



**CROUCH  
WATERFALL**

## TRANSPENNINE ROUTE UPGRADE – W3 & W4 TEMPORARY WORKS MINING RISK ASSESSMENT

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## Document Control Sheet

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Issue number	Date	Revision Details
P01	18 May 2023	First issue.
A01	11 July 2023	Second issue – assessment expanded to temporary works red line boundary.
A02	9 February 2024	Updated to reflect Wider W3 and W4 Risk Assessments

Crouch Waterfall and partners Limited has prepared this report in accordance with the instructions of the above-named Client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

# 1. Introduction

## 1.1. Scope and objectives

Crouch Waterfall and Partners Limited (CWP) have been appointed by Transpire Alliance to undertake a mining risk assessment within the construction redline boundary for the Transpennine Route Upgrade (TRU). The assessment only considers route section W3, (Ch:40300 to 54000) and W4 (Ch: 54000 to 66100) between Huddersfield and Leeds.

The objectives of the assessment are to:

- Undertake assessment of historic mine workings risk within the construction boundary.
- Consult existing information and reports to identify mine shafts and entries that are in the vicinity of temporary works, assess the risk and delineate hazard zones where necessary.
- Assess the risk of possible or known shallow mine workings for further consideration by the temporary works designer.

The risk assessment as presented on schedules 22902W-061-SCH-W3-001-A01 and 22902W-061-SCH-W4-001-A01 along with the accompanying drawings.

## 1.2. Existing documents

To supplement the risk assessments the following documentation produced during the development of the permanent works design has been consulted during the development.

- > W3.1: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.1](#)
- > W3.2: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.2](#)
- > W3.3: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.3](#)
- > W3.4: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.4](#)
- > W3.5: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.5](#)
- > W3.6: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.6](#)
- > W3.7: [W3 – GEO – GRIP 4 – Mining Risk Assessment W3.7](#)
- > [W3 – GEO – GRIP 4 – Advances Works – Mining Risk Assessments](#)
- > [W3 – GEO – GRIP 4 – Mining Risk Mitigation Remit](#)
- > W4 Area A: [151667-TSA-40-MDL1-REP-W-GE-030013-A02.pdf](#)
- > W4 Area B: [151667-TSA-41-MDL1-REP-W-GE-030024-A03.pdf](#)
- > W4 Area M: [151667-TSA-48-MDL1-REP-W-GE-030023-A02.pdf](#)
- > W4 Area C: [151667-TSA-42-MDL1-REP-W-GE-030025-A02.pdf](#)

These reports were utilised to access available ground investigation information for the site and comparison of coal mining information.

## 1.3. Information Used

Information utilised in the development of the risk assessments was as follows:

- > Online access to British Geological Survey (BGS) Mapping and Aerial Imagery for the site.
- > Old Maps
- > Aerial photographs from Google Earth
- > OS Maps

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- > Project Mapper: <https://projectmapper.com/map.aspx?cid=55>
  - o Coal Authority WMS Layers
  - o Geology and Mineral Extraction Layers
  - o Water Environment
  - o Infrastructure

For the development of the W3 mining risk assessments data was obtained from the Coal Authority through Data Licencing. The data outputs are presented in the drawings associated with this document. The included data sets are as follows:

- > Underground Works
- > In Seam Levels
- > Seam Table
- > Shallow Workings
- > Unlicensed Opencast
- > Mine Entries
- > Outcrops
- > Probable Workings
- > Spine Roadways

For the assessment of W4, mining reports produced by the Coal Authority were utilised. These were purchased by TRU for the area. The links to the reports are as follows:

- > Area A: [151667-TSA-W4-MDL1-REP-W-GE-270532](#)
- > Area B: [151667-TSA-W4-MDL1-REP-W-GE-270533](#)
- > Area M: [151667-TSA-W4-MDL1-REP-W-GE-512011](#)
- > Area C: [151667-TSA-W4-MDL1-REP-W-GE-270534](#)

## 2. Risk assessment methodology

In the absence of full details on the form of temporary works across W3 & W4, this risk assessment is a high-level assessment from the available information to detail the potential risk to any temporary works within the construction boundaries. This methodology has been adopted in the absence of detailed temporary works briefs for the required works.

The risk assessment is confined to the construction boundaries only, as this is the envisaged location of any temporary works. If any temporary works are to be carried outside of the construction boundary a detailed mining risk assessment shall be required as part of that design.

Where the risk has been classified as medium or high, temporary works designs are to re-assess the mining risk when full design briefs have been received and any information from the permanent works mining mitigation is received. It should be noted that areas of grouting are being undertaken along the route. These details have been seen as part of the assessment; however, as the works are on-going the risk categorisation may change as more information becomes available.

### 2.1. Mine entries and shafts

Table 1 details the matrix generally used to assess the risk of mine entries on or near the intervention sites. Justification for deviation from this matrix is given on a case-by-case basis in the mining risk assessment schedules.

The potential collapse crater diameter is calculated in accordance with CIRIA C758D Section 5.2.3, which considers the thickness and friction angle of superficial overburden deposits, as shown in Figure 1.

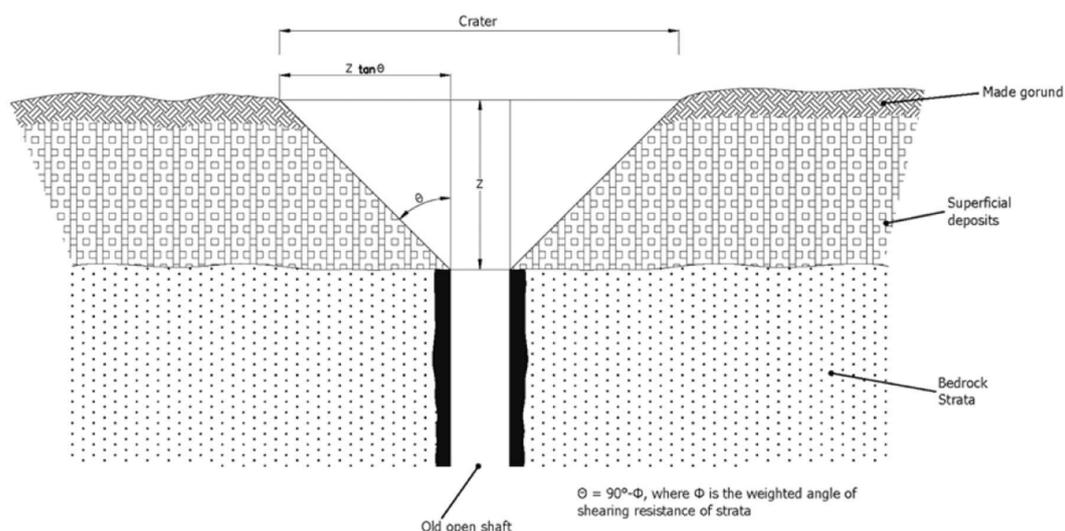


Figure 1: Possible diameter of crater due to shaft collapse (CIRIA C758D)

Where the risk is deemed medium or high, hazard zones have been highlighted on the mine entry hazard plan included in Appendix B. The temporary works designer should consider exclusion zones

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for plant in these areas or a phased construction programme with stability monitoring. In-situ testing, ground investigation or probing may also be undertaken to refine the risk of mine entry collapse.

Table 1: Mine entries risk assessment matrix

Mine Entry Risk	Reasoning
Low Risk	Zone of influence > 10 m away from construction boundary track
Medium Risk	Zone of influence intersects construction boundary but not track. Mine entry located outside of construction boundary
High Risk	Zone of influence encompassing construction boundary track

## 2.2. Mine workings

Table 2 details the matrix used to assess the risk of mine workings beneath the intervention sites. Justification for deviation from this matrix is given on a case-by-case basis in the mining risk assessment tables. CIRIA C758D indicates that 10:1 rock cover to extracted thickness is a generally accepted rule of thumb as a conservative limit, whereby crown holes are extremely unlikely to propagate beyond this thickness above workings (also quoted as 10T, where T = worked thickness).

Where the risk is deemed medium or high, the temporary works designer should take the necessary precautions to mitigate the risk. In-situ testing and/or additional ground investigation may also be used to refine the risk.

Table 2: Mine workings risk assessment matrix

Mining Risk	Reasoning
Low Risk	Cover Ratio $\geq$ 10:1
Medium Risk	Cover Ratio assessment lacking GI data
High Risk	Cover Ratio <10:1



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