

3 ENVIRONMENTAL CONTEXT AND ALTERNATIVES

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FIGURES

Presented in Volume 4 of this Environmental Statement:

Figure 3.1 Environmental constraints plan

3.1 Site setting and environmental context

Site location and history

3.1.1 The Site is approximately 160 hectares (ha) in size and is located at the central and southern areas of the established Port Talbot Steelworks at Margam in South Wales. The Site comprises an extensive complex of active industry, areas of previously developed brownfield land, and open areas of undeveloped greenfield land. Land uses within the Site include:

- Operational areas of the steelworks – the planning application boundary comprises a number of operational areas of the steelworks, including:
 - Basic oxygen steelmaking (BOS) and casting plant.
 - Contractor compound and process areas – an area of the steelworks demarcated for contractor activity, including staff offices and welfare.
 - Operational lagoon – a large central body of water in the northern area of the Site.
 - Slab yards – a large area of steel slab storage and transfer.
 - Existing pipeline – a route of over-ground utilities pipelines running from east to west across the Site.
 - Coal stockyard – located in the south-western section of the application boundary, adjacent to Morfa Beach.
- The former Grange Works – built in circa 1954, the former Grange Works included a number of buildings, coke ovens, industrial structures and areas of plant equipment. The buildings and structures were de-commissioned in 1999 and demolished in circa 2004. This area of the Site is now previously developed but cleared land.
- Infrastructure – sections of the incoming and outgoing railway line infrastructure and loading/unloading areas partly fall within the application boundary. A number of existing internal and private roads used by staff and visitors to the steelworks also cross the Site.
- Open areas – within the Site are areas of undeveloped and/or re-vegetated industrial land. These are predominantly located in the southern section of the application boundary. This land includes watercourses and drainage ditches ('reens').

3.1.2 The Site is bounded to the north and east by the existing industrial development of the steelworks. To the west, the application boundary extends as far as Morfa Beach. To the south, the main application area extends as far as the fields north of the Longlands Lane access track and public right of way (PRoW). These fields are crossed by the section of proposed electrical cable connection corridor that lies within the application boundary.

3.1.3 The wider surrounding area comprises a wide variety of different uses and character, including:

- West – Morfa Beach and coastline;
- East – mainline railway line, Eglwys Nunydd Reservoir and the residential areas of Margam and Port Talbot, with the M4 beyond;
- South – greenfield land of Margam Moors, with Kenfig Industrial Estate beyond; and

- North – the wider steelworks operated by the Applicant, harbour and docklands operated by Associated British Ports, with Port Talbot settlement beyond.

- 3.1.4 The Site forms part of a long-established and operational steelworks. It is an existing destination and major industrial landmark in Port Talbot and Swansea Bay. Major industrial buildings of significant scale and mass are present in this area of Port Talbot, including large emissions stacks and the two blast furnace structures. The buildings and heavy industrial nature of the area in which they operate are integral elements of the character, appearance, and skyline of Port Talbot.
- 3.1.5 The Site is accessible by a range of modes of transport, including rail, bus, private car and bicycle/walking. The whole of the Site is private and is not publicly accessible. Some industrially active parts of the Site have restricted access due to health, safety and environmental requirements.

Landform and topography

- 3.1.6 The Site is topographically largely flat between 4–7 m AOD, with a slight downward slope westwards towards the sea.
- 3.1.7 The bedrock geology underneath the Site is South Wales Middle and Lower Coal Measures Formation, a sedimentary bedrock of mudstone, siltstone and sandstone. The superficial geology underneath the Site are tidal flat deposits (clay, silt and sand), blown sand and marine beach deposits (sand and gravel).

Settlement and transportation pattern

- 3.1.8 The Site is located approximately 5 km south-east of Port Talbot town centre, 1 km south-west of the residential estate of Margam and 2 km north-west of the residential estate of Eglwys Nunydd.
- 3.1.9 There is an internal rail system within the Site serving the wider Port Talbot Steelworks, which connects to the South Wales main line railway running to the East of the Site. The Site is well connected to the surrounding road network, including the M4 and A4241 to the East and A48 to the north.
- 3.1.10 National Cycle Network Route 4 runs approximately 1 km to the East of the Site. Longlands Lane public right of way (PRoW) runs along the southern boundary of the Site.

Hydrology

- 3.1.11 The Site is located directly adjacent to Swansea Bay/Bristol Channel along its south-western boundary.
- 3.1.12 The River Afan (Afon Afan) is located north of the Site, while the River Kenfig (Afon Kenfig) is located south of the Site.
- 3.1.13 There is a network of small ditches and drainage channels ('reens') to the south-east of the Site associated with Margam Moors. Named ditches in this area include Lower Mother Ditch and Middle Mother Ditch, though a number of interlinked unnamed ditches are also present.
- 3.1.14 A number of small waterbodies are present within the Site or in the immediate vicinity. An operational lagoon is located within the Site boundary. Eglwys Nunydd Reservoir is located to the south-east of the Site, bounded to the west by railway lines and to the east

by the M4 motorway. The reservoir is an 110 ha supply reservoir constructed to provide water for the steelworks.

- 3.1.15 A small area of the southern extent of the Site is located within Flood Zones 2 and 3, for rivers and the sea. Throughout the Site there are small areas in Flood Zones 2 and 3 for surface water and small watercourses, particularly in the operational lagoon situated within the Site which is in Flood Zone 3.

Environmental designations

- 3.1.16 The environmental constraints plan provided in **Figure 3.1** presents the main environmental features and designations within the vicinity of the Site identified from publicly available datasets. Key designations in close proximity to the Site are summarised as follows:

- Margam Moors Site of Special Scientific Interest (SSSI) and Eglwys Nunydd Reservoir SSSI are located adjacent and 310 m to the south of the Site respectively. Kenfig/Cynffig SSSI is located over 1km to the south of the Site.
- Kenfig/Cynffig Special Areas of Conservation (SACs) is located over 1 km to the south of the Site.
- Kenfig Pool and Dunes National Nature Reserve (NNR) is located over 1 km to the south of the Site.
- Kenfig Pool and Dunes Local Nature Reserve (LNR) is located over 1 km to the south of the Site.
- Margam Country Park is located approximately 1 km to the east of the Site.
- There are two areas of National Forest Inventory located within the Site boundary. A further six areas are located within 1 km of the Site.
- The Site is located within the Neath Port Talbot Watercourses Site of Nature Conservation Importance (SINC). The Eglwys Nunydd (coincident with SSSI boundary as above) and Junction 38 Wetland Complex SINC are both located within 1 km of the Site to the southeast and east of the site respectively.
- Margam Park Conservation Area is located approximately 1 km to the east of the Site.
- Listed Buildings. There are two Grade II* and three Grade II Listed Buildings within 1 km of the Site. The closest of these is the Grade II listed milepost at Tollgate Park, approximately 850 m north-east of the Site
- There are two non-designated heritage assets located within the Site. These are Morfa Colliery and Theodric Grange. Additionally, there are 17 non-designated heritage assets located within 1 km of the Site.

3.2 Consideration of alternatives

- 3.2.1 Regulation 17¹ and Schedule 4² to the EIA Regulations 2017 require an environmental statement to include an outline of the reasonable alternatives studied by the Applicant which are relevant to the Proposed Development, together with an indication of the reasons for selecting the preferred option. Consideration of reasonable alternatives focused on the following:

¹ <https://www.legislation.gov.uk/wsi/2017/567/regulation/17/made>

² <https://www.legislation.gov.uk/wsi/2017/567/schedule/4/made>

- 'Do nothing' scenario
- 'Alternative sites;
- Alternative designs; and
- Alternative technologies.

Do nothing/do minimum scenario

- 3.2.2 Information released publicly by Tata Steel UK³ indicates that since 2007 it has lost £4 billion and this position has deteriorated further since 2023 due to the increase in energy costs and ageing assets which are expensive to maintain and operate.
- 3.2.3 Tata Steel has indicated publicly that these losses are not sustainable and therefore an alternative business model and significant new investment is required to support the continuation of the UK business.
- 3.2.4 Generating significant new investment in maintaining the *status quo* at a facility which currently emits approximately 20% and 2% respectively of Welsh and UK national emissions (in 2020) would be very challenging in a net zero-led policy environment, and where public and consumer pressure is increasingly focused on clean and sustainable products.
- 3.2.5 This has led Tata Steel to the conclusion that investment at the level required at Port Talbot could not be justified economically or environmentally to support the current methods of production.
- 3.2.6 The 'do nothing' scenario would therefore constitute the closure of the steelworks and cessation of steel production at Port Talbot. The Site would likely be re-developed for unknown purposes.

Alternative sites

- 3.2.7 Tata Steel has seven manufacturing sites within the UK, located at Port Talbot, Llanwern, Trostre, Corby, Hartlepool, Shotton and Shapfell (Tata Steel UK, 2024⁴). However, the Port Talbot site is the only integrated site with all the main processes required for primary steel making taking place at the same location. Developing the equivalent infrastructure at a new location would be uneconomic and require a significantly greater development footprint than could be accommodated within Tata Steel's existing land estate. Such development would also likely result in greater environmental impact than it would at Port Talbot where some of the existing land and assets can be re-purposed or re-used.
- 3.2.8 The Port Talbot site is therefore the only viable UK location available to Tata Steel with the necessary infrastructure and land availability to support the development of an EAF.
- 3.2.9 Other Tata Steel UK sites have good downstream and distribution capacity; while there may be further developments at these sites to meet the requirements of the market in the future, currently there is no immediate need for wholesale re-development.

³ [Green Steel Future | Tata Steel UK \(tatasteeleurope.com\)](https://www.tatasteeleurope.com/green-steel-future)

⁴ [Sites and facilities | Tata Steel in Europe \(tatasteeleurope.com\)](https://www.tatasteeleurope.com/sites-and-facilities)

Alternative designs

- 3.2.10 Previous designs for the EAF envisaged a different site within the steelworks, occupying land further to the south of the current proposals, focused on previously developed land at the southern end of the steelworks complex and extending into the greenfield land to the north of Longland Lane.
- 3.2.11 This was driven in large part by the intention at that time for a phased transition from the existing steelmaking processes to the EAF, with existing 'heavy end' processes (the coke ovens and blast furnaces primarily) continuing whilst the EAF was being constructed and commissioned. Production would then subsequently transition to the EAF through a phased closure of the 'heavy end'.
- 3.2.12 It has now been determined by Tata Steel that continued operation of the 'heavy end' is no longer safe or economically viable and this will therefore cease irrespective of the EAF application.
- 3.2.13 This has facilitated the location of the Proposed Development to move north into the steelworks, utilising a greater proportion of brownfield land and increasing the stand-off distance from the public access provided by Longland Lane.
- 3.2.14 It is anticipated that the Proposed Development will have fewer adverse environmental effects than the previous proposals, with the principal differences being:
- Reduced requirement for greenfield land and therefore reduced potential for ecological and archaeological effects.
 - Greater integration with the existing built form of the steelworks.
 - Increased distance from the public right of way at Longland Lane, with resultant reduced visual impact.
 - Better integration with existing access routes and other site infrastructure, allowing greater re-use of existing facilities including the casters, hot and cold mills.
- 3.2.15 Once the preferred site had been selected, the layout was guided by the availability of land and the desire to re-use and re-purpose existing assets as far as possible. The EAF will be developed within the existing BOS plant building, making use of the existing structure site infrastructure which serves it and ensuring a continued sufficient degree of separation for safety and amenity purposes from the residential areas of Margam and Port Talbot to the east.
- 3.2.16 The scrap handling is proposed for the land to the south, utilising the large areas of previously developed, but cleared, land already present in that area. The land is therefore already available for this purpose with limited need for demolition of structures or removal of natural habitats.
- 3.2.17 An alternative layout to that proposed would involve more demolition of existing structures, and a greater level of replacement construction activity. The layout proposed is therefore the most environmentally and economically advantageous.

Alternative technologies

- 3.2.18 There were two other main alternative steelmaking technologies to EAF considered by Tata Steel when determining the future use of the site; these are as follows.

Alternative technology 1: Blast furnace & carbon capture, use and storage (CCUS)

- 3.2.19 This option would involve the retrofitting of the existing steelmaking processes at Port Talbot, with a focus on capturing blast furnace gas and safely storing it, or using it to make other products. CCUS is well established in other sectors but has not yet been applied at scale within the steel industry. There is no known track record of CCUS being applied to steel-making at the scale required at Port Talbot, and hence the investment and technological risk would be high.
- 3.2.20 CCUS would additionally still require significant investment in renewal of existing infrastructure, specifically the blast furnace and coke ovens. The environmental and economic case for such investment would remain challenging given the continued reliance on coal to operate the facility, the public perception of this, and the associated environmental costs of coal extraction and transport.
- 3.2.21 CCUS deployment at the necessary scale would require access to a CO₂ transport network and suitable geological storage location. Such facilities do not currently exist in the vicinity of Port Talbot and CO₂ would therefore have to be compressed and transported by road.
- 3.2.22 The use of alternative technology 1 would mean limited work to the current site as some existing assets would remain viable. However, due to much of Port Talbot's heavy-end assets (coke ovens and blast furnaces) reaching the end of their operational lifespans, the lack of CCUS being applied at scale, and continuing reliance on coal as a non-renewable energy source, this option does not align with reaching sustainability and net-zero emissions goals.

Alternative technology 2: H₂ direct reduced iron (DRI) & electric arc furnaces (EAF)

- 3.2.23 This option would involve replacing carbon in ironmaking with a focus on the reduction of iron ore with hydrogen to make solid DRI which is then melted in an EAF. Current DRI technology uses natural gas, although hydrogen DRI is being developed. Hydrogen made with renewable electricity in DRI production offers a potential route to CO₂ free ironmaking.
- 3.2.24 This approach would avoid using coal, with natural gas-DRI and EAF technologies well established and suitable for a wide range of steel grades. However, renewably sourced hydrogen at the scale required is currently unavailable, and no confident timescale could currently be placed on when sufficient supply could be secured. With the Port Talbot heavy-end assets reaching the end of their operational lifespans before this date, hydrogen DRI is unlikely to be a feasible solution to current requirements for the site without interim reliance on natural gas.
- 3.2.25 This would still entail significant investment without the immediate de-carbonisation benefits, and create a need for further significant investment to convert the processes to hydrogen if/when sufficient supply were to come available.

Rationale for chosen option EAF

- 3.2.26 In summary, EAF presents the most appropriate solution for the continued use of the Port Talbot site in comparison to the alternative options. Focusing on recycling steel, of which the UK has a large surplus (8 million tonnes exported every year, which is more than any

other country in the world), and ultra-low emissions if the electricity supplied to EAF comes from renewable sources.

3.2.27 Compared to alternative technology 1, EAF technology is already well established at an industrial scale to meet the demands of the site. Additionally, EAF is compatible with green DRI, so there is the potential to develop the site further in the future. In the short term, not all steel grades are proven using EAF, with work ongoing to mitigate any potential impacts.

3.2.28 The proposed EAF process will enable a circular economy as follows:

- EAF steel production – enables new steel to be manufactured from scrap steel as opposed to the current operations at Port Talbot that require steel to be manufactured from raw materials, a traditionally carbon intensive process.
- Manufacturing of products using steel – during the manufacturing process, any scrap steel can recommence EAF production to produce new steel.
- Steel in use – steel is 100% recyclable and can be used indefinitely.
- Post-consumer steel scrap – steel is easily identifiable in recycling and can be harvested and returned through the EAF process. The EAF also discovers other metals such as zinc, which is often a steel coating to enhance durability. This therefore benefits other circular supply chains.