DESIGN NOTE:

1. BECAUSE OF THE PROTOTYPE NATURE OF THE TRIAL, THE CA & HEMSC ARE IN THE SAME ENCLOSURE. FOR COMMERCIAL PURPOSES, THE CA & HEMSC ARE TO BE SEPARATE STANDALONE ELEMENTS WHEREBY FOR COMPETITIVE AND PRIVACY REASONS, THE CA IS OWNED, CONTROLLED AND MAINTAINED BY THE UTILITY AND THE HEMSC IS OWNED, CONTROLLED AND MAINTAINED BY THE DER PARTICIPANT.
2. THE CA CAN BE A GATEWAY TO MANY HEMSCS, BUT AT LEAST ONE IS REQUIRED. THE HEMSC CAN MANAGE MANY HEMS AND THESE HEMS CAN BE MANY TYPES OF SOURCES (EG. BESS, GENERATORS, ...), OR LOADS (EG., SMART THERMOSTATS, LOAD CONTROL MODULES, ...).
3. MiGen IS TO COMPLY WITH THE INTEROPERABILITY STANDARD IEEE2030.5, WHICH ALSO DEFINES THE MINIMUM CYBERSECURITY REQUIREMENTS, AND ADHERE TO BEST PRIVACY-BY-DESIGN PRINCIPLES.

LEGEND AND DEFINITION:

PROGRAM MANAGER:	CONNECTING UTILITY REPRESENTATIVE RESPONSIBLE OF THE DISTRIBUTED ENERGY RESOURCES PROGRAM
PARTICIPANT:	OWNER OF THE DISTRIBUTED ENERGY RESOURCES
DER	DISTRIBUTED ENERGY RESOURCES
TA	TRANSFORMER AGENT
CA	CUSTOMER AGENT
HEMSC	HOME ENERGY MANAGEMENT SYSTEM CONTROLLER
DG	DISTRIBUTED GENERATION
DP	DISTRIBUTION PANEL
MET	METERING RELAY

TRANSFORMER (TX)

COMBINED INVERTER AND CHARGE CONTROLLER (INV)

BATTERY STORAGE UNIT (BAT)

BREAKER (BK)

DISCONNECT (SW)

FUSE (F)

RELAY, LOSS OF PHASE (LOP)

CONTACT

PUSH BUTTON

INVERTERS	
REGULATORY APPROVALS AND COMPLIANCE	UL1741, CSA 22.2 No 107.1 IEEE 1547

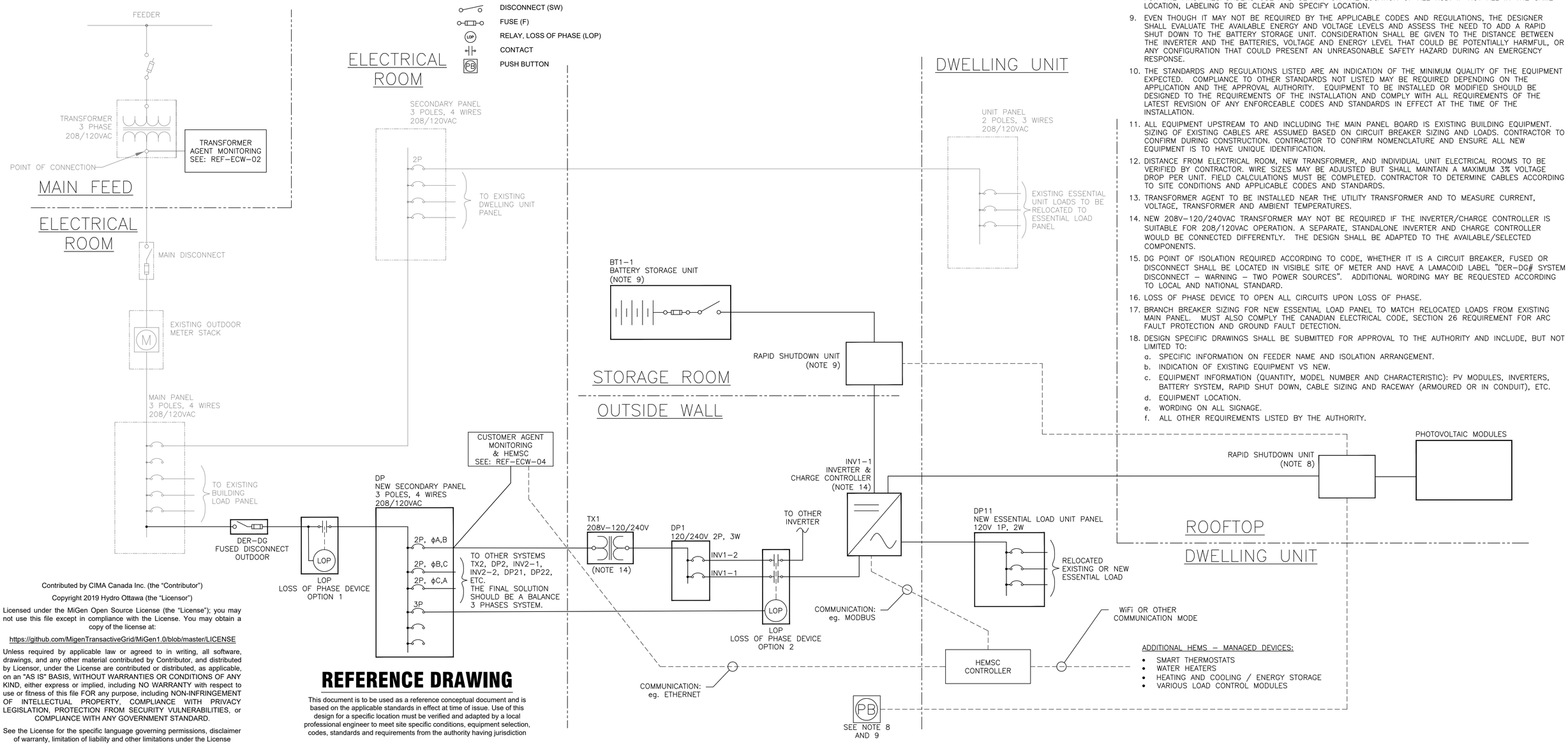
BATTERY BANK	
REGULATORY APPROVALS AND COMPLIANCE	UL1973 CSA 22.2 No.60950–1

PHOTOVOLTAIC MODULE	
REGULATORY APPROVALS AND COMPLIANCE	CSA–C22.2 No.61215 CSA–C22.2 No.61730 UL1703

RAPID SHUTDOWN SYSTEMS (RSD)	
REGULATORY APPROVALS AND COMPLIANCE	C22.2 No. 330

ENERGY STORAGE SYSTEM	
REGULATORY APPROVALS AND COMPLIANCE	ANSI/CAN/UL9540

NOTE 10



NOTES:

1. THIS DRAWING IS A GENERIC REPRESENTATION OF AN INSTALLATION WITH MULTIPLE DWELLING UNITS CONNECTED TO A THREE PHASE TRANSFORMER. IT CAN BE USED AS A GUIDE TO DEVELOP A SITE SPECIFIC DRAWING ACCORDING TO SITE SPECIFIC CONDITIONS. CONTACT DER PROGRAM MANAGER FOR ADAPTATION REQUIRED FOR YOUR SPECIFIC APPLICATION.
2. ALL PARTS AND WORK SHALL BE ACCORDING TO CODES, STANDARDS AND REGULATIONS APPLICABLE TO THE LOCATION OF THE INSTALLATION. NEVERTHELESS DUE TO THE NEW NATURE OF THE TECHNOLOGY THAT INTRODUCES BATTERY STORAGE IN RESIDENTIAL DWELLINGS, IT MAY BE NECESSARY TO GO ABOVE THE REQUIREMENTS OF CODES AND STANDARDS TO INSURE THE SAFETY OF THE PUBLIC AND PROPERTY.
3. METERING REQUIREMENTS TO BE REPLACED WITH BI–DIRECTIONAL REVENUE METER. THE LOCAL UTILITY SHALL BE CONTACTED TO VALIDATE THE REQUIREMENT SPECIFIC TO THE LOCATION.
4. METER BASE SHALL BE ONE OF THE APPROVED MANUFACTURERS AND CATALOGUE NUMBER AS PER LOCAL UTILITY METERING REQUIREMENT.
5. EQUIPMENT LAMACOID LABELING REQUIREMENT SHALL BE VALIDATED WITH THE LOCAL AUTHORITY. WHERE MULTIPLE DWELLING UNITS ARE INVOLVED AND IMPLIED SEPARATE DISTRIBUTED ENERGY RESOURCES / PARTICIPANT CONTRACTUAL AGREEMENT, IT SHALL BE REFLECTED IN THE LABELING. FOR EXAMPLE, THE ACRONYM "DER" COULD BE REPLACE BY A REFERENCE TO THE OWNER OF THE DER.
6. INVERTER GROUNDING / BONDING AS PER MANUFACTURER INSTRUCTIONS AND APPLICABLE CODES AND STANDARDS.
7. ALL AC AND DC CABLES SHALL BE ARMOURED TYPE OR MECHANICALLY PROTECTED. MINIMUM CONDUIT SIZING FOR ALL CABLE INSTALLATIONS SHALL MEET APPLICABLE CODES AND STANDARDS.
8. ATTENTION TO THE LOCATION OF THE RAPID SHUTDOWN (RSD) MANUAL CONTROL SHALL CONSIDER ACCESS FOR THE FIRST RESPONDERS USE AND CLARITY ON THE LOCATION OF ALL RSD. IF NOT ALL IN THE SAME LOCATION, LABELING TO BE CLEAR AND SPECIFY LOCATION.
9. EVEN THOUGH IT MAY NOT BE REQUIRED BY THE APPLICABLE CODES AND REGULATIONS, THE DESIGNER SHALL EVALUATE THE AVAILABLE ENERGY AND VOLTAGE LEVELS AND ASSESS THE NEED TO ADD A RAPID SHUT DOWN TO THE BATTERY STORAGE UNIT. CONSIDERATION SHALL BE GIVEN TO THE DISTANCE BETWEEN THE INVERTER AND THE BATTERIES, VOLTAGE AND ENERGY LEVEL THAT COULD BE POTENTIALLY HARMFUL, OR ANY CONFIGURATION THAT COULD PRESENT AN UNREASONABLE SAFETY HAZARD DURING AN EMERGENCY RESPONSE.
10. THE STANDARDS AND REGULATIONS LISTED ARE AN INDICATION OF THE MINIMUM QUALITY OF THE EQUIPMENT EXPECTED. COMPLIANCE TO OTHER STANDARDS NOT LISTED MAY BE REQUIRED DEPENDING ON THE APPLICATION AND THE APPROVAL AUTHORITY. EQUIPMENT TO BE INSTALLED OR MODIFIED SHOULD BE DESIGNED TO THE REQUIREMENTS OF THE INSTALLATION AND COMPLY WITH ALL REQUIREMENTS OF THE LATEST REVISION OF ANY ENFORCEABLE CODES AND STANDARDS IN EFFECT AT THE TIME OF THE INSTALLATION.
11. ALL EQUIPMENT UPSTREAM TO AND INCLUDING THE MAIN PANEL BOARD IS EXISTING BUILDING EQUIPMENT. SIZING OF EXISTING CABLES ARE ASSUMED BASED ON CIRCUIT BREAKER SIZING AND LOADS. CONTRACTOR TO CONFIRM DURING CONSTRUCTION. CONTRACTOR TO CONFIRM NOMENCLATURE AND ENSURE ALL NEW EQUIPMENT IS TO HAVE UNIQUE IDENTIFICATION.
12. DISTANCE FROM ELECTRICAL ROOM, NEW TRANSFORMER, AND INDIVIDUAL UNIT ELECTRICAL ROOMS TO BE VERIFIED BY CONTRACTOR. WIRE SIZES MAY BE ADJUSTED BUT SHALL MAINTAIN A MAXIMUM 3% VOLTAGE DROP PER UNIT. FIELD CALCULATIONS MUST BE COMPLETED. CONTRACTOR TO DETERMINE CABLES ACCORDING TO SITE CONDITIONS AND APPLICABLE CODES AND STANDARDS.
13. TRANSFORMER AGENT TO BE INSTALLED NEAR THE UTILITY TRANSFORMER AND TO MEASURE CURRENT, VOLTAGE, TRANSFORMER AND AMBIENT TEMPERATURES.
14. NEW 208V–120/240VAC TRANSFORMER MAY NOT BE REQUIRED IF THE INVERTER/CHARGE CONTROLLER IS SUITABLE FOR 208/120VAC OPERATION. A SEPARATE, STANDALONE INVERTER AND CHARGE CONTROLLER WOULD BE CONNECTED DIFFERENTLY. THE DESIGN SHALL BE ADAPTED TO THE AVAILABLE/SELECTED COMPONENTS.
15. DG POINT OF ISOLATION REQUIRED ACCORDING TO CODE, WHETHER IT IS A CIRCUIT BREAKER, FUSED OR DISCONNECT SHALL BE LOCATED IN VISIBLE SITE OF METER AND HAVE A LAMACOID LABEL "DER–DG# SYSTEM DISCONNECT – WARNING – TWO POWER SOURCES". ADDITIONAL WORDING MAY BE REQUESTED ACCORDING TO LOCAL AND NATIONAL STANDARD.
16. LOSS OF PHASE DEVICE TO OPEN ALL CIRCUITS UPON LOSS OF PHASE.
17. BRANCH BREAKER SIZING FOR NEW ESSENTIAL LOAD PANEL TO MATCH RELOCATED LOADS FROM EXISTING MAIN PANEL. MUST ALSO COMPLY THE CANADIAN ELECTRICAL CODE, SECTION 26 REQUIREMENT FOR ARC FAULT PROTECTION AND GROUND FAULT DETECTION.
18. DESIGN SPECIFIC DRAWINGS SHALL BE SUBMITTED FOR APPROVAL TO THE AUTHORITY AND INCLUDE, BUT NOT LIMITED TO:
    a. SPECIFIC INFORMATION ON FEEDER NAME AND ISOLATION ARRANGEMENT.
    b. INDICATION OF EXISTING EQUIPMENT VS NEW.
    c. EQUIPMENT INFORMATION (QUANTITY, MODEL NUMBER AND CHARACTERISTIC): PV MODULES, INVERTERS, BATTERY SYSTEM, RAPID SHUT DOWN, CABLE SIZING AND RACEWAY (ARMOURED OR IN CONDUIT), ETC.
    d. EQUIPMENT LOCATION.
    e. WORDING ON ALL SIGNAGE.
    f. ALL OTHER REQUIREMENTS LISTED BY THE AUTHORITY.

REFERENCE DRAWING

This document is to be used as a reference conceptual document and is based on the applicable standards in effect at time of issue. Use of this design for a specific location must be verified and adapted by a local professional engineer to meet site specific conditions, equipment selection, codes, standards and requirements from the authority having jurisdiction

MiGen Transactive Grid is a smart grid technology field demonstration project led by Hydro Ottawa and partially funded by the Ontario Ministry of Energy, Northern Development and Mines' Smart Grid Fund and the LDC Tomorrow Fund, with great support from the IEEE Standards Association and seven collaborating partners: Carleton University, CIMA+, Panasonic Eco Solutions Canada, Quadra Power, Tantalus (formerly Energate), Thorium Technologies, and University of Ottawa

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Stamp

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0	ISSUE AS REFERENCE DRAWING	01/13/2020	R.L. / A.L.

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Project Manager: E. Cantin, tech.

Client: HYDRO OTTAWA

Project title: MiGen TRANSACTIVE GRID REFERENCE DRAWING

Drawing title: THREE PHASE SYSTEM GENERAL SITE INTERCONNECTION SINGLE LINE DIAGRAM

Project number: A000597B
Designed by: R.Langlois
Drawn by: A. Teranun
Verified by: E. Cantin
Revision: 0
Drawing N°: REF ESL-02

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Filename: MiGen_REF-ESL-02_SINGLE LINE THREE PHASE.dwg / Layout: THREE PHASE GENERAL SITE SINGLE / Last save: 2020/01/24, 07:36 / Printed: 2020/01/24, 08:56