

Alectra Utilities

Distributed Energy Resource (DER)

Micro Connection Information Package

($\leq 10\text{kW}$)

Prepared by: Station Design – DER

Revision Number	Date Issued	Comments
0	Dec 2022	Issued

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1. Introduction

This guideline provides a set of references that are intended to familiarize Alectra Utilities customers with the overall information and explain the process, requirements, and options for connecting generation facilities to Alectra Utilities' distribution or the sub-transmission system. This is a guide only; final design approval for all generators will be made by the Station Design - Distributed Energy Resource Team.

1.1. What is Alectra Utilities responsible for?

Alectra Utilities is responsible for the safety, reliability, efficiency of its distribution and sub-transmission system, and ensuring that the new generation connection does not adversely affect the distribution system or existing customers. Alectra Utilities is responsible to serve as the liaison between the Generator and Hydro One Networks Inc.

1.2. What is the Generator (Customer) responsible for?

The Generator (Customer) is responsible for the safety, design, construction, operation, metering, protection and control, and maintenance of their generating facility.

The Customer must contact all applicable agencies involved and obtain all approvals prior to connection being permitted.

The Customer must ensure that all necessary submissions and agreements are completed, and all required payments have been made to Alectra Utilities and to Hydro One Networks Inc.

The Customer may consider using a consultant to assist with the connection requirements, process, and approvals.

1.3. What is the process for connecting a generator facility?

The process for connecting a generation facility to Alectra Utilities' distribution system depends on the size of the generation facility. This information package is for micro (>10kW) projects only. For projects >10kW, please refer to the non-micro information package.

Generator Classification as shown in the table below:

Generator Classification	Rating
Micro	≤ 10 kW
Non-Micro	> 10 kW (require CIA study. Please refer to >10kW info Package)

1.4. Alectra Utilities Service Area

Alectra East: Alliston, Aurora, Barrie, Beeton, Bradford West Gwillimbury, Markham, Penetanguishene, Richmond Hill, Thornton, Tottenham, Vaughan (Legacy PowerStream)

Alectra Central - South: Mississauga (Legacy Enersource)

Alectra Central - North: Brampton (Legacy Hydro One Brampton)

Alectra West: Hamilton, St. Catharines (Legacy Horizon)

Alectra Guelph: Guelph, Rockwood (Legacy Guelph Hydro)

2. Alectra Utilities Contact Information

a) Distributed Energy Resources - General Information:

Alectra Utilities Corporation
Stations Design – Distributed Generation
161 Cityview Boulevard
Vaughan, Ontario, L4H 0A9

Email: DER@alectrautilities.com
Phone: 905-283-3982

Note: Please ensure that all email correspondence includes the generator address, including town or city, in the subject line.

3. Roles of government agencies and organizations

It is important for Alectra Utilities' customers to understand the roles of government bodies, agencies and organizations and their involvement in generation connections. Depending on the size, type, fuel, and location of generation facilities, the connection of the generation facility to the distribution or sub-transmission system may require approvals from various regulators that govern the electricity industry in Ontario. Below are some of the relevant organizations you may need to engage for the connection of a generation facility.

Organization	Roles and Responsibilities
Ministry of Energy	<ul style="list-style-type: none"> Establishes public policy and develops legislation and regulations relating to electricity Legislative responsibility for the Independent Electricity System Operator (IESO), the Ontario Energy Board (OEB), and other agencies Significant legislation: Electricity Act, 1998 and Regulations, Ontario Energy Board Act, 1998, Electricity Restructuring Act, 2004, Green Energy and Green Economy Act, 2009
Independent Electricity System Operator (IESO)	The Independent Electricity System Operator (IESO) operates and manages Ontario's electricity system at the generation and transmission level. It does not design, build or own the system; it co-ordinates how the system interacts and performs. The IESO monitors the performance, reliability and future adequacy of the system to provide electricity to Ontarians. The IESO creates electricity market rules, matches generation with load 24/7, establishes the Hourly Ontario Energy Price (HOEP) and settles wholesale electricity payments.
Ontario Energy Board (OEB)	<ul style="list-style-type: none"> Regulates the electricity sector in Ontario. This includes generators, transmitters (greater than 50 kV) and distributors (less than 50 kV) Issues licenses for generators, transmitters, distributors, and retailers Responsible for protecting the interests of consumers with respect to prices, reliability, and adequacy and quality of electricity service Approves the rates charged by transmitters and distributors Creates codes and regulations for certain aspects of how transmitters and distributors conduct their business Responsible for promoting economic efficiency of generation, transmission and distribution.
Hydro One	<ul style="list-style-type: none"> The province's largest transmission company Owns the provincial transmission grid Distributes electricity outside of the major urban centers Supplies Local Distribution Companies (LDCs) from transformer stations and distribution stations Owned by the Province of Ontario.
Electrical Safety Authority (ESA)	The Electrical Safety Authority (ESA) is responsible for ensuring that electrical equipment is installed safely and meets required standards in accordance with the Ontario Electrical Safety Code (OESC). Before connecting to Alectra Utilities' distribution system, the customer is required to have the ESA inspect their generation facility and provide an Authorization to Connect to their respective LDC.
Measurement Canada (MC)	Measurements Canada (MC) is a federal agency of Industry Canada with the mandate of regulating meters and metering throughout the country. MC administers the Electricity and Gas Inspection Act. R.S. 1985, C.E-4

4. Alectra Utilities Reference Links

- a) Alectra Utilities' Distributed Generation Main Home Page:
Link: alectrautilities.com/connecting-generation
- b) PCIR – Preliminary Consultation Information Request:
Link: alectrautilities.com/sites/default/files/assets/AlectraDERCP-PreliminaryConsultationInformationRequest.pdf
- c) Form C – Micro Generation Connection Application:
Link: <https://alectrautilities.com/sites/default/files/assets/pdf/AlectraUtilitiesFormC.pdf>
- d) Alectra Utilities Commissioning Verification Form ($\leq 10\text{kW}$)
Link: <https://alectrautilities.com/sites/default/files/assets/pdf/AlectraUtilitiesCVF-MicroEmbeddedGenerators.pdf>
- e) Connection Agreement ($\leq 10\text{kW}$)
Link: <https://alectrautilities.com/sites/default/files/assets/pdf/AlectraUtilitiesMicroEmbeddedGenerationFacilityConnectionAgreement.pdf>

5. Micro DER (≤ 10kW) Connection Process

a) **Preliminary Consultation**

Customer completes and submits a [PCIR – Preliminary Consultation Information Request](#) to DER@alectrautilities.com. Alectra Utilities establishes the generator classification and determines if there is capacity available for the proposed generator.

b) **Connection Application**

Customer submits a completed [Form C – Micro Generation Connection Application](#).

c) **Offer to Connect**

Alectra Utilities reviews the application and once it is accepted, an Offer to Connect is issued to the Customer with the requirements and construction costs to connect the generator.

If the Customer decides to proceed with the project, Customer pays Alectra Utilities the connection fees as per the Offer to Connect. The Customer will be issued a Commissioning Verification Form and Connection Agreement which must be completed before the project is connected.

d) **Design and Build**

If applicable, the Customer makes an appointment with Alectra Utilities for a service disconnect/isolation. Customer installs the micro generation facility according to Alectra Utilities' requirements and applies to the Electrical Safety Authority (ESA) for an electrical inspection.

e) **Commissioning**

Customer completes and submits the signed [Commissioning Verification Form](#).

f) **Connection Agreement**

Customer completes and submits the [Connection Agreement](#) prior to energization.

g) **Connect, Operate and Maintain**

If required, Alectra Utilities performs an inspection and authorizes connection. Inspection includes confirmation of lamacoid labels and equipment locations are according to requirements. After the Electrical Safety Authority provides the electrical inspection "Connection Authorization" directly to Alectra Utilities, Alectra Utilities installs the bi-directional generation meter.

Alectra Utilities will work with the customer to set up the appropriate settlement arrangement based on the project type.

6. Fees Schedule

Please note as Alectra is going under consolidation, the applicable fees may change at any point.

The below application fees for residential projects less than or equal to 10kW are as of January 2022:

- a) All rate zones in Alectra, except Guelph and Rockwood, is:
 - o $\$387.00 + \text{HST } (\$50.31) = \$437.31$
- b) Guelph and Rockwood:
 - o $\$1,500.00 + \text{HST } (\$195.00) = \$1,695.00$ [$\leq 10\text{kW}$ Single-phase]
 - o $\$2,000.00 + \text{HST } (\$260.00) = \$2,260.00$ [$\leq 30\text{kW}$ Three-phase]

7. Payment Instructions

Customer is to advise DER once payment has been sent. DER will follow up internally to confirm receipt.

- a) Payments are done by a cheque payable to “**Alectra Utilities Corporation**”
- b) Cheque Memo should state: “[address] – DER – OTC fee”
- c) Send a scan of the cheque to DER@alectrautilities.com (‘reply all’ to this email).
- d) Mail the cheque to the below address:

Alectra Utilities
175 Sandalwood Pkwy W, Brampton, Ontario, L7A 1E8
Attn: **Payments Department (Lisa F.)**

8. Technical Requirements

8.1. Sample Single Line Diagram (SLD)

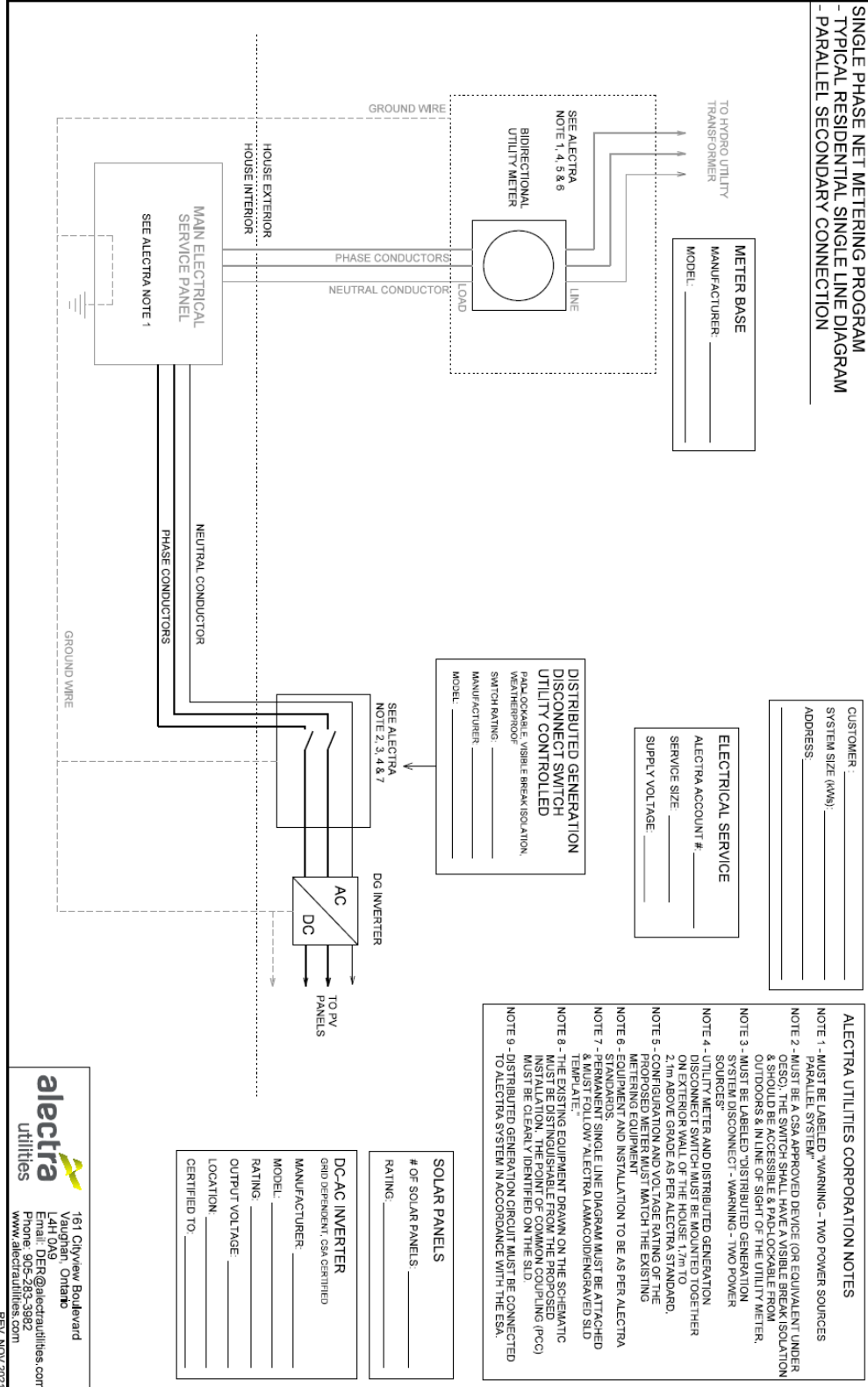
The customer must design and submit a Single Line Diagram (SLD) of the proposed project.

Please refer to the next pages for sample SLDs of common project types received in Alectra service area. The sample SLDs are for reference and additional notes on the minimum requirements that should be shown on the project's SLD.

The sample SLDs are for parallel secondary connections. Alectra may apply additional and/or different requirements based on each project specific details.

Please note that the samples are for demonstration purposes only. The customer must provide an original SLD.

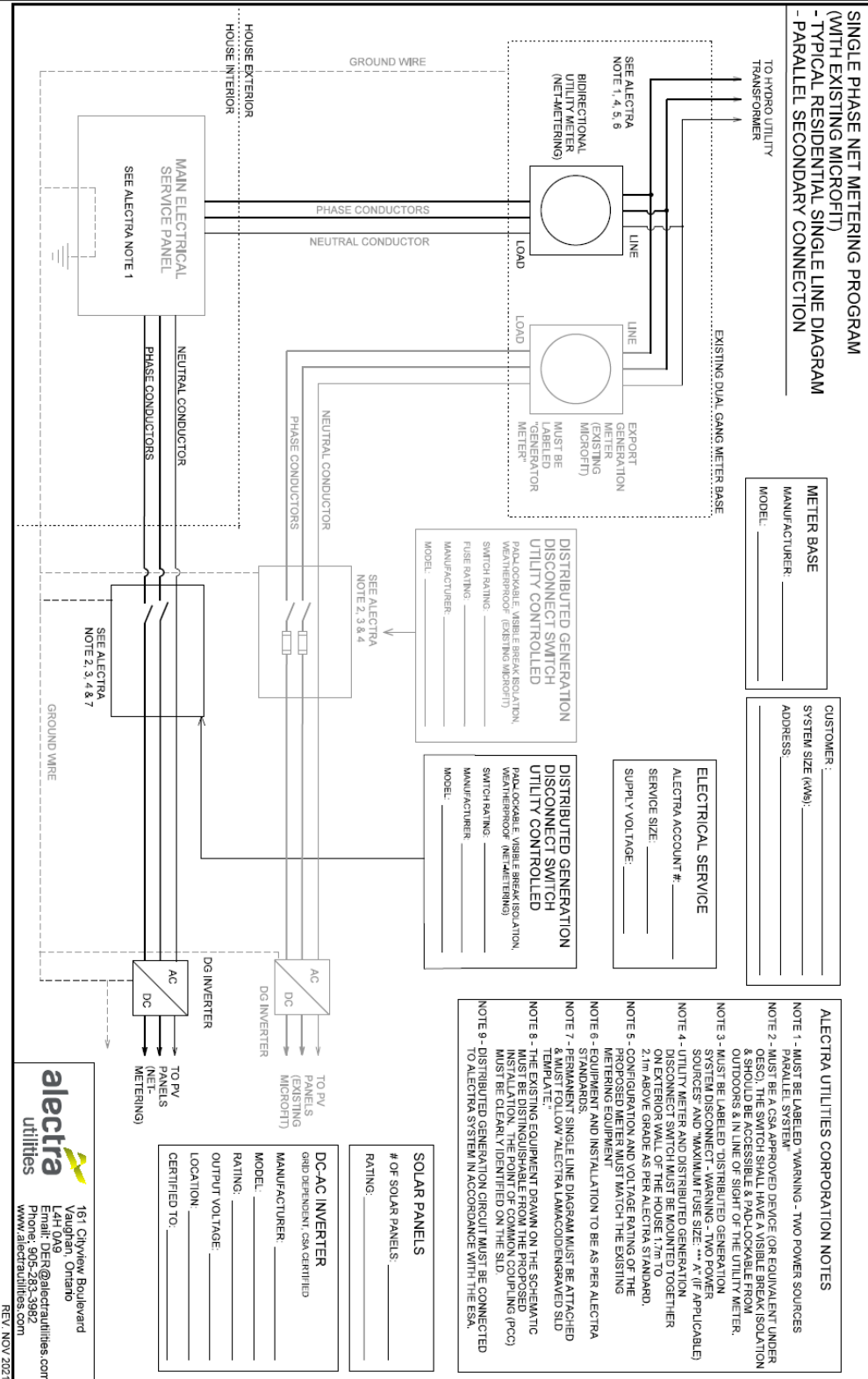
8.1.1 Micro Net Metering Sample SLD



alectra utilities
161 Cityview Boulevard
Vaughan, Ontario
L4L 1A5
Email: DER@alectrautilities.com
Phone: 905-283-3982
www.alectrautilities.com

REV NOV 2021

8.1.2 Micro Net Metering with microFIT Sample SLD



8.2 List of Labels

Single Phase DER project – Labelling Requirements

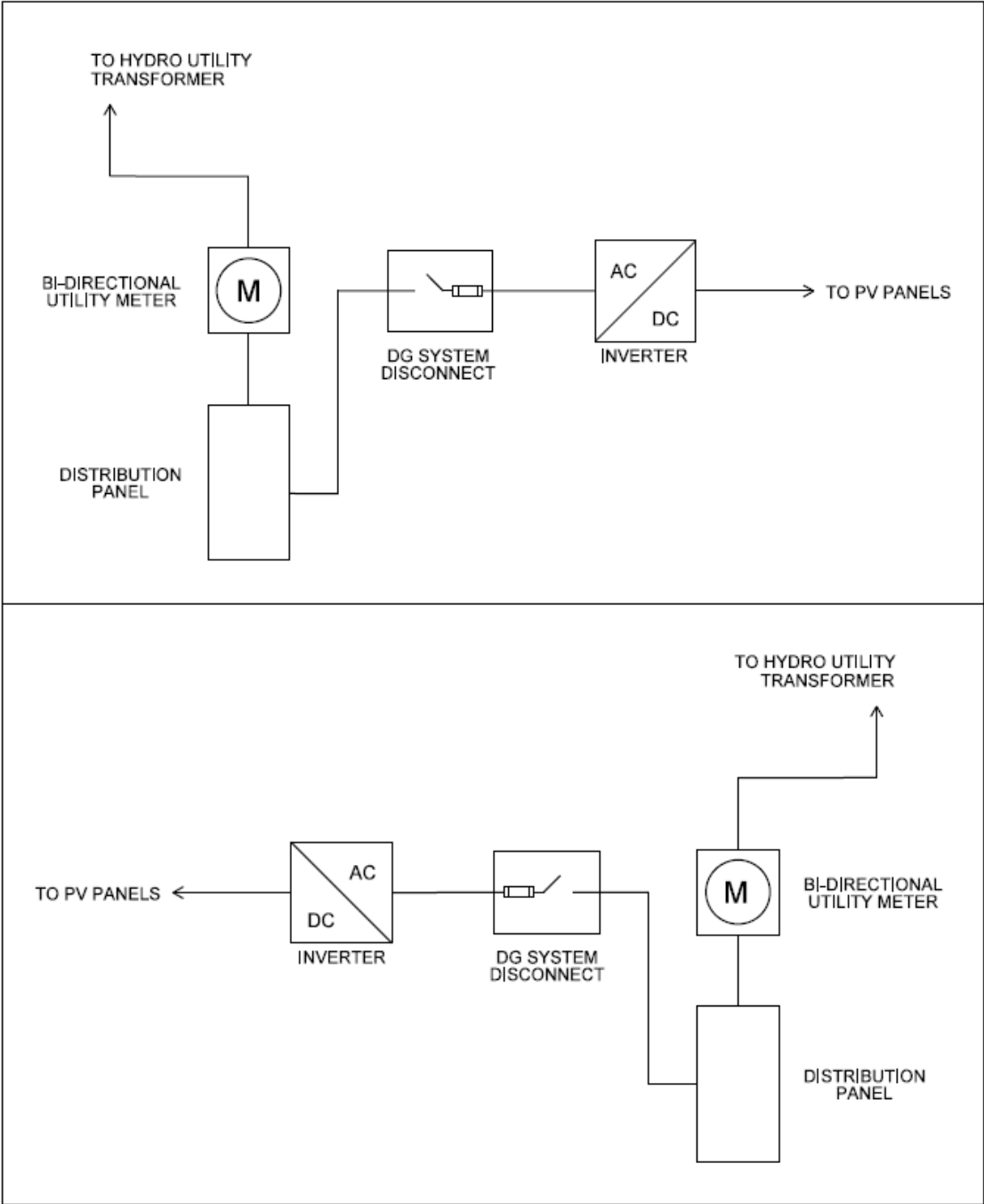
All Labels Must Be Lamacoid Engraved

Label Location	Label Contents
Meter Base	<ol style="list-style-type: none">1) "WARNING – TWO POWER SOURCES NET METERED GENERATION"2) Single line diagram Note that the SLD label must match the installation physically and schematically
Distributed Generation Disconnect Switch	<ol style="list-style-type: none">1) "DISTRIBUTED GENERATION DISCONNECT"2) "WARNING – TWO POWER SOURCES"3) Single line diagram Note that SLD label must match the installation physically and schematically4) "MAXIMUM FUSE SIZE ... A" (if applicable)

8.3 Sample Lamacoid

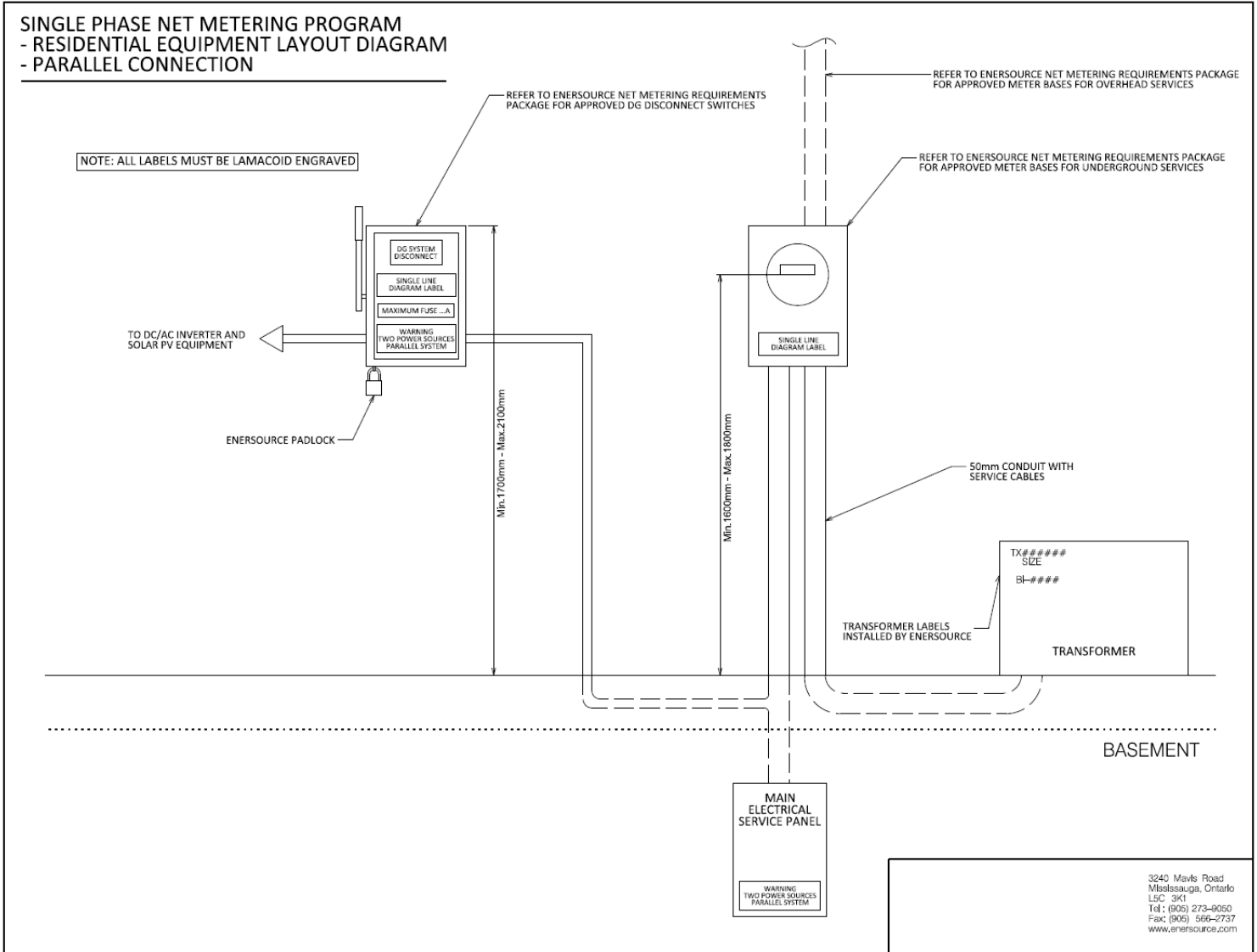
8.3.1 Single Phase DER project – Lamacoid SLD Sample

SINGLE PHASE NET METERING PROGRAM
- APPROVED LAMACOID SLD TEMPLATES



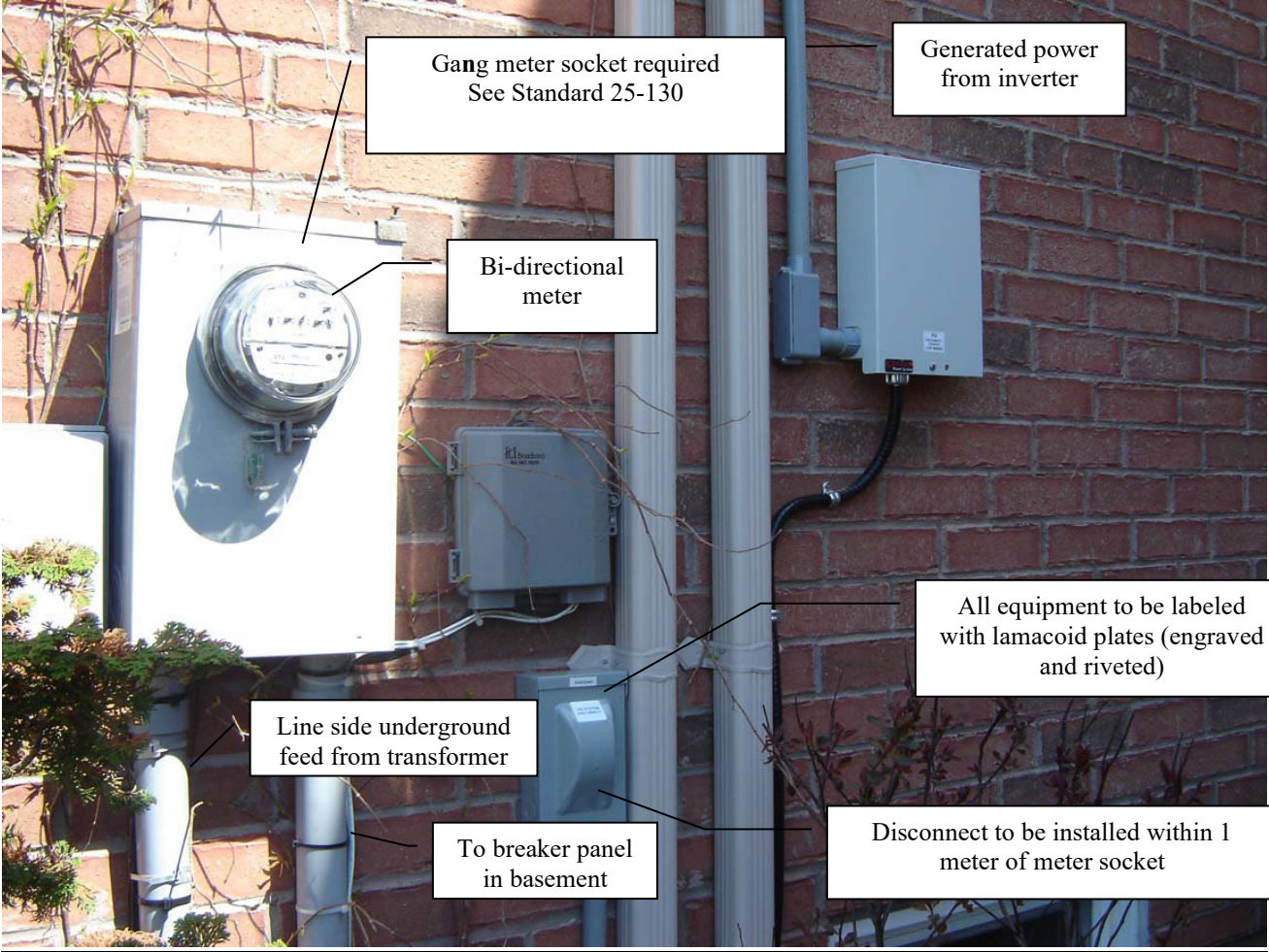
REV. NOV 3, 2016

8.3.2 Single Phase DER project – Equipment with lamacoid Layout Sample



REV. JUNE 17, 2015

8.3.3 Sample Installation with Lamacoid Plates



Net Metering Generation – Single Phase

Micro DER Information Package

8.4 List of Approved Meter Bases



20-1
21-06-30-R1
CERTIFIED

	Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE (Main Panel)	METER BASE † (O/H) – LOCATED OUTSIDE			Reference Alectra Metering Standards	
				Hydel	Eaton Cutler-Hammer	Microelectric		
R E S I D E N T I A L	1	4-Jaw	Up to 200 A	EK400RO	LM2	BS2-TCV	Std. 20-20 Std. 20-40	
	METER BASE † (U/G) – LOCATED OUTSIDE							
	2	4-Jaw	Up to 200 A	Single dwelling	MSC400TW	CLX	MO2-VO	Std. 20-30 Std. 20-40 Std. 20-70
				Townhouse	MSC400TW-3	-	-	
		5-Jaw	400A (Complete with current transformer)	CT4-TS5	TCC5-T11	JS4AB	Std. 20-210	
		5-Jaw	400 A or Larger (w/ 20 A Remote Meter)	CTS409PW	TCC5-0	CL5-V	Std. 20-250	
	METER BASE † (O/H) – LOCATED OUTSIDE							
	3	4-Jaw	Up to 200 A	2 Multiple Positions: 200 A Main & 200 A / Position	HC22R	-	BDA2-V BDA2-VH	Std. 20-50
				3 Multiple Positions: 200 A Main & 200 A / Position	HC23R	-	BDA3-V BDA3-VH	
				4 Multiple Positions: 200 A Main & 200 A / Position	HC24R	-	-	
METER BASE † (U/G) – LOCATED OUTSIDE								
4	4-Jaw	Up to 200 A	2 Multiple Positions: 200 A Main & 200 A / Position	MSC22R	2KU2CLX	BDC2-V BDC2-VH	Std. 20-60 Std. 20-80	
			3 Multiple Positions: 200 A Main & 200 A / Position	MSC23R	3KU2CLX	BDC3-V		
			4 Multiple Positions: 200 A Main & 200 A / Position	MSC24R	4KU2CLX	BDC4-V		

† - Other meter bases may be approved by Alectra if they provide functionality not provided by the listed meter bases.

	Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE (Main Panel)	METER BASE † (O/H) – LOCATED OUTSIDE			Reference Alectra Metering Standards	
				Hydel	Eaton Cutler-Hammer	Microelectric		
I N D U S T R I A L / C O M M E R C I A L	5	4-Jaw	Up to 200 A	EK400RO	LM2	BS2-TCV	Std. 20-20 Std. 20-40	
	METER BASE † (U/G) – LOCATED OUTSIDE							
	6	4-Jaw	Up to 200 A	400A	MSC400TW	CLX	MO2-VO	Std. 20-30
				(Complete with current transformer)	CT4-TS5	TCC5-T11	JS4AB	Std. 20-210
				400 A or Larger (w/ 20 A Remote Meter)	CTS409PW	TCC5-0	CL5-V	Std. 20-250
	METER BASE † (U/G) – LOCATED INSIDE							
	7	347/600 V & 120/208 V 3-Phase, 4-Wire	Up to 200 A	100 A	SFC703PW	P27-0-IN2	PL17-IN-TCV	Std. 20-160 Std. 20-170 Std. 20-180
				200 A	STC703RK		PL27-IN-TCV	
		120/208 V 2-Phase, 3-Wire 5-Jaw*	Up to 200 A	100 A	MSC400TW*	CLX*	MO2-VO*	Std. 20-160 Std. 20-170 Std. 20-180
				200 A	SE400RW- SXX503	-	BE1-TCV ††	
3-Phase, 3-Wire	Up to 200 A	100 A	EK400RO- SXX503	-	BS2-TCV ††			
		200 A						
ENCLOSURE (U/G) – LOCATED OUTSIDE ^a								
8	ALL (1-Phase & 3-Phase)	Up to 200 A	>1200mm x 1200mm x 300mm (48"x48"x12") FOR METER BASE & DISCONNECT SW	OR		Std. 20-130 Std. 20-140 Std. 20-150		
			>900mm x 600mm x 300mm (36" x 24" x 12") FOR METER BASE ONLY					
ENCLOSURE (U/G) – LOCATED INSIDE ^b								
9	120/240V 1-Phase, 3-Wire	600 A	>900mm x 900mm x 300mm (36" x 36" x 12") FOR INSTRUMENT TRANSFORMER			Std. 20-250		
			>1200mm x 1200mm x 300mm (48"x48"x12") FOR INSTRUMENT TRANSFORMER	AND		Std. 20-240		
			>300mm x 300mm x 150mm (12" x 12" x 6") FOR COMMUNICATION					
347/600 V & 120/208 V 3-Phase, 4-Wire	400 A and 600 A	800 A TO 7000 A (EQUIPPED W/ SWITCHBOARD)	>500mm x 635mm x 165mm (20" X 25" x 6.5") FOR INSTRUMENT TRANSFORMER			Std. 20-310		

- * - Must have 5th Jaw at 9 O'clock position. A sample installation is at an apartment
- † - Other meter bases may be approved by Alectra if they provide functionality not provided by the listed meter bases.
- †† - Must order with 5th jaw, standard or full capacity, at 9 O'clock position
- a - Minimum 14 gauge, CSA approved, Minimum NEMA 3 Stainless Steel
- b - Minimum 14 gauge, CSA approved, Minimum NEMA 3

APPROVED IN ACCORDANCE WITH REGULATION 22/04			
DATE	REVISION	CKHD	APPVD
21-06-30	- TABLE UPDATED	<i>A. G.</i>	<i>MD</i>

Construction Standard Certificate of Approval	
This Construction Standard meets the safety requirements of Section 4 of the Ontario Regulation 22/04	
Shereez Ali	6/2021
Name	Date
<i>Shereez Ali</i>	P. Eng., PMP
Signature & Professional Designation	

CHECKED: *[Signature]*

APPROVED: *[Signature]*

ORIGINAL ISSUE: DECEMBER 22, 2020

APPROVED LIST OF
METER BASES, ENCLOSURES,
PEDESTALS AND FOUNDATIONS
(1 OF 2)

Micro DER Information Package



20-1
21-06-30-R1
CERTIFIED

INDUSTRIAL / COMMERCIAL / RESIDENTIAL (AS APPROVED)

Table No.	120/240V 1-Phase, 3-Wire	SERVICE SIZE 400 A Main 200 A Position	METER BASE † (U/G) – LOCATED OUTSIDE				REFERENCE ALECTRA METERING STANDARDS
			Hydel	Eaton Cutler-Hammer	Microelectric L.H. Entry	Microelectric R.H. Entry	
10	4-Jaw	2	MSC42TW	2K4	BS42-V	BS42-V-H	Std. 20-220 Std. 20-230
		3	MSC43TW	3K4	BS43-V	BS43-V-H	
		4	MSC44TW	4K4	BS44-V	BS44-V-H	
			JAL40R *				
		5	MSC45TW	5K4	BS45-V	BS45-V-H	
		6	MSC46TW	6K4	BS46-V	BS46-V-H	

† - Other meter bases may be approved by Alectra if they provide functionality not provided by the listed meter bases.
* - This meter base is only approved for use where the ESA/OESC requires an upstream protective device for the individual service/position cable.

RESIDENTIAL

Table No.	120/240V 1-Phase, 3-Wire	STACKABLE MODULE † (U/G) - LOCATED OUTSIDE	MANUFACTURER	MODEL NUMBER	REFERENCE ALECTRA METERING STANDARDS
11	4-Jaw	400 A MAIN CIRCUIT BREAKER	EATON	1MCB400R	Std. 20-360
		600 A MAIN CIRCUIT BREAKER	EATON	1MCB600R	
		6 - METER STACK 125 A / METER SOCKET	EATON	C1MM612R *	

† - Other stackable modules may be approved by Alectra if they provide functionality not provided by the listed stackable modules.
* - As per manufacturer, the fifth jaw at 9 o'clock position is included (Note: To be removed by the Customer as Alectra does not require this feature)

PEDESTALS AND FOUNDATIONS

Table No.	MANUFACTURER	MODEL NUMBER	DIMENSION (L x D x H) in mm (inches)	FOUNDATION	REMARKS	REFERENCE ALECTRA METERING STANDARDS
12	Pedestal Solutions Inc.	HSLM27-Typical	457.2 mm x 508 mm x 688.98 mm (18" x 20" x 27.125")	UP2022 (Utilicon)	Can be used with BS2-TCV or equivalent †††	Std. 20-120
	Pedestal Solutions Inc.	SLM42 - Typical	457.2 mm x 508 mm x 1069.98 mm (18" x 20" x 42.125")	UP2022 (Utilicon)	Can be used with BS2-TCV or equivalent †††	
	Pedestal Solutions Inc.	SLT-Typical	457.2 mm x 203.2 mm x 1879.6 mm (18" x 8" x 74")	UPI420 (Utilicon)	Can be used with BS2-TCV or equivalent †††	
	The Durham Company	SKT/SW/PED 20A 5T DB FW	184.15 mm x 88.9 mm x 1524 mm (7.25" x 3.5" x 60")	With Stabilizer Foot included	Factory Wired, 5 Terminal Non-Circuit Closing Socket	
	The Durham Company	1 SKT/PED 20A 5T PM	368.8 mm x 330.2 mm x 1168.4 mm (14.52" x 13" x 46")	UPI420 (Utilicon)	Factory Wired, 5 Terminal Non-Circuit Closing Socket	

Note: The list of pedestals and foundations are Alectra's recommendation only. The Customer may use other pedestals if approved by Alectra.
††† - Consult manufacturer for other meter bases that would fit pedestal.

APPROVED IN ACCORDANCE WITH REGULATION 22/04			
DATE	REVISION	CKHD	APPVD
21-06-30	- TABLE UPDATED		

Construction Standard Certificate of Approval	
This Construction Standard meets the safety requirements of Section 4 of the Ontario Regulation 22/04	
Shereez Ali	6/2021
Name	Date
	P.Eng., PMP
Signature & Professional Designation	

CHECKED: 

APPROVED: 

ORIGINAL ISSUE: DECEMBER 22, 2020

APPROVED LIST OF
MATER BASES, ENCLOSURES,
PEDESTALS AND FOUNDATIONS
(2 OF 2)

8.5 Micro DER Design Requirements:

8.5.1 Single Phase Design Requirements:

As per sample, the SLD should include the following items:

- a) Show the disconnect switch
- b) Show step-up transformer (if applicable)
- c) Show meter location
- d) Show where connection to existing service is to be made

8.5.2 Single Phase Metering Requirements:

- a) All metering and disconnect equipment to be located outside and to be accessible to Alectra Utilities staff.
- b) Micro-generation disconnect to be within line of sight of the bi-directional meter.
- c) ESA inspection is required to energize.
- d) Alectra Utilities to install one bi-directional meter.
- e) All Labels Must Be Lamacoid Engraved
- f) The customer shall supply and install the meter base and Distributed Generation (DG) disconnect switch. Please refer to the “Approved List of Meter Bases, Enclosures, Pedestals and Foundations” for a list of acceptable equipment.
- g) Ensure location of meter socket is compliant with building and fire codes to ensure safe accessibility.
- h) Clearly label with lamacoid plates (i.e. riveted engraved plates) illustrating the following:
 - i. Bi-directional meter
 - ii. Generation disconnect switch

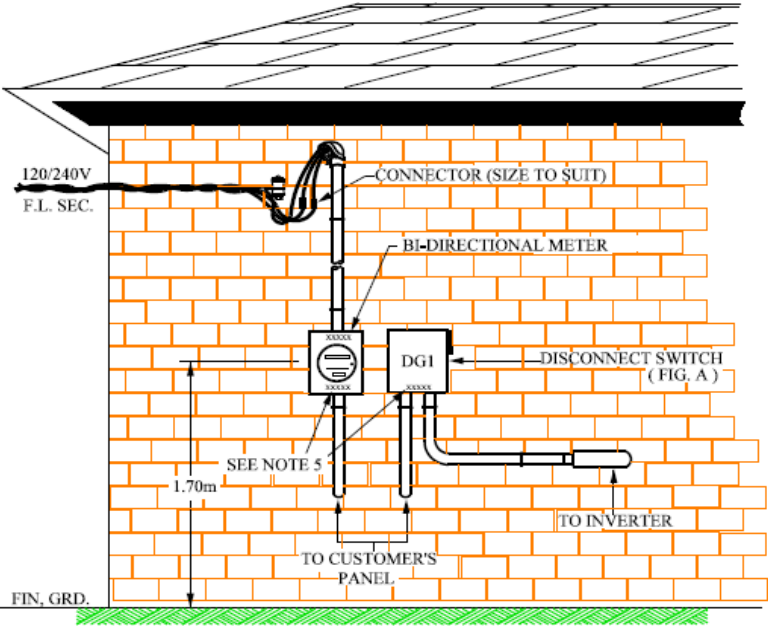
8.5.3 Single Phase DER Project Requirements

- a) The Distributed Generation (DG) Disconnect Switch:
 - i. Must be a CSA Approved device (or equivalent under the OESC).
 - ii. Shall have a visible break isolation
 - iii. Should be accessible and pad-lockable from outdoors.
- b) The voltage rating and phase configuration of the proposed generation connection must match the existing load connection.
- c) The meter and DG disconnect switch must be mounted together on an exterior wall of the building at 1.7 m to 2.1 m above grade and must be readily accessible.
- d) Meter base shall be located at least 1.0 m away from windows, doors or other openings. For townhouses and row housing this may be reduced to 0.6 m. A 1.0 m minimum horizontal clearance from the gas meter and 1.0 m minimum radial clearance from any other objects shall be maintained for all installations.

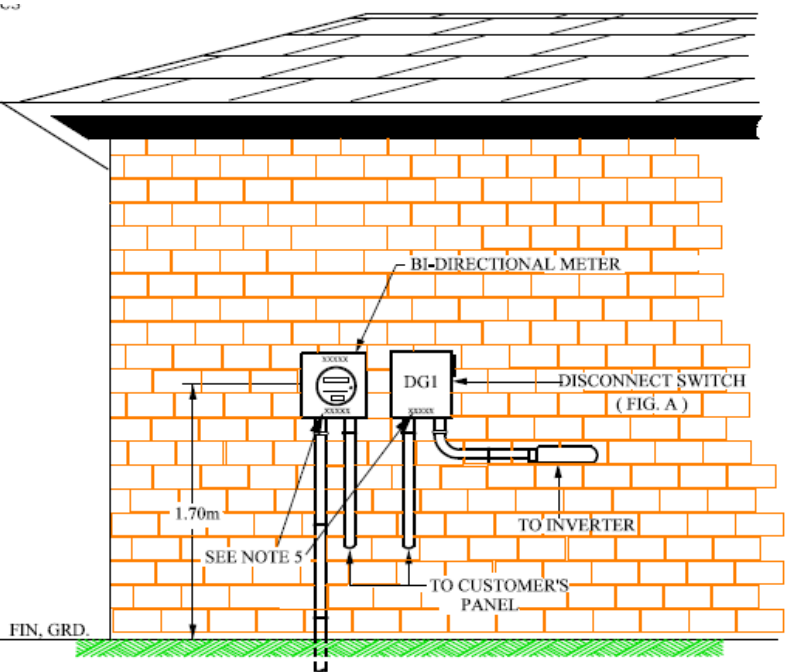
- e) The customer must supply and install all labels at the specified locations according to the “Single Phase Net Metering Labelling Requirements”. The posted SLD must match the appropriate template from the “Single Phase Net Metering Program – Approved Lamacoid SLD Templates”.
- f) The project will be subject to an Alectra Utilities site inspection, if required.
- g) Alectra Utilities shall connect the project to its distribution system within five business days, or at such later date as agreed to by the applicant and the distributor, of all of the following occurring:
 - i. ESA provides Authorization to Connect directly to Alectra Utilities;
 - ii. The Customer enters into a Connection Agreement with Alectra Utilities;
 - iii. Project has satisfied all applicable service conditions and received all necessary approvals;
 - iv. The Customer has paid Alectra Utilities for the connection costs, including costs for any necessary new or modified metering; and
 - v. Alectra Utilities inspector authorizes connection (if required).

8.6 Micro Generator Sample Layout:

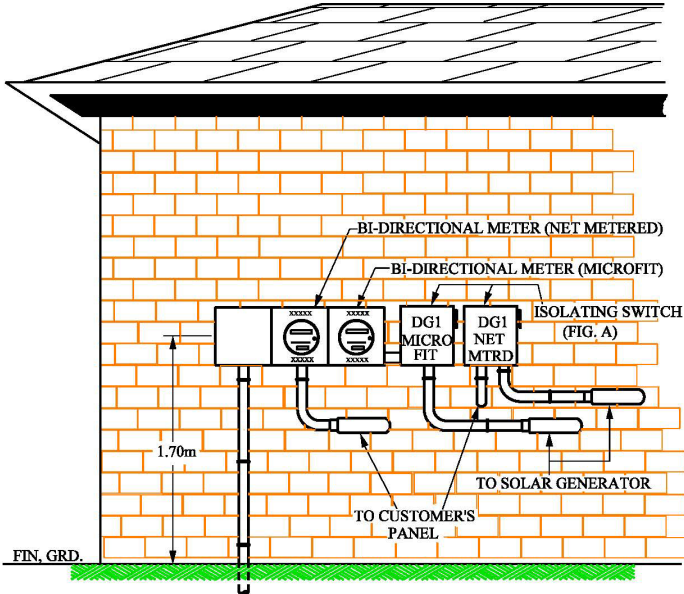
8.6.1 O/H Service Residential Net Metered Generation (Up to 10kW)



8.6.2 U/G Service Residential Net Metered Generation (Up to 10kW)



8.6.3 U/G Service Residential Net Metered (and Micro FIT) Generation



8.6.4 O/H Service Residential Net Metered (and Micro FIT) Generation

