Division Manual: Embedded Generator Major Network Connection Costing Guideline CEOM7817

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CONTENTS

1.0 PURPOSE

To provide high level connection options, general arrangements and non-contestable cost estimates for a HV embedded generator connection enquiry greater than 30kW into the Essential Energy (EE) network.

During the connection enquiry stage of a new HV embedded generator, potential connection applicant's require high level connection options for various sized generators. This includes but is not limited to different connection options at various voltages and typical non-contestable project costs.

2.0 ACTIONS

2.1 Preliminary Design Cost Variances

The project cost estimates provided in this document are for the HV connection of typical large-scale embedded generator connections based on EE's historical data. Due to the large scale of these projects multiple factors can affect the final installation cost and create large variations from these indicative figures.

Historically, high speed telecommunication and protection/SCADA requirements have significant cost implications which cannot be determined at the enquiry stage of the connection. These cost implications will not be clear until further analysis and completion of detailed studies/detailed design for each individual connection.

Consideration should be given to the existing generation or any facilities under development that may severely limit the available generation capacity in that region of the NEM.

This guideline is provided for information purposes only, a detailed list of requirements will be included as part of the Contestable Works Design Information Pack which is to be requested via the Connection Applicant's ASP to the EE Contestable Works team. All costs associated with the engagement of an ASP are the responsibility of the Connection Applicant.

2.2 Typical Voltage Level for Connections

The maximum generator output for each network connection voltage is provided in Table 1 below. Consideration may be granted by EE in special circumstances to permit higher generator outputs at each voltage level where capacity is available in the network. The Connection Applicant should consider that implementing generator levels above the typical maximum generator output can result in substantial network augmentation costs.

Table 6.0.1: Typical voltage levels for embedded generator connections

Network Connection Voltage	Maximum Generator Output
11/22kV	5MW
33kV	20MW
66kV	40MW
132kV	100MW

2.3 Project Costs Considerations

2.3.1 Potential Cost Implications

The following items can have connection cost implications beyond the typical high-level figures provided in a typical connection arrangement. Investigation into these considerations should be carried out as part of the connection enquiry.

2.3.1.1 Land & Routes

- Are there existing easements that need to be considered?
- Is the existing line within the road reserve or on Council controlled land?
- What customer consultation will be required along any new routes?
- Is customer consultation required?
- Is the line protected under the Electricity Supply Act (1995)?

2.3.1.2 Environmental

- Is a REF and/or EIA checklist required?
- Is a site survey available/required?
- Is a geotechnical report available/required?
- Is the new route or are adjacent properties heavily vegetated?

2.3.1.3 Network Earthing

- Does an earthing report exist for the site? Is one required?
- For further consideration go to EE Document - External Network Connection - Earth System Design & Test Requirements, Version 1.1 via this link.

2.3.1.4 Operations Planning

- Detail network constraints and outage requirements.

2.3.1.5 Telecommunication

- Is high speed protection required?
- What new/augmentation equipment will be required (protocol, hardware type, location, installation requirements).
- Is a communications tower/antenna required?

2.3.1.6 Load Control

- Will existing FI plants be impacted by the new connection?
- Will the Connection Applicant need to install reactors?
- Will FI network studies need to be done?
- Is a bulk relay upgrade to devices more suited to a daytime loss of signal a possibility?

2.3.1.7 Protection

- Detail new /augmentation equipment details: -
  - Installation of new or upgrading of existing RTU's?
  - Installation of new line differential protection scheme?
  - Installation of a new distance protection scheme?
  - High speed inter-tripping?
  - Is a Special Protection Scheme (SPS) or runback required?

2.3.1.8 SCADA

- Detail new/augmentation equipment requirements (protocol, equipment details, location etc.).
- Are there sufficient I/O and AC inputs to complete the project? If not, consider combining alarms/indicators.
- Will the new equipment be commissioned with integration to the SCADA RTU located in the SCADA cabinet within the control building?

2.3.1.9 Substation Design

- Is a survey available (2D/3D)?
- Is a geotechnical report available?
- Briefly detail the availability/format/condition of existing drawings in ProjectWise.
- Detail work completed by Subtransmission Development during the preliminary stage (transformer modelling, lightning study, security fence assessment) and where it has been stored (i.e. *Project Information* folder in ProjectWise).

2.3.1.10 Overhead Mains Design

- What is the design temperature?
- Confirm load capability.
- Complete a comprehensive detail design package.
- Is survey data available? Where is it located?
- Have spans been modelled?
- Have photos been reviewed?
- Wind return period for pole strength assessment: ** Years?
- Wind region to be used in design calculations: Zone *?
- Wind return period for pole changes/replacements: ** Years?
- Ground clearance assessment temperature: **°C?
- Conductor design temperatures: -
  - Uplift: -*°C?
  - Sustained: **°C?

2.3.2 Contestable (Connection Applicant) Scope

The full extent of works considered to be contestable and thus the responsibility of the Connection Applicant includes but may not be limited to the following.

2.3.2.1 General

- Design and construction of: -
  - Embedded Generation Substation (owned and operated by Connection Applicant).
  - Embedded Generation Connection Point (EE standard construction - gifted asset).
  - Auxiliary 415VAC supply (No1) from EE distribution network (gifted to EE).
- All necessary approvals that are to be gained from other relevant authorities that may affect the substation/switchyard and line works.
- Provide SiD documentation.

2.3.2.2 Network Performance Analysis

- Voltage regulation.
- Fault level and sensitivity.
- Stability and harmonics.
- Protection analysis.
- Earthing analysis.
- Operational parameters.
- FI impact study and analysis.

2.3.2.3 Subtransmission and Distribution Construction

- The embedded generator shall be connected as a high voltage customer/generator/developer.
- Where possible the connection point will be located adjacent to the Connection Applicant's substation site at the embedded generation site.
- Any transfer of gifted assets and energisation of the embedded generator shall follow the successful commissioning and sign-off.

Note: Works inside existing EE substations are considered non-contestable and shall be designed, constructed, and commissioned by EE.

2.3.2.4 Protection

- Installation and pre-commissioning of embedded generation protection relays, protection panel and embedded generation substation.
- Protection schemes and settings shall be implemented such that the performance of existing protection schemes are not adversely impacted.

2.3.2.5 SCADA

- It is the Connection Applicant's responsibility to contact the AEMO and negotiate their requirements regarding the data to be transferred from the Embedded Generation site.
- Installation of a SCADA scheme for the solar connection point (gifted to EE) in line with EE standards and existing infrastructure.
- Refer to CEOS7902 for design guidelines.
- All SCADA equipment shall be submitted to and approved by EE Specialist Engineering Manager prior to procurement.

- Before the Connection Applicant's RTU's can be connected to the EE SCADA network, the Connection Applicant must make available their RTU's with a technician for bench testing of the DNP compatibility with POF.
- EE is responsible for providing a SCADA communication path to AEMO from power generators within its network. An AEMO monitored site requires duplicate RTU's.
- In order to guarantee continuity across EE's footprint, EE will provide a comprehensive list of SCADA equipment requirements associated with the connection.

2.3.2.6 Telecommunication

- Design, construct and test all agreed contestable telecommunications works.
- For sites requiring duplicated communications paths, these paths are also required to be diverse with the exception of communications towers located at the sending/receiving ends of diverse paths.

2.3.2.7 Metering

- Procurement, installation and commissioning of metering equipment in accordance with regulatory requirements (located outside of EE infrastructure).

2.3.2.8 Power Quality

- Installation of a PQM (A-Eberle PQI-DA smart) in the solar SS at the point of common coupling.

2.3.2.9 Earthing

- Prepare and submit earthing designs for any embedded generation substation and embedded generation SS sites.
- Construct earthing system.
- Submit earthing system test reports for approval by EE prior to connection.

2.3.2.10 Commissioning

- Provide installation test documentation to EE for review.
- Provide pre-commissioning documentation to EE for review.
- Provide access to EE for commissioning of gifted assets and embedded generation substation data network equipment.

2.3.2.11 Land and Routes

- Acquisition of land and easements: -
  - Where existing lines are being altered then easements will be required, with widths as per the EE Code of Practice document CEOP8046 - Easement Requirements.
  - Easement widths will need to cater for all anchor guy requirements.
  - If any SS site is to be gifted to EE, it is to become Freehold Title in favour of EE including a "right of access", in favour of EE.
  - This access is to be maintained by the Connection Applicant as per the applicable memorandum:
    - CEOF9097A - Terms of Easement for Overhead Powerlines.
    - CEOF9097B - Terms of Easement for Underground Powerlines.
    - CEOF9097C - Terms of Easement for Multi-Purpose Electrical Installation.

2.3.3 Special Protection Scheme (SPS)

In order to maintain a safe and reliable power supply for all of EE's customers and help protect the existing network assets from overload or unplanned outages, a SPS may need to be implemented as part of the new network connection. A SPS works in real time with the assistance of high-speed communications over multiple sites to monitor the network loads and react by adjusting generation input to within a safe operating level.

A SPS system is implemented separate from any existing or proposed SCADA and Protection systems.

Based on the requirements for the new connection and the existing network conditions the SPS required to protect the network may vary from one of or a combination of the following, a complex multi-site system, a more simplistic Transformer Overload Scheme (TOLS) or Line Overload Scheme (LOLS).

The following conditions all contribute to and may initiate the requirement for a SPS to be implemented:

- Connection type, generator size and operating protocol.
- Feeder voltage and conductor type/size.
- Existing generator connections within the wider network area.
- Existing ZS equipment and capacity.
- TransGrid feeder and equipment capacity.

Typical costs for the implementation of a SPS (EE works only) are illustrated in Table 7.3.1, 7.3.2 and 7.3.3 below:

Table 7.3.1 Typical TOLS Costs

Connection Voltage	Non-Contestable Works	Potential Additional Contestable Works	Estimated Non-Contestable Cost
All	• ZS design, materials, construction & commissioning. • Supply materials, install & commission EE specified TOLS equipment at Solar Farm site.	• Additional or upgraded communications bearers. • Solar Farm TOLS cabinet.	$200k - $600k

Table 7.3.2 Typical LOLS Costs

Connection Voltage	Non-Contestable Works	Potential Additional Contestable Works	Estimated Non-Contestable Cost
All	• ZS design, materials, construction & commissioning. • Supply materials, install & commission EE specified LOLS equipment at Solar Farm site.	• Independent high-speed communications bearers (OPGW, ADSS, microwave). • Solar Farm LOLS cabinet.	$250k - $1Million

Table 7.3.3 Typical SPS Costs

Connection Voltage	Non-Contestable Works	Potential Additional Contestable Works	Estimated Non-Contestable Cost
All	• ZS design, materials, construction & commissioning for all effected EE ZS's. • Supply materials, install & commission EE specified SPS equipment at Solar Farm site.	• Independent high-speed communications bearers (OPGW, ADSS, microwave) between all affected sites. • Solar Farm SPS cabinet.	$500k – $2.5Million

Notes:

- Costs and typical requirements described in the tables above are indicative only. Detailed analysis during the connection process may result in substantial impacts / costs outside of the ranges indicated.
- Overall cost of the SPS is closely related to the Solar Farm location, size, wide area impact to EE's network and beyond.
- Reduction to the maximum output of the network connection may result in a less complicated SPS or a SPS no longer being a requirement.

2.4 Design References

Refer to CEOP2015 for a list of design reference documents relating to HV assets which are to be owned by EE on completion and HV assets which are to be owned and operated by others.
Design and construction shall be to Australian Standards, as a minimum and EE standard for all gifted assets. Supply and construction of any proposed embedded generation substation and embedded generation SS, all-inclusive, will be fully funded by the Connection Applicant.
EE HV connection documentation is available here.

2.4.1 General

All electricity works shall be designed to be safe for the electrical conditions likely to be experienced during service and the physical environment in which they will operate.
Electrical distribution and transmission design are specialist engineering field and it is the responsibility of the Connection Applicant to confirm that the ASP3 and ASP1, contracted to carry out works, are suitably qualified and experienced.
Any assets that are gifted to EE must, at minimum, comply to all relevant EE procedures, guidelines, manuals and standards:

- All designs are to be carried out by an ASP3 accredited in transmission line and substation design.
- All designs to comply with relevant EE standards, templates and requirements.
- In absence of applicable EE standards, the minimum requirements will be as per the following:
  - AS/NZS 3000 – Australian and New Zealand Wiring Rules.
  - NSW Service and Installation Rules 2018.
  - National Electricity Rules.
  - AS 3007 – Electrical Installations.
  - Electricity Supply Act 1995.
  - AS/NZS 7000 – Overhead Line Design.
  - AS 2067 – Substations and High Voltage installations exceeding 1kV AC.
- All electricity works shall be designed to be safe for the electrical conditions likely to be experienced during service and the physical environment in which they will operate.

2.4.2 Substation Design

- All Substation and SS design shall comply with the following standards:
  - CEOP8032 – Transmission and Zone Substations: Design Guidelines.
  - CEOM7052 – Zone Substation Design Services: Drawing Guidelines.
  - CEOM5113.01 – High Voltage AC Transmission, Sub-transmission and Zone Substation earthing.
  - AS 2067: Power installations exceeding 1kV AC.
- EE's CAD workspace guidelines and drawing templates are available upon request.
- To confirm the solar SS design, the following "concept" details are to be provided: -
  - Single Line diagram.
  - General Arrangement – plan view.
  - Site plan.
  - Protection Single Line Diagram.
  - Phasing diagram – if available.
  - SCADA schedule – preliminary.
  - Building floor plans.
  - Earthing design.
  - SiD report.
- EE's approval of this "concept" design package is required before final designs can commence.

- All equipment and materials used for construction in the solar SS are required to be approved by the relevant EE manager.
- The intention is the No1 auxiliary 415VAC supply for the solar SS (EE asset) shall be supplied from the essential services board within the embedded generation substation with the back-up AC supply from the EE distribution network.
- A separate application to EE will be required for the connection to the distribution network.

2.4.3 Mains Design

- Design criteria and conditions as set by this document, and the following EE standards, which are to be incorporated into the design submitted for approval as per the following:
  - CEOM7081 – Sub-transmission Overhead Design Manual.
  - CEOM7082 – Sub-transmission Construction Manual.
  - CEOM7080 – Sub-transmission Lines Drawings Standards.
  - CEOP8042 – Asset Identification and Operational Labels.
  - CEOM7097 – Overhead Design Manual.
  - CEOM7098 – Distribution Underground Design and Construction Manual.
  - CEOM7001 – Asset Management and Engineering: Network Mains Design - Construction Drawing Requirements.
  - CEOM7199 – Underground Construction Manual.
- After determination of the line route and before design approval can be given the ASP3 designer is to submit a conceptual design to EE for comment and approval. Once the conceptual detail has been approved by EE, a final design may be completed and submitted to EE for approval.
- The design is to be undertaken using PLS-Cad or PowerLines Pro design software.
- In absence of relevant EE standards, the minimum design requirements will be as per Australian Standard AS/NZS 7000:2010 “Overhead Line Design – Detailed procedures.
- The conceptual design is to include: -
  - Route plans.
  - Line schedule.
  - Line profile.
  - PLS-Cad “bak” file or PowerLines Pro “power” file.
  - Design criteria report.

2.4.4 Protection, SCADA and Telecommunication

- All protection, control and communication designs shall comply with the following standards:
  - CEOP8002 – Protection Guidelines.
  - CEOP8032 – Control and Protection Panels.
  - CEOS7902 – Design Guidelines for SCADA and DSA.
  - CEOP8082 – Design Guidelines for Load Control.
  - CEOP8012 – Generation Connection: Protection Guidelines.
  - CEOM7621.01 – Technology Guideline (Telecommunications and Infrastructure).
  - CEOM7210 – Operational Manual Radio Sites: Construction.
  - IEC 61000 Electromagnetic Compatibility.
  - AS/NZS 3000 Wiring Rules.
  - Telecommunications Cabling Provider Rules 2014.
  - AS/CA S009:2013 – Installation Requirements for Customer Cabling (Wiring Rules).
  - NER Chapter 5 (Network Connection, Planning and Expansion), particularly control characteristics (clause S5.25), communication facilities (clause S5.2.6) and interlocking and synchronising arrangement.

2.4.5 Metering

- All metering designs shall comply with the following standards:
  - CEOP8032 – Control and Protection Panels.
  - Embedded Generation Connection Agreement.
  - CEOP8079 – HV Metering.
  - IEC 60255 Electrical Relays.
  - IEC 61000 Electromagnetic Compatibility.
  - AS/NZS 3000 Wiring Rules.
  - National Electricity Rules.
- Metering must comply with, the requirements set by AEMO, NER “Chapter 7– Metering” and NEM “Metrology Procedure”.
- Revenue metering will be undertaken at the connection voltage and be located as close as practicably possible to the connection point.
- Power Quality metering will be undertaken at the connection voltage and be located within the embedded generation SS control room.

2.4.6 Network Earthing

- An earthing analysis and design are to be undertaken for the substation and SS site and connection to the EE network. A report is to be submitted to EE for review and approval.
- The link to the existing OPGW on the feeder shall be non-conductive.
- The earthing system is to be constructed in accordance with EE standards and tested as part of the commissioning process.
- The following EE standard is to be incorporated into the design detail: -
  - CEOM5113.01 – High Voltage AC Transmission, Sub-transmission and Zone Substation earthing.
  - CERM2456 - External Network Connection Earth System Design & Test Requirements.

2.5 Contestability of Services

Refer to document: - CEOP2015 – General Terms and Conditions for Contestable Work

2.6 Contestable Works Design Certification

Refer to document: - CEOP2015 – General Terms and Conditions for Contestable Work

Please Note:

- All compliant submissions to Contestable Works will be subject to a 28-day turnaround period.
- Any resubmissions due to non-compliance or omissions shall result in a new 28-day turnaround period.

2.7 Risks

All projects have inherent risks, any potential risks should be identified and mitigated if possible, early in the project timeline. Consider the following questions for each identified project risk:

- What is the risk?
- What is the mitigation? (i.e. measures implemented or contingency allowed).
- What is the justification? (i.e. if a risk is mitigated through an action determined by EE or, it has been deemed 'acceptable', this then provides the reasoning for the decision).

A list of typical risks in example categories are listed below:

2.7.1 Construction

- Asbestos present in building.

2.7.2 Environment

- Asbestos present in building.

2.7.3 Equipment

- Unknown lead time/cost of non-standard major plant.

2.7.4 Legal

- Development dependent upon council approvals.

2.7.5 Network

- No back-up supplies available during installation or maintenance of a transformer.

2.7.6 Safety

- Site entry is off the main highway which is single lane and has no shoulder.

2.8 Typical Connection Arrangements

2.8.1 Option 1: Additional Feeder Bay in Zone Substation

OPTION	VOLTAGES	TELECOMMUNICATION	ESTIMATED COST RANGE (based on previous projects)	NON CONTESTABLE COST RANGE INCLUDES	POTENTIAL ADDITIONAL CONTESTABLE WORKS COSTS
1 - Additional Feeder Bay Outdoor ZS	66-132kV	Duplicate paths available	$2 Million - $3 Million	All design inside ZS, CB & Fdr bay equipment, Prot/Control Panels, SCADA modifications.	RTU upgrade, telecommunications, extra land acquisition, bench extension, additional road access, busbar additions, TX upgrade or Solar Farm substation works.

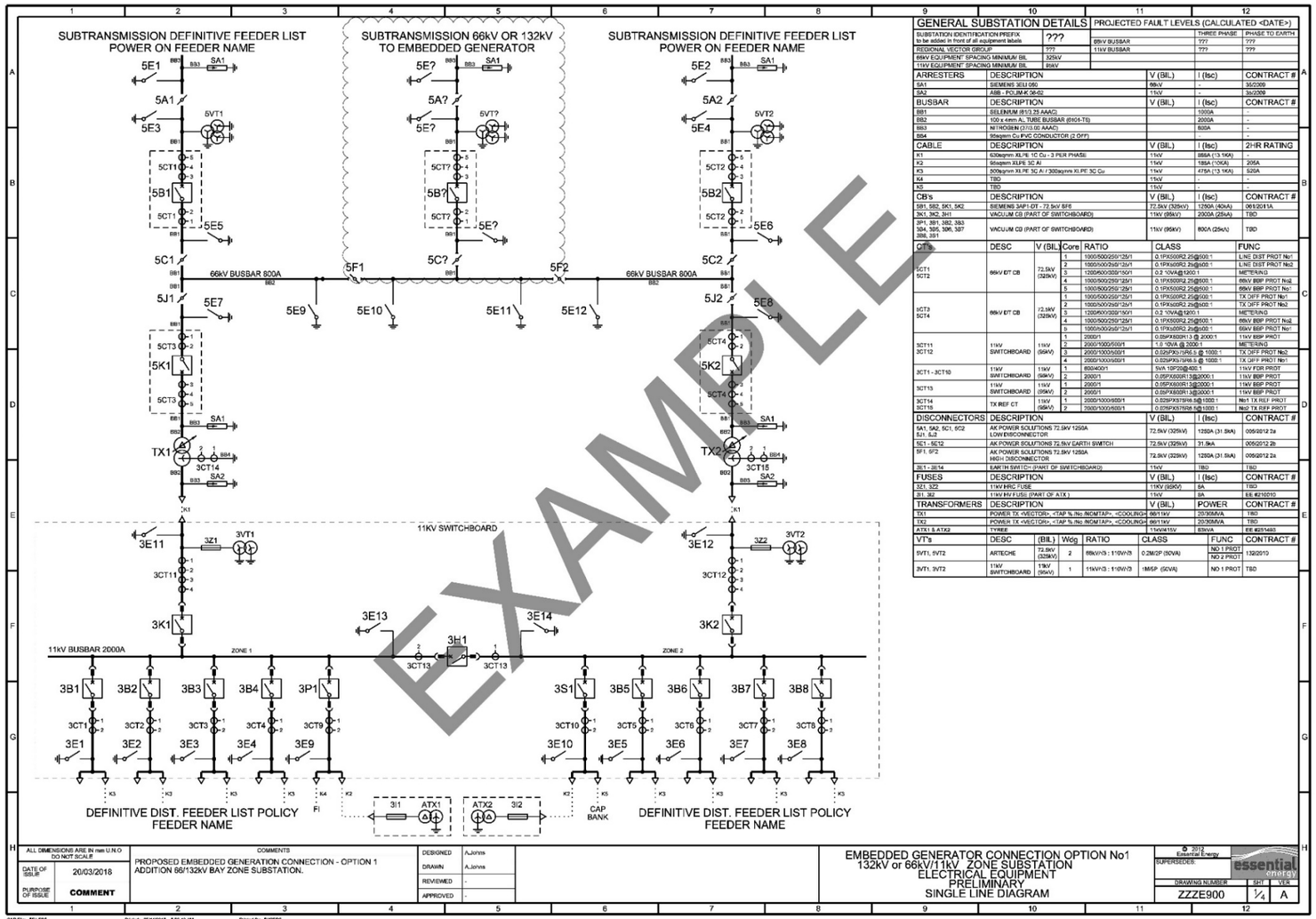

Figure 10.1.1: Example SLD of an Additional Feeder Bay Connection

2.8.2 Option 2: New 3 Way Switching to Existing Sub-transmission line

OPTION	VOLTAGES	TELECOMMUNICATION	ESTIMATED COST RANGE (based on previous projects)	NON CONTESTABLE COST RANGE INCLUDES	POTENTIAL ADDITIONAL CONTESTABLE WORKS COSTS
2 - Construct 3 Way SS	66/132kV	Duplicate paths available - OPGW	$4 Million - $5 Million	All design and construction of 3-way SS, Prot/Control Panels, SCADA development & modifications, telecommunications, design review and certification, commissioning, switching, integration into EE network.	Design & construction of the Solar Farm Substation, fees and land acquisition, all network studies, design and construction of all auxiliary supplies.

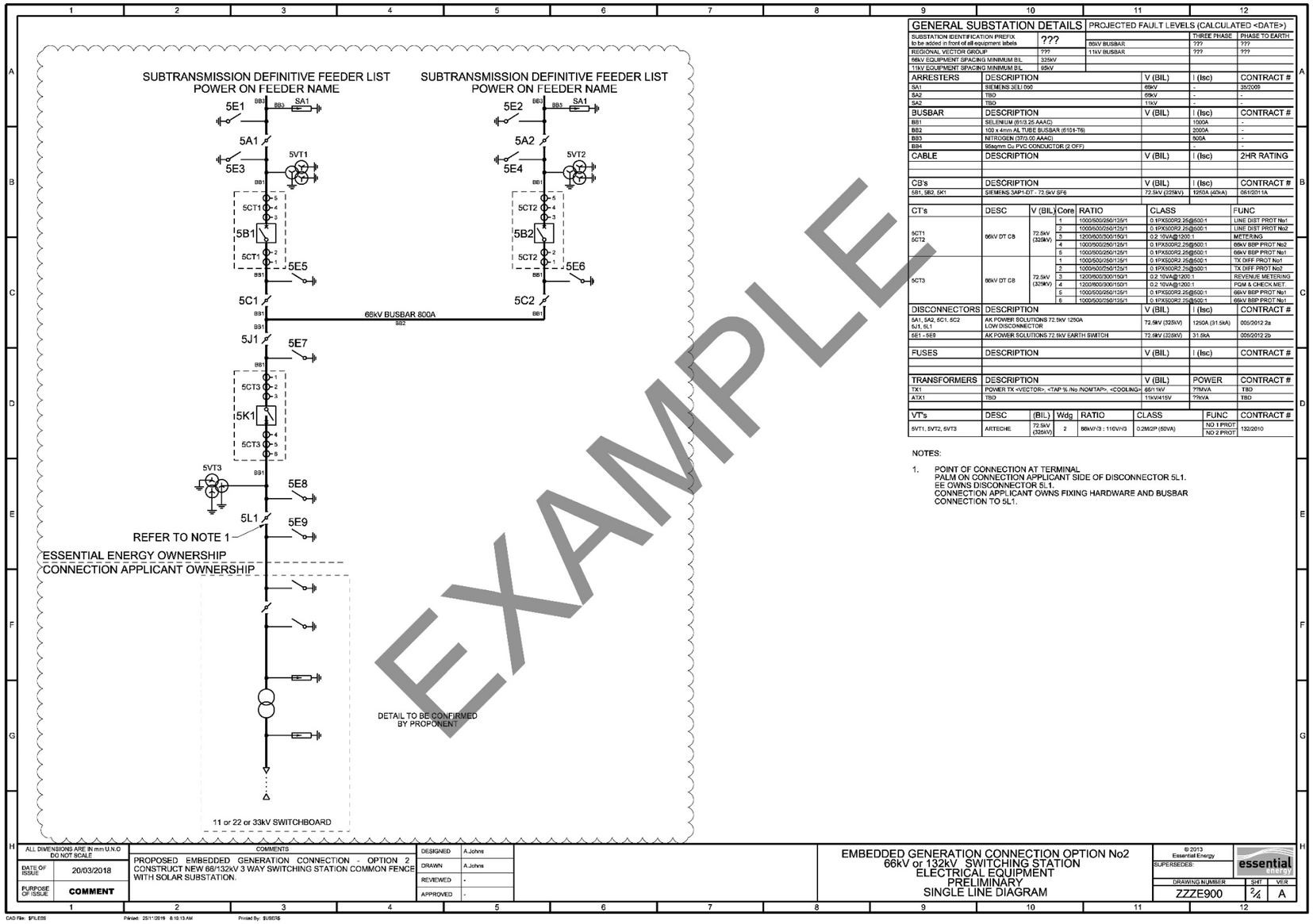

Figure 10.2.1: Example SLD of 3-Way SS Connection

2.8.3 Option 3: Direct Connection to Zone Substation (<5MW)

OPTION	VOLTAGES	TELECOMMUNICATION	ESTIMATED COST RANGE (based on previous projects)	NON CONTESTABLE COST RANGE INCLUDES	POTENTIAL ADDITIONAL CONTESTABLE WORKS COSTS
3 - Additional Indoor CB	11/22kV	Duplicate paths available	$1.5 Million - $2.5 Million	All design inside ZS, all construction & commissioning within the ZS, additional protection, telecommunication and SCADA.	RTU upgrade, telecommunications, extra land acquisition, bench extension, additional road access, busbar additions, TX upgrade or Solar Farm substation works.

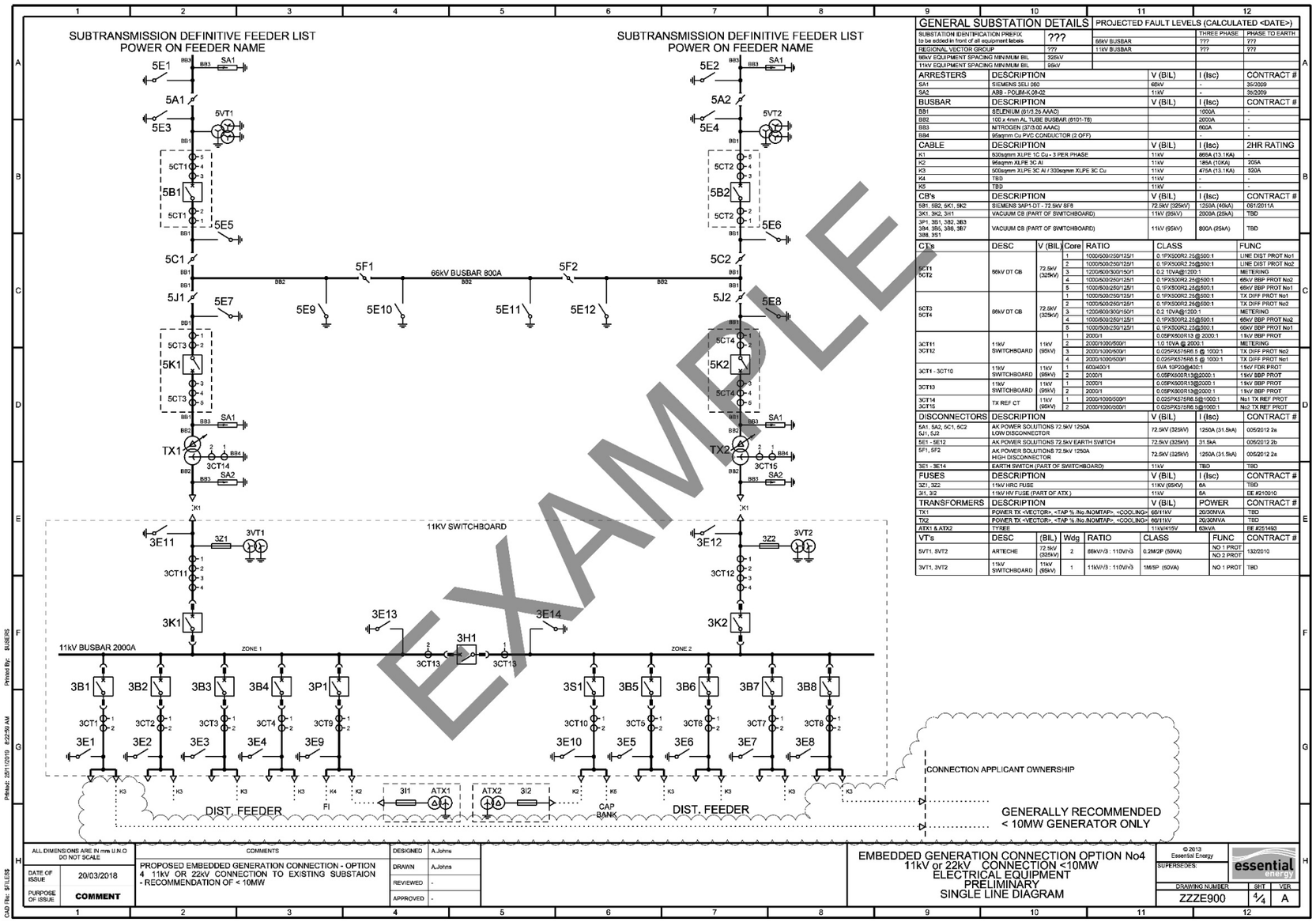

Figure 10.3.1: Example SLD of a Direct Connection to CB

2.8.4 Option 4: Ancillary Works in Zone Substation

OPTION	VOLTAGES	TELECOMMUNICATION	ESTIMATED COST RANGE (based on previous projects)	NON CONTESTABLE COST RANGE INCLUDES	POTENTIAL ADDITIONAL CONTESTABLE WORKS COSTS
4 - Ancillary Works in ZS	66/132kV	Duplicate paths available - OPGW	$200K - $500K	Telecommunications, SCADA development, design review and certification, commissioning, switching, integration into EE network.	Design & construction of the 3-way SS, Solar Farm Substation, subtransmission line, all auxiliary supplies, network studies, fees and land acquisition.

2.8.5 Option 5: HV "T" or Recloser Interface Connection

OPTION	VOLTAGES	TELECOMMUNICATION	ESTIMATED COST RANGE (based on previous projects)	NON CONTESTABLE COST RANGE INCLUDES	POTENTIAL ADDITIONAL CONTESTABLE WORKS COSTS
5 - HV "T"or Recloser Interface Connection	11/33kV	Duplicate paths available	$200K - $500K	Review study recommendations, design review of new gifted reclosers and metering TX, Protection coordination, implementation of protection setting changes, earthing design review, PQM installation (including telecommunications paths between PQM and reclosers), commissioning and final testing.	Facilitate network performace analysis, design, construction and commissioning of Solar Farm and ancillary services, metering TX and reclosers. Line easements, land purchases, metering, safety in design documentation, test and commissioning documentation.

Refer to CEOM7114.01 Typical 11-33kV HV Customer Overhead Connection Arrangement and CEOM7114.02 Typical 11-33kV HV Customer Underground Connection Arrangement

3.0 AUTHORITIES AND RESPONSIBILITIES

Summarise responsibilities allocated to employees (by job/position title) within the process specified under Actions.

Position / Title	Responsibility
Manager / Network Design Development (NDD)	• The approval of this guideline.
Team Leader / NDD Major Connections	• Updating of this document as required.
All Major Stakeholders consulted in the major network connection process.	• Reviewing of this document.

4.0 DEFINITIONS

ADSS
All-Dielectric Self-Supporting (optical fibre cable).

AEMO
Australian Energy Market Operator.

ASP
Accredited Service Provider - A person accredited under a scheme approved by the NSW Department of Trade and Investment.

CB
Circuit Breaker.

CBF
Circuit Breaker Failure.

Connection Applicant
For the purposes of this document shall mean the customer / generator / developer requesting the works to be conducted.

Contestable Works
Works for which a Connection Applicant may choose the provider of services.

CT
Current Transformer.

DIP
Design Information Pack.

DNP3
Distributed Network Protocol is the communication protocol used by Essential Energy.

DSR

Design Safety Report.

EE
Essential Energy.

EIA
Environmental Impact Assessment.

FI
Frequency Injection.

ICCP
Inter-Control Centre Protocol.

IED
Intelligent Electronic Device.

NATA
National Association of Testing Authorities.

NER
National Electricity Rules.

NEM
National Energy Market.

Non-Contestable works
Works which Essential Energy deem to be impractical or too great a risk, to allow external parties to undertake.

OPGW
Optical Ground Wire or optical fibre composite overhead ground wire.

POC
Point of Connection, the physical connection between Essential Energy's network and a private network.

POF
PowerOn Fusion, is the network management system used by Essential Energy.

PD
Project Definition.

PQM
Power Quality Meter.

PSA
Protection Settings Advice.

PV
Photovoltaic.

RBSC
Runback Scheme Controller.

REF
Review of Environmental Factors.

RTU
Remote Terminal Unit.

SCADA
Supervisory Control and Data Acquisition.

SiD
Safety in Design.

SLD
Single Line Diagram.

SS
Switching Station.

VT
Voltage Transformer.

WAN
(Telecommunication) Wide Area Network.

ZS
Zone Substation.

5.0 REFERENCES

Internal
Branch Procedure – Connection Process Guideline – CEOP8079
Branch Procedure - Transmission and Zone Substations: Design Guidelines - CEOP8032
Division Manual - Sub-transmission Line Design Manual – CEOM7081
Branch Manual - Sub-transmission Construction Manual – CEOM7082
Operational Manual - Overhead Construction Manual – CEOM7099
Branch Manual - Asset Management and Engineering Network Mains Design - Construction Drawing Requirements - CEOM7001

Branch Manual - Zone Substation Design Services: Drawing Guidelines – CEOM7052
Branch Manual - Underground Construction Manual - CEOM7199
Division Procedure - General Terms and Conditions for Contestable Works - CEOP2015
Operational Standard - SCADA and DSA Systems - CEOS7902
Essential Energy's HV connection documentation is available here

External
Nil Entry

6.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Type of Record	Storage Location	Retention Period
Nil entry		

* The following retention periods are subject to change e.g. if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Management Team.

7.0 REVISIONS

Issue No.	Section	Details of changes in this revision	Change Risk Impact?
2	2.3.3	Addition of SPS requirements.	Low
	2.4.6	Addition of CERM2456.	
	2.8.2	Updated EE Non contestable scope for construction of 3-way SS.	
	Various	Update references to CEOS7902 – Design Guidelines for SCADA and DSA.	
	2.8.5	Updated reference to Standard O/H and U/G Connection Arrangements	