



NETWORKS



GENERAL SPECIFICATION FOR CONTESTABLY BUILT MV SUBSTATIONS EQUIPPED WITH EMBEDDED GENERATION INTERFACE PROTECTION (EGIP)

Network Assets, Underground Networks

SPEC-280813-AXG

Note: The following document is highly technical in nature and may be complex to understand. If you are having trouble understanding the content of this document, please reach out to ESB Networks and we will assist you to understand their meaning.

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Title: General Specification for Contestably Built MV Substations equipped with Embedded Generation Interface Protection (EGIP)

Revision Number: 5

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(ESB Networks Specifications are subject to change, this specification version shall only be used for the purpose/project for which it was issued by ESB Networks to you)

**Approved for Issue: Specifications Manager
ESB Networks**

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History of Revisions

Rev No	Date	Revision Content
0	August 2013	First version
1	January 2014	Changes to drawings numbers and other minor changes
2	October 2014	Removed reference to DC Distribution Boards Spec, introduced heating to MV substation, introduced Quality requirements. Tidy up on earthing requirements.
3	September 2015	Control and interlock revised. Battery capacity specified, extract vent referenced. Earthing design review clarified. Bonding of MV switchgear changed Generic signal lists removed
4	May 2016	EGIP section 14.3.1 revised to clarify wiring requirements for Asynchronous/Synchronous generators and remove dedicated overcurrent relay
5	Aug 2020	Minor changes and additions based on feedback from Renewables team.

Note:

This specification will be reviewed at minimum before the Latest Review Date, but may also be reviewed in the interim. Consequently the “Latest Review Date” does not indicate that this particular version of the Specification is current. Accordingly, only the version of the specification issued by ESB Networks to the user for the particular purpose/project should be used.

ESB Technical Specification Approval

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1.0 Scope

The scope of this document is to specify the requirements for the design, manufacture, works testing, installation, pre-commissioning testing and maintenance of MV Substations which the Independent Power Producer (IPP) elects to contestably build for handover to, and for operation by, ESB Networks. Commissioning of the electrical plant will be carried out by ESB Networks.

The Works shall be designed and constructed in accordance with all Irish and EU safety regulations. The IPP shall assume the duties of the Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) as specified under the Safety, Health and Welfare at Work (Construction) Regulations 2013 and all subsequent modifications and regulations arising under or in relation to same.

The design of the station, and the plant and equipment supplied and installed shall comply with the requirements of:

- This specification
- The individual ESB Networks Specifications for Equipment and Materials

A Risk and Quality Assurance Assessment is required for equipment which is not already installed on ESB Networks – see Specification 18081 and associated Product Specifications for detail.

Where there is a conflict between this specification and any of the other specifications mentioned above, the requirements of this specification shall take precedence insofar as it relates to the said conflict. The Works shall comply with the Specification in all respects, unless any deviation has been specifically requested by the IPP and accepted in writing by ESB Networks.

The major requirements for the Works are outlined in this Specification. This includes control, protection, metering, signalling, SCADA, substation earthing, control wiring and other small wiring, auxiliary systems, ventilation, heating, lighting, mechanical and electrical systems, LVAC, batteries and chargers etc. and all other equipment and facilities necessary to complete the works in all respects.

However, equipment and facilities not specifically mentioned here or in the overall Specification, but which are clearly necessary for the construction, satisfactory operation, safety, security and reliability of the electrical plant are also understood to be included in the Scope.

The equipment shall be installed by the IPP and/or the IPP's contractor in accordance with the manufacturer's instructions. These instructions shall be clear, shall be specific to the equipment and shall cover all aspects of equipment installation up to and including putting into service.

The layout of the equipment within the substation shall be as in ESB's equipment layout diagram, included in the Works Package.

The Schedules and Appendices (a) attached to this specification and/or (b) attached to the individual Equipment Specifications for the particular item (including Specification 18081), shall be completed by the IPP and the equipment manufacturer and signed off by both parties as required and submitted to ESB Networks.

2.0 Health and Safety

2.1 Client

The IPP is the Client as defined in safety legislation. The Client shall comply, at all times, with all statutory duties or provisions imposed upon them by any current legislation, new legislation or amendments to legislation which are current during the course of the project. The Client shall ensure that all necessary statutory appointments are made.

2.2 Safety File

At pre-commissioning stage, a copy of the Safety File shall be submitted to ESB Networks for review. The IPP shall provide:

- A Design Risk Assessment (DRA) indicating the risks identified with the Operation and Maintenance of the substation (and equipment) and how these risks have been mitigated.
- Operation and Maintenance instructions for the equipment installed in ESB substation.
- Fully completed as built drawings within 30 business days post energisation.

3.0 Applicable Codes, Standards and Directives

3.1 Terms and Acronyms

The following terms and acronyms are used throughout this document

AAP	Alarm Annunciator Panel
DCC	Distribution Control Center
DOF	Declaration Of Fitness
DRA	Design Risk Assessment
DSO	Distribution System Operator
EGIP	Embedded Generation Interface Protection
ECL	Energisation Check List
IAC	Internal Arc Capability
IPP	Independent Power Producer
LV	Low Voltage
MV	Medium Voltage 20kV or 10kV
NCC	National Control Center
O&M	Operation and Maintenance
PSCS	Project Supervisor Construction Stage
PSDP	Project Supervisor Design Process
RA	Risk Assessment
RTU	Remote terminal unit
SCADA	Supervisory control and data acquisition
SLD	Single Line Diagram
TSO	Transmission System Operator

3.2 Codes and Standards

See ESB Specification 18081, clause 1.03 for applicable standards and precedence of standards.

Except where otherwise stated in the Specification, materials shall be designed, manufactured, tested and installed according to the requirements set out in ESB's Product Specifications. Where no requirement is referenced in the ESB Product Specification, or where an ESB Product Specification does not exist, then CENELEC Standards shall be applied or if CENELEC standards unavailable, IEC standards.

In the absence of a suitable IEC standard the matter shall be referred to ESB for a decision.

The latest edition and amendments of the appropriate standard shall apply in all cases. In case of conflict between this Specification and any of the CENELEC/IEC Recommendations or national standards, then this Specification shall take precedence.

The IPP shall state in their proposal the standards and codes of practice which they propose for any items of Plant not covered by CENELEC/IEC Recommendations. The IPP shall submit two English language copies of any standard or code of practice, other than CENELEC/IEC Standard publications, not later than the Initial meeting required by ESB Networks.

3.3 EU Directives

The equipment supplied, and also the design and construction of the project shall all be in compliance with the provisions of all relevant Directives of the EU relating to work equipment, i.e. in regard to safety of personnel who operate and maintain the equipment. Where appropriate, the equipment shall carry the CE Mark in accordance with the latest EU Direction, (as listed in Specification 18081 Section 1.03.01 (d)).

3.4 System of Units

The SI system of units shall be used throughout the project. Temperature shall be in degrees Celsius, electrical energy shall be in kWh and SF6 gas pressure shall be expressed in MPa.

3.5 ESB Networks Specifications and Civil Drawings

The materials supplied and works carried out shall comply with the ESB Networks Specifications and drawings issued for the project as listed in the Project Work Pack Register.

4.0 Service Conditions

These are set out in ESB Specification 18081.

The equipment to be provided shall be capable of operating satisfactorily under the conditions likely to be encountered on site. In particular the MV system shall be designed for 20kA 3-phase short circuit level (rms) and 50kA dynamic current (peak).

5.0 Proposed Design

5.1 Summary – Substation

The IPP shall provide a substation electrical design in accordance with the Standard MV Single Line Diagrams (SLDs) included in the Works Package, (e.g. PE607-D000-001-001 or PE607-D000-001-002). This will be determined by the proposed type of switchgear to be installed by the IPP. The SLD should be submitted 12 months in advance of energisation in order for the DSO and TSO (where applicable) signal lists to be developed.

The main items of equipment include the following:

Contestable

- MV Substation Switchgear with Circuit Breaker.
- The Embedded Generator Interface Protection shall be located in the switchgear MV panel's low voltage control cabinet.

- Wall mounted cabinet for housing the Alarm Annunciator Panel (AAP). This cabinet shall have a swing frame arrangement to facilitate rear access to the AAP. The AAP design is non-contestable (please see details below).
- 24 V DC Battery and Charger System for control, protection and telecoms requirements.
- LV AC Distribution Board and associated works.
- Customer Interface Panel located on the wall between ESB Substation and IPP MV room.
- Remote Interrogation Cabinet.
- Communications for Cello, i.e. provide and set up SIM card.

Non-Contestable

- Protection requirements as outlined in Section 14.3.
- MV Metering Chamber with CTs and VTs (supplied by ESB Networks).
- Revenue Metering installed by ESN.
- 98 Way Alarm Annunciation Panel (AAP) to be supplied by IPP from ESB nominated supplier.
- DCC RTU supplied by IPP from ESB nominated supplier. (Refer to Works Package Section 5: Telecoms Specification).
- NCC RTU Where required, refer to the letter of Quotation.
- Poling Radio.

Commissioning of the substation, including the 20 kV overhead line/underground cable and remote end works will be carried out by ESB Networks.

5.2 Risk Assessment and Equipment Quality Assessment

Where the IPP proposes to use equipment that complies with ESB specifications but which is not currently in use on ESB Networks, then ESB Networks will require its own Risk Assessment and Quality Assessment to be carried out in order to accept the equipment for use on ESB Networks.

A Risk Assessment for the overall configuration of the equipment in the substation and of the substation itself shall be carried out by the IPP.

In particular as ESB Operators may operate the switchgear locally, the Risk Assessment shall deal with the switchgear installation, highlighting mitigations on Internal Arc Capability (IAC) of switchgear and safety of operator while standing in front of switchgear, in the event of internal short circuit. This risk assessment shall be submitted to ESB Networks and approval received prior to procurement of the electrical equipment by the IPP.

5.3 Civil Works

The IPP shall provide all infrastructure, including the MV Building, site surfacing, site boundary fence and access roads in accordance with the Civil Works Specifications contained within the Works Package, (i.e. PE607-F0000-S00-010 (Part 1) and PE607-F0000-S00-011 (Part 2)).

The IPP shall consider the dimensions required to facilitate the proposed switchgear i.e. external door, cable ducts and internal building height and Risk assessment described in Clause 5.2 above.

The IPP shall examine and adhere to this Civil Works Specification. All civil designs and drawings shall be submitted to ESB Networks for review four weeks prior to the commencement of civil work.

The IPP shall provide two weeks advance notice to ESB Networks to facilitate witnessing the following critical milestone items:

- Excavation of foundations
- Foundation pouring.
- Floor rebar installation.
- Concrete floor pouring.
- Wall construction.
- Roof slab pouring.
- Switchgear installation.
- Earth and Erath mat installation.

5.4 Revenue Metering

The ESB Networks owned DSO-IPP Revenue Meters and Power Quality Meter will be installed in the IPP control room. Revenue Metering requirements are outlined in Works Package Section 4: Revenue Metering Specification.

5.5 Telecommunication Systems

General telecommunication system requirements are outlined in Works Package Section 5: Telecoms Specification.

Note: a wood pole may be needed for communications, this should be included as part of the planning application.

5.6 Mechanical and Electrical Services

The substation shall include the following as per Specification:

- Small power and lighting system within the substation building.
- Substation heating and extraction fan (regulated by 24V DC system).
- An additional extraction outlet to a natural ventilation opening is required for the combined battery/charger unit.
- A smoke detector shall be fitted via a smoke detector hatch on the substation door. This is to allow the IPP to test the smoke detector without gaining access to the ESB Networks substation.

5.7 Design Requirements

The design shall meet the requirements of the specification and comply with ALL applicable ESNB Specifications and standards.

The design shall make adequate provision for:

- Safety of operations and maintenance personnel.
- Safety of members of the public.
- Reliability and continuity in service.
- Ease of inspection and maintenance.
- Ease and clarity of operation.
- Avoidance of spurious alarms.

- Ability to withstand the severe service conditions specified.
- Freedom from undue vibration and noise.
- Exclusion of vermin, birds and animals.
- Precautions to minimise fire risk.
- High energy efficiency.

5.7.1 Specific Design Requirements

Specific Design requirements include:

- There shall be no facility available on the front of the ESB substation circuit breaker cubicle to mechanically CLOSE the ESB circuit breaker.
- There shall be a mechanical TRIP push button on the ESB substation circuit breaker cubicle and it shall be labelled 'Emergency use only'.
- Local electrical push-button control (Open and Close) of the ESB substation circuit breaker shall be provided. These push button controls shall be located at the LV control cabinet of the ESB switchgear.
- Interlocking shall be provided as outlined in Section 10.5 of this specification.
- Two rotary control switches shall be positioned on the ESB Substation circuit breaker cubicle. Both switches in the 'Off' position shall give remote alarm to the RTU.
 - Control On/Off – when in the Off position disables local electrical push-button and remote control. Protection tripping is not impacted when this switch is in the Off position.
 - SCADA On/Off. When in the Off position disables remote control (via RTU) of the ESB Substation circuit breaker.
- Remote Open and Close commands of the ESB Substation circuit breaker shall be implemented by the provision of 24 V DC interposing relays. The SCADA On/Off switch shall remove the ESB Substation circuit breaker control supply from the contacts of the interposing relays.
- Two bit (i.e. confirmation of "OFF" and "ON" position) status indication shall be provided from the ESB Substation circuit breaker to the IPP.
- Two bit (i.e. confirmation of "OFF" and "ON" position) status indication to DCC shall be provided for the following functions by potential free contacts. It is permissible to group one side of potential free contacts into a common return where it is practical to do so.
 - Position indication (ON and OFF) of ESB Substation:
 - Circuit breaker.
 - Disconnecter(s).
 - Earth switches.
 - Position indication (ON and OFF) of the IPP's Main Incomer circuit i.e. circuit breaker, disconnecter and earths.
- Signal alarms shall be based on IPP supplied data and as per ESBN/EirGrid issued Signal list and hardwired to the Alarm Annunciation Panel via Phoenix type Termitrab voltage suppression type terminal. Signals routed to the Alarm Annunciation Panel shall be connected to the DCC RTU via a serial data RS232 communications link. Signals required for the NCC RTU shall be interposed.

Interlocking conditions governing the closing of ESB Substation circuit breaker are outlined in section 10.5 of this specification.

5.7.2 Main 20 kV ESB Networks Incomer Cubicle Items (Metal clad):

Item	Rating
Circuit breaker	1250 A, 20 kA fault current. Note: This Circuit breaker shall be capable of switching the capacitive current associated with the length of MV cable to the windfarm(s). Table 9 of IEC 62271-100 refers.
Combined Busbar Disconnectors/ Circuit Earth Switch	1250 A / 20 kA Fault make rated. Note: Not required for Withdrawable Circuit Breaker option.
Voltage Transformers	20 kV/ $\sqrt{3}$ /, 100 V/ $\sqrt{3}$, 100 V/ $\sqrt{3}$.
Circuit Earth Switch (Withdrawable Circuit Breaker option)	1250 A / Fault make rated.
Current Transformers	600/300 A Primary current rating (Primary reconnectable for withdrawable Circuit Breaker option and secondary reconnectable for fixed Circuit Breaker option), 1 A secondary. Note: Where Directional Overcurrent is required a second CT core shall be utilised (refer to Section 14.2.1).
Busbar Circuit Earth Switch	20 kA Fault make rated.

5.7.3 Main 20 kV ESB Networks Customer Cubicle Items (Metal clad):

Item	Rating
Combined Busbar Disconnectors/ Circuit Earth Switch	1250 A.

5.7.4 MV Metering Chamber

The metering chamber complete with CTs and VTs will be supplied by ESB Networks.

5.8 Design Review

The proposed design shall be submitted for review by ESB Networks.

Where there is a change to the design already reviewed by ESB Networks, such changes shall also be submitted for review by ESB Networks.

Notwithstanding any review by ESB Networks of any information submitted by the IPP, the IPP's obligations under the Agreement shall not be relieved, absolved or otherwise modified and ESB Networks shall have no liability whatsoever in relation to its review comments or lack of review comments in respect of any designs or information submitted to it by the IPP.

5.9 IPP Works Programme

The IPP shall submit a Works Programme to ESB Networks prior to construction – Appendix 3 of the Connection Agreement refers.

This program shall identify all key milestones and stages of the project from mobilisation to final commissioning. Typical timeframes for required documentation are outlined in **Appendix 4 IPP Works Programme**.

5.10 Design Package (DP)

A fully completed Design Package (DP) shall be submitted in accordance with the IPP Works Programme. Each package shall be submitted in an orderly and timely manner during the periods shown for design review in the Works Programme, such that ESB Networks shall have adequate time to carry out a design review and for checking of any necessary revisions. Incomplete Design Packages shall not be accepted for review. Refer to details outlined in Appendix 5 Design Package.

5.11 Design Log

Issues that arise during the Design Review shall be recorded in the Design Log and all such issues shall be addressed and closed before construction. In any event all issues shall be closed before handover of the contestable assets.

6.0 ESB Networks-IPP Interface

6.1 ESB Networks-IPP Ownership Interface

ESB Networks will take ownership of all the equipment installed by the IPP in the ESB Networks MV substation.

- MV

ESB Networks will own all MV equipment in the ESB Networks MV substation including MV cables up to the termination point on the IPP's MV main incomer circuit breaker.

- LV

ESB Networks will own the interconnecting cables between the ESB Networks LV board in the ESB Networks MV substation and the ESB Networks-IPP boundary.

- Billing Metering

The ESB Networks-owned DSO-IPP billing meters will be installed in the IPP control room.

6.2 ESB Networks-IPP Construction Interface

The IPP shall install all equipment in the MV substation with the exception of the Polling radio and antenna.

The IPP shall be responsible for all cables between the substation equipment and the SCADA equipment and for the termination at the substation equipment end of the cables only.

All associated Revenue Metering enabling works are outlined in the documents associated with Spec 18137 – Revenue Metering for Contestably Built MV substations.

The IPP shall install a key safe (available from ESB Networks) in the wall or door of the MV substation. This key safe shall hold a key to the switchroom that will allow ESB Networks access to the Revenue Meter.

The IPP shall install all fibre optic cables between the substation equipment and the fibre optic interface cabinet. The IPP shall terminate both ends of these cables into suitable connectors.

All construction interface works shall be agreed by all stakeholders prior to commencement of works.

7.0 Environmental Issues and Hazardous Substances

See Specification 18081 in relation to requirements for Material, Plant and Equipment and in addition:

7.1 Environmental Law

The IPP shall comply with all aspects of Irish legislation (in addition to the relevant European legislation) in relation to the environment during all phases of the project. Where appropriate, the equipment shall carry the CE Mark in accordance with Directive 93/465/EEC. **A complete list of current environmental legislation is available on the Irish Government's website** (<http://www.irishstatutebook.ie>).

7.2 Planning Permission

The IPP shall prepare the planning permission application, shall apply for planning permission, and shall obtain full planning permission without restrictive conditions for the contestable substation and associated works.

The IPP shall submit to ESB Networks all planning permission documentation associated with the works. This shall include a clear listing of any planning conditions relating to the project and, all conditions required in connection with protection of the environment.

The IPP shall submit to ESB Networks any documents revised or updated as a result of any change and/or update to any of the required documentation submitted as part of the planning application.

7.3 Environmental Compliance

The IPP shall immediately notify ESB Networks of any prosecution instituted by the Environmental Protection Agency, National Parks & Wildlife Service, National Monuments Service, relevant local authority or any other statutory body including any revocation and/or suspension and/or expiry of any licence, consent, permission and/or permit. In addition, the IPP shall notify ESB Networks of any correspondence and/or statutory notices, non-compliances or observations received from the Environmental Protection Agency and/or National Parks & Wildlife Service and/or National Monuments Service and/or local authorities and/or any other statutory body in respect of any licence, consent, permission and/or permit and/or arising from the construction of the works.

7.4 Post-Handover Monitoring

Where there is a requirement for ongoing monitoring of environmental impact of the substation and associated works, after Handover to ESB Networks, the IPP shall be responsible for this monitoring and the associated costs and shall submit copies of the monitoring results to ESB Networks.

7.5 Declaration of Environmental Compliance

Prior to Handover, the IPP shall submit a declaration from a Chartered Environmentalist confirming that the works have been carried out in compliance with all environmental protection requirements of the Specification and of the relevant authorities and also confirming that no environmental incidents occurred during the project.

7.6 Equipment Manufacturer's Declarations

Where the equipment specifications require manufacturer's declarations, the IPP shall ensure that these declarations are comprehensive and complete. The IPP shall submit these with the design review submission.

7.7 Disposal of Material Found to be Hazardous

Equipment manufacturers who supply plant to the IPP for this project shall undertake to dispose of it should it be found that the plant or its packing contains undeclared hazardous substances, not previously declared, at some stage during its life.

8.0 Quality Assurance

The MV substation and installed equipment shall conform to the requirements of ESB Networks' Specifications. As a means of ensuring these objectives the IPP shall maintain a documented quality control and quality assurance system which shall be in accordance with ISO 9001. The IPP shall ensure that the same requirements are applied to products, systems, and services supplied by Sub-Contractors and suppliers.

The IPP shall file all quality certification documents relating to the products and systems supplied for the project. ESB Networks shall have full access to such files.

The IPP shall submit its Quality Assurance plan to ESB at pre-design stage. The plan shall demonstrate, to the satisfaction of ESB, that the control measures to be adopted in the design and construction of the proposed works will result in successful commissioning and long-term performance of the contestably built network.

The Quality Assurance plan shall address, but not be limited to, the elements in the following list:

- Competence of Civil and Electrical Designers, Contractor, Pre-commissioner and Commissioner. This shall detail the selection criteria used and proven track record of all parties in respect of installation of plant at the voltages relevant to the project.
- Details of Quality Assurance Certification.
- Proposals for compliance with Environmental Legislation and (where applicable) Grant of Planning Permission.
- Material selection, sampling, handling, testing on site and testing off site.
- Site Work Audit and Control plan.
- Pre-commissioning plan.
- Commissioning Plan (where relevant).
- Documentation submittal schedule.
- Legal transactions concerning property transfer and line/cable routes over third party lands.
- Safety File requirements of the Connection Agreement.

At the initial meeting, the IPP shall identify the appointed person with responsibility for quality assurance of the IPP's works, who shall engage with ESB Networks on material and installation quality.

All test equipment used for testing and recording test results shall be calibrated for accuracy at regular intervals and shall display the date of next calibration and that of last calibration.

8.1 Audits by ESB Networks

During the construction of the project, on-site audits or inspections may be carried out by ESB Networks or their agents to ensure compliance with statutory provisions and agreed engineering designs and/or specifications. The IPP shall ensure that such representatives have unrestricted access to the project as required to carry out this role.

Following audits, Quality Inspection Reports, will be issue. The IPP shall remedy all items raised prior to energisation.

8.2 Material Workmanship

All materials and workmanship shall be of a suitable type and quality to ensure that the equipment will operate satisfactorily in accordance with the relevant equipment specification.

All works shall be adequately supervised by the IPP and quality control checks shall be carried out by the IPP throughout the works.

8.3 Disclosure of Defects Found

In the event of quality problems, identified by the equipment manufacturer, which are likely to cause an impact on equipment after installation, the equipment manufacturer shall inform the IPP and ESB Networks immediately.

This applies to quality issues or defects which may subsequently come to light either with this particular equipment or with similar equipment supplied to other customers.

The IPP shall submit manufacturers' declaration of compliance with this quality requirement. ESB Networks as end user reserve the right to audit the equipment manufacturer to ensure compliance.

8.4 Product Quality Assessment

If requested during the design review process, the IPP shall make available a fully assembled example of the equipment proposed, for inspection by ESB Networks.

9.0 Commissioning and Handover

9.1 Pre-commissioning

The IPP shall carry out Pre-commissioning testing in accordance with the requirements of this Specification and the Pre-commissioning document ***ESB Networks Pre-Commissioning Sheet for 20 kV Generation Substation*** (refer to Section 9 of the Works Package) is to be completed.

The IPP shall compile a list of pre-commissioning snags encountered. The list shall be kept in the substation and each item shall be discussed in detail with the ESB Networks commissioner.

The IPP shall continue to carry out the role of PSCS during the commissioning phase.

The IPP shall provide suitably qualified assistance as required to the ESB Networks commissioners to facilitate the efficient commissioning of the station.

The IPP shall provide continuous stable three phase AC supply (50kVA) to the substation for commissioning. The supply shall remain live and connected from the completion of the battery discharge test up until the time of final energisation.

9.2 Handover Agreement

On foot of the provision of a declaration of fitness for the contestably built assets, the IPP shall enter into a Handover Agreement in respect of the contestably built assets in the format set out in Appendix 1. Please note this format is subject to Amendment.

Operator training, provision of spares (as required) and final as-built drawings shall be provided before the Handover Certificate is signed by ESB Networks.

9.3 Handover Certificate

ESB Networks will execute the Handover Certificate (see Handover Agreement) confirming it's acceptance of Operational Control of the contestably built assets, when all of the requirements set out in the Connection Agreement, between ESB Networks and the Customer, which are due before energisation, have been met. These include, but are not limited to, the following:

- Completed site specific ECL (Energisation Check List)
- Safety
 - Receipt by ESB of Original and Up to Date Safety File complete;
- Building Regulations
 - Receipt by ESB of all relevant certificates of compliance;
- Environmental
 - Receipt by ESB of all relevant certificates of compliance;
- Civil
 - Receipt by ESB of all relevant design calculations;
- Electrical
 - Receipt by ESB of Earth resistance test results;
 - Receipt by ESB Commissioning Red Line Mark ups of As built Drawings.
- Operations
 - Receipt by ESB of agreement to the jointly prepared Operations Procedure;
 - Energisation Instructions (Switching plan) drafted and agreed;
 - Receipt by ESB of O&M manuals;
 - Receipt by ESB of all relevant equipment certificates;
 - Receipt by ESB of plant training;
 - DoF (Declaration of Fitness)
- Commercial
 - Receipt by ESB of all invoiced amounts;
 - Receipt by ESB of all relevant Bonds;
- Satisfactory closure of all issues logged in the Design Log;
- Provision of equipment Asset Data (GAR Sheet) in the Pre-Commissioning sheets for recording in ESBN's Asset Register Property
 - Completion of all requirements set out in Appendix 1 of the Connection Agreement;

9.4 Energisation Check List

The energisation checklist (ECL) is a list of over 45 items that need to be attended to before the substation is connected to the MV network. A sample is reproduced in Appendix 6.

The ECL contains items to be completed by the developer and ESB Networks.

The ECL will be given to the developer at an early stage in the construction.

Efficient completion of the ECL, working in conjunction with ESB Networks, is crucial to achieving prompt connection to the MV network.

10.0 Operation and Maintenance

10.1 Operation of Assets to be Transferred

The contestably built plant shall not be energised until ESB Networks accept Operational Control of same. Following successful completion of the Commissioning Tests and Handover to ESB Networks of Operational Control of the contestably built assets, the Operational control shall rest totally with ESB Networks. ESB Networks Safety Rules shall apply from the handover date set out in the Handover Certificate of the Handover Agreement.

10.2 Boundaries

Ownership and Operational Boundaries:

Item	Boundary
Ownership	The asset ownership boundary between ESB Networks Distribution circuits and IPP Circuits is the termination point of ESB Networks conductor termination on the IPP's plant.
Operational	The system/operational boundary between ESB Networks Distribution circuits and IPP circuits is the IPP's MV Main Incomer Circuit Breaker.

10.3 Operation

Operational Requirements for ESB Networks equipment:

Item	Requirements
Operations Procedure	Operations Procedure as per ESB Networks operating Policy.
ESB Networks Equipment	Operation, Maintenance and Testing to be carried out by ESB Networks personnel only.

10.4 Operation and Maintenance – Equipment and Tools

The IPP shall supply a list of tools and equipment required for the operation and maintenance of the station and shall identify which tools are proprietary to the equipment installed. The IPP shall supply such identified tools and arrange them neatly in the substation, all tools shall be clearly marked with their size or purpose and shall be new and unused.

Operating handles required for normal operation shall be mounted adjacent to the relevant equipment and securely stored.

The IPP shall provide for neat storage of any portable earthing equipment.

10.5 Interlocking on MV switchgear

The interlocking conditions as outlined in the ESB Networks document **Conditions Governing Connection to the Distribution System** *, in Table 2B (Additional Interlocking Requirements in Embedded Generator Installations) shall be replaced by the following requirements * <http://www.esb.ie/esbnetworks/en/downloads/Conditions-Governing-Connection-to-The-Distribution-System.pdf>

All electrical interlocking shall be designed, as far as reasonably practicable, to meet the following requirements:

- To fail in SAFE mode in the event of component failure
and
- For positive indication (presence of control voltage) for permissive conditions
- Electrical CLOSING of ESB Substation circuit breaker shall be permitted only when the following conditions are met:
 - For withdrawable IPP Main Incomer circuit breaker.
 - IPP circuit breaker is in 'in service' position'
AND
 - IPP circuit breaker is OPEN
AND
 - IPP cable earth switch is OPEN
- For fixed IPP Main Incomer circuit breaker.
 - IPP Disconnector is CLOSED
AND
 - IPP circuit breaker is OPEN
AND
 - IPP cable earth Switches are OPEN.
- 'AND' conditions shall be implemented via NC contacts in series
- NC aux contacts shall be directly driven by the relevant mechanism i.e. they shall not be aux relay for duplication of aux contacts.
- Electrical CLOSING of IPP's Main Incomer circuit breaker shall be permitted only when the following conditions are met:
 - Closing of the IPP's Main Incomer circuit breaker shall only be permissible when electrical interlocking conditions permit.
 - There shall be no mechanical closing facility on the IPP's main incomer circuit breaker.
 - Closing of IPP's Main Incomer circuit breaker shall only be permitted when incoming ESB cable is live.
- It shall not be possible for the IPP's main incomer circuit breaker to close or to remain closed (subject to EGIP settings) unless all three phases of the ESB incoming mains supply voltage are normal.
- To allow fitting of core balance protection CTs, interlocking shall be in place such that access to the incomer cable chamber can only be gained, if the incomer circuit breaker is open and earths applied to the incomer cables.
- Interlocking shall be provided on the ESB Substation switchgear between the disconnection point and earthing facilities on either side of ESB substation circuit breaker e.g. opening of disconnector on outgoing cable to IPP shall only be possible when ESB substation circuit breaker is open.

10.6 Interlocking Summary Table

Interlocking Requirements for MV Switchgear in MV EGIP Tail fed Substations		
	Switchgear Operation	Condition
1	ESB CB (Q0) Close Command (Bay E3)	IPP CB Open IPP DA Closed IPP Earth Open
2	ESB Incomer DA (Q1) Access (Bay E3)	ESB CB Open ESB Cable Earth DE Open
3	ESB Cable Earth DE (Q1) Access (Bay E3)	ESB CB Open and spring Charged ESB DA Open
4	Busbar Earth DEA1 (Q15) Access (Bay E3)	ESB CB Closed ESB Cable Earth DE Closed Customer Feeder DA Open (Bay E1)
5	Customer Feeder Earth DE (Q1) Access (Bay E1)	Customer Feeder DA Open (Bay E1)
6	Customer Feeder DA (Q1) Access (Bay E1)	ESB CB Open Busbar Earth DEA1 Open Customer Feeder Earth DE Open (Bay E1)
7	IPP CB Close Command	ESB CB Closed Presence of Voltage (Using ESB VT in Bay1)

A permanent notice of the interlocking conditions shall be posted on the switchgear panel. The notice shall be black text on white background 200mm x 200mm.

10.6.1 General

The requirements for MV Switchgear are given in the MV Switchgear Specifications in the Works Package, and in addition a fail-safe 20 kV switchgear interlocking system using the switchgear primary auxiliary contacts shall be installed. This system shall ensure that disconnectors and earth switches may only be operated when it is safe to do so. Depending on the equipment provided, interlocking of circuit breaker operation may also be required.

The IPP earth switch on the incoming ESB Networks MV cable shall be capable of locking-off by ESB Networks in the open or closed position with standard ESB Networks padlock. Padlocking facilities shall have padlock holes of 7 mm diameter to accept a padlock with shackle diameter of 6.3 mm, shackle radius of 30 mm and closed shackle length of 23 mm.

The proposed interlocking design shall be submitted to ESB Networks for review.

10.7 Spare Parts

If materials proposed by the IPP are not from current ESB Networks contract suppliers then the equipment in question will need to be Risk Assessed and Quality Assessed to the same standard and Specification as ESB Networks purchased equipment and agreed on by ESB Networks. Where such equipment is acceptable to ESB Networks, and ultimately the ownership of the contestable assets transfers to ESB Networks, the IPP shall purchase and shall keep the required number of spares, in a lockable building on the station site associated with the project and, which ESB Networks will have direct access to if required. ESB Networks shall not be liable for any extended outage that results from non-availability of this equipment. The IPP shall dispose and replace spares with expired “use by” dates.

The spares shall be delivered prior to putting into service of the ESB MV Substation. Spare parts shall be treated and packed to ensure safe transport and a long shelf life without deterioration.

Parts shall be separately packed. A drawing which clearly identifies the part, quotes the part's serial number and gives a clear reference to the maintenance manual shall be enclosed in each pack. In addition, installation instructions shall be included in all packs containing spares for cable joints and terminations.

Parts which are liable to deterioration by atmospheric pollution, humidity or ingress of foreign matter shall be totally sealed in strong polythene bags. Parts which are subject to deterioration due to condensation shall be protected by packs of silica gel or other approved desiccant.

Packages shall be crated in robust wooden packing cases. Large items shall be crated separately and shall be securely clamped against movement. Small items shall be grouped by type and/or application, to the approval of ESB Networks. Packing cases shall be suitable for safe transit to ESB Networks stores and for long-term storage without deterioration under the environmental conditions which pertain there.

Each packing case shall be clearly and indelibly labelled. The label shall provide the following information: case number, ESB Networks name, Project number, description and serial number of contents, shelf life and its expiry date, and where appropriate, lifting and storage/stacking instructions. The shelf life shall be at least five years. Where, because of case size, it is not practical to provide the above information on the packing case, the details shall be given in a sealed waterproof envelope which shall be securely attached to the case.

Cases which contain fragile parts shall have the following notice prominently displayed:

“FRAGILE – HANDLE WITH CARE”

The IPP shall guarantee the availability of spare parts for 15 years.

11.0 Warranty

The warranty requirements for the contestably built network are stated in the Connection Agreement (the Agreement).

12.0 Documentation

12.1 Design Submissions

12.1.1 General

All designs shall be submitted for ESB Networks review. A period of 60 working days shall be allowed for ESB Networks review of any design submission from date of receipt of each submission to date of notification of comments or no comments. The design shall reflect the Connection Agreement and any associated Single Line Diagrams (**SLDs**) provided. If the IPP does not complete the design within two years of receiving the work package from ESB Networks, the IPP shall revert to ESB Networks to ensure that there have been no updates to any of the specifications in the interim. Designs reviewed by ESB Networks shall not be altered without written agreement. All symbols used in electrical drawings shall be in accordance with IEC Publication 60617 and the SI system of units shall be used throughout.

Design submissions (two copies) shall be made within the times named in the individual equipment specifications. They shall be made in an orderly and timely manner during the periods shown for design approval in the Works Programme such that ESB Networks shall have adequate time to review them.

In programming submissions the IPP shall allow for the possibility that a resubmission may be necessary before the start of any part of the Works.

Each design submission to ESB Networks shall be serially numbered and dated and shall refer to one subject matter only. Each submission shall be accompanied by a summary sheet which lists the documents comprising the submission. Where a submission includes revisions of documents previously submitted the summary sheet shall include a reference to the original submission number.

12.1.2 Contestable Control and Protection Schematic

The format and layout of the Control and Protection design submitted by the IPP shall be in accordance with the following EPLAN P8® standard schematic diagram issued in the Works Package:

PG406-D009-560-001 Standard MV Line End Bay

MV Line End Application Notes:

1. The presentation of the station Control and Protection schematic shall be in the same format to the standard referenced above. It shall be complete and easy to follow as it forms part of the Operation and Maintenance (O&M) manual issued on completion of the project.
2. Primary Protection relay codes detailed in the schematic shall comply with those referenced in in Section 14.3 and the associated Single Line Diagrams in the Works Package, (i.e. PE607-D000-001-001 and PE607-D000-001-002).
3. Non-contestable protection equipment associated with the standard schematic include:
 - Primary Protection relays.
 - Test sockets.
4. All contestable equipment is detailed in the Bill of Materials (BOM) for information only. The equipment listed is ESB standard equipment. The IPP can offer alternative equipment provided ESBN are satisfied with their suitability.
5. As part of the schematic design, the IPP shall include:
 - Full cable schedule.
 - Complete connection diagram.
 - Complete wiring details.
 - Complete detailed device legend.
 - Bill of Materials.

12.1.3 Drawings

All drawings shall be on international A3, A2 or A0 size sheets but A0 size drawings shall be reduced to A2 size for submission. A3 should be used as far as possible, and only where the subject matter cannot be accommodated to a good standard on the smaller sizes should the next sizes A2 etc. be used.

Drawings shall be complete in all respects, accurate numerically and geometrically correct and shall be sufficiently detailed to enable plant erection to proceed without the need for further supporting drawings, details or interpretation. Drawings and calculation sheets which are not easily legible or present difficulty in interpretation will be returned by ESB Networks to the IPP for resubmission.

All drawings and calculation sheets shall have title blocks which shall contain the station name and number. They shall be correlated one with the other. They shall be numbered in a logical sequence. The first edition submitted for review shall be Revision 0 (zero) and subsequent revisions shall be referred to a Revision 1, Revision 2, etc. Alternative systems shall be subject to ESB Networks approval. Each revision shall be recorded in a revision block on the drawing and the subject matter of the revision shall be indicated. The revised portions of the drawings and design sheets shall be highlighted.

Drawings shall be submitted in the following formats:

Digitally:

1. Microstation DGN or AutoCAD DWG (OSI background in the AutoCAD drawings)
and
2. PDF Format
and

Physically printed:

1. One hard copy.

12.1.4 Deviations from Specification

Where the IPP proposes a deviation from the detailed requirements of the Specification they shall make a written application for approval of such deviation to ESB Networks (in addition to highlighting such deviation in the equipment specification technical schedules) and they shall highlight the proposed deviation on the relevant drawings and design sheets of the submission. Except in the case of a deviation specifically approved by ESB Networks the IPP shall be responsible for ensuring the conformity of the Works with the Specification, notwithstanding any general approval or lack of approval of design submissions by ESB Networks.

12.2 Site Document File

The IPP shall maintain at the site a Site Document File incorporating all changes and modifications as they occur. The file shall include a Drawing/Document List, a Master Drawing File and a Master Technical Instruction File. The IPP's proposals for the Site Document File shall be submitted to ESB Networks for review.

The Drawing/Document List shall be prepared and updated regularly at periods to be decided by ESB Networks. The first issue shall be made within 30 days of the project start up and shall indicate the various types of drawings and documents which will be prepared during the project and the anticipated numbers thereof. The list shall be updated as necessary and the status of each drawing/document shall be indicated under one or other of the following headings:

- Issued for review.
- Approved (IPP).
- Not approved.
- Approved with comments.
- Issued for construction.
- Issued "as built".

All changes and modifications to the Master Drawing Files and the Master Technical Instruction Files shall be highlighted in red markings.

12.3 Operation and Maintenance Instruction Manuals

Operation and Maintenance Instructions shall be prepared in the form of an instruction manual for use by ESB Networks personnel. Storage space for these manuals shall accommodate a minimum of three lever arch files in a cabinet drawer/shelf within building.

Operation and Maintenance Instructions shall include the station Name and Number.

Draft copies for ESB Networks comment shall be submitted three months before commencement of construction.

Final Operation and Maintenance Instruction Manual shall be submitted to ESB Networks three months before the Handover Date.

One hard copy and one soft copy (PDF) shall be submitted in each case.

The preparation of the manual shall be carried out by personnel who are trained and experienced in the operation and maintenance of the plant described and who are skilled as draughtspersons/CAD operators competent to prepare the required drawings.

The hard copy format of the manual shall be on A4 size white paper with neatly typed text and similarly sized manufacturer's printed data sheets. Drawings shall be provided with durable punched reinforced plastic edge and shall be folded to A4 size. They shall preferably not exceed 297 mm in height and shall be arranged such that they may be easily unfolded and refolded as required. The text, printed matter and drawings shall be placed in commercial, durable fourring binders with cleanable plastic or metal covers. The number of volumes shall be adequate for the material to be bound and the instructions shall be correlated into consistent related groupings. Each volume of the manual shall be clearly identified on the front and on the spine of the binder with the title "Operation and Maintenance Instructions", the title of the project, the name of the substation, the volume number and identity of the general subject matter covered in the manual. In addition, suitable provision should be made on the spine and front for the reference number of ESB Networks.

Each volume shall contain a summary table of contents for the entire manual and a detailed table of contents for that particular volume. Pages shall be numbered sequentially. The IPP's name, address and telephone number shall be given. Where the volume refers to SubContractors plant, the name, address and telephone number of the SubContractors shall be given with a clear reference to the items of plant supplied.

Only the manufacturer's printed data which is pertinent to the specific plant supplied shall be included. The manuals shall be free from irrelevant matter such as might be contained in manufacturers' general brochures. Each sheet of the manufacturer's instructions shall be annotated to identify clearly the specific item or part installed and the instructions applicable to such installation and where they are located. All inapplicable instructions shall be deleted. Plant data shall be supplemented with drawings as necessary to illustrate clearly component parts, systems and control diagrams. Manufacturer's printed instructions shall be supplemented with typed text setting out particular aspects of the installation. The typed text shall be organised into a consistent format under separate headings to provide a logical sequence of instructions.

An Operation and Maintenance Manual shall be provided for each substation and shall include:

1. Description of plant, systems and component parts including nameplate data and lists of equipment.
2. Operating procedures including step-by-step instructions for normal and emergency operation.
3. Maintenance procedures, including routine maintenance procedures, guides to trouble-shooting, procedures for dismantling, cable jointing instructions, repair and reassembly, procedures for alignment, adjusting and checking.
4. General arrangements and detail drawings for switchgear, control and protection cabinets, transformers, cables and other items of plant.
5. Substation line diagram and elementary schematic diagrams.
6. Schematic circuit diagrams covering control, metering, protection, signalling, indications, auxiliary supplies and all other circuitry.
7. Detailed wiring diagrams and cable lists.
8. Detailed records of all type tests, routine tests and site tests.
9. Spare parts lists.
10. Schedule of lubricants.
11. Details of mechanical and electrical settings.

12. Detailed alarm list, which shall contain a list of all alarm titles, an explanatory note on the alarm functions and a brief description of the action to be taken by the operator on receipt of each alarm.
13. Operation Instruction documentation {OI}

12.3.1 Drawings and Information Initial Submission

The following shall be included with the initial submission:

1. Proposals for execution of civil works including drawings and information, as required by the technical specification, for each section of the works.
2. Proposals for execution of electrical works including drawings and information on equipment, as required by the technical specifications, for each section of the works. This includes design calculations, equipment technical schedules and equipment specification non-conformance sheets, equipment reference lists etc.
3. In addition, the Proposal shall include drawings and information on site layout and general arrangement of equipment, e.g. in substations.
4. Proposals for Quality Control and Quality Assurance.
5. Lists of applicable standards and codes other than IEC.
6. Outline Works Programme for each section of the works.
7. Outline Organisation Chart.
8. Type Test Certificates for tests undertaken by an independent test laboratory or witnessed by an independent party, as called for in equipment specifications.
9. Reference lists as required by the sub clause on Service Experience.
10. All other information necessary for a full understanding and evaluation of the proposal shall be included (electronically completed, printed and signed by equipment manufacture AND IPP) attached to each of the equipment specifications issued in respect of this project.
11. Technical Schedules (electronically completed, printed and signed by equipment manufacture AND IPP) attached to each of the equipment specifications issued in respect of this project.

12.3.2 Initial Meeting

The following shall be submitted at the initial meeting:

1. Organisation Chart.
2. Mobilisation Chart.
3. English language translations of national standards and codes proposed (i.e. other than IEC and BSI publications).

12.3.3 According to the Agreed Programme

The following shall be submitted according to the agreed programme:

1. Works Programme.
2. Drawing Document List.
3. A complete set of As-Built Drawings.
4. Proposal for contents of the Safety File.
5. Training Plan.

12.3.4 Before Handover to ESB Networks

Site Safety File in accordance with the Construction Regulations.

12.3.5 Completion of Station Works

The following shall be submitted on completion of the Station works:

1. One hard copy and one digital copy (pdf) of the reviewed “as built” Operation and Maintenance Instructions shall be furnished within two months of the Works being taken over or any portion of the Works being put into service (refer to section 12.3).
2. One hard copy and one digital copy (pdf) of the “as built” folders containing all associated electrical, physical and civil works drawings shall be furnished within 30 days of the Works being put into service. A digital copy (pdf) of the Commissioning folder is required to validate all electrical drawings.
3. A CAD version of all associated drawings compatible with the formats outlined in section 12.1 shall be furnished within two months of the Works being put into service.
4. Guaranteed rated values and characteristics i.e. the Technical Schedules that accompany the Design Review modified where necessary.
5. Certificates relating to the insulating medium.
6. Summary of routine tests and special tests, with copies of the test reports.

13.0 Test

13.1 Test and Inspection

In accordance with the agreed programme the IPP shall submit for review by ESB Networks a Test and Inspection Plan for all items of the Works whether at the Site or elsewhere up to the date of certification of completion in accordance with the provisions of the agreement. This plan shall be in two parts covering (a) factory tests as outlined in ESB Networks Product Specifications and (b) site tests. If the equipment used is the same as that currently installed on ESB system, then the routine test requirements in ESB’s Product Specifications are required and should be detailed. For example, description of the acceptance tests item or part of the Works to be inspected or tested, the nature and frequency of the inspection and testing, the type and size of samples to be taken (if any), the means of recording the test and inspection data, the name and specific responsibilities of any proposed test and inspection agency and all other information necessary to describe the test or inspection to be performed.

Aside from the individual equipment tests and Factory Visits, which are required if equipment different from that currently installed by ESB is selected, there is also a requirement for Testing on the overall substation configuration as a System.

Not later than two months prior to the commencement of any particular test full details of the proposed method of test, test parameters and test circuits shall be submitted for ESB Networks review and following such review shall become part of the Test and Inspection Plan.

Such plan, as reviewed by ESB Networks, shall be used for the inspection and testing of the Works and shall be revised and resubmitted for ESB Networks review if the IPP desires to change the sequence, method or nature of the test or inspection or if such a change is required by changes in the Works Programme or scope of the Works.

Measuring equipment shall be subject to the ESB Network’s review and if required by ESB Networks it shall be calibrated at such independent laboratory as may be agreed. The cost of any such calibration shall be borne by the IPP.

The cost of all tests, factory visits etc. required by the Specification, including the cost of providing samples where needed, shall be borne by the IPP.

No approval of tests or inspection of the Works or portions of the Works by ESB Networks shall not relieve the IPP of their responsibility to complete the Works according to the Specification, including the

satisfactory execution of all necessary site inspections and tests nor shall it relieve him of his duties and obligations under the Agreement.

If the switchgear proposed by the IPP advocates disconnecting for work via a non-visible break, then appropriate type testing evidence of the kinematic chain shall be provided and the proposed design shall be approved by ESB Networks as per 5.5.1(c) of the Electrical Safety Rules 2006 prior to construction.

13.2 Factory Tests

Type and routine tests shall be performed on all equipment as set out in the equipment specifications.

Items which are ancillary to the main equipment, e.g. supporting insulators, terminal bushings, fuses, etc. shall be tested in accordance with the requirements in the relevant ESB Networks Specification. If a supplier claims exemption from such tests, they shall submit to ESB Networks certified copies of test reports.

Type tests may be dispensed with if the IPP furnishes evidence to ESB Networks that the relevant type tests have already been performed on identical equipment in a testing facility acceptable to ESB Networks. In this case the type test certificates shall be submitted with the design review. Where the particular equipment specification calls for type tests to be carried out at an independent testing laboratory or witnessed by an independent party the type test certificates submitted with the design review shall show proof of such independent witness.

Note that the Independent Testing laboratory should be one which has already been used by ESB Networks for testing similar ESB equipment, or which is specifically approved by ESB Networks.

In the case of equipment for which specific type tests or routine tests are not called for in the particular equipment specification, such as control and protection cabinets and AC and DC distribution cabinets, the IPP shall include in the Test and Inspection Plan details of all tests proposed prior to delivery. Certificates of all such tests shall be submitted to ESB Networks.

All tests shall be carried out to the satisfaction of ESB Networks and no equipment shall be dispatched prior to ESB Networks written acceptance of the test results. The IPP shall provide adequate notice of factory tests/inspections for equipment to allow ESB Networks to witness the tests if so desired. Witnessing of tests shall not relieve the IPP of any responsibility with respect to conforming to this specification. If tests are not witnessed by ESB Networks then factory tests certificates shall be forwarded to ESB Networks for review before accepting delivery of the equipment.

13.2.1 Construction Monitoring

During the course of construction of the substation, ESB Networks may require tests to be carried out on the works to confirm compliance with specification and with IPP's design. These tests shall be undertaken by, and at the expense of the IPP and shall be witnessed by ESB Networks.

14.0 Physical Requirements

As part of the design review submission, IPP shall submit their design drawings for earthing and bonding of the ESB MV substation to confirm compliance with ESB's minimum standard earthing requirements. IPP shall also advise ESB of his proposed earth measurement test method.

14.1 Substation Equipotential Bonding

The design of the equipotential bonding system shall ensure that any risk of step or touch potential is reduced to a safe level.

The IPP shall connect the screens of the incoming MV cables to the earthing bar at their MV Main Incomer Circuit Breaker and also to the earthing bar at the metering cubicle in ESB room.

The design shall include a specific consideration of the risks of:

- Substation doors creating a dangerous touch potential in any closed or open position
- Metallic fences creating dangerous touch potentials

Earth Grading rings may also be used to minimise step potentials. Grading rings and earth mats shall be buried at 200mm below surface.

A copper Earth Marshalling Bar of adequate length, 50mm x 12mm cross section, shall be provided in the ESB substation. This shall be drilled to accommodate M12 bolts for copper lug connection for bonding purposes. The Earth Marshalling Bar shall be secured in a visible location and all connections suitably labelled.

All metalwork in the ESB MV room shall be independently bonded to the ESB MV Earth Marshalling Bar using 25mm² copper conductor. Daisy-chaining of earths is NOT allowed.

The following equipment shall be independently bonded to the MV Earth Marshalling Bar:

- The external MV earth conductor.
- The frame of MV switchgear which shall be connected to earth grid at 2 no. independent points.
- The frame of the MV metering CT/VT Chamber.
- All MV cable screens.
- The substation floor re bar which shall be bonded at multiple points.
- Copper earth mat outside the steel doors.
- All exposed metalwork (incl. RTUs, battery and chargers etc.).
- All earth continuity conductors for the LV supply in the ESB MV room.
- Steel doors and door frame.
- Control cabinets and battery panel.
- Other exposed metalwork items.
- External telecommunication equipment.

IPP shall submit an earthgrid installation report with photographic evidence of each individual joint, and the complete earth grid installation.

The report shall include pull test report from an independent test lab for the joint types used.

14.2 Substation Earthing

An external MV earth connection for the ESB Networks substation shall be achieved by installing a minimum of:

- 25m of 25mm² bare copper wire in a trench; or
- Five galvanised steel earth rods spaced by 3.7m. Connections to the earth rods shall be sealed against the effects of moisture.

The resistance to remote earth of the earth connection shall be measured and shall not exceed 20 ohms, the measured value shall be submitted to ESB Networks for review.

The preferred measurement method is the fall-of-potential method as outlined in Standard IEEE81-2012, with the remote earth used for the test located at the recommended distance away from the earthing system, or equivalent measurement method agreed with ESB Networks. All buried earth equipment shall have a cover of at least 0.45m to finished ground level.

ESB buried earthing equipment shall not be installed in the same trench as IPP buried equipment (apart from in the immediate vicinity of the substation) in order to optimise overall resistance to remote earth.

14.3 Protection Requirements

EGIP is designed to disconnect the generator from the ESB Networks Distribution network during abnormal system conditions by tripping a dedicated circuit breaker, located as close as practically possible to the interface between the IPP equipment and the ESB Networks distribution network.

The IPP shall supply and install all of the relays and associated equipment as described below and in the associated elementary diagrams.

Protection relay test sockets and connections shall in accordance with the relevant elementary diagrams.

Protection relay test switches shall be in accordance with the relevant specification.

14.3.1 EGIP

IPP shall provide the following equipment for use with 1 A CT secondaries and 24 V DC power and command supplies.

Siemens 7RW600: over/under voltage, over/under frequency and rate of change of frequency protection. ESB order reference 7RW6000-2EA00-1DA0 with firmware Version 3.0.

Siemens 7SJ804: over/under voltage, over/under frequency protection, rate of change of frequency and residual overvoltage protection. ESB order reference 7SJ8042-1EB36-1FC0 with firmware version 4.62.

Where the IPP's generator is an asynchronous machine the relays shall be wired in accordance with elementary PG406-D800-047-001

Where the IPP's generator is a conventional synchronous machine, Directional Overcurrent protection shall also be provided. In this case the relays shall be wired in accordance with elementary PG406-D009-576-001.

Signal List requirements are outlined in Appendix 2 of this document.

14.3.2 Remote Interrogation

Protection relays shall have a fibre optic communications port.

Where the relay cannot be provided with a fibre optic port, IPP shall provide and install a serial fibre convertor (Siemens 7XV5650), which shall be located with the relay.

IPP shall provide and install fibre patch cables to the Telecoms cabinet.

14.3.3 Auxiliary Power Supplies and Equipment

IPP shall provide a 230 V AC phase and neutral supply from a dedicated MCB and RCD on the IPP's main LV board to the ESB Networks MV room. If the earthing design indicates that an RCD would not be sufficient then a suitably rated isolation transformer may be used. The sub board shall be equipped with sufficient RCBO's for lighting, sockets and DC power supply.

IPP shall supply and install lighting equipment, 13 A outlet socket and anti-condensation heater; it shall be automatically controlled by a humidistat, the operating range of which shall be adjustable.

IPP shall provide a 24 V DC power system consisting of a sealed cell battery system and switched mode power supply (SMPS). This shall be supplied from its own dedicated LV MCB on the ESB Networks LV sub board via a 32 A rotary switch. The battery capacity of the system shall be capable of supplying station DC standing load for a period of 24 hours.

Provision shall be made for the air exchange requirements of the equipment as set out in the DC system specification 17030.

All LV supplies shall enter the ESB Networks MV room through plastic conduit. Any possibility of nuisance tripping/disconnection of the ESB LV supply shall be eliminated. Works shall comply with NSAI regulations. All precautions necessary shall be taken to avoid the inadvertent introduction of an LV earth when providing the LV supply.

These supplies and equipment shall comply with ESB Networks Specifications in the Work Package (e.g. Specs. 16450, 16481 and 17030) as appropriate.

14.4 Heating and Ventilation

The building shall be naturally ventilated. The ventilation shall be designed to ensure that adequate ventilation is provided for plant and personnel under the range of Service Conditions described in ESB Specification 18081 mentioned in Section 4 of this document.

The IPP shall calculate heat gains and losses under the specified conditions for the substation, taking into account solar radiation, thermal transmittance through roofs, walls and floors, fresh air requirements, heat emission from installed electrical equipment and lighting, personnel, infiltration and any other sources.

The IPP shall be responsible for determining the heat transfer coefficients for all materials used in building construction. In the event of any change in materials, design or method of building construction, the IPP shall at all times be responsible for rechecking the design of all systems to ensure that they are capable of meeting the specified design requirements.

Heating in the substation shall be provided by two electrical heaters controlled by thermostat and the temperature in the substation room shall not fall below 10 °C.

An additional extraction outlet to a natural ventilation opening is required for the combined battery/charger unit.

14.5 Miscellaneous Equipment

IPP shall provide the following:

1. Signage and labelling.
 - All signage and labelling be in accordance with ESB document (DOC-210317-CQH-TRN).
2. Statutory Notices.
3. Filing Cabinet for storage of site-specific documents.
4. Small desk.
5. Chair.
6. Notice board.

14.6 Installation Works

ESB Networks shall supply the MV Metering Cabinet and IPP shall supply all other equipment. IPP shall install all equipment and terminate all MV, LV and fibre optic cables.

Where the incoming MV cable is not contestably installed, the IPP shall co-ordinate with ESB Networks the termination of the MV cabling. This shall require the IPP to accommodate the opening of a cable pit close to the MV Building in order to allow ESB Networks to install the cable. The ground outside the substation shall not be completed prior to the MV cable being terminated.

15.0 Document Register

Refer to MV Works Package Document Register.

Appendix 1. Handover Agreement

THIS HANDOVER AGREEMENT is made the [] day of [] 20[]

BETWEEN:

- (1) ESB Networks Ltd whose registered office is at Clanwilliam House, Clanwilliam Place, Dublin 2 (hereinafter called the “Company”); and
- (2) [] (the “Customer”), whose registered address is [] and Company Registration Number is [] (hereinafter called the “**Customer**”)
(hereinafter collectively referred to as the “Parties”)

WHEREAS:

- A. This Handover Agreement is made to facilitate the Company's operational control of the Contestable Components that are more particularly shown on the single line diagram attached at Schedule 1 hereto (the “Scheduled Contestable Components”) after the Commissioning phase and pending the formalisation of the property transfer from the Customer to ESB in accordance with the provisions of the Connection Agreement entered into on the [] day of [] 20 [] relating to [insert name of Windfarm] (hereinafter referred to as “the Agreement”) and in accordance with the terms and conditions contained therein between the Company and the Customer and the terms and conditions of this Handover Agreement.
- B. The references and definitions used in this Handover Agreement shall have the meaning assigned to them in the Agreement unless otherwise stated herein or where the context otherwise requires.

THE PARTIES HEREBY AGREE in consideration of the Company paying the Customer the sum of €1 (the receipt of which is hereby acknowledged) the Parties hereby agree that the following terms and conditions shall apply to this Handover Agreement:-

1. Without prejudice to its rights under Clause 3 hereof, the Company confirms that the Scheduled Contestable Components are substantially complete following the conclusion of the Commissioning phase, in accordance with Appendix 3 of the Agreement with the exception of the Snag List attached at Schedule 2 hereto.
2. The Customer hereby certifies that he has taken-over the Scheduled Contestable Components from his contractor/supplier (which means in practical terms that risk and title in the Scheduled Contestable Components have passed to the Customer).
3. The Parties agree that the Company shall assume operational control of the Scheduled Contestable Components on the time and date recorded on the executed Handover Certificate subject to the principle that any faults arising from or discovered pursuant to Commissioning, Commissioning Tests,, Energisation and/or all defects covered by the warranties set out in the Agreement or otherwise caused by breach of the agreement by the Customer and/or negligence of the Customer shall be rectified by the Customer in accordance with the provisions of the Agreement. It is agreed and accepted that it is intended that the target handover of the Scheduled Contestable Components shall occur on the [] day of [] 20[] and confirmation of the precise timing of actual handover shall be certified by the Parties in the same format as the Handover Certificate set out in Schedule 3 attached hereto.
4. Subject to the terms of Clause 1 above occurring, the Parties agree that access to the Scheduled Contestable Components for the Customer shall be subject to agreement from the Company. Further, at the request of the Company, the Customer shall complete outstanding items on the Snag List and shall resolve all faults arising from or discovered pursuant to Commissioning, Commissioning Tests, Energisation and/or all defects covered by the warranties set out in the Agreement, or otherwise caused by breach of the agreement by the

Schedule 1

Single Line Diagram showing the Scheduled Contestable Components

Schedule 2

Snag List

Schedule 3

Form of Handover Certificate

To: [the Customer]
[Address]

It is hereby certified that the Handover of the Scheduled Contestable Components as defined in the Handover Agreement for [insert name of Windfarm] took place at am/pm on the [] day of 20 .

Signed for and on behalf of
ESB Networks Ltd
In the presence of:-

Appendix 2. Signal List

To be provided separately

Appendix 3. Deviations

	<p>Deviation from General Equipment Requirements for items supplied by IPP for use on Contestably Built Network:</p> <p>Where the equipment proposed deviates in any way from the clauses of this specification, attention should be drawn to the deviations below. Where there are no deviations, the words “No deviations” shall be entered below. In this instance ESB will assume that the equipment proposed meets the specification in all respects.</p>
--	---

We confirm that we have read and understand the requirements of this Specification and we confirm our equipment is compliant with the clauses therein other than as detailed in our List of Deviations

IPP Signature: _____

Name: _____

Company: _____

Position in Company: _____

Date: _____

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Appendix 4. IPP Works Programme

Document Required	Submitted for review	As Built
~ Works Programme	Initial Meeting; (20 Business Days before construction)	
~ Organisation Chart	Initial Meeting;	
~ Mobilisation Chart	Initial Meeting;	
~ National standards and codes proposed	Initial Meeting;	
Drawing/Document List	20 Business Days before project start up;	
Work package		
Design package		
~ DP001 Pre-Design Information	Flood Risk Assessment Report at least 40 Business Days prior to commencement on site;	
~ DP002 Project Schedule		
~ DP003 Single Line Diagram (SLD)		
~ DP004 IPP Scope of Works	Design Risk Assessment at least 15 Business Days prior to commencement of work on site;	
~ DP005 Civil Works	<ul style="list-style-type: none"> • Document entitled 'Design Criteria for Civil and Structural Works' summarising all design related parameters, at least 10 Business Days prior to commencement of detailed design; • Fire certificate submission at least 15 Business Days prior to submission; <p>Prior to commencement on site the following:</p> <ul style="list-style-type: none"> • Soils Investigation Report at least 40 Business Days; • Full planning submission documents at least 15 Business Days; • Structural calculations and drawings at least 40 Business Days. Note: drawings received without full calculations will be returned to the IPP; • Ground Risk Register at least 15 Business Days; • Construction drawings, steelwork fabrication drawings and cladding fabrication drawings at least 15 Business Days; 	
~ DP006 Plan, Elevation and Section Physical Layouts		
~ DP007 Earthing and Lightning Protection Design		
~ DP008 ESB Control Building		
~ DP009 Primary Plant		
~ DP010 Secondary Electrical Systems		
~ DP011 Precommissioning		
~ DP012 AS BUILTS		
Ventilation design of the battery room	10 Business Days before works commence onsite	
Operation and Maintenance Instructions		
~ Draft copy, before erection of equipment	60 Business Days	
~ 3 Draft copy, before erection of equipment	20 Business Days	
~ 3 complete copies, before erection of equipment		
Training Plan		
~ Notification of the training course date	40 Business Days	
~ Notification before the commissioning of the plant	20 Business Days	
Testing		
~ Test and Inspection Plan	40 Business Days before testing commences	
~ Test Records	20 Business Days before testing commences	
~ Factory Acceptance Test	10 Business Days prior to FAT	
~ Earthing & Soil Resistivity Witnessing	20 Business Days before testing commences	
Handover Agreement	20 Business Days before energisation	
Safety File and As-Builts	At precommissioning stage	20 Business Days before energisation
A complete set of As-Built Drawings		
~ Two hard copies and one electronic copy Folders		20 Business Days before the works go into service
~ Two hard copies and one electronic copy	20 Business Days before the works go into service	
~ CAD version of all associated drawings		40 Business Days after energisation

Appendix 5. Design Package

Design Package (DP) Information Requirements for Contestably built MV Substations.

Note: All IPP design submissions shall be submitted in the following format and sequence. Incomplete DP's will not be accepted for review.

Pre-Design

DP001 Pre-Design Information

- 1.1 Planning Conditions;
- 1.2 NC5 Form;
- 1.3 Substation location map;
- 1.4 Flood Risk Assessment Report;
- 1.5 Buried Services Report;
- 1.6 Appendix 1 requirement of Connection Agreement for sites;
- 1.7 Appendix 1 requirement of Connection Agreement for overhead line and underground cable routes;
- 1.8 List of Designers, Consultants & Contractors and PSDP;
- 1.9 Professional Designer Indemnity Insurance Details;
- 1.10 CT calculations;
- 1.11 Outline Programme;
- 1.12 All other additional information as outlined in Section 12.1.

Project Construction

DP002 Project Schedule

- 2.1 List of all project milestones, activities and deliverables with intended start and finish dates;

DP003 Single Line Diagram (SLD)

- 3.1 Single Line Diagrams for both the ESB and IPP compounds;
- 3.2 SLD requirements;

DP004 IPP Scope of Works (SoW)

- 4.1 SoW requirements for ESB MV Substation;
- 4.2 Connection details to the Distribution System;
- 4.3 DRA Electrical and Civils Requirements;

DP005 Civil Works

- 5.1 Planning Submission;
- 5.2 Disability access dispensation;
- 5.3 Fire certificate;
- 5.4 Soil investigation report & Ground risk register;
- 5.5 Basis of design document;
- 5.6 Civil/Structural design calculations;
- 5.7 Control building drawings and details
– foundations, floor slab, ducts, walls, doors, pit, sump, roof;

DP006 Plan, Elevation and Section Physical Layouts

- 6.1 Standard Drawings;
- 6.2 Compound Layout – clearances, access, outdoor lighting, WC, lightning protection;
- 6.3 AIS Busbar and Bay/Cubicle Layouts – clearances, elevation, support steelwork, conductors, fittings;

DP007 Earthing and Lightning Protection Design

- 7.1 Earthing/GPR Study – design criteria, calculations, installation/civil works;

DP008 ESB MV Substation Building

- 8.1 General Layout;
- 8.2 Civil Works;
- 8.3 Mechanical and Electrical services;

DP009 Primary Plant

- 9.1 Submission requirements – Technical schedules, drawings, test reports/certs;
- 9.2 Switchgear;
- 9.3 Spares;

DP010 Secondary Electrical Systems

- 10.1 Cabinet and Board Design;
- 10.2 Control and Protection Schemes;
- 10.3 24VDC Self-Contained System;
- 10.4 LV Distribution Board;
- 10.5 Control & Protection Cabinet;
- 10.6 Signals Cabinet;
- 10.7 Control & Protection Schemes;
- 10.8 CT circuits;
- 10.9 VT circuits;
- 10.10 Protection;
- 10.11 EGIP, Busbar Protection, Check Synch Schemes;
- 10.12 Interlocking requirements;
- 10.13 Signals System;
- 10.14 DCC and NCC Requirements;

DP011 Pre-commissioning

- 11.1 Checklists/Handover Certificates;
- 11.2 Red Line Site Folder;

DP012 AS BUILTS

- 12.1 Timeline and format;

Appendix 6. Energisation Checklist for Contestable Connections

Energisation cannot take place until the authorised ESB person executes the Handover Certificate on behalf of ESB. This marks the start of the Operational Control Period.

Windfarm Name: Sample Windfarm

Windfarm DG or TG ref: T Sample

Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
1.1a	Planning Permission	Are the Planning Permission Application Documents in ESB possession where Customer applied for Planning Permission?	Y	Y	Y		
1.1b	Planning Permission	Is the Grant of Planning Permission in ESB possession?	Y	Y	Y		
1.2	Planning Permission	Is the Certificate of Compliance with PP in ESB possession for Customer constructed works?	Y	Y	Y		

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
1.3	Planning Permission	Planning Permission for Grid Connection -					
		(a) does exemption apply? and	Y	Y	(a) N or Y		
		(b) does Windfarm PP Grant condition require PP for grid connection, and	N	Y	(b) N		
		(c) is a Section 5 Declaration in ESB possession ? and	Y	Y	(c) Y		
		(d) has Customer confirmed grid connection works were built in compliance with Customer's Section 5 Application, and	Y	Y	(d) Y		
		(e) is Section 5 Declaration clear of Legal challenge, (4wks after LA and 8w after An BP), and	Y	Y	(e) Y		
		(f) has ESN confirmed that no contradictory Section 5 Application or Declaration exists?	Y	Y	(f) Y		
1.4	Building Regulations	Has ESB a copy of the statutory "Certificate of Compliance on Completion"? (Statutory requirement)	Y	Y	Y		
1.5	Building Regulations	Have all of the "buildings" been registered on the Statutory Register of the Building Control Authority? (Statutory requirement)	Y	Y	Y		
1.6	Building Regulations	Is the Fire Certificate in ESB possession? (Statutory requirement)	Y	Y	Y	Final FSC. Provided 31/05/2019	

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
1.7	Environmental	Is the Certificate of Compliance with Environmental Conditions of the Specification and of the Planning Grant of Permission in ESB possession?	Y	Y	Y		
2.1	Quality	Is the Civil Designer's confirmation of Construction compliance with Civils Design (Contestable/Civils by Customer/Civils by ESB Contractor) in ESB Possession?	Y	Y	Y	Submitted	
2.2	Quality	Is the Electrical Designer's confirmation of Construction compliance with Electrical Design in ESB possession?	Y	Y	Y	Submitted	
3.1	Telecoms	Have ESB Telecoms confirmed to the power plant commissioner that all comms are completed?	Y	Y	Y	All Telecoms equipment is installed including the comms link Satellite and DCC SCADA Polling Radio which are both operational.	
3.2	Metering	Have metering works been completed?	Y	Y	Y	Meters installed April 2019	
4.1	Contestable	Has Handover Agreement been executed by ESB and IPP?	Y	Y	Y	Executed	
4.2	Contestable	Have non-standard spares been delivered and stored?	NA	Y	Y	None required no non standard equipment installed.	
4.3	Contestable	Have all issues on ESB Network's Design Issues Log been closed?	Y	Y	Y	Civil log – Closed Electrical log – Closed UG Network log – Closed	

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
4.4	Contestable	Have all issues on EirGrid Design Issues Log been closed?	NA	Y	Y	No EirGrid logs on this project.	
5.1	Operations	Have the “Operating Instructions” been drafted by ESB and agreed with IPP, including confirmation of customer’s approved operators?	Y	Y	Y	Final version issued.	
5.2	Operations	Has ESB Operator site familiarisation training taken place?	Y	Y	Y		
5.3	Operations	Has ESB Maintenance NT training taken place for non-standard equipment?	NA	Y	Y	None required no non-standard equipment installed.	
5.4	Operations	Have the Energisation Instructions (Switching plan) been drafted by ESB and agreed with IPP? (Due in advance of DOF.)	Y	Y	Y	Ops confirmed that the draft EI will issue w/c 19th August	
5.5	Operations	Has Customer provided details of Main Incomer protection Relays and CT ratios?	Y	Y	Y	Confirmation on SLD and settings request forms	
5.6	Operations	Has Customer provided Primary and Secondary Test Sheets for Main Incomer CB Protection Relays?	Y	Y	Y		
5.7	Operations	Have System Performance Section supplied Customer Relays settings?	Y	Y	Y	Provided 14/05/2019	
5.8	Operations	Has Customer confirmed that Main Incomer CB Relays setting nominated by ESBN have been installed?	Y	Y	Y		

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
5.9	Operations	Has Customer confirmed that Earthing Facilities comply with ESB requirements?	Y	Y	Y	All relevant earthing studies provided as part of the Safety File	
6.1	Commercial	Have all pre energisation payments been received by ESB?	Y	Y	Y	3rd stage invoice paid 7th August 2019	
6.2	Commercial	(a) Is Capacity Bond required? and if so (b) has it been received by ESB?	Y	Y	YY or N	Paid w/c 6th August	
6.3	Commercial	(a) Is the Charges Bond required? and if so (b) has it been received by ESB?	N/A	Y	YY or N		
6.4	Commercial	Have Commercial Section confirmed all outstanding issues are cleared?	Y	Y	Y		
6.5	Commercial	Is there a Supply Agreement in place?	Y	Y	Y	Confirmed by Production Support Central	
6.6	Commercial	Is there a TUOS Agreement in place with EirGrid? (For MEC greater than 5MW.)	Y	Y	Y		
7.1	Property	Has the Contract for Sale been executed by both sides?	N	Y	Y	ESB Solicitor instructed on 1st May 2019	
7.2	Property	Have all Connection Agreement Appendix 1 documents and maps been received and assessed to be acceptable to ESB?	Y	Y	Y		
7.3	Property	Is the wayleave management plan and landowner list in ESB possession and assessed to be acceptable to ESB?	Y	Y	Y		

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
7.4	Property	Have the executed deeds for route rights (Deeds A & B) been received by ESB and assessed to be acceptable to ESB?	Y	Y	Y		
7.5	Property	Have all Statutory Wayleave notices, and all documents confirming proper service, been received by ESB and assessed to be acceptable to ESB?	N/A	Y	Y		
7.6	Property	Site Material Removal Confirmations – have these been received for all private landowners?	Y	Y	Y		
7.7	Property	Have Local Authority confirmed that all road reinstatements are to their satisfaction?	Y	Y		LA screen dump shows in warranty period	
8.1	Records	Have the detailed Cable Route records been received by ESB?	Y	Y	Y	Received 21/05/2019	
8.2	Records	Have the detailed Line Route records been received by ESB?	N/A	Y	Y		
8.3	Records	Have new circuits and stations been recorded into G-Tech (Geodart)	Y	Y	Y	As-builts sent to Central Mapping 22/05/2019	
8.4	Records	Has Single Line Diagram been provided for substation wall	Y	Y	Y		
9.1	Safety	Is the original and up-to-date safety file in ESB possession? (Statutory requirement)	Y	Y	Y		

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Item	Heading	Question	Answer	Acceptable Y or N	Required answer	Progress Notes	Confirmed by (name & date)
9.2	Safety	Is signage in Customer Installation compliant with ESB's Conditions Governing Connection to the Distribution System?	Y	Y	Y	Yes the customer has used the most current version of ESB's signage specification.	
10.1	Commissioning	Has the Commissioner's DOF been received for the components to be energised on ESB side of interface?	Y	Y	Y	Commissioning is complete – DOFs will issue as part of the EI.	
10.2a	Commissioning	Is the "customer side of meter" installation HV or MV DOF in ESB possession?	Y	Y	Y	Commissioned 14th August	
10.2b	Commissioning	Is ETCI (NSAI) LV Certificate in ESB possession?	Y	Y	Y	Yes – submitted 31st May	
10.3	Commissioning	Have GAR sheets been received for the new equipment?	Y	Y	Y	Yes – submitted 31st May	
11.1	EirGrid	Does ESB have EirGrid notification to Connect? (NOSS)			Y		
SCORE				98%			
12.1	Operation Control Acceptance	Has Head of Asset Management approved execution of the Handover Certificate?	Y	Y		Approved by 29/08/2019	

Site Asset Management, ESBN. Ver 007, 23rd April 2018

Rev 7 additions