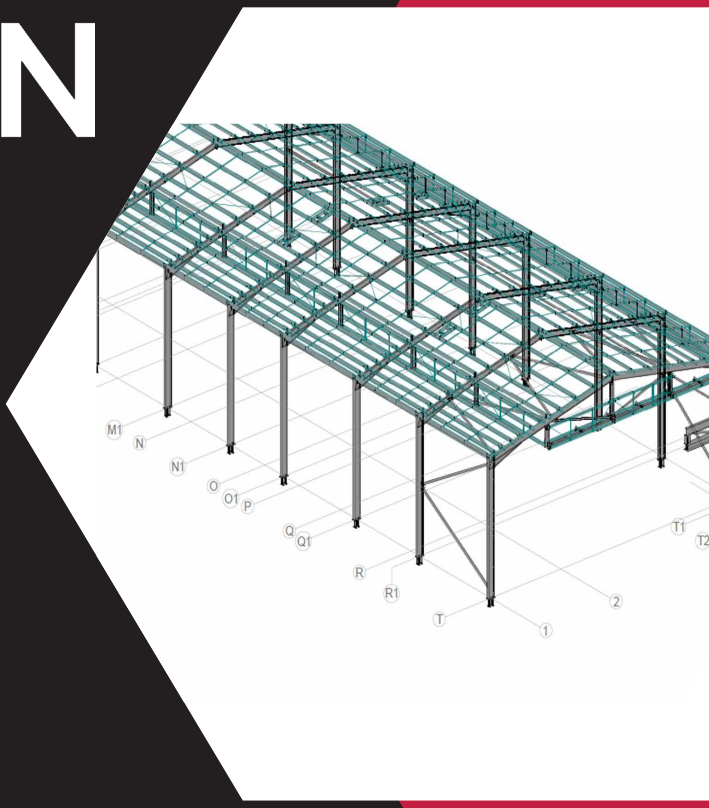
HEXAGON

Case Study

Hull Botanic Gardens Depot Infrastructure Upgrade Works



Hexagon was engaged under a design contract to deliver rail depot infrastructure upgrades and structural modifications to Northern's rail maintenance shed

Customer	Completion Date	Location
Northern	**May 2021**	**Hull Butanic Gardens**

ABOUT US

HEXAGON (formerly Epsilon Design Engineers) is a design consultancy providing engineering expertise and services, specialising in rail depots and designs relating to train facility infrastructure works.

Working closely with developers, contractors, and other stakeholders to ensure that your project's structures are safe, stable, and structurally sound.

Hexagon's construction heritage ensures that they understand construction compliance and real-world situations to provide you with trusted, reliable and workable designs.

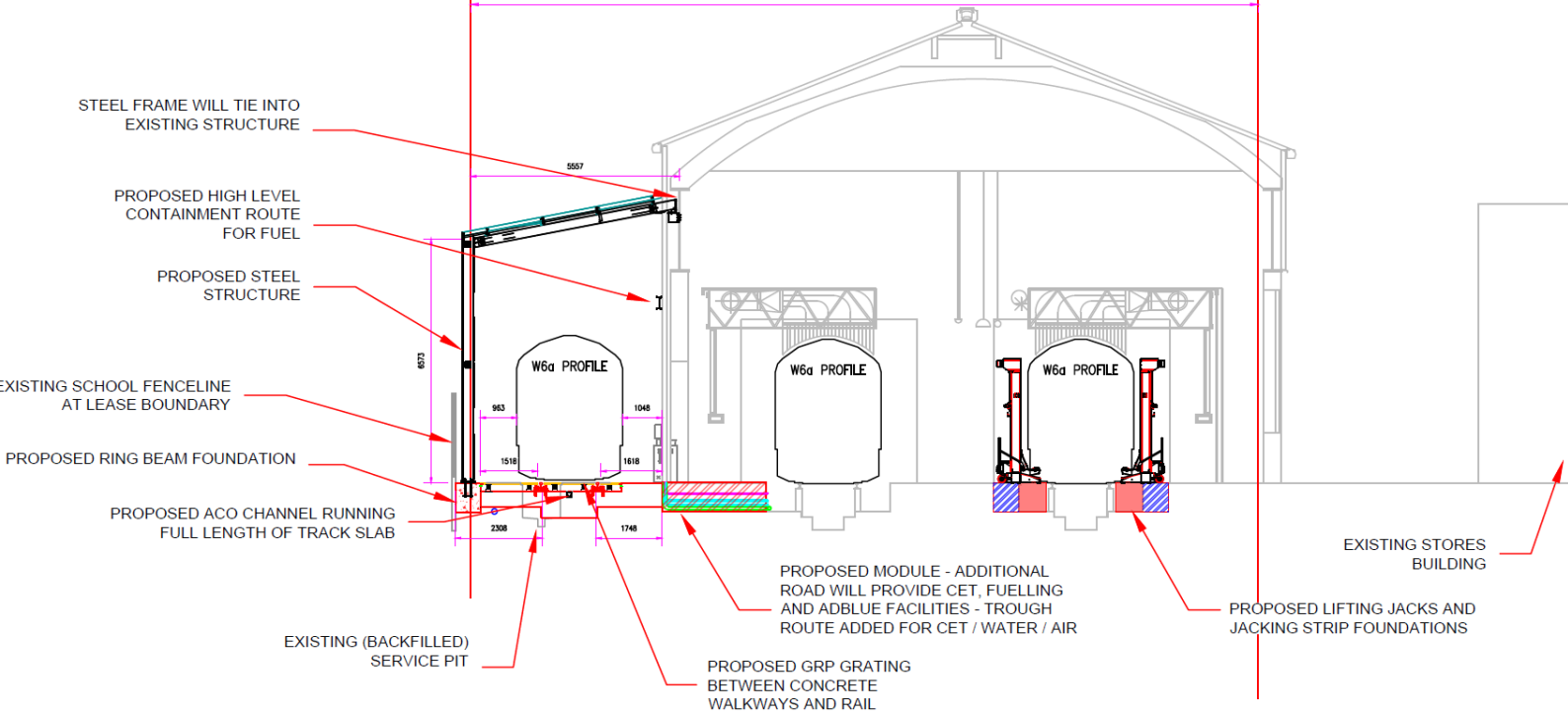
DESCRIPTION

This project involved a comprehensive renovation and enhancement of Northern Rail's Hull Botanic Gardens maintenance depot, delivering significant rail depot infrastructure upgrades and structural modifications to the existing rail shed building.

The works focused on replacing a life-expired shed roof and upgrading the depot's servicing capability to support new rolling stock, including Class 170 and Class 155 vehicles, while maintaining depot operations and minimising disruption. The existing roof structure was dilapidated, with prestressed beams requiring replacement, and the depot infrastructure needed enhancement to meet modern operational and safety standards.

Working in partnership with Cairn Cross, Hexagon undertook a series of detailed surveys, structural assessments, and design development activities to enable the safe replacement of the roof and integration of new facilities. The scope included the introduction of roof access equipment, jacking systems, pedestrian footbridge upgrades, and the provision of new fuelling, CET, tanking, and AdBlue facilities, complete with weather protection canopies.

The project also delivered a new stabling road for 3-car Class 170 units, incorporating defined walking routes and Safety TrackPan GRP walkways to improve safe access around rolling stock. Additional works included the design of a bespoke steel exoskeleton over the existing building, reinforced concrete foundations for a 12-tonne jib crane, new permanent way, lighting, drainage, and mechanical and electrical systems tied into the existing depot infrastructure.

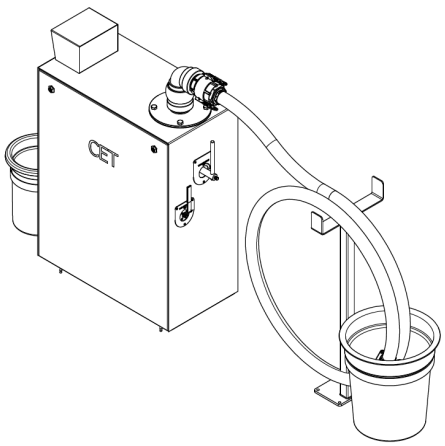


Outline & Detailed Design | **Calculation & Temp Works Design Package** | **Consultancy & Design Management Services** | **Design Studies / Feasibility Reports** | **Topographical & Point Cloud Surveys**

REQUIREMENTS

Hexagon provided a full design solution covering all critical aspects required for the successful integration of the new system, including:

- Replacement of life-expired shed roof with minimal disruption to ongoing operations
- Increase depot servicing capability to support new rolling stock fleets
- Provision of:
  - 4No. jacking systems on Road 1
  - Roof access equipment (boxing ring) for Class 170 and Class 155 vehicles
  - Additional mesh guarding to the existing pedestrian footbridge
  - Fuelling, CET, tanking and AdBlue services with weather protection canopy
  - New stabling road for 3-car Class 170 vehicles with defined walking routes
  - Reinforced concrete foundation for a 12-tonne jib crane
- Network Rail–compliant design in accordance with the GRIP process
- Existing buried services surveys
- Desktop studies including gauging, infrastructure dimensions, and rolling stock clearances
- Site investigations to assess the condition of building steelwork, concrete structures, and permanent way
- Ground investigations including core sampling, condition surveys, and 3D point cloud survey
- Outline and detailed design drawings, including:
  - Foundation layout plans and structural calculations
  - Steelwork and fabrication details
  - Drainage, cladding, and piling designs
- Bespoke design of a steel exoskeleton to over-clad the existing structure
- Mechanical and electrical design covering ventilation, lighting, power supplies, charging systems, CCTV, drainage, and troughing integrated with existing depot systems



The design met with the client requirements and NR_L2_CIV_003 Issue 7- Engineering and Architectural Assurance of Building & Civil Engineering Works

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