

4 Site selection and design evolution

4.1.1 Schedule 4(2) of the EIA Regulations requires the following in relation to consideration of alternatives for a proposed development:

4.1.2 *‘A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects’.*

4.1.3 This section provides an overview of reasons for the selection of the site and how the design has evolved to reach the current outline planning application design.

4.1 Site selection

4.1.4 The Nant Helen site was selected for this project because it has a number of important advantages:

- It is large enough to accommodate the needs of the rail industry on a single site;
- It is in single ownership with no requirement to use compulsory purchase powers;
- The natural termination of existing coaling use (Celtic Energy is decommissioning the site in 2021), means it is available and a new industrial legacy can be simultaneously created;
- Good access to the rail network, strategic road network and to deep water ports; and
- Strong potential for local regeneration, and an opportunity to avoid the long-term socio-economic issues that can otherwise occur when mines close.

4.1.5 Due to the scale of the project there were very few alternative site options. Sites at Llanwern and St Athans were considered however the constraints were deemed more difficult to overcome than those presented at Nant Helen. Llanwern was deemed too narrow to accommodate the large tracks required while St Athans posed major challenges regarding land ownership and acquisition and was considered to be too close to highway and residential receptors.

4.2 Design Evolution

4.1.6 The proposed GCRE project has been shaped through engagement with the rail industry, rail academic and other institutions over a

period of nearly 2 years. This engagement with the rail industry has shaped the illustrative layout and the components of the project which are described in more detail in Chapter 3.

4.1.7 The evolution of the scheme and ultimately the illustrative masterplan that encapsulates the output has been influenced and driven by the environmental assessment work that has been carried out in parallel with the development of design proposals. This has led to a scheme design which embeds environmental considerations, identified throughout the ES as ‘embedded mitigation’.

4.1.8 Key constraints and considerations have included:

- Surrounding context in terms of proximity to the National Park;
- Ecological sensitivities;
- Proximity of settlements and residential receptors;
- Topography and ground conditions;
- Connections into the existing railway line;
- Utilities, predominantly overhead powerlines;
- Public Rights of Way;
- Common land;
- Heritage assets;
- Rail industry consultation requests for facilities and the number and size thereof; and
- Technical high speed and infrastructure testing requirements

4.1.9 The preliminary design was developed in September 2018 and included seven base loop options which varied in speeds between 80 and 125mph. These plans were further developed, adding in initial plans to include ancillary testing facilities and track connections.

4.1.10 In November 2018, following Steering Group review, a number of options were dropped for the main loop alignment, leaving only the 95, 110 & 125mph outer loop options. These were developed for the constraints workshop held on 11th of November 2018. This review considered the development of different tracks and loops within the loop which led to the conception of the ‘Squeal track’. The ‘Squeal track’ was a concept of a test track with extreme geometry to test the performance of rolling stock through difficult scenarios such as, tight and reverse curves or steep gradients. These are designed to mimic constraints seen in the wider rail network.

4.1.11 A constraints meeting was held on the 17th of January 2019. TfW and the WG wished for the 95mph loop to be dropped, placing emphasis

on the 125mph line. In the business case for the scheme, a separate storage for train fleets was also discussed.

- 4.1.12 On the 20th of February 2019 industry engagement was held. The 125mph line was dropped as it was deemed unnecessary and would require difficult earthworks requirements and 1,000m straights on the main loop were added to allow for effective brake testing for most rolling stock. Network Rail suggested adding an infrastructure testing track as this would add value to the project, due to the lack of this type of facility in the UK. The eastern curve radius was reduced from 840m to 600m to reduce the earthwork requirement.
- 4.1.13 A High Tonnage Loop and Vehicle Performance Loop were developed and added to the 110mph loop option. Currently Network Rail must test high tonnage loads on the live network or to a test centre outside the UK, which adds risk and cost to the testing. The Vehicle Performance Loop was an extension of the 'Squeal Track', to test rolling stock's performance in extreme circumstances.
- 4.1.14 Calculations showed an unacceptable cut and fill balance when the design contained both the High Tonnage and Vehicle Performance Loops, thus the Vehicle Performance Test loop was omitted from the design.
- 4.1.15 Following conversation with Siemens, in order to brake test their fleet of rolling stock, additional straight lengths are required (up to 2140m). After discussions regarding earthwork requirements the Impact Track was omitted and the eastern curve radius was reduced to 530m (reducing line speed by 5mph). This reduction was to avoid the National Grid overhead lines.
- 4.1.16 On the 4th of April 2019 the washing facilities were relocated to the south east to allow the inclusion of the carriage wash.
- 4.1.17 Following pre-application consultation, some changes were made to the design in terms of ecological mitigation, noise barrier locations/heights and drainage. These changes have been made in response to comments and potential concerns raised by statutory consultees and NPTCBC/PCC.
- 4.1.18 Appendix 4B provides plans and more description of the design iterations.