

Technical Note

Ref. ST20879-0003

CLIENT:	TATA Steel UK
PROJECT:	Project EAF
SUBJECT:	Scheme of Mitigation for Coal Mining Risk: Invictus / Project EAF Full Permission Area
JOB NO.:	ST20879
DATE:	26 May 2026
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APPROVED BY:	Rory Bates, Technical Director

Introduction

As part of the redevelopment of the Tata steelworks in Port Talbot, several new buildings will be constructed, existing buildings modified and parcels of land modified for new purposes. A history of coal mining activity is at the Site and this technical note serves as a Scheme of Mitigation for understanding and reducing risk posed by mining collapse hazards.

The British Geological Survey (BGS) data indicates that the land beneath the Port Talbot Steel Works Site is located on Coal Measures geological formation. A part of the Site proposed for redevelopment is described by the Mining Remediation Authority (The statutory planning consultee for land containing coal, formerly known as The Coal Authority) as being a Development High Risk Area. This designation highlights a potential for ground instability, resulting from legacy coal mining operations. A Coal Mining Risk Assessment (CMRA) is a requirement for any planning consultation with such a designation. A desk-based CMRA has been prepared by Wardell Armstrong (now SLR Consulting) for the whole Project EAF site which provides a deeper understanding of the below ground hazards and to allow any proposed redevelopment of the Site to be designed in such a way to mitigate against any risk that might be identified.

This Technical Note forms a Scheme of Mitigation for mining legacy risk, in line with the hybrid (Full Permission) planning condition 18. The extent of the area covered by this Scheme is shown by EAF-LAW-X-X-DR-A-900009 P07 "Proposed Site Plan – Hybrid Planning Application".

Background

The Site is underlain by Lower and Middle Coal Measures deposits, which consist primarily of mudstones, siltstones and sandstones, interspersed with bands of coal dipping in a north-east direction. The thickest and most valuable of these coal seams have been given names to help reference and map their mineral value. There are 15 named coal seams which are indicated to subcrop (outcrop beneath soil deposits) within the main Project EAF planning boundary. These named seams are likely to be of mineable thickness, and at least four of these seams are known to have been mined beneath the Site. Additional unnamed coal seams are present but are less likely to be of sufficient thickness or mineral value to have been mined.

Several geological faults subdivide the stratigraphy at the Site. The Kenfig-Tytlwyn Thrust Fault crosses through the Site in an approximate east-west direction and offsets (throws) the geological sequence. The offset is such that several named coal seams are thought to subcrop within the Site on both sides of the fault. BGS records also describe additional faulting (Giant's Grave fault and Morfa fault) at the Site; but without detailed investigation, the conjectured position, and throw of these faults cannot be accurately determined.

Coal mining is known to have historically occurred at the Site, most notably associated with the former Morfa Colliery, formerly located at the Site. The CMRA on part of the Site, identified a low/moderate risk to any future development.

Three mine entries are recorded by the Mining Remediation Authority within the wider Planning Boundary. Wardell Armstrong (now SLR Consulting) has previously carried out physical searches for the three mine entries, proving the position of one shaft and providing search records for the other two. The treatment status of these mine entries is yet to be proven. The three mine entries fall within the Outline Planning Boundary, and thus are not considered further in this Scheme.

Evidence of possible coal mine workings exists for up to ten of the coal seams beneath the Site, and is summarised by each source of the information below:

1. The Consultant Mining Report records workings in the Five Foot, Gellideg, Lower Nine Foot Top Leaf and Garw Vein coal seams.

2. Available Morfa Colliery abandoned mine plans describe workings in the Four Feet (L 4 FT) and Nine Feet (U 9 FT and/or L 9 FT).
3. British Geological Survey held plans and borehole logs indicates workings of the North Fawr, South Fawr, Six-Feet, Four-Feet, Nine-Feet, Five Quarters, and Cribbwr Fawr seams.
4. The North of England Institute of Mining and Mechanical Engineers - Forster Collection, records workings in the Nine Feet (U 9 FT and/or L 9 FT) and Garw Vein.
5. The Northern Mining Research Society website reports the “Morfa colliery worked the North Fawr, South Fawr, Six-Feet, Three-Feet, Nine-Feet, Five-Quarter and Cribbwr seams; and worked the Clay seam between 1854 and 1865”.

Several of the worked seam names can be corroborated by multiple sources, with evidence for the Five Feet (Nine Feet) and Gawr Vein seams reported as worked in three of the above searches. These two seams are the principal worked seams, with record of workings extending across most of the area where the seam is present. The Five Feet (Nine Feet) workings being the largest, with an extraction thickness of 3.3m. The other seams above are recorded as worked across a smaller area and with a lesser extraction thickness.

There is difficulty correlating old records to the modern seam names, particularly where two records provide conflicting names for an individual seam. The Yard seam for example is thought to have been worked beneath the Site, with evidence under its modern name beyond the Site boundary, and possibly via historical names (Four Feet, Six Feet and Clay) beneath the Site. The most recent date of recorded mine workings at the Site is 1913, in the Gawr Vein seam, from the Consultant Mining Report.

Following the assessment made in the CMRA, the likelihood of subsidence or significant ground collapse resulting from deep recorded mine workings of this age and at these depths is very low. This very low risk persists across much of the Site where the coal seams are not at shallow depth. In small and isolated parts of the Site the possibility for historical unrecorded workings at a shallower depth cannot be discounted, and a moderate risk was assessed (with lesser coal seams posing a lower risk). This Scheme of Mitigation is to target areas of low/moderate and moderate risk to better assess the level of risk.

Typical Remediation Programme (mine workings) – Industry Guidance

Remediation of coal mine workings hazards typically involves the injection of a cementitious grout into the mine workings, to fill any voids. The industry standard document is the Abandoned Mine Workings Manual, (CIRIA C758D, 2019) which contains general advice, industry knowledge and outline methods for investigation. This is carried out via a number of boreholes, drilled across the area of risk in a grid pattern. Where evidence for mine workings at shallow depth is identified, the grid spacing may be tightened. Where mine workings are identified and grout takes are high (typically a 5-tonne threshold in a single hole), additional boreholes on secondary grids may be drilled at spacing tighter than the primary grid.

Drilling and grouting on a tightly spaced grid system infills a large majority of the mine workings void, which largely inhibits collapse void migration; but it does not provide strength to prevent the actual collapse of overlying roof strata. Where piled foundations are to be used, grout infilled mining voids without significant rock cover are considered unable to provide the support for a pile. It is more appropriate to remediate the area immediately beneath the pile; either confirming the absence of mine workings, where moderate rock cover is available; or advocating for grout injection below the base of the pile and/or the installation of the pile below the seam horizon with lesser rock cover and/or evidence of workings. In advance of remediation, where piled foundations are to be used, the designer of the pile group should be notified, and become an active participant in the remediation design process.

Typical Remediation Programme (mine entries) – Industry Guidance

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Preliminary Opinion on Mining Risk – Project EAF / Invictus (Full Planning Area)

This opinion is based on existing information about the Site, and the local area, and formulated in line with past experience and industry guidance.

The understanding of the Full Planning area is based on Lawray Architect Drawing EAF-LAW-X-X-DR-A-900009 Rev. P07. The majority of the development within the Full Planning area is a swathe of buildings to the north and to the east of the Operational Lagoon, and consists of the repurposing of existing buildings and the construction of new buildings associated with the steelmaking process. A secondary group of buildings is also proposed, somewhat removed from the main hub of the development and associated with the National Grid Substation, positioned in the Outline Planning Area.

There are recorded workings beneath the Full Planning area, associated with the Morfa Colliery. The colliery worked two of the thickest coal seams in the local area: the Gellideg, and the Five-Foot seams. Additionally, up to eight other seams have been worked beneath the Site, albeit to a lesser extent than the largest seams. The thick Superficial Deposits and shallow tidal groundwater would present a significant challenge to any mining operation, and as such go some way to precluding the presence of ancient and artisanal unrecorded mine workings.

There would appear to be a sequence of 10 to 17 coal seams at shallow depth beneath the Full Planning area, with reference only to proposed new or retained structures an estimated 12 coal seams; where shallow depth is taken as the depth below rockhead (bedrock) equivalent to 10 times the worked thickness of the coal seam. The coal identified is considered to be the following sequence of seams in ascending order: Upper Five Feet, Seams of the Seven Feet Group, Yard, Amman Marine Band (Rider), Bute, Seams of the Nine Feet Group, Red Vein, Caerau, Six Feet, Seams of the Four Foot group, Sulphury, Two Foot Nine, and the Balling seam.

Three mine entries recorded by the Mining Remediation Authority are within the planning boundary of Project EAF but are outside the Full Planning Boundary. The nearest shaft is an estimated 32m beyond the extent of the Full Planning Boundary and considered to be outside of influencing distance.

The Mining Remediation Authority records cannot be considered the ultimate source on the history of coal mining in the area, and particularly prior to the Coal Mines Regulations Act 1887, records of mining were not required to be kept. Indeed, several records of mining activity beneath the Site, previously unknown to the Mining Remediation Authority, have been brought to light in producing this opinion.

The level of risk varies from seam to seam depending on a variety of factors listed below. Each seam will have a mix of factors which either increase the risk and reduce the risk.

Reduced risk:

- No recorded workings at shallow depth
- Limited extent of seam (truncated by fault)
- Thin seam (low commercial value)
- Challenging mining conditions (thick Superficial Deposits)
- Challenging mining conditions (shallow tidal influenced groundwater)
- Challenging mining conditions (faulting)

Increased risk:

- Seam known to be worked elsewhere in South Wales.
- Seam of workable thickness.
- Seam subcrops within the Site (no rock cover mitigation)
- Limited and inconclusive site investigation data
- High collapse migration (steep seam angle)
- High collapse migration (weak, faulted and broken roof strata)

The seams have been grouped into three broad categories to provide a simple summary of the risk. Each Category will correspond to a level of risk and a recommended action for mitigation. The categories are as follows:

Category 1: Seam recorded worked at the Site or highly likely to have been worked. Seam of workable thickness at shallow depth.

Category 2: Seam with no record of working at the Site but of workable thickness and known to be worked by nearby collieries. Seam of workable thickness at shallow depth.

Category 3: Seam of thin or inconsistent thickness, and low potential for workings.

Coal Seam Details

The below coal seams are recorded or conjectured to be present beneath the Site. The average dip taken from min and max values of recorded dip of underground workings in five seams, within main fault block. Taken as 19.2. or $O/A = 0.348$. Many depths and thickness are reported below are vertical thickness and not corrected for dip angle; true stratigraphic thickness is reported where available.

Thick Superficial Deposits are recorded at the Site, with as much as 37m anticipated in the West of the Site. As such, the basic rules which define 'shallow' as a depth of <30m from surface, are inappropriate. Throughout the following section, a coal seam is considered 'shallow' where it is within 10T influencing depth of rockhead

Lower Cockshot seam and Balling seam

BGS memoir for Sheet 247 describes the Lower Cockshot as 0.3m thick and the Balling as 0.37m thick. The vertical separation between these seams is reported by the BGS as 6m. RSK borehole BH330 did not identify a corresponding seam and as such neither seam is proven to be present at the Site. One or other, or both of the seams may nonetheless be present subcropping further to the north than BH330. Neither seam is of particularly great thickness compared to the other seams in the Middle Coal Measures and are not recorded as worked seams.

Risk Level: Category 3

Two Foot Nine seam

RSK borehole BH330 identifies a single coal seam of 0.8m thickness, at shallow depth which is considered to represent the Two Feet Nine seam, suggesting that this seam subcrops further to the north than conjectured by the Mining Remediation Authority. BGS historical borehole SS78NE89 identifies a shallow coal seam of 0.61m thickness (not vertically corrected), which may be the Two Foot Nine. The BGS memoir for Sheet 247 describes this seam as between 0.5m and 1.4m thick, with a sandstone roof in the Cwmavon area. This seam is of workable thickness and is recorded as a worked seam elsewhere. The Two Foot Nine is the youngest seam (and furthest north) with a significant likelihood of workings at the Site.

Risk Level: Category 1

Sulphury seam

BGS memoir for Sheet 247 describes a coal seam of 0.9m thickness, at a depth of 4.6m beneath the Two Foot Nine, and 9m to 12m above the Upper Four Feet seam. BGS borehole SS78NE89 describes a coal seam of 0.61m thickness at a shallow depth, which is presumed to be the Sulphury seam. 11.43m beneath this seam, traces of coal beneath a band of shale, is described, which is roughly consistent with the description of the underlying Upper Four Feet seam. Sulphur rich coal is considered of less commercial value due to lower yield and higher processing costs and is therefore less likely to be worked.

Risk Level: Category 3

Four Feet Group

The Four Feet Group consists of two seams; (Upper and Lower), separated variably by 19.8m to 24.4m of Middle Coal Measures strata. The Upper Four Feet is recorded by the BGS as one of the principal worked coal seams in the area to the east of the Neath Disturbance. While no workings are recorded beneath the Site, the possibility for unrecorded workings cannot be discounted. The Upper Four Feet is described by the BGS memoir as a group of seatearths, coal and carbonaceous shale, from 1.1m to 1.5m thickness. It is considered that BGS borehole record SS78NE89 identifies the Upper Four Feet at a depth of 35.81m (BGL).

The Lower Four Feet has not been identified in any of the boreholes recorded at the Site. Elsewhere it is recorded to have been worked as the Ball Mine seam, primarily for ironstone associated with the coal seam, rather than the coal itself (at Cwmavon, to the north of the Site). There are no recorded workings associated with the Lower Four Feet, but the possibility for shallow unrecorded workings cannot be discounted.

Risk Level: Category 1

Six Feet seam

The Six Feet seam is one of the principal worked seams in the area to the east of the Neath Disturbance. From BGS records, it is inferred that the Six Feet may separate into seams named Big and Little. The Big seam demonstrates high variability with a thickness of up to 2.7m, while the Little is closely associated with the seatearth of the Big, and is only 0.2m to 0.38m thick. RSK borehole BH304 records a shallow coal seam at a depth of 35.0m, of only 0.5m thickness which is conjectured to be the Six Feet seam. The seam is possibly too thick

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to be the Little, but not thick enough, and without an underlying 'little' seam, to be the Big; and so the name for this seam cannot be given accurately.

If the seam identified by RSK is only attributed to the Little Six Feet, the potential for the Big Six Feet to be present at shallow depth to the northeast of this position cannot be discounted.

Risk Level: Category 1

Caerau seam

The Caerau, or Lower Clay is recorded by the BGS as a 0.51m thick seam. While not recorded as one of the principal worked seams, to the east of the Neath Disturbance, is of a workable thickness. The Caerau is anticipated to be present beneath the Six Feet seam, and RSK borehole BH304 records a coal seam of 1.4m thickness, related to the subcrop location of the Caerau. Regardless of the worked history of the Caerau, the presence of a 1.4m thick coal seam demonstrates a seam of workable thickness. Therefore, the possibility of shallow mine workings associated with the Caerau cannot be discounted.

Risk Level: Category 2

Red Vein seam

The BGS historical record for mine entry 277186-001 (SS78NE58) records the shallowest coal seam as the North Fawr. The modern name for this seam is considered to be the Red Vein, based on more modern BGS records. RSK boreholes BH304, and BH324 record a coal seam in approximately similar position, of variable thickness (0.25m and 0.6m respectively – BH324 additionally records a zone of core loss of 1.5m, immediately below the base of the seam). The North Fawr, whether as the Red Vein or otherwise, is a recorded worked seam beneath the Site. As such, the possibility for further workings within this seam, at shallow depth, cannot be discounted.

Risk Level: Category 1

Nine Feet Group seams

A lack of correlation continues below the Red vein, with modern large scale interpretation differing from the historical on-Site records from Morfa Colliery. The second seam of significance in the historical Grange Pit shaft record is referred to as Three Feet, with a thickness of c.0.91m, and a second 'rider' seam of c.0.95m. This is considered to be a 'top' and 'bottom' leaf of the Upper Nine Foot.

Below this is the South Fawr seam, the third seam of significance down the Grange Pit shaft. The BGS memoir suggests that the South Fawr may actually be the Upper Nine Feet, but this is discordant with the conjectured subcrop positions, and is out of place with the overall sequence.

RSK borehole BH324 identifies a sequence of coal seams between 44.1m and 74.5m (BGL) which is considered to be the Nine Feet Group. The Group variably consists of an upper and lower coal seam, which themselves are also split seams.

The Upper Nine Feet seam

RSK borehole BH324 identifies a coal seam at a depth of 44.1m (BGL) and a second underlying seam at 53.7m (BGL), which are interpreted as the Top and Bottom leaf of the Upper Nine Feet. The Upper Nine Feet is “liable to internal disturbance and is not so widely worked” across much of South Wales; but has been worked extensively at the nearby Newlands Colliery to the south of the Site. With two seams of variable thickness, and most notably, a thickness of 1.9m at BH324, the possibility for workings in the Upper Nine Feet seam cannot be ruled out.

Risk Level: Category 1

The Lower Nine Feet seam

RSK borehole BH324 identifies a zone of core loss at a depth of 67.5m (BGL) and an underlying seam of 0.8m thickness, at a depth of 73.7m (BGL). The core loss cannot necessarily be attributed specifically to mine workings, but demonstrates potential weakness.

Risk Level: Category 1

Bute seam

The BGS memoirs describe the Bute as of considerable economic importance, and worked across much of South Wales. The Bute is considered to have been called the Four Feet and is recorded worked at the Site, in close proximity to the mine shaft 277186-001 (Grange Pit). The workings are at significant depth and are not recorded to progress the distance up-dip from the shaft to reach ‘shallow’ depth. , cannot be ruled out beneath the Site, and an area of mining risk is labelled.

Risk Level: Category 2

Amman Rider seam

The Amman Rider is thought to be a thin coal seam immediately below the Amman (Vanderbeckei) Marine Band, which marks the boundary between the Lower and the Middle Coal Measures. The Coal Authority do not record the presence of the Amman Rider, but the seam is shown in vertical section on BGS 1:50,000 scale Sheet 247, and positioned subcropping twice within the Site area on BGS 1:10,000 scale SS78NE. There are no boreholes investigating the seam to the south of the Kenfig-Tytlwyn Thrust fault, while north of the fault RSK borehole BH317 is thought to encounter the sequence of strata of the Amman Rider, with a 0.4m thick 'thin' seam, at a depth of 51.6m (BGL).

The seam is described in the Swansea BGS memoir as a "dirty, sulphurous coal" with a thickness of 0.19m. Mine workings in a such a thin seam are unlikely, with a limited commercial viability, and the close proximity to thicker, more viable seams, is a strong indicator that the Amman Rider has not been worked. Elsewhere in the South Wales Coal Measures, the Amman Rider is thought to have been worked only rarely, where it is reported to increase in thickness, up to 0.61m; and where it may also coalesce with the underlying Yard seam where both have been worked together. The 'outcrop' position of the Amman Rider seam falls within the boundary of the NG Substation, but this should only be considered approximate, given the conjectured nature of the outcrop data and lack of borehole information confirming its presence to the south of the fault. There are no specific records to suggest that the Amman Rider seam has been worked beneath the steelworks, and the seam thickness is of low commercial value. Risk associated with this seam is considered to be very low, but it is recommended to validate the possible presence of the seam by borehole investigation within the area of risk.

Risk Level: Category 3

Yard seam

RSK borehole BH323A identified a coal seam of up to 2.2m vertical thickness. This measurement is made up of 0.7m weathered coal and 1.5m of "No recovery (coal washaway)". The seam depth in this borehole approximately coincides with the Coal Authority inferred/conjectured SW025I 'outcrop' position, and the general dip angle of strata, recorded in coal mine workings beneath the Site. There are no specific records to suggest that the Yard seam has been worked beneath the steelworks, but interpretation of historical records suggest the Yard seam may have been worked, in part, under a different name (Four

Feet); and the Yard seam is known to have been worked elsewhere in the Neath/Port Talbot area. The coal seam is of workable thickness, whether using the full 2.2m thickness or simply the 0.7m thick positively identified coal, and so is considered to be a mining hazard.

It is thought that the Upper Seven Feet seam is closely associated with the Yard seam. BH323A identifies three leaves of coal, tightly spaced at shallow depth, within a 5.5m vertical sequence. It is considered that these seams represent the Yard seam, and a subordinate Upper Seven Feet. The seam separation observed is thought to be too small to suggest that both the Yard and the Upper Seven will have both been worked. Any investigation of the Yard seam should be undertaken with knowledge of the multi-leaf nature of the seam.

Risk Level: Category 1

Seven Feet Group seams

The Seven Feet Group is described by the BGS memoir for Pontypridd and Maesteg as having a “complicated behaviour”, which is reflected at the Site, with coal split into three seams. Some nomenclature from the BGS memoirs divides them into an Upper, Middle and Lower seam. At the Site, the Seven Feet Group is considered to consist of two seams of coal, with the Middle and Lower Seven the most prominent, where the Middle Seven is itself split into two leaves in places. It is generally recorded that the Upper Seven is absent here, in close proximity to, and coalescing with the overlying Yard seam. Both Upper Seven and the Yard are considered to have been identified together in BH320 and BH323A.

BH322 does not identify a coal seam shallower than the very thick Upper Five Foot (see below). It is possible that the very low core recovery returned from BH322 has failed to identify the Lower Seven; but it is taken that the Lower Seven and Middle Seven are not present here. Elsewhere, the Lower Seven is approximately 38m above the Upper Five, based on the two BGS records for the on-Site mine shafts, and would therefore subcrop further to the north of BH322 than is indicated.

The Middle Seven Feet seam

RSK borehole BH323A identifies a 0.6m horizon of coal at an approximate depth of 55m (BGL) which is considered to represent the upper leaf of the Middle Seven Feet seam; approximately 18m below the Yard/Upper Seven Feet interleaved seam. Available records are somewhat contradictory and an approximate understanding is that the Middle Seven is 1.35m thick, in up

to three leaves. Historical workings in the Middle Seven Feet are recorded in the BGS shaft record for the Grange Pit (referred to as Six Feet in SS78NE58) and are at this point at a depth of 167m (BGL). The workings are not recorded to extend significantly in the up-dip direction from the shaft, but the possibility for unrecorded workings at shallower depth in this seam cannot be discounted.

Risk Level: Category 2

The Lower Seven Feet seam

The Lower Seven Feet is not positively identified beneath the Site in the area north of the Kenfig-Tytlwyn Fault, other than the indicated positions within the shaft records. RSK borehole BH12 is thought to have identified a seam of the Seven Feet Group in the region to the south of the fault. This seam is 0.5m thick and correlates with the subcrop referred to as “Spotted Pins” by the Coal Authority. The actual position of the Spotted Pins (see below) is thought to be much lower in the sequence, and the subcrop of SW020i, is considered to relate instead to a seam of the Seven Feet Group. The Lower Seven is considered to have been historically called Smoke at the Morfa Colliery, and Slattog elsewhere in the local area, with a thickness of 0.86m, as described in the Abbot Pit shaft record; and 0.91 (3 ft) on the BGS plan SS78NE. A low potential exists for unrecorded shallow mine workings in this seam.

Risk Level: Category 2

Upper Five Foot seam

RSK borehole BH322 identifies a coal seam at an approximate depth of 21.0m (BGL), which is thought to be the Upper Five Foot seam; the largest of the worked seams beneath the steelworks. In this borehole, this seam is logged with a thickness of 5.0m, which is thought to be an over-estimate of the seam thickness, due to highly fractured strata and poor quality drilling. The Coal Authority data indicates an extraction thickness limited to 3.3m. The BGS record SS78NE58 provides several descriptions of the primary shaft of Morfa Colliery, the Grange Pit (277186-001); where (as the Nine Foot) the Upper Five Foot is reported as a seam of 3.96m thickness, in bands of variable coal quality. The BGS shaft record for the Morfa Colliery Abbot Pit, (SS78NE58, p.26) reports the Upper Five Foot as a seam of 2.75m vertical thickness, alongside a 0.41m thick coal seam lying beneath, named the Danllyd (Dantlid), separated by 0.45m of siltstone. Both seams, along with the siltstone parting, form a total vertical sequence of 3.61m in the shaft – again approximately concordant with the reported extraction thickness. Interpretation of a nearby BGS recorded borehole to the south of the

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Site, SS78NE80, provides description of three distinct seams in close proximity. This is thought to constitute the Upper Five Feet seam, with the coal encompassing sequence measured at 3.81m vertically. This seam is observed in other records with up to five leaves of coal (BGS Memoir 248), which in combined total, will account for the large extraction thickness of this seam, reported at 3.3m.

This seam is extensively worked beneath the Site, on both sides of the Kenfig-Tytlwyn Thrust Fault. The majority of the mine working is at sufficient depth and of sufficient age to not pose a tangible risk. In the area to the north of the fault, by projecting the coal seam in an up dip direction from its recorded position, it can be shown that the coal seam would be truncated by the thrust fault before reaching the surface. While it does not reach subcrop to the north of the fault, the coal seam will be present at shallow depth (<10T rock cover) due to the large extraction thickness.

Risk Level: Category 1

Summary Risk

In light of the above, and taking into consideration of the location of proposed and retained built structures only, it is considered there is a moderate category of mining risk at the Project EAF/Invictus site, which is limited to the zone of influence of the Upper Five Foot seam at a shallow influencing depth; a low/moderate category of mining risk limited to the zone of influence of c.10 seams at a shallow influencing depth; and a low category of mining risk limited to the zone of influence of the Amman Rider seam at a shallow influencing depth.

While there is no recorded mining at shallow depth immediately beneath this area of the Site, there is a seam of high extraction thickness (heavily worked in the down dip direction), and a second seam of workable thickness; potential for unrecorded workings; and a potential for mining collapse to migrate to surface. There is a lack of high-quality ground investigation data nearby and assessment of competent rock cover and worked nature of the seams as a result is difficult.

Scheme of Mitigation

Several parts of the Site are designated as a Development High Risk Area, which are areas where the Mining Remediation Authority considered that coal mining hazards beneath the Site are considered somewhat likely to pose a risk to the built environment. Wardell

Armstrong (now SLR Consulting) prepared a Coal Mining Risk Assessment (Report: ST20879-001) which identified the main hazards, areas of additional risk and recommended further works. This further works is now termed a Scheme of Mitigation, and the outline of which is presented below:

The Scheme of Mitigation will include four elements:

1. Ground investigation consisting of a spread of boreholes drilled to investigate the mining hazards.
2. Detailed Coal Mining Risk Assessment and production of 'live' 3D mining risk model, which shall analyse the ground investigation, assess the risk level, and demonstrate areas of risk.
3. Further investigation and remediation of coal mining hazards, to reduce risk to as low as is practicable. Where a mining hazard exists, the risk can never fully be reduced to zero. The design of the risk reduction will vary depending on the type of hazard (mine entry or mine workings), the revised risk level; the proposed foundation type; and the end use for the land or structure at risk.

Mine Workings Mitigation

The possibility of mine workings in shallow coal seams, and collapse voids in the strata above those coal seams cannot be ruled out. Based on the maximum level of risk assessed, it is recommended that further investigation is carried out in the EAF/Invictus area, to clarify the potential risk areas shown on drawing ST20879-006. This further investigation has been designed to provide coverage focussing on the footprint of buildings and plant forming part of the Full Permission area of the Site, and shall investigate the thickness of roof strata above the coal seams, and the worked nature of the coal seams.

Examples of the evidence for mining include soft drilling, open voids and loss of drilling flush at or above the coal seam horizon; and broken rock suggesting collapse migration. Should mining voids, or evidence to suggest mining void may be present, a more detailed remediation programme should take place, following the typical outline described in the Background. Where the roof rock is found to be of sufficient thickness, or where no evidence of mine workings are identified, the risk category will be reduced, and no further work will be required.

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Where the risk remains elevated by the identification of evidence for shallow mine workings, the remediation will take the form of injection of a cementitious grout mix into the coal horizon. The grout will be injected via a series of boreholes spaced in a pattern with specific consideration of the proposed foundation solution for each structure. Where raft or other shallow foundations are proposed, treatment on an initial 12m x 12m grid, with centres across an area beneath and immediately adjacent to the footprint of any buildings should be carried out with the grid spacing tightening where grout takes are high. Where pile foundations are proposed, the pile designer should consider whether piling to beneath the coal seam horizon is a more practicable option, or grout infilling of any mining void beneath the rock. The location of the treatment works, should be undertaken directly below the base of each pile.



DO NOT SCALE FROM THIS DRAWING

KEY

-  PLANNING BOUNDARY
 HYBRID FULL BOUNDARY
 NATIONAL GRID SUBSTATION BOUNDARY
 HYBRID OUTLINE AREA - DETAIL NOT SHOWN
 GEOLOGICAL FAULT
 COAL SEAM SUBCROP
 INDICATIVE COAL SEAM INSTABILITY ZONES
 SELECTED PREVIOUS INVESTIGATION LOCATION
 GEOTECHNOLOGY PROPOSED INVESTIGATION LOCATION
 MINING REMEDIATION AUTHORITY MINE FINY

NOTES

THIS DRAWING SHOULD BE VIEWED IN
CONJUNCTION WITH DETAILED COAL MINING
RISK ASSESSMENT AND SCHEME OF
MITIGATION (YET TO BE PUBLISHED)

THE COAL SEAMS SHOWN ON THIS DRAWING ARE NOT EXHAUSTIVE AND FURTHER COAL SEAMS ARE ANTICIPATED TO BE PRESENT AT SUBCROP BENEATH THE SITE. REFER TO FIGURE 2.1 OF REPORT ST20879-001.

SUBCROP POSITIONS AND SEAM NAMES ARE STILL WORK IN PROGRESS AND SUBJECT TO CHANGE.

RISK ZONES BASED ON A CONSERVATIVE
AVERAGE DIP OF 17° FROM HORIZONTAL

RISK ZONES ARE AN INDICATION OF THE POSSIBLE PRESENCE OF COAL AND DO NOT DEMONSTRATE THE LIKELIHOOD FOR MINE WORKINGS WITHIN THE SEAM

INITIAL TREATMENT TO CONSIST OF 12m
SQUARE GRID OF BOREHOLES WITHIN
TARGETED TREATMENT AREAS, OR AT THE
PROPOSED POSITION OF A PILE FOUNDATION

EXTENT OF RECOMMENDED TREATMENT IS LIMITED TO THE EXTENT OF BUILDINGS PLUS 10m BUFFER BEYOND THE OUTER FOOTPRINT OF THE BUILDINGS

ONLY KEY BUILDINGS SHOWN FOR CONTEXT PURPOSES. SMALL SCALE BUILDINGS AND OTHER STRUCTURES SUCH AS TANKS DUCTS AND GANTRIES, PIPELINES, ROADS AND RAIL LINES ARE NOT SHOWN BUT SHOULD BE CONSIDERED WITHIN DETAILED RISK ASSESSMENT.

MINING REMEDIATION AUTHORITY DATA USED
UNDER LICENCE: THE MINING REMEDIATION
AUTHORITY IS THE TRADING NAME OF THE
COAL AUTHORITY © THE MINING REMEDIATION
AUTHORITY LICENCE NUMBER CA36/IFTS
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CONTAINS BRITISH GEOLOGICAL SURVEY
MATERIALS © UKRI 2025

TATA STEEL UK AND NG SUBSTATION
PROPOSED DEVELOPMENT LAYOUT BASED ON
DRAWING(S):
1. 3701.00025.TSL.200100.CI.DRG.PL.00008
2. EAF-LAW-X-X-DR-A-900001-Site Location
Plan P05

A FIRST ISSUE		BUILD NO.		REV	DATE
DETAILS		DATE		DATE	DATE
CLIENT					
TATA STEEL UK					
PROJECT					
PROJECT EAF					
DRAWING TITLE					
INVICTUS (FULL PLANNING) - MINING RISK					
DRG NO.		REV		SUIT CODE	
ST20879-006		A		---	
DRG SIZE		SCALE		DATE	
A0		1:2000		26 MAY 2026	
DRAWN BY		CHECKED BY		APPROVED BY	
AJC		RB		RB	
					
PART OF		SLR			