



LS Civil Engineering Ltd

RWE Pembroke Synchronous Condenser
Project

CASE STUDY

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RWE Pembroke Synchronous Condenser Project

In the UK's Electricity System Operator (ESO) Pathfinder 3 procurement event, which concluded in Q4 2022, RWE was awarded a contract to deliver grid stability services to the transmission network from its operational site at Pembroke. This led to the construction of a new Synchronous Condenser at the site, which is scheduled to be operational in Q2 2026.

The project comprises a multi-million pound investment and represents the first deployment of this technology by RWE in the UK.

Contracted by Metlen who undertook the role of Principle Contractor, LS Civil Engineering Ltd tackled one of Pembrokeshire's largest and demanding Civil Engineering projects of 2024-2025.

We played a key role in the successful delivery of the Pembroke Synchronous Condenser Project, providing a range of complex civil engineering works to support critical electrical infrastructure. The project formed part of the UK's grid stability programme, designed to enhance power system resilience as renewable energy generation increases.

LS Civil Engineering Ltd was responsible for delivering multiple reinforced concrete structures, foundations, and associated civil infrastructure necessary for the installation of high-voltage electrical equipment and plant systems.

Scope of work

LS Civil Engineering Ltd completed a comprehensive package of civil works including:

Excavation for the installation of GIS Building, SCB Building, Transformer Bay Area, Plant System Drainage Pits.

Ground improvement layers utilising Geo grid as per design

Site wide Drainage, 800m of 100mm - 630mm utilising various pipe materials and installation methods.

Main Earthing Grid, 900 linear meters, all passing continuity testing, Exothermic welding connections

Fire Main Installation, 560 meters 250mm HDP, all tested and passed first time

Full Road Construction, 500 meters throughout site

Security Fencing, with anti-burrow bases along the south and west perimeter as well as internal security fencing for several locations.

Landscaping, 4000m²

Challenges

Poor design review lead to a number of issues being highlighted by our Engineers. This was resolved by our engineers having to work closely with the PC Providing them with n the ground solutions to rectify design issues, and clashes.

Last minuet changes to design leading to clashes within program, To ensure program was kept additional personnel were allocated to our project scope and LS Civil Engineering took a proactive role in ensuring that Strict time scales were adhered to and milestone targets hit.

Limited access throughout the project with the addition of Simultaneous operations meant that co-ordination needed to be precise and well communicated to ensure efficiency and safety were maintained throughout.

Health, Safety and Quality

LS Civil Engineering Ltd maintained a strong focus on health, safety, and quality throughout the project. With Trimtech site services Ltd have produced robust quality packages, ITPS and managed the quality system, in addition to providing all Site engineering requirements. All work was carried out in compliance with Metlen and RWE site safety requirements and industry standards. Strict quality control procedures ensured that structural integrity and alignment requirements for installations were consistently achieved and fully documented.

Project Outcome

The civil engineering works delivered by LS Civil Engineering Ltd provided the essential structural infrastructure required for the successful installation of the synchronous condenser equipment at Pembroke.

Through precise construction, strong project coordination, and a commitment to quality, LS Civil Engineering Ltd has contributed to a successful key energy infrastructure project supporting the continued stability of the UK electricity network.



Lessons Learnt

Design Review: Although not a part of the design review team LS Civil Engineering has been able to highlight the importance of Design Review. Early involvement with our engineers would have been able to mitigate issues before they started to cause redesign at late stages which prove to be costly and often cause delays.

Sequencing: This project has reaffirmed existing knowledge of the importance of sequencing on large projects and how small changes can have a major impact further down the line if the management of change is not correctly controlled

Co-ordination, communication: Daily meetings with contractors, PC and client have been vital to ensuring that teams are well informed of the activities on site, with keeping clear and effective lines of communication open the team have been able to work effectively with other stakeholders, minimising interruption to tasks and frustration that comes with delays or miscommunication.

