**DISTRIBUTION CONFORMANCE ASSESSMENT – SUBSTATION INSTALLATIONS**

**PART A - DESIGN**

**Purpose:** To ensure the requirements for a substation installation have been met. The relevant sections of the WA Service & Installation Rules, Distribution Substation Plant Manual, Building Code of Australia and Australian Standards should be consulted for further information and clarity.

**Site Address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Reference** | **Substation Design Requirements** | **✓ or explanation** |
|  | **General Conditions** |  |
| WASIR  6.7.1  6.8  6.11  6.13 | Have the following matters been considered and addressed as part of the design preparation   * Correct site identification (including final levels) * Land allocation and easement/encumbrance requirements * Removal and reinstatement requirements for road reserves, public open space, etc. * Environmental and heritage requirements |  |
| WASIR  14.4.3  14.4.4  14.4.6 | A risk and hazard assessment has been undertaken including but not limited to the following:   * Location of other existing or proposed structures both on and adjacent to the site * Identification of fire zones and fire escape routes * Hazardous environments * Climatic environmental conditions and flood levels * Other matters (please state) * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| WASIR 14.4.2 | Substation contains no building or other services apart from those shown on the drawings provided by the Network Operator. |  |
| WASIR 14.4.2 | Does the enclosure comply with Government Agencies, Building Code of Australia and Local Government Authority requirements? |  |
|  | **Site Requirements** |  |
| WASIR 14.4.6 | The selected site has been designed in accordance with the regulatory and network operators requirements including but not limited to acceptable:   * Location above adjacent lots/roads, flood levels * Location regarding water inundation and vegetation * Site levels, compaction, stabilisation and soil erosion (where required engineering certified retaining walls, batters) * Traffic movement and the need to provide infrastructure/equipment protection eg bollards * Surface treatments (outdoor) |  |
|  | **Access and Installation Requirements** |  |
| WASIR  14.4.7.1  14.4.7.2  14.4.7.3 | Access to substation sites shall be suitable for heavy vehicles and heavy plant. Provide details for:   * Access route (including slope/gradient) * Cable hauling/pulling eyes * Gatic covers (as relevant) |  |
| AS2067 5.5.4 | Minimum access requirements maintained in service areas as per AS2067 5.5.4 where a non-standard design is proposed |  |
| WASIR 14.2.1 | District Substations: Preferably situated on the front street boundary or by agreement with the Network Operator up to a maximum (LV Cable length) of 30m. |  |
|  | **Emergency and Exit Requirements** |  |
| WASIR 14.4.5  14.6.4 | Requirements of fire alarm and fixed fire suppression systems are met. |  |
| WASIR 14.4.4.2, AS2419.1-2005 | Fire hydrants and brigade booster assemblies are located in accordance with the standards (located 10m from any HV distribution equipment). |  |
| WASIR 14.4.4.3 | Petroleum and gas installations are located from any Network Operator electrical equipment or as per WASIR distances. |  |
| WASIR 14.6.6 | Doors (2) are:   * located on alternative walls * self-closing/locking doors, fitted with panic release bars * 2hr fire rated (including all associated hardware) * fitted with Network Operator labels as per AS/NZS 1905 |  |
|  | **Civil and Structural Requirements** |  |
| DPSM Section 3 | Minimum dimensions and arrangement as per relevant DSPM Section 3 arrangement. Please detail relevant DSPM drawing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| WASIR 14.3.4.1  DSPM 3 DSM 6 | HV/LV Switchgear and metering unit (if required) support structures have been designed correctly. |  |
| WASIR 14.6.2 | The enclosure to be designed by a chartered structural engineer to accommodate loads and forces as outlined in AS/NZS 1170. |  |
| WASIR 14.6.2 | Substation design has no more than two transformers in the same enclosure, with transformer pairs fire segregated. |  |
| WASIR 14.6.5  DSPM 3  DSPM 5 | Substations housing a transformer have   * brick bund at least 75 mm high at every door location OR * alternative bunding |  |
| WASIR 14.6.7  DSPM 3 | Have a minimum ceiling height of 2.5 metres (3 metres where ducting passes over the top of the transformer), roof to be dust tight and all storm water guttering to be external to the room. |  |
| WASIR 14.6.11 | Fire rated certification available/provided. |  |
|  | **Trenches, Ducts and Other Penetrations** |  |
| WASIR 14.6.2 | Allowance for trench surfaces and enclosure floors to be painted with an appropriate sealant. |  |
| WASIR 14.6.8  DSPM 3 | Appropriate trench covers:   * Designed correctly (mesh/slab) * Supported correctly |  |
| WASIR 14.6.8 | Ducts or other penetrations entering the trench or enclosure are designed with removable watertight seals to both ends of the installed ducts or penetrations (includes earth rod penetrations). |  |
| WASIR 14.6.8 | Where ducts are installed between fire segregated switch-rooms, ducts are designed with 2hr fire rated sealing. |  |
| WASIR 6.10  DSPM 3 DSM 6 | Substation site has the correct cable duct arrangement   * Power (including transformer tails) * Communication * Metering |  |
|  | **Ventilation** |  |
| WASIR 14.6.7  AS2067  AS 1682  AS/NZS 1668  DSPM 3  DSM 6-02 | Ventilation designed as follows:  **Cooling**   * Cross flow over transformers * Fans located inside room (if forced) * Dedicated inlet/outlet outside the building (basement OR non-boundary located) * Individual (non-cumulative) ducting per transformer * Vent/louvre number/size/type/positions * Increased room height (3m) if ducting above transformer/RMU * Thermostat location and setting per transformer * Correct flow rate per transformer   **Fire/Smoke**   * Self-closing pressure relief vents * Ventilation system is 2hr fire rated   **Electrical**   * Supplied from Substation Local DB * Correct fan starter wiring |  |
|  | **Light and Power** |  |
| WASIR 14.6.9  AS2067 Cl. 5.1.6  AS/NZS 1680  AS/NZS 3000 | All general and emergency lighting fixtures, GPO’s including all associated wiring has been designed correctly.   * Substation Local DB (3ph) supplied from Customer SMSB (min. 6sq.mm) * Illuminated light switch mechanisms |  |
|  | **Metering and Customer Switchboard** |  |
| WASIR 14.4.12 | Customer metering requirements have been considered and appropriate provision made for their installation. Appropriate provisions made for the Customer Main Switchboard. |  |
| WASIR 14.3.4.1 | Customer Substations with more than 4MVA: The load is to be supplied from 2 evenly loaded fire rated switchboards with mechanical interlocking. |  |
|  | **Earthing** |  |
| WASIR 14.4.10 | The earthing system has been designed to ensure compliance with AS 2067, AS/NZS 3000 and the network operators requirements including the following:   * Earthing conductors are copper and sized in accordance with AS 2067 * Earth connections are to be made in accordance with AS 2067 and AS/NZS 3000 * Connections tagged and labelled * Earth Bar location & adequate bonding |  |
| WASIR 14.4.10.3 | Dependant on location, EPR studies may be required for metallic structures/services around the substation site such as metallic pipelines, telecommunication services, metallic fences. |  |
| WASIR 14.6.3.1 | District or Sole Use Substation: Customer to arrange with the Network Operator to have the earth electrodes installed in the floor before pouring the concrete. Where remote earthing is designed:   * earth pits * conduits * earth wire |  |
| WASIR 14.6.3.2  DSPM 3 | Customer Substation: Minimum of 2 earth electrodes is to be installed by the customer in the trench. For separate trenches, at least one electrode is required in each trench with a 75mm conduit to interconnect the electrodes. |  |

**Signed:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Company: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART B – CONSTRUCTION**

**Purpose:** To ensure the Design requirements in Part A have been Constructed and for any discrepancies to be addressed and rectified. Residual hazards to Western Power staff shall be adequately documented/managed for the life of the installation/asset.

**Western Power (WP) Reference number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**The following requirements have been segregated into Pre-Installation and Post-Installation activities relating to the Western Power equipment/assets.**

**PART B1 – PRE-INSTALLATION**

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| **Reference** | **Substation Construction Requirements** | **✓ or explanation** |
|  | **General Conditions** |  |
|  | Confirm that ALL requirements outlined in Part A have been met. |  |
| WASIR 14.4.2 | Substation contains no building or other services apart from those shown on the drawings provided by the Network Operator. |  |
| WASIR 14.4.4 | Hazardous or flammable materials are not stored within the confines of a substation or its access and evacuation routes. |  |
| DPSM Section 3 | Minimum dimensions and arrangement as per the architect/site drawing. Identify the relevant DSPM drawing: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| WASIR 14.6.11 | Fire rated certification provided OR (where outdoor) fire clearances/mitigation endorsed with Restrictive Covenant in place |  |
|  | **Site (outdoor)** |  |
| WASIR 14.4.6  DSPM | The selected site has been prepared and constructed in accordance with the Network Operators requirements inclusive of   * soil compaction * erosion prevention measures * retaining walls/batters * fire clearances/mitigation |  |
|  | **Access and Installation** |  |
| WASIR 14.4.7 | 24/7 Access to substation suitable for heavy vehicles and heavy plant.   * Access route (including slope/gradient) * Cable hauling/pulling eyes * Gatic covers (as relevant) |  |
| AS2067 5.5.4 | Minimum access requirements maintained in service areas as per AS2067 5.5.4 where a non-standard design is proposed. |  |
|  | **Emergency and Exit** |  |
| WASIR 14.6.4 | Requirements of fire alarm and fixed fire suppression systems are met. |  |
| WASIR 14.4.4.2, AS2419.1-2005  WASIR 14.4.4.3 | * Fire hydrants and brigade booster assemblies clearance from any HV distribution equipment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Petroleum and gas installations clearances from electrical equipment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| WASIR 14.6.6 | Doors (2) are:   * located on alternative walls (adequate separation) * self-closing/locking doors, fitted with panic release bars * 2hr fire rated (including all associated hardware) * fitted with Network Operator labels as per AS/NZS 1905 |  |
|  | **Civil and Structural** |  |
| WASIR 14.6.7  DSPM 3 | * Minimum ceiling height: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Roof to be dust tight * All storm water guttering external to the room. |  |
| WASIR 14.3.4.1  DSPM 3 DSM 6 | HV/LV Switchgear and metering unit (if required) support structures have been supplied and installed. |  |
|  | **Trenches, Ducts and Other Penetrations** |  |
| WASIR 14.6.2 | Trench surfaces and enclosure floors painted with an appropriate sealant. |  |
| WASIR 6.10  DSPM 3  DSM 6 | Substation site has the correct cable duct arrangement, size and number:   * Power (including transformer tails) * Communication (where required) * Metering (where required) |  |
|  | **Ventilation** |  |
| WASIR 14.6.7  AS2067  AS 1682  AS/NZS 1668  DSPM 3  DSM 6-02 | Ventilation installed as follows:   * Cross flow over transformers * Fans located inside room (if forced) * Dedicated inlet/outlet outside the building (basement OR non-boundary located) * Individual (non-cumulative) ducting per transformer * Vent/louvre number/size/type/positions * Increased room height (3m) if ducting above transformer/RMU * Thermostat location and setting per transformer * Correct flow rate per transformer * Self-closing pressure relief vents * Ventilation system is 2hr fire rated * Supplied from Substation Local DB * Correct fan starter wiring |  |
|  | **Light and Power** |  |
| WASIR 14.6.9  AS2067 Cl. 5.1.6  AS/NZS 1680  AS/NZS 3000 | All general and emergency lighting fixtures, GPO’s including all associated wiring has been installed and tested.   * Substation Local DB (3ph) supplied from Customer SMSB (min. 6sq.mm) * Illuminated light switch mechanisms |  |
|  | **Earthing** |  |
| WASIR 14.6.3.1 | Identifiable location/labelling of (including remote):   * Earth pits * Conduits * Earth wire |  |
| WASIR 14.4.10.2 | The earthing installation is tested and commissioned in accordance with the requirements of AS 2067, AS/NZS 3000 and as specified by the Network Operator. Test results have been provided to Construction Project Manager. |  |

**Signed:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Company: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART B2 – POST-INSTALLATION**

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| --- | --- | --- |
| **Reference** | **Substation Construction Requirements** | **✓ or explanation** |
|  | **Site (outdoor)** |  |
| WASIR 14.4.6  DSPM | Final site finishings:   * infrastructure/equipment protection * screening |  |
|  | **Civil and Structural** |  |
| WASIR 14.6.5  DSPM 3  DSPM 5 | Substations housing a transformer have   * brick bund installed at least 75 mm high at every door location OR * alternative bunding |  |
|  | **Trenches, Ducts and Other Penetrations** |  |
| WASIR 14.6.8  DSPM 3 | Appropriate trench covers:   * Installed correctly (mesh/slab) * Supported correctly * Fixed correctly |  |
| WASIR 14.6.8 | Ducts or other penetrations entering the trench or enclosure are:   * Fitted with removable watertight seals to both ends (earth rod penetrations single end only) * 2hr fire rated sealed (including post-cable installation) |  |
|  | **Earthing** |  |
| AS 2067, AS/NZS 3000 | Earthing components:   * Earth bar correctly installed/located * Connections tagged and labelled * Bonding completed |  |

**Signed:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Company: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**