



**SP MANWEB**

**SP Manweb plc**

and

**XXX**

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**AGREEMENT FOR CONNECTION TO THE DISTRIBUTION SYSTEM**  
(Where the customer has generating plant and uses the Distribution System for  
selling electricity or exporting energy)

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**THIS AGREEMENT is made the**

**day of**

**20**

**BETWEEN:**

- (1) **SP Manweb Plc** a company registered in England Wales with the registered number 02366937 whose registered office is at 3 Prenton Way, Prenton CH43 3ET ("the Company"), and
- (2) **XXX** a company registered in **XXX** with the registered number **XXX** whose registered office is at **XXX** ("the Customer")

**WHEREAS:-**

- A The Company is authorised by a licence granted under the Act to carry on the business of the distribution of electricity and under the terms of that licence is required (except in certain circumstances specified in that licence) to offer to enter into an agreement for connection to the Distribution System by any person requesting the same, subject to payment by the Customer of an appropriate charge.
- B The Customer has made such request to the Company for Connection.

**NOW THEREFORE** the Parties **HAVE AGREED AND DO HEREBY AGREE** as follows:

1. The Company agrees to the Connection of the Customer's Installation to the Company's Distribution System on the terms and conditions of this Bespoke Connection Agreement.
2. Subject to the express provisions of this Bespoke Connection Agreement, Section 3 of the National Terms of Connection (the "**Applicable NTC Section**") will apply as if it was set out in this Bespoke Connection Agreement, and as if references in the Applicable NTC Section to "this agreement" or to "this Agreement" were to this Bespoke Connection Agreement.
3. The National Terms of Connection are available in writing from the Energy Networks Association, 6th Floor, Dean Bradley House, 52 Horseferry Road, London SW1P 2SF, or from the website at [www.connectionterms.co.uk](http://www.connectionterms.co.uk).
4. The Customer's attention is drawn specifically to the Applicable NTC Section, and the Customer confirms that it has read and fully understands the Applicable NTC Section.
5. Expressions used in this Bespoke Connection Agreement shall have the same meanings as is given to them in the Applicable NTC Section.
6. Details of the Premises, the Connection Points, the technical characteristics of the Connection Points and other matters are set out in the appendices to this Bespoke Connection Agreement.
7. Both parties agree to comply with and be bound by the provisions of the Appendices to this Bespoke Connection Agreement.
8. The Parties may agree variations to this Bespoke Connection Agreement, which variations must be recorded in writing and signed by an authorised representative of each Party. Each Party shall negotiate in good faith the terms of any variation proposed by the other.

If any variation has not been agreed within 1 month of its being proposed, either Party may refer the matter to the Authority for resolution pursuant to section 23 of the Act. The Parties shall give effect to any such determination, and shall enter into any agreement as shall be necessary to give effect to any such determination.

9. Address for notices

(a) for the Company:	(b) for the Customer:
Distribution Policy Manager SP Manweb plc Ochil House 10 Technology Avenue Hamilton International Technology Park High Blantyre G72 OHT	XXX

**IN WITNESS** the hands of the duly authorised representatives of the Company and Customer on the day and year first before written.

SIGNED at..... on the .....day of.....201.....  
 for and on behalf of **SP Manweb Plc**

by.....  
 Distribution Policy Manager/Authorised Signatory

WITNESSED at ..... on the.....day of .....201  
 for and on behalf of **SP Manweb Plc**

by.....  
 / Authorised Signatory

SIGNED at .....on the.....day of .....201  
 for and on behalf of the **Customer**

by.....  
 Designation/Company

WITNESSED at .....on the.....day of .....201

For and on behalf of the **CUSTOMER**

by.....

**THESE ARE THE APPENDICES REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN THE COMPANY AND THE CUSTOMER**

**APPENDIX 1 - GENERAL PARTICULARS OF THE CONNECTION**

1. CONNECTION CHARGES

These comprise the Connection Charges and (if applicable) the Use of System Charges:

<p>Connection Charge</p>	<p><b>The total charge for the Company's Works as specified in the Offer Letter, dated <b>XX XXX 200X</b>, is <b>£X,XXX,XXX</b> (X million, X hundred and X thousand pounds) plus VAT at the appropriate rate.</b></p> <p>The connection charge must be paid in full before the connection of the Customer's Installation can be made and energised. The initial Connection Charge may be subject to review in the manner set out in the Offer Letter for the connection made to and accepted by the Customer.</p>
<p>Use of System Charges</p>	<p>Such charges will be calculated in accordance with the Company's Statement of Use of System Charges for the time being in force and issued pursuant to Condition 14 of the Electricity Distribution Licence.</p> <p>So far as Use of System Charges are concerned, where another person is paying the charges for the import or export from the site, the Customer shall not be liable for such charges.</p>

2. LOSS ADJUSTMENT FACTOR

The Customer acknowledges and accepts that in signing this Agreement a site-specific loss adjustment factor is being requested from the Company. The Company shall calculate the site-specific loss adjustment factor in accordance with its Methodology Statement for Use of System Charges. It is a condition of the connection of the Customer's Installation that a site-specific loss adjustment factor is in place.

3. SUPPLY CHARACTERISTICS

Except as set out in paragraph 2 below, the characteristics of the connection(s) shall be as follows:

(a) Characteristics of supply:

(i) Number of Phases	[enter number]
(ii) Current	[alternating current]
(iii) Voltage	[Enter Statutory Voltage kV ± 6% / +10%/-6%]
(iv) Frequency	[50 Hertz ± 1%]

(b) Connection Point(s): either

- (i) where connection is provided from the Company's final cut-out fuse, isolator, switch, metering switch fuse, HV metering unit or metering

circuit breaker, unless otherwise stated in this Bespoke Connection Agreement the Connection Points are the outgoing terminals of the Company’s final cut-out fuse, isolator, switch, metering switch fuse or metering circuit breaker, or

- (ii) where the Company’s electric lines connect directly to a Customer’s intake isolator, switch, metering switch fuse or metering circuit breaker, unless otherwise stated in this Bespoke Connection Agreement the Connection Points are the incoming terminals of the Customer’s intake isolator, switch, metering switch fuse or metering circuit breaker,

and, for the avoidance of doubt, the Connection Points may be remote from the Customer’s Installation where third party electric lines and/or electric plant provide the intermediate electrical connection from the Company’s Distribution System to the Customer’s Installation.

4. DETAILS OF PREMISES

(a)	Address	[SITE ADDRESS HERE]
	Import MPAN	[IMPORT MPAN HERE]
	Export MPAN	[EXPORT MPAN HERE]
(b)	Commencement Date	[DD/MM/YYYY]
(c)	Maximum Import Capacity	XXX kVA With effect from : DD/MM/YYYY
	Maximum Export Capacity	XXX kVA With effect from : DD/MM/YYYY

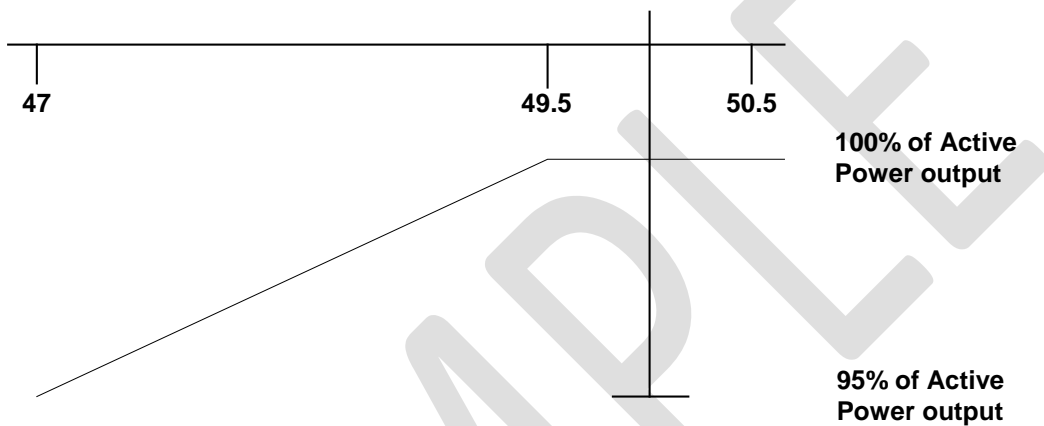
5. FREQUENCY RANGE REQUIREMENTS

The **Plant** and **Apparatus** must be designed:

1. To enable operation of that **Plant** and **Apparatus** within the **System Frequency** range of 52Hz – 47Hz in accordance with the following.
  - 51Hz – 52Hz Operation for a period of at least 0.2 seconds is required each time the **Frequency** is above 51Hz.
  - 47.5Hz – 52Hz Continuous operation is required.
  - 47Hz – 47.5Hz Operation for at least 20 seconds is required each time the **Frequency** is below 47.5Hz.
2. Such that each **Generating Unit** remains connected to the system without tripping of any **Generation Unit** for a close up solid three-phase fault on the **National Grid Transmission system** for a total fault clearance time of up to 140ms. It should be noted that although a solid three phase fault results in zero voltage at the point of

fault at the instant of fault, the sequential clearance of the fault by circuit breakers means that the duration of zero voltage should not be more than 100ms. Such that each **Generating Unit** is capable (recognising that for wind farms **active power** can vary with wind speed) of;

- (a) Continuously maintaining constant **Active Power** output for **System Frequency** changes within the range 50.5Hz to 49.5Hz, and
- (b) Maintaining its **Active Power** output at a level not lower than the figure determined by the linear relationship shown in figure 1 for **System Frequency** changes within the range 49.5Hz to 47Hz, such that if the **System Frequency** drops to 47Hz the **Active Power** output does not decrease by more than 5%.



- 4. Such that for steady state voltage changes in the normal operating range, the **Active Power** output at the **Connection Point** to the **Network Operator's** system should not be affected by more than the change in the **Active Power** losses incurred at reduced or increased voltages.
- 5. To include a continuously acting control system to provide a voltage control, or **Reactive Power** control, or **Power Factor** control, or a combination of these, without instability over the entire **Active Power** operating range of the **Power Station** at the **Connection Point** to the host **Network Operators** system. The overall system shall include elements, which provide a limited bandwidth output of not greater than 0 to 5 Hz.

**The bold fonts are terms that are defined in the Glossary and Definitions in the Grid Code.**

6. POWER FACTOR

The Customer should operate within the power factor range 0.9 (exporting MVAR's) and 0.95 (importing MVAR's) averaged over a half hour period with a power factor averaged over a four week period targeted at unity power factor (but not greater than 0.928) at all times measured at the Connection Point.

7. SPECIAL AUTOMATIC FACILITIES

An emergency trip facility connected to the Company’s metering [33,000] volt switchgear for use by the Customer. The emergency trip facility will be installed at an agreed location within the Customer’s area of the Substation building.

8. COMMUNICATIONS EQUIPMENT AND DATA REQUIREMENTS

The following will be provided by the Customer at each Connection Point for input to the Company’s communications system.

**Analogues**

- Total generated MW per Connection Point
- MW, MVA, Amps, Volts (kV) and frequency (0.01Hz precision) per Connection Point
- Anemometer reading of wind speed and wind direction for any turbine or cluster of turbines ]

**Indications**

- Double point circuit breaker indication contacts (i.e. one open, one closed) shall be provided for the Customer’s main XXX33,000 / 11,000 XXXX volt circuit breaker on the Customer’s installation.]

9. GENERATING PLANT

<b>GENERATING UNIT DATA</b>	<b>UNIT</b>	
QAS Reference		XXX
Number of identical units to which this data applies	No	XXX
Prime Mover	Text	XXX
Electrical Machine type	Text	XXX
Machine Rating	kVA kW	XXX
Rated terminal voltage	V	XXX
Rated Power factor at machine terminals	---	XXX
Maximum Generation (per unit)	kW	XXX
Minimum Generation (per unit)	kW	XXX
<b>GENERATOR TRANSFORMER DATA</b>	<b>UNIT</b>	
Rated Capacity	MVA	XXX
Positive sequence reactance (% on rated MVA)	%	XXX

10. DESIGN FAULT LEVEL

[XXX include details]

11. MAXIMUM FAULT CONTRIBUTION FROM [XXX]

[XXX include details]

SAMPLE



**APPENDIX 1 – ANNEXE 1 LINE DIAGRAM**

[attach line diagram]

SAMPLE

**APPENDIX 1 - ANNEXE 2 LOCATION PLAN**

[include location plan]

SAMPLE

## APPENDIX 2 - TECHNICAL CONDITIONS

### 1. DEFINITIONS

For the purpose of this Schedule the following definitions shall apply;

"Authorised Person" is a person recognised by the Company or the Customer as having sufficient technical knowledge and/or experience to enable him to avoid danger, as referred to in the notes of guidance on the Electricity at Work Regulations 1989 relating to Regulation 16. This person may be nominated by the Company or the Customer to carry out specific duties.

"G59/3" is the current Electricity Association Recommendation relating to the connection of embedded generating plant at the date of the Offer Letter.

"Protection Equipment" is the automatic equipment installed by the Customer to comply with G59/3, and listed in Annexe 1.

"G5/4" is the current Engineering Recommendation G5/4, "Limits for Harmonics in the United Kingdom Electricity Supply System.

"Power Systems Management Centre or (PSMC)" The Duty Engineer within The Company's Network Management Centre. The lines of communication with this centre will be defined and agreed with due regard to and the Distribution Code before Energisation.

"P28" is the current Engineering Recommendation P28, "Planning Limits for Voltage Fluctuation caused by Industrial, Commercial and Domestic Equipment in the United Kingdom.

"P29" is the current Engineering Recommendation P29, "Planning Limits for Voltage unbalance in the United Kingdom.

"Interface Protection" the automatic equipment installed by either the Customer or the Company at the Exit Point and listed in annexe 1.

"Unfirm" the proposed method of electrical connection whereby the faulting, repairs, replacements or planned maintenance, of any single major item of plant, equipment or line, associated with the connection (including items on the NGC transmission system, or the Distribution System) will cause the connection to be lost (i.e. the Customer will be unable to export or import to or from the Distribution System) until repairs, replacement, maintenance or other works on that item of plant, equipment and lines, are complete.

Annexe 1 - Protection Details and Settings.

Annexe 2 - Schematic Diagram of Customer's Installation.

Annexe 3 - Communication Channels.

### 3. GENERATING PLANT

XXX

## **2) OPERATION**

The Customer's operational regime must comply with the principles of G59/3 and G75.

The Customer shall ensure that the Customer's Installation is operated within the limits detailed in Engineering Recommendations G5/4, P28 and P29.

The Customer should operate at the power factor stipulated in Schedule 2 of this Agreement. The vector sum of the real and reactive power should not exceed the maximum capacity MVA limits specified in Schedule 2.

The Customer must ensure that the generator is stable under all required operating conditions.

The Customer must comply with the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time)

The Customer must establish whether the substation is a "hot" site, having a rise of earth potential exceeding the present limit of 650V for any earth fault on the site. If the substation is declared "hot" then the Customer must install appropriate barrier and isolation facilities in all wiring and communication circuits which may be referred to a remote earth potential. It will also be necessary to ensure that appropriate safety procedures are used when working on these facilities.

## **3) INTERFACE PROTECTION**

### **Company Protection**

The function of this equipment is to enable compliance with our responsibilities under the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) and to provide back up to the Customer's G59 protection.

It is the Customer's responsibility to protect the whole of the Customer's Installation including the short length of Customer busbar between the metered interface breakers and the Customer's apparatus.

The Company will allow the Customer to use a company current transformers and a trip signal for the customer to use to protect the short length of the customer's 132kV busbar between this interface breaker and the customer's apparatus.

Overcurrent and earth fault backup protection will be fitted on the interface circuit breakers. This includes under/over frequency and under/over voltage. The Company's protection equipment and settings are detailed in Annexe1. Each feeder is protected by its own set of relays.

The Customer shall perform system studies to support the settings to be applied to the loss of mains relays. It is recommended that these studies form part of the dynamic modelling of the whole installation. The Company will provide the necessary data regarding the distribution system to facilitate this.

### **Customer Protection**

The Customer must install protection to comply with G59/3 and G75. This protection system must incorporate a recognised loss of mains protection device to ensure disconnection of the generation if islanding occurs.

The performance of the Customers protection for the Customer's Installation should not compromise the security and quality of supply of customers connected to the Company's Distribution System. To this end we expect the Customer's protection to perform within the same operating criteria that the Company applies for its Distribution System protection, that is the detection and clearance of 132kV phase & earth faults within 120ms and detection and clearance of 33kV phase & earth faults within 200ms.

All the Customer's equipment beyond the Connection Point including cables, overhead lines or busbars and all plant, including circuit breakers, reactors, capacitors or windings of transformers owned and operated by the Customer are to be deemed as part of the Customer's Installation and therefore the protection of this equipment is to be covered by the above protection requirements.

Following correct operation of the Customer's Protection Equipment, the Customer's interface circuit breaker shall not be closed in parallel with the Company's Distribution System until the incoming supply has been proved sound and correct on all phases for a period not less than 5 minutes, or so determined by consultation with the PSMC.

The Customer shall perform periodic testing of the Protection Equipment at regular intervals. The Company shall have the right periodically (at reasonable times and on reasonable notice) to, require the Customer to demonstrate that the Protection Equipment continues to function correctly.

The Customer is responsible for providing at its own cost and expense:-

(a) protection for the Customer's Installation so as to prevent Danger (as defined in the Regulations) and not to cause damage to or interference with the Distribution System or the supply of electricity to others and

Synchronisation Equipment at a circuit breaker forming part of the Customer's Installation.

One 132kV circuit breaker at the Connection Point belongs to the Company with standard protection and control settings, full details of which have been given to the Customer and receipt of which the Customer hereby acknowledges.

In accordance with the Company's recommendations which the Company considers to be Good Industry Practice, the Customer should at its own expense:-

(b) install maintain and operate a circuit breaker forming part of the Customer's Installation which is opened by the Customer's G59 and G75 Equipment and which is closed by the Customer's Synchronisation Equipment.

#### **4) POWER QUALITY**

The Customer shall ensure that the Customer's Installation is operated within the limits detailed in Engineering Recommendations G5/4, P28 and P29.

The Customer must ensure that each generator is stable under all required operating conditions.

The Customer shall ensure that the connection of their Generating plant and any associated plant must not cause the levels of harmonic voltage distortion measured at the point of common coupling to exceed the appropriate levels given in Engineering Recommendation G5/4. Particular attention should be made to avoid any resonant condition caused by a mix of unloaded cable capacitance and transformer reactance.

The Customer shall ensure that the connection of their Generating plant and any associated plant must not cause any harmonic current injection into telephony and communication networks.

The Customer shall ensure that their Generation plant and any associated plant should be capable of performing satisfactorily under the network unbalance conditions defined in Engineering Recommendation P29. Voltage unbalance should not normally exceed 2 % during any one minute period but 1 % may exist continuously.

The Customer shall ensure that their Generation plant and any associated plant will not create voltage disturbances assessed against Engineering Recommendation P28. The effect of Step Voltage Changes caused by the connection and disconnection of the Generating Plant from the Distribution System must not impose unacceptable voltage changes. Limits for Step Voltage changes caused by the connection and disconnection of Generating Plants from the Distribution System, are  $\pm 3\%$  for infrequent planned switching events or outages (in accordance with Engineering Recommendation P28) and  $\pm 6\%$  for unplanned outages such as faults.

The Customer shall ensure that their Generation plant has sufficient steady state, voltage and transient stability in order to prevent power quality disturbances to others. During fault conditions, where the combination of generation output, and through flow levels leads which lead to circuit overloading, the Customer should rapidly disconnect or constrain their Generating Plant."

## **5) OPERATIONAL AND SAFETY ASPECTS**

As indicated in the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) Regulation 26 (as amended) has to be complied with and the detail is outlined in Schedule 3. In this case application is made on the basis of Part I and Part II, but in general Part II will apply, since parallel operation will be the normal method of operation.

Synchronisation will be automatic and controlled by the Customer on its own circuit breakers.

The Company will maintain records of plant maintenance and failure of the Company's equipment and the Customer will maintain records of plant maintenance and failure of the Customer's Equipment.

The Company's means of connection and disconnection of the Connection is the one 132kV Company circuit breaker in the XXX substation. The Customer will be provided with an emergency trip facility that will open the 1 breaker and disconnect the connection.

The Customer's means of connection and disconnection are on the Customer's 33kV circuit breaker in the Customer's substation.

The normal method of communication between both parties will be through the Communication Channel detailed in Annexe 3.

Both parties shall ensure that all persons carrying out operations on their installation or equipment are authorised and competent. Details of the both parties Authorised Persons can be obtained through the Communication Channels detailed in Annexe 3. The Customer's Shift Manager (To Be Agreed) will keep a record of any condition, occurrence or incident which could affect the safety of the Company's personnel and inform the Company. The Company's Control Engineer will keep a record of any condition occurrence or incident which could affect the safety of the Customer's personnel and inform the Customer.

The Customer shall ensure that all Plant and/or apparatus under its control is capable of withstanding the prospective fault current associated with all sources of electrical energy.

The Customer shall post a copy for inspection near the Exit Point and keep up to date the following information as required by Schedule 3 Part II section 3(h) of the Regulations and the Distribution Code DPC5.4.3 ;

- 1) A System Diagram.
- 2) A Schedule showing the Control Engineer, Occupier, Safety Rules and ownership applicable to the control and maintenance of electrical plant.
- 3) A Schedule of agreed protection settings and the result of tests.
- 4) A Responsibility schedule for equipment at the Exit Point.

The Customer must establish whether the substation is a "hot" site, having a rise of earth potential exceeding the present limit of 650V for any earth fault on the site. If the substation is declared "hot" then the Customer must install appropriate barrier and isolation facilities in all wiring and communication circuits which may be referred to a remote earth potential. It will also be necessary to ensure that appropriate safety procedures are used when working on these facilities.

### **Electrical Interconnection**

The Customer must ensure that the Customer's Electrical Installation does not extend beyond the Premises boundary defined in Schedule 2 and that there is no electrical interconnection with any adjacent premises or installation.

### **6) OPERATIONAL RESTRICTIONS**

The Company reserves the right to instruct the Customer to reduce or curtail power export and power import during time of operational difficulties, Emergency situations or during Outages (or as so directed by our Control Engineer).

### **7) CONSTRAINTS**

The Customer acknowledges and accepts a connection which is subject to the restrictions Outages and constraints referred to in this Agreement, and that it is not entitled under the provisions of this Agreement or otherwise to the payment of compensation from the Company in respect of any such restriction Outage or constraint.

In the event that the Company has (under the provisions of any other agreement or legislation or arrangement of any kind) to make a payment in respect of such restriction outage or constraint to the Customer (or to any other person and the Customer, directly or indirectly, receives any such payment or part of it) then the Customer shall refund the same to the Company and the Agreement shall contain specific details to this effect.

The Customer is requesting and accepting a connection via a single circuit breaker for the Customer's Installation (including the Generating Plant) to the Distribution System at the XXX.

The Customer acknowledges that in the event of any of the single connection equipment at XXX (e.g. the 132kV overhead line, 132kV circuit breaker or associated protection or auxiliary equipment) being out of service at times of Outages, maintenance, fault, extension, repair or during Planned Outages or other times, the Customer will not be able to export energy onto or import energy from the Distribution System during this period.

Under the terms of the CUSC and the Company's Bilateral Connection Agreement for XXX the Company only has a right to import energy from the GB Transmission System. Should NGET experience an export of energy from the Distribution System the Company reserves the right to instruct the Customer (who must implement a system and procedures acceptable to the Company) to reduce generation output to a point at which normal import power flows from the GB Transmission System are resumed.

#### **8) GENERATOR INSTALLATION CHARACTERISTICS**

A requirement of the Agreement is that the new connection should not have a detrimental effect on the stability of the distribution system and should not cause voltage steps, harmonics or other disturbances on the Company's system outside the values laid down in the relevant documents. It is also a condition of connection that the installation rides through transient faults on the 132kV distribution system without affecting the security and quality of supply to existing customers.

#### **9) DEROGATION FROM DISTRIBUTION CODE**

Neither Party is required to comply with the provisions of the long term planning phase as detailed in DOC 2.6.



**APPENDIX 2 – ANNEXE 1 PROTECTION DETAILS AND SETTINGS**

(To be agreed)

SAMPLE

**APPENDIX 2 – ANNEXE 2 SCHEMATIC DIAGRAM OF CUSTOMER'S INSTALLATION**

(To be provided by the Customer)

SAMPLE

**APPENDIX 3 – COMMUNICATION CHANNELS AND AUTHORISED PERSONS**

<b>Communication Channels</b>	
For the Company:	For the Customer:
Power Systems Management Centre (PSMC) SP Manweb plc 3 Prenton Way Prenton CH43 3ET	XXX
<b>Authorised Persons:</b>	
For the Company:	For the Customer:
As above	XXX