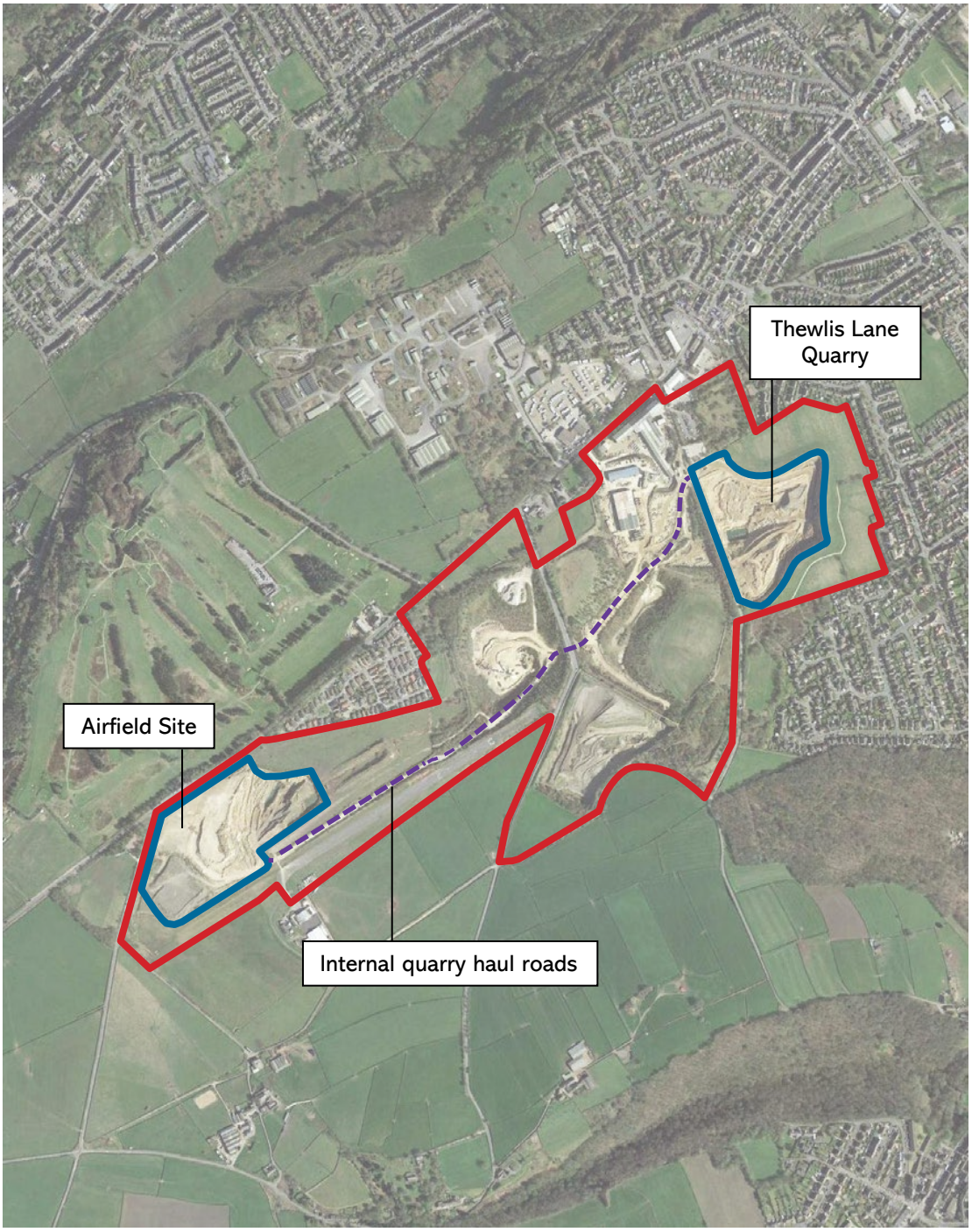
Thewlis Lane – Engineered Backfill

Initial Overview

The purpose of this report is to highlight the different scenarios and cost associated with the restoration of Thewlis Lane Quarry.

This report includes:

- Backfill scenarios highlighting advantages and disadvantages.
- Recent experience and learnings relating to enabling works at a new site adjacent to current operations at Johnsons Wellfield.
- Completing an engineered backfill:
    - Cost
    - Phasing
    - Environmental impact
    - Timeline



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edward
architecture

Scenario 1

Completing an engineered backfill in line with original planning consent.

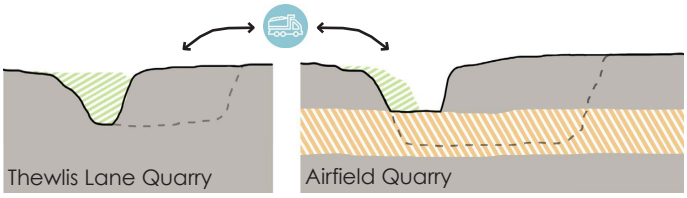
Key to the original plan was to maximise the 'back haul' opportunity when moving mineral within the Johnsons Wellfield site.

The sequence of which was as follows:

1. Extract mineral from Thewlis Lane and store at Airfield site.
2. Vehicles returning from journey in point 1 would be loaded with shale as part of the engineered backfill in line with specification.
3. Points 1 & 2 would be repeated throughout the active life of the quarry until all mineral extracted and engineered backfill completed.

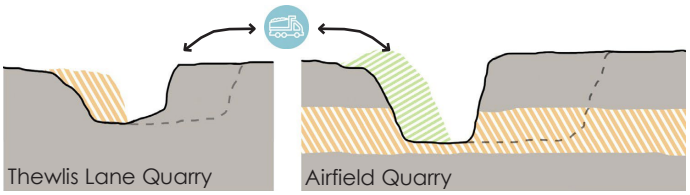
Original Backfill Proposal (Scenario 1)

Phase 1



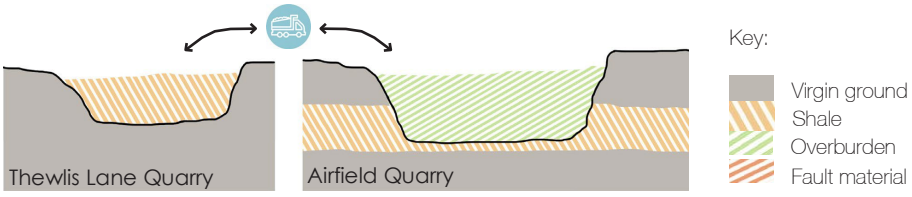
Overburden from Thewlis Lane Quarry used to infill Airfield Quarry. Extraction from Airfield Quarry is ongoing alongside Thewlis.

Phase 2



Thewlis Quarry is backfilled with shale, whilst the Airfield is backfilled to an agreed sloping level with the overburden from Thewlis Quarry.

Phase 3



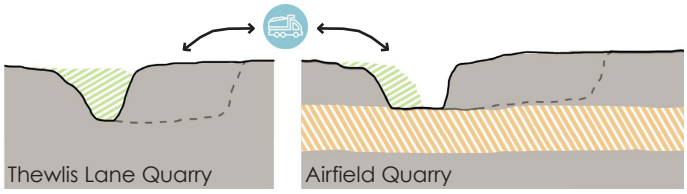
Thewlis Quarry is backfilled with shale, whilst the Airfield is backfilled to an agreed sloping level with the overburden from Thewlis Lane.

Scenario 1 failed due to the following issues:

1. An initial working area had to be created to extract mineral, in this instance mineral was removed but insufficient working area was available to start an engineered backfill.
2. Area initially identified for mineral storage in the Airfield was insufficient in size and thus had to be tipped on top of shale. This sterilised significant volumes of mineral that would no longer be available for the return journey of vehicles.
3. During the extraction process in Thewlis Lane, a significant mineral fault was experienced in the Southeast corner running through the middle of the entire site. This resulted in 'short shifting' mineral in the extraction process to access good quality block suitable for masonry and paving.

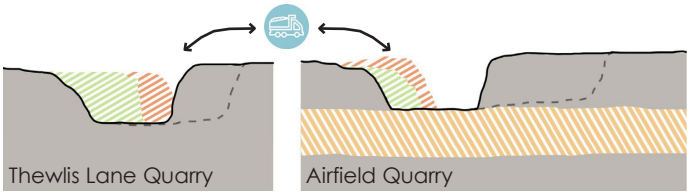
Reaction to Mineral Fault & Failure of Scenario 1

Phase 1



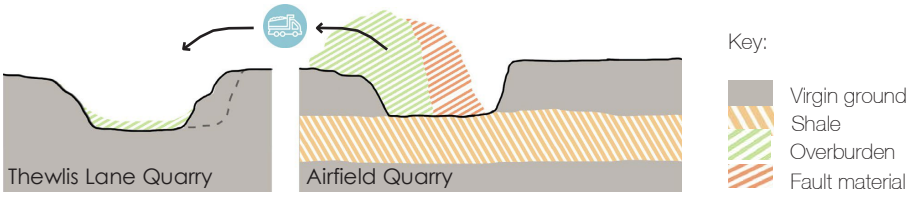
Overburden was removed from Thewlis and sent to the Airfield Quarry.

Phase 2



Mid extraction, Thewlis Quarry hit a large fault leaving no time to start the shale backfill. Shale in the Airfield Quarry is covered and sterilised.

Current Situation



Airfield currently has above ground storage of both fault material, overburden and shale. The environmental impact imposed if the material was to be returned to Thewlis Quarry would be detrimental.

Scenario 2

Site reinstated to original ground level but not to an engineered standard, therefore unsuitable for housing development.

In this scenario the starting point is that Thewlis Lane is already partially filled with mineral which has not left the extraction area. Mineral removed from the extraction face has been placed immediately behind the working area.

Once extraction of mineral is completed from Thewlis Lane, balance of mineral required can be moved from Airfield.

Benefits:

1. Area restored to original levels
2. Creates a generous green open space for the future.
3. Significantly less carbon emitted compared with Scenario 1

Disadvantages:

1. Area not suitable for housing development.
2. Does not deliver housing stock in line with local plan.
3. Approximately 1.5 million tonnes of mineral will require transporting from Airfield to Thewlis Lane.
4. It will take 350 working days to complete once work commences.
5. Approximately 809 tonnes of carbon will be emitted during this process.
6. Cost to complete exercise estimated at circa £2.53m

Scenario 3

Site completed with a low level restoration.

In this scenario a low-level restoration will comprise of mineral that is left from the original extraction with no imported mineral outside of the Thewlis Lane operating area.

The shaping of restoration will closely match the existing infill process, i.e., minimal mineral movement once extraction is completed.

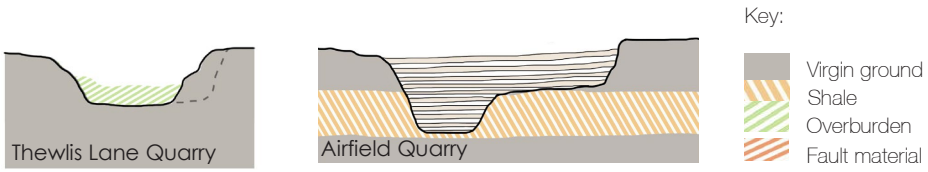
Benefits:

1. Creative green space that provides versatile urban areas usable across the local community.
2. Improving biodiversity within the area allocated for development in the local plan.
3. No delays to the development of surrounding land.
4. Minimal work required with heavy machinery to landscape the area, estimated at below 20 tonnes of carbon.
5. Delivers housing stock quantity in line with local plan (adjacent land to be made available from Isaac Timmins – parent company of Johnsons Wellfield).

Disadvantages:

1. Low level restoration area will not be suitable for development.

Carbon Emission Reduction & Public Open Space Option (Scenario 3)



Wagon Transfers: 0 tonne mineral moved
0 wagon movements

Additional Carbon Impact: 20 tonnes of carbon emited

Moor End South Enabling Works & Key Learnings

During the first quarter of 2021, a report was completed to understand timeline and cost associated with completing an engineered backfill for the site at Thewlis Lane.

Third part enabling works at Johnsons Wellfield latest quarry (Moor End South) was completed during the summer and early autumn of 2021. Cost for the project was significantly higher than expected, driven by inflation across the construction sector not experienced for decades.

Following this, it was decided to seek feedback from the external market on project cost for completing an engineered backfill at Thewlis Lane and benchmarking this against an updated cost from Johnsons Wellfield for carrying out an engineered backfill at Thewlis Lane.

Scenario 4 – Thewlis Lane Engineered Backfill (post extraction)

The purpose of this section is to highlight key activities and cost associated with completing an engineered backfill of Thewlis Lane Quarry to enable development for housing.

The extraction area comprises of approximately 12 acres of land adjacent to Thewlis Lane, Huddersfield, HD4 7AB.

This report is based on the movement and processing of material purely associated with completing an engineered backfill.

Two working areas have been identified to complete the project, they are Thewlis Lane and Airfield. Site referred to as 'Airfield' is located approximately 1 mile West of Thewlis Lane and is accessible using internal haul roads owned by Johnsons Wellfield. This report assumes Airfield can be made available but will need Shareholder approval due to existing operations within the Airfield site remain ongoing.

There are multiple stages in completing an engineered backfill at Thewlis Lane, the relatively small working area determines the speed of which this project can be completed. Based on the working areas available, the scheme is split into four phases:

Phase 1

Movement of material from Thewlis Lane to Airfield, this is scheduled to take 34 weeks and will involve the removal of all over and interburden. Once complete, it will present the quarry in its entirety completely void of material which will provide a suitable working area to complete an engineered backfill.

The proposed route for the movement of material will utilise existing internal quarry haul roads between Thewlis Lane quarry and Airfield (subject to shareholder approval). Due to the size of these haul roads the operation will be limited to using four articulated dumpers, each with a payload of approximately 40 tonnes.

Equipment/Personnel required:

Articulated Dumper (A45 equivalent) x 4

Excavator (50t) for loading Articulated Dumpers.

Dozer x 2 to place material safely at Airfield

Project Manager x 1

Administrator x 1

Skilled Operatives x 7

Total cost for this phase is projected to be £825k (excludes Admin, PM role and any ongoing servicing and repairs to mobile plant).

Phase 2

This phase runs for the entirety of the project and is focused solely on the crushing of material to a specification suitable to complete an engineered backfill (as per report – Patrick Parsons report H18028 Thewlis Quarry Earthworks Specification FINAL).

Phase 2 will run for an estimated 104 weeks with no allowance for slippage or unforeseen operational issues during this period.

Phase 2a will consist of crushing material being transported from Thewlis Lane and will run concurrently with Phase 1. As noted in Phase 1, this will run from week 1 to week 34 of the project.

Phase 2b will consist of crushing material transported within the Airfield site. This will commence after Phase 1 has been completed due to vehicle movements on site and the available working area. This phase will run 70 weeks, from week 35 to week 104 of the project.

Equipment Required

Phase 2 (inclusive of 2a)

Jaw Crusher x 3

Excavator for loading crusher x 3

Excavator with Pecker x 1

Motorised vehicle to provide fuel to mobile plant and carry out dust suppression duties x 1

Loading Shovel for management of material x 1

Stock conveyor x 2

Skilled Operatives x 7

Total cost for this phase is projected to be £4,072k (excludes Admin, PM role and any ongoing servicing and repairs to mobile plant).

Phase 2b

Articulated Dumper (A45 equivalent) x 2

Excavator (50t) for loading Articulated Dumpers.

Skilled Operatives x 3

Total cost for this phase is projected to be £762k (excludes Admin, PM role and any ongoing servicing and repairs to mobile plant).

Phase 3

This phase also runs concurrently with Phase 2, it will run for the final 34 weeks of the project. It will commence on week 70 and run through to completion on week 104.

Transporting crushed material from Airfield to Thewlis Lane and placing as an engineered backfill to required specification. As part of this phase, third party contractors will be on site to supervise the placement and compaction of material to ensure it complies with the engineered backfill specification.

Equipment Required

Articulated Dumper (A45 equivalent) x 4

Excavator (50t) for loading Articulated Dumpers.

Dozer x 2 to place material safely at Airfield

Roller x 2

Skilled Operative x 9

Total cost for this phase is projected to be £960k (excludes Third party engineering, Admin, PM role and any ongoing servicing and repairs to mobile plant).

Miscellaneous cost including – Servicing, consumables, welfare facilities, insurance, security, mobile plant compound and contingency planning.

Summary of cost	
Phase 1	£824,981
Phase 2 (inc. 2a)	£4,072,477
Phase 2b	£762,022
Phase 3	£959,865
Admin/Project Mgr	£285,313
Engineering Specialist	£551,096
Miscellaneous	£852,608
Contingency/Profit	£1,491,151
Total	£8,946,905

The above cost is comparable with an external quote received towards the end of 2021 for the same work. Please note obtaining third parties to quote for this project is particularly difficult in the current climate.

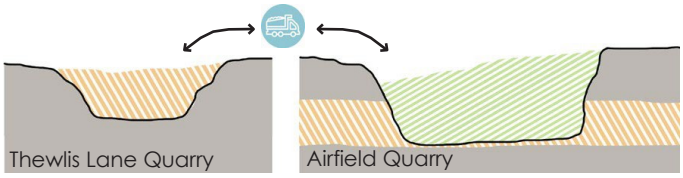
Third party contractor has quoted a price of £8.25m for the works excluding engineering and fuel, these two items will add an estimated £1.8m. Total cost for works at £10.0m.

A combination of high inflation, problematic supply chains and a shortage of skilled labour remains high risk.

Carbon Calculations

With Co2 omissions becoming increasingly important to decision makers, it is important to understand the environmental impact for the proposed scheme. Based on all mobile plant and material processing equipment running off diesel powered engines, this will emit over 3,800 tonnes of Co2. Alternative fuel sources can be explored, however, suitable heavy plant is not currently available but could change given projected completion of the project.

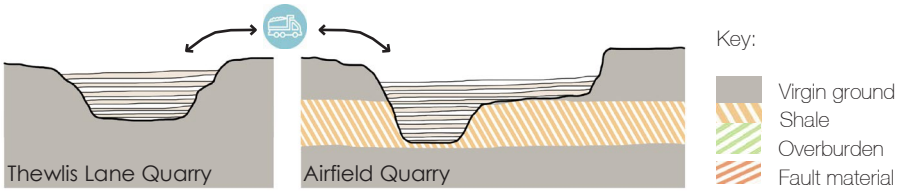
Original Plan



Shale was planned to be returned on 'back hand' as overburden was taken to airfield.

Stored overburden and fault material could be taken back to Thewlis, crushed and compacted. Shale at Airfield can be sterilised, however, in order to completely fill Thewlis Quarry it would require twice as many truck deliveries, leading to a major increase in carbon emissions due to fuel etc.

Fault Impact on Original Plan



2.9m tonne of mineral

3800 tonnes of carbon emitted

72,500 wagon movements

It would also add 3 more years to the housing development, making the start time move from 2025 to 2028, whilst ultimately adding a £10 million additional cost to the business.

Timeline

There are additional factors to consider in the timeline of this project, in principle the priority of the business is to safeguard its longevity to support local jobs within the immediate division of Johnsons Wellfield but also its vertical integration with Myers Building Supplies (Builders Merchants). Johnsons Wellfield supplies Dimension Stone products as well as Aggregates to Myers Building Supplies, the two companies are part of an integrated supply chain.

Due to mineral issues that have been experienced in 2018, late 2020 and running through to date. Johnsons Wellfield is not currently fulfilling orders secured, based on supplying a 'Classic' Crosland Hill Sandstone for which it is renowned for.

During the past 14 months, mineral extracted from Thewlis Lane is not representative of extensive core holes that were carried out in 2018 to assess remaining mineral. This current situation is not sustainable, resulting in lower output and restricting commercial opportunities due to mineral type.

Therefore, mineral extraction will move to Moor End South quarry in February 2022 to obtain sufficient 'Classic' Crosland Hill Block Stone. This has become a number one priority for the business.

Primary operational focus will be to extract mineral from Moor End South to recover the current position by creating suitable stock of Block Stone. This is envisaged to take circa 20-24 months.

Following a period where sufficient Block Stone Stock has been created, the business can reconvene extraction at Thewlis Lane. On this basis, half of the operational focus will remain at Moor End South with the other half at Thewlis Lane.

Operational extraction activities with timeline shown below:

Jun 20 – Jan 22	70% extraction resource at Thewlis Lane.
	30% extraction resource at Airfield.
Feb22 – Jun 22	40% extraction resource at Thewlis Lane.
	30% extraction resource at Moor End Sth.
	30% extraction resource at Airfield.
May 22 – Dec 23	70% extraction resource at Moor End Sth.
	30% extraction resource at Airfield.
Jan 24 – Dec 25	70% extraction resource at Thewlis Lane.
	30% extraction resource at Moor End Sth.
Jan 26 – Jan 28	Complete Engineered Backfill at Thewlis Lane.

Scenario Phasing Timeline Summary

Table below shows a chronological summary of when works would be completed at Thewlis Lane for each of the four scenarios. For example, scenario 1 would result in all extraction and backfill work completed in the second quarter of 2027.

	Timeline									
	Jan-26	Apr-26	Jul-26	Oct-26	Jan-27	Apr-27	Jul-27	Oct-27	Jan-28	Apr-28
Scenario 1	N/A									
Scenario 2										
Scenario 3										
Scenario 4										

Executive Summary

This report highlights various options for the future use of the extractive area at Thewlis Lane, Crosland Hill, Huddersfield.

It brings together time, cost and environmental impact directly associated with various options for its future use. Something the report does not detail and is difficult in any climate, is to provide solutions to changes beyond reasonable control in cost or timeline if infill is required at Thewlis Lane. Whether this be to, or not to, an engineered standard.

What the report does highlight, is that completing an engineered backfill is not financially viable for Johnsons Wellfield with a cost projected between £8.25m and £10.0m (excluding inflation).

Johnsons Wellfield recommend implementing scenario 3 set out in the report. By utilising adjacent land to Thewlis Lane owned by Isaac Timmins (Parent company to Johnsons Wellfield), it is possible to deliver number of houses committed to in the 'local plan' on time.

This proposal also has the benefit of minimising cost, environmental impact, enhancing public open space associated with the development, and supporting continued employment for employees of Johnsons Wellfield.