

High Speed Rail (West Midlands - Crewe)

Supplementary Environmental Statement 2 and
Additional Provision 2 Environmental Statement

Volume 5: Technical appendices

CA1: Fradley to Colton

Water resources assessment (WR-002-001)

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CA1: Fradley to Colton
Water resources assessment (WR-002-001)



Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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1 Introduction

1.1 Structure of this appendix

- 1.1.1 This document is an appendix to the water resources assessment which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES) for the Fradley to Colton community area (CA1).
- 1.1.2 This appendix provides details of changes to the water resources assessment since the production of the High Speed Two (HS2) Phase 2a (West Midlands - Crewe) Environmental Statement (ES)¹ published in July 2017 (the main ES), as well as the Supplementary Environmental Statement (SES1) and Additional Provision Environmental Statement (AP1 ES) published in March 2018².
- 1.1.3 This report should be read in conjunction with Volume 5, Appendix WR-002-001 of the main ES.
- 1.1.4 In order to differentiate between the proposals originally described in the main ES and subsequent changes, the following terms are used:
- ‘the original scheme’ – the Bill scheme submitted to Parliament in July 2017, which was assessed in the main ES;
 - ‘the SES1 scheme’ – the original scheme with the changes described in the SES1 that are within the existing powers of the Bill, submitted to Parliament in March 2018;
 - ‘the AP1 revised scheme’ – the SES1 scheme as amended by the AP1 amendments submitted to Parliament in March 2018;
 - ‘the SES2 scheme’ – the SES1 scheme with the changes described in the SES2 that are within the existing powers of the Bill; and
 - ‘the AP2 revised scheme’ – the SES2 scheme as amended by the AP2 amendments.

1.2 Purpose of this appendix

- 1.2.1 An assessment on the impact of the original scheme on water resources was undertaken as part of the water resources and flood risk chapter of the main ES (Volume 2: Fradley to Colton Community area report and Volume 5: Appendix WR-002-001) referred to hereafter as ‘the original water resources assessment’.
- 1.2.2 The purpose of this document is to report any changes or updates to environmental information and scheme design or assumptions that have occurred since the main ES,

¹ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

² HS2 Ltd (2018), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Supplementary Environmental Statement and Additional Provision Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-supplementary-environmental-statement-and-additional-provision-environmental-statement>

which will result in a change in effects and/or the introduction of new effects on water resources receptors.

- 1.2.3 The route-wide Water Framework Directive (WFD) compliance assessment (see Volume 5: Appendix WR-001-000 of the main ES) has also been updated to take account of the SES2 changes and AP2 amendments. This is presented in Volume 5, SES2 and AP2 ES Appendix WR-001-000.

1.3 Assessment methodology

- 1.3.1 The scope, assumptions and limitations for the water resources assessment are set out in the main ES Environmental Impact Assessment Scope and Methodology Report (SMR)³, the SMR Addendum⁴, and SMR Addendum 2 (see SES2 and AP2 ES Volume 5: Appendix CT-001-000). The study area was extended to include all areas potentially affected by temporary groundwater draw-down during excavation and backfilling of the borrow pits.

³ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Impact Assessment Scope and Methodology Report, Main ES, Volume 5: Appendix CT-001-001*,

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627187/E23_EIA_SMR_CT-001-001_WEB.pdf

⁴ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Impact Assessment Scope and Methodology Report Addendum, Main ES, Volume 5: Appendix CT-001-002*,

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf

and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627189/E24-B_CT-001-002_Part_B_WEB.pdf

2 Part 1: Supplementary Environmental Statement 2

2.1 New environmental baseline information relevant to water resources

2.1.1 No new environmental baseline data of relevance to this assessment has been identified since the main ES was submitted.

2.2 Changes to design or construction assumptions which do not require changes to the Bill relevant to water resources

2.2.1 Since submission of the Bill, additional information relating to the likely ground conditions in the vicinity of all of the borrow pits in the Fradley to Colton area has become available. For three of these borrow pits, this indicated that useful aggregates may be present to a maximum depth greater than originally estimated. The new information for the fourth borrow pit (at Blithbury, located to the north of the River Trent viaduct) confirmed that the previous assessment of the maximum depth of aggregates potentially available here was appropriate.

2.2.2 There has, in addition, been a change to the assumption about the depth of topsoil and subsoil at all four borrow pits within the Fradley to Colton area. The depth of topsoil and subsoil was assumed in the main ES to be an average of 0.8m. It is now assumed that topsoil and subsoil will be excavated and restored to an average depth of 1.2m to allow a full agricultural soil profile to be restored.

2.2.3 Since the production of the SES1 and AP1 ES, more detailed hydrogeological models have been developed of the areas around each borrow pit. These models have been used to inform the scope of a ground investigation. They provide an improved, but very precautionary estimate of the areas where groundwater levels could potentially be affected by the AP2 revised scheme. They assume that the borrow pits are excavated, one at a time, to their maximum depth over their full areas and are fully dewatered.

2.2.4 For the following borrow pits a maximum depth of 18m has been assumed:

- Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch;
- Kings Bromley North, located adjacent to the realigned A515 Lichfield Road; and
- Kings Bromley North, located adjacent to the realigned Shaw Lane.

2.2.5 For the borrow pit at Blithbury, located to the north of the River Trent viaduct, a maximum depth of 15m has been assumed.

2.2.6 Initial outputs from a preliminary ground investigation indicates that suitable aggregate may not actually be present to these maximum depths. This further reinforces the conservative and precautionary nature of the assessment of temporary dewatering impacts and effects.

- 2.2.7 The general approach to excavation and the restoration proposals are set out in the Borrow pits restoration strategy⁵ in the main ES. Ground permeability in the areas around the borrow pits is based on British Geological Survey (BGS) geological mapping data. Conservatively high permeability values have been selected with the aim of ensuring that the maximum potential extent of the impacts is identified.
- 2.2.8 Figures 1 – 4 present the maximum predicted extent of groundwater lowering at each of the borrow pits.

⁵ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Statement, Borrow pits restoration strategy, Volume 5: Appendix CT-009-000*, <https://www.gov.uk/government/publications/hs2-phase-2a-environmental-statement-volume-5-borrow-pits-restoration-strategy>

Figure 1: Borrow pit (Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch) drawdown extent from numerical modelling

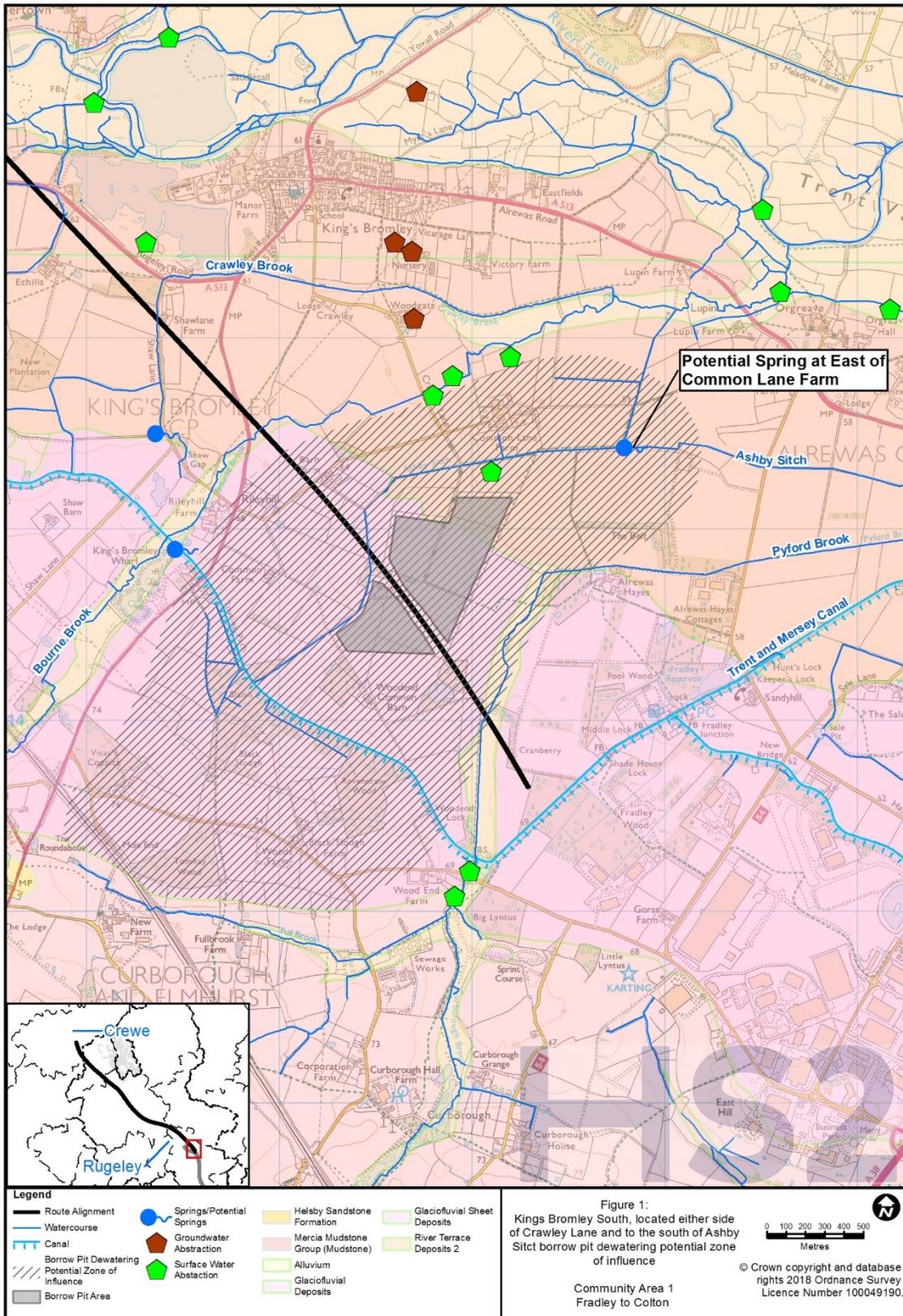


Figure 2: Borrow pit (Kings Bromley North, located adjacent to the realigned A515 Lichfield Road) drawdown extent from numerical modelling

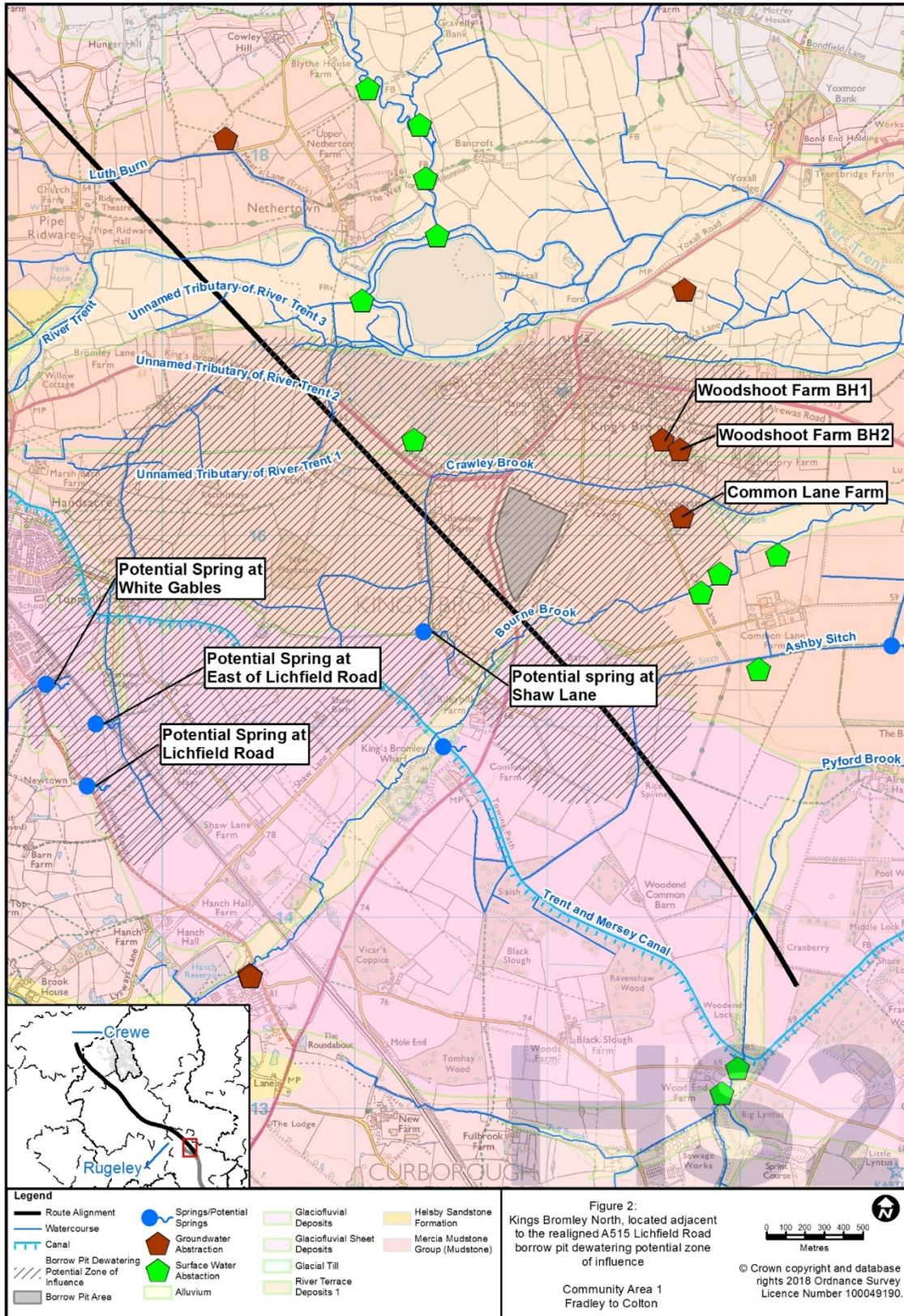


Figure 3: Borrow pit (Kings Bromley North, located adjacent to the realigned Shaw Lane) drawdown extent from numerical modelling

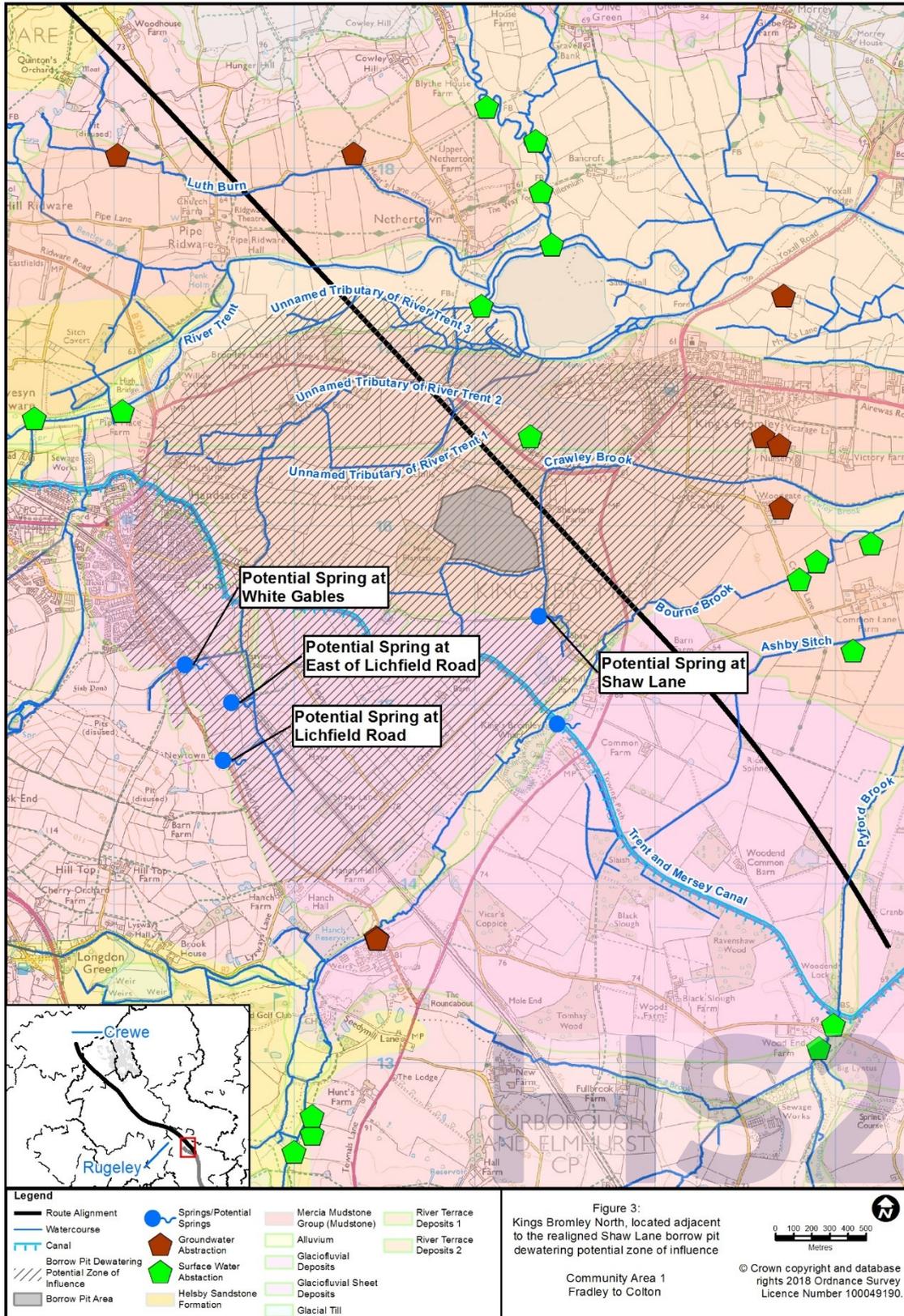
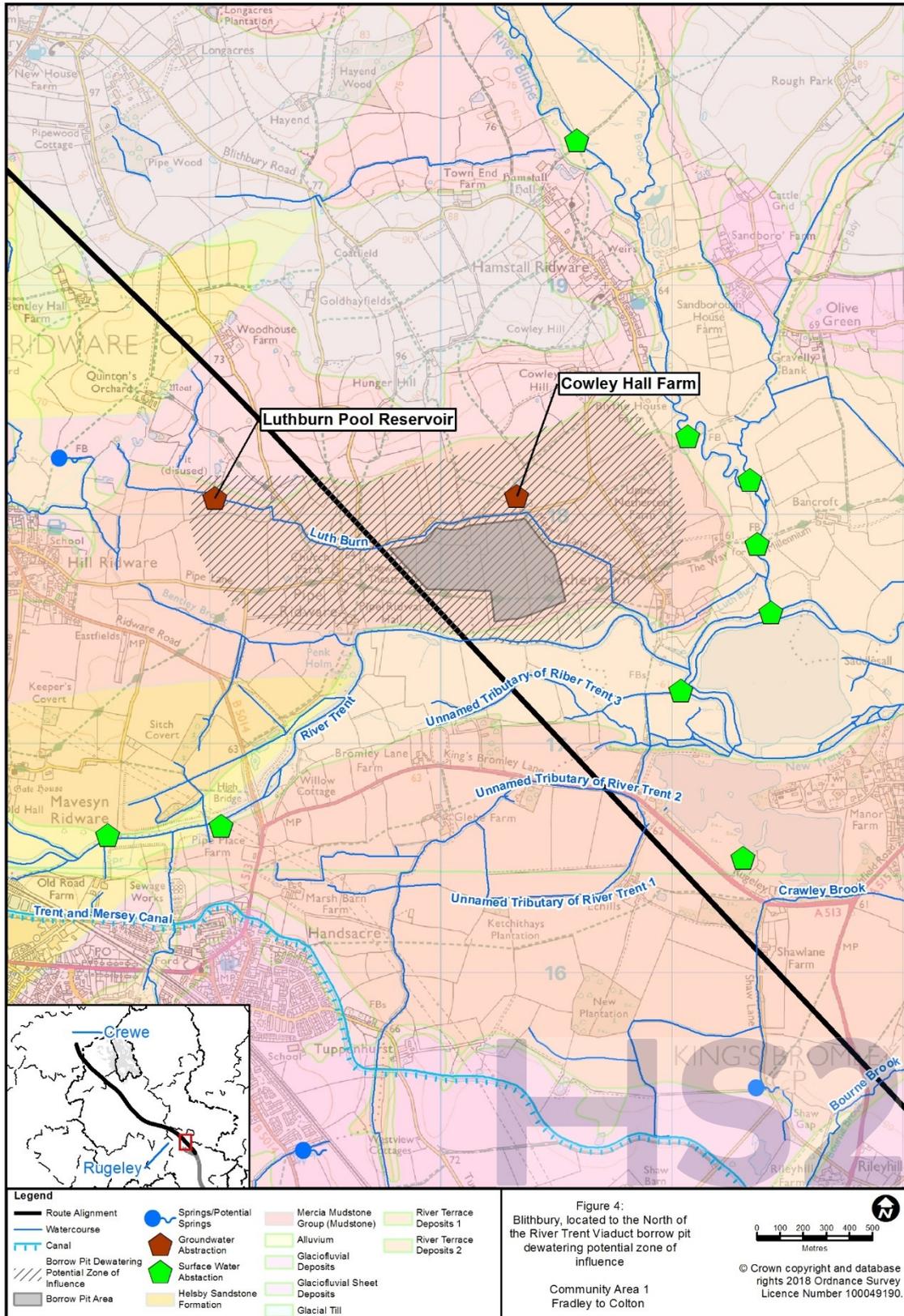


Figure 4: Borrow pit (Blithbury, located to the north of the River Trent viaduct) drawdown extent from numerical modelling



2.3 Environmental baseline

- 2.3.1 The existing and future baseline is described in the water resources and flood risk chapter of the main ES (Volume 2: Community area 1 report, Fradley to Colton) and the original water resources assessment, as updated in SES1. These baselines will remain unchanged.
- 2.3.2 Table 1 shows all the water resources receptors that have potential to be affected by temporary dewatering of the borrow pits. The majority of these were identified and impacts assessed in the main ES. However, the refined hydrogeological model outputs indicate that there is a potential for additional receptors to be affected and the likely worst-case impacts are now better understood. The new receptors are indicated in bold in Table 1.

Table 1: Water resources receptors potentially affected by dewatering of the borrow pits

Receptor	Receptor type	Receptor value	Borrow pit potentially affecting the receptor
Watercourses			
River Trent	Surface watercourse	Very high	Blithbury, located to the north of the River Trent viaduct
Bourne Brook	Surface watercourse	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Crawley Brook	Surface watercourse	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Unnamed tributary of the River Trent 1	Surface watercourse	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Unnamed tributary of the River Trent 2	Surface watercourse	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Unnamed tributary of the River Trent 3	Surface watercourse	Low	Kings Bromley North, located adjacent to the realigned Shaw Lane
Ashby Sitch	Surface watercourse	Low	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Luth Burn	Surface watercourse	Low	Blithbury, located to the north of the River Trent viaduct
Pyford Brook	Surface watercourse	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch

SES2 and AP2 ES Appendix WR-002-001

Receptor	Receptor type	Receptor value	Borrow pit potentially affecting the receptor
Canals			
Trent and Mersey Canal	Canal	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Aquifers			
River Terrace Deposits	Secondary A aquifer	Moderate	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Alluvium	Secondary A aquifer	Moderate	Blithbury, located to the north of the River Trent viaduct
Licensed abstractions ⁶			
Common Lane Farm	Licensed abstraction from U24T Minor Aquifer - Upper Trent Area (assumed River Terrace Deposits)	High	Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Woodshoot Farm	Licensed abstraction from U24T Minor Aquifer - Upper Trent Area (assumed River Terrace Deposits)	High	Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Cowley Hall Farm	Licensed abstraction from U24T Minor Aquifer - Upper Trent Area (assumed River Terrace Deposits)	High	Blithbury, located to the north of the River Trent viaduct
Luthburn Pool Reservoir	Licensed abstraction from a groundwater fed pond	High	Blithbury, located to the north of the River Trent viaduct

⁶ These are all groundwater abstractions. There are also a number of licensed surface water abstractions from watercourses in the area. It is assumed that provided impacts on baseflows in the watercourses are mitigated, there will be no impacts on these surface water abstractions.

SES2 and AP2 ES Appendix WR-002-001

Receptor	Receptor type	Receptor value	Borrow pit potentially affecting the receptor
Springs or potential spring features			
Potential spring at Shaw Lane	Potential spring feature	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Potential spring at White Gables	Potential spring feature	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Potential spring east of Lichfield Road	Potential spring feature	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Potential spring at Lichfield Road	Potential spring feature	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road
Potential spring east of Common Lane Farm	Potential spring feature	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch

2.4 Assessment of impacts and effects

2.4.1 The updated assessment of the impacts, effects and mitigation proposals are set out in Annex A.

Avoidance and mitigation

2.4.2 The avoidance and mitigation measures specifically associated with the CA1 borrow pits are set out in the Volume 2 Community area 1 report, Fradley to Colton and the borrow pit restoration strategy, in Volume 5: CT-009-000 of the main ES. These documents clarify that mitigation measures will be designed in detail following ground investigation and monitoring of surface water and groundwater levels.

Temporary effects

Watercourses

2.4.3 Dewatering of the excavations may reverse the hydraulic gradient between the aquifer and surface water features.

2.4.4 With a 50m buffer, and the implementation of the measures in the draft CoCP and borrow pit restoration strategy, a minor impact to the River Trent and Bourne Brook were reported in the main ES. These resulted in moderate adverse effects related to the River Trent and Bourne Brook. No significant effects related to Pyford Brook, Crawley Brook or the unnamed tributaries of the River Trent (1 and 2) were reported in the main ES.

2.4.5 The impacts on all local watercourses have been reassessed using the outputs from the hydrogeological model and would result in the following new or different effects:

- the potential impacts on the River Trent, which is a very high value receptor, would result in a major temporary adverse effect, which is significant. This is different to the main ES, which reported a moderate adverse, but still significant, temporary effect;
- the potential impacts on Pyford Brook and Bourne Brook, which are high value receptors, would result in major temporary adverse effects, which are significant. The main ES reported a moderate adverse, but still significant, temporary effect related to Bourne Brook. With respect to Pyford Brook, this is a new significant effect;
- the potential impacts on Crawley Brook, which is a moderate value receptor, would result in a moderate temporary adverse effect, which is significant. This is different to the main ES, which reported a minor adverse temporary effect, which is not significant;
- the potential impacts on the unnamed tributary of the River Trent 1 and the unnamed tributary of the River Trent 2, which are all moderate value receptors, would result in a moderate temporary adverse effect, which is new and significant; and
- the potential impacts on Ashby Sitch, Luth Burn and the unnamed tributary of the River Trent 3, which are all low value receptors, would result in minor temporary adverse effects, which are not significant. The main ES reported

minor adverse effects, which are not significant, related to Ashby Sitch and Luth Burn. No effects were reported in relation to the unnamed tributary of the River Trent 3 in the main ES.

Trent and Mersey Canal

- 2.4.6 The main ES did not identify the potential for impacts on the Trent and Mersey Canal. The revised analysis indicates that groundwater levels beneath the Trent and Mersey Canal, which is a high value receptor, could be lowered by several metres. This has potential implications for the structural integrity and operation of the canal which have been assessed.
- 2.4.7 An assessment of implications for the structural integrity of the canal has concluded that the likelihood of the temporary reduction in groundwater levels causing ground subsidence is negligible.
- 2.4.8 The Trent and Mersey Canal was designed by James Brindley, popularly credited with inventing puddle clay as a technique to line canals. Available evidence suggests that the canal has a puddle clay liner⁷. However, until this has been confirmed in consultation with the Canal and River Trust (CRT), it has been conservatively assumed that sections of the canal may be unlined. In the absence of mitigation, if the canal is not lined, the borrow pit dewatering could cause a loss of water from the canal through its bed and banks, which could affect its operation. This would comprise a new temporary moderate adverse impact on a high value receptor, which would be significant.

Licensed abstractions

- 2.4.9 Impacts on Common Lane Farm, Woodshoot Farm and Cowley Hall Farm licensed abstractions were described in the main ES and do not give rise to significant effects. The modelling has shown that dewatering the borrow pits also has the potential to result in a reduction of groundwater flow to the abstraction at Luthburn Pool Reservoir. This abstraction is registered for spray irrigation and has a licence for abstracting up to 1,000m³/d.
- 2.4.10 The measures included in the draft CoCP require that the risk of impacts occurring on private water supplies are assessed and, if necessary, alternative water supplies provided. Following ground investigation and further development of the hydrogeological models, if it is still considered that there is potential for adverse impacts to occur, this will be discussed with the landowners concerned with a view to a permanent new supply being provided. Any impacts associated with this supply will therefore be mitigated by the provisions made within the original scheme.

Potential spring features

- 2.4.11 Dewatering of the excavations could also reduce the flow to the potential spring features at Shaw Lane, White Gables, Lichfield Road, east of Lichfield Road and east of Common Lane Farm which are assumed to be high value receptors. This would result in a moderate impact on the potential spring at Shaw Lane, and minor impacts

⁷ Available online at: <https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do/trent-and-mersey-canal>

on the remaining four potential springs, which would result in five new moderate temporary adverse effects which are significant.

Permanent effects

- 2.4.12 The borrow pits will be restored to current ground levels and land use. As it is assumed that the area of permeable sand and gravel will be replaced with material of lower permeability, the restoration plans will include land drainage measures to ensure no groundwater flooding up gradient of the infilled sites and allowing continued water discharge to the surface water features.
- 2.4.13 As set out in the borrow pits restoration strategy in Volume 5: CT-009-000 of the main ES, the details of the drainage design will be agreed following ground investigation and monitoring of the hydraulic gradient across the borrow pit areas, and hydrometric monitoring of the appropriate surface water features. The resulting permanent effect of the original scheme on the surface water features and the groundwater abstractions due to the borrow pit areas will be negligible.

Additional mitigation measures

General

- 2.4.14 The assessment indicates that, if the borrow pits are excavated, one at a time, to their full extents and depths and fully dewatered immediately prior to backfilling, this has potential to result in a range of major and moderate adverse effects related to nearby high and very high value water receptors. Possible measures identified in the main ES to mitigate such effects include:
- a wider buffer strip, or shallower batter on the excavations;
 - installation of groundwater cut-off structures;
 - creation of a temporary section of lined channel on the Bourne Brook;
 - adoption of wet working techniques that avoid the need for dewatering; and
 - recirculation of treated water to the River Trent and Bourne Brook at an appropriate rate and location.
- 2.4.15 The ground investigations now in progress will provide more detailed information on the permeability of the ground in the areas adjacent to the borrow pits. This will in turn allow the hydrogeological models to be updated and used to inform the design of a mitigation strategy.
- 2.4.16 It is likely that each borrow pit will need to be excavated and backfilled in stages to manage impacts, with close monitoring of groundwater levels at sensitive locations. The types of additional mitigation that may be required to address the new or different significant effects identified in this assessment are outlined below.

Watercourses

- 2.4.17 Where dewatering operations risk impacting on baseflows in sensitive watercourses, flow augmentation will be considered. The AP2 amendments include provision of temporary pipelines from the borrow pits to the key nearby watercourses potentially affected by dewatering. These include:

- Additional land required for new pipework from the Kings Bromley South borrow pit for groundwater recharge to Pyford Brook, Trent and Mersey Canal and Bourne Brook (AP2-001-003);
- Additional land required for new pipework from the Kings Bromley North (Shaw Lane) borrow pit for groundwater recharge to Bourne Brook and the Trent and Mersey Canal (AP2-001-008); and
- Additional land required for new pipework from the Blithbury borrow pit for groundwater recharge to Luth Burn and River Trent (AP2-001-009).

2.4.18 If required, these will allow recirculation of treated water from the borrow pits to augment flows in the watercourses, should this prove to be necessary. Any such treatment would likely comprise removal of suspended solids stirred-up during excavation of the sands and gravels.

Trent and Mersey Canal

2.4.19 The specific issues of relevance to the Trent and Mersey Canal are being discussed with the Canal and River Trust (CRT). Walkover surveys of the canal indicate that it is at least partially artificially raised above surrounding ground level. At one point, it passes over the top of both Ashby Sitch, a minor watercourse, and Pyford Brook, which is a Main river. This indicates that the canal has an impermeable liner at these locations. The canal was designed by James Brindley, popularly credited with inventing puddle clay as a technique to line canals and was generally constructed with a one metre thick layer of puddle clay⁸. If this liner remains in place, the canal will be unaffected by borrow pit dewatering. However, until it has been verified that lowering groundwater levels near the canal will not adversely affect its operation, the most effective means of mitigating these impacts will be to:

- design the dewatering operation to avoid impacting on groundwater levels beneath the canal (using the relevant techniques outlined above); or
- recirculation of treated water to the canal at an appropriate rate and location.

2.4.20 Any such mitigation will be developed in consultation with the CRT.

Potential spring features

2.4.21 A survey of the potential spring features will be undertaken to determine their value. If an inspection confirms that these springs are of high value, then a means of temporarily augmenting flows from these springs would be developed in consultation with the affected landowner and the Environment Agency.

Cumulative effects

2.4.22 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the SES2 changes acting in combination with any AP2 amendments, the AP1 amendments or any relevant committed development.

⁸ Available on line at: <https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do/trent-and-mersey-canal>

Summary of likely residual significant effects

- 2.4.23 It is currently anticipated that it will be possible to develop the mitigation of these impacts to ensure that there are no residual significant effects arising from the construction and restoration of the borrow pits.

Effects arising during operation

- 2.4.24 No new or different operational effects are foreseen from those presented in the main ES, SES1 and AP1 ES.

3 Part 2: Additional Provisions 2 Environmental Statement

3.1 Summary of amendments to scheme design and construction assumptions relevant to water resources

3.1.1 There are four AP2 amendments that will involve construction activities of a nature and scale that have potential implications for the wider water environment:

- Additional land and a change to Bill powers required to divert Common Lane to the A515 Lichfield Road (AP2-001 – 006);
- Additional land and a change to Bill powers required for a grid supply point connection to National Grid Parkgate substation (AP2-001-015);
- Additional land required for the amendment to a National Grid Electricity Transmission 400kV overhead power line and a new utility compound, near Kings Bromley viaduct (AP2-001-007;) and
- Additional land required for the diversion of a National Grid Gas Transmission gas pipeline and a new utility compound, north of Pipe Ridware (AP2-001-010.)

3.1.2 These construction activities could result in temporary impacts on surface water quality, due to site runoff and increased pollution risk, affecting existing abstractions and the water environment more generally.

3.1.3 These AP2 amendments will be constructed in accordance with the measures outlined in the draft CoCP, which includes a range of measures to safeguard water resources. Implementation of the measures within the draft CoCP will ensure that these construction works will not give rise to any new or different significant effects and will not change the level of significance of the effects reported in the main ES, SES1 and AP1 ES.

3.1.4 The AP2 amendments also include provision of pipelines to allow flow augmentation at the upstream extent of key watercourses potentially affected by borrow pit dewatering. The temporary presence of this infrastructure would result in no new or different effects related to water resources and flood risk. The detailed design of these pipelines, the flow augmentations rates and volumes and the means of discharging the water to the watercourses concerned will all be dependent on the detailed design of the borrow pit dewatering mitigation strategy discussed in Section 2 of this report.

4 References

HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe) Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>.

HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands – Crewe), Scope and Methodology Report, Volume 5, Appendix CT-001-001*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627187/E23_EIA_SMR_CT-001-001_WEB.pdf.

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HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Draft Code of Construction Practice, Volume 5, Appendix CT-003-000*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627182/E26_CT-003-000_WEB.pdf.

Annex A: Revised detailed impact assessment table

Table 2: Revised detailed impact assessment table

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
River Trent	Very high	Blithbury, located to the north of the River Trent viaduct	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Major Significance of effect – Major adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Major Significance of effect – Major adverse, Significant	Excavate and backfill borrow pits in stages. Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Moderate adverse, Significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Bourne Brook	High	Kings Bromley North, located adjacent to the realigned	Hydraulic gradients may be reversed locally, resulting in reduced	Magnitude of impact – Major Significance of effect – Major adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Major Significance of effect – Major	Excavate and backfill borrow pits in stages. Flow augmentation allowing	Magnitude of impact – Negligible Significance of effect –	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		A515 Lichfield Road	baseflow in this watercourse.			adverse, Significant	recirculation of treated water from the borrow pit to augment flow.	Negligible, not significant	
		Kings Bromley North, located adjacent to the realigned Shaw Lane	Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Moderate adverse, Significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
		Kings Bromley North, located adjacent to the realigned A515 Lichfield Road							
Pyford Brook	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Major Significance of effect – Major adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Major Significance of effect – Major adverse, Significant	Excavate and backfill borrow pits in stages. Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Moderate adverse, Significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Crawley Brook	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Major Significance of effect – Moderate adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Major Significance of effect – Moderate adverse, Significant	Excavate and backfill borrow pits in stages. Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
		Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if	Magnitude of impact – Minor Significance of effect – Minor adverse, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			the borrow pits are restored using less permeable material.						
Unnamed tributary of the River Trent 1	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane;	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Moderate Significance of effect – Moderate adverse	Excavate and backfill borrow pits in stages. Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
		Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Minor adverse, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Unnamed tributary of the River Trent 2	Moderate	Kings Bromley North, located adjacent to the realigned Shaw Lane	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Excavate and backfill borrow pits in stages. Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
		Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Minor adverse, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Unnamed tributary of the River Trent 3	Low	Kings Bromley North, located adjacent to	Hydraulic gradients may be reversed locally, resulting in reduced	Magnitude of impact – Moderate Significance of effect – Minor	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Moderate Significance of effect – Minor	Excavate and backfill borrow pits in stages.	Magnitude of impact – Negligible Significance of effect –	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		the realigned Shaw Lane	baseflow in this watercourse.	adverse, not significant		adverse, not significant		Negligible, not significant	
			Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Ashby Sitch	Low	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Major Significance of effect – Minor adverse, not significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Major Significance of effect – Minor adverse, not significant	Excavate and backfill borrow pits in stages.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
		Kings Bromley North, located adjacent to the realigned	Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits	Magnitude of impact – Minor Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		A515 Lichfield Road	are restored using less permeable material.						
Luth Burn	Low	Blithbury, located to the north of the River Trent viaduct	Hydraulic gradients may be reversed locally, resulting in reduced baseflow in this watercourse.	Magnitude of impact – Moderate Significance of effect – Minor adverse, not significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Moderate Significance of effect – Minor adverse, not significant	Excavate and backfill borrow pits in stages.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Increased rates and volumes of runoff from the borrow pit areas could affect flows in this watercourse, if the borrow pits are restored using less permeable material.	Magnitude of impact – Minor Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Trent and Mersey Canal	High	Kings Bromley South, located either side of Crawley Lane and to the	Hydraulic gradients may be reversed locally, resulting in increased	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Minimum buffer strip of 50m between the watercourse and the borrow pit.	Magnitude of impact – Moderate Significance of effect – Moderate	Excavate and backfill borrow pits in stages. Use of groundwater cut-offs.	Magnitude of impact – Negligible Significance of effect –	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		<p>south of Ashby Sitch</p> <p>Kings Bromley North, located adjacent to the realigned Shaw Lane</p> <p>Kings Bromley North, located adjacent to the realigned A515 Lichfield Road</p>	leakage from the canal.			adverse, Significant	Flow augmentation allowing recirculation of treated water from the borrow pit to augment flow.	Negligible, not significant	
River Terrace deposits	Moderate	<p>Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch</p>	Temporary works have the potential to affect localised groundwater quality and flow.	<p>Magnitude of impact - Minor</p> <p>Significance of effect - Minor adverse, not significant</p>	Implementation of measures described in the draft CoCP.	<p>Magnitude of impact – Negligible</p> <p>Significance of effect – Negligible, not significant</p>	None required	<p>Magnitude of impact – Negligible</p> <p>Significance of effect – Negligible, not significant</p>	Construction (temporary)
		<p>Kings Bromley North, located adjacent to</p>	Reduction in groundwater recharge, if borrow pits are restored using lower	<p>Magnitude of impact – Minor</p> <p>Significance of effect – Minor</p>	Implementation of the borrow pits restoration strategy.	<p>Magnitude of impact – Negligible</p> <p>Significance of effect –</p>	None	<p>Magnitude of impact – Negligible</p> <p>Significance of effect –</p>	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	permeability material.	adverse, not significant		Negligible, not significant		Negligible, not significant	
Alluvium	Moderate	Blithbury, located to the north of the River Trent viaduct	Temporary works have the potential to affect localised groundwater quality and flow.	Magnitude of impact - Minor Significance of effect - Minor adverse, not significant	Implementation of measures described in the draft CoCP.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None required	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge.	Magnitude of impact – Minor Significance of effect – Minor adverse, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Common Lane Farm abstraction	High	Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Excavation and dewatering of the borrow pit has the potential to temporarily affect groundwater quality and flow to the abstraction.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Implementation of measures described in the draft CoCP. This will include risk assessment and if necessary provision of an alternative water supply.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the abstraction.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Woodshoott Farm abstraction	High	Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Excavation and dewatering of the borrow pit has the potential to temporarily affect groundwater quality and flow to the abstraction.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Implementation of measures described in the draft CoCP. This will include risk assessment and if necessary provision of an alternative water supply.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the abstraction.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Cowley Hall Farm abstraction	High	Blithbury, located to the north of the River Trent viaduct	Excavation and dewatering of the borrow pit has the potential to temporarily affect groundwater quality and flow to the abstraction.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Implementation of measures described in the draft CoCP. This will include risk assessment and if necessary provision of an alternative water supply.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the abstraction.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Luthburn Pool Reservoir abstraction	High	Blithbury, located to the north of the River Trent viaduct	Excavation and dewatering of the borrow pit has the potential to temporarily affect groundwater quality and flow to the abstraction.	Magnitude of impact – Moderate Significance of effect – Moderate adverse, Significant	Implementation of measures described in the draft CoCP. This will include risk assessment and if necessary provision of an alternative water supply.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the abstraction.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Potential spring at Shaw Lane	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned	Groundwater flow to the receptor may be reduced due to dewatering.	Magnitude of impact - Moderate Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature.	Magnitude of impact - Moderate Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature. If this spring is confirmed to be of high value, the extent of the drawdown impacts will need to be controlled to avoid impacting	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		A515 Lichfield Road					on flows from the spring. Alternatively, flows could be temporarily augmented from a new temporary groundwater abstraction with the agreement of the landowner.		
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the potential spring.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Potential spring at White Gables	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North,	Groundwater flow to the receptor may be reduced due to dewatering.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature. If this spring is confirmed to be of high value, the extent of the drawdown impacts will	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		located adjacent to the realigned A515 Lichfield Road					need to be controlled to avoid impacting on flows from the spring. Alternatively, flows could be temporarily augmented from a new temporary groundwater abstraction with the agreement of the landowner		
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the potential spring.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (permanent)
Potential spring at Lichfield Road	High	Kings Bromley North, located adjacent to the realigned Shaw Lane	Groundwater flow to the receptor may be reduced due to dewatering.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature.	Magnitude of impact - Minor Significance of effect – Moderate	Survey to be undertaken to determine the value of the feature. If this spring is confirmed to be of high value,	Magnitude of impact – Negligible Significance of effect –	Construction (temporary)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
		Kings Bromley North, located adjacent to the realigned A515 Lichfield Road				adverse, Significant	the extent of the drawdown impacts will need to be controlled to avoid impacting on flows from the spring. Alternatively, flows could be temporarily augmented from a new temporary groundwater abstraction with the agreement of the landowner.	Negligible, not significant	
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the potential spring.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	None	Magnitude of impact – negligible Significance of effect – negligible, not significant	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
Potential spring east of Lichfield Road	High	Kings Bromley North, located adjacent to the realigned Shaw Lane Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Groundwater flow to the receptor may be reduced due to dewatering.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature. If this spring is confirmed to be of high value, the extent of the drawdown impacts will need to be controlled to avoid impacting on flows from the spring. Alternatively, flows could be temporarily augmented from a new temporary groundwater abstraction with the agreement of the landowner.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge over borrow pit area resulting in reduced groundwater flow to the	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Implementation of the borrow pits restoration strategy.	Magnitude of impact – Negligible Significance of effect –	None	Magnitude of impact – negligible Significance of effect –	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			potential spring.			Negligible, not significant		negligible, not significant	
Potential spring east of Common Lane Farm	High	Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch	Groundwater flow to the receptor may be reduced due to dewatering.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature.	Magnitude of impact - Minor Significance of effect – Moderate adverse, Significant	Survey to be undertaken to determine the value of the feature. If this spring is confirmed to be of high value, the extent of the drawdown impacts will need to be controlled to avoid impacting on flows from the spring. Alternatively, flows could be temporarily augmented from a new temporary groundwater abstraction with the agreement of the landowner.	Magnitude of impact – Negligible Significance of effect – Negligible, not significant	Construction (temporary)
			Reduction in recharge over borrow pit area resulting in	Magnitude of impact – Negligible	Implementation of the borrow pits	Magnitude of impact – Negligible	None	Magnitude of impact – negligible	Construction (permanent)

Water feature/ receptor	Receptor value	Borrow pit	Discussion of potential impact to water receptor	Magnitude of potential impact and effect	Avoidance and mitigation measures included in design	Magnitude of remaining impact and effect	Other mitigation measures	Residual effects	Duration of effect
			reduced groundwater flow to the potential spring.	Significance of effect – Negligible, not significant	restoration strategy.	Significance of effect – Negligible, not significant		Significance of effect – negligible, not significant	

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