HS2

Phase 2a – Borrow Pits

May 2018

P125 (1)

HOC/10010/0002

Need for High Quality Aggregate

There is a shortfall in high quality aggregate (sand and gravel) required for construction of the Proposed Scheme.

Options considered to address the shortfall:

- Importation of aggregate from commercial quarries;
- Use of clay extracted during construction of the railway;
- Stabilisation of extracted clay with cement or lime;
- Extraction of aggregate from borrow pits located close to the railway.

Why Borrow Pits?

- Will provide the high quality aggregates needed for the construction of the railway.
- Allows extracted aggregate to be transported to construction locations largely via site haul routes within the construction boundary of the Proposed Scheme.
- Allows backfilling with excavated materials from the construction of the Proposed Scheme largely via site haul routes within the construction boundary of the Proposed Scheme.
- Generates significantly lower levels of HGV movements on local roads than importation of aggregate from commercial quarries.
- Reduces risk of delay to construction due to need to stabilise inferior quality aggregate.
- Reduces cost risks arising from double handling, importation from commercial quarries and land fill disposal.

Borrow Pits – Planning and Location

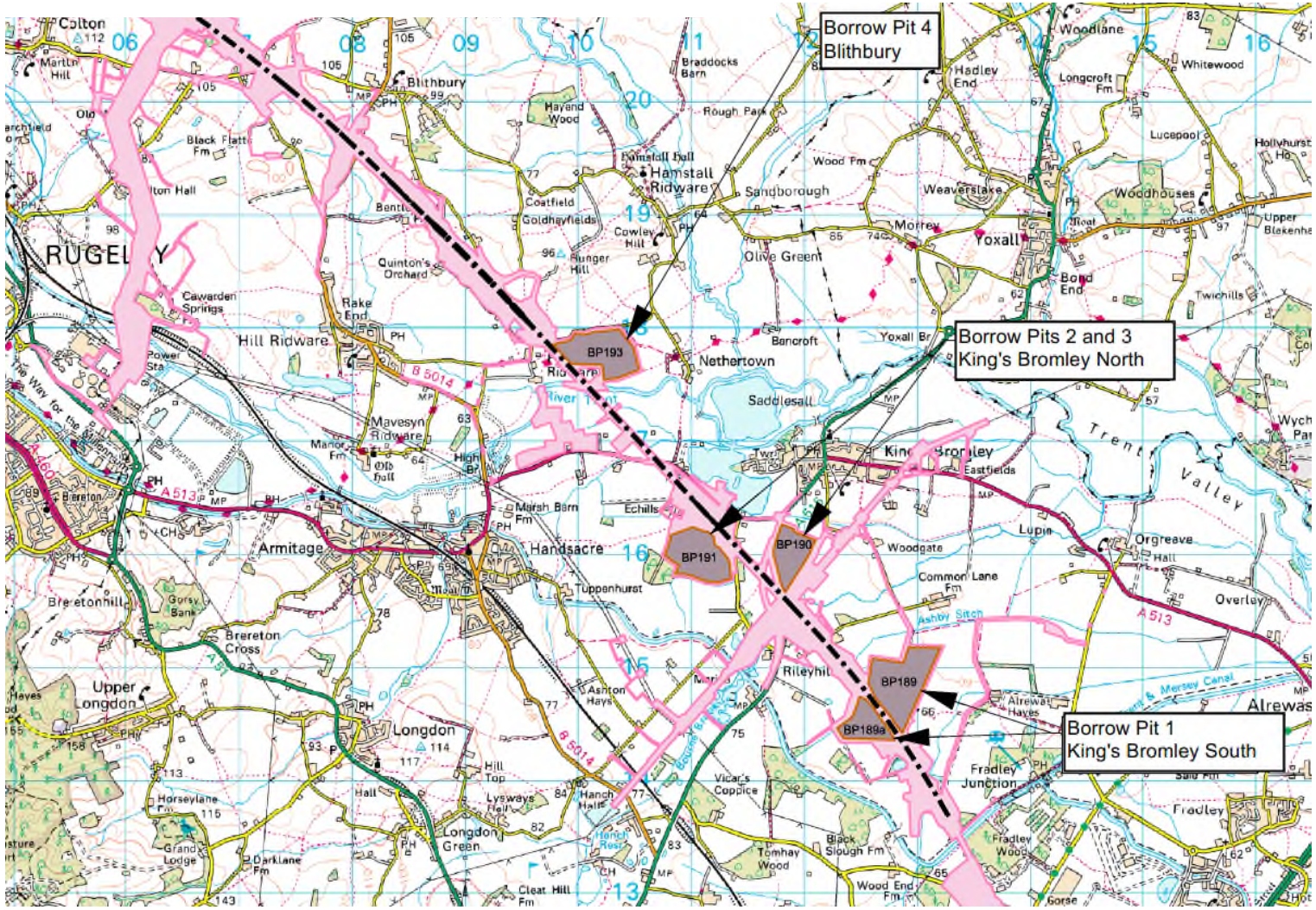
- Each borrow pit is located on land that falls within an area of search that has been identified by the Mineral Planning Authority for future potential mineral extraction.
- Each borrow pit is expected to yield the required quality and quantity of aggregate on the basis of its known geological characteristics.
- Each borrow pit is suitably located to allow for the movement of extracted and imported materials via site haul routes.

Borrow Pits - Locations

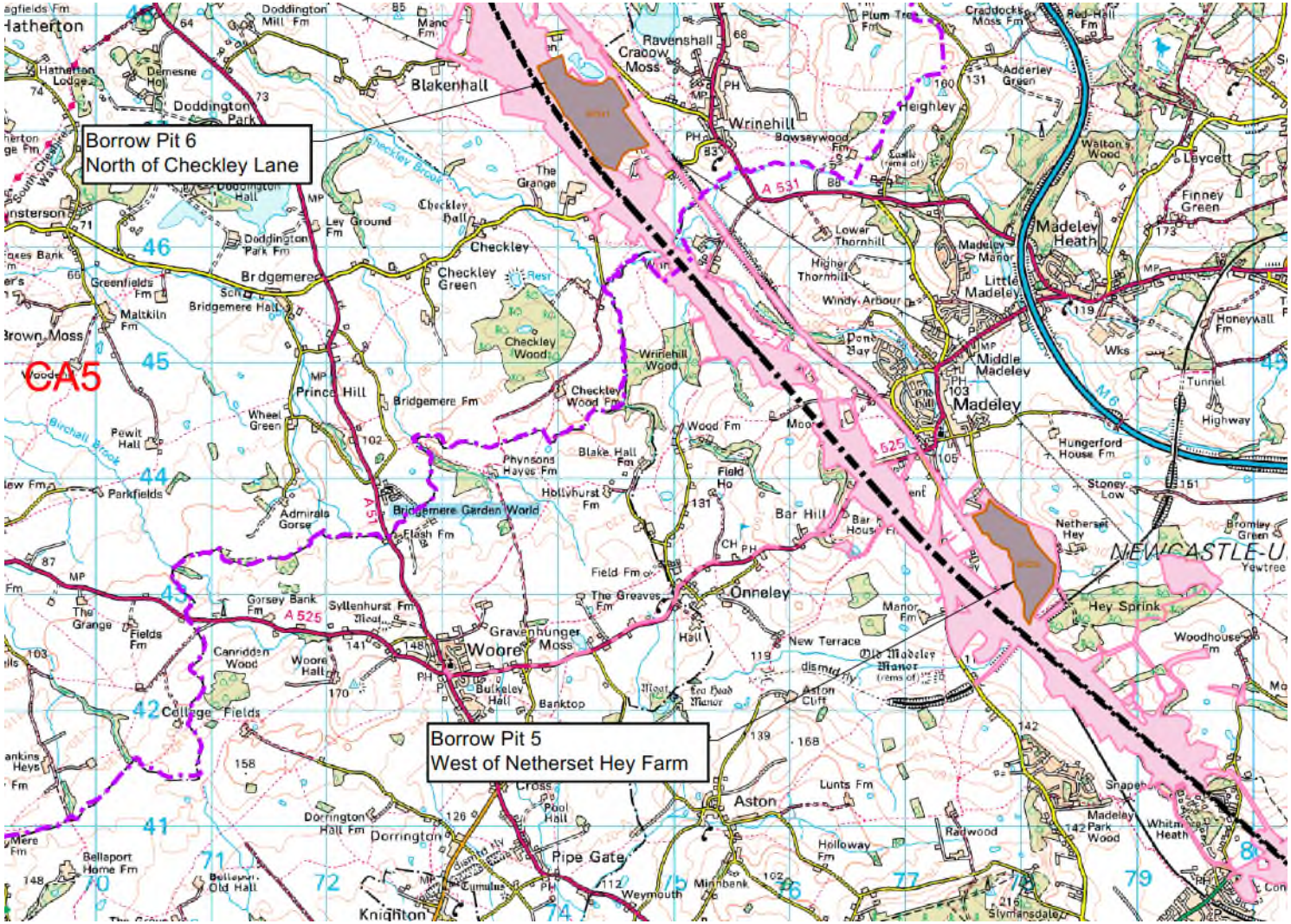
The Proposed Scheme includes six borrow pits in the following locations:

Borrow pit Location	Community Area (CA)
Kings Bromley South, located either side of Crawley Lane and to the south of Ashby Sitch, both sides of the Proposed Scheme	Fradley to Colton (CA1)
Kings Bromley North, located adjacent to the realigned A515 Lichfield Road	Fradley to Colton (CA1)
Kings Bromley North, located adjacent to the realigned Shaw Lane	Fradley to Colton (CA1)
Blithbury, located to the north of the River Trent viaduct	Fradley to Colton (CA1)
West of Netherset Hey Farm	Whitmore Heath to Madeley (CA4)
North of Checkley Lane	South Cheshire (CA5)

Borrow Pits 1-4 Location



Borrow Pits 5-6 Location

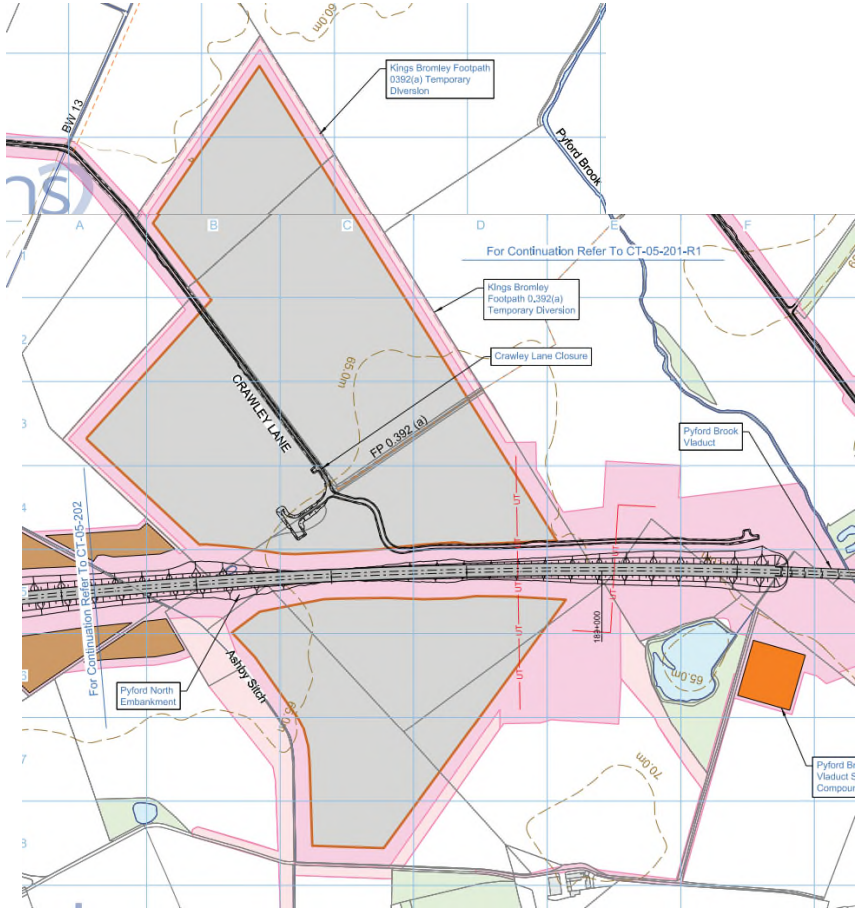


Borrow Pit 1 - Kings Bromley South

Dimensions (approximate): excavated to average depth of 4.1m (0.8m of topsoil and subsoils, 3.3m of sand and gravel) across an area of up to 35ha. Maximum depth 12.8m.

Duration: 4 years (Q2 2021- Q1 2025).

Access: site setup via A515 Lichfield Road, main access via site haul routes.



Borrow Pit 1 - Kings Bromley South

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)[1]	Road Haul (2 way movements)	Destination material use
BP1	Pyford North Embankment	163,000	9,600	0	Railway embankment fill / selected fill
BP1	Pyford North Embankment	37,000	2,200	0	Landscape fill
BP1	Pyford South Embankment	30,000	1,800	0	Railway embankment fill / selected fill
BP1	Pyford South Embankment	9,000	600	0	Landscape fill
	Total	239,000	14,200	0	

Borrow Pit 1 - Kings Bromley South

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

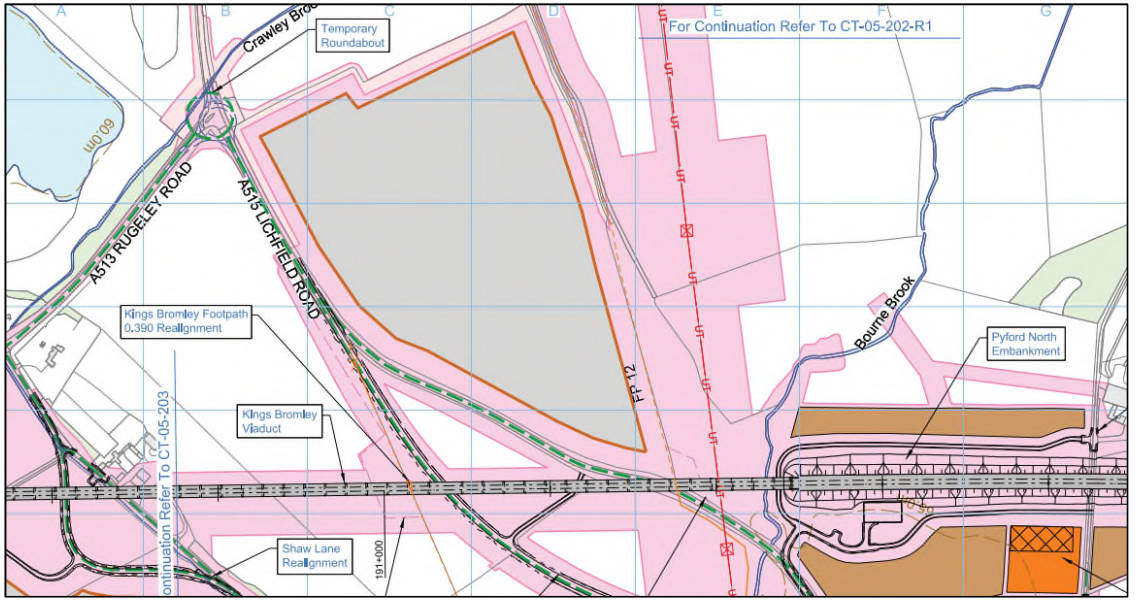
Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Moreton Cutting	BP1	210,000	24,700	24,700	Borrow pit backfill
Brancote South Cutting	BP1	29,000	3,400	3,400	Borrow pit backfill
	Total	239,000	28,100	28,100	

Borrow Pit 2 - Kings Bromley North (A515)

Dimensions (approximate): excavated to average depth of 4.1m (0.8m of topsoil and subsoils, 3.3m of sand and gravel) across an area of up to 12ha. Maximum depth 8.8m.

Duration: 4 years (Q2 2021- Q1 2025)

Access: site setup via A515 Lichfield Road, main access via site haul routes.



Borrow Pit 2 - Kings Bromley North (A515)

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
BP2	Yarlet Embankment	205,000	24,100	24,100	Railway embankment fill / selected fill
BP2	Trent South Embankment	28,000	3,300	3,300	Railway embankment fill / selected fill
BP2	Marston North Embankment	11,000	1,300	1,300	Railway embankment fill / selected fill
BP2	Marston South Embankment	3,000	300	300	Railway embankment fill / selected fill
	Total	247,000	29,000	29,000	

Borrow Pit 2 - Kings Bromley North (A515)

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Yarlet Central Cutting	BP2	169,000	19,900	19,900	Borrow pit backfill
Hopton North Cutting	BP2	50,000	5,900	5,900	Borrow pit backfill
Brancote South Cutting	BP2	28,000	3,200	3,200	Borrow pit backfill
	Total	247,000	29,000	29,000	

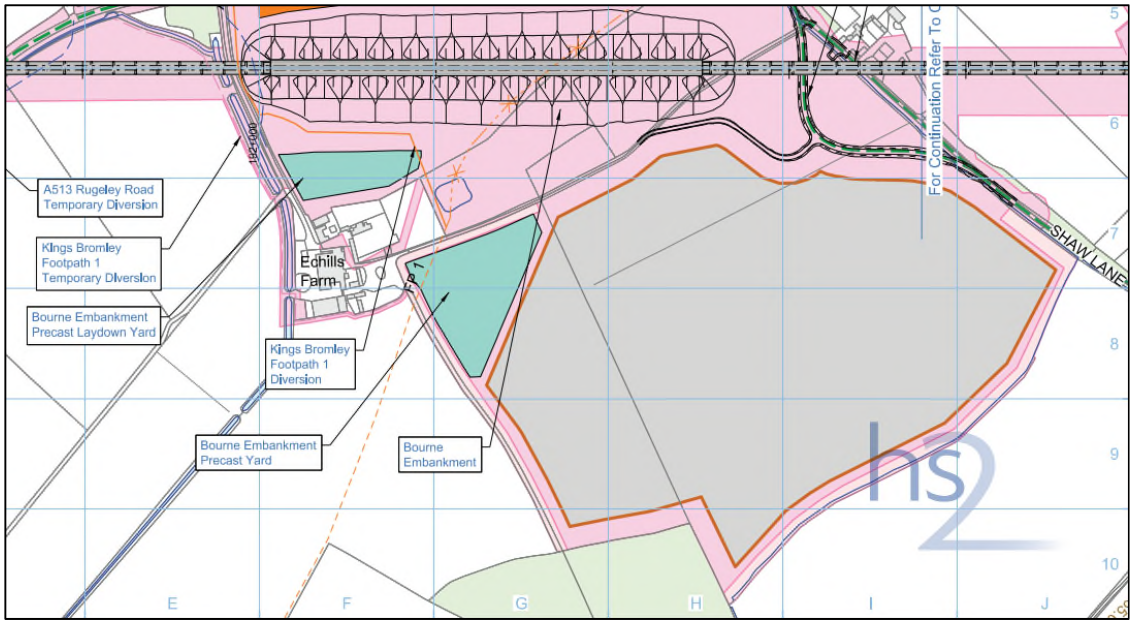
Borrow Pit 3 - Kings Bromley North (Shaw Lane)

Dimensions (approximate): excavated to average depth of 4.3m (0.8m of topsoil and subsoils, 3.5m of sand and gravel) across an area of up to 19ha.

Maximum depth 8.8m.

Duration: 4 years (Q2 2021- Q1 2025).

Access: site setup via A515 Lichfield Road and Shaw Lane, main access via site haul routes.



Borrow Pit 3 - Kings Bromley North (Shaw Lane)

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
BP3	Bourne Embankment	236,000	13,900	0	Railway embankment fill / selected fill
BP3	Bourne Embankment	116,000	6,800	0	Landscape fill
	Total	352,000	20,700	0	

Borrow Pit 3 - Kings Bromley North (Shaw Lane)

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Brancote South Cutting	BP3	232,000	27,300	27,300	Borrow pit backfill
Hopton South Cutting	BP3	88,000	10,400	10,400	Borrow pit backfill
Local Misc. Sources *	BP3	32,000	3,000	0	Borrow pit backfill
	Total	352,000	40,700	37,700	

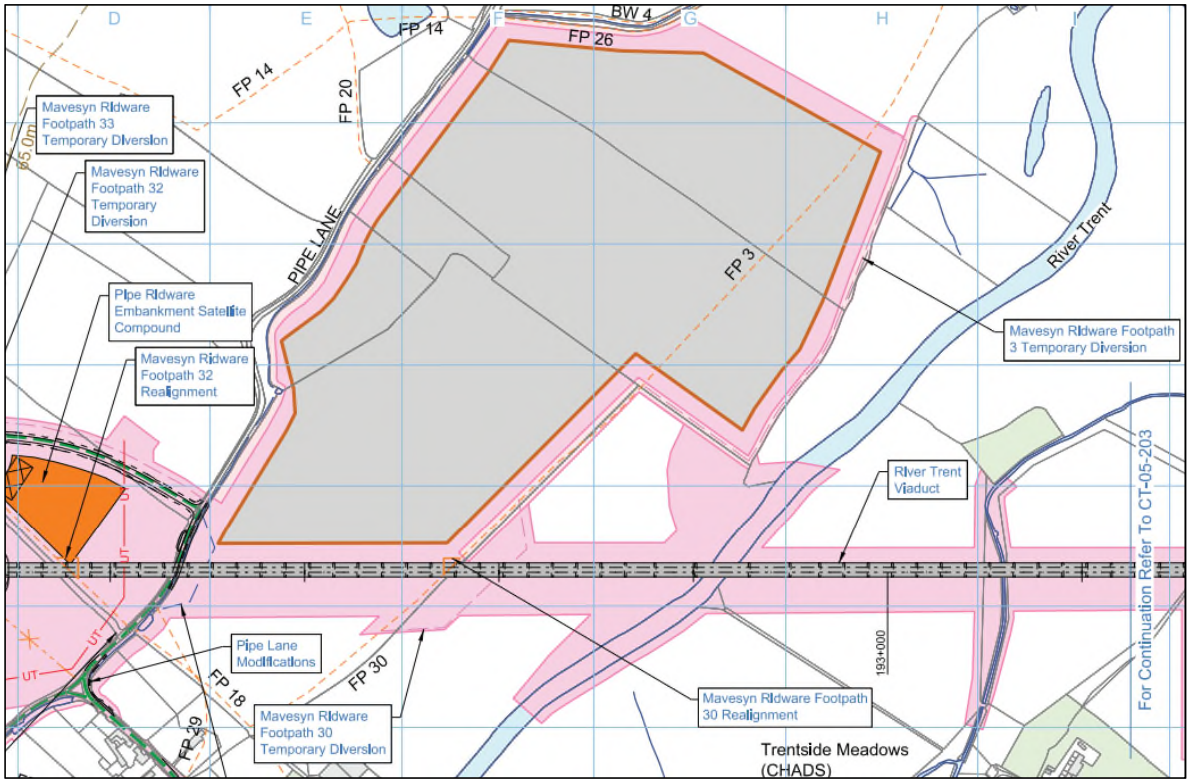
*Local Misc. Sources comprises material arising from temporary works, haul route and drainage

Borrow Pit 4 - Blithbury

Dimensions (approximate): excavated to average depth of 11.1m (0.8m of topsoil and subsoils,10.3m of sand and gravel) across an area of up to 20ha. Maximum depth 15.8m.

Duration: 4 years (Q2 2021- Q1 2025).

Access: site setup via A513 Rugeley Road, the A515 Lichfield Road and Pipe Lane, main access via site haul routes.



Borrow Pit 4 - Blithbury

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
BP4	Pipe Ridware Embankment	88,000	5,200	0	Railway embankment fill / selected fill
BP4	Blithbury Central Cutting	19,000	1,100	0	Railway embankment fill / selected fill
BP4	B5014 Uttoxeter Road Overbridge	4,000	200	0	Railway embankment fill / selected fill
BP4	B5014 Uttoxeter Road Overbridge	76,000	4,500	0	Highway embankment fill
BP4	Blithbury Road Overbridge	4,000	300	0	Railway embankment fill / selected fill
BP4	Blithbury Road Overbridge	12,000	700	0	Highway embankment fill
BP4	Blithbury North Cutting	3,000	200	0	Railway embankment fill / selected fill
BP4	Stockwell Heath Embankment	178,000	10,500	0	Railway embankment fill / selected fill
BP4	Newlands Lane South Overbridge	2,000	100	0	Railway embankment fill / selected fill
BP4	Stockwell Heath Cutting	2,000	100	0	Railway embankment fill / selected fill
BP4	Moreton South Embankment	93,000	5,400	0	Railway embankment fill / selected fill
BP4	B5013 Uttoxeter Road Underbridge	4,000	200	0	Railway embankment fill / selected fill
BP4	Moreton North Embankment	69,000	4,000	0	Railway embankment fill / selected fill
BP4	Colwich Bridleway 23 Accommodation Overbridge	4,000	200	0	Railway embankment fill / selected fill
BP4	Colwich Bridleway 23 Accommodation Overbridge	16,000	1,000	0	Highway embankment fill
BP4	Trent South Embankment	356,000	21,000	0	Railway embankment fill / selected fill
BP4	A51 Lichfield Road Underbridge	3,000	200	0	Railway embankment fill / selected fill
BP4	Other	14,000	800	0	Borrow pit backfill
	Total	947,000	55,700	0	

Borrow Pit 4 - Blithbury

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Pipe Ridware Embankment	BP4	21,000	1,200	0	Borrow pit backfill
Blithbury South Cutting	BP4	49,000	2,900	0	Borrow pit backfill
Mavesyn Ridware Footpath 38 Accommodation Overbridge	BP4	10,000	600	0	Borrow pit backfill
Blithbury Central Cutting	BP4	260,000	15,300	0	Borrow pit backfill
B5014 Uttoxeter Road Overbridge	BP4	3,000	200	0	Borrow pit backfill
Blithbury North Cutting	BP4	246,000	14,400	0	Borrow pit backfill
Stockwell Heath Embankment	BP4	8,000	500	0	Borrow pit backfill
Stockwell Heath Cutting	BP4	122,000	7,200	0	Borrow pit backfill
B5013 Uttoxeter Road Underbridge	BP4	65,000	3,800	0	Borrow pit backfill
Moreton North Embankment	BP4	4,000	200	0	Borrow pit backfill
Moreton Cutting	BP4	159,000	9,400	0	Borrow pit backfill
		947,000	55,700	0	

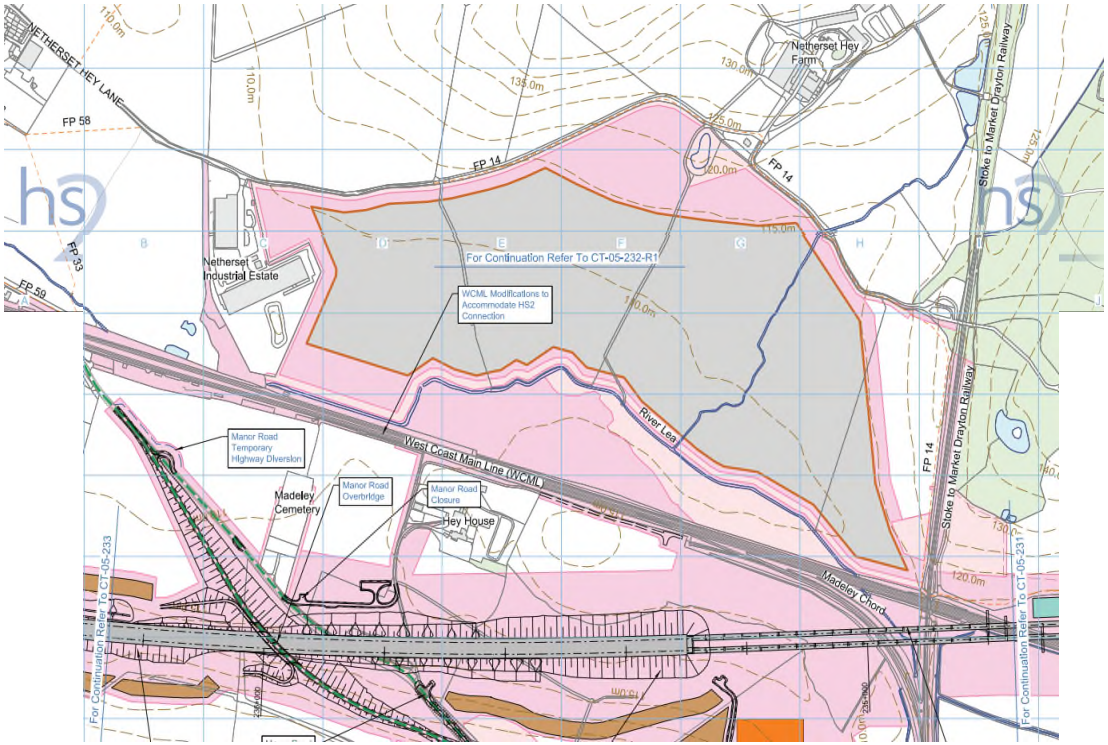
Borrow Pit 5 - Netherset

Dimensions (approximate): excavated to average depth of 4.5m (1m of topsoil and subsoils, 3.5m of sand and gravel) across an area of up to 28ha.

Maximum depth 17.8m.

Duration: 4 years (2021-2024).

Access: site setup via Netherset Hey Lane and the A525 Bar Hill Road, main access via site haul routes.



Borrow Pit 5 - Netherset

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
BP5	Dog Lane Overbridge	2,000	100	0	Railway embankment fill / selected fill
BP5	A53 Newcastle Road Overbridge	3,000	200	0	Railway embankment fill / selected fill
BP5	A53 Newcastle Road Overbridge	40,000	2,300	0	Highway embankment fill
BP5	Lea South Embankment	17,000	1,000	0	Railway embankment fill / selected fill
BP5	Whitmore Wood Overbridge	13,000	700	0	Highway embankment fill
BP5	Lea North Embankment	29,000	1,700	0	Railway embankment fill / selected fill
BP5	Manor Road Overbridge	152,000	9,000	0	Highway embankment fill
BP5	A525 Bar Hill Overbridge	2,000	100	0	Railway embankment fill / selected fill
BP5	A525 Bar Hill Overbridge	8,000	400	0	Highway embankment fill
BP5	Checkley South Embankment	224,000	13,200	0	Railway embankment fill / selected fill
BP5	Checkley North Embankment	93,000	5,500	0	Railway embankment fill / selected fill
BP5	Blakenhall Northbound Spur Embankment	12,000	700	0	Railway embankment fill / selected fill
	Other	7,000	400	0	
	Total	602,000	35,300	0	

Borrow Pit 5 - Netherset

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Yarlet North Cutting	BP5	327,000	38,400	38,400	Borrow pit backfill
Swynnerton North Cutting	BP5	107,000	6,300	0	Borrow pit backfill
Material deficit	BP5	168,000			
	Total	602,000	44,700	38,400	

[1] To address material deficit, it can be assumed that some landscaping has not been compacted and there will be an amount of surplus excavated material as a result of bulking.

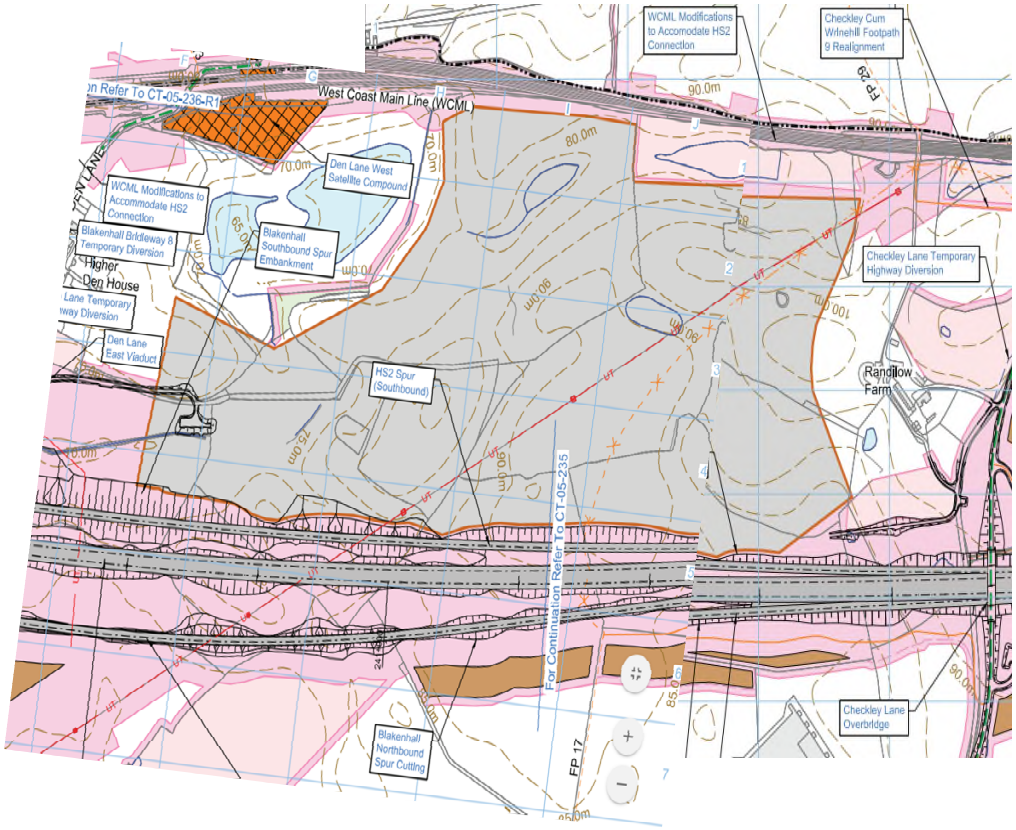
Borrow Pit 6 - Checkley Lane

Dimensions (approximate): excavated to a depth of 1m above existing groundwater level, across an area of up to 40ha.

Duration: 4 years (2021-2024).

Access: site setup via Checkley Lane, main access via site haul routes.

Other considerations: The borrow pit is in the vicinity of the Betley Mere Site of Special Scientific Interest / Midlands Meres and Mosses Phase 1 Ramsar site. The Environment Agency has confirmed it is content with the proposed approach.



Borrow Pit 6 - Checkley Lane

HGV movements out

Site haul (materials moved on site haul roads without use of public highway).

Road haul (export and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
BP6	Checkley North Embankment	47,000	2,800	0	Landscape fill
BP6	Checkley North Embankment	23,000	1,400	0	Railway embankment fill / selected fill
BP6	Checkley Lane Overbridge	3,000	200	0	Railway embankment fill / selected fill
BP6	Den Lane Underbridge and Viaducts	4,000	200	0	Railway embankment fill / selected fill
BP6	Blakenhall Viaduct	3,000	200	0	Railway embankment fill / selected fill
BP6	Blakenhall Bridleway 12 Accommodation Bridges	3,000	200	0	Railway embankment fill / selected fill
BP6	South Crewe Auto-Transformer Feeder Station	14,000	800	0	Railway embankment fill / selected fill
BP6	Newcastle Road Overbridge	7,000	400	0	Railway embankment fill / selected fill
BP6	Chorlton South Embankment	409,000	24,100	0	Railway embankment fill / selected fill
BP6	Chorlton North Embankment	17,000	1,000	0	Railway embankment fill / selected fill
BP6	Blakenhall Northbound Spur Cutting	62,000	3,700	0	Railway embankment fill / selected fill
BP6	Blakenhall Northbound Spur Embankment	44,000	2,600	0	Railway embankment fill / selected fill
BP6	Blakenhall Southbound Spur Embankment	141,000	8,300	0	Railway embankment fill / selected fill
BP6	Blakenhall Bridleway 8 Accommodation Overbridge	24,000	1,400	0	Highway embankment fill
BP6	Chorlton Cutting	8,000	500	0	Railway embankment fill / selected fill
BP6	Other	1,000	40	0	
	Total	810,000	47,840	0	

Borrow Pit 6 - Checkley Lane

HGV movements in

Site haul (materials moved on site haul roads without use of public highway).

Road haul (importation and transfer of materials via public highway).

Source	Destination	Volume (m3)	Site Haul (2 way movements)	Road Haul (2 way movements)	Destination material use
Yarlet North Cutting	BP6	539,000	53,000	53,000	Borrow pit backfill
Crewe South Cutting	BP6	77,000	5,000	0	Borrow pit backfill
Crewe South Portal	BP6	66,000	4,000	0	Borrow pit backfill
Stone Headshunt	BP6	21,000	2,000	2,000	Borrow pit backfill
Meaford Cutting	BP6	52,000	6,000	6,000	Borrow pit backfill
Meaford South Embankment	BP6	20,000	2,000	2,000	Borrow pit backfill
M6 Meaford Viaduct	BP6	22,000	2,000	3,000	Borrow pit backfill
Swynnerton South Cutting	BP6	13,000	2,000	2,000	Borrow pit backfill
	Total	810,000	76,000	68,000	

Borrow Pits - Environmental Controls

- Code of Construction Practice - controls include agriculture and soils, construction noise, dust and air quality, working hours, ground settlement, landscape and visual, waste and materials, water resources and flood risk, traffic and transport.
- Schedule 17 (Planning Conditions) paragraph 7 – planning authority's approval required for plans or specifications for the excavation of bulk materials from borrow pits.
- Planning authority can refuse approval or impose conditions on grounds of the design or external appearance of the borrow pits, the methods by which they are worked and arrangements as to noise, dust, vibration or screening during their operation.
- Planning authority's approval required for scheme of restoration before borrow pit excavation commences.

Borrow Pits – Restoration Principles

- Restore land to a condition suitable for its previous use, with good ground surface drainage gradients and field drainage installed where required.
- Good practice in handling, storing and reinstating soils to provide a sufficiently deep soil profile to manage both wetter and drier future conditions.
- Topsoils and subsoils will be separately stripped and stored for use in restoration of the borrow pit.
- Maximise use of cohesive materials (e.g. silt and clay) arising from construction of the Proposed Scheme in the restoration process thus avoiding transportation off site.
- Contribute to addressing the impact of climate change by taking opportunities to mitigate pre-existing and potential future flood risk.
- See the Promoter's published Borrow Pit Restoration Strategy.

Borrow Pits – Restoration Process

Survey and design

- Undertake surveys of the site – soils, agricultural land classification, topological, hydrological and hydrogeological, archaeological etc.

Site preparation

- Topsoil and subsoil will be separately stripped and stored (in stockpiles) for reuse prior to excavation as set out in the Code of Construction Practice

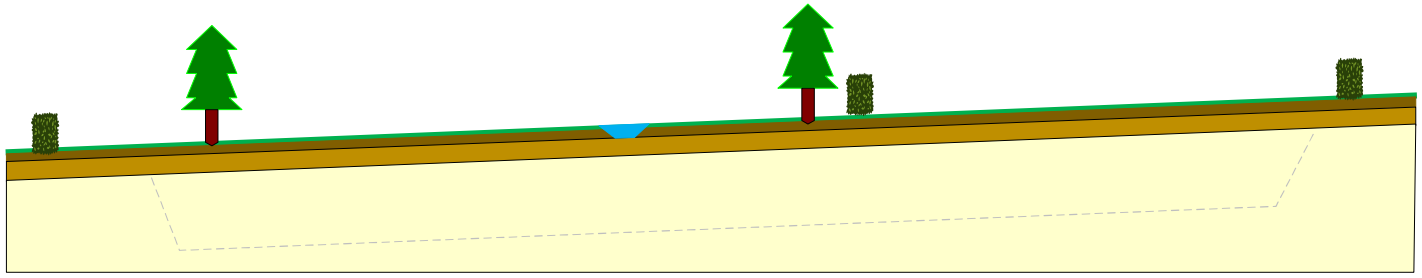
Excavation

- Excavation will be in accordance with good practice as set out in the Code of Construction Practice

Restoration

- It is proposed that the borrow pits will be made available to be returned to their original land use (predominantly agriculture)

Borrow Pits – Working Sequence

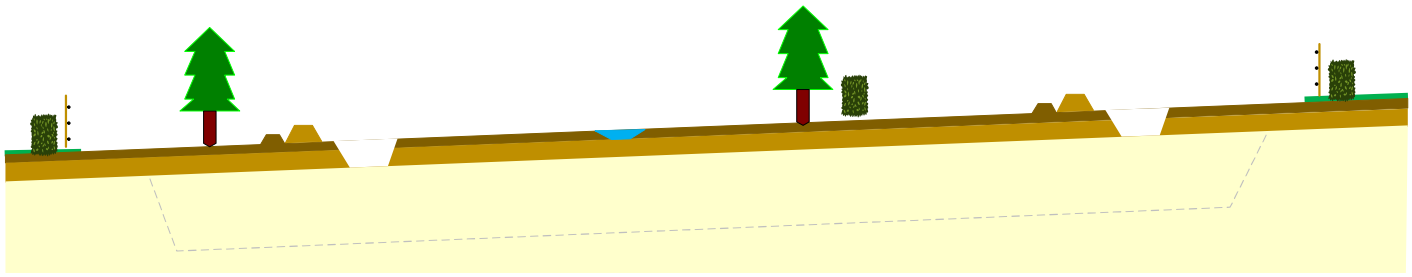


Before Mobilisation

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

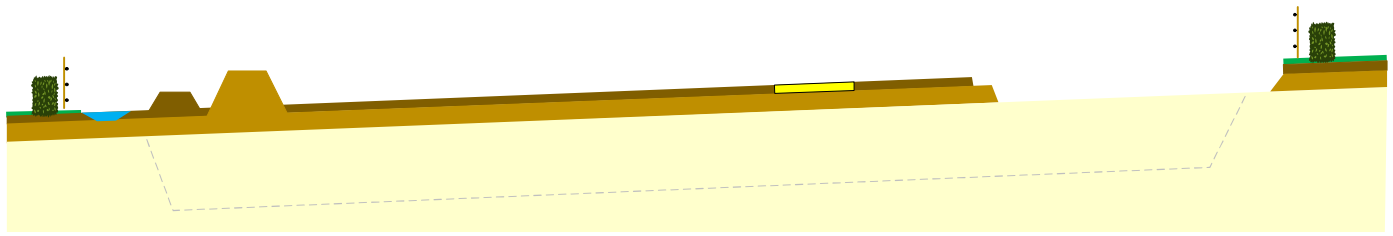


Phase A - Survey
Secure site.
Environmental surveys and mitigation (Cultural Heritage and Ecology)

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

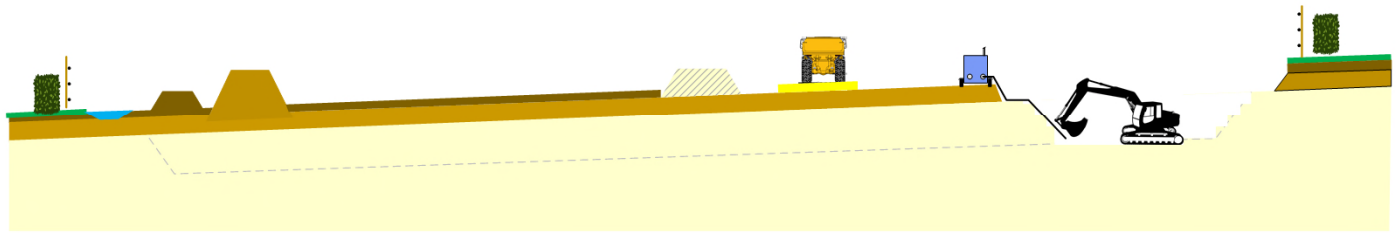


Phase B - Mobilise
Site Clearance, Temporary drainage, Mobilise temporary dewatering,
Divert watercourses (if required). Infrastructure – Internal routes, Welfare

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

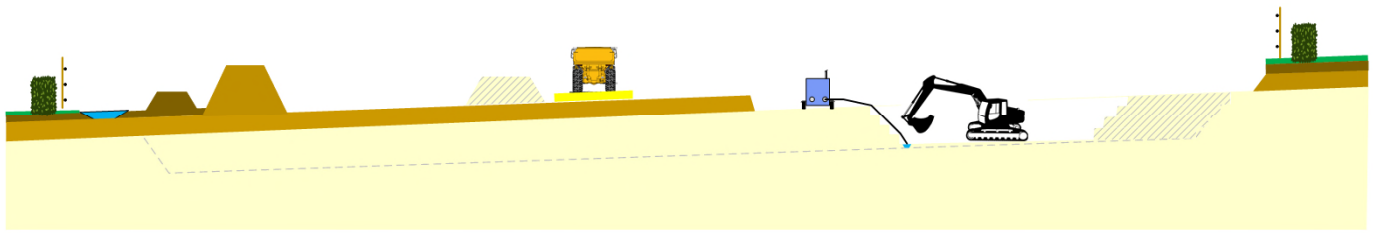


Phase C – Commence Extraction
Temporary drainage, Temporary Dewatering

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

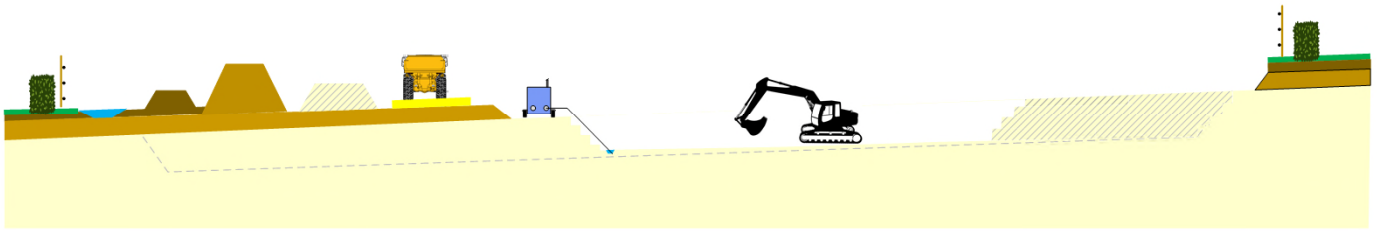


Phase D1 – Continue Extraction – Commence Backfill
Temporary dewatering

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

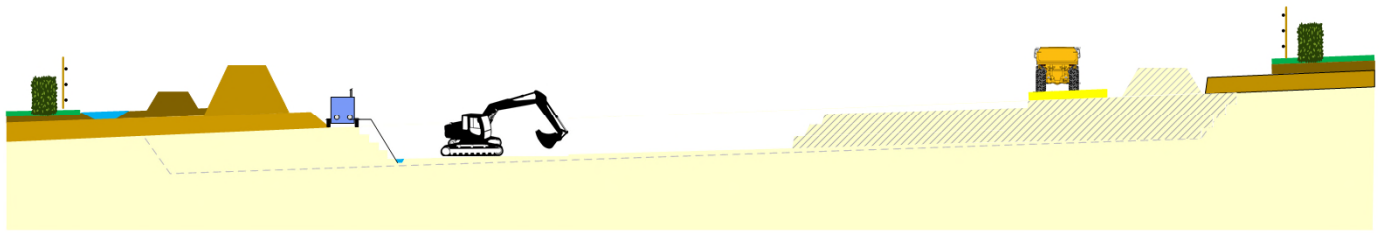


Phase D2 – Continue Extraction – Continue Backfill
Temporary dewatering

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

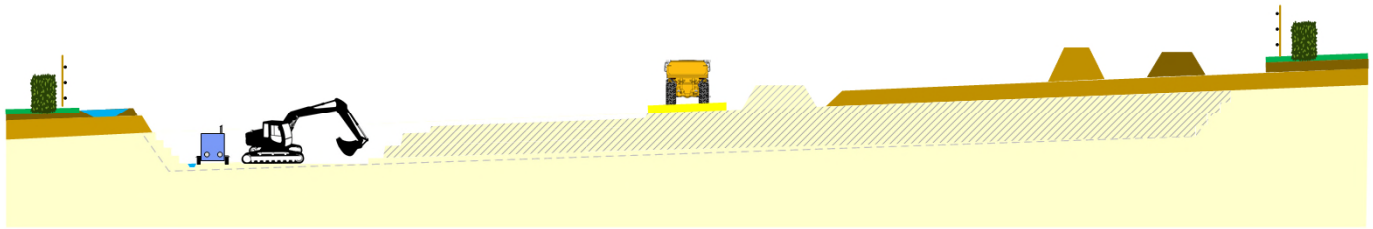


Phase D3 – Continue Extraction – Continue Backfill
Temporary dewatering

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

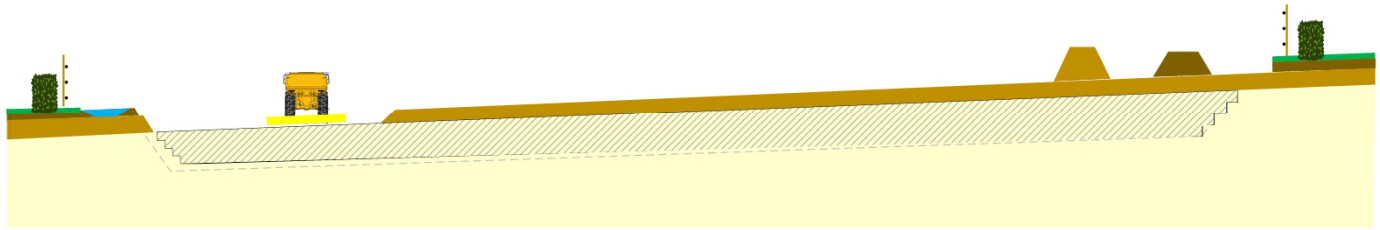


Phase D4 – Continue Extraction – Continue Backfill
Temporary dewatering

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

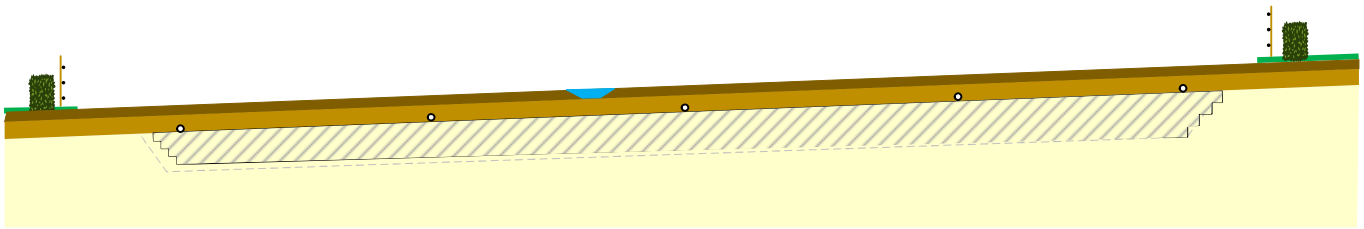


Phase E – Complete Backfill

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence

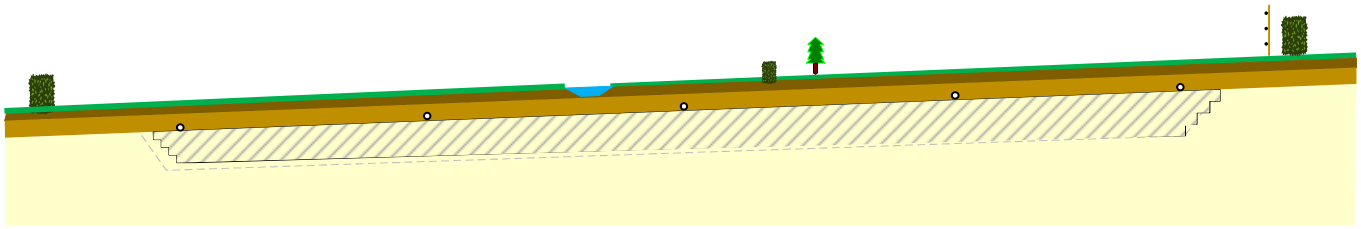


Phase F – Reinstate
Complete sub-soiling and top-soiling
Install land drainage (as per design / stakeholder requirements)

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Borrow Pits – Working Sequence



Phase G - Planting

Vegetation
Topsoils
Subsoils
Watercourse

Underlying Materials
Non Class 1 or 6 (from site or borrow)

Further information

- Information paper D12: Borrow Pits (https://www.gov.uk/government/publications/construction-hs2-phase-2a-information-papers)
- Borrow Pits Restoration Strategy (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627178/E30_CT_009_000_WEB.pdf)
- Phase 2a Environmental Statement (https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement)
- Phase 2a Draft Code of Construction Practice (https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a)
- CL:AIRE Definition of Waste Code of Practice (https://www.claire.co.uk/projects-and-initiatives/dow-cop)