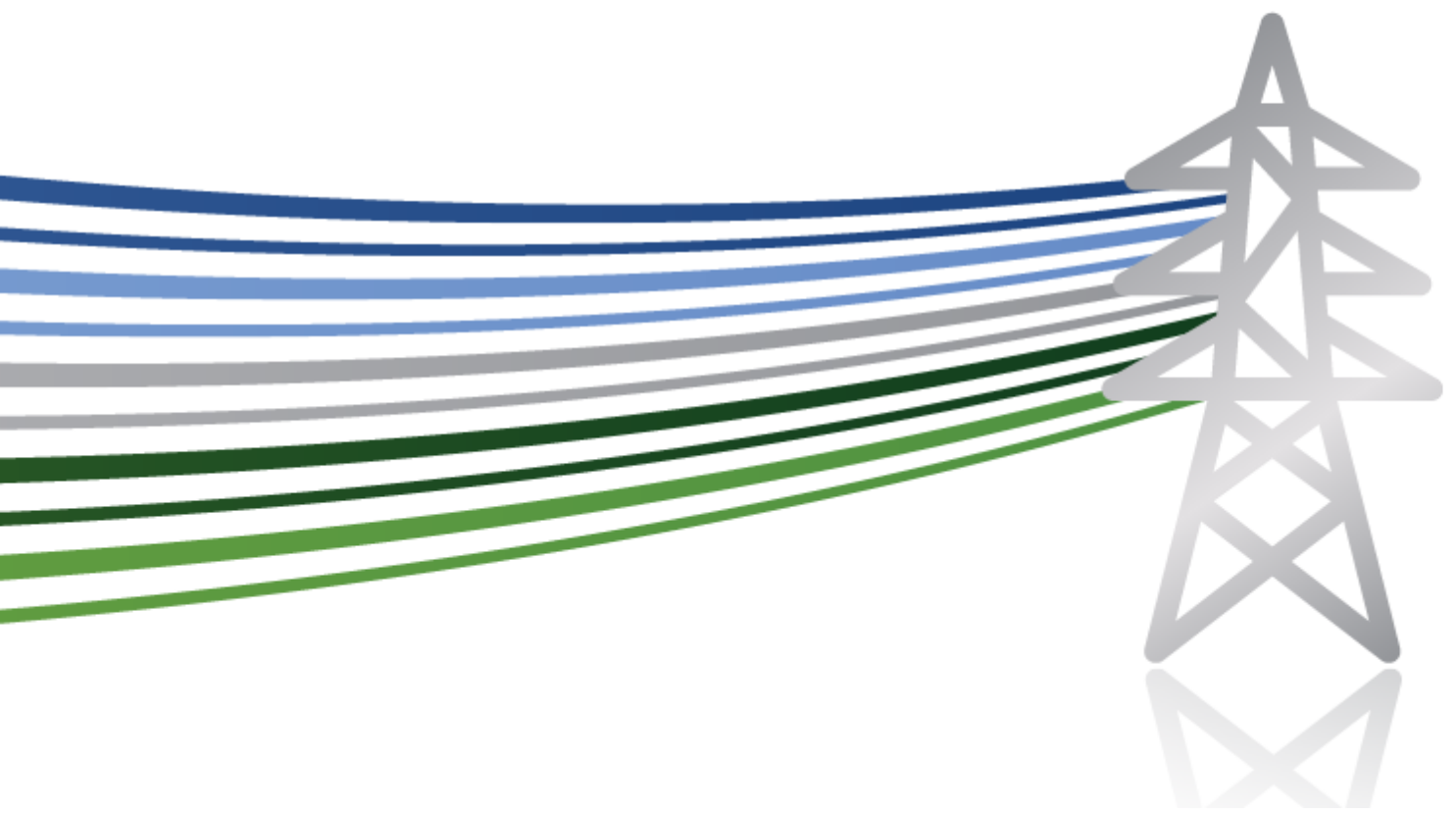


SHE Transmission

New Suite of Transmission Structures: NeSTS (SSEN003)

Creation of Technical Specifications

August 2018



Contents and Overview

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1. Preliminary Technical Specification for NeSTS 132kV Double Circuit Medium Duty

Overview of NeSTS

Scottish Hydro Electric Transmission plc (SHE Transmission) is developing a New Suite of Transmission Structures (NeSTS), which are planned to be deployed on the Transmission Network

Overhead lines (OHLs) built using transmission structures are the most visible element of the transmission network, and the impact OHLs have on the environment can cause stakeholders concern.

The only available alternative to the steel lattice structures traditionally used in OHL construction is the T-Pylon. Developed by National Grid, the T-Pylon reduces the visual impact of OHLs but may be unsuited to areas with challenging terrain and propensity for severe weather events.

Establishing new infrastructure in these areas is essential to connect renewable generation, so there is a need for a new type of structure to address stakeholder concern.

The NeSTS project will develop innovative designs for OHL structures based on new technologies and techniques. The new suite of structures will then be deployed on the transmission network.

The NeSTS Project seeks to prove the following benefits:

- Improved OHL environmental performance by lowering visual and construction impacts; and
- Lower OHL whole life asset costs via reduced land, construction, maintenance and outage requirements.

Introduction

The Project is developing the following suites of structures;

- NeSTS 275kV Medium Duty
- NeSTS 132kV; Double Circuit Medium Duty; and
- NeSTS 132kV Single Circuit Medium Duty

These have developed in response to changing network requirements for OHLs which may be constructed using NeSTS.

Their technical specifications are at correspondingly different stages of evolution, however, subject to passing its impending Stage Gate, and successful full scale testing, the Project plans to publish them as new documents in the ENA 43 series of overhead line specifications.

This report details the status of each of these documents, and introduces the Preliminary Technical Specification for NeSTS 132kV Double Circuit Medium Duty.

Its submission fulfils the requirements of the Project's third Successful Delivery Reward Criterion (SDRC), Creation of Technical Specifications.

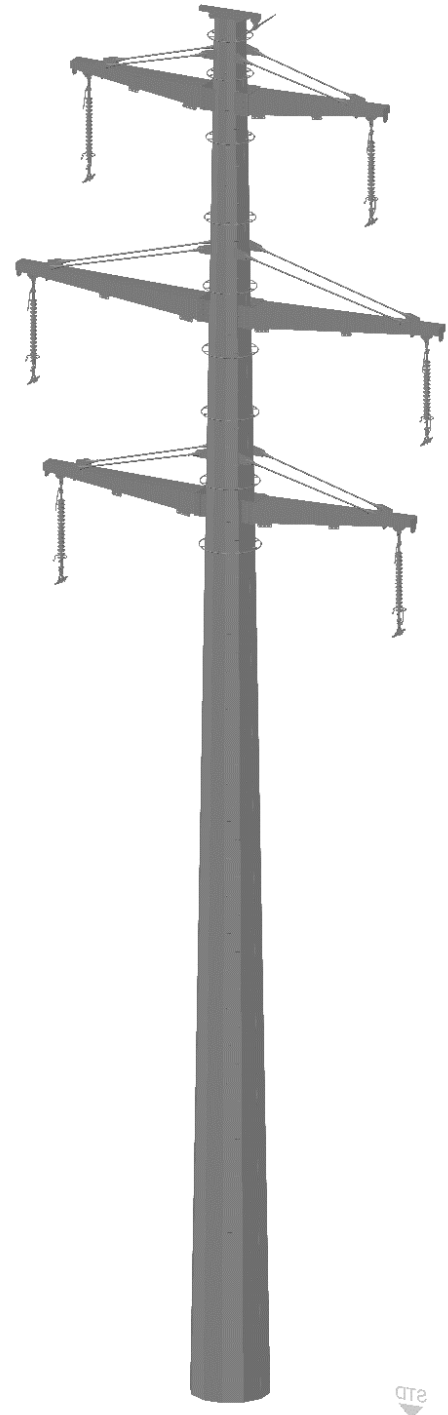


Figure 1: NeSTS 132kV Medium Duty Double Circuit D2 Support

Creation of Technical Specifications

Evolution from Design Briefs

Design briefs are developed corresponding to OHL project requirements and stakeholder inputs. The Project submitted design briefs for the NeSTS 275kV Medium Duty and NeSTS 132kV Medium Duty suites as appendices to its report on the Outputs of Stakeholder Engagement in 2017.

In the meantime, a design brief for a NeSTS 132kV Single Circuit Medium Duty suite has been developed.

The evolution from design brief to preliminary technical specification involves;

- Scrutiny by technical experts;
- Design refinement in response to prototyping;
- Design refinement in response to optimisation by manufacturers;
- Design endorsement by main construction contractors;
- Design refinement in response to testing; and
- Presentation in ENA 43 series format

Preliminary technical specifications will then be subjected to scrutiny by the Energy Networks Association (ENA) OHL panel and, in conjunction with full scale testing plans and specifications, by the SHE Transmission Technical Authority.

Status of Specifications

The NeSTS 275kV Medium Duty suite design brief is ready to be prepared for design endorsement by a main construction contractor. The preparation for this stage will embody the learning from both 132kV suites.

The Preliminary Technical Specification for NeSTS 132kV Double Circuit Medium Duty suite is presented in ENA 43 series format in Appendix 1. The load case analysis for this suite is currently being revised following input from the main contractor, and its cross arm connection design is being refined following cross arm testing. When these tasks are completed, it will be presented for scrutiny by the ENA OHL panel.

The Project is currently focussed on the development of the design brief for the NeSTS 132kV Single Circuit Medium Duty suite which is intended for construction in Phase 2 of the Project following the impending Stage Gate (Decision to Proceed).

Creation of Technical Specifications

Plans for Publication

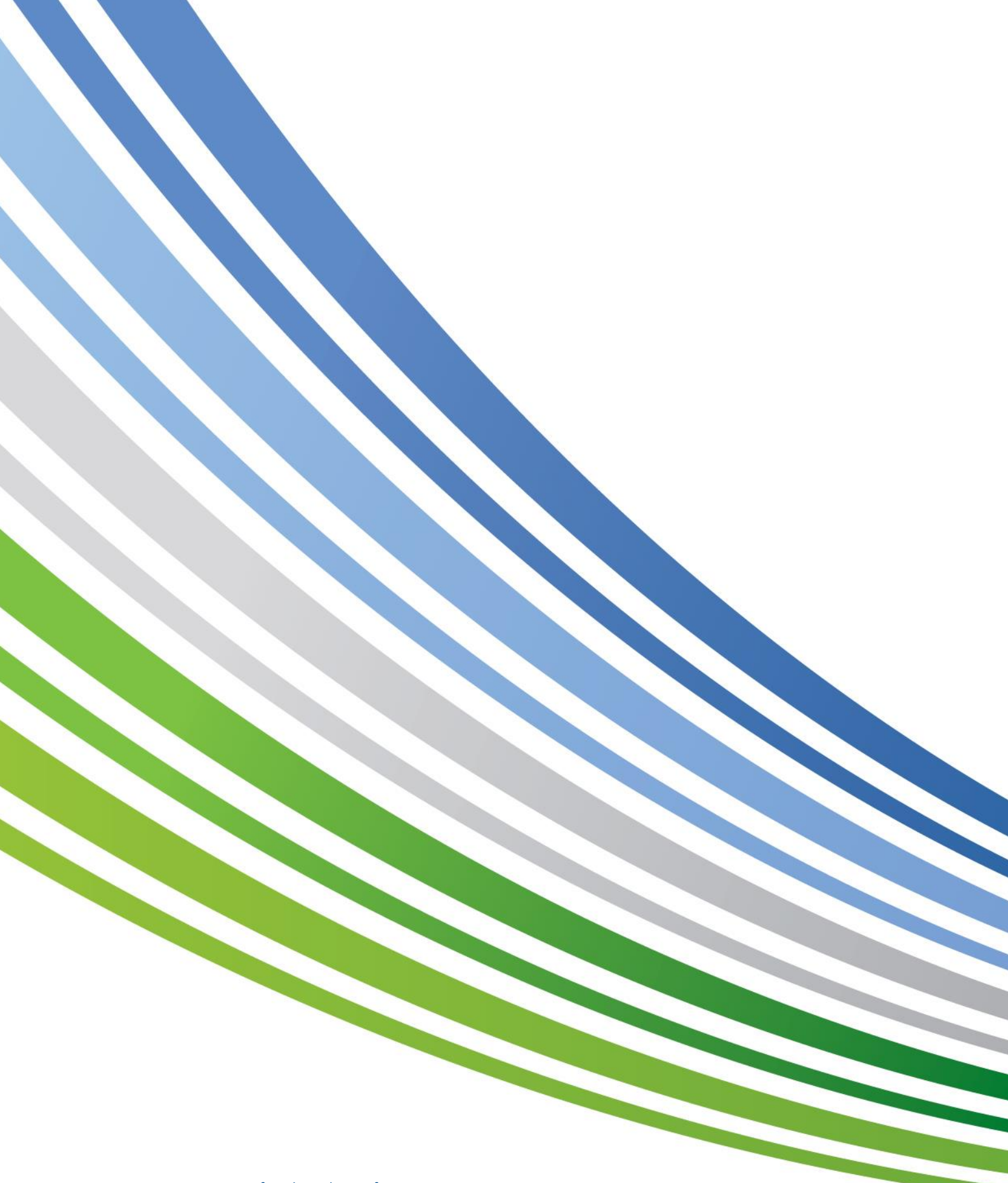
The Project has an agreement in principle that the NeSTS technical specifications will be published by the ENA as part of the 43 series of OHL technical specifications, subject to their review by the ENA OHL panel.

These publication arrangements reflect the Project's aim of producing designs suitable for use across the GB network.

Subject to the Project passing its Stage Gate in 2018, the first type testing – of the NeSTS 132kV Single Circuit Medium Duty suite – is scheduled to be completed in 2019. Publication of its technical specification will follow SHE Transmission Technical Authority approval of the completed test reports and initial construction feedback.



Figure 2: Visualisation of a NeSTS 132kV Double Circuit Medium Duty Overhead line



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