| Revenue Metering Specification |

| RECOMMENDED: | S. McNally  | P. Eng. |
| APPROVED:    | C. Malone   | P. Eng. |
| REV. DATE:   | 2016/02/05  |        |
| NO:          | GCS0008     |        |
| REV:         | 5           |        |
### REVISION SHEET

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Change</th>
<th>Date</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Original Document</td>
<td>2003-07-23</td>
<td>bp/csm</td>
</tr>
<tr>
<td>1</td>
<td>Section 10.3 indexing correction</td>
<td>2004-01-12</td>
<td>bp/csm</td>
</tr>
<tr>
<td></td>
<td>Section 14.3 except in specified areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Section 4.96 depth of cabinet</td>
<td>2006-12-20</td>
<td>jjp/csm</td>
</tr>
<tr>
<td></td>
<td>Table 6 depth of cabinet to accommodate Smart metering</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modified overall formatting and layout.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Added 5 jaw meter sockets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Added Sec 12.4 &amp; 12.5 for Backup Generators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>General Content Revision, Indexing, &amp; Reformatting</td>
<td>2014-06-09</td>
<td>smc/bp/csm</td>
</tr>
<tr>
<td>4</td>
<td>General Content Revision</td>
<td>2016-02-05</td>
<td>smc/csm</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Introduction</td>
<td>10</td>
</tr>
<tr>
<td>2.0 References</td>
<td>10</td>
</tr>
<tr>
<td>3.0 Scope</td>
<td>15</td>
</tr>
<tr>
<td>4.0 Definitions</td>
<td>15</td>
</tr>
<tr>
<td>5.0 Metering Specification Fundamentals</td>
<td>28</td>
</tr>
<tr>
<td>5.1 Metering Enclosures and Cabinet Construction Requirements</td>
<td>35</td>
</tr>
<tr>
<td>5.2 Metering Conduit Requirements</td>
<td>44</td>
</tr>
<tr>
<td>5.3 Electrical Room Requirements</td>
<td>46</td>
</tr>
<tr>
<td>5.4 Instrumentation Transformer Requirements</td>
<td>50</td>
</tr>
<tr>
<td>5.5 Utilization of Permanent Labels and Tags</td>
<td>50</td>
</tr>
<tr>
<td>5.6 Termination of a Customer’s Metered Secondary Service</td>
<td>51</td>
</tr>
<tr>
<td>6.0 Metering Responsibilities</td>
<td>53</td>
</tr>
<tr>
<td>6.1 Hydro Ottawa: Responsibilities</td>
<td>53</td>
</tr>
<tr>
<td>6.2 The Customer: Responsibilities</td>
<td>54</td>
</tr>
<tr>
<td>6.3 Point of Demarcation: Residential Services</td>
<td>55</td>
</tr>
<tr>
<td>6.4 Point of Demarcation: Commercial Services</td>
<td>55</td>
</tr>
<tr>
<td>7.0 Meter Location</td>
<td>56</td>
</tr>
<tr>
<td>7.1 Residential Customer Class: 120V/240V, 1-Phase, Up To 200A</td>
<td>56</td>
</tr>
<tr>
<td>7.2 General Service Customer Classes: 120V/240V, 1-Phase, Up To 200A</td>
<td>56</td>
</tr>
<tr>
<td>7.3 Central Metering Agricultural Class</td>
<td>56</td>
</tr>
<tr>
<td>7.4 Meter Base Mounting Considerations</td>
<td>57</td>
</tr>
<tr>
<td>7.5 Metered Services for Other Utilities</td>
<td>57</td>
</tr>
<tr>
<td>7.5.1 Metered Utility Tower Services</td>
<td>57</td>
</tr>
<tr>
<td>7.5.2 Third Party Utility Owned Metered Pedestal Services</td>
<td>61</td>
</tr>
<tr>
<td>8.0 Auxiliary Connections</td>
<td>65</td>
</tr>
<tr>
<td>9.0 Transformer Rated Meter and Instrumentation Transformer</td>
<td>66</td>
</tr>
<tr>
<td>9.1 Instrumentation Transformer Cabinets</td>
<td>66</td>
</tr>
<tr>
<td>9.2 Revenue Metering Service Secondary Conductors</td>
<td>67</td>
</tr>
<tr>
<td>9.3 Instrumentation Transformer Secondary Conductors and Conduit</td>
<td>70</td>
</tr>
<tr>
<td>9.4 Meter Cabinet Installation</td>
<td>70</td>
</tr>
<tr>
<td>9.5 Conductor Loops within Instrumentation Transformer Cabinets</td>
<td>71</td>
</tr>
<tr>
<td>9.6 Isolated Neutral Terminal Block</td>
<td>72</td>
</tr>
<tr>
<td>9.7 Connection to Metering Equipment: Conductor Requirements</td>
<td>73</td>
</tr>
<tr>
<td>9.8 Plywood Mounting Board</td>
<td>73</td>
</tr>
<tr>
<td>9.8.1 120V/240V, 1-Phase, 225A to 400A: Individual Services</td>
<td>75</td>
</tr>
<tr>
<td>9.8.2 120V/240V, 1-Phase, 3-Wire, 400A to 600A: Individual Services</td>
<td>75</td>
</tr>
<tr>
<td>9.8.3 120V/208Y (up to 800A) and 347V/600Y (225A to 400A), 3-Phase: Standard Commercial Services</td>
<td>75</td>
</tr>
</tbody>
</table>
10.0 Low Voltage (Less Than 750V) Services: Meter Equipment Installation Requirements .......................................................... 77

10.1 120V or 240V, 1-Phase, 2-Wire Services ................................................................. 78

10.2 120V/240V, 1-Phase, 3-Wire, Up To 200A: Overhead Individual Services (where permitted according to municipal by-law) .................................................. 79

10.2.1 Use of ‘Wired’ Smart Meters on Residential Services ........................................... 80

10.3 120V/240V, 1-Phase, 3-Wire, Greater Than 200A: Overhead Individual Services ................................................................. 86

10.4 120V/240V, 1-Phase, 3-Wire, Up To 200A: Underground Individual Services .................. 87

10.5 120V/240V, 1-Phase, 3-Wire, 225A to 400A: Underground Individual Residential Services ................................................................. 88

10.6 120V/240V, 1-Phase, 3-Wire, Greater Than 400A, Underground Individual Services .......... 90

10.7 120V/240V, 1-Phase, 3-Wire, 225A to 400A: Underground Commercial Services .................. 90

10.8 120V/240V, 1-Phase, Up To 400A: Residential Townhouses and Underground Multi-Position Services ................................................................. 94

10.8.1 Residential Townhouses with Six Individual Units or Less .................................. 94

10.8.2 Residential Townhouses with More than Six Individual Units ................................. 96

10.9 120V/208Y or 347V/600Y, 3-Phase Services: Apartment Buildings with Residential Units ................................................................. 102

10.10 Commercial Services: Standard 3-Phase Metering Configuration ............................... 103

10.10.1 120V/208Y, 3-Phase, 4-Wire Grounded-WYE, Up To 200A: Commercial Services ................................................................. 104

10.10.2 347V/600Y, 3-Phase, 4-Wire Grounded-WYE, Up To 200A: Commercial Services .................. 105

10.11 3-Phase, 3-Wire, “Delta” Connected Service .......................................................... 105

10.12 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, Greater Than 200A and Up To 600A Services ................................................................. 107

10.13 120V/208Y, 2-Phase, 3-Wire, Up To 200A Service: Individual Network Services ................................................................. 113

10.14 1-Phase, Network, and 3-Phase Services: Multiple Unit Services ............................. 113

10.14.1 Meter Centres .......................................................................................................... 113

10.14.2 Splitter Trough Applications ................................................................................. 115

10.14.3 Identifying Individual Units ................................................................................... 116

10.15 General Service Customer Class: Commercial Installations ....................................... 116

10.16 Service Identification ................................................................................................ 117

10.17 1-Phase and 3-Phase, Up To 200A, Secondary Metered Outdoor Pedestal, Up To 750V: Installations for Non-Distributed Generation Applications ................................................................. 117

10.17.1 Metering and Equipment Requirements ................................................................... 118
10.17.2 Location Requirements .......................................................... 119
10.17.3 Personnel Access ................................................................. 121
10.17.4 Installation and Ongoing Responsibilities of the Service Owner .... 121

11.0 Secondary Distribution Metal Enclosed Switchgear .......................... 121
  11.1 Customer Owned Secondary Switchgear with Revenue Metering
      within the Same Enclosure .................................................. 125

12.0 120V/240V, 1-Phase, Greater Than 200A: Central Metering for
      Agriculture Properties ............................................................. 128
  12.1 Combination Meter and CT Cabinet Enclosure Option .................... 129
  12.2 Typical CT Cabinet Option ..................................................... 129

13.0 120V/240V and 120V/208Y Services using Multiple Customer Metering
      System (MCMS): Suite Metering ............................................. 131
  13.1 Required Submittals to Hydro Ottawa for review by a Professional
      Engineer ................................................................. 133
  13.2 Development Process for Required Submittals ............................ 133
  13.3 Metering Room Requirements ................................................. 135
  13.4 Installation of a “Check” Meter ................................................ 137
  13.5 Residential Condominiums with Customer Owned Dry-Core
      Transformers ................................................................. 137
  13.6 Fire Pump Metering .............................................................. 138
  13.7 Common Service Metering .................................................... 138
  13.8 Commercial Service Metering ............................................... 138

14.0 Interval Metering Requirements (New Installations) ......................... 138
  14.1 General Service Class: 347V/600Y (Greater than 200A), 3-Phase
      Service, or 120V/208Y (800A or more), 3-Phase Service ............... 138
  14.2 Meter Requirements ............................................................. 139
  14.3 Revenue Interval Metering Communication Requirements ................ 140
  14.4 Customer Request for Interval or Non-Interval Meter with KYZ
      Output for Load Analysis .................................................... 142
  14.5 Interval Metering Output Request for Load Analysis ..................... 143
  14.6 Manual Collection of Interval Data .......................................... 143

15.0 Fire Pump Services ................................................................. 144
  15.1 Fire Pump Service Permanent Labelling and Tagging ...................... 145
  15.2 Fire Pump Service Conductor Size Considerations ........................ 146

16.0 Temporary Services .................................................................. 146

17.0 Emergency Power Supplies: Back-Up Generators ............................ 148

18.0 Net Metering ........................................................................... 150
19.0 Distributed Generation and Energy Resource Facilities: Revenue Metering Requirements

19.1 Distributed Generation, Up To 10kW: Individual Residential Customers, 120V/240V, 1-Phase, 200A to 400A Services ................................................................. 159

19.2 Distributed Generation, Up To 10kW: Residential Townhouses (120V/240V, 1-Phase, Up To 200A) and Apartment Buildings with Multiple Residential Units (120V/208Y or 347V/600Y, 3-Phase, Grounded-WYE Connected, Up To 200A) ........................................................................................................ 162

19.3 Distributed Generation, Greater Than 10kW: Revenue Metering Requirements ........................................................................................................... 170

19.4 Distributed Generator, Greater Than 10kW, 120V/208Y or 347V/600Y, 3-Phase, Grounded Grounded-WYE Connected, 4-Wire, Greater Than 200A Services............................................................................. 175

19.5 Distributed Generator, 10kW or More: Additional OESC Requirements ......................................................................................................................... 178

20.0 Primary Metering .................................................................................................................. 180

Schedule 1: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet ........................................................................................................ 204

Schedule 2: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued) ........................................................................................................ 206

Schedule 3: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)........................................ 208

Schedule 4: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet ........................................ 210

Schedule 5: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet ........................................................................................................ 212

Schedule 6: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet ........................................ 214

Schedule 7: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet ........................................ 216

Schedule 8: 3 Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet ........................................ 218

Schedule 9: Residences Separated by a Non Shared Driveway that is at least 3000 mm [10'] in Width ........................................................................................................ 220

Schedule 10: Residences Separated by a Shared Driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in Width ............................................................................. 221

Schedule 11: Residences Separated by a Shared Driveway that is at least 3600 mm [12'] in Width ........................................................................................................ 222

Schedule 12: Sale and Service Agreement for KYZ Outputs as per Section 14.4.5 ........................................ 223
| Table 1:     | Hydro Ottawa Acceptable Criteria For Meter Base Socket For Overhead 120V/240V, 1-Phase, 3-Wire, 100A Or 200A Services ......................................................183 |
| Table 1A:   | Hydro Ottawa Acceptable Criteria For Meter Socket Base For Underground 120V/240V, 1-Phase, 3-Wire, ≤200A Services ..................................................184 |
| Table 2:    | Hydro Ottawa Approved Underground Multi-Position Meter Gang Socket Trough For Residential 120V/240V, 1-Phase, 3-Wire, 400A Multi-Unit Service .................................................................185 |
| Table 3:    | Hydro Ottawa Approved Weatherproof Combination Base Metering Enclosure For Underground 120V/240V, 1-Phase, 3-Wire, 225A To 400A Service .................................................................186 |
| Table 4:    | Hydro Ottawa Approved 1-Phase, 20A, 600V, Transformer Rated 5-Jaw Meter Socket Bases with Provision For Test Switch For 240V, 1-Phase, 3-Wire, >200A Service .................................................................187 |
| Table 5:    | Hydro Ottawa Approved Commercial 7-Jaw Meter Socket Bases For 120V/208Y and 347V/600Y, 2-Phase and 3-Phase, 100A and 200A Services .................................................................188 |
| Table 5A:   | Hydro Ottawa Approved Commercial 13-Jaw Transformer Rated Meter Socket Bases For 3-Phase, 4-Wire, >200A Secondary And Primary Services .................................................................189 |
| Table 5B:   | Hydro Ottawa Approved Commercial 8-Jaw Transformer Rated Meter Socket Base For 3-Phase, 3-Wire, "Delta"–Connected, Primary Service .........................................................190 |
| Table 6:    | Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear for Agricultural, Residential, Commercial and Distributed Generation Services .................................................................191 |
| Table 7:    | Hydro Ottawa Approved 2 to 6 Multi-Gang Meter Socket Trough for Overhead, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services .........................................................197 |
| Table 8:    | Hydro Ottawa Approved 2 – 6 Multi-Gang Meter Socket Trough for Underground, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services .........................................................198 |
| Table 9:    | Meter Sockets .................................................................................................................................199 |
| Table 10:   | Secondary Services .............................................................................................................................200 |
| Table 10A:  | Primary Services ...............................................................................................................................201 |
| Table 11:   | Hydro Ottawa Approved Utility Pedestal Services 600V, 1-Phase, 100A, 4-Jaw Meter Socket Base And Circuit Breaker With For 240V, 1-Phase, 3-Wire, 30A Service .................................................................203 |
| Table 12:   | Summary of Service Entrance and HOL Specifications ........................................................................179 |
Figure 1: DG System Disconnect Warning label

Figure 2: DG System Two Power Sources Warning label

Figure 3: 1-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36” x 36” x 12”]

Figure 4: 1-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]

Figure 5: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36” x 36” x 12”]

Figure 6: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]

Figure 7: 3-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36” x 36” x 12”]

Figure 8: 3-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed BackPlate Layout, For 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]

Figure 9: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36” x 36” x 12”]

Figure 10: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]

Figure 11: Two residences separated by a non-shared driveway that is at least 3000 mm [10'] in width

Figure 12: Two residences separated by a shared driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in width

Figure 13: Two residences separated by a shared driveway that is at least 3600 mm [12'] in width
Footnote 1: Taken from http://wikipedia.org as of 2015/03/30. .................................................................20
Footnote 2: Adapted from http://www.cuttingedgeinc.com/ref/glm2.htm as of 2015/03/30. .................................................................................................................................20
Footnote 3: Adapted from http://wikipedia.org as of 2015/03/30.................................................................20
Footnote 4: Taken from NEMA Document 250–2003, “Definitions” ...............................................................22
Footnote 5: Adapted from http://en.wikipedia.org as of 2015/09/15..........................................................23
Footnote 6: Adapted from CSA 22.3, No 1-10, 2010 Edition, Canadian Electrical Code Part III, Section 1.8................................................................................................................24
Footnote 7: Based on HOL’s study of typical Cell Phone Tower Loading. .................................................58
Footnote 8: Adapted from the Halton Hills Hydro document “Generation Connection Package”. .................................................................154
1.0 Introduction

Amendments and Changes
The provisions of this Metering Specifications document, and any amendments made from time to time.

The Customer is responsible for contacting HOL to ensure that the Customer have the current version of the Metering Specifications document. The latest Metering Specifications shall be provided through the HOL website – refer to HOL’s Conditions of Service, HOL document ECS0012, under ‘Contact Information’ for more information. HOL may charge a reasonable fee for providing printed copies of this document.

If there are any discrepancies with this document and the most current revision of HOL’s Conditions of Service, HOL document ECS0012, the Conditions of Service shall take precedence, unless the Conditions of Service creates a hazard or conflicts with provincial or federal regulations.

2.0 References
This document refers to the following documents and specifications:


Canadian Standards Association (CSA) – CSA B137.3: Rigid Poly-Vinylchloride (PVC) Pipe and Fittings for Pressure Applications

Canadian Standards Association (CSA) – CSA C22.3, No. 1-10: Canadian Electrical Code, Part III

Canadian Standards Association (CSA) – CSA C282: Emergency Electrical Power Supplies for Buildings

Electrical Safety Authority (ESA) – ESA Bulletin DIB-06/12: Distributor Information Bulletin (Revision: Meter Base Mounted Transfer Devices)

Hydro Ottawa – ECG0001 – Commercial Secondary Ownership
Hydro Ottawa – ECG0002 – Technical Guideline For Customer Owned Standby Generation
Hydro Ottawa – ECG0005 – Commercial Primary Service Ownership Demarcation, Customer Owned Equipment
Hydro Ottawa – ECG0006 – Embedded Generation Technical Connection Guideline
Hydro Ottawa – ECG0008 – Distribution System Voltage and Power Quality
Hydro Ottawa – ECG0009 – Commercial Primary Service Ownership Demarcation, Hydro Ottawa Owned Equipment
Hydro Ottawa – ECG0011 – MicroFIT DG (10kW and Less) Single Phase Parallel Generator Connection To Overhead System (Construction Detail)
Hydro Ottawa – ECG0013 – MicroFIT DG (10kW and Less) Single Phase Parallel Generator Connection To Underground System (Construction Detail)
Hydro Ottawa – ECG0015 – ERF/Com 1PH or 3PH, Secondary Commercial Service ≤500kW 1PH or >10kW 3PH
Hydro Ottawa – ECS0012 – Conditions of Service
Hydro Ottawa – ECS0013 – Customer–owned Switchgear
Hydro Ottawa – ECS0023 – Un–metered Service Conditions, Connections and Upgrades
Hydro Ottawa – ECS0034 – Profiling Unmetered Loads
Hydro Ottawa – ECS0035 – Protocol for Self–Reporting Consumption of Unmetered Loads
Hydro Ottawa – ECS0040 – Res 120V/240V, 1PH, 3W, ≤200A Overhead Service Entrance
Hydro Ottawa – GCS0001 – Underground Residential Distribution Installation of Civil Work
Hydro Ottawa – GCS0002 – Primary Voltage Service General Guideline
Hydro Ottawa – GDS0011 – Residential URD Design Guidelines
Hydro Ottawa – MCG0001 – Metering Specification Application Guide
Hydro Ottawa – MCS0003 – Res UG 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base
Hydro Ottawa – MCS0004 – Agr OH 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base
Hydro Ottawa – MCS0005 – Res 120V/208Y, 2PH, 3W, 100A to 200A Network Service Entrance and Meter Socket Wiring Detail
Hydro Ottawa – MCS0007 – Com 120V/240V, 1PH, 3W, 400A Transformer Rated Service Using Meter Socket with Separate Instrument Transformer Cabinet
Hydro Ottawa – MCS0008 – Agr/Com UG 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Weatherproof Combination Meter Socket Base
Hydro Ottawa – MCS0016 – Com 600V, 3PH, 3W Delta or 347V/600Y, 3PH, 4W Wye, ≤200A 7–Jaw Meter Base Wiring Detail
Hydro Ottawa – MCS0017 – Com 120V/208Y or 347V/600Y, 3PH, 4W, ≥200A to 600A Services
Hydro Ottawa – MCS0018 – ERF/Agr/Com/Res 1PH and 3PH, 4–Jaw, 5–Jaw, and 7–Jaw Wiring Detail
Hydro Ottawa – MCS0019 – Com/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Using Combination Meter Socket Base
Hydro Ottawa – MCS0020 – Com/Res SLD Typical Secondary Metering for Multiple Unit Building
Hydro Ottawa – MCS0021 – Res 120V/240V, 1PH, 3W, 400A Multiposition Ganged Meter Trough
Hydro Ottawa – MCS0022 – Com 120V/208Y or 347V/600Y, 3PH, 4W, 400A Transformer Rated Service Installation with Instrument Transformer Cabinet
Hydro Ottawa – MCS0023 – MCMS/Com/Res Typical Secondary Metering for Multiple Unit Building with Conventional Metering and MCMS
Hydro Ottawa – MCS0024 – Com/Res 120V/208Y or 347V/600Y, 3PH, 4W, Non–Interval Metering Arrangement in a Switchboard with Peak Demand ≤233kW
Hydro Ottawa – MCS0025 – Com/Res 120V/208Y or 347V/600Y, 3PH, 4W, Interval Metering Arrangement in a Switchboard with Peak Demand >233kW

Hydro Ottawa – MCS0026 – Com/Res 120V/208Y ≥800A or 347V/600Y >200A, 3PH, 4W Parallel Metering Arrangement in a Switchboard with Peak Demand >233kW

Hydro Ottawa – MCS0035 – ERF/Com Concrete Base Foundation for Weatherproof Metered Cabinet

Hydro Ottawa – MCS0036 – Com/Res 120V/240V, 1PH, 3W, 400A Secondary Service with Meter Centre

Hydro Ottawa – MCS0037 – Com/Res 120V/240V, 1PH, 3W, 100A to 400A Secondary Service with Multiple ≤200A Sub–Service Disconnects

Hydro Ottawa – MCS0038 – Com 1PH or 3PH, 400A Transformer Rated Service with Instrument Transformer Cabinet and Meter Socket Base

Hydro Ottawa – MCS0041 – Agr/Com 120V/240V, 1PH, 3W, 400A Transformer Rated Service with Instrument Transformer Cabinet and Meter Base

Hydro Ottawa – MCS0042 – Com UG 120V/240V, 1PH, 3W, 400A Service with Switchboard

Hydro Ottawa – MCS0043 – ERF/Com 1PH or 3PH, ≤200A Service Pedestal Mounted Metering Cabinet

Hydro Ottawa – MCS0052 – Multiple Customer Metering System Installation Requirements By The Owner For An Existing Building

Hydro Ottawa – MCS0053 – ERF 120V/240V, 1PH, 3W, ≤200A Overhead Service Entrance Parallel Metering <10kW Wiring Detail

Hydro Ottawa – MCS0055 – Multiple Customer Metering System Installation Requirements By The Owner For A New Building

Hydro Ottawa – MCS0056 – Multiple Customer Metering System Installation Requirements For Hydro Ottawa And Its Contractors

Hydro Ottawa – MCS0057 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Secondary Parallel Service Wiring Detail

Hydro Ottawa – MCS0058 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Secondary Parallel Construction Detail

Hydro Ottawa – MCS0059 – Res MCMS Individual Multiple Customer Metering Systems Communication Wiring for Electrical Rooms without Communications Equipment

Hydro Ottawa – MCS0060 – Res MCMS Individual Multiple Customer Metering Systems Communication Wiring for Electrical Rooms with Communications Equipment

Hydro Ottawa – MCS0061 – Res MCMS Communication Wiring for Electrical Rooms without Communications Equipment

Hydro Ottawa – MCS0063 – ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub–Service with Splitter Trough

Hydro Ottawa – MCS0064 – ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub–Service with Metering Centre

Hydro Ottawa – MCS0066 – Com 120V/208Y, 3PH, 4W, ≥800A, or 347V/600Y, 3PH 4W, >200A Interval Metering External Modem Enclosure with Telephone Line for Communications
Hydro Ottawa – MCS0069 – Res UG 120V/240V, 1PH, 3W, ≤200A Service Entrance Disconnect and Metering on Customer Owned Pole

Hydro Ottawa – MCS0070 – Res OH 120V/240V, 1PH, 3W, ≤200A Service Entrance Disconnect and Metering on Customer Owned Pole

Hydro Ottawa – MCS0071 – Com UG 120V/240V, 1PH, 3W, ≤200A, Service Entrance Disconnect and Metering on Customer Owned Pole

Hydro Ottawa – MCS0072 – Com OH 120V/240V, 1PH, 3W, ≤200A, Service Entrance Disconnect and Metering on Customer Owned Pole

Hydro Ottawa – MCS0073 – Com UG 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Service Upgrade Using Combination Meter Socket Base

Hydro Ottawa – MCS0074 – ERF 1PH or 3PH, ≤200A Outdoor Enclosure Metering Installation

Hydro Ottawa – MCS0075 – ERF 1PH or 3PH, ≥200A to 600A Outdoor Enclosure Metering Installation with Separate Instrument Transformer Cabinet

Hydro Ottawa – MCS0076 – ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade Using Combination Meter Socket Base

Hydro Ottawa – MCS0077 – Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade Using External Modem Enclosure with Telephone Line for Communications

Hydro Ottawa – MCS0078 – ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade to use Combination Meter Socket Base

Hydro Ottawa – MCS0079 – ERF 120V/208Y or 347V/600Y, 3PH, 4W, 400A to 600A Secondary Service Construction and Wiring Detail


Hydro Ottawa – MCS0081 – Com 120V/240V, 1PH, 3W, ≤600A and 120V/208Y or 347V/600Y, 3PH, 4W, ≥200A Secondary Utility Tower Service using Splitter Trough

Hydro Ottawa – MCS0082 – Com 120V/240V, 1PH, 3W, ≤600A Secondary Metered Utility Tower Service with 6–Position Ganged Meter Trough

Hydro Ottawa – MCS0083 – ERF/Res 120V/240V, 1PH, 3W, ≤200A Load Displacement (NET–Metering) with Single Socket Base

Hydro Ottawa – MCS0084 – ERF/Res 120V/240V, 1PH, 3W, ≤400A Load Displacement (NET–Metering) with Ganged Meter Trough

Hydro Ottawa – MCS0085 – ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Using Load Displacement (NET–Metering) with Combination Meter Socket Base

Hydro Ottawa – MCS0086 – ERF/Res 120V/240V, 1PH, 3W, ≤600A Load Displacement (NET–Metering) with Splitter Trough

Hydro Ottawa – MCS0087 – ERF/Com 120V/240V, 1PH, 3W, 400A to 600A Secondary Service Wiring

Hydro Ottawa – MCS0088 – ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade to Combination Meter Socket Base with Load Displacement (NET–Metering)

Hydro Ottawa – MCS0089 – ERF/Com 120V/208Y or 347V/600Y, 3PH, 4W, 400A to 600A Secondary Service with Offset Meter Socket

Hydro Ottawa – MCS0090 – ERF 120V/240V, 1PH, 3W, 400A to 600A Secondary Service with Offset Meter Socket
Hydro Ottawa – MCS0091 – Com 120V/240V, 1PH, 3W, ≤200A Secondary Service with Meter Socket Wiring Detail

Hydro Ottawa – MCS0092 – Com 120V/240V, 1PH, 3W, 400A to 600A Transformer Rated Secondary Service with Offset Meter Socket

Hydro Ottawa – MCS0093 – Com 120V/240V, 1PH, 3W, 600A Transformer Rated Secondary Service with Offset Meter Socket

Hydro Ottawa – MCS0094 – Com 120V/208Y or 347V/600Y, 3PH, 4W, >200A to 400A Secondary Service with Offset Meter Socket

Hydro Ottawa – MCS0095 – Com 120V/208Y or 347V/600Y, 3PH, 4W, 400A to 600A Secondary Service with Offset Meter Socket

Hydro Ottawa – MCS0096 – Com 120V/208Y or 347V/600Y, 3PH, 4W, 100A to 200A Secondary Service with Meter Socket Construction and Wiring Detail

Hydro Ottawa – MCS0097 – ERF 120V/240V, 1PH, 3W, 400A to 600A Outdoor Enclosure Metering Pedestal Installation with Separate Instrument Transformer Cabinet

Hydro Ottawa – MCS0098 – ERF 120V/208Y or 347V/600Y, 3PH, 4W, 400A to 600A Outdoor Enclosure Metering Pedestal Installation with Separate Instrument Transformer Cabinet

Hydro Ottawa – MCS0099 – Com 120V/208Y or 347V/600Y, 3PH, 4W, Customer Owned Outdoor Switchgear with Check Meter Installation

Hydro Ottawa – MCS0100 – ERF 1PH or 3PH, ≤200A Outdoor Enclosure Metering with Outdoor Mounted Disconnects

Hydro Ottawa – MCS0101 – ERF 1PH or 3PH, 400A to 600A Outdoor Enclosure Metering with Outdoor Mounted Disconnects

Hydro Ottawa – MCS0102 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Placement of Warning Lamacoid and Stickers

Hydro Ottawa – MCS0103 – COM 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Sub-Services, Customer Owned Outdoor Meter Centre or Switchboard with Check Metering

Hydro Ottawa – MCS0104 – ERF 120V/240V, 1PH, 3W, >400A, AND 120V/208Y or 347V/600Y, 3PH, 4W, >200A Placement of Warning Lamacoid and Stickers

Hydro Ottawa – UFS0001 – Bollards Protective

Hydro Ottawa – UGS0002 – Grounding Transformer or Switchgear Base

Measurement Canada – E-24 (Rev 1) – Policy on Approval and Use of 2.5–Element Metering

Measurement Canada – Electricity and Gas Inspection Act

Measurement Canada – S-E-04 – Specifications for the Installation Requirements for Multiple Customer Metering Systems

Measurement Canada – S-E-10 – Specification For Installation And Use: Size Of Wires Used To Connect Meters To Conventional Instrument Transformers

National Electrical Manufacturers Association (NEMA) – NEMA 250–2003: Enclosures

Ontario – Current edition of the Ontario Building Code OBCOBCOB(OBC)


Ontario – Regulation 22/04 – Electrical Distribution Safety
3.0 Scope

This document focuses on new or upgrading Low-Voltage revenue metering installations performed by HOL. It is a compendium of the prerequisites and requirements that HOL requires fulfilled before revenue metering can be installed or energized.

The type of low-voltage HOL revenue metering equipment to be installed is determined by the application, voltage, and Ampacity of the service to be metered: this document is organized accordingly. Note that when using this document to determine either the prerequisites or requirements of metering a particular service, the entire document must be considered – not just the section discussing a particular type of service.

Contact information for HOL can be found in HOL’s Conditions of Service, HOL document ECS0012, under ‘Contact Information’.

4.0 Definitions

‘AC’ means “Alternating Current”.


‘Amalgamated Switch’ is a generic term that means a single enclosure that contains both a Service Entrance disconnect and fuse panel; manufacturers include Amalgamated Electric and Canadian Electrical Box.

‘AMI’ – see definition of “Advanced Metering Infrastructure”.

‘Ampacity’ – see definition of “Ampacity” in the OESC.

‘ANSI’ means the “American National Standards Institute”.
‘Apparent Power’ means the total power measured in kiloVolt Amperes (kVA).

‘Appropriate’ in this document means what HOL, at its determination, deems to be apt, correct, fitting, proper, right, or suitable.

‘ASA’ means the “American Standards Association”.

‘ASTM’ means the “American Society for Testing and Materials”.

‘AWG’ means “American Wire Gauge”; used to specify size of conductor.

‘Back-Up Generator’ means Permanent or temporary generation that does not parallel with HOL’s distributor’s system, as per HOL document ECG0002.

‘Badge Number’ means the unique identifier, given by HOL, for an electric revenue meter. HOL badge numbers take the form of OTT#####, where ###### is a unique number within the HOL distribution system.

‘Bi-Directional Meter’ means a meter capable of recording net energy flow by registering the amount of energy delivered by HOL or received from the Customer.

‘Break-Before-Make Transfer Switch’ – see definition of “Open Transition Transfer Switch”.

‘Bulk Meter’ – see definition of “Bulk Meter” in HOL’s Conditions of Service, HOL document ECS0012.

‘Check Meter’ – see definition of “Check Meter” in HOL’s Conditions of Service, HOL document ECS0012.

‘Circuit Breaker’ – means a device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

‘Cold Metering’ – see definition of “Cold Metering” in HOL’s Conditions of Service, HOL document ECS0012.


‘Communications Tower’ means a mechanical structure, and related electronic supporting equipment, used in the broadcast or reception of wireless communications. This includes, but is not limited to, cell phone towers, microwave towers, television and radio transmission towers.

‘Compartment’ means a subdivision of a switchgear switchboard unit.

‘Conditions of Service’ – see HOL document ECS0012.
‘Confined Space’ means the OH&SA definition of a confined space in addition to any space recognized as a space that:

- Has limited, or restricted, means of entry or exit
- Is large enough for a utility worker to enter to perform tasks

‘Copper’ means “a chemical element with the symbol Cu (from Latin: cuprum) and atomic weight of 29. It is a ductile metal with very high thermal and electrical conductivity. Pure copper is soft and malleable; a freshly exposed surface has a reddish-orange color. It is used as a conductor of heat and electricity, a building material, and a constituent of various metal alloys.”

‘CSA’ means the “Canadian Standards Association”.

‘CT’ means “Current Transformer”. A CT is a type of Instrumentation Transformer and is used as part of a metering circuit. It is used to detect the flow of current on a service being metered.

‘Customer’ – see definition of “Customer” in HOL’s Conditions of Service, HOL document ECS0012.

‘Customer Side’ of a device – see definition of “Load Side”.

‘DC’ means “Direct Current”.

‘Demand Billed Customer’ means a demand metered non-residential Customer with average monthly peak demand greater than 50kW over the most recent calendar year that is read monthly and billed on kW, kVAR, or kVA demand as well as kWh energy.

‘Demand Meter’ means a meter that measures a Customer’s peak usage during a specified period of time.

‘Demarcation Point’ – see definitions of both “Operational Demarcation Point” and “Ownership Demarcation Point” in HOL’s Conditions of Service, HOL document ECS0012.

‘DG’ see definition of “Distributed Generator”.

‘DG Source Disconnect’ also means all of the following: “Distributed Generation Source Disconnect”, “DG Source Fused Disconnect”, and “Distributed Generation Source Fused Disconnect”. All of these refer to an Electrical Safety Authority (ESA) approved device with factory installed over-current protection rated at either 100% full-load amps (FLA) or 80% of the available fault amps of the customer’s generation or energy storage equipment, whichever is greater; moulded case breakers are not acceptable. It shall provide an obvious visible open point. This device is used to isolate the customer’s distributed generation (DG) equipment, or energy resource facility (ERF) equipment, from the utility distribution system.

‘DG System Fused Disconnect’ means “Distributed Generation Fused Disconnect”, an Electrical Safety Authority (ESA) approved device with factory installed over-current protection rated at either 100% full-load amps (FLA) or 80% of the available fault amps from the customer’s generation or energy storage equipment, whichever is greater; moulded case breakers are not acceptable. It shall provide an obvious visible open point. This device is used to isolate the customer’s distribution generation (DG) equipment, or energy resource facility (ERF) equipment, from the equipment that it supplies. Also referred to as “Utility Disconnect”.

For Hydro Ottawa Use Only © 2016  GCS0008 Rev. 5  Page 17 of 225
‘Direct-Connect Meter’ means a meter that carries full load current and connects across full line voltage. Also called a self-contained meter.

‘Distributed Generator’ (DG) means electric generation facilities connected to a distribution system through a point of common coupling (PCC). In this document, this term is used interchangeable with Energy Resource Facility (ERF) and vice-versa.

‘Distribution Panel’ means a panel contains over-current devices and distributes electricity to the various electrical circuits and equipment.

‘Distribution System Code’ (DSC): sets out the minimum conditions that an electricity distributor must meet in carrying out its obligations; the DSC is established and approved by the Ontario Energy Board (OEB). All licensed electricity distributors in Ontario must comply with the provisions of the DSC as a condition of their license.

‘Downstream’ side of a device – see definition of “Load Side”.

‘Drip-Loop’ means a downward loop in the Customer’s service conductors, near where the Customer’s service conductors attach to the supply authority overhead conductors, to prevent water from entering the service mast at the weather-head.

‘Dry Core Transformer Losses’ – see definition of “Dry Core Transformer Losses” in HOL’s Conditions of Service, HOL document ECS0012.

‘DSC’ – see definition of “Distribution System Code”.

‘Duct’ means a pipe, tube, or conduit through which Cabling is passed and includes, where applicable, the Entrance Duct and Risers.

‘Electrical Safety Authority’ (ESA) – see definition of “Electrical Safety Authority” in HOL’s Conditions of Service, HOL document ECS0012.


‘EMT’ means “Electrical Metallic Tubing”; a type of conduit that can house insulated electrical conductors.

‘Energy Resource Facility’ – see definition of ‘ERF’.

‘ERF’ means “Energy Resource Facility”. In this document, this term is used interchangeably with Distributed Generator (DG) and vice-versa.

‘ESA’ – see definition of “Electrical and Safety Authority”.

‘EUSA’ means the “Electrical and Utilities Safety Association”.
‘Fault’ means a partial or total failure of insulation that causes a short circuit between conductors, or between a conductor and ground, causing an abnormal current to flow. This term can also refer to a failure (break) in a conductor that causes an open circuit.

‘Fault Current’ means a current that flows between conductors, or between a conductor and ground, due to a fault. A fault current flowing to ground may be called a ground fault current.

‘FIT’ – see definition of “FIT” in HOL’s Conditions of Service, HOL document ECS0012.

‘FLA’ means “Full-Load Amps”.

‘Gas’ refers to a combustible substance, in gaseous form, typically Natural Gas or Propane.

‘General Service Customer Classes’ – see definition of “General Service Customer Class” in HOL’s Conditions of Service, HOL document ECS0012.

‘GFCI’ – see definition of “Ground Fault Circuit Interrupter” in the OESC.

‘Grid Side’ of a device – see definition of “Line Side”.

‘High Side’ of a device – see definition of “Line Side”.

‘High-Voltage’ – see definition of “High-Voltage” in the OESC.

‘HOL’ means “Hydro Ottawa Limited”.

‘Hot Metering’ refers to a specific configuration of HOL owned revenue metering equipment, typically used on residential services, when the Service Entrance disconnect is connected on the Load Side of the revenue meter.

‘HVAC’ means “Heating, Ventilation, and Air Conditioning”.

‘IES’ means the “Illuminating Engineering Society”.

‘IESO’ means the “Independent Electrical System Operator”.

‘Instrument Rated Meter’ means a meter used in conjunction with Instrumentation Transformers, to measure Low-Voltage or high-current services. Also called a “Transformer Rated Meter”.

‘Instrumentation Transformer’ (Instrument Transformer) refers to a class of devices, often part of a metering circuit, that can be used to detect voltage on a Low-Voltage or a high-current service. Note that this definition does not apply to instrumentation transformers used in the primary metering of High-Voltage circuits.

‘Interval Meter’ – see definition of “Interval Meter” in HOL’s Conditions of Service, HOL document ECS0012.
‘kcmil’ – see definition of “MCM”.

‘kVA’ means “kiloVolt Ampere”; see also “Apparent Power”.

‘kVAR’ means “kiloVolt Ampere Reactive”; see also “ReACTIVE Power”.

‘kW’ means “kiloWatt”; see also “Real Power”.

‘kWh’ means “kiloWatt Hour”; “a unit of energy equivalent of 1 kW of power expended over 1 hour.”\(^1\)

‘Lamacoid’ means “a generic term commonly used for specifying 2-ply or 3-ply, laminated engraving stocks and/or the nameplates, tags, or legend plates produced from [plastic] stock.”\(^2\)

Can be used interchangeably with the term ‘Lamicoid’.

‘LDC Side’ of a device – see definition of “Line Side”.

‘Lexan’ refers to high-impact transparent polycarbonate, a type of plastic. In this document, unless noted otherwise, Lexan may be used interchangeably with strong, transparent, plastic sheeting.

‘Line Side’ of a device refers to the point at which utility supplied energy enters the device. Also referred to as either the “High Side”, “LDC Side”, “Grid Side”, “Upstream” side, or “Utility Side” of a device.

‘Liquatite’ refers to a brand-name of fitting that can be used to terminate TECK conduit.

‘Load Limiter’ is a device that will limit the amount of power delivered to a premise. Load interrupters are also used to limit the amount of power delivered. The load limiting devices are typically used during collection activity.

‘Load Side’ of a device refers to the point at which utility supplied energy exits the device. Also referred to as the “Customer Side”, “Downstream” side, or “Low Side” of a device.

‘Lock Box’ means a utility owned box for the housing of the Customer’s key which allow HOL entry into normally locked rooms containing HOL owned revenue meter and ancillary equipment. Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

‘LOP’ means “Loss of Phase”.

‘LOP Protection’ means Loss of Phase Protection; refers to a protective device capable of sensing a fault condition, loss of voltage, and/or adverse frequency condition on a single phase of a 3-Phase system, and reacts by operating an isolation device.

---

1 – Taken from http://wikipedia.org as of 2015/03/30.

2 – Adapted from http://www.cuttingedgeinc.com/ref/glm2.htm as of 2015/03/30.
‘Low Side’ of a device – see definition of “Load Side”.

‘Low-Voltage’ – see definition of “Low-Voltage” in the OESC.

‘Maintenance’ means any activity intended to keep equipment in satisfactory working condition, including tests, measurements, replacements, adjustments, and repairs.

‘Marine Grade Plywood’ means a sheet of plywood that has been manufactured to be specifically used in wet or humid environments. It is resistant against delamination, fungal attack, rot, and decay.

‘MCM’ means “thousand Circular Mils”, or more commonly “kcmil”; a unit of measure that denotes the cross-sectional area of a cable.

‘MCMS’ see definition of “Multiple Customer Metering System”.

‘MCMU’ see definition of “Multiple Customer Metering Unit”.

‘MDM/R’ means “Meter Data Management and Repository” which centrally stores and manages meter data from smart meters across the Province of Ontario.

‘Measurement Canada’ means the regulatory body that is responsible for overseeing the accuracy of trade measurement for electricity meters in Canada.

‘Mesh Network’ means a network where any device within the network can act as a repeater for network communication. A mesh network shall be able to self-heal around non-communicating devices by hopping to an operational device.

‘Meter’ means a revenue class Measurement Canada “type” approved meter and/or installation that is used as a single point of measurement and the final HOL meter element of the typical billing arrangement for a premise.

‘Meter Installation’ – see definition of “Meter Installation” in HOL’s Conditions of Service, HOL document ECS0012.

‘Meter Ring’ means a metal ring that secures the meter to the meter socket, which can be sealed by the Supply Authority to prevent tampering with the meter.

‘Meter Socket’ means the mounting device consisting of meter jaws, connectors, and enclosure for receiving a socket-type revenue meter.

‘Metric’ units of measure – see definition of “SI System of Measure”.

‘Metrology’ means any equipment installed for the purposes of revenue metering. This includes, but is not limited to, revenue meters, conductors, conduit, enclosures, instrumentation transformer, and isolating disconnects.
‘MicroFIT Generator’ – see definition of “Micro FIT” in HOL’s Conditions of Service, HOL document ECS0012.

‘Mimic Bus’ – A primary Single Line Diagram affixed on the outside face of a Switchboard showing the principle connections and electrical components contained inside.

‘MSG’ means “Manufacturer’s Standard Gauge”.

‘MTO’ means the “Ontario Ministry of Transportation”.

‘Mullion’ means a vertical element that forms a division between units of a window, door, or screen, or is used decoratively; also applies to a piece of hardware that divides the opening of a pair of doors.³

‘Multiple Customer Metering System’ (MCMS) – see definition of “MCMS” in HOL’s Conditions of Service, HOL document ECS0012.

‘Multiple Customer Metering Unit’ (MCMU) means an individual metering panel which, when combined with multiple MCMUs form a buildings’ MCMS excluding the communication infrastructure. The MCMU panels should have the same form, fit and function as each panel within the system with only programming required to differentiate each panel’s metering requirements.

‘NEMA’ means the “National Electrical Manufacturers Association”.

‘NEMA Type 1’ means “Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).”⁴ See NEMA document 250–2003 for more information.

‘NEMA Type 3’ means “Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.”⁴ See NEMA document 250–2003 for more information.

‘NEMA Type 3R’ means “Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.”⁴ See NEMA document 250–2003 for more information.

³ – Adapted from http://wikipedia.org as of 2015/03/30.

⁴ – Taken from NEMA Document 250–2003, “Definitions”.
‘NEMA Type 4’ means “Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure.” See NEMA document 250–2003 for more information.

‘NEMA Type 4X’ means “Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.” See NEMA document 250–2003 for more information.

‘Net Metering’ (see also “Bi-Directional Meter”). Typically used in installations when the Customer is primarily interested in offsetting their consumption of utility supplied power with power generated by their own equipment. Potential exists to sell power not utilized within the premise to the provincial grid.

‘Network Service’ or ‘Network Load’ means a service or load consisting of two phase conductors plus a Neutral conductor supplied from a 3-Phase, 4-Wire, Grounded-WYE power system.

‘Neutral’ means the grounded conductor, or buss, in a 1-Phase 3-Wire, or 3-Phase 4-Wire system.

‘OBC’ means the most current revision of the “Ontario Building Code”.

‘OEB’ means the “Ontario Energy Board”.

‘OESC’ – see definition of “Ontario Electrical Safety Code”.

‘OH&SA’ means the “Occupational Health and Safety Association of Ontario”.


‘Open Transition Transfer Switch’ means a transfer switch that “breaks contact with one source of supply before it makes contact with another”. The intent of this device is to prevent back feed in to HOL’s distribution system or back feed through HOL’s revenue metering equipment from the Customer owned equipment.

---

‘Overcurrent Device’ means a device capable of automatically opening an electric circuit, under both predetermined overload and short-circuit conditions, either by fusing of metal or by electromechanical means (a fuse or Circuit Breaker). An approved fuse or Circuit Breaker is required to protect the electrical system from a short circuit or overload failures.

‘Permanent’ means a period of time greater than one (1) calendar year.

‘PMT’ means Primary Metering Transformer; refers to an individual Instrumentation Transformer (either a PT or a CT).

‘PMU’ means Primary Metering Unit. Typically refers to a group of six Instrumentation Transformers (three PTs and three CTs), mounted in a single location, used to provide metering for a 3-Phase Primary Metered Service.

‘Point of Demarcation’ – see definition of “Demarcation Point”.

‘Point of Supply’ – see definition of “Supply Point” in HOL’s Conditions of Service, HOL document ECS0012.

‘Power Factor’ means the cosine of the angle taken between Real Power (kW) and Apparent Power (kVA).

‘Practicable’, in this document means what HOL, at its determination, deems to be feasible, realistic, viable, workable, or Practical. Further, the term ‘practicable’ is not “intended to provide an opportunity for not meeting the requirements of this [document], but indicates the preferred clearance or method. Where an alternative is not specified, the engineering solution that most closely adheres to the preferred method should be used.”

‘Practical’, in this document, means what HOL, at its determination, deems to be acceptable, feasible, Practicable, realistic, suitable, viable, useful, or workable.

‘Primary Metered Service’ means a Connection whose meter point is located on the primary side of a distribution transformer, at a voltage greater than 750V.

‘Professional Engineer’ – see definition of “Professional Engineer” as defined by the Professional Engineers Act.

‘PT’ means “Potential Transformer”. A PT is a type of Instrumentation Transformer and is used as part of a metering circuit. It is used to detect voltage on a service being metered.

‘PVC’ means “Poly-Vinyl Chloride”; a polymer material used in conduit suitable to house insulated electrical conductors.

‘Reactive Power’ means the power component that does not produce work but is necessary to mitigate line-losses and also allow some equipment to operate, measured in kiloVolt Amperes Reactive (kVAR).

---

‘Real Power’ means the power component that can be used to perform real work, measured in kiloWatts (kW).

‘Riser’ means a Duct or raceway that begins at the Service Entrance and travels from there to each of the floors in the building and through which internal electrical distribution cabling is passed, or is to be passed.

‘SAE’ means the “Society of Automotive Engineers”.

‘Schedule 80’ means Schedule 80 PVC conduit, as per ASTM document D1785 and CSA document B137.3. A conduit’s schedule refers to the thickness of its walls and is a function of the conduit’s nominal diameter.

‘Sea Can’ (Intermodal Container) means a Customer supplied Weatherproof reusable metal box, made of corrugated steel, intended to be used in transporting goods on a ship, rail, or truck. Structures of this type generally do not have either a NEMA or CSA rating. In the context of this document, it can be used as a temporary portable enclosure.

‘Seal’ means a locking device to secure a meter or other service equipment against tampering by non-HOL personnel.

‘Sealing Ring’ – see definition of “Seal” and “Meter Ring”.

‘Secondary Metered Service’ means a connection whose meter point is located on the secondary side of a distribution transformer at a voltage less than 750V.

‘Secure Key Box’ – see “Lock Box”.

‘Self-Contained Meter’ means a meter which carries full load current and connects directly across full line voltage. Also called a “Direct-Connect Meter”.

‘Service’ – see definitions of “Service, supply” and “Service, consumer’s” in the OESC.

‘Service Box’ – see definition of “Service Box” in the OESC.

‘Service Entrance’ – see definition of “Service Box” in the OESC.

‘Service Size’ or “Service Entrance Size” – see definition of “Service Size” in HOL’s Conditions of Service, HOL document ECS0012.

‘SI System of Measure’ means the International System of Units, commonly referred to as the Metric System.

‘SLD’ means “Single Line Diagram”.

‘Smart Meter’ – see definition of “Smart Meter” in HOL’s Conditions of Service, HOL document ECS0012.
‘Standard HOL Padlock’ is a padlock that uses a 9.5 mm [3/8”] shackle; its manufacturer, model, and style is determined by HOL.

‘Standby Generator’ (see definition of “Back-Up Generator”) – see HOL document ECG0002.

‘Strut channel’ often referred to colloquially by one of several manufacturer trade names, (e.g. “G-STRUT”, “Flexstrut”, “Kindorf”, “Unistrut”, “SuperStrut”, “UltraSTRUT”, “Strut”, “Metstrut”, “JIKAstrut”), is a standardized formed structural system used in the construction and electrical industries for light structural support, often for supporting wiring, electrical, plumbing, or mechanical components.

‘Sub-Service’ – see definition of “Sub-Service” in HOL’s Conditions of Service, HOL document ECS0012.

‘Suite Metering’ – see definition of “Multiple Customer Metering Unit”.

‘Supply Point’ – see definition of “Supply Point” in HOL’s Conditions of Service, HOL document ECS0012.

‘Switchboard’ – see definition of “Switchboard” in OESC.

‘TAC’ means the Transportation Association of Canada.

‘TECK’ refers to a brand-name of flexible conduit. It consists of a flexible sheath surrounding a flexible steel conduit.

‘Temporary’ means any period of time up to one (1) calendar year, as defined in HOL’s Conditions of Service, HOL document ECS0012.

‘Test Switch’ means a device used to isolate voltage and current connections between a meter and external Instrumentation Transformers.

‘Three-Phase’ (also referred to as ‘3-Phase’) means a 60 Hertz (120π radians per second) alternating current system having three (3) distinct alternating voltages 120 electrical degrees between each phase, and three (3) distinct alternating currents 120 electrical degrees between each phase.

‘Total Losses’ means the sum of Distribution Losses and Unaccounted for Energy.

‘Transformer Rated Meter’ means a meter used in conjunction with Instrumentation Transformers, to measure high-voltage and/or high-current services. Also referred to as an “instrument rated meter”.

‘ULC’ means “Underwriters Laboratories Canada”.

‘Upgrade’ – see definition of “Upgrade” in HOL’s Conditions of Service, HOL document ECS0012.

‘UPS’ means “Uninterruptable Power Supply”.

‘Standby Generator’ (see definition of “Back-Up Generator”) – see HOL document ECG0002.

‘Strut channel’ often referred to colloquially by one of several manufacturer trade names, (e.g. “G-STRUT”, “Flexstrut”, “Kindorf”, “Unistrut”, “SuperStrut”, “UltraSTRUT”, “Strut”, “Metstrut”, “JIKAstrut”), is a standardized formed structural system used in the construction and electrical industries for light structural support, often for supporting wiring, electrical, plumbing, or mechanical components.

‘Sub-Service’ – see definition of “Sub-Service” in HOL’s Conditions of Service, HOL document ECS0012.

‘Suite Metering’ – see definition of “Multiple Customer Metering Unit”. 

‘Supply Point’ – see definition of “Supply Point” in HOL’s Conditions of Service, HOL document ECS0012.

‘Switchboard’ – see definition of “Switchboard” in OESC.

‘TAC’ means the Transportation Association of Canada.

‘TECK’ refers to a brand-name of flexible conduit. It consists of a flexible sheath surrounding a flexible steel conduit.

‘Temporary’ means any period of time up to one (1) calendar year, as defined in HOL’s Conditions of Service, HOL document ECS0012.

‘Test Switch’ means a device used to isolate voltage and current connections between a meter and external Instrumentation Transformers.

‘Three-Phase’ (also referred to as ‘3-Phase’) means a 60 Hertz (120π radians per second) alternating current system having three (3) distinct alternating voltages 120 electrical degrees between each phase, and three (3) distinct alternating currents 120 electrical degrees between each phase.

‘Total Losses’ means the sum of Distribution Losses and Unaccounted for Energy.

‘Transformer Rated Meter’ means a meter used in conjunction with Instrumentation Transformers, to measure high-voltage and/or high-current services. Also referred to as an “instrument rated meter”.

‘ULC’ means “Underwriters Laboratories Canada”.

‘Upgrade’ – see definition of “Upgrade” in HOL’s Conditions of Service, HOL document ECS0012.

‘UPS’ means “Uninterruptable Power Supply”.
‘Upstream’ – see definition of “Line Side”.

‘Utility Disconnect’ – see “DG System Fused Disconnect”.

‘Utility Side’ of a device – see definition of “Line Side”.

‘UV’ means “Ultraviolet light”.

‘Weatherproof’ means the building, structure, or object, is able to protect its contents from the effects of inclement weather, especially precipitation.
5.0 Metering Specification Fundamentals

5.0.1 This document outlines HOL’s Metering Specifications and practices regarding revenue metering and installations. It also details the responsibilities of HOL and the Customer.

This document is subject to change without notice to the Customer, with the most recent version available on HOL’s website – refer to HOL’s Conditions of Service, HOL document ECS0012, under ‘Contact Information’ for more information.

5.0.2 All installations referenced in this document shall comply with the requirements of the latest edition of HOL’s Conditions of Service, HOL document ECS0012, all applicable Provincial and Canadian Electrical Codes (including, but not limited to, the current edition of the Ontario Electrical Safety Code and Canadian Electrical Code), all other applicable federal, provincial, and municipal laws, by-laws, specifications, and codes. The work shall be conducted in accordance with the Ontario Occupational Health and Safety Act, HOL’s Engineering Specifications, and the EUSA Safe Practice Guide Rule Book. All references to the OESC and ESA Specifications are to the most current editions.

5.0.2.1 When all applicable codes, laws, and all applicable HOL documents and standards are silent, absent, or do not provide adequate direction, then any decision, review, or acceptance on any component, work, or installation used to satisfy the requirements of this document shall be subject to what HOL, at its determination, considers to be Appropriate.

5.0.3 The requirements described in this section apply to the entire document – metering requirements to a specific type of service may be found in the respective section of the document.

5.0.4 This document is not intended to serve as an instruction manual for the Customer. Customers using the information contained within this document bears the responsibility of its correct application.

5.0.5 It is the Customer’s responsibility to ensure that all of the Customer supplied and installed equipment meet the requirements of this document and comply with all applicable laws and codes, including the most recent edition of the OESC.

5.0.6 Performing planned work on metering, or ancillary, equipment may result in a short interruption to the customer’s service. HOL will attempt to notify the affected customer(s) as per HOL’s Conditions of Service, HOL document ECS0012, immediately before work begins.
5.0.7 This document primarily uses the SI System of Measure and includes equivalent dimension using the Imperial units of measure in square brackets. These are included as some equipment may only be available from the United States and have specifications provided by the manufacturer expressed in Imperial units.

5.0.7.1 When an exact conversion of Metric units of measure to Imperial units of measure (or vice-versa) does not bring additional clarity this document may use a less precise, but HOL accepted nominally converted value, when describing the installation or location of equipment. Manufactured product specifications are expressed using a precise conversion of units.

5.0.7.2 This document uses abbreviated forms for Metric units; this includes, but is not limited to, the following:

5.0.7.2.1 Use of ‘mm’ denotes length, in millimeters.
5.0.7.2.2 Use of ‘m’ denotes length, in meters.
5.0.7.2.3 Use of ‘km/h’ denotes speed, in kilometers-per-hour.
5.0.7.2.4 Use of ‘ºC’ denotes temperature, in degrees Celsius.

5.0.7.3 This document uses abbreviated forms of Imperial units (sometimes referred to as “United States Customary Units”); this includes, but is not limited to, the following:

5.0.7.3.1 Use of ‘ ’ denotes length, in inches.
5.0.7.3.2 Use of ‘ ’ denotes length, in feet.
5.0.7.3.3 Use of ‘mph’ denotes speed, in miles-per-hour.
5.0.7.3.4 Use of ‘ºF’ denotes temperature, in degrees Fahrenheit.

5.0.7.4 This document uses ‘Y’ to denote the line-to-line (sometimes referred to as ‘phase-to-phase’) potential difference between two different phases, of a 3-Phase grounded-WYE circuit; expressed in Volts.

5.0.8 To ensure compliance with the most current edition of HOL’s Metering Specifications, the Customer should consult with HOL’s Metering Services prior to commencing any electrical work on revenue metering installations. HOL assumes no responsibility, in any event, when this is not followed.

5.0.9 A definition of terms used in this document is available in Section 4.0 of this document and also in Section 4 of HOL’s Conditions of Service, HOL document ECS0012, and can be viewed on HOL’s Web Site at www.hydroottawa.com. Customer, as used in this document, is interchangeable with an owner or developer.

5.0.10 Individual metering is available to all buildings with more than one (1) self-contained residential unit to promote equity in metering and to encourage energy efficiency.

Note: This shall not be applicable to dwelling units used for short-term occupancy, such as trailer parks, hotels, motels, rooming houses, and short-term occupancy apartments. Further, owners shall be responsible for the Practical separation of loads, or common loads, within the individual units.
5.0.11 All equipment installed to satisfy the requirements of this document shall be approved by the ESA, CSA, or ULC and shall carry the markings of the approving organization.

At HOL’s determination, equipment used to satisfy the requirements of this document that has not been approved by the ESA, CSA, or ULC may not be permitted and shall be replaced with equivalent approved by the ESA, CSA, or ULC.

5.0.12 Unless noted otherwise, all mechanical fasteners including bolts, nuts, washers, spacers, etc., used to fulfill the requirements of this document shall meet, or exceed, SAE Grade 5 specifications as per SAE J429-1999.

5.0.13 All customer constructed structures (used in conjunction with HOL revenue metering or ancillary equipment) that do not adhere to accepted construction or industry standards, statutes, or codes shall be reviewed and approved by a Professional Engineer, prior to energization, at the customer’s cost. The intent is to verify the customer constructed structure has adequate strength and to ensure the structure can endure typical conditions for the duration of its useful life.

5.0.14 No HOL revenue metering equipment shall be installed in a location that would present a hazard to a Meter Technician while performing HOL required work. Examples of unsuitable locations includes, but it not limited to, installing HOL revenue metering equipment over top a window well, overtop HVAC equipment, behind locked gates or fences that are not reasonably accessible by HOL personnel, in the proximity of equipment that may start or stop without warning, or any horizontal surface.

5.0.15 Where one (1) Service Entrance provides service to a number of units, as in row housing, the Service Entrance shall be installed in a public area. The Service Entrance equipment shall not be installed in a private apartment or private basement.

5.0.16 HOL supplied revenue metering, and HOL supplied ancillary, equipment, enclosure, or cabinet, shall not be installed any closer than 1000 mm [3’ 4"] of horizontal distance to any Gas related equipment. This requirement exceeds the requirements of Rule 2-324 of the OESC.

5.0.16.1 In the event that Propane related equipment is involved, this clearance shall be extended to a minimum of 3000 mm [10'] of horizontal distance as per the recommendation of CSA.

5.0.17 Should metering be requested to be installed on the side of a residence that faces a driveway separating the residence from its neighbour, the request shall be subject to all of the following:

5.0.17.1 If the driveway is not shared between by the Customers of both residences, and the driveway is consistently a minimum of 3000 mm [10'] wide along its entire length (as shown in Schedule 9 of this document), the meter may be mounted on the side of the residence, of the Customer who owns the driveway, on the side that faces the driveway.
5.0.17.2 If the driveway is shared by the Customers of both residences, and the driveway is consistently a minimum of 3000 mm [10'] wide but less than 3600 mm [12'] wide along its entire length (as shown in Schedule 10 of this document), the meter may be mounted on the side of the residence that faces the shared driveway, of the Customer who makes the request to HOL first.

5.0.17.3 If the driveway is shared by the Customers of both residences, and the driveway is consistently a minimum of 3600 mm [12'] wide along its entire length (as shown in Schedule 11 of this document), the meter may be mounted on the side of both residences that faces the shared driveway.

5.0.18 All Customer electrical installations shall meet HOL’s requirements and shall also be inspected and approved by the ESA. Before the revenue metering equipment can be energized, HOL requires notification from ESA (in the form of an ESA Connection Authorization Certificate, as per HOL’s Conditions of Service, HOL document ECS0012, signifying their completed inspection and approval prior to the installation of HOL supplied revenue metering and supporting ancillary equipment.

5.0.19 HOL revenue metering equipment shall not be energized until an ESA Connection Authorization Certificate has been received by HOL that accurately reflects the service being energized, including the service address (as it appears in HOL’s records), voltage, and Ampacity of the service, and any de-rated protective equipment.

5.0.19.1 HOL shall not energize any service whose ESA Connection Authorization Certificate is not as accurate as Practicable; refer to HOL document ECS0012 for more information.

5.0.20 Work performed on services, in close proximity to the service’s Demarcation Point (see Section 6.3 and Section 6.4 of this document for more information on determining the location of the Demarcation Point), that require an ESA permit or services that have been de-energized for a period of six (6) months or longer, regardless of reason, shall be reviewed by HOL to ensure compliance to current HOL standards and shall also require ESA re-inspection and approval prior to reconnection; exemptions to this clause is restricted to the following:

5.0.20.1 **On Residential Single Residence Services Only:** If the rectangular meter base is already mounted at an outdoor location at the residence that is deemed safe by HOL, and is both accessible and serviceable by HOL personnel, and if the scope of work is restricted to the replacement of the Service Entrance disconnect itself on 120V/240V, 1-Phase, 3-Wire individual residential service, that uses Self-Contained Metering, HOL may not require the Customer to meet the requirements of the most current revision of this document.
5.0.21 Work performed on services that require an ESA permit or services that have been disconnected for a period of six (6) months or longer, regardless of reason, shall be reviewed by HOL to ensure that the revenue metering equipment is compliant to current Measurement Canada and HOL metrology standards.

5.0.21.1 This includes, but is not limited to, the replacement of obsolete metering, including the replacement of 2.5-Element metering with 3-Element metering as per Measurement Canada document E-24.

5.0.21.2 This includes, but is not limited to, the replacement of non-standard and/or obsolete services and equipment as per Appendix G of HOL’s Conditions of Service, HOL document ECS0012.

5.0.22 HOL owned metering equipment used for revenue purposes shall not cover more than one (1) clearly defined area, such as a residential unit or commercial space. Conversely, more than one (1) revenue meter may not service a clearly defined area simultaneously. An individual building, unit, bay, or apartment shall constitute a clearly defined area. The only exception for a revenue meter covering more than one (1) clearly defined area shall be if HOL designates it to be a “public” or “common” area. Only one (1) public meter and Service Entrance voltage per building shall be permitted without the express consent of HOL.

5.0.22.1 The purpose of this regulation is to ensure that HOL revenue meters accurately measure the Customer’s consumption and bills each Customer for electrical energy from the Customer’s own revenue meter. The Customer shall be responsible for the Practical separation of loads in a multiple unit dwelling and commercial space.

5.0.22.2 Unless noted otherwise, all HOL revenue metering equipment shall be installed immediately next (or as close as Practicable) to, and within easy and obvious sight of, the Service Entrance disconnect it takes supply from.

5.0.22.3 Unless noted otherwise, HOL owned revenue metering for commercial services shall use Cold Metering; HOL owned revenue metering for residential services shall use Hot Metering.

5.0.23 All disconnection devices electrically connected Upstream of any HOL revenue metering, or ancillary equipment, shall have provisions permitting it to be securely locked in the “open” position with a Standard HOL Padlock. This shall include, but be not limited to, switches, disconnects, and breakers.

The intent is to provide for a disconnection device, that can be locked in the “open” position with a Standard HOL Padlock, that can de-energize and isolate HOL revenue metering, and ancillary, equipment.

5.0.24 Metering shall be installed at the utilization voltage. Primary metering may be allowed on strictly commercial and industrial services and only in limited special circumstances (including, but not limited to, campus metering and rock quarries) subject to the HOL Distribution Design Department and HOL Metering Services.
5.0.25 The location of the Service Entrance point (or main Service Entrance equipment) and all revenue metering, and ancillary, equipment shall be established through consultation with HOL; refer to HOL document ECS0012 for more information.

5.0.25.1 Unless noted otherwise there shall be a minimum of 1500 mm [5'] of horizontal and vertical clearance in front of all Service Entrance apparatuses, disconnection switches, and revenue metering apparatuses and shall be kept free of any obstructions at all times, permitting easy and obvious access for authorized personnel.

5.0.25.2 Unless noted otherwise the area of the finished grade, or floor, immediately in front of all Service Entrance apparatuses, disconnection switches, splitter troughs, and revenue metering equipment shall be as level as Practicable for the entire width of the equipment and the entire extent of the clearance specified in this document.

5.0.25.2.1 The intent is to create a safe surface from which to perform work and operate electrical equipment.

5.0.25.3 If an Instrumentation Transformer cabinet is required, the meter socket base may be positioned either directly above the Instrumentation Transformer cabinet or offset to the immediate left or right of the Instrumentation Transformer cabinet. In all cases, the Instrumentation Transformer shall remain within easy and obvious sight of the meter socket base.

5.0.26 For both primary and secondary services in all Customer classes, HOL shall designate a Supply Point at a nominal service voltage. In all cases, HOL shall decide the location of the ownership point, Demarcation Point, or Supply Point.

5.0.27 Unless noted otherwise or in the absence of explicit HOL authorization, no Customer owned equipment shall be connected to any internal part of HOL owned revenue metering circuitry.

5.0.28 Unless noted otherwise or in the absence of explicit HOL authorization, no Customer owned equipment shall be installed Upstream of HOL revenue metering equipment.

5.0.28.1 Exceptions are made at HOL’s determination; may include, but is not limited to, Customer owned transformation, Customer owned disconnects for the purposes of Cold Metering, and services for Fire Pumps.

5.0.29 The Customer shall not install or operate equipment that interferes with the safety, operation, or accuracy of HOL owned revenue metering and HOL owned ancillary, equipment.

5.0.30 Normally HOL does not permit Customers to remove HOL installed seals. If removed, this can allow protective covers to be opened exposing the Customer to hazardous voltages inside the Service Entrance main disconnect/breaker or splitter trough. The Customer shall not remove the HOL installed seals on their meters or Instrumentation Transformer cabinets/enclosures.
5.0.31 Only a HOL employee, agent, or another person lawfully entitled to do so on HOL’s behalf, may conduct work on HOL revenue metering equipment. No Customer shall remove, connect, alter, repair, inspect, or tamper with HOL’s revenue metering equipment or seals except where noted in Section 5.0.30 and Section 5.0.32 of this document.

5.0.31.1 Customers conducting Maintenance on their electrical systems and require the seals to be cut (unless noted otherwise in this document), or meters removed, shall contact HOL Metering Services to make arrangements for a Meter Technician to remove the seals or meters and to later return to re-install the meters and apply new seals as required.

5.0.32 The Customer shall notify HOL Metering Services as soon as Practicable with the type of equipment, Customer’s name, service address, the date the Seal was cut or when the Seal was noticed to be missing. HOL shall dispatch a Meter Technician, as soon as Practicable to re-inspect the service and, if found satisfactory, install new seals as needed. This shall be done in the event that the Customer does any of the following:

5.0.32.1 Removes one (1), or more, HOL installed seals to gain access to replace blown or damaged fuses in the Service Entrance main disconnect or to access the interior of a splitter trough that contains conductors on the Line Side of the meter.

5.0.32.2 Notices that one (1), or more, HOL installed seals on their equipment (including, but not limited to, meters socket bases, Instrumentation Transformer cabinets, metering communication equipment enclosures, primary disconnects/breakers enclosures, splitter troughs, etc.) have been removed or have become damaged such that they no longer effectively Seal the equipment they are attached to.

5.0.33 All utility revenue metering equipment shall remain in HOL’s ownership, regardless of any and all charges levied by HOL to the Customer, for the procurement and installation of: Instrumentation Transformers, secondary wiring, test links, Test Switch, fuses, fuse block, meter protection boxes, data recorders, telecommunication equipment, or meters, required for revenue metering.

5.0.34 All Customer supplied and installed Meter Sockets shall be compatible with Sealing Rings in use by HOL as a means of sealing the meter to the Meter Socket base. Refer to Table 1, Table 1A, Table 2, Table 3, Table 4, Table 5, Table 5A, Table 5B, Table 7, Table 8, Table 9, Table 10, and Table 11 at the end of this document for requirements, specifications, and lists of HOL approved Meter Socket bases.

5.0.35 HOL encourages the Customer institute a preventative maintenance and inspection program on their equipment that is used in conjunction with HOL owned revenue metering, and ancillary, equipment. The intent is to ensure the customer owned equipment is kept in proper working to order to avoid outages or damaging HOL owned revenue metering equipment due to failure of their equipment.
5.0.36  All electrical outlets installed to meet the requirements of this document installed in an outdoor location, exposed to outdoor elements, or are installed in a location that is easily accessible from an outdoor location shall have factory installed GFCI capability as per OESC.

5.0.37  In this document:

5.0.36.1  Headings, paragraph numbers and underlining are for convenience only and do not affect the interpretation of this document.

5.0.36.2  Words referring to the singular include the plural and vice versa.

5.0.36.3  A reference to a document or a provision of a document includes any amendment or supplement to, or any replacement of, that document or provision of that document.

5.1  Metering Enclosures and Cabinet Construction Requirements

5.1.1  Unless noted otherwise, all metering enclosures and cabinets:

5.1.1.1  Shall be mounted on a Permanent vertical surface (i.e. a Permanent wall) such that it is as level and plumb as Practicable. The finished grade, or floor, immediately in front of the enclosures and cabinets shall be as level as Practicable as per Section 5.0.25.2 of this document.

5.1.1.2  Shall be mounted such that it does not encroach on any of a building’s doors, windows, air-conditioning equipment, vent, exhaust stack, exhaust vent, fresh-air vent, or connections for fire-fighting equipment. There shall be a minimum of 1000 mm [3’ 4"] of horizontal clearance between the meter equipment and any of the building’s doors, windows, vent, stack, or connections for fire-fighting equipment.

5.1.1.3  Shall be mounted in a location where there is a minimum of 1500 mm [5’] of horizontal and vertical clearance in front of it. This is to provide ample space for a person to walk in front of the enclosure when its doors are locked in the open position unimpeded.

5.1.1.3.1  Shall be mounted such that access to the metering, or ancillary, equipment does not become impeded while the entrance door (to the room or area the enclosure is installed) is open. Further, it shall be mounted such that the entrance door cannot make contact with the metering equipment enclosure doors when they are operated. The intent is to:

5.1.1.3.1.1  Allow the entrance door to be open while performing work on the metering equipment simultaneously.
5.1.1.3.1.2 Allow any revenue metering enclosure door to be operated regardless if the entrance door is open or closed.

5.1.1.3.1.3 Prevent workers from accidentally being pushed into the revenue metering enclosure, by the entrance door, while performing work on the metering equipment.

5.1.1.3.1.4 Allow the worker, at their discretion, to leave the entrance door open while performing work on the metering equipment.

5.1.1.4 Unless noted otherwise, the top of the enclosure shall not be higher than 1830 mm [6'] above finished grade.

5.1.1.5 If the enclosure uses Mullion(s) as part of its construction, then all of the following shall apply:

5.1.1.5.1. If disconnect(s) are installed within the enclosure, they shall be placed such that none the Mullion(s) limit the accessibility, visibility, or operability of the disconnect(s). The intent is for none of the Mullion(s), while installed in the enclosure, not to restrict the operation of any of the disconnect(s) or impede verifying the state of any of the disconnect(s).

5.1.1.5.2. If revenue metering equipment is installed within the enclosure, they shall be placed such that the whole of the face of the meter is easily and obviously visible. The intent is for none of the Mullion(s), while installed in the enclosure, to obstruct the face of the meter or impede the use of any controls present on the face of the meter.

5.1.1.5.3. If the Mullion(s) can be temporarily removed, it shall be such that it can be removed by a single HOL Meter Technician using only tools they are equipped with.

5.1.1.5.4. If the Mullion(s) can’t be temporarily removed, the equipment installed in the enclosure shall be placed such that none of the Mullion(s) reduce the accessibility, operability, or serviceability of the equipment installed in the enclosure.

5.1.1.6 Shall not be recessed into the Permanent wall it is mounted on to aid in making the meter, and supporting structures, readily visible and to facilitate Maintenance for HOL personnel. Meters may be out of roadside visibility if the building that the meter is mounted on is considered a significant heritage building under the Ontario Heritage Act, as per HOL’s Conditions of Service, HOL document ECS0012.
5.1.1.7 Shall not be mounted in a location that may become encroached upon by the installation of other equipment in such a way that it violates the requirements of this document or creates an unsafe environment for HOL employees while performing work on the enclosure.

5.1.1.8 Shall be constructed using a minimum of:

5.1.1.8.1 All outdoor metering pedestals, as per HOL Specification MCS0043, shall be comprised of minimum #14 AWG sheet metal.

5.1.1.8.2 All NEMA rated enclosures and cabinets shall be comprised of minimum #16 AWG sheet metal unless noted otherwise.

5.1.1.9 With the exception of Meter Socket bases and disconnect switches, all enclosures shall come equipped with factory installed back plate or mounting plate, composed of a minimum of #16 AWG sheet metal, shall be used to mount all equipment installed inside the enclosure. It shall be secured to the enclosure with either Appropriately sized nuts with lock washers or “posi-lock” nuts with flat washers and:

5.1.1.9.1 Using no less than four (4) factory installed posts (located at the corners of the back plate or mounting plate, as shown in Figure 5 or Figure 9) for enclosures (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] or smaller.

5.1.1.9.2 Using no less than six (6) factory installed posts (located along the edge of the back plate or mounting plate, as shown in Figure 6 or Figure 10) for enclosures larger than (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"].

5.1.1.10 Shall be painted with grey baked enamel, as close as Practicable to colour ASA 61 [RGB # 129, 134, 130] as defined in ASTM document D1535. This colour is also referred to as ANSI 61.

5.1.1.11 Shall come with factory installed hardware allowing the cabinet to be locked against unauthorized access. It shall be such that it allows for at least one of the following, whichever is more Appropriate:

5.1.1.11.1 A single Standard HOL Padlock.
5.1.1.11.2 A polished steel bar, [2-3/8" or 3"] in length, that permits two padlocks to be used to secure the cabinet: a Standard HOL Padlock and the Customer’s padlock. The intent of using a bar is to permit access by both HOL personnel and the Customer. Both the locking hardware and bar shall have sufficient strength as to prevent unauthorized access and be such that it can accommodate a Standard HOL Padlock.

Note: The use of plastic latches or plastic locking mechanisms to satisfy this requirement shall not be permitted.

5.1.1.12 Shall be bonded to ground by a Customer supplied ground conductor connected to the service’s main grounding point using an Appropriately sized conductor, regardless if EMT conduit is used. It shall be done as per both ESA and OESC requirements. This conductor shall also be used by HOL Metering Technicians as a reference point when using a multi-meter to measure for voltage. The conductor shall be enclosed in a green-coloured insulative jacket.

5.1.1.13 All enclosures mounted in an outdoor location or in a location that will be subjected to the outdoor elements, shall be subject to all of the following:

5.1.1.13.1 All Meter Socket bases shall meet, or exceed, the requirements of either NEMA Type 3 or NEMA Type 3R specifications, whichever is more Appropriate.

5.1.1.13.2 Unless noted otherwise, all outdoor mounted disconnects shall meet the requirements of either NEMA Type 4 or NEMA Type 4X specifications (whichever is the most Appropriate). Disconnects mounted inside an enclosure shall be exempt from this requirement.

5.1.1.13.3 All splitter troughs shall meet, or exceed, the requirements of either NEMA Type 3 or NEMA Type 3R specifications, whichever is more Appropriate.

5.1.1.13.4 All other enclosure types shall meet, or exceed, the requirements of NEMA Type 4 or NEMA Type 4X specifications (whichever is the most Appropriate) if any of the following occurs:

5.1.1.13.4.1 The enclosure will be installed in an outdoor location or in a location that will allow it to be exposed to outdoor elements.
5.1.1.13.4.2 The enclosure will be installed in a location that will allow it to be exposed to corrosive substances including, but not limited to, those used as winter-time roadway and pathway treatments.

5.1.1.13.4.3 The enclosure will be installed in a location that will allow it to be exposed to a corrosive environment (areas where the atmosphere contains one, or more, corrosive substances) which includes, but is not limited to, any of the following:

   i) Indoor or outdoor recreational pools
   ii) Potable or waste water storage, treatment, or dispensary facilities
   iii) Commercial car washes
   iv) Animal feces processing, storage or dispensary facilities
   v) Fertilizer manufacturing, processing, storage, or dispensary facilities
   vi) Cement manufacturing, processing, storage, or dispensary facilities
   vii) Fossil fuel manufacturing, processing, storage, or dispensary facilities
   viii) Any area exposed to spray from a roadway or highway
   ix) Any marine environment
   x) Any environment with high humidity
   xi) Any environment that can encourage, accelerate, or cause adverse electro-chemical or galvanic effects

5.1.1.13.4.4 HOL, at its determination, deems it necessary.

5.1.1.14 All enclosures mounted in an indoor location, or within an outdoor rated enclosure, shall be subject to all of the following:

5.1.1.14.1 Enclosures installed in a location that meets any of the requirements Section 5.1.1.13.4 shall meet the requirements of Section 5.1.1.13.4 of this document.

5.1.1.14.2 All Meter Socket bases shall meet, or exceed, the requirements of either NEMA Type 3 or NEMA Type 3R specifications.
5.1.1.14.3 All Meter Centres, Instrumentation Transformer enclosures, disconnection switch enclosures, and splitter troughs mounted in a location that will not be subject to a fire suppression system (including, but not limited to, sprinkler systems) shall meet, or exceed, the requirements of NEMA Type 1 specifications.

5.1.1.14.4 All Meter Centres, Instrumentation Transformer enclosures, disconnection switch enclosures, and splitter troughs mounted in a location that will be subject to a fire suppression system shall meet, or exceed, the requirements of NEMA Type 3 or NEMA Type 3R specifications, whichever is more Appropriate.

5.1.1.14.5 All other enclosures, unless noted otherwise shall meet, or exceed, the requirements of either NEMA Type 3 or NEMA Type 3R specifications, whichever is more Appropriate.

5.1.1.15 If a ganged meter trough is used, the Customer shall use only the factory installed Meter Sockets it was manufactured with. Further, the Customer shall not modify it so it can accommodate more Meter Sockets than it was manufactured for.

5.1.1.16 If a splitter trough is used, the number of secondary sub-services that can take supply from it shall be subject to ESA approval.

5.1.1.17 All enclosures intended to be mounted outdoors, with the exception of Meter Socket bases and combination base metering enclosures, require a factory installed drip-cover to be installed over all operable doors.

5.1.1.18 All hinged doors shall be factory installed, with welded hinges, and be capable of opening outward at least 90 degrees with respect to the enclosure.

5.1.1.19 All hinged doors shall be electrically bonded to the enclosure with either a #10 AWG or #12 AWG stranded Copper conductor that is either bare or has a green coloured insulative jacket, using factory installed posts or studs. This shall be done in such a way that it does not interfere with the operation of the hinged door.

5.1.1.20 The back plate or mounting plate of the enclosure shall be electrically bonded to the enclosure using either #10 AWG or #12 AWG stranded Copper conductor that is either bare or has a green coloured insulative jacket, using factory installed posts or studs.
5.1.1.21 If an individual space within enclosure is covered by two (2), or more, doors, then one (1) of them shall have a factory formed, or welded, tongue in which the other door(s) rest in when all of the doors have been closed and locked. This shall be manufactured in such a way that an object cannot be inserted into the enclosure between any two (2) closed doors.

5.1.1.22 Enclosures shall also be equipped with a door stop capable of holding the door in the open position preventing it from being accidentally closed.

5.1.1.23 The enclosure shall be installed in the orientation it was designed for. Further, all hinged enclosure doors shall be operated by swinging from left-to-right or from right-to-left; doors that operate from top-to-bottom or bottom-to-top shall not be permitted. While the enclosure door is in the “open” position, it shall not limit the accessibility or serviceability of the equipment contained inside the enclosure.

5.1.1.24 Enclosures that have been altered by the Customer may be deemed incongruous by HOL at its determination. This includes any action that reduces the NEMA, or CSA, rating of the enclosure and includes installation of additional hardware that has been fastened, welded, or soldered to the enclosure by the Customer.

5.1.2 Unless otherwise noted, all additional enclosures to be mounted inside an existing approved enclosure, shall be subject to all of the following:

5.1.2.1 All additional enclosures shall meet, or exceed, the requirements of Section 5.1 of this document.

5.1.2.2 The exterior wall of all additional enclosures shall be mounted no closer than 100 mm [4"] to the interior wall of the larger enclosure.

5.1.2.3 The serviceability of the smaller enclosure, including the operation and accessibility of all doors and access panels shall not be hindered by any part (including, but not limited to, the larger enclosure’s location, doors, or Mullion) of the larger enclosure it resides within.

5.1.3 Unless noted otherwise, all disconnection switch enclosures shall be subject to all of the following:

5.1.3.1 The disconnection switch shall be mounted such that the top of its enclosure shall be not more than 1830 mm [6’] above finished grade or finished floor.

5.1.3.2 The disconnection switch shall be mounted such that the top of its enclosure shall be not less than 1200 mm [4’] above finished grade or finished floor. The intent is to allow a person to operate the device as safely and easily as possible.
5.1.4 If any of the doors, locking hardware, or exterior of an enclosure that meets, or exceeds, the requirements NEMA Type 3, NEMA Type 3R, NEMA Type 4, or NEMA Type 4X specifications have been damaged, the enclosure shall be considered de-rated from its original NEMA specification.

If the enclosure’s installation was to satisfy the requirements of this document, the Customer shall undertake one of the following:

5.1.4.1 Replace the damaged enclosure with an undamaged enclosure.

5.1.4.2 Repair the enclosure, as per the manufacturer’s directions, restoring the enclosure to its factory NEMA rating. The repairs shall be to the satisfaction of HOL.

5.1.4.3 Repairs the enclosure and provides documentation, that has been signed and sealed by a Professional Engineer, documenting the nature of the damage, the nature of the repairs, and provides verification that the enclosure’s factory NEMA rating has been restored. Both the repairs and documentation shall be to the satisfaction of HOL.

5.1.4.4 Repairs the enclosure to the satisfaction of HOL.

5.1.5 The installation of Service Entrance equipment, Meter Sockets, or enclosures used to house revenue HOL owned metering equipment on to a HOL owned pole shall not be permitted with the following exceptions:

5.1.5.1 The installation of HOL owned metering, and ancillary, equipment installed as part of an HOL approved equipment trial, as per HOL documents ECS0012, ECS0023, and ECS0034 shall be exempt. This metering equipment shall be installed between the ‘Telecom’ space and ‘Power’ space on the utility pole and within easy and obvious sight of the load being supplied.

As an alternative to installing the metering equipment on a HOL owned pole, refer to HOL specification MCS0074 for more information on revenue metering installations used in conjunction with a HOL approved equipment trial.

5.1.5.2 The installation of HOL owned metering, and ancillary, equipment installed as part of an HOL wholesale metering point shall be exempt.

5.1.5.3 The installation of HOL owned metering, and ancillary, equipment installed to detect diversion of power shall be exempt.
5.1.6 The installation of Service Entrance equipment, Meter Sockets, or enclosures, for use by HOL revenue metering equipment on a Customer owned pole shall be subject to all of the following:

5.1.6.1 The service’s eligibility to install HOL revenue revenue metering equipment onto the Customer owned pole shall be made at HOL’s determination.

5.1.6.2 Services that used in conjunction with ERF are not eligible.

5.1.6.3 The installation of HOL revenue revenue metering on a Customer owned pole shall be permitted only for:

5.1.6.3.1 A single 120V/240V, 1-Phase, 3-Wire Service Entrance with a nominal Ampacity of up to, and including, 200A.

5.1.6.3.2 A single 120V/208Y or 347V/600Y, 3-Phase, 4-Wire Service Entrance with a nominal Ampacity of up to, and including, 200A.

5.1.6.4 The installation of a ganged metering trough, splitter trough, or metering centre on a Customer owned pole, for use by HOL revenue metering, shall not be permitted.

5.1.6.5 The pole’s specifications, method of installation, and the method used attach enclosures and equipment to the pole shall meet the requirements of the OESC and shall be to the satisfaction of HOL.

5.1.6.6 No enclosure or equipment shall be mounted on the pole such that it extends past the top of the pole.

5.1.6.7 All enclosures shall be grounded as per OESC and HOL requirements. The intent is to ensure the outside of the enclosure is touch safe.

5.1.6.8 Unless noted otherwise, all enclosures used to house metering equipment and Instrumentation Transformers shall have provisions for lighting (as per Section 5.3.1.12 of this document), heat (as per Section 5.3.1.13), and 120V / 15A convenience outlet (as per Section 5.3.1.19).

5.1.6.8.1 Combination meter socket bases and enclosures that contain only the revenue meter (with Instrumentation Transformer(s)) shall be exempt from this requirement.

5.1.6.9 Overhead services shall meet the requirements of Section 10.2 of this document.

5.1.6.9.1 Overhead services shall use a Meter Socket that meets the requirements of Table 1 of this document.
5.1.6.9.2 Refer to HOL specifications MCS0070 and MCS0072 for more information.

5.1.6.10 Underground 1-Phase services shall meet the requirements of Section 10.4 of this document.

5.1.6.10.1 Underground 1-Phase services shall use a Meter Socket that meets the requirements of Table 1A of this document.

5.1.6.10.2 Refer to HOL specifications MCS0069 and MCS0071 for more information.

5.1.6.11 Underground 3-Phase services shall meet the requirements of Section 10.10 of this document.

5.1.6.11.1 Underground 3-Phase services shall use a Meter Socket that meets, or exceeds, the requirements of Table 5 of this document.

5.1.6.11.2 Refer to HOL specification MCS0073 for more information.

5.2 Metering Conduit Requirements

5.2.1 Unless noted otherwise, all conduits used as part of a metering installation:

5.2.1.1 A single conduit run shall not house both metered and unmetered conductors (i.e. conductors used to connect revenue Instrumentation Transformers, as part of the revenue metering equipment, to HOL owned revenue metering equipment and conductors used to supply power to the Customer). Metered conductors shall be housed in a separate dedicated conduit for its exclusive use.

5.2.1.2 All metal conduits shall be bonded to ground as per both ESA and OESC requirements.

5.2.1.2.1 This requirement shall not apply to secondary service masts, installed as part of the Customer’s Service Entrance, to accept supply from an overhead source.

5.2.1.3 All conduits that enter, or exit, a NEMA, CSA, or ULC rated enclosure shall do so in such a way that doesn’t de-rate the enclosure’s NEMA, CSA, or ULC rating.

5.2.1.4 It is recommended that all metering conduit be stopped with fire-stop caulking, as per ANSI specification 1479.

5.2.1.5 All revenue metering conduits shall incorporate no more than three (3) 90-degree bends or 90-degree fittings per run.
5.2.1.6 Unless noted otherwise, all metering conduit shall be 25 mm [1"] in diameter if it encloses conductors for a 1-Phase service and is less than 20 m [65'] in length.

5.2.1.7 Unless noted otherwise, All metering conduit shall be 30 mm [1-1/4"] in diameter if it encloses conductors for a 3-Phase service and it less than 20 m [65'] in length or if it encloses conductors for a 1-Phase service and is longer than 20 m [65'] but less than 30 m [100'] in length.

5.2.1.8 Unless noted otherwise, all metering conduit shall be 40 mm [1-1/2"] in diameter if it encloses conductors for a 3-Phase service and is longer than 20 m [65'] but less than 30 m [100'] in length.

5.2.1.9 All metering conduit shall be not longer than 30 m [100'] in total length in a single run for a revenue metering point.

5.2.1.10 For non-distributed generation applications, all indoor mounted revenue metering conduits shall be EMT and continuous in length (i.e. it shall not use any unnecessary splice fittings along its run).

5.2.1.11 For distributed generation applications, all indoor conduits that enter or exit an enclosure containing metering equipment shall be EMT. All other indoor conduit may be either TECK or EMT. In either case, all conduit shall be continuous in length (i.e. it shall not use any unnecessary splice fittings along its run).

5.2.1.12 All outdoor revenue metering conduits shall be PVC and continuous in length (i.e. it shall not use any unnecessary splice fittings along its run).

5.2.1.12.1 This requirement shall not apply to secondary service masts, installed as part of the Customer’s Service Entrance, to accept supply from an overhead source; refer to OESC, Specification 28, for mast requirements.

5.2.1.13 All PVC revenue metering conduits shall be a minimum of Schedule 80. It’s diameter to be sized according to ESA and OESC requirements.

5.2.1.14 When PVC revenue conduit enters a Permanent structure, it shall transition from PVC to EMT at a point closest to the indoor side of the exterior wall as Practicable.

5.2.1.15 All PVC revenue conduits, including residential frost-pulls, shall be mounted with provisions to allow for linear expansion due to temperature changes, as per ESA and OESC requirements.

5.2.1.16 For revenue meters mounted indoors, only EMT conduit shall be used to house conductors entering or exiting an enclosure used to house metering equipment.

5.2.1.17 All TECK conduits shall have its diameter sized as per ESA and OESC requirements.
5.2.1.18 All TECK conduits shall have a UV rated sheath and steel core.

5.2.1.19 All EMT and PVC conduit shall terminate at an enclosure with Appropriate NEMA rated fittings and bushings.

5.2.1.20 All TECK conduits shall terminate at an enclosure with Appropriately sized Liquatite fittings.

5.2.1.21 All newly installed empty metering conduits shall have an industrial-grade polypropylene rope, 6 mm [1/4”] in diameter or more, fished through it in conduit runs longer than 5800 mm [20’]. The rope shall be of sufficient strength to pull conductors through the conduit prior to the installation of metering equipment.

5.2.1.22 Unless noted otherwise all conduit entering, or exiting, a 13-Jaw meter socket base (used for 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, >200A services) shall do so using the factory manufactured knock-outs located on the bottom-half of the meter socket base.

5.2.1.2.1 Conduit entering, or exiting, the meter socket base from the 'top portion of a 13-jaw meter socket base shall not be permitted; this includes the top side of the meter socket base and the upper portions of the sides of the meter socket.

5.3 Electrical Room Requirements

5.3.1 Unless noted otherwise all indoor rated revenue metering equipment, that is not mounted inside a Weatherproof cabinet or enclosure, shall be installed in an electrical room, the electrical room:

5.3.1.1 Shall be located indoors, inside a Permanent Customer built structure that meets the requirements of the OBC, except where noted otherwise. The use of “Sea Can” shipping containers as an electrical room for a Permanent service shall not be permitted.

5.3.1.2 The Customer shall submit to HOL for their review, a detailed proposed layout, with dimensions including width and height, prior to the start of construction, renovation, or modification of their electrical room.
5.3.1.3 Where Practical, an outside fire-rated door shall provide secure access from the outdoors. Otherwise, a fire-rated doorway shall provide for secure access from a public area and must not connect to an adjoining room.

5.3.1.4 Unless noted otherwise, all electrical rooms used as part of the building’s electrics shall be physically part of the building being served.

5.3.1.5 Shall be such that it cannot become a ‘Confined Space’ as defined by both OHSA and HOL.

5.3.1.6 Customers shall provide access to their electrical rooms to HOL personnel as per HOL’s Conditions of Service, HOL document ECS0012.

5.3.1.7 The entrance door for electrical rooms that contain multi-position metered services shall be equipped with a dual locking system acceptable to HOL, or Secure Key Box (also known as a “Lock Box”) as per HOL’s Conditions of Service, HOL document ECS0012, such that both HOL and Customer may have access to their meter or equipment. The locking system shall conform to one of the following:

5.3.1.7.1 Electrical rooms with an entrance accessible from the outdoors, HOL shall supply, and the Customer shall install:

5.3.1.7.1.1 A Secure Key Box adjacent to the electrical room’s entrance. Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

5.3.1.7.1.2 A Secure Key Box that is accessible via a Customer provided combination, installed elsewhere on the Customer’s premise. Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

5.3.1.7.2 Electrical rooms with an entrance accessible only from inside the building, HOL shall supply, and the Customer shall install either:

5.3.1.7.2.1 A Secure Key Box adjacent to the proposed “public” building entrance door. Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

5.3.1.7.2.2 A Secure Key Box that is accessible via a Customer provided combination, installed elsewhere on the Customer’s premise. Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.
5.3.1.7.3 A polished steel bar, [2-3/8" or 3"] in length, that permits two padlocks to be used to secure the cabinet: a Standard HOL Padlock and the Customer’s padlock.

5.3.1.8 Shall be kept locked at all times, preventing access by unauthorized personnel.

5.3.1.9 Shall be maintained by the Customer and reserved for the sole purpose of the electrical equipment that it contains and shall not contain equipment foreign to the electrical installation. The electrical room shall also be kept as clean and tidy as Practicable, providing a clear, unobstructed, and safe working space in accordance with the OESC. Observed obstruction of this working space shall be remedied by HOL notifying the Fire Department and the ESA.

5.3.1.10 Customer owned electrical monitoring equipment shall not be installed within the same enclosure as the Instrumentation Transformers as per Section 9.1.1 of this document.

5.3.1.11 A disconnection device shall not be used to enclose additional equipment not intended by its manufacturer. This includes, but is not limited to, Customer owned Instrumentation Transformers and Customer owned monitoring equipment.

5.3.1.12 The electrical room shall be equipped with adequate lighting that provides illumination at the working level, in accordance with IES standards. The lighting within the electrical room shall have mechanical protection (such as a metal or wire cage) and controlled via a wall switch located adjacent to the electrical room’s outer door.

5.3.1.13 Unless noted otherwise, the electrical room, or enclosure, shall be heated for the purpose of keeping excess humidity and moisture from damaging or corroding the metering equipment and ensuring the metering equipment will operate in a reliable and predictable manner. The ambient temperature shall be maintained, as much as Practicable, in the electrical room or enclosure, such that:

5.3.1.13.1 The ambient temperature shall not be permitted to drop below 10 °C [50 °F].

5.3.1.13.2 The ambient temperature shall not be permitted to rise above 30 °C [86 °F].
5.3.1.14 The Customer shall supply and install protective arrangements to the satisfaction of HOL if the possibility of danger to workers, or damage to the meter or metering equipment, from moving machinery, dust, fumes, moisture, excessive noise, or vibration inside the electrical room. This may include the installation of fenders or vibration absorbing equipment for the protection of the metering equipment.

5.3.1.15 If not located on the ground floor, the Customer shall provide a stairway, or CSA approved ladder, leading directly to the electrical room’s entrance, while the building is under construction; a ladder shall not be considered acceptable as a Permanent means of accessing the electrical room. The Permanent stairway shall meet the OBC’s requirements and be equipped with a CSA or ULC approved handrail. In either case, this shall be made available to HOL personnel prior to the installation of metering equipment.

5.3.1.16 The electrical room shall be subject to all of the following:

5.3.1.16.1 It shall provide a clear, safe and adequate working space, as determined by HOL. The room’s floor shall be as level as Practicable as per Section 5.0.25.2 of this document.

5.3.1.16.2 Shall be an enclosed space that restricts access to its contents; at a minimum, shall consist of four permanent walls (that meet OBC requirements) that continue uninterrupted from the permanent floor to the permanent ceiling, and at least one (1) permanent entrance door used to restrict access.

5.3.1.16.3 It shall including a ceiling height of not less than 2130 mm [7'] above the finished grade or floor.

5.3.1.16.4 It shall be large enough to accommodate the full height and width of the metering installation including a minimum of 1500 mm [5'] of horizontal clearance in front of all revenue metering equipment; this is to provide ample space for a person to walk in front of the enclosure when its doors are locked in the open position unimpeded.

5.3.1.17 It is recommended that all electrical rooms shall be designed to include 30% spare vertical and horizontal wall capacity for future growth, including FIT and additional revenue metering equipment for additional load Customer.

5.3.1.18 Outside doors providing access to electrical rooms must have at least 150 mm [6"] clearance between final grade and the bottom of the door. Electrical rooms ‘on’ or ‘below’ grade must have a drain including a “P” trap complete with a non-mechanical priming device and a backwater
valve connected to the sanitary sewer. The electrical room floor must slope 6 mm / 300 mm [1/4" / 12"] or 2% towards the drain.

5.3.1.19 The electrical room shall be equipped with 120VAC, 15A, grounded convenience outlet located within 1000 mm [3'4"] of the metering equipment itself. It shall be supplied from a public circuit and protected by a dedicated single-pole, double-throw breaker.

5.4 Instrumentation Transformer Requirements

5.4.1 Unless noted otherwise, all Instrumentation Transformers used as part of the revenue metering installation shall be subject to all of the following:

5.4.1.1 All CTs used in services with an Ampacity up to, and including, 1200A shall be of the Bar Type CTs.

5.4.1.2 All CTs used in services with an Ampacity exceeding 1200A shall be of the Doughnut Type CT.

5.5 Utilization of Permanent Labels and Tags

5.5.1 Unless noted otherwise, all Customer provided nomenclature used to identify primary disconnects, and multiple meters used in buildings with multiple services, including apartment buildings, condominiums, strip malls, and shopping malls, shall be subject to all of the following:

5.5.1.1 The Customer shall mark, or provide Permanent, visible, and legible nomenclature, to identify each Meter Socket base, and secondary sub-service disconnect if present, with the identifier of the apartment or unit being served which shall include the civic address and the unit number on the door to the apartment or unit.

5.5.1.2 The Customer shall provide Permanent, visible, and legible nomenclature, to identify the apartment number or unit number either on, or adjacent to, the door of each apartment, unit, or commercial being served.

5.5.1.3 The Customer shall mark, or provide Permanent and legible nomenclature, to identify the Customer’s main disconnect or breaker, and the individual disconnects or breakers for each service being metered on the Permanent non-removable portion of the Meter Socket enclosure (it shall not be put on a removable cover). The medium used to display the nomenclature shall be fastened by a method that is both resistant to moisture and mechanical wear (i.e. can’t be accidentally removed or rubbed off). Nomenclature shall also be resistant to fading due to age, mechanical wear, and UV light.
5.5.1.4 The accuracy of the Customer’s nomenclature shall be verified by the Customer’s electrician prior to the request for energization.

5.5.1.5 All nomenclature font shall be at least 50 mm [2’’] in height. This includes, but is not limited to, services for strip malls, shopping malls, individual store fronts, and buildings with multiple residential units.

5.5.1.6 Newly constructed multi-unit buildings shall not be energized until clear and Permanent nomenclature, identifying the apartment or unit being served, has been applied to the metering enclosure associated with each unit.

5.5.1.7 The Customer, owners, and property managers of the buildings shall inform HOL if changes are made to apartment or unit numbering in a timely manner to ensure proper association of revenue meters, and electricity bills, to Customers.

5.6 Termination of a Customer’s Metered Secondary Service

5.6.1 If a metered service is no longer required, the Customer shall contact HOL and follow the process outlined in HOL document ECS0012.

5.6.1 Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information on how to request the removal of a metered service.

5.6.2 For individually supplied services (such as those used for a detached residence), HOL shall remove both the Line Side conductors and revenue metering equipment at a time that both HOL and Customer can mutually agree upon.

5.6.2.1 In this instance, the Customer can leave the Load Side conductors from the Meter Socket base in place if they choose to do so.

5.6.2.2 It is recommended that the exposed Meter Socket base be covered with a Customer supplied UV rated Lexan or UV rated strong plastic cover secured using the existing steel Sealing Ring.

5.6.3 For 1-Phase services that are supplied from a ganged-meter trough, metering centre, or from a splitter trough:

5.6.3.1 The Customer shall remove the Load Side conductors from the Meter Socket base to ensure internal electrical safety and also to ensure that there is no inadvertent energy usage, as per HOL’s Conditions of Service, HOL document ECS0012.

5.6.3.2 HOL shall remove the revenue metering equipment after it has been verified that the meter-socket Load Side conductors have been removed.
Note the ganged-meter trough, metering centre, or splitter trough, shall remained energized, after the Customer service to be terminated has been de-energized to continue supplying the remaining Customers.
5.6.3.3 If the Customer intends to re-energize the service within the next calendar year, the exposed Meter Socket base is to be covered by a Customer supplied UV rated Lexan or UV rated strong plastic cover, steel Sealing Ring, and a HOL supplied and installed meter Seal.

5.6.3.4 If the Customer does not intend to re-energize the service within the next calendar year:

5.6.3.4.1 If the newly vacated Meter Socket is part of a ganged meter trough or metering centre, the Customer shall provide and install a factory supplied metal cover to cover the vacated Meter Socket position.

5.6.3.4.2 Services that take supply from a splitter trough are to have the Meter Socket covered by a Customer supplied UV rated Lexan or UV rated strong plastic cover, steel Sealing Ring, and a HOL supplied and installed meter Seal.

5.6.4 For 3-Phase services that are supplied from a splitter trough, the Customer shall remove the Line Side conductors from the splitter trough to the service main disconnect, to ensure internal electrical safety and also to ensure that there is no inadvertent energy usage, as per HOL’s Conditions of Service, HOL document ECS0012. HOL shall remove the revenue metering equipment after it has been verified that the meter-socket Load Side conductors have been removed and lock the disconnect switch in the “open” position.

Note that the splitter trough shall remain energized after the Customer service has been removed to continue supplying the remaining Customers.

6.0 Metering Responsibilities

6.1 Hydro Ottawa: Responsibilities

6.1.1 The electrical safety of the Customer’s premise, the public, and all HOL staff is very important.

6.1.2 HOL, when requested, shall supply, install, and maintain its revenue meters, Instrumentation Transformers, interconnecting wiring, and any related equipment; see Section 1.7 of HOL’s Conditions of Service, HOL document ECS0012.

6.1.3 For distributed generation Customers only: HOL shall supply the model, manufacturer, and specifications of the Instrumentation Transformers that form part of the installed metering equipment at the Customer’s request to assist the Customer with the reconciliation of the delivered and received energy component.
6.1.4 It shall be HOL’s responsibility to meet the requirements, specifications, bulletins, amendments, and schedules of the Measurement Canada Electricity and Gas Inspection Act as it pertains to revenue metering. All revenue metering, and supporting ancillary, equipment provided by HOL shall be compliant with this Act.

6.1.5 HOL shall provide revenue metering, and supporting ancillary, equipment consistent with current HOL standards, the current revision of this document, the current release of HOL’s Conditions of Service, HOL document ECS0012, and shall be auditable to meet the requirements of Ontario Regulation 22/04.

6.2 The Customer: Responsibilities

6.2.1 Customer shall provide safe and unobstructed access for HOL for the purposes of performing work on the revenue metering, and ancillary, equipment; see HOL’s Conditions of Service, HOL document ECS0012 for more information.

If the metering equipment is located in, or near, an environment that may contain hazardous machinery or a harmful atmosphere, the Customer must provide protective arrangements that are satisfactory to HOL.

6.2.2 The Customer must provide, in a timely manner, the size and type of service required to HOL in order that they receive the best possible experience from HOL.

6.2.3 In the absence of permission, or direction, from HOL, no person may remove, connect or otherwise interfere with HOL’s revenue meters, wires, supporting ancillary equipment, or seals.

6.2.4 The Customer shall be responsible for the care and safekeeping of HOL’s revenue meters, wire, and supporting ancillary equipment, on the Customer’s premises. If any HOL equipment on the Customer’s premises is lost, destroyed, or damaged by means other than ordinary wear and tear or act of nature (not including any of insect infestation, animals, or plant/tree growth) during any and all phases of construction in the area of a HOL Meter Installation, the Customer shall be held responsible at HOL’s determination. If the metering equipment can be subject to falling icicles, ice, and/or snow from the Customer’s roof, the Customer shall install a suitable ice rack or ice guard above.

6.2.5 The Customer shall ensure that the meter is suitably protected while work is being done adjacent to the meter and shall be entirely responsible/liable for all costs incurred relating to materials and labour for repairing or replacing a damaged meter, metering equipment, or supporting ancillary equipment that has been damaged through the Customer’s action, inaction, or neglect. Further, if the metering equipment is located outdoors in an area that is at risk of being damaged by falling icicles, ice, and/or snow from their roof, the Customer shall install an ice rack or ice guard.
6.2.6 The Customer shall ensure that the Customer owned equipment is properly identified, marked, and connected for metering and operation purposes. The Customer shall take whatever steps necessary to correct any deficiencies, in particular cross wiring situations, in a timely fashion. If the Customer does not take such action within a reasonable time, HOL shall disconnect the supply of power to the Customer.

6.2.7 The Customer shall provide space acceptable to HOL, as outlined in this document, for the installation of revenue meters and metering equipment and communications. Specifications for each type of electrical service are listed later in these Metering Specifications.

6.2.8 The Customer/owner grants HOL permission to operate the Customer’s Service Entrance main disconnect breaker/switch for the purpose of meter re-verification and Maintenance. The Customer shall continue to be responsible for the integrity (and repair or replacement) of the disconnect breaker/switch, meter socket, and ancillary revenue metering equipment should it be discovered any have been damaged or become damaged as a result of HOL performing its work as described above. All safety equipment must be maintained and capable of being operated, as per HOL’s Conditions of Service, HOL document ECS0012.

6.3 **Point of Demarcation: Residential Services**

6.3.1 For the purpose of this document, refer to HOL document ECS0012 for more information on demarcation points and how to determine them.

6.3.2 For the Customer who have existing Service Entrances with Amalgamated Switches, combination panels or a similar configuration, HOL's service cables shall enter the Customer’s disconnect switch ahead of the meter. In these instances, the Customer is also responsible for the Maintenance and repair of the disconnect switch or combination panel.

6.4 **Point of Demarcation: Commercial Services**

6.4.1 For the purpose of this document, refer to HOL document ECS0012 for more information on demarcation points and how to determine them.
7.0 Meter Location

7.0.1 This section discusses the general requirements for the location of revenue metering. Refer to Section 5.0 and Section 10.0 of this document for additional requirements specific to a service type.

7.1 Residential Customer Class: 120V/240V, 1-Phase, Up To 200A

7.1.1 Meter Socket bases shall be located outside, in a location that allows access to the metering equipment, by HOL personnel, at all times as per Section 5.0.25 of this document. The location shall be approved by HOL Customer Service Department, or Service Layout Field Agents as part of the service layout in consultation with HOL Metering Services.

7.1.2 See Section 5.0 of this document for restrictions and requirements on the location of a Meter Socket base.

7.2 General Service Customer Classes: 120V/240V, 1-Phase, Up To 200A

7.2.1 The Service Entrance main disconnect and the Meter Socket bases shall be installed inside the building.

7.2.1.1 With the prior approval of HOL’s Customer Service Department and Metering Services, the Customer may supply and install these equipment in an outdoor location for 120V/240V, 1-Phase, up to and including 200A. If mounted outdoors, both the Service Entrance main disconnect and Meter Socket bases(s) shall be housed within a single lockable Weatherproof cabinet, or Customer constructed Weatherproof enclosure, that is supplied and installed by the Customer. The Weatherproof cabinet, or Customer constructed Weatherproof enclosure, can be used to house one or many meters and shall meet the requirements of Section 5.1 of this document.

7.3 Central Metering Agricultural Class

7.3.1 Transformer rated combination base metering enclosure shall be located outside, in a location approved by HOL’s Customer Service Department and HOL’s Metering Services. See Section 12.0 of this document for more information.
7.4 Meter Base Mounting Considerations

7.4.1 Unless noted otherwise, all approved Meter Socket bases:

7.4.1.1 Shall be mounted a minimum height of 1500 mm [5'] to a maximum height of 1680 mm [5' 6''] from the center line of the Meter Socket base above the finished floor level or finished grade.

7.4.1.2 Shall be mounted as plumb and level as Practicable.

7.4.1.3 Shall not be recessed into the wall it’s mounted on.

7.4.1.4 Shall have minimum clearances from Gas related equipment as per Section 5.0.16 and Section 5.0.16.1 of this document.

7.4.1.5 Unless noted otherwise, all revenue metering equipment shall be installed in a location such that there is a minimum distance of 1500 mm [5'] of horizontal and vertical clearance in front of all revenue metering equipment. In the event that an obstruction (including, but limited to, doors, windows, vents, equipment installed by other utilities, etc.) does not make this Practicable, HOL staff shall designate an acceptable alternate location.

7.4.1.6 With the exception of Weatherproof enclosure and cabinets, it shall not be covered or obstructed in any way – doing so would limit the serviceability, or replacement, of the meter or Meter Socket base, and would restrict the Customer’s access to their own meter. This includes, but is not limited to, covering the meter with an aesthetic cover, siding, stucco, etc.

7.4.1.7 The finished grade, or floor, immediately in front of the metering socket shall be as level as Practicable as per Section 5.0.25.2 of this document.

7.5 Metered Services for Other Utilities

In addition to the requirements for metering equipment already discussed in this document, metering equipment installed for other utilities shall be subject to all of the following:

7.5.1 Metered Utility Tower Services

A metered utility tower service includes metering for any tower or mast (including, but not limited to, cell-phone towers, communication towers, and communication masts) shall be subject to all of the following:

7.5.1.1 The Customer shall make provisions to prevent access by unauthorized personnel to the Service Entrance equipment and any HOL provided revenue metering, or HOL provided ancillary, equipment.
7.5.1.1 Provisions may include, but is not limited to, enclosing the area containing the Service Entrance, HOL provided revenue metering, and HOL provided ancillary, equipment with a fence of sufficient height to both discourage and prevent unauthorized access. Fence shall also include a locked gate such that it permits both the Customer and HOL access the fenced off area.

7.5.1.2 Provisions shall be made to allow for HOL personnel to have access to the metering equipment at all times, as per Section 5.0.25 of this document.

7.5.1.3 At HOL’s determination, the metering equipment shall not be visible from highways, arterial, or collector roads. Further, they shall not be installed in sensitive commercial or heritage districts, without care of installation, to blend into the aesthetic neighbourhood value.

7.5.1.4 The following shall be used to determine nominal Service Entrance Ampacity for new services:

7.5.1.4.1 For new 1-Phase services, a nominal Service Entrance Ampacity of at least 400A shall be used.

7.5.1.4.2 For new 3-Phase services, a nominal Service Entrance Ampacity of at least 200A shall be used.

Industry Canada requires commercial antenna tower owners to provide access to other telecoms where structural capacity allows additional attachments. This recommendation is to give sufficient electrical capacity, and fulfillment of other conditions, for the tower’s current and future requirements, alleviating the need for the Customer to re-engage HOL to replace the Service Entrance due to incremental increased requirements.

7.5.1.5 All new metering installations for a metered utility tower service shall be subject to all of the following:

7.5.1.5.1 For each individual a tower, a single Service Entrance shall be provided at a single service voltage.

7.5.1.5.2 An Appropriately rated Service Entrance disconnect switch shall be installed Upstream of all HOL revenue metering, and HOL supplied supporting ancillary, equipment.

7.5.1.6 All new metering installations for a metered utility tower service shall comprise of one of the following:

---

7 – Based on HOL’s study of typical Cell Phone Tower Loading.
7.5.1.6.1 A ganged meter trough with six (6) Meter Sockets and subject to the requirements of Section 10.8.1 of this document. The ganged meter trough shall be subject to Section 5.1.1.13, Section 5.1.1.14, and Section 5.1.1.15 of this document. See HOL specification MCS0082 for more information. In this case, sub-services that take supply from the ganged meter trough shall be limited to less than, or equal to, 200A.

7.5.1.6.2 An approved metering centre with Appropriately rated Service Entrance disconnects switch / breaker with a minimum of six (6) Meter Socket positions and subject to the requirements of both Section 5.1.1.14 and Section 10.14.1 of this document.

7.5.1.6.3 A Service Entrance disconnect switch and a lockable and sealable splitter trough that provides supply to individual approved Meter Socket bases. Each individual socket base shall have an Appropriately rated individual disconnect switch located on its Line Side. See HOL specification MCS0081 for more information.

The installation shall be subject to Section 10.14.2 of this document. A disconnection switch shall be installed for each meter and connected immediately Upstream of the meter such that:

7.5.1.6.3.1 The disconnection switch’s enclosure shall meet, or exceed, the requirements of Section 5.1 of this document.

7.5.1.6.3.2 The disconnection switch shall be such that it can be locked in the “open” position with a Standard HOL Padlock.

7.5.1.6.3.3 The enclosure shall be secured such that both the Customer and HOL personnel can access the disconnection switch.

7.5.1.6.3.4 1-Phase sub-services that take supply from the splitter trough shall be limited to less than, or equal to, 400A. 3-Phase sub-services that take supply from the splitter trough shall be limited to less than, or equal to, 200A.

7.5.1.6.4 Disconnects installed under a roof, as per HOL specifications MCS0081 and MCS0082, shall meet the requirements of either NEMA Type 3 or NEMA Type 3R, whichever is more appropriate.
7.5.1.7 All revenue metering equipment shall be installed in one of the following:

7.5.1.7.1 In a location described in Section 10.12.1 of this document.

7.5.1.7.2 On an open-air metal corrosion-resistant structure subject to the following:

7.5.1.7.2.1 It shall be comprised of channel strut members that support a sheet of marine-grade plywood that meets all the requirements of Section 9.8 of this document that will be used to mount the Service Entrance and revenue metering equipment, or shall comprise of channel strut members and shall have the Service Entrance and revenue metering equipment mounted directly to it.

7.5.1.7.2.2 The open-air channel strut structure shall be for the exclusive use of Service Entrance and revenue metering equipment. If marine-grade plywood is used, equipment shall be installed only on one (1) side of the plywood.

7.5.1.7.2.3 It shall have an open-air roof that extends no less than 1000 mm [3' 4"] in all directions over the footprint of the channel strut structure. The roof shall be constructed as per one of the following:

7.5.1.7.2.3.1 Metal (such as Corrugated Galvanized Steel) mounted on either the channel-strut structure directly.

7.5.1.7.2.3.2 Metal (such as Corrugated Galvanized Steel) on plywood mounted on the channel-strut structure.

7.5.1.7.2.3.3 A roof that meets OBC requirements.

7.5.1.7.2.4 The roof shall be such that it shall provide adequate mechanical protection for both the metering equipment and personnel performing work on the equipment, from both precipitation and falling ice, as per Section 6.2.4 of this document.

7.5.1.7.2.5 The roof shall be slanted allowing water to drain such that it does not drain on personnel while performing work on the metering equipment.

7.5.1.7.3 Satisfy the requirements of Section 5.0.13, of this document, if applicable.
7.5.2 Third Party Utility Owned Metered Pedestal Services

7.5.2.1 A third party utility owned metered pedestal service, as defined in HOL’s Conditions of Service, HOL document ECS0012, shall be used inside of, or within, 5000 mm [16’ 4-7/8"] of the closest public road allowance. This includes metering for any enclosure, or structure, with a height less than 1830 mm [6'] above finished grade, excluding pedestals under the control of the Public Road Authority. It shall be subject to all of the following:

7.5.2.1.1 The service shall consist of a single 120V/240V, 1-Phase, 3-Wire, metered service with a maximum Ampacity of 200A.

7.5.2.1.2 Only one (1) metered service shall be permitted per pedestal and one (1) metered service per third party utility within a 50 m [164’] horizontal radius.

7.5.2.1.3 Provisions shall be made to provide a minimum of 1000 mm [3’ 4'""] of horizontal and vertical clearance in front of all metering apparatuses and shall free of any obstructions at all times.

7.5.2.1.4 All access panels shall be secured against unauthorized access as much as Practicable.

7.5.2.1.5 The pedestal shall be kept free and clear of snow, and debris, to allow access to the metering equipment at all times.

7.5.2.1.6 A pedestal shall have only one (1) service from HOL. A pedestal shall not take supply from both metered and unmetered services (also referred to as a “flat-rate” service) simultaneously.

7.5.2.1.7 The pedestal shall be supplied from an underground conductors from HOL’s designated Supply Point.

7.5.2.1.8 The Neutral conductor shall be extended past the Service Entrance disconnect and Meter Socket to be terminated at the first Customer owned device.

7.5.2.1.9 A pedestal’s metered service can be shared amongst multiple pedestals for that third party utility company provided that all pedestals taking supply from the metered service are:

7.5.2.1.10.1 The property of the same Customer as the pedestal that has the Service Entrance disconnect mounted on it.
7.5.2.1.10.2 Within immediate and obvious view from both the pedestal that has the Service Entrance disconnect mounted on it and HOL’s designated Supply Point.

7.5.2.1.10.3 Does not take supply from a different unmetered service simultaneously.

7.5.2.1.10 The Service Entrance equipment shall be subject to all of the following:

7.5.2.1.11.1 The approved Meter Socket base or combination enclosure shall be mounted such that the center of the Meter Socket shall be not less than 1200 mm [4’] and not more than 1680 mm [5’ 6”] and not above finished grade.

7.5.2.1.11.2 The top of the Service Entrance disconnect, Meter Socket base, or combination socket base and disconnect shall be installed at a height that meets the requirements of Section 5.1.1.4, Section 5.1.3, and Section 7.4.1 of this document.

7.5.2.1.11.3 The bottom of the Service Entrance disconnect, Meter Socket base, or combination socket base and disconnect shall be not less than 1050 mm [3’ 6”] above finished grade.

7.5.2.1.11.4 The Service Entrance disconnect, approved meter base, or combination meter base and disconnect shall be mounted on the pedestal such that it does not extend past the side or top of the pedestal.

7.5.2.1.11.5 If the nominal Service Entrance Ampacity is less than or equal to 30A, the Service Entrance equipment and Meter Socket shall be subject to all of the following:

7.5.2.1.11.6 Conductors used to provide supply to the Service Entrance shall be no smaller than #6 AWG and shall meet the requirements of ESA and OESC.

7.5.2.1.11.6.1 The Service Entrance disconnect shall consist of “single throw, double pole” breaker that is suitable for use within the combination Meter Socket and disconnect enclosure. The breaker shall have a nominal Ampacity of no more than 30A and shall be installed Upstream from the 100A, 600V rated Meter Socket.
7.5.2.11.6.2 An approved combination Meter Socket and disconnect enclosure, chosen from Table 11 (located at the end of this document) shall be used to house both the Meter Socket and Service Entrance disconnect.

7.5.2.11.7 If the nominal Service Entrance Ampacity is greater than 30A but less than or equal to 100A, then the Service Entrance disconnect and Meter Socket shall be subject to all of the following:

7.5.2.11.7.1 Conductors used to provide supply to the Service Entrance shall be no smaller than #3 AWG and shall meet the requirements of ESA and OESC.

7.5.2.11.7.2 The Service Entrance disconnect shall consist of “single throw, double pole” breaker(s) or a mechanical bladed switch with over-current protection with nominal Ampacity of no more than 100A. It shall be installed Upstream from the 100A, 600V rated Meter Socket.

7.5.2.11.7.3 An approved individual socket base, chosen from Table 1 (located at the end of this document) and an outdoor rated and Appropriately sized Service Entrance disconnect and enclosure.

7.5.2.11.7.4 PVC conduit, meeting the requirements of Section 5.2 of this document, shall be used to house all conductors connecting Service Entrance disconnect, the Meter Socket base, and the first Customer owned device.
7.5.2.1.11.8 If the nominal Service Entrance Ampacity is greater than 100A but less than or equal to 200A, then the Service Entrance shall be subject to all of the following:

7.5.2.1.11.8.1 Conductors used to provide supply to the Service Entrance shall be no smaller than 3/0 AWG and shall meet the requirements of ESA and OESC.

7.5.2.1.11.8.2 The Service Entrance disconnect shall consist of “single throw, double pole” breaker(s) or a mechanical bladed switch with over-current protection with nominal Ampacity of no more than 200A. It shall be installed Upstream from the 200A, 600V rated Meter Socket.

7.5.2.1.11.8.3 An approved individual socket base, chosen from Table 1 (located at the end of this document) and an outdoor rated Appropriately sized Service Entrance disconnect and enclosure.

7.5.2.1.11.8.4 PVC conduit, meeting the requirements of Section 5.2 of this document, shall be used to house all conductors connecting Service Entrance disconnect, the Meter Socket base, and the first Customer owned device.

7.5.2.1.11 Installation of metering equipment shall be subject to City of Ottawa Road Authority Pedestal Guidelines.

7.5.2.1.12 The pedestal being metered shall be located and oriented such that:

7.5.2.1.13.1 It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.

7.5.2.1.13.2 It shall not obstruct any vehicular traffic while its doors are in the open position.

7.5.2.1.13.3 HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.
7.5.2.1.13 If located in, or near, the vicinity of a road the enclosure shall be set back:

7.5.2.13.4.1 A minimum of 1000 mm [3' 4"] from the travelled portion of the road if the road has a curb, but does not have a sidewalk.

7.5.2.13.4.2 A minimum of 4000 mm [13' 1-1/2"] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

7.5.2.13.4.3 A minimum of 1000 mm [3' 4"] from the sidewalk away from the travelled portion of the road if the road has both a curb and sidewalk.

8.0 Auxiliary Connections

8.0.1 All of the Customer’s connections to the metered service (including fire alarms, exit lights, surge devices, Customer’s instrumentation, etc.), with the exception of Fire Pumps (see Section 15.0 of this document for more information), shall be subject to all of the following:

8.0.1.1 All of the Customer’s circuits connected to the electrical service shall be made to the Load Side and Downstream of HOL revenue metering; it shall be located in a separate Compartment or cell.

8.0.1.2 All interval metered Customers metered by an interval meter with external communication ports: with the exception of the meter’s communication ports discussed in Section 8.0.1.4 of this document, no Customer owned equipment shall be connected to any internal part of HOL’s revenue metering circuitry. Any damage to the revenue metering equipment as a direct, or indirect, result of being connected to the Customer’s equipment shall be repaired, or replaced, at the Customer’s cost.

8.0.1.3 The meter’s KYZ outputs, if available, shall be connected to a contact strip for purposes of connecting the Customer’s equipment. The contact strip shall serve as the point of demarcation between HOL revenue metering equipment the Customer’s equipment.

8.0.1.4 With the exception of KYZ outputs from the meter and the meter’s factory installed communication ports, if available, no Customer equipment shall be connected to any internal part of HOL’s metering circuitry. Any damage to the metering equipment that results directly, or indirectly, from the metering equipment’s KYZ outputs or factory installed communication ports being connected to the Customer’s equipment shall be repaired, or replaced, at the Customer’s cost.
9.0 Transformer Rated Meter and Instrumentation Transformer Installations

9.0.1 Where metering and Instrumentation Transformer cabinets are required to be installed as part of the metering equipment, they shall be subject to all of the following:

9.1 Instrumentation Transformer Cabinets

All Instrumentation Transformer cabinets used to enclose HOL metering equipment shall be subject to all of the following:

9.1.1 The Instrumentation Transformer cabinet is for the exclusive use of HOL revenue metering and ancillary equipment; it shall not be used to house Customer owned equipment including, but not limited to, the following:

9.1.1.1 Customer owned load or monitoring equipment.

9.1.1.2 Customer owned heating or thermostat equipment.

9.1.1.3 Customer owned lighting or lighting control equipment.

9.1.1.4 Customer owned electrical outlets.

9.1.2 All instrumentation cabinets shall meet, or exceed, the requirements of Section 5.1 of this document.

Further, all Instrumentation Transformer cabinets shall be equipped with removable #16 MSG minimum sheet metal interior mounting plates or back plates. The mounting plate or back plate shall be 75 mm [3"] narrower and 75 mm [3"] shorter than the Instrumentation Transformer cabinet and mounted with a minimum clearance of 15 mm [9/16"] behind it.

9.1.3 Refer to HOL Specification MCS0017, for wiring details and HOL Specification MCS0038 for construction details of layout of Instrumentation Transformers in cabinet.

9.1.4 The size of Instrumentation Transformer cabinets shall be dependent on the secondary conductor size, and the type of metering installation. Refer to Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrumentation Transformer cabinets used in residential and/or commercial services.

9.1.5 The Instrumentation Transformer cabinet shall not be used as a splitter trough or raceway.
9.2 **Revenue Metering Service Secondary Conductors**

9.2.1 All electrical service secondary conductors, installed as part of a revenue metering installation, shall be subject to all of the following:

9.2.1.1 Unless noted otherwise, conductors terminating at the main Service Entrance disconnect, conductors terminating at HOL owned revenue metering equipment, conductors terminating at any operable device that may be operated by HOL personnel (under the direction of the device’s control authority) including, but not limited to, DG / ERF Disconnects, shall be subject to the following:

9.2.1.1.1 Copper conductors: both mechanical and compression lugs are acceptable means of termination.

9.2.1.1.2 Aluminum conductors:

- 9.2.1.1.2.1 For services up to and including 200A, both mechanical and compression lugs are acceptable means of termination.

- 9.2.1.1.2.2 For services greater than 200A, the conductor shall be terminated with a compression lug.

- 9.2.1.1.2.3 Conductors terminating at an Instrumentation Transformer, regardless of service ampacity, shall be terminated with compression lugs.

9.2.1.1.3 Unless noted otherwise, conductors installed for the purposes of bonding surfaces to ground shall be comprised of Copper.

9.2.1.1.4 All HOL installed metrology revenue metering conductors (used to connect an Instrumentation Transformer, as part of the revenue metering equipment, to HOL owned revenue metering equipment) shall be comprised of Copper only. This does not relate to current carrying customer service conductors aforementioned in Section 9.2 of this document.

- 9.2.1.1.4.1 The conductors connecting an Instrumentation Transformer, as part of the revenue metering equipment, to HOL owned revenue metering equipment shall be sized as per Measurement Canada document S-E-10. This requirement shall not apply if it creates a hazard or violates the requirements of either ESA or the OESC.

9.2.1.1.5 In the absence of permission from HOL, Copper-to-Aluminum (or vice-versa) transition splices connected electrically between the main Service Entrance disconnect and HOL owned metering equipment or between HOL owned metering equipment and the first Customer owned device shall not be permitted.
9.2.1.2 Continuous runs of conductor, as much as Practical, shall be used to connect the Load Side of the Service Entrance disconnect to the metering equipment enclosure, and the metering equipment enclosure to either:

9.2.1.2.1 The first Customer owned device connected down-stream from the metering equipment.

Or:

9.2.1.2.2 The load-side disconnect, as per Section 10.7.2.4 of this document, if applicable.

9.2.1.3 In the event of multiple sub-services, each with its own disconnect and meter socket, taking supply from the property’s Service Entrance through a splitter trough, Copper conductors used to connect the Load Side of the Service Entrance disconnect, each of the sub-service disconnects, each meter socket, and satisfy the requirements of Section 9.2.1.2 of this document. Refer to HOL document MCS0037 for more information.

9.2.1.4 All conductors on the Line Side of a device shall be identical in type, quantity, and size.

9.2.1.5 All conductors on the Load Side of a device shall be identical in type, quantity, and size.

9.2.1.6 Unless noted otherwise, all secondary conductors shall be obviously marked, at their terminations, using electrical phasing tape to ensure that the corresponding phase terminations of the conductors are electrically correct. Identification of the conductors shall adhere to one the following conventions, whichever is more appropriate:

9.2.1.6.1 For 1-Phase Services: White phasing tape shall be used to identify the Neutral conductor.

9.2.1.6.2 For 3-Phase Services: Red phasing tape shall be used to indentify the conductor connected to the A-Phase of supply, Black phasing tape to identify the B-Phase conductor, Blue phasing tape to identify the C-Phase conductor, and White phasing tape to identify the Neutral conductor.

9.2.1.7 Each secondary conductor used in a commercial service shall be terminated as per Section 9.2.1.1 of this document using an Appropriately sized lug.
9.2.1.8 A lug shall be considered Appropriately sized if the lug meets the following conditions:

9.2.1.8.1 The size of conductor that will be used to terminate is explicitly indicated as Appropriate, and supported, within the lug’s factory specifications and ESA requirements.

9.2.1.8.2 The size of conductor that will be used to terminate falls within the range of conductor sizes explicitly indicated as Appropriate, and supported, within the lug’s factory specifications.

9.2.1.8.3 HOL, at its determination, deems it Appropriately sized.

9.2.1.9 The termination of two (2), or more, conductors within the same mechanical lug barrel shall not be permitted, as per OESC.

9.2.1.10 Secondary conductors shall enter and leave the Instrumentation Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet housed in conduit that meets the requirements already contained in this document; see Section 5.2.1 of this document for more information.

If this cannot be arranged, then an Instrumentation Transformer cabinet that has the minimum dimensions of (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs as detailed in Table 6, and Schedule 1, Schedule 2, Schedule 3, Schedule 4, Schedule 5, Schedule 6, Schedule 7, and Schedule 8 located at the back of this document.

9.2.1.11 Where parallel secondary conductors are required for the metering installation, the Customer shall provide properly sized double barrel mechanical lugs, which shall be compatible with Copper, for the connection between the CT(s) and the secondary conductors for each phase, to the line and Load Side of each CT.

9.2.1.12 A full-sized Neutral conductor is required and must enter the instrument transformer cabinet for Grounded-WYE connected services, on both 120V/208Y and 347V/600Y volt metering installations. The full sized Neutral conductor (white) shall originate from the Neutral buss in the main Service Entrance disconnect, or Switchboard, to the instrument cabinet. The Neutral conductor is to be terminated on an isolated neutral block mounted as per Section 9.6 of this document, centered left to right and front to back, and shall be provided and installed by the Customer in the instrument cabinet prior to the installation of metering equipment. The isolated neutral block shall be required even when the Neutral conductor is continued past the instrument cabinet to the Customer load equipment.
9.2.1.13 If the Customer does not require the use of the full-sized Neutral conductor, it shall be extended from the meter enclosure and terminated at the first Customer owned device where Practicable. This shall be done so that if the Customer requires it in the future, it will be available to them for use.

9.2.1.14 Where parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the type of material of the conductors.

9.2.1.15 “Stranded Bi-Metallic Pin Terminals” shall not be permitted when transitioning from Aluminum conductor to Copper conductor for the metering installation, as per Section 9.2.1.1.5 of this document.

9.3 Instrumentation Transformer Secondary Conductors and Conduit

9.3.1 The Instrumentation Transformers shall be supplied and installed on site by HOL Metering Services.

9.3.2 All secondary conductors that enter or exit an Instrumentation Transformer cabinet shall be subject to all of the following:

9.3.2.1 Conductors shall be housed in conduit that meets the requirements for conduit already contained in this document; see Section 5.2.1 of this document for more information.

9.3.2.2 Conductors shall be secured onto a device, such as Instrumentation Transformers, terminal blocks, etc., with fasteners that shall meet, or exceed, SAE Grade 5 specifications as per SAE J429-1999.

9.4 Meter Cabinet Installation

9.4.1 Meter cabinets, or enclosures, may be required where telephone communication equipment forms part of the installation for protection of the revenue Meter Installation. Meter cabinets shall be supplied and installed by the Customer and shall meet the requirements already contained in this document; see Section 5.1 of this document for more information. Further, the installation of the cabinets shall be subject to all of the following:

9.4.1.1 Meter cabinets shall be mounted at a height that meets the requirements of Section 5.1.1.4 of this document.
9.4.1.2 If the meter cabinet is to be installed indoors, the cabinet shall meet the requirements for indoor cabinets already contained in this document; see Section 5.1 of this document for more information.

9.4.1.3 If the meter cabinet is to be installed outdoors, prior consultation and approval is required to be obtained from HOL’s Customer Service Department and HOL’s Metering Services. In such cases, the outdoor enclosure shall meet the requirements for outdoor enclosures already contained in this document; see Section 5.1 of this document for more information.

9.4.1.4 Refer to HOL Specification MCS0066 for construction details.

9.5 Conductor Loops within Instrumentation Transformer Cabinets

9.5.1 Services over 200A, with the exception of services described in Section 10.5 of this document, require the secondary conductors to enter and leave the Instrumentation Transformer cabinet at opposite lower sides or the bottom of the Instrumentation Transformer cabinet housed in conduit that meets the requirements already contained in this document; see Section 5.2.1 of this document for more information. These conductors shall be subject to all of the following:

9.5.1.1 The minimum length of each conductor for both line and Load Side of the bar type (in-line) CTs will be 1200 mm [4’] shall be provided within the Instrumentation Transformer cabinet. This will enable the conductors to be trained in place for the termination and to ensure that strain is not applied to the CTs for the metering installation.

9.5.1.2 Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.

9.5.1.3 All Line Side conductors shall be identical in type, number of conductors, and conductor size.

9.5.1.4 All Load Side conductors shall be identical in type, number of conductors, and conductor size.

9.5.1.5 Mineral insulated, solid, or hard drawn wire conductors are not acceptable for meter loops. Any variation from the above must be approved by HOL prior to the installation.
9.6 Isolated Neutral Terminal Block

9.6.1 On all 3-Phase services, where Instrumentation Transformers are required as part of the metering installation, the Customer shall supply and install a full-sized Neutral conductor to be used as a voltage reference by revenue metering equipment, that shall be subject to all of the following:

9.6.1.1 The full-sized Neutral conductor (white) shall be bonded to ground at the Service Entrance and, connected to the Neutral buss located in the main Service Entrance box to the instrument transformer cabinet.

9.6.1.2 The full-sized Neutral conductor is to be terminated in the Instrumentation Transformer cabinet on an isolated neutral terminal block. The isolated neutral terminal block shall be mounted as follows:

9.6.1.2.1 If mounted within a minimum of NEMA Type 1 rated enclosure, it shall be mounted such that it is centered in the bottom of the enclosure. Refer to Schedule 5 and Schedule 6 for more details.

9.6.1.2.2 If mounted within a minimum of either a NEMA Type 3, NEMA Type 3R, NEMA Type 4, or NEMA Type 4X rated enclosure, it shall be mounted such that it is centered at the bottom of the back plate or mounting plate in the CT cabinet, which shall be supplied and installed in the Instrumentation Transformer cabinet prior to the metering installation. Refer to Schedule 7 and Schedule 8 located at the back of this document for more details.

9.6.1.3 The isolated neutral terminal block shall be required even if the Customer does not require the use of the full-sized Neutral conductor.

9.6.1.4 If the Customer does not require the use of the full-sized Neutral conductor, it shall be extended from the meter enclosure and terminated at the first Customer owned device where Practicable. This shall be done so that if the Customer requires it in the future, it will be available to them for use.

9.6.1.5 Where parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the type of material of the conductors.

9.6.1.6 If a Customer’s requests a reduced sized Neutral conductor, and their service meets the requirements of the OESC, the Customer shall provide sufficient information to HOL to be used for considering a technical deviation approval.
9.7 Connection to Metering Equipment: Conductor Requirements

9.7.1 In all cases where Instrumentation Transformers are required for the metering installation, the Customer shall provide either properly sized mechanical lugs or compression lugs (as appropriate per Section Error! Reference source not found. of this document) for the connection between the bar type (in-line) CTs and the secondary conductors on the Line Side and Load Side of the CTs. HOL’s metering personnel shall train the conductors, cut the length of the conductors, and complete the termination to the bar type (in-line) CTs.

9.7.2 “Stranded Bi-Metallic Pin Terminals” shall not be permitted when transitioning from Aluminum conductor to Copper conductor for the metering installation, as per Section 9.2.1.1.5 of this document.

9.7.3 Where parallel conductors are used, the Customer shall train the conductors, cut the length of the conductors, and complete the termination to the bar type (in-line) CTs as per Section 9.2.1.1.5 of this document.

9.8 Plywood Mounting Board

With the exception of revenue metering equipment typically installed for a single residence (including individual 4-jaw meter socket bases and 5-jaw combination base metering enclosure), and revenue metering equipment installed inside of an enclosure or within a Customer constructed Weatherproof enclosure, all revenue metering equipment installations require a minimum 16 mm [5/8"] thick plywood mounting board subject to the following:

9.8.0.1 The surface of the plywood mounting board is for the exclusive use of HOL revenue metering, and ancillary, equipment. The installation of additional customer-owned equipment or enclosures onto the plywood mounting board, or encroaching the plywood mounting board, shall not be permitted.

9.8.0.2 The finished grade, or floor, immediately in front of the plywood mounting board shall be as level as Practicable as per Section 5.0.25.2 of this document.

9.8.0.3 The plywood shall be treated, and carry a stamp to the effect of, to be fire resistant or shall be covered on all sides with a fire retardant paint prior to its installation. The fire retardant coating shall provide a maximum flame spread rating of 25 (Class A) in accordance with ULC document CAN/ULC-S102.

9.8.0.4 Unless noted otherwise, Marine Grade Plywood shall be used in place of non-Marine Grade Plywood in the following instances:

9.8.0.3.1 If the plywood mounting board will be mounted outdoors or will be exposed to precipitation.
9.8.0.3.2 The plywood mounting board will be mounted in an area that has sufficient moisture or humidity that would be damaging to non-Marine Grade Plywood.

9.8.0.3.3 HOL, at its determination, deems it necessary.

9.8.0.5 The plywood shall be mounted as plumb and level as Practicable, with its long dimension parallel to the finished floor.

9.8.0.6 If mounted directly on a Permanent wall, the plywood shall be mounted flush; it shall not be recessed into the wall.

9.8.0.7 If the wall is not suitable to mount the plywood, due to excess condensation or other considerations, Appropriately sized Strut channel members shall be mounted vertically on the wall and the plywood mounted overtop the Strut channel members. They shall be long enough to span the entire width of the plywood sheet. The members shall be installed such that each end of the plywood sheet is supported and there is no more than a 1200 mm [4'] span of unsupported plywood. This is to provide an air-gap to help prevent, or slow, the excess moisture from damaging the plywood.

9.8.0.8 If there is insufficient room on the electrical room walls for the plywood mounting board, and subject to HOL approval, the plywood sheet may be mounted on an open-air frame comprised of Appropriately sized Strut channel members. The members shall run floor to ceiling, and secured to the floor with an Appropriately sized foot that permits the installation of four (4) fasteners; the same shall be used to secure the member to the ceiling. The members shall be installed such that each end of the plywood sheet is supported and there is no more than a 1200 mm [4'] span of unsupported plywood.

9.8.0.9 If the plywood is fastened directly to a wall, it shall be done such that the plywood is secure, and not permitted to buckle, bow, peel, or be lifted off of the wall.

9.8.0.10 If fastened to Strut channel members, it shall be secured to it by using one of the listed fasteners:

9.8.0.9.1 Appropriately sized “Channel Nut”, with or without spring.

9.8.0.9.2 [3/8"] bolt with [1"] washer, secured with [3/8"] posi-lock nut with [1"] flat washer, or [3/8"] nut, lock-washer, and [1"] flat washer, to be placed through both the plywood and Strut channel member. Flat washers to be placed against the plywood and intended to prevent the bolt from being pulled through the plywood in the event the nut is overtightened. All bolts shall meet, or exceed, SAE Grade 5 specifications as per SAE J429-1999.

9.8.0.9.3 Fasteners shall be used to secure the corners of the sheet and every linear 600 mm [2'] after along the Strut channel member.
9.8.0.11 If more than one (1) sheet is required, the plywood shall be mounted such that each sheet is butted up against the next one, leaving no gaps between the sheets.

9.8.1 120V/240V, 1-Phase, 225A to 400A: Individual Services

9.8.1.1 The Customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] for the 5-Jaw Transformer Rated Meter combination base metering enclosure, and for the exclusive use of HOL’s metering equipment.

9.8.2 120V/240V, 1-Phase, 3-Wire, 400A to 600A: Individual Services

9.8.2.1 The Customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] for the 5-Jaw Transformer Rated Meter and for the exclusive use of HOL’s revenue metering equipment.

9.8.3 120V/208Y (up to 800A) and 347V/600Y (up to 200A), 3-Phase: Standard Commercial Services

9.8.3.1 The Customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] for the 13-Jaw transformer rated combination base metering enclosure. This shall be for the exclusive of HOL’s metering and communications equipment.

9.8.4 120V/208Y (800A and Higher) and 347V/600Y (Greater than 200A), 3-Phase: Interval Metering for Standard Commercial 3-Phase Services

9.8.4.1 The Customer shall supply and install an approved plywood mounting surface with a minimum size of (H x W x D) 1200 mm x 1200 mm x 16 mm [48" x 48" x 5/8"] for the 13-Jaw transformer rated combination base metering enclosure, and metering equipment communications enclosure shall be for the exclusive use by HOL’s metering and communications equipment.

9.9 Instrumentation Transformers

9.9.1 Instrumentation Transformers may be required as part of a metering installation depending on the voltage and amperage of the service being metered.

9.9.2 Refer to Table 10, located at the end of this document, to determine the type and quantity of Instrumentation Transformers required.

9.9.3 Instrumentation Transformer placement within the enclosure shall be such that it shall maximize primary and secondary terminal accessibility. Proper polarity orientation shall be required with the CT’s polarity marks pointing towards the utility supply. The nameplate may be oriented upside-down or sideways, allowing for ease of serviceability of the terminations.
9.10 “Check” Metering Equipment: Metering Losses from Customer Owned Devices and Conductors

9.10.1 The intent of a “check” meter can be any of the following:

9.10.1.1 It may be used to verify the losses generated by Customer owned devices (including, but not limited to, Customer owned transformation) that is installed Upstream of revenue metering equipment.

9.10.1.2 To verify the accuracy of MCMS revenue metering equipment.

9.10.1.3 To detect diversion of power that would otherwise go unmetered.

9.10.2 If the Customer shall be required to make provisions for the installation of a “check” meter if any of the following occur:

9.10.2.1 The Customer has, or intends to have, HOL revenue metering equipment installed Downstream of Customer owned devices that generate losses that are not static, easily calculated, above industry norms for a particular device class, or available from the device’s manufacturer.

9.10.2.2 The Customer has, or intends to have, MCMS revenue metering equipment installed.

9.10.2.3 The Customer has, or intends to have, metering located in a secondary electrical room that is separate from the building’s main electrical room.

9.10.2.4 HOL, at its determination, deems it necessary. Unless noted otherwise, HOL shall use it to detect diversion of power.

9.10.3 The Customer shall also make provisions for the installation of a metered “public” service if HOL owned revenue metering is installed Downstream of a Customer owned transformer.

9.10.3.1 The “check” meter shall not be used for revenue billing purposes during construction of the project. The intent behind this requirement is based on the “check” meter installation not meeting all of the requirements of a revenue meter.
10.0 Low Voltage (Less Than 750V) Services: Meter Equipment Installation Requirements

10.0.1 This section of the document refers to the supply of electrical energy to residential Customers residing in detached, semi-detached, duplex, triplex, or townhouse dwelling units in urban and rural areas, those residing in units that are part of multi-story apartment or condominiums as well as commercial Customers. Refer to Section 5.0 and Section 7.0 of this document for additional requirements for the location of metering equipment.

10.0.2 Residential services are typically 120V/240V, 1-Phase, 3-Wire, 200A or less, self-contained services; services greater than 200A will require provisions for external Instrumentation Transformers to be installed. Commercial services are typically offered as either 120V/240V 1-Phase 3-Wire, 120V/208Y 3-Phase 4-Wire, or 347V/600Y 3-Phase 4-Wire services, each of which is available with a limited variety of Ampacity.

10.0.2.1 The voltage and Ampacity of the service shall be subject to HOL’s Conditions of Service, HOL document ECS0012.

10.0.2.2 In lieu of HOL’s standard residential metering offerings, if the Customer chooses to have a non-standard residential revenue metering configuration (this shall include, but not limited to, revenue metering requiring a dedicated telephone line for communications in lieu of a wireless radio – refer to Section 10.2.1 of this document and HOL specification MCS0080 for more information), it shall be done at the Customer’s cost. The Customer shall consult with a HOL Service Layout Agent to determine eligibility and feasibility.

10.0.3 Service availability, orientation (either overhead or underground), voltage, and Ampacity subject to availability as per HOL’s Conditions of Service, HOL document ECS0012.
10.0.4 Conditions Requiring Relocation of a Meter Outside or Socket Base Upgrade: Residential Service Customer Class

All meters for new or upgraded, relocated, or modified residential services shall be mounted outside on a Meter Socket base approved by HOL and be furnished with a time of use “Smart Meter”. Existing services shall require the relocation of an inside meter to an outdoor location with a meter base Upgrade under any of the following conditions:

10.0.4.1 The Customer replaces their fuse panel with a breaker panel, regardless if the service conductor, load wires or the standpipe are changed.

10.0.4.2 Repairs to the standpipe, Meter Socket, service conductors, or Service Entrance as the result of an act of nature; exemptions to this can be found in HOL’s Conditions of Service, HOL document ECS0012.

10.0.4.3 Any re-arranged or upgraded Meter Installations that have an A-base or A-frame meter type inside or outside, or a small or round aluminum Meter Socket base outside.

10.0.4.4 The Customer adds a Distributed Generator installation that delivers less than 10kW installation.

10.0.4.5 If the Customer performs work on their service, in close proximity to the service’s Demarcation Point (see Section 6.3 and Section 6.4 of this document for more information on determining the location of the Demarcation Point) that requires an ESA permit.

10.0.4.6 If the service has been de-energized for more than six (6) months.

10.0.4.7 If the service has been disconnected to allow work to proceed on the building footprint and the existing installation has been deemed, at HOL’s determination, to be unsafe or at the end of its useful life.

10.0.4.8 HOL, at its determination, deems it necessary to have the meter moved to an outdoor location.

10.1 120V or 240V, 1-Phase, 2-Wire Services

HOL does not provide 120V or 240V, 1-Phase, 2-Wire services as a standard offering on new services, as per HOL’s Conditions of Service, HOL document ECS0012.
10.2 120V/240V, 1-Phase, 3-Wire, Up To 200A: Overhead Individual Services (where permitted according to municipal by-law)

Meter bases shall be located outdoors, in a location approved by the HOL’s Customer Service Department, normally on the side, or front, of the residence and in front of any existing, or proposed fence. Further, the location of meter base installation shall be subject to all of the following:

10.2.0.1 The Customer is required to supply and install an approved Meter Socket with a screw type Sealing Ring for service up to 200A.

10.2.0.2 If a ganged meter trough is used in conjunction with a 200A overhead service, it shall consist of no more than an individual ganged meter trough that has no more than six (6) metering positions.

10.2.0.3 The ganged meter trough shall not be altered as per Section 5.1.1.15 of this document.

10.2.0.4 If a splitter trough, in conjunction with individual Meter Socket bases, is used in conjunction with a 200A overhead service, the overhead service shall be used to supply no more than six (6) individual Meter Socket bases.

10.2.0.5 Sockets bases with current bypass switches shall not be permitted.

10.2.0.6 Socket bases shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document.

10.2.0.7 Socket bases shall be installed on a vertical surface, or on a Customer owned pole, such that it is as level and plumb as Practicable as per Section 7.4 of this document.

10.2.0.8 Shall have minimum clearances from Gas related equipment as per Section 5.0.16 of this document.

10.2.0.9 Typically, shall be installed no farther than 1500 mm [5’] of horizontal distance from the corner of the residence, on the side closest to the electrical service’s Supply Point.

10.2.0.10 If installed on the side of the residence, there shall be a minimum of 1000 mm [3’ 4"] of horizontal clearance between the meter base and the Customer’s property line.
Refer to Table 1, located at the end of this document, for a list of HOL acceptance criteria for the meter base socket and HOL Specification MCS0018 for wiring details.

10.2.0.11 If an Instrumentation Transformer on a 120V/240V, 1-Phase, 3-Wire, up to 200A, transformer rated service requires replacement as a result of ordinary wear and tear or has reached the end of its service life, HOL, at its determination, shall require the Customer to replace the existing metering equipment with an equivalent Self-Contained Meter.

As part of replacing the metering equipment, HOL at its determination shall:

10.2.0.11.1 Remove the existing transformer-rated meter, Instrumentation Transformers, fusing blocks (if present), and test-switch blocks (if present).

10.2.0.11.2 Replace the existing Meter Socket base, if required, in situ, with an approved Meter Socket base of equivalent Ampacity.

10.2.0.11.3 Install a Self-Contained Meter of adequate Ampacity.

10.2.0.11.4 Refer to HOL specification MCS0077 for more information.

10.2.0.12 If installed for a commercial service, the Meter Socket can be located outdoors (either mounted on the exterior wall of the building being supplied, inside a NEMA rated enclosure that meets the requirements of Section 5.1 of this document, or inside a customer built enclosure that meets the requirements of Section 5.1 of this document) at a location approved by the HOL Customer Service Department or can be installed inside a dedicated electrical room that meets the requirements of Section 5.3 of this document.

Refer to HOL document MCS0091 for more information.

10.2.1 Use of ‘Wired’ Smart Meters on Residential Services

The standard residential revenue meter used by HOL contains a small wireless radio used to relay metering data back to HOL for billing purposes.

As an alternative, HOL offers revenue metering equipment that uses a dedicated telephone line to communicate with HOL, in lieu of the wireless radio, available for additional cost to the Customer. An installation of this type shall be subject to HOL specification MCS0080 and all of all of the following:

10.2.1.1 Residential revenue metering equipment, that uses a dedicated telephone line, is intended for residential Customers that are both individually supplied and individually metered.
10.2.1.1 Residential Customers that have ERF equipment (as described Section 19.0 of this document) installed on their premise shall not be eligible.

10.2.1.2 Residential Customers that use an Automatic Open Transition Supply Transfer systems, such as GenerLink, shall not be eligible.

10.2.1.3 Residential Customers that have an Emergency Power Supply (as described in the OESC) installed on their premise shall not be eligible.

10.2.1.4 Residential Customers that have the revenue meter for their service mounted on a Customer owned pole shall not be eligible.

10.2.1.5 Residential Customers supplied from a ganged meter trough, metering centre, or take supply from a splitter trough may not be eligible. Consult with an HOL Service Layout Agent to determine feasibility and eligibility.

10.2.1.2 Residential revenue metering equipment that uses a telephone line to communicate is not a standard item that HOL keeps in stock; as a result:

10.2.1.2.1 HOL requires a minimum of 16 weeks of lead-time to procure, configure, and install the residential revenue metering equipment that uses a telephone line to communicate.

10.2.1.2.2 The Customer shall be responsible for the cost of procuring the residential revenue metering equipment that uses a telephone line to communicate, a spare revenue meter (as applicable), communications equipment used by the revenue meter, and any additional ancillary equipment that may be needed.

10.2.1.2.3 HOL shall retain ownership of all revenue metering, communications, and ancillary equipment as per Section 5.0.33 of this document.

10.2.1.2.4 HOL shall Upgrade the equipment used by the revenue meter to communicate when HOL deems it obsolete, end-of-life, or is no longer commercially available; this shall be done at the Customer’s cost.
10.2.1.3 The Customer shall supply and install a disconnect switch, with over-current protection, on the Line Side of the revenue meter. The nominal rating of the switch’s over-current protection shall be equivalent to the Service Entrance Ampacity.

10.2.1.4 All HOL revenue metering, and HOL supplied supporting ancillary, equipment shall be installed on the exterior wall of the residence on the side closest to the point of supply. The revenue metering, and supporting ancillary, equipment shall be installed as per one of the following:

10.2.1.4.1 Directly onto the exterior surface of the residence’s wall. In this case, the disconnect switch, HOL supplied revenue metering equipment, and supporting ancillary equipment, shall be installed on the same surface and within 1000 mm [3' 4"] of each other. It shall meet the requirements of Section 5.1 of this document.

10.2.1.4.2 Inside an enclosure that either meets, or exceeds, the requirements of Section 5.1.1 of this document, or within a Customer constructed Weatherproof enclosure. Further, it shall be such that it can be secured using a polished steel bar, [2-3/8" or 3"] in length, that can accommodate two (2) padlocks: a Standard HOL Padlock and the Customer padlock. This shall be done to permit access by both the Customer and HOL personnel to the revenue metering equipment.

10.2.1.4.2.1 If an enclosure is used, it shall be large enough to house the disconnect switch the revenue meter, Meter Socket, and communications enclosure (see Section 10.2.1.5 of this document for more information).

10.2.1.4.2.2 HOL recommends that an Appropriately rated view port be installed in the door of the enclosure that would allow the Customer to have easy access to the revenue meter’s display. If installed, it shall centered over the revenue meter and be large enough to see the entire face of the meter.
10.2.1.4.2.3 HOL recommends installing the revenue metering, and supporting ancillary, equipment inside an outdoor rated enclosure as it can protect the equipment it contains from mechanical damage and can prevent access by unauthorized personnel.

10.2.1.5 The Customer shall supply and install an enclosure to house the communications equipment. The enclosure shall be subject to all of the following:

10.2.1.5.1 Shall meet the requirements for metering enclosures already contained in this document; see HOL document MCS0080 and Section 5.1.1 of this document for more information. Further, it shall be such that it can be secured with a polished steel bar, [2-3/8” or 3”] in length, that can accommodate two (2) padlocks: one padlock shall be a Standard HOL Padlock, the other the Customer’s padlock. The purpose shall be to provide access for both HOL personnel and the Customer.

10.2.1.5.2 Shall have minimum dimensions of (H x W x D) 400 mm x 400 mm x 150 mm [16” x 16” x 6”].

10.2.1.5.3 Shall be installed within 75 mm [3”], to a maximum of 130 mm [5”], of horizontal distance between the enclosure and the Meter Socket.

10.2.1.5.4 The Customer shall supply and install a 120VAC within the enclosure for the exclusive use of the revenue meter’s communications equipment. The outlet shall take supply from the Customer’s panel, Downstream of the Customer’s Service Entrance disconnect.

10.2.1.5.4.1 The duplex grounded outlet shall have factory installed GFCI capability as per OESC.

10.2.1.5.4.2 The duplex grounded outlet shall take supply from, and be protected by, a dedicated breaker that can be locked in the “closed” position with a Standard HOL Padlock while still able to maintain trip-free operation in the event of a Fault.
10.2.1.5.4.3 If the Customer uses a fuse panel, in lieu of a breaker panel, for their residence then the Customer shall supply and install a “pony” panel, or electrical “sub-panel”, for the purposes of housing the breaker as described in Section 10.2.1.5.4.2.

10.2.1.5.4.4 In the event that multiple residential Customers that reside in a duplex, row house, or condominium request that their conventional revenue metering equipment be substituted with revenue metering equipment that uses a telephone line to communicate, each of the requesting Customer shall supply and install a separate communications enclosure to enclose additional communications equipment.

Each of the additional communications equipment installed shall take supply from the Appropriate Customer’s panel, as per Section 10.2.1.5.4 of this document.

10.2.1.6 The Customer shall make provisions to install a dedicated telephone line for the exclusive use of HOL to communicate with the revenue metering, and supporting ancillary, equipment connected to their service.

10.2.1.6.1 The telephone line shall be separate and apart from the telephone line used to provide service for the residence.

10.2.1.6.2 The telephone line shall be available for use by both HOL and revenue metering equipment at all times of the day.

10.2.1.6.3 The telephone line shall be such that it can be dialed directly by HOL.

10.2.1.6.4 Each Customer shall require a separate dedicated telephone line for the revenue metering equipment connected to their service. A single telephone line shall not be shared among different Customers.

10.2.1.6.5 In the event that an individual Customer has more than one revenue meter, the a single dedicated telephone line may be used by HOL to communicate with all of the Customer’s revenue meters.
10.2.1.6.6 A RJ-11 (4 pin) telephone jack receptacle is to be provided and terminated on the telephone cable within the meter’s communications enclosure with 300 mm [12"] to 460 mm [1’6"] telephone cable to allow for mounting the telephone jack inside the enclosure.

10.2.1.6.7 The cost of installing and maintaining the telephone line shall be at the Customer’s expense.

10.2.1.7 Reliable communications between HOL and the revenue meter equipment is essential. It enables HOL to provide the Customer with accurate billing and the best customer service experience.

10.2.1.7.1 HOL, at its determination, may replace the revenue metering equipment that uses a telephone line to communicate with conventional revenue metering equipment that instead uses a wireless radio if any of the following occurs:

10.2.1.7.1.1 HOL, at its determination, losses communications with the revenue metering equipment for a period of more than five (5) business days.

10.2.1.7.1.2 HOL, at its determination, deems the telephone line capacity, availability, reliability, or quality to be insufficient to properly support communications between HOL and the revenue metering equipment.

10.2.1.7.1.3 HOL, at its determination, deems the 120VAC grounded duplex plug providing supply to the communications equipment to have insufficient capacity, availability, or reliability to support the revenue metering equipment.

10.2.1.7.1.4 HOL, at its determination, deems it necessary.

10.2.1.7.2 HOL may re-install the revenue metering equipment that uses a telephone line to communicate, as soon as Practicable, only after the issue causing the lost communications has been remedied to HOL’s satisfaction.
10.3 120V/240V, 1-Phase, 3-Wire, Greater Than 200A: Overhead Individual Services

HOL does not provide Permanent overhead individual services, 120V/240V, 1-Phase, 3-Wire greater than 200A as a standard offering from HOL owned utility poles.

HOL may, at its determination, provide a Temporary overhead individual 120V/240V, 1-Phase, 3-Wire, with an Ampacity greater than 200A service subject to the requirements of Section 16.0 of this document.

10.3.1 The Customer shall Upgrade their existing 120V/240V, 1-Phase, 3-Wire, greater than 200A overhead service, in consultation with either HOL Design Services or an HOL Service Layout Agent, with one of the following:

10.3.1.1 A 120V/240V, 1-Phase, 3-Wire, greater than 200A underground service, as per Section 10.5 of this document.

10.3.1.2 A 120V/240V, 1-Phase, 3-Wire, less than 200A overhead service, as per Section 10.2 of this document.

10.3.1.3 A 120V/240V, 1-Phase, 3-Wire, less than 200A underground service, as per Section 10.4 of this document.

This shall be done in the event that any of the following occurs:

10.3.1.4 The Customer undertakes work on their service, in close proximity to the service’s Demarcation Point (see Section 6.3 and Section 6.4 of this document for more information on determining the location of the Demarcation Point), that requires an ESA permit.

10.3.1.5 The service has been de-energized for a period of more than six (6) months.

10.3.1.6 The service was initially granted as a Temporary service and has been in place longer than one (1) calendar year.

10.3.1.7 The existing metering equipment has been damaged such that it requires replacement, regardless of the cause of the damage.

10.3.1.8 The existing metering equipment will shortly reach or has already reached the end of its service life and requires replacement.

10.3.1.9 HOL, at its determination, deems the Upgrade necessary.
10.4 120V/240V, 1-Phase, 3-Wire, Up To 200A: Underground Individual Services

10.4.0.1 If installed for a residential service, the Meter Socket base shall be located outdoors, in a location approved by the HOL Customer Service Department, normally on the side, or front of the residence, and in front of any existing, or proposed fence.

If installed for a commercial service, the Meter Socket can be located outdoors (either mounted on the exterior wall of the building being supplied, inside a NEMA rated enclosure, or inside a customer built Weatherproof enclosure, that meets the requirements of Section 5.1 of this document) at a location approved by the HOL Customer Service Department or can be installed inside a dedicated electrical room that meets the requirements of Section 5.3 of this document; refer to HOL document MCS0091 for more information.

Further, the meter base and its location shall be subject to all of the following:

10.4.0.1.1 The Customer is required to supply and install an approved Meter Socket with a screw type Sealing Ring for each service up to 200A.

10.4.0.1.2 Socket bases with current bypass switches shall not be permitted.

10.4.0.1.3 A 1-Phase service served from an underground supply system by HOL (not including the proposed underground secondary network system) requires a minimum 200A Meter Socket, designed for connection to an underground supply system.

10.4.0.1.4 Socket bases shall be equipped with [1/2"] studs on the Line Side of the meter base that allows for the connection of compression type lugs.

10.4.0.1.5 Socket bases shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document.

10.4.0.1.6 Socket bases shall be installed on a Permanent vertical surface (i.e. a Permanent wall) or on a Customer’s owned pole, making it is as level and plumb as Practicable as per Section 7.4 of this document.

10.4.0.1.7 Shall have minimum clearances from Gas related equipment as per Section 5.0.16 of this document.

10.4.0.1.8 Typically, socket bases shall be installed no farther than a maximum of 1500 mm [5'] of horizontal distance from the corner of the residence, on the side closest to the electrical service’s Demarcation Point or Supply Point.
10.4.0.1.9 Refer to Table 1A, located at the end of this document, for a list of HOL acceptance criteria for the Meter Socket base and HOL Specifications ECS0002 and MCS0018 for construction details.

10.4.0.1.10 The socket base, if installed on the side of the residence, there shall be a minimum of 1000 mm [3' 4"] of horizontal distance between the meter base and the Customer’s property line.

10.4.0.1.11 If an Instrumentation Transformer on a 120V/240V, 1-Phase, 3-Wire, up to 200A, transformer rated service requires replacement as a result of ordinary wear and tear has reached the end of its service life, HOL, at its determination, shall require the Customer to replace the existing metering equipment with an equivalent Self-Contained Meter.

10.4.0.2 As part of replacing the metering equipment, HOL at its determination shall:

10.4.0.2.1 Remove the existing transformer-rated meter, Instrumentation Transformers, fusing blocks (if present), and test-switch blocks (if present).

10.4.0.2.2 Replace the existing Meter Socket base, if required, in situ, with an approved Meter Socket base of equivalent Ampacity.

10.4.0.2.3 Install a Self-Contained Meter of adequate Ampacity.

10.4.0.2.4 The standard residential revenue meter used by HOL on underground residential services contains a small wireless radio used to relay metering data back to HOL for billing purposes. As an alternative, HOL offers revenue metering equipment that uses a dedicated telephone line, in lieu of the wireless radio, available for additional at cost to the Customer.

See Section 10.2.1 of this document for more information.

10.5 120V/240V, 1-Phase, 3-Wire, 225A to 400A: Underground Individual Residential Services

10.5.0.1 The Service Entrance meter base shall be located outdoors in a location that has been approved by HOL Service Layouts, normally on the front, or side, of the residence and in front of any existing or proposed fence. Further, the meter base and its location shall be subject to all of the following:

10.5.0.1.1 The Customer is required to supply and install an approved 120V/240V, 400A, transformer rated combination base metering enclosure that meets, or exceeds, the requirements of Section 5.1 of this document, with screw type Sealing Ring.
10.5.0.1.1 Residential services that use an Instrumentation Transformer mounted inside an indoor location, but the meter base is installed at an outdoor location, shall Upgrade the Meter Socket to one described in Section 10.5.0.1.1 of this document. The empty Instrumentation Transformer cabinet shall be removed as it will no longer be required. See HOL specification MCS0077 for details.

10.5.0.1.2 Shall be equipped with [1/2"] studs on the Line Side of the metering enclosure that allows for the primary connections of compression type lugs in the metering enclosure.

10.5.0.1.3 HOL shall supply and install compression lugs for the Line Side conductors and mechanical lugs for the Load Side conductors in the Meter Socket enclosure.

10.5.0.1.4 Shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document.

10.5.0.1.5 Shall be installed on a Permanent vertical surface (i.e. a Permanent wall) such that it is as level and plumb as Practicable as per Section 7.4 of this document.

10.5.0.1.6 Shall have minimum clearances from Gas related equipment as per Section 5.0.16 of this document.

10.5.0.1.7 Shall be installed a maximum of 1500 mm [5'] of horizontal distance from the corner of the residence, on the side closest to the electrical service’s Demarcation Point or Supply Point.

10.5.0.1.8 If installed on the side of the residence, there shall be a minimum of 1000 mm [3’ 4’"] of horizontal distance between the meter base and the Customer’s property line.

10.5.0.1.9 Refer to Table 3, located at the end of this document, for a list of HOL approved Weatherproof combination base metering enclosure and HOL Specifications MCS0003 and MCS0019 for construction details.

10.5.0.1.10 The standard residential revenue meter used by HOL on transformer rated residential services contains a small wireless radio used to relay metering data back to HOL for billing purposes. As an alternative, HOL offers revenue metering equipment that uses a dedicated telephone line, in lieu of the wireless radio, available for additional at cost to the Customer.

See Section 10.2.1 of this document for more information.
10.6 120V/240V, 1-Phase, 3-Wire, Greater Than 400A, Underground Individual Services

With the exception of row houses, town houses, and condominiums, HOL Metering Services does not allow underground individual services, 120V/240V, 1-Phase, 3-Wire services for individual residential homes with an Ampacity greater than 400A as a standard offering.

10.7 120V/240V, 1-Phase, 3-Wire, 225A to 400A: Underground Commercial Services

10.7.2.1 The Customer is responsible to supply and install metering enclosures that meet the requirements of either Section 10.7.2.2 or Section 10.7.2.3 of this document.

10.7.2.2 Transformer Rated Combination Base Metering Enclosure

The Customer shall supply and install an approved Meter Socket enclosure on the load-side of a disconnect switch, in an indoor location approved by HOL. Both the Meter Socket enclosure and its location shall be subject to all of the following:

10.7.2.2.1 The Customer shall provide and install an approved underground 120V/240V, 400A, transformer rated combination base metering enclosure, with isolated neutral block and 4-pole metering Test Switch.

10.7.2.2.2 The combination socket base enclosure shall be located immediately after, and on the Load Side of, the main fused disconnect or breaker, inside the building and in the same electrical room, and within sight, of the Service Entrance main disconnect or breaker.

10.7.2.2.3 The combination socket base enclosure shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document.

10.7.2.2.4 The combination socket base enclosure shall be installed on a Permanent vertical surface (i.e. a Permanent wall) such that it is as level and plumb as Practicable as per Section 7.4 of this document.

10.7.2.2.5 The combination socket base metering enclosure shall be mounted on a Customer provided plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] that meets the requirements of Section 9.8 of this document.
10.7.2.2.6 Shall be installed in a location such that there is a minimum of 1500 mm [5'] of horizontal and vertical clearance in front of all metering enclosure(s) as per Section 7.4 of this document.

10.7.2.2.7 The Customer shall supply and HOL shall install mechanical lugs for both the Line Side conductors and Load Side conductors in the Meter Socket enclosure.

10.7.2.2.8 Refer to Table 3, located at the end of this document, for a list of HOL approved Meter Socket base and HOL Specification MCS0008 for construction details.

10.7.2.3 Instrumentation Transformer Cabinet and Transformer Rated Combination Base Metering Enclosure

10.7.2.3.1 The Customer shall supply and install an approved Instrumentation Transformer cabinet and approved transformer rated combination base metering enclosure in an indoor electrical room approved by HOL. The instrumentation cabinet shall meet the requirements already contained in this document; see Section 5.1.1 of this document for more information.

10.7.2.3.2 The installation shall be subject to all of the following:

10.7.2.3.2.1 The Customer shall provide and install an approved 120V/240V, 400A, or 600A, Instrumentation Transformer cabinet.

10.7.2.3.2.2 The Instrumentation Transformer cabinet is to be located immediately after, and on the Load Side of, and within the same electrical room and within view of, the main fused disconnect or breaker.

10.7.2.3.2.3 The Instrumentation Transformer cabinet shall not be used to house Customer owned equipment.

10.7.2.3.2.4 The Instrumentation Transformer cabinet shall not be used as a splitter trough.

10.7.2.3.2.5 The Instrumentation Transformer cabinet shall have minimum dimensions of (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] and maximum dimensions of (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]. Conduit ingress and egress locations are subject to the size of the enclosure (see Schedule 1, Schedule 2, Schedule 3, Schedule 4, Schedule 5, Schedule 6, Schedule 7, and Schedule 8 located at the end of this document for details).
10.7.2.3.2.6 The Instrumentation Transformer cabinet shall have side-hinged doors opening at the centre capable of opening at least 90 degrees and equipped with three-point latching mechanism that permits a Standard HOL Padlock and Seal.

10.7.2.3.2.7 The Customer shall supply and HOL shall install mechanical lugs for both the Line Side and Load Side conductors in the Instrumentation Transformer cabinet.

10.7.2.3.2.8 A continuous 25 mm [1"] EMT conduit shall be used to house the metering secondary conductors from the instrumentation cabinet to an approved 5-Jaw transformer rated combination base metering enclosure. Conduit used shall meet the requirements as per Section 5.2.1 of this document.

10.7.2.3.2.9 The combination base metering enclosure shall be installed such that it satisfies the requirements of Section 7.4 of this document. Further, it shall be installed in the same electrical room, and within sight, of the Instrumentation Transformer cabinet and main fused disconnect or breaker.

10.7.2.3.2.10 The combination base metering enclosure shall be mounted on a Customer provided plywood mounting surface with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] that meets the requirements of Section 9.8 of this document.

10.7.2.3.2.11 Shall be installed in a location such that there is a minimum of 1500 mm [5'] of horizontal and vertical clearance in front of all metering enclosure(s), as much as Practicable as per Section 7.4 of this document.

10.7.2.3.2.12 Refer to Table 4, located at the end of this document, for a list of HOL approved transformer rated combination base metering enclosure and Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrumentation Transformer cabinets and HOL Specifications MCS0041 and MCS0007 for wiring details. Refer to Schedule 3, and Schedule 4 located at the back of this document for more information.
10.7.2.4 Load-Side Disconnect Requirements when an Emergency Power Supply Present or to be Installed

10.7.2.4.1 If the Customer uses an emergency power supply (as defined in Section 46 of the OESC), regardless if it is permanently connected or not:

10.7.2.4.1.1 If an Automatic Transfer Switch scheme is used, it shall be such that it can be locked in the “open” position.

10.7.2.4.2 If the Automatic Transfer Switch or Manual Transfer Switch does not have obvious means to visibly verify its state, then subject to practicality and HOL’s determination:

10.7.2.4.2.1 The Customer shall provide and install an Appropriately sized disconnect switch immediately after, and within view of, the meter and/or Instrumentation Transformer cabinet. This disconnect switch shall be labelled, meeting the requirements of Section 5.5 of this document, as the “Load Side Disconnect” switch.

10.7.2.4.2.2 The Load Side disconnect switch shall be located in the building’s primary electrical room.

10.7.2.4.2.3 The Load Side disconnect switch shall be capable of opening all phases simultaneously, while leaving the Neutral conductor closed, and come with the obvious means to visibly verify its state.

10.7.2.4.2.4 The Load Side disconnect switch shall be such that it can be locked, with a Standard HOL Padlock, in the “open” position.

10.7.2.4.2.5 No Customer owned equipment shall be installed between the Service Entrance disconnect and the metering equipment enclosure or between the metering equipment enclosure and the load-side disconnection switch.

10.7.2.4.2.6 The Load Side disconnect shall be incapable of remote operation and shall not contain any equipment that gives it any remote operation capability.
10.7.2.4.2.7 The purpose of the Load Side disconnect is to isolate the metering equipment, while being worked on by HOL personnel, from any and all Downstream sources of energy, including the Customer’s backup generator.

10.8 120V/240V, 1-Phase, Up To 400A: Residential Townhouses and Underground Multi-Position Services

When metering is required for continuous row of townhouses or condominiums, the Customer shall provide and install metering enclosure(s) that meet the requirements of either Section 10.8.1 or Section 10.8.2 of this document:

10.8.1 Residential Townhouses with Six Individual Units or Less

When metering is required for a residential townhouse or condominium development, consisting of no more than six (6) units, each building shall be permitted to use:

10.8.1.1 An approved 120V/240V, 1-Phase, 400A, multi-position ganged Meter Socket trough, consisting of up to a maximum of six (6), approved Meter Socket bases.

10.8.1.2 The ganged meter trough shall not be altered to accept more meters than factory installed Meter Sockets as per Section 5.1.1.15 of this document.

10.8.1.3 Conductors from the utility supply shall enter the ganged Meter Socket trough through the space specifically provided for that purpose, typically found on the end of the ganged Meter Socket trough. The ganged Meter Socket trough shall not be used as a raceway.

10.8.1.4 Shall be equipped with [1/2"] studs on the Line Side of the ganged Meter Socket trough that allows for the primary connections of compression type lugs in the metering enclosure.

10.8.1.5 HOL shall supply and install compression lugs for the Line Side conductors and the ganged meter trough shall come with factory installed mechanical lugs for the Load Side conductors in the ganged Meter Socket trough.

10.8.1.6 Meter Socket positions shall not be equipped with automatic by-pass or shorting devices.
10.8.1.7 Unused positions within a ganged Meter Socket trough shall be:

10.8.1.7.1 Covered with a Customer supplied UV rated Lexan or UV rated strong plastic cover and a steel Sealing Ring if service will eventually be re-instated. Each unused metering position shall not have Load Side conductors installed.

10.8.1.7.2 If a meter position is permanently removed, the Load Side conductors shall also be removed, as per Section 5.6 of this document, and a factory supplied blank cover shall be installed over top that meter position.

10.8.1.8 If the ganged Meter Socket trough is to be installed inside a metal enclosure, the enclosure shall be subject to all of the requirements of this document; see Section 5.1.1 of this document for more information.

10.8.1.9 If the ganged Meter Socket trough is to be installed inside a Weatherproof enclosure of the Customer’s construction, the Weatherproof enclosure shall have a Permanent roof and Permanent walls, as per the OBC, covered with brick, siding, or stucco. It shall also provide secure access to the metering equipment. The Weatherproof enclosure shall be subject to both the approval of both HOL Design Services and HOL Metering Services.

10.8.1.10 When revenue meters are located inside a Weatherproof cabinet, the cabinet must be secure from the general public. The Weatherproof cabinet must be accessible to HOL’s employees, agents, and contractors at all hours, to permit meter readings, and the changing of meters and access to metering equipment and must be locked. The access doors to the Weatherproof cabinet must be equipped with either a dual locking system or is able to accommodate a [2-3/8” or 3”] long polished steel bar with two holes to accommodate two (2) padlocks: a Standard HOL Padlock and the Customer’s padlock. Alternatively, a key may be left in a Secure Key Box (also known as a “Lock Box”). Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

10.8.1.11 The ganged Meter Socket trough shall be mounted at a height that satisfies the requirements of Section 7.4.1 of this document.

10.8.1.12 The Meter gang socket trough shall be installed such that it shall be as level and plumb as Practicable as per Section 7.4 of this document.
10.8.1.13 Meter gang socket trough shall be installed on the exterior wall of the building, or unit, no further than 1500 mm [5'] of horizontal distance from the corner of the building, or unit, closest to the electrical service’s Demarcation Point or Supply Point. Further, there shall be a minimum of 1500 mm [5'] of horizontal distance between the front of the ganged socket trough and the Customer’s property line.

10.8.1.14 It is the Customer’s responsibility to provide suitable mechanical protection for all of the revenue metering equipment as per Section 6.2.4 and Section 6.2.5 of this document. Refer to Table 2, located at the end of this document, for a list of HOL approved multi-position meter gang socket trough and to HOL Specification MCS0021 for construction details.

10.8.1.15 The Customer shall be responsible for the installation, access, and on-going Maintenance of the ganged meter bases. Where these are multiple Customers supplied from the ganged meter bases, each supplied Customer shall proportionally share the responsibility, based on the number of meters used for their service, of the on-going access and maintenance of the ganged meter bases.

10.8.2 Residential Townhouses with More than Six Individual Units

When metering is required for a residential townhouse or condominium development, consisting of more than six (6) units, metering shall be on the Load Side of the disconnect/breaker supplying each individual unit, and be located either inside or outside of the building.

10.8.2.1 If Metering Equipment is to be installed Outside of the Building: Meter Enclosure and Cabinet Requirements

If the metering equipment is to be installed outside of the building, it shall be subject to all of the following:

10.8.2.1.1 Metering equipment shall be installed inside one of:

10.8.2.1.1.1 An approved prefabricated Weatherproof cabinet that has been supplied and installed by the Customer meeting the requirements of Section 5.1.1 of this document.

Or:

10.8.2.1.1.2 A Permanent Weatherproof enclosure of the Customer’s construction. It shall consist of a Permanent roof and Permanent walls that meets the requirements of the OBC, and shall be covered with brick,
siding, or stucco. It shall provide secure access to the metering equipment contained inside.

Both shall be subject to both the approval of both HOL Design Services and HOL Metering Services.

10.8.2.1.2 If an outdoor cabinet is used, the bottom of the access doors shall be no less than 460 mm [1’ 6”] above the finished grade and such that the top of the cabinet is not higher than 2130 mm [7’] above the finished grade.

10.8.2.1.3 When the meters are located inside an outdoor cabinet or Weatherproof enclosure, the cabinet must be secure from the general public. The Weatherproof cabinet must be accessible to HOL’s employees, agents, and contractors at all hours, to permit meter readings, and the changing of meters and access to metering equipment and must be locked. The access doors to the Weatherproof cabinet must be equipped with either a dual locking system including a [2-3/8” or 3"] long polished steel bar that can accommodate two (2) padlocks: a Standard HOL Padlock and the Customer’s padlock; the intent is to provide access for both the Customer and HOL personnel. Alternatively, a key may be left in a Secure Key Box (also known as a “Lock Box”). Refer to HOL’s Conditions of Service, HOL document ECS0012, for more information.

10.8.2.1.4 The outdoor cabinet or Weatherproof enclosure shall be such that it shall provide adequate mechanical protection for the equipment inside against damage not caused by ordinary wear and tear and acts of nature (not including any of insect infestation, animals, or plant/tree growth). If the outdoor cabinet or Weatherproof enclosure is subject to falling ice or snow from the Customer’s roof, the Customer shall supply and install an ice rack above as per Section 6.2.4 and Section 6.2.5 of this document.

10.8.2.1.5 All revenue metering equipment shall be installed as level and plumb as Practicable.

10.8.2.1.6 The outdoor cabinet or Weatherproof cabinet shall be mounted on the outside wall no more than 1500 mm [5’] of horizontal distance from the corner of the building on the side closest to the electrical service’s Supply Point.
10.8.2.2. Meter Requirements

10.8.2.2.1 The outdoor cabinet or Weatherproof enclosure shall have minimum clearances from Gas related equipment as per Section 5.0.16 of this document. If a Weatherproof enclosure is used, Gas related equipment shall not be installed on the exterior of it. Further, it shall be located such that there is a minimum of 1500 mm [5'] of horizontal distance between the front of the cabinet or enclosure and the Customer’s property line as per Section 7.4 of this document.

10.8.2.2.2 For the metering itself, the Customer shall supply and install one of the following:

10.8.2.2.2.1 An approved metering centre, with Appropriately rated Service Entrance disconnect switch / breaker with a sufficient number of approved Meter Socket positions for each unit being served.

**Or:**

10.8.2.2.2.2 A Service Entrance disconnect switch, lockable and sealable splitter trough, and an individual disconnect switch and individual approved Meter Socket base for each service to be metered.

10.8.2.2.3 Meter Socket positions shall not be equipped with automatic by-pass or shorting devices.

10.8.2.2.4 The Service Entrance disconnect shall permit sealing and padlocking with a Standard HOL Padlock:

10.8.2.2.4.1 With the lock applied, it shall maintain the operating handle of the main switch or breaker in the “open” position.

10.8.2.2.4.2 The provisions for sealing, or locking, the cover, or door, in its closed position shall be accommodated.

10.8.2.2.5 Each Meter Socket shall have clear and unambiguous nomenclature indicating which unit the meter base is connected to.

10.8.2.2.6 The Service Entrance disconnect shall be installed at a height that meets the requirements of Section 5.1.3 of this document.
10.8.2.2.7 If individual Meter Socket bases with splitter trough are used, they shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document. They shall be installed such that they are to be as level and plumb as Practicable.

10.8.2.2.8 If a meter centre is used, it shall be installed such that the top of the meter centre enclosure is no more than 1830 mm [6'] above the finished floor.

10.8.2.2.9 The Service Entrance disconnect shall permit the sealing and padlocking with a Standard HOL Padlock, of:

10.8.2.2.9.1 The operating handle of the main switch or breaker in the “open” position.

10.8.2.2.9.2 The cover or door in its closed position.

Refer to HOL Specifications MCS0036 and MCS0037.

10.8.2.3. If Metering Equipment Is To Be Installed Inside The Building

Meters located inside the building shall be subject to all of the following:

10.8.2.3.1 Metering equipment shall be installed in the building’s electrical room. The electrical room shall be subject to all of the requirements of this document; see Section 5.3.1 of this document for more information.

10.8.2.3.2 The metering equipment shall be installed on an approved plywood mounting surface; see Section 9.8 of this document for more information.

10.8.2.3.3 The Customer shall supply and install one of the following:

10.8.2.3.3.1 An approved metering centre, with Appropriately rated Service Entrance disconnect and a sufficient number of approved Meter Socket positions for each unit being served.

Or:

10.8.2.3.3.2 A Service Entrance disconnect switch, lockable splitter trough, and an individual disconnect switches and individual approved Meter Socket base for each service to be metered.
All revenue metering equipment shall be grouped and installed in the same electrical room as the building’s Service Entrance disconnect that service those meters. Multiple electrical rooms may exist in the same building, yet the Service Entrance main disconnect switch shall be in the same room for the meters it feeds.

10.8.2.3.4 Existing installations that use a splitter trough and individual Meter Socket bases, but do not have a Service Entrance disconnect, shall be “grandfathered”. In the event that the Customer wishes to Upgrade, or significantly alter their service, the Customer shall be required to supply and install an approved Service Entrance disconnect, installed on the Line Side of the meter centre or splitter trough.

10.8.2.3.5 Meter Sockets shall not be equipped with automatic by-pass or shorting devices.

10.8.2.3.6 The Service Entrance disconnect, immediately preceding the meter centre or splitter trough, shall be installed at a height that meets the requirements of Section 5.1.3 of this document.

10.8.2.3.7 If individual Meter Socket bases, with splitter trough, are used they shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document. They shall be installed such that they are to be as level and plumb as Practicable.

10.8.2.3.8 If a meter centre is used, it shall be installed such that the top of the disconnect enclosure is no more than 1830 mm [6'] and no less than 1200 mm [4'] above the finished floor.

10.8.2.3.9 The Service Entrance disconnect shall permit sealing and padlocking with a Standard HOL Padlock:

10.8.2.3.9.1 With the lock applied, it shall maintain the operating handle of the main switch or breaker in the “open” position.

10.8.2.3.9.2 The provisions for sealing, or locking, the cover, or door, in its closed position shall be accommodated.

10.8.2.3.10 All metering sockets shall be installed within view of the Service Entrance disconnect.
10.8.2.3.11 Each Meter Socket shall have clear and unambiguous nomenclature indicating which unit the meter base is connected to.

10.8.2.4. Residential Townhouse or Condominiums with Customer Owned Dry-Core Transformers

A building that contains multiple residential units fed by a 3-Phase service may use a Customer owned dry-core transformer to modify the service voltage to be suitable for residential use. The dry-core transformers for this purpose are typically found ahead of the meters used to measure the residential unit’s consumption.

All residential metering done down-stream, or on the “secondary” (low voltage) side, of Customer owned dry-core transformers shall be subject to all of the following:

10.8.2.4.1 They shall have a “public” service installed.

10.8.2.4.2 All metered Customer owned dry-core transformer and line losses shall be applied to the “public” service account.

The Customer shall be subject to all of the following:

10.8.2.4.3 Install the “check” meter within view of the Service Entrance main disconnect or breaker inside an electrical room, or if outdoors inside an approved Weatherproof enclosure.

10.8.2.4.4 Install the “check” meter such that it is connected immediately after the building’s Service Entrance main disconnect or breaker and before the dry-core transformers.

10.8.2.4.5 Install a Transformer Rated Meter base and Instrumentation Transformer cabinet, as per Section 10.7 of this document, shall be installed to serve as a “check” meter to account for the losses created by the Customer owned dry-core transformer and the conductors that deliver the energy to the residential units.

Refer to HOL Specification MCS0020 for more information.
10.9 120V/208Y or 347V/600Y, 3-Phase Services: Apartment Buildings with Residential Units

A residential apartment building may contain Customer owned dry-core transformers that transform the building’s service voltage to be suitable for residential use. The energy from these transformers is then distributed to electrical rooms located throughout building that contain the metering used to monitor each apartment unit’s consumption.

10.9.1 To determine the losses generated by the Customer owned dry-core transformers, and the conductors, a “check” meter must be installed. The installation of this meter requires the Customer to:

10.9.1.1 Install the “check” meter such that it is connected immediately after the building’s Service Entrance main disconnect or breaker and before the dry-core transformers.

10.9.1.2 Install a Transformer Rated Meter base and Instrumentation Transformer cabinet, as per Section 10.7 of this document, shall be installed to serve as a “check” meter to account for the losses created by the Customer owned dry-core transformer and the conductors that deliver the energy to the residential units.

10.9.1.3 Install a “check” meter in the building’s primary electrical room, within view of the Service Entrance main disconnect / breaker or switchgear.

10.9.2 Electrical rooms that contain metering equipment shall meet the requirements of Section 5.3.1 of this document.

10.9.3 The metering bases for each individual apartment unit shall be located in an electrical room either on the same, or adjacent, floor as the apartment unit itself. Metering equipment supplied and installed by the Customer shall be in accordance with one of the following methods:

10.9.3.1 A meter centre containing sufficient meter positions of proper rating, located on the Load Side of a Service Entrance main disconnect/breaker shall be provided. Each meter position shall be “Cold Metering,” equipped and protected by a rated Circuit Breaker having adequate short circuit interruption capacity on the Line Side of the socket meter, for each unit it supplies. The Service Entrance main disconnect shall be installed immediately next (or as close as Practicable) to, and within easy and obvious sight of, the meter centre taking supply from it.

Refer to HOL Specification MCS0036 for service with meter centre and construction details.

10.9.3.2 A lockable splitter trough located immediately adjacent to, and on the Load Side of the Service Entrance main disconnect, shall be provided.
The splitter trough shall supply individual meter bases to each unit. A disconnect/breaker must be provided between the splitter trough and each of the individual Meter Socket bases.

Refer to HOL Specification MCS0037 for service with multiple Sub-Service points for construction details and Table 1, located at the end of this document, for a list of HOL acceptance criteria for meter base socket.

10.9.3.3 Metering may be accomplished through MCMS, as per Section 13.0 of this document. Consult with HOL to determine eligibility.

Meter Sockets shall not be equipped with automatic by-pass or shorting devices.

10.10 Commercial Services: Standard 3-Phase Metering Configuration

All new 3-Phase services shall be 4-Wire, Grounded-WYE (sometimes called Grounded-Star) systems, 3-Element metered with the Neutral conductor (grounded conductor) forming part of the metering circuit. The Neutral conductor must be connected between the transformer or point of supply and the metering point of all 3-Phase, 4-Wire, Grounded-WYE systems. The Neutral conductor must be grounded at the main service disconnect. The use of an isolated neutral block is necessary when the metering point is on the Load Side of the main service disconnect.

10.10.0.1 A 3-Phase Service Entrance shall not be permitted for an individual single residence or townhome, as per HOL’s Conditions of Service, HOL document ECS0012.

The 3-Phase commercial revenue metering installation shall consist of one of the following:

10.10.0.2 All revenue metering, and supporting ancillary, equipment shall be installed immediately Downstream of the Service Entrance and up stream of all Customer devices. In this instance, a “check” meter and a metered public service shall not be required.

Note: In this instance no HOL commercial revenue metering, or HOL supplied supporting ancillary equipment, shall be installed after a Customer owned dry-core transformer except for metering an individual residential service, as per Section 10.9 of this document.

Or:

10.10.0.3 All commercial metering installed down-stream, or on the “secondary” (low voltage) side, of Customer owned dry-core transformers shall:

10.10.0.3.1 Have a “public” metered service installed.

10.10.0.3.2 Have all metered Customer owned dry-core transformer and line losses shall be applied to the “public” service account.
10.10.1 120V/208Y, 3-Phase, 4-Wire Grounded-WYE, Up To 200A: Commercial Services

In the case of single metered services, up to 200A, a Self-Contained Meter shall be installed to meter the service. The Customer shall:

10.10.1.1 Install the prerequisite revenue metering equipment indoors, either inside the building’s electrical room, inside a Weatherproof enclosure of the Customer’s own construction. Note that the Service Entrance disconnect and any Bulk Meter revenue equipment must be installed in the same electrical room or enclosure.

10.10.1.2 Install an approved commercial 7-Jaw Meter Socket base after, and on the Load Side of the Service Entrance main fused disconnect or breaker.

10.10.1.3 Install the Service Entrance main fused disconnect or breaker at a height that meets the requirements of Section 5.1.3 of this document.

10.10.1.4 Install an approved commercial 7-Jaw Meter Socket base at a height that satisfies the requirements of Section 7.4.1 of this document. Further it shall be installed such that it is parallel with finished floor.

10.10.1.5 Supply and install an approved commercial 7-Jaw Meter Socket base with full-sized Neutral conductor. The socket base shall be installed such that it shall be as level and plumb as Practicable.

10.10.1.6 Install the Neutral conductor terminated in the Meter Socket base on an isolated neutral terminal block. A white #10 AWG Neutral tap shall be supplied to the 6th jaw, of the 7-Jaw Meter Socket base, as a voltage reference.

HOL shall install a self-contained socket meter of sufficient capacity to cover the Service Entrance main disconnect nameplate ratings and supply voltage. The meter shall be located on the Load Side of the Service Entrance main disconnect/breaker in all circumstances.

Refer to Table 5, located at the end of this document, for a list of HOL approved 7-Jaw Meter Socket bases and HOL Specification MCS0018 for meter base wiring details.
10.10.2 347V/600Y, 3-Phase, 4-Wire Grounded-WYE, Up To 200A: Commercial Services

In the case of single metered services, up to and including 200A, a Self-Contained Meter shall be installed. The Customer shall ensure:

10.10.2.1 Metering equipment shall be mounted indoors, either inside the building’s electrical room, inside a Weatherproof enclosure of the Customer’s own construction, or on a Customer owned pole mounted inside a NEMA Type 4 or NEMA Type 4X rated, or better, enclosure, as per HOL document MCS0073.

10.10.2.2 The approved commercial 7-Jaw Meter Socket base is to be connected after, and on the Load Side of the Service Entrance main fused disconnect or breaker.

10.10.2.3 The Service Entrance main fused disconnect or breaker shall be installed at a height that meets the requirements of Section 5.1.3 of this document.

10.10.2.4 The approved commercial 7-Jaw Meter Socket base shall be mounted such that it satisfies the requirements of Section 7.4 of this document.

10.10.2.5 Supply and install an approved commercial 7-Jaw Meter Socket base with full-sized Neutral conductor. The socket base shall be installed such that it shall be as level and plumb as Practicable.

10.10.2.6 The Neutral conductor is to be terminated in the Meter Socket base on an isolated neutral terminal block or isolated Neutral bus. A white #10 AWG Neutral tap shall be supplied to the 6th jaw, of the 7-Jaw Meter Socket base, as a voltage reference.

HOL shall install a self-contained socket meter of sufficient capacity to cover the Service Entrance main disconnect nameplate ratings and supply voltage. The meter shall be located on the Load Side of the Service Entrance main disconnect/breaker in all circumstances.

Refer to Table 5, located at the end of this document, for a list of HOL approved 7-Jaw Meter Socket bases and HOL Specifications MCS0016 and MCS0018 for meter base wiring details.

10.11 3-Phase, 3-Wire, “Delta” Connected Service

10.11.1 All 3-Phase, 3-Wire, Delta connected secondary services represent a legacy standard HOL service voltage. HOL does not provide 3-Phase, 3-Wire, Delta connected meters for new, added, or upgraded secondary services.
10.11.2 For existing Delta connected secondary services that have been “grandfathered”, the Customer shall supply and install, on the Load Side of the revenue meter, equipment capable of detecting and indicating the presence of a ground Fault (normally in the form of fault-indicator lights), as per HOL’s Conditions of Service, HOL document ECS0012.

10.11.3 Existing 3-Phase, 3-Wire Delta-connected services shall be “grandfathered”.

10.11.4 The Customer, in consultation with HOL, shall Upgrade their existing Delta connected service to a Grounded-WYE connected service, of comparable Ampacity, in the event that any of the following occurs:

10.11.4.1 The Customer undertakes work on their service, in close proximity to the service’s Demarcation Point (see Section 6.3 and Section 6.4 of this document for more information on determining the location of the Demarcation Point), that requires an ESA permit.

10.11.4.2 The service has been de-energized for a period of more than six (6) months.

10.11.4.3 The existing metering equipment has been damaged such that it requires replacement, regardless of the cause of the damage.

10.11.4.4 The existing metering equipment will shortly reach or has already reached the end of its service life and requires replacement.

10.11.4.5 HOL, at its determination, deems the Upgrade necessary. Reasons may include, but are not limited to, the following:

10.11.4.5.1 HOL is no longer able to procure Delta-connected meters.

10.11.4.5.2 The accuracy of the existing metering installation has been proven suspect and would not be corrected through the replacement of the existing metering equipment.

10.11.4.5.3 The Upgrade is required to provide continued reliable service to the Customer.

10.11.5 The upgraded service shall be subject to all of the following:

10.11.5.1 It shall meet all the requirements of the most current version of this document.
10.11.5.2 It shall provide a Grounded-WYE connected service. This may include the installation of a full-sized Neutral conductor from the supplying transformer(s) to the location where the revenue metering equipment is installed. The full-sized Neutral conductor shall be extended from the metering equipment to be terminated at the first Customer owned device where Practicable.

10.11.5.3 The full-sized Neutral conductor shall be brought to an isolated neutral block, inside the Instrumentation Transformer enclosure, before being extended and terminated at the first Customer owned device where Practicable.

10.11.5.4 The service shall be metered as a 3-Phase, 4-Wire, Grounded-WYE connected service.

10.11.5.5 If the Service Entrance Ampacity is less than 200A, the Customer shall supply and install an approved commercial king-size 7-Jaw Meter Socket base.

**Note:** Refer to Table 5, located at the end of this document, for a list of HOL approved 7-Jaw Meter Socket bases and HOL Specifications MCS0016 and MCS0018 for meter base wiring details.

10.11.5.6 If the Service Entrance Ampacity is greater than 200A, the Customer shall supply and install an approved commercial king-size 13-Jaw Meter Socket base.

**Note:** Refer to Table 5A, located at the end of this document, for a list of HOL approved 13-Jaw Meter Socket bases and HOL Specification MCS0017, for meter base wiring details.

10.11.5.7 The Customer should consult with HOL to determine where they may require a high impedance grounding system for specialized applications and the correct specification and operation of the metering equipment.

10.12 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, Greater Than 200A and Up To 600A Services

The Customer shall provide and install a properly sized Instrumentation Transformer cabinet and Appropriate meter base in a location that meets the requirements of Section 10.12.1 of this document.

**Note:** A 3-Phase, 4-Wire, Service Entrance shall not be permitted for use on an individual residence.
The instrumentation cabinet shall meet the requirements in Section 5.1.1 of this document. Further, the installation shall be subject to all of the following:

10.12.1 All Instrumentation Transformers for services over 200A shall be installed in one of the following locations:

**Note:** Regardless of location, if service is 120V/208Y and greater than or equal to 800A, or 347V/600Y and greater than or equal to 400A, a dedicated phone line shall be required as part of the metering installation.

10.12.1.1 In the main electrical room of the building being serviced. The electrical room shall be Weatherproof and subject to Section 5.3 of this document.

**Or:**

10.12.1.2 In a walk-in enclosure that meets, or exceeds, the requirements of Section 5.1.1 of this document, or a Permanent Customer constructed Weatherproof structure that meets OBC requirements, that is separate and apart from the building being served, and shall be subject to all of the following:

10.12.1.2.1 It shall be Weatherproof.

10.12.1.2.2 Customer constructed Weatherproof structures shall consist of Permanent walls covered in brick, siding, or stucco, and shall be covered by a Permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of both the OBC (for including, but not limited to, residential buildings, electrical walk-in enclosures, and storage sheds) and Section 5.3 of this document.

10.12.1.2.3 It shall be located and oriented such that:

- **10.12.1.2.3.1** It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.

- **10.12.1.2.3.2** It shall not obstruct any vehicular traffic while its doors are in the open position.

- **10.12.1.2.3.3** HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.
10.12.1.2.3.4 The Customer shall provide mechanical protection for the enclosure in the form of bollards, if required, as per Section 10.17.2.5 and Section 10.17.2.6 of this document.

10.12.1.2.3.5 If located in the vicinity of a road, the enclosure and any bollards shall be set back:

10.12.1.2.3.5.1 A minimum of 1000 mm [3’ 4"] from the travelled portion of the road if the road has a curb but does not have a sidewalk.

10.12.1.2.3.5.2 A minimum of 4000 mm [13’ 1-1/2"] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

10.12.1.2.3.5.3 A minimum of 1000 mm [3’ 4"] from the sidewalk away from the travelled portion of the road if the road has both a curb and sidewalk.

10.12.1.2.4 An outdoor public light shall be installed on the exterior of the structure as close as Practicable to the main entrance for the purpose of illuminating the structure’s entrance.

10.12.1.2.5 Remove any graffiti on a regular basis or when requested.

10.12.1.2.6 If a landing has been constructed outside the exterior door, then both the landing and staircase shall have CSA approved handrails.

10.12.1.2.7 The Customer, at their expense, shall install a metered “public” service in the structure for the purposes including, but not limited to, running the heater, convenience outlet, and lighting.

10.12.1.2.8 The entrance to the structure shall be kept free of snow, and debris, at all times to permit easy and safe access.

10.12.1.2.9 The entrance to the structure shall be both obvious and visible from the road allowance nearest to it, and labelled to indicate that it contains HOL revenue metering equipment.

Or:
10.12.1.3 Shall be mounted in an enclosure or pedestal that meets, or exceeds, the requirements Section 5.1.1 of this document (or equivalent CSA specifications and shall be subject to all of the following:

10.12.1.3.1 It shall be Weatherproof.

10.12.1.3.2 It shall meet all the applicable requirements as per Section 5.3 and Section 10.17.2 of this document.

10.12.1.3.3 The exterior shall be either painted gray (as close as Practicable to colour ASA 61 [RGB # 129, 134, 130]), as defined in ASTM document D1535, or be polished stainless steel. This colour is also referred to as ANSI 61.

10.12.1.3.4 An outdoor public light shall be installed on the exterior of the enclosure, as close as Practicable to the main entrance for the purpose of illuminating the structure’s entrance.

10.12.1.3.5 Subject to the City of Ottawa Utility Pedestal Guidelines.

10.12.1.3.6 It shall be located and oriented such that:

10.12.1.3.6.1 It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.

10.12.1.3.6.2 It shall not obstruct any vehicular traffic while its doors are in the open position.

10.12.1.3.6.3 HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.

10.12.1.3.6.4 The Customer shall provide mechanical protection for the enclosure in the form of bollards, if required, as per Section 10.17.2.5 and Section 10.17.2.6 of this document.
10.12.1.3.6.5 If located in the vicinity of a road, the enclosure any bollards shall be set back:

10.12.1.3.6.5.1 A minimum of 1000 mm [3’ 4"] from the travelled portion of the road if the road has a curb but does not have a sidewalk.

10.12.1.3.6.5.2 A minimum of 4000 mm [13’ 1-1/2"] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

10.12.1.3.6.5.3 A minimum of 1000 mm [3’ 4"] from the sidewalk away from the travelled portion of the road if the road has both a curb and sidewalk.

10.12.1.3.6.6 The bottom of the doorway shall be a minimum of 460 mm [1’ 6"] above grade to a maximum that permits the top of:

10.12.1.3.6.6.1 The pedestal to be less than 1830 mm [6'] above finished grade.

Or:

10.12.1.3.6.6.2 The top of the walk-in to be less than 2130 mm [7'] above finished grade.

10.12.1.3.7 Remove any graffiti on a regular basis or when requested.

10.12.1.3.8 The Customer, at their expense, shall install a metered “public” service in the structure for the purposes including, but not limited to, running the heater, convenience outlet, and lighting.

10.12.1.3.9 The entrance to the enclosure shall be both obvious and visible from the road allowance nearest to it, and clearly labelled that it contains HOL revenue metering equipment.

10.12.1.3.10 The enclosure shall be kept free of snow, and debris, at all times to permit easy and safe access.
10.12.2 The Customer shall provide a plywood mounting surface, that meets the requirements of Section 9.8 of this document, with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] to mount the combination base metering enclosure.

10.12.3 The Customer shall provide and install an Instrumentation Transformer cabinet that shall be a minimum size of (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] to a maximum size of (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]).

10.12.4 The Instrumentation Transformer cabinet shall not be used to house Customer owned equipment.

10.12.5 The Instrumentation Transformer cabinet shall not be used as a splitter trough or raceway.

10.12.6 The Instrumentation Transformer cabinets must also be equipped with factory installed three-point latching, that permits the cabinet to be locked with a Standard HOL Padlock and Seal.

10.12.7 The Instrumentation Transformer cabinet is to be connected after, and on the Load Side of the Service Entrance main fused disconnect or breaker.

10.12.8 The Customer shall provide and install an approved 13-Jaw transformer rated combination base such that it satisfies the requirements of Section 7.4 of this document.

10.12.9 The secondary metering conductors from the instrumentation cabinet to the combination base metering enclosure shall be enclosed in continuous EMT conduit. The conduit used shall meet the requirements of this document; see Section 5.2.1 of this document for more information. The conduit shall be 30 mm [1-1/4"] in diameter if the conduit’s run is less than 20 m [65']. The conduit shall be 40 mm [1-1/2"] in diameter if the run is greater than 20 m [65'] but less than 30 m [100']. A single run of conduit shall not be longer than 30 m [100'] in length.

10.12.10 If switchgear is used in lieu of a metering cabinet, it shall be subject to the same requirements as mentioned above.

10.12.11 Refer to Table 5A, located at the end of this document, for a list of HOL approved commercial 13-Jaw Transformer Rated Meter socket base and Table 6, located at the end of this document, for a list of HOL acceptance criteria for Instrumentation Transformer cabinets and HOL Specification MCS0022 for construction details and HOL Specification MCS0017 for wiring detail.
10.13 120V/208Y, 2-Phase, 3-Wire, Up To 200A Service: Individual Network Services

10.13.1 When metering is required for Network Services of 120V/208Y, Grounded-WYE connected, 2-Phase with Neutral conductor, up to and including 200A, it shall have a 7-Jaw socket meter base connected on the Load Side of each Customer’s fused disconnect or breaker.

Note: Network Services are only available in apartment buildings and multi-storey condominiums for use with residential services.

10.13.2 5-Jaw socket meters shall only be permitted if the Customer installs a meter centre. The 5-Jaw assembly shall be full capacity, not a substitute, factory installed in the nine (9) o’clock position in the Meter Socket base.

10.13.3 All 120V/240V, 1-Phase meter centres shall use only 4-Jaw Meter Sockets. If the socket is supplied with a 5-Jaw installed, it shall be removed prior to the installation of the metering equipment.

10.13.4 Refer to Table 5, located at the end of this document, for a list of HOL approved commercial 7-Jaw Meter Socket bases. Refer to HOL Specifications MCS0005 and MCS0018 for construction details.

10.14 1-Phase, Network, and 3-Phase Services: Multiple Unit Services

A Customer may install multiple metering through one of the following two methods, meter centres, or splitter trough applications:

10.14.1 Meter Centres

Only an approved 5-Jaw Meter Socket position shall be permitted, when the Customer installs a meter centre. The 5-Jaw assembly must be full capacity, factory installed, not a substitute, and installed in the nine (9) o’clock position in the Meter Socket base.

Meter centres may be used for applications less than 750V provided they meet the following:

10.14.1.1 Meet all the requirements of Section 5.1.1.14 of this document.

10.14.1.2 Metering centres that are not outdoor rated shall be mounted in an indoor location. Indoor locations may include, but are not limited to, electrical rooms, Customer built Weatherproof enclosures, and outdoor rated enclosures and walk-ins that meet, or exceed, the requirements of Section 5.1 of this document.
10.14.1.2.1 Metering centres that will installed in an area that will expose the revenue metering equipment to corrosive substances, as per Section 5.1.1.13, shall mount the metering centre inside an enclosure that meets, or exceeds, the requirements of Section 5.1.1.13 of this document.

10.14.1.3 An approved, suitably rated socket base meter centre located on the Load Side, and immediately adjacent to, the Service Entrance main disconnect for the building is required. Each meter position within the meter centre shall be “Cold Metering”. Equipped and protected by an Appropriately rated Circuit Breaker having adequate short circuit interruption capacity on the Line Side of the meter position, for each distinct unit it supplies. The meter centre shall be installed immediately next (or as close as Practicable) to, and within easy and obvious sight of, the Service Entrance disconnect it takes supply from.

Refer to HOL Specification MCS0036 for construction details.

10.14.1.4 The meter centre shall be installed such that it shall be as level and plumb as Practicable.

10.14.1.5 The centre of the bottom row of meter positions, on the installed meter centre, shall be not less than 600 mm [2'] above the finished floor. The centre of the top row of meter positions shall be not more than 1830 mm [6'] above the finished floor.

10.14.1.6 The distance between adjacent Meter Socket rims along the horizontal shall not be less than 150 mm [6”].

10.14.1.7 The distance between adjacent Meter Socket rims along the vertical shall be:

10.14.1.8.1 For 100A, 4-Jaw or 5-Jaw Meter Sockets, not less than 75 mm [3”].

10.14.1.8.2 For 100A, 7-Jaw Meter Sockets, not less than 150 mm [6”].

10.14.1.8.3 For 200A, 4-Jaw, 5-Jaw, or 7-Jaw Meter Sockets, not less than 150 mm [6”].

10.14.1.8 Side-hinged doors, or panels, shall be installed over all sections of the Switchboard where HOL may be required to work including un-metered sections and those sections containing breakers or switch and meter mounting devices.

10.14.1.9 All of the hinged doors, or panels, shall have the following provisions:

10.14.1.10.1 They shall be such that they can be opened at least 90 degrees with respect to the cabinet.
10.14.1.10.2 Come with factory installed door stops allowing them to be locked in the open position.

10.14.1.10.3 Come with factory installed equipment that allow them to be locked in the closed position with Standard HOL Padlocks and sealed with HOL seals.

10.14.1.10.4 If bolts are used, they shall be the captive knurled type (thumb screws).

10.14.1.10.5 The hinged covers over breakers or switches shall be constructed so that the covers cannot be opened when sealed or padlocked.

10.14.1.10 Breakers or switch handles shall have provisions for positive sealing and permit them to be padlocked, with a Standard HOL Padlock, in the “open” position.

10.14.1.11 Meter jaw arrangements shall be factory installed and not retrofitted to meet service requirements.

10.14.1.12 Each individual Meter Socket position, associated breaker, and breaker cover plate shall have adequate space for Permanent Customer identification, and each shall be identified with respect to civic address and/or unit number; refer to Section 5.5 of this document for more information.

10.14.1.13 The meter mounting socket and metal Sealing Ring shall be such that it can be sealed by HOL.

10.14.1.14 When a Neutral conductor is required for metering, the meter-mounting device shall have a pre-wired, ungrounded Neutral connection to the 5th terminal in the 5-Jaw socket, or 6th terminal in the 7-Jaw socket. The connection, if not made directly to the Neutral buss, shall not be less than a white #10 AWG conductor, or equivalent.

Refer to HOL Specification MCS0018 for wiring detail connection configuration.

10.14.2 **Splitter Trough Applications**

When a Splitter Trough is required as part of the metering installation, the Customer shall provide, and install, a CSA or ULC approved trough that is suitably rated for the application and subject to the following:

10.14.2.1 The splitter trough shall be located immediately after, and on the Load Side, of the building’s Service Entrance fused disconnect or breaker.
10.14.2.2 The splitter trough shall be installed such that it shall be as level and plumb as Practicable.

10.14.2.3 The splitter trough shall be mounted horizontally; if space does not permit, and after obtaining HOL’s consent, the splitter trough may be mounted vertically.

10.14.2.4 The Customer shall supply and install an isolated neutral block to be installed at a Practicable location within the splitter trough. A full-sized Neutral conductor shall run from the Neutral buss in the Service Entrance disconnect to the isolated neutral block. The full-sized Neutral conductor for each metered service shall be supplied from the isolated neutral terminal block inside the splitter trough.

10.14.2.5 Individual socket type meter bases, for each unit being served, shall be supplied from the splitter trough.

10.14.2.6 Each service coming out of the splitter trough must be enclosed in EMT conduit, and go directly into a lockable disconnect, with isolated neutral block, before proceeding to the individual socket type meter base.

10.14.2.7 The splitter trough shall come with factory installed hardware that permits its door to be locked with a Standard HOL Padlock and HOL installed Seal.

10.14.2.8 The splitter trough’s door shall be either:

10.14.2.8.1 Attached to the trough via a factory installed hinge such that it permits the door to be opened downwards.

10.14.2.8.2 Normally secured to the trough by multiple bolts, or studs, such that it permits the door to be removed completely.

Refer to HOL Specification MCS0037 for construction details.

10.14.3 Identifying Individual Units

The Customer shall provide clear, Permanent, and unambiguous nomenclature to identify each meter that meets the requirements of Section 5.5 of this document.

10.15 General Service Customer Class: Commercial Installations

10.15.1 When metering equipment is to be placed in an electrical room, the electrical room itself shall meet the requirements already discussed in this document; see Section 5.3.1 of this document for more information.
10.15.2 Where there is the possibility of danger to workers, or damage to the meter or metering equipment, from moving machinery, dust, fumes, moisture, or excessive noise, protective arrangements shall be provided by the Customer to the satisfaction of HOL.

10.15.3 Any compartments, Instrumentation Transformer cabinets, boxes, sockets, or other workspace provided for the installation of HOL’s metering equipment shall be for the exclusive use of HOL. No equipment, other than what is provided and installed by HOL may be installed in any part of the HOL metering workspace.

10.15.4 Alternate provisions must be made in the case of the following arrangements:

10.15.4.1 In Metal Enclosed Switchgear, as specified in Section 11.0 of this document.

Or:

10.15.4.2 In Meter and Metal Instrumentation Transformer Cabinet(s), as described in Section 9.0 of this document.

10.16 Service Identification

10.16.1 In addition to the requirements for nomenclature in Section 5.5, the Customer shall permanently, and legibly, identify all metered services with respect to apartment or unit number and the civic address.

10.17 1-Phase and 3-Phase, Up To 200A, Secondary Metered Outdoor Pedestal, Up To 750V: Installations for Non-Distributed Generation Applications

For 1-Phase, and 3-Phase, services, up to 200A, located such that it isn’t Practicable to install the metering equipment in a Permanent building, or in cases where due to the nature of the service (such as parks, utilities, sports facilities, etc.) it may be preferable to install the metering equipment in a metering pedestal.

This specification describes the minimum requirements that the Customer must meet before connecting to HOL’s electrical system.

When approved by HOL, the Customer has the option to meet the requirements listed below or the Customer shall build to HOL’s Specifications MCS0043 and MCS0035 for their secondary metered pedestal.
10.17.1 **Metering and Equipment Requirements**

The pedestal and enclosure shall meet the requirements for metering cabinets already included in this document; see Section 5.1.1 of this document for more information. Further, it shall also be subject to the following:

10.17.1.1 Metered service pedestals are to be used when a suitable building, or electrical room, is not available to house the electrical service equipment.

10.17.1.2 Minimum outside metering cabinet dimensions are (H x W x D) 920 mm x 1321 mm x 400 mm [36-1/4" x 52" x 15-3/4"].

10.17.1.3 It shall meet both the ESA and OESC requirements for grounding and bonding.

10.17.1.4 All locks and operating mechanics must be heavy-duty type and capable of securing the doors to make unauthorized entry as difficult as possible.

10.17.1.5 The access doors must be equipped with a dual locking system including a [2-3/8" or 3"] long polished steel bar that can accommodate two (2) padlocks: a Standard HOL Padlock and the Customer padlock. The intent is to provide access for both the Customer and HOL personnel.

10.17.1.6 The main switch shall be lockable, in the “open” position, with a Standard HOL Padlock.

10.17.1.7 All double doors with internal hardware shall have a steel astragal to cover the gap between the doors.

10.17.1.8 If a double door is used, the inactive door must be equipped with two 19 mm x 250 mm [3/4" x 10"] bolts located on the inside at the top and bottom in addition to any internal locking mechanism.

10.17.1.9 The Meter Socket base shall be located immediately after, and on the Load Side of, the Service Entrance, or main, fused disconnect within the metering pedestal.

10.17.1.10 All 120V/240V, 1-Phase, up to 200A, services shall have a 4-Jaw king size Meter Socket base as detailed in Table 1, located at the end of this document, to be supplied and installed by the Customer in the metering pedestal. The Meter Socket base shall be installed such that it shall be as level and plumb as Practicable.
10.17.1.11 All 120V/208Y or 347V/600Y, 3-Phase, up to 200A, services shall have an approved 7-Jaw Meter Socket base as detailed in Table 5, located at the end of this document, to be supplied and installed in the metering pedestal by the Customer. The Customer shall supply and install both a full-sized Neutral conductor and an isolated Neutral conductor terminal block. The Neutral conductor shall be used as a voltage reference by the metering equipment. The Meter Socket base shall be installed such that it shall be as level and plumb as Practicable.

10.17.2 Location Requirements

The location of the pedestal shall be subject to all of the following:

10.17.2.1 Shall meet the location requirements for metering cabinets already included in this document; see Section 5.1.1 of this document for more information.

10.17.2.2 Shall be subject to the most current version of the City of Ottawa Utility Pedestal Guidelines.

10.17.2.3 The service owner shall supply the GPS coordinates with ±2 m [±6’ 6-3/4"] accuracy and the associated civic address (if available) of the pedestal’s location.

10.17.2.4 The pedestal location shall be clear of the travelled portion of the roadway by meeting the Transportation Association of Canada offset guidelines as found in the Geometric Design Guide for Canadian Roads, Section 3.1.3.

10.17.2.5 The Customer shall supply, install, and maintain protective bollards around the outdoor metering enclosure, cabinet, walk-in, or pedestal for the purposes of providing mechanical protection and to act as a mechanical barrier for HOL personnel against passing traffic.

Note: Services described in Section 7.5.2 of this document are exempt from this requirement. Bollards shall be required if any of the following conditions exist:

10.17.2.5.1 The metering equipment installation location is located inside an area that can be accessed by a motor vehicle (including automobiles, sport-utility vehicles, and trucks), or located within 2000 mm [6’6-3/4"] of an area that can accessed by a motor vehicle (including automobiles, sport-utility vehicles, and trucks), where they easily achieve speeds in excess of 20 km/h [12 mph].
10.17.2.5.2 The metering equipment installation location is located in an area that will be subject to grounds Maintenance equipment operating within 1000 mm [3’ 4"] of the pedestal, capable of causing significant mechanical damage to the pedestal. This includes snow clearing equipment and large riding lawn mowers.

10.17.2.5.3 HOL, at its determination, deems them required.

10.17.2.6 If protective bollards are required, they shall be subject to all of the following:

10.17.2.6.1 The bollards shall be installed in sufficient quantity to provide adequate protection to the satisfaction of HOL.

10.17.2.6.2 When used to protect 1-Phase metering, the bollards shall be no less than 100 mm [4"] in diameter; when used to protect 3-Phase metering, the bollards shall be no less than 150 mm [6"]). The bollard shall consist of a steel jacket filled with concrete, and meet the requirements of HOL Specification UFS0001.

10.17.2.6.3 Bollards shall be positioned around the enclosure, cabinet, walk-in, or pedestal, as per UGS0002.

10.17.2.6.4 They shall be installed on only the sides of the enclosure, cabinet, walk-in, or pedestal that are visible from the well-travelled portion of the road.

10.17.2.6.5 Bollards shall be positioned in such a way that they do not interfere with the accessibility, or maintainability, of the enclosure, cabinet, walk-in, or pedestal nor shall it interfere with the accessibility or maintainability of the equipment it contains.

10.17.2.6.6 It is recommended that the bollards be painted in a highly visible colour. If painted, the paint itself shall be such that:

10.17.2.6.6.1 It is intended, by the paint’s manufacturer, to be used outdoors.

10.17.2.6.6.2 It is intended, by the paint’s manufacturer, to cover the material(s) the bollard is comprised of.

10.17.2.6.6.3 It shall act as a mechanical barrier, helping to protect the bollard against corrosion and water damage.
10.17.3 **Personnel Access**

Access to the pedestal, by HOL’s personnel, agents, or contractors shall meet the requirements already included in this document and shall also be subject to the following:

10.17.3.1 Personnel to have a clear access in front of cabinet with no obstructions.

10.17.3.2 Accessible via a flat surface area.

10.17.3.3 The access door swing shall be un-impeded.

10.17.3.4 Safe access to the enclosure shall not be impeded.

10.17.3.5 Joint access to the pedestal shall be maintained through a key or lock sharing agreement.

10.17.4 **Installation and Ongoing Responsibilities of the Service Owner**

The pedestal’s owner shall be subject to all of the following when the pedestal is installed within the public road allowance:

10.17.4.1 Meet the technical requirements within the public road allowance, and have a Public Road Authority Access Agreement.

10.17.4.2 Perform on-going Maintenance of the enclosure and the electrical conductor and equipment to designated Supply Point.

10.17.4.3 Remove any graffiti on a regular basis or when requested.

11.0 **Secondary Distribution Metal Enclosed Switchgear**

11.0.1 The Customer shall submit two (2) copies of the manufacturer’s Switchboard drawings for approval to HOL’s Distribution Design Department, with the dimensions showing provisions for, and arrangement of, HOL’s revenue metering equipment.

11.0.2 Individual services utilizing metal clad switchgear must provide a separate, lockable vertically hinged access door to the Instrumentation Transformer/metering Compartment on the Load Side, and immediately adjacent to the switchgear main disconnect Compartment. This metering Compartment is to be permanently identified “For Supply Authority Use Only” and shall be provided for each set of metering Instrumentation Transformers within the Switchboard.
11.0.3 Instrumentation Transformer spaces are for the exclusive use of HOL Metering personnel. It shall not be used for any other purposes including raceways, pass throughs, or for storage in the construction of the switchgear itself.

11.0.4 Where Instrumentation Transformers are to be installed on the Load Side secondary buss of metal clad switchgear, shop drawings shall be submitted to HOL’s Distribution Design Department to ensure that the Instrumentation Transformers fit. In cases where the Instrumentation Transformers only meter a portion of the metal clad switchgear, (such as public loads), a separate, lockable, disconnect switch must be installed ahead of the metering Compartment, so that the service can be de-energized without any interruption to the main service supply.

11.0.5 Mounting bolts or nuts for support of the base of the Instrumentation Transformers shall be installed in a manner which shall permit complete installation and/or removal of the Instrumentation Transformers from within the Compartment in which they are installed. Fixed mounting studs using nuts or bolts shall be required for this purpose.

11.0.6 When window (donut) type CTs is to be installed, the buss shall be sectionalized. The removable buss links through the CTs shall be bolted in the vertical buss section directly above and below the CTs. When three (3) window type CTs are used, for 3-Element metering, they shall be mounted in a staggered arrangement.

11.0.7 When window (donut) type CTs are used and the Switchboard buss is larger than the window opening, the Customer or Switchboard manufacturer shall modify the buss to accommodate the CTs.

11.0.8 When required, provision shall be made for the installation of PTs on a #16 MSG steel panel in an accessible location in the Instrumentation Transformer Compartment. This panel must not obstruct access to the CTs or the removable buss links that pass through the CTs.

11.0.9 A readily accessible grounding stud with a connector suitable for a #10 AWG Copper wire or a ground bar provided with three (3) 10-24 tapped holes shall be provided in the Instrumentation Transformer Compartment. The grounding facility in the Compartment shall be connected directly to the Switchboard ground buss.

11.0.10 An approved 13-Jaw transformer rated combination base metering enclosure shall be supplied, and installed by the Customer in an approved location, separate from the Switchboard. The Meter Socket base shall be installed such that it shall be as level and plumb as Practicable. The Customer shall supply and install a continuous run of conduit to house the secondary metering conductors connecting the Instrumentation Transformer Compartment and the meter location (13-Jaw transformer rated combination base metering enclosure) in the electrical room. All of the conduit used shall meet the requirements of this document; see Section 5.2.1 of this document for more information.

11.0.11 Refer to HOL Specifications related to meter enclosed switchgear: MCS0024, MCS0025, MCS0026, MCS0042, MCS0066, and MCS0099 for construction details.
11.0.12 Neutral Bus Connections: A readily accessible continuous Neutral Copper bus, made of a material compatible with the material comprising the conductors, of 25 mm x 3 mm [1" x 1/8"] or equivalent (#6 AWG Copper white TW75 wire), with three (3) 10-24 tapped holes, shall be provided in each Instrumentation Transformer Compartment. If the main Neutral bus passes through a metering Instrumentation Transformer Compartment, the bus shall be provided with three (3) individual 10-24 tapped holes.

11.0.13 All disconnect switches, and Circuit Breakers, on the Line Side of HOL’s metering, shall have provisions for sealing and padlocking with a Standard HOL Padlock. This includes feeder breakers supplying dry-core transformers, which in turn feed meter centres.

11.0.14 The Customer shall provide mechanical protection for the metal enclosed switchgear in the form of bollards, if required, as per Section 10.17.2.5 and Section 10.17.2.6 of this document.

   11.0.14.1 Bollards installed to protect Customer owned switchgear shall meet the requirements of HOL specifications.

   11.0.14.2 If required by the OESC or ESA, the Customer shall install a ground-grid around the foundation pad of the switchgear and bond the protective bollards.

11.0.15 A minimum clearance of 1500 mm [5'] must be provided in front of all Instrumentation Transformer compartments and shall be installed at a height that meets the requirements of Section 5.1.1.4 of this document.

11.0.16 If installed at an outdoor location, the metal enclosed switchgear shall be positioned such that:

   11.0.16.1 It does not obstruct any sidewalk, walkway, or pedestrian traffic while any of its doors are in the open position.

   11.0.16.2 It does not obstruct any vehicular traffic while any of its doors are in the open position.

   11.0.16.3 It does not encroach, obstruct, or reduce the accessibility or serviceability, any adjacent HOL owned equipment while any of its doors are in the open position.

   11.0.16.4 HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.

   11.0.16.5 The installation location meets or exceeds the requirements of Section 5.0.16 of this document.
11.0.17 If the metal enclosed switchgear is customer owned and functions to distribute power to multiple individual customers:

11.0.17.1. The metal enclosed switchgear shall be equipped with a “check” meter intended to register the total amount of power distributed through it.

11.0.17.1.1. The metal enclosed switchgear shall have a dedicated cell for the exclusive use of HOL revenue metering, and ancillary equipment.

11.0.17.1.2. The “check” meter shall be installed within a separate enclosure that meets the requirements of this document. The enclosure itself shall be within easy and obvious sight of the metal enclosed switchgear the enclosed metering monitors.

11.0.18 If installed at an outdoor location and located in, or near, the vicinity of a road or parking lot, the metal enclosed switchgear shall be set back from the road or parking lot such that:

11.0.18.1 On the sides of the metal enclosed switchgear that do not have an operable door:

11.0.18.1.1 A minimum of 1000 mm [3’ 4"] of clearance between the outer edge of the metal enclosed switchgear’s foundation pad and the adjacent sidewalk, away from the travelled portion of the road, or parking lot, if the road or parking lot has both a curb and sidewalk.

11.0.18.1.2 A minimum of 1000 mm [3’ 4"] of clearance between the outer edge of the metal enclosed switchgear’s foundation pad and the travelled portion of the road or parking lot if the road, or parking lot, has a curb but does not have a sidewalk.

11.0.18.1.3 A minimum of 4000 mm [13’ 1-1/2"] of clearance between the outer edge of the metal enclosed switchgear’s foundation pad and the travelled portion of the road or parking lot if the road, or parking lot, does not have a curb and does not have a sidewalk.

11.0.18.2 On the sides of the metal enclosed switchgear that have an operable door:

11.0.18.2.1 A minimum of 1000 mm [3’ 4"] of clearance between the outer edge of the open door (while the door is opened 90 degrees with respect to the metal enclosed switchgear) and the adjacent sidewalk, away from the travelled portion of the road, or parking lot, if the road or parking lot has both a curb and sidewalk.
11.0.18.2.2 A minimum of 1000 mm [3' 4"] of clearance between the outer edge of the open door (while the door is opened 90 degrees with respect to the metal enclosed switchgear) and the travelled portion of the road or parking lot if the road, or parking lot, has a curb but does not have a sidewalk.

11.0.18.2.3 A minimum of 4000 mm [13' 1-1/2"] of clearance between the outer edge of the open door (while the door is opened 90 degrees with respect to the metal enclosed switchgear) and the travelled portion of the road or parking lot if the road, or parking lot, does not have a curb and does not have a sidewalk.

11.0.18.2.4 Refer to HOL document MCS0099 for more information.

11.0.19 The enclosure shall sit on a concrete foundation pad. The top of the foundation pad shall be no less than 460 mm [1' 6"] above finished grade. The bottom of the access or cell doors shall not be less than 460 mm [1' 6"] above the foundation pad.

11.0.20 The top of the main Service Entrance disconnect within the enclosure shall be not higher than 1800 mm [6'] above the finished foundation pad.

11.0.21 Any additional enclosures installed on the outside surface of the metal enclosed switchgear to house revenue metering or ancillary equipment, shall be subject to the requirements of Section 5.1 and Section 11.0.18 of this document.

11.1 **Customer Owned Secondary Switchgear with Revenue Metering within the Same Enclosure**

At the Customer’s option, revenue metering may be installed within the same enclosure as the Customer owned secondary switchgear shall meet the requirements of Section 11.0, of this document, in addition to the following:

11.1.1 The ampacity of the main Service Entrance disconnect shall meet the requirements of both HOL’s Conditions of Service, HOL document ECS0012, and the requirements of this document.

11.1.2 Supply taken from the switchgear shall only be used within a single property. A single Customer owned secondary switchgear supplying multiple separate properties shall not be permitted.

11.1.3 Each property shall limited to a single Customer owned secondary switchgear per supplying HOL distribution transformer. Multiple Customer owned secondary switchgear, supplied from the same HOL owned distribution transformer, shall not be permitted.

11.1.4 Each property shall have a single point of maintenance contact designated for HOL to contact to co-ordinate a convenient time in the event of planned work.
11.1.5 To promote metering accessibility by the Customer, provisions for the Customer to access to the face of the meter will be made. This may include, but not limited to, the following:

11.1.5.1 View-ports, that meet requirements of NEMA Type 4 of NEMA Type 4X built into the door of the space, or cell, where the meter is installed.

11.1.5.2 An agreement between the land-lord and the customer for access when requested.

11.1.6 This type of installation shall be permitted when multiple commercial secondary sub-services require supply or when multiple secondary sub-services for agriculture require supply. Supply for secondary sub-services, taken from the secondary switchgear, shall be subject to the following:

11.1.6.1 Secondary sub-services shall be restricted to commercial services at 120V/208Y or 347V/600Y, 3-Phase, 4-Wire, less than 200A.

11.1.6.2 Secondary sub-services shall be metered at a single voltage, either 120V/208Y or 347V/600Y. A mix of revenue metering at different voltages, within the same enclosure, shall not permitted.

11.1.6.3 Supply for unmetered secondary sub-service(s) greater than 200A are permitted. The intent of an unmetered secondary sub-service shall be for providing supply to a dedicated electrical room where HOL owned revenue metering is installed.

11.1.7 The use of “Sea Can” shipping containers as an enclosure shall not be permitted.

11.1.8 The roof of the enclosure shall be such that falling precipitation drains to side opposite of the operable doors. Further, the roof shall also have a factory-installed drip-edge. The intent is to prevent falling precipitation from draining onto HOL employees while performing work on the contents of the enclosure.

11.1.9 The enclosure shall have lights meeting the requirements of Section 5.3.1.12, a heater meeting the requirements of Section 5.3.1.13, and a convenience outlet meeting the requirements of Section 5.3.1.19 of this document.

11.1.9.1 Provisions for a public revenue meter shall be included, to record the consumption of the light, heater, and 120V / 15A convenience outlet.

11.1.10 The switchgear shall be installed such that:

11.1.10.1 It is in a generally flat area and does not require a ladder or step to access or service it. The intent is to provide a safe surface to access and service the contents of the enclosure.

11.1.10.2 It is not installed in a location that can become a Confined Space.
11.1.10.3 It is not installed in a location that limits the accessibility or serviceability of adjacent HOL plant including, but not limited to, HOL owned pad-mounted transformers.

11.1.10.4 It is not installed within easy sight of a public road. Further, it shall be installed outside of the 15 m [49' 2-1/2"] sight line triangle at road intersections within the property being served.

11.1.10.5 It is not installed in an area that is, or can become, used to store cleared snow.

11.1.10.6 It is installed at least 5 m [16' 5"] from any fire-hydrant. If a ground-grid is installed, it shall be such that fire-hydrant(s) shall not encroach it.

11.1.10.7 A retaining wall shall not be permitted as part of its construction or installation.

11.1.10.8 Supply for a fire-pump service taken from ahead of the main Service Entrance disconnect shall not be permitted.

11.1.11 The metering positions within the enclosure shall be subject to the following:

11.1.11.1 The center of each metering position shall be not higher than 1500 mm [5’] above the finished foundation pad and no higher than 1980 mm [6’ 6"] above finished grade.

11.1.11.2 If an unused metering position will be used within the next calendar year of the energization date, the Customer shall supply and install a UV rated Lexan cover, steel locking ring. HOL shall supply and install a meter seal.

11.1.11.3 If an unused metering position will not be used within the next calendar year of the energization date, the Customer shall supply and install a factory supplied metal cover to cover the position.

11.1.12 The enclosure shall meet, or exceed, the requirements of NEMA Type 4 or NEMA Type 4X.

11.1.13 The switchgear shall use either silver-plated Copper, bare Copper, or Aluminum buss between the main Service Entrance disconnect the revenue metering positions.

11.1.14 The Customer may use one of the following to connect the metering positions to the Customer’s building or load:

11.1.14.1 Copper conductor terminated as per Section 9.2.1.1 of this document.

11.1.14.2 Aluminum conductor terminated as per Section 9.2.1.1 of this document.
11.1.15 The Customer will provide a white-on-red Lamacoid SLD of the switchgear’s buss and wiring configuration. It shall be posted on the inside of the door of space containing the check metering Instrumentation Transformers or revenue metering. Further, each cell door shall carry a Lamacoid label indicating the contents behind the enclosure or cell door.

12.0 **120V/240V, 1-Phase, Greater Than 200A: Central Metering for Agriculture Properties**

12.0.1 Overhead, 120V/240V, 1-Phase, 400A, services, shall be permitted on agricultural properties and subject to the following:

12.0.1.1 Central metering shall be permitted on single properties that have multiple, commonly owned, detached buildings that do not have any distributed generation equipment installed.

12.0.1.2 The location of the Customer’s Service Entrance equipment shall be approved by HOL’s Customer Service Department and in accordance with the ESA and the OESC.

12.0.1.3 New installations require all Instrumentation Transformers to be installed near finished grade for both Maintenance and serviceability purposes.

12.0.1.4 Outdoor rated metering enclosures shall be permitted to be mounted on Customer owned utility poles.

12.0.2 If an agricultural premise with central metering is to have ERF equipment connected to the same Service Entrance feeding the premise, HOL shall require the central metering equipment to be removed and a traditional metering installation be installed that meets the requirements of either Section 10.0 or Section 14.0 (depending on the size of the Service Entrance) and Section 19.0 of this document.

12.0.3 Central Metering shall be provided in accordance, as detailed below. Existing central metering services shall be upgraded to the current standards outlined below when the following activities occurs:

12.0.3.1 A new service is required.

12.0.3.2 The Owner changes or alters the support structure.

12.0.3.3 The Owner alters the central metering.

12.0.3.4 The Owner upgrades or increases the Service Size.

12.0.3.5 The Customer adds a Distributed Generator installation that is capable of delivering no more than 10kW.
12.1 Combination Meter and CT Cabinet Enclosure Option

12.1.1 If Central Metering is approved as a servicing option, by HOL’s Customer Service Department, then the installation of the central revenue metering equipment shall be subject to all of the following:

12.1.1.1 The owner supplies and installs a 120V/240V, 1-Phase, 400A transformer rated combination meter and CT enclosure at ground level, with isolated neutral block and 4-pole metering Test Switch included.

12.1.1.2 It must be located immediately after and on the Load Side of the main fused disconnect.

12.1.1.3 The enclosure shall be mounted at a height that satisfies the requirements of Section 7.4.1 of this document.

12.1.1.4 The enclosure shall also be installed such that it shall be as level and plumb as Practicable.

12.1.1.5 A splitter trough shall be installed immediately adjacent to the meter base enclosure from which the Customer owned secondary services would be routed to the individual buildings on the property.

12.1.1.6 Connections and installation shall be in accordance with the OESC and subject to the approval of the ESA.

12.1.1.7 PVC conduit, meeting the requirements of Section 5.2 of this document, shall be used to house all conductors connecting the meter enclosure, Service Entrance disconnect, and the first Customer owned device.

12.1.2 Refer to Table 3, located at the end of this document, for a list of HOL approved Weatherproof combination base metering enclosure and HOL Specifications MCS0004 and MCS0008 for construction details.

12.2 Typical CT Cabinet Option

12.2.1 If the revenue metering is to consist of a typical CT Cabinet, then upon receiving approval from HOL’s Customer Service Department to proceed with the installation of the central metering equipment, the following shall apply:

12.2.1.1 The Customer supplies and installs an approved 120V/240V, 400A Instrumentation Transformer cabinet.

12.2.1.1.1 Meter cabinets shall be a minimum size of (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"], and have side-hinged doors opening at the centre. The cabinets must also be equipped with three-point latching with provisions, for a Standard HOL Padlock.
12.2.1.1.2 The Instrumentation Transformer cabinet is to be located immediately after and on the Load Side of the main Service Entrance fused disconnect.

12.2.1.1.3 The cabinet shall meet all the requirements of Section 5.1 of this document.

12.2.1.2 A continuous 25 mm [1"] metering conduit shall connect an approved transformer rated combination base metering enclosure to the Instrumentation Transformer cabinet. The conduit shall meet all the requirements of Section 5.2 of this document.

12.2.1.3 The Customer shall provide an approved Marine Grade Plywood mounting surface, with a minimum size of (H x W x D) 900 mm x 900 mm x 16 mm [36" x 36" x 5/8"] that meets the requirements of Section 9.8 of this document.

12.2.1.4 The Meter Socket enclosure shall be mounted at a height that satisfies the requirements of Section 7.4.1 of this document.

12.2.1.5 The metering equipment shall be installed in a lockable, Weatherproof cabinet acceptable to HOL; the cabinet shall meet all the requirements of Section 5.1 of this document. Customer owned equipment shall not be installed within the Instrumentation Transformer cabinet.

12.2.1.6 Access doors to the Weatherproof cabinet shall be equipped with a dual locking system, acceptable to HOL. The minimum height to the bottom of the access doors shall not be less than 460 mm [1' 6"] from the finished grade or floor.

Refer to Table 4 and Table 6, located at the end of this document, for a list of HOL approved Meter Socket enclosure and HOL acceptance criteria for the Instrumentation Transformer cabinet. Refer to the HOL Specification MCS0041 for construction details and MCS0007 wiring details.

12.2.2 If multiple 120V/240V, 1-Phase, services are required, on a single agricultural property, to service multiple commonly owned detached buildings, then the installation of multiple revenue metering installations supplied from a single transformer may be permitted. With the prior approval from HOL’s Customer Service Department, and in rural/agricultural areas, multiple metering loads may be installed where the total secondary load from a single transformer does not exceed 400A.

This allowance is typically applied when significant geographic distances exist on the property between the meter and the distributed loads and buildings. If approved by HOL, this type of servicing is approved, the owner shall supply and install all secondary cables, or conductors, from the transformer location to the Meter Socket bases, in accordance with the OESC and subject to the approval of the ESA.
Refer to Table 1, located at the end of this document, for a list of HOL acceptance criteria for the Meter Socket base.

12.2.3 Metering arrangements for each of the metered elements of the multi-Meter Installations shall be consistent with Section 10.2 and Section 10.4 of this document.

13.0 120V/240V and 120V/208Y Services using Multiple Customer Metering System (MCMS): Suite Metering

13.0.1 MCMS is a metering standard that is employed by HOL for multiple unit residence buildings. Where Practical and feasible, the residential units within a rental or condominium property having a minimum of 25 residential units within a single vertically arranged building that is three (3) stories or higher have the option of MCMS metering standard. All other public, or common load, meters shall be the conventional individual self-contained units.

13.0.2 For further details about MCMS standards, see the following HOL documents, repeated here for convenience:

- Hydro Ottawa – MCS0020 – Com/Res SLD Typical Secondary Metering for Multiple Unit Building
- Hydro Ottawa – MCS0023 – MCMS/Com/Res Typical Secondary Metering for Multiple Unit Building with Conventional Metering and MCMS
- Hydro Ottawa – MCS0052 – Multiple Customer Metering System Installation Requirements By The Owner For An Existing Building
- Hydro Ottawa – MCS0055 – Multiple Customer Metering System Installation Requirements By The Owner For A New Building
- Hydro Ottawa – MCS0056 – Multiple Customer Metering System Installation Requirements For Hydro Ottawa And Its Contractors
- Hydro Ottawa – MCS0059 – Res MCMS Individual Multiple Customer Metering Systems Communication Wiring for Electrical Rooms without Communications Equipment
- Hydro Ottawa – MCS0060 – Res MCMS Individual Multiple Customer Metering Systems Communication Wiring for Electrical Rooms with Communications Equipment
- Hydro Ottawa – MCS0061 – Res MCMS Communication Wiring for Electrical Rooms without Communications Equipment
13.0.3 HOL shall not proceed with the installation of any MCMS, or supporting ancillary, equipment until all of the following have been completed:

13.0.3.1 For retrofit MCMS installations: HOL and the responsible condominium corporation have both signed the “SUITE METER INSTALLATION AGREEMENT”.

13.0.3.2 For new installations: HOL and the responsible condominium corporation have completed the agreement that is part of the Offer to Connect.

13.0.3.3 A copy the signed agreement has been deposited with HOL Metering Services.

13.0.4 All installations shall conform to Measurement Canada’s document S-E-04 ‘Specifications for the Installation Requirements for Multiple Customer Metering Systems’ and all requirements of the Electricity and Gas Inspection Act. The MCMS system shall be installed in a manner that allows for on-site testing of all metering components. All equipment associated with the MCMS shall be installed in manner conforming to the OESC and the OBC.

13.0.5 The building owner shall cover the cost of the associated dedicated communication link(s), the “check” meter, Public services and the MCMS system and also will be responsible for the ongoing monthly costs of operating the phone line(s) and shall maintain its availability while the electrical service exists.

13.0.5.1. The building’s “check” meter shall not be used for revenue billing purposes during construction of the project.

13.0.6 The MCMU panel selected for the residential units shall operate in a Measurement Canada approved manner for all service Ampacity up to 200A and capable of monitoring one of the following:

13.0.6.1 Twelve (12) 1-Phase 120V/240V residential services.

13.0.6.2 Twenty (20) 1-Phase 120V/240V residential services.

13.0.6.3 Twelve (12) Network (2-Phase with Neutral conductor) 120V/208V residential services.

13.0.6.4 Twenty (20) Network (2-Phase with Neutral conductor) 120V/208V residential services.

13.0.7 The building owner shall procure appropriately sized Distribution Panels with sufficient space allowance for mounting all the necessary milliAmpere CTs. The panel shall meet, or exceed, ESA free space requirements after all CTs have been installed. The Distribution Panel cable channels shall have a minimum width of 250 mm [10"] between the Circuit Breaker mounting rails and the side of the Distribution Panel to allow for the mounting of the milliAmpere transducers.
13.0.8 Each Distribution Panel containing MCMS equipment shall have a local disconnection switch to isolate power from the Distribution Panel. The disconnect switch shall be lockable, with a Standard HOL Padlock, in the open position. The disconnection means shall be one of the following:

13.0.8.1 A barriered, rated main Service Entrance breaker within the Distribution Panel.

13.0.8.2 A separate lockable disconnect switch immediately before, and within the same electrical room as, the oversized Distribution Panel.

13.1 **Required Submittals to Hydro Ottawa for review by a Professional Engineer**

13.1.1 A SLD of the entire building’s electrical distribution system including all of the public loads within the building.

13.1.2 An electrical secondary distribution Riser diagram for the building.

13.1.3 A proposed suite-metering overlay to the buildings SLD for residential suites that shall indicate the distribution and risers for the metering equipment, MCMS panel locations, electrical connections and MCMS panel associations for the building.

13.1.4 Load summary for each of the MCMS panels used throughout the building, as per Appendix A of HOL’s Conditions of Service, HOL document ECS0012.

13.2 **Development Process for Required Submittals**

13.2.1 The application process for a new buildings application for suite-metering and the development of the required submittals is as follows:

13.2.1.1 Developer selects the HOL MCMS offering as the metering choice for the residential suites.

13.2.1.2 Developer contacts HOL Distribution Design Department indicating the intention of utilizing Suite-Metering for the new building. The Distribution Design Department shall provide contact info for HOL’s MCMS Equipment Provider.

13.2.1.3 The developer and HOL’s MCMS Equipment Provider develop the building metering proposal documents.

13.2.1.4 Developer submits the required submittals to HOL’s Distribution Design Department for review.
13.2.1.5 HOL Design Department and Metering Services reviews the proposal and provides feedback as required. Once the proposal meets HOL’s requirements an Offer to Connect shall be provided to the developer by the Distribution Design Department.

13.2.1.6 The developer accepts Offer to Connect and submits any required payments.

13.2.1.7 The developer accepts responsibility for the requirements of supporting a MCMS offering on their premises. They shall reserve the space needed in the building’s dedicated electrical room for the MCMS equipment and arrange for electrical support and communications as required.

13.2.1.8 The equipment that forms the MCMS offer shall not be installed if the constructor cannot meet the prerequisites and requirements as outlined by HOL.

Note: As work progresses on the building’s construction, the developer shall endeavour not to interfere with any prerequisites or requirements that have already been fulfilled; this includes, but is not limited to, reducing the amount of space reserved for the MCMS equipment.

13.2.1.9 HOL Metering Crews shall be scheduled, as soon as Practicable, to install the necessary conventional metering, including any required PT(s) or CT(s), the “check” metering, Public, Fire Pump and Commercial loads in the building.

13.2.1.10 HOL’s approved Suite Metering Contractor shall be scheduled for the installation of the MCMS equipment in the building as per the metering proposal developed by the MCMS equipment provider in coordination with the developer.

13.2.1.11 Once the installation is completed, an ESA inspection is required to be scheduled for the MCMS installation and inspection certificates forward to HOL.

13.2.1.12 Proper association of the current sensors and phase reference voltages to the Customer units shall be confirmed in advance of the commissioning, prior to the commissioning the MCMS equipment itself.

13.2.1.13 HOL Metering Technician(s) shall witness the commissioning of the MCMS installations for the associated suites.

13.2.1.14 HOL shall evaluate the installation to ensure compliance to standards.
13.2.1.15 HOL’s MCMS Equipment Provider shall make arrangements to have the MCMS commissioned as per Measurement Canada’s requirements and provide the Measurement Canada S-E-04 certifications.

13.2.1.16 HOL’s MCMS Equipment Provider shall provide the inspection certificates (meter sealing reports) with MA CT test cards/information.

13.2.1.17 When commissioning is complete “As-Built” documentation, as per HOL document MCS0055, shall be provided to HOL, including electrical distribution, MCMS panels, and the communication equipment shall be finalized by the developer and HOL’s MCMS Equipment Provider to reflect changes in the original design.

13.2.1.18 HOL shall accept the MCMS installation as complete once the “As-Built” documentation has been submitted, received, and approved.

13.3 Metering Room Requirements

13.3.1 The MCMS panels and associated equipment shall be installed within the same electrical room as the Distribution Panel associated to the suites being individually metered.

13.3.2 The electrical room shall meet all the requirements described in Section 5.3 of this document. Further, all doors to it shall be locked at all times and inaccessible by the general public.

13.3.3 HOL staff shall have unrestricted access to all MCMS components and associated wiring. The access doors to the electrical room shall be equipped with a dual locking system acceptable to HOL.

13.3.4 All primary, and secondary, metering room(s) shall be subject to the following:

13.3.4.1 Shall have a minimum ceiling height of 2130 mm [7’].

13.3.4.2 Shall have adequate lighting at the working level, in accordance with IES standards. The lighting within the secondary electrical room(s) shall have mechanical protection (such as a metal or wire cage) and controlled via a wall switch located adjacent to the room’s door.

13.3.4.3 Shall be heated, maintaining the room’s ambient temperature as per Section 5.3.1.13.1.
13.3.5 The secondary electrical room(s) shall have a minimum continuous wall space for the different MCMS equipment layout as specified in the following standards (repeated here for convenience):

13.3.5.1 Hydro Ottawa – MCS0059 – Individual Multiple Customer Metering Systems Communication Wiring For Electrical Rooms Without Communication Equipment – Construction Detail.

13.3.5.2 Hydro Ottawa – MCS0060 – Multiple Customer Metering Systems Communication Wiring For Electrical Rooms With Communication Equipment – Construction Detail.

13.3.5.3 Hydro Ottawa – MCS0061 – Multiple Customer Metering Systems Communication Wiring For Electrical Rooms Without Communication Equipment – Construction Detail.

13.3.6 All electrical rooms shall provide a clear, safe and adequate working space that shall be subject to all of the following to ensure the safety of HOL and other authorized personnel who may be required to work on the metering installation:

13.3.6.1 It shall be large enough to accommodate the full height and width of the metering installation including the MCMU(s), Distribution Panel, communication equipment, and local disconnect switch (if applicable).

13.3.6.2 There shall be a minimum of 1500 mm [5'] of horizontal and vertical clearance in front of all revenue metering equipment.

13.3.7 The MCMU panels, and associated equipment, shall be installed within the same electrical room as the Distribution Panel associated to the suites being individually metered. Each suite, or unit, metered shall have distinct and separate wiring at the metered panel.

13.3.8 The public, fire pump, and commercial loads shall be independently metered using conventional meters and associated equipment at the expense of the building developer. Conventionally metered points may require self-contained or Transformer Rated Meters as determined by the metered load and as referenced in this specification.

13.3.9 Breaker locks shall be installed for each individual breaker in the Distribution Panel located in each electrical room where residential units are being metered by MCMS units.

13.3.10 The Distribution Panel shall have a lockable cover and each individual unit breaker within the Distribution Panel shall have the means to lock the breaker switch in the OFF position.
13.3.11 The building’s metered “public” load shall be consolidated into a single metered point. Conventionally metered points may require Self-Contained Metering or Transformer Rated Metering, and associated equipment, as determined by the requirements of the metered load.

13.4 Installation of a “Check” Meter

13.4.1 The building’s Service Entrance main electrical feed shall be metered by a “check” meter, in form of a standard self-contained or transformer-rated meter installed Upstream of the MCMS equipment.

13.4.2 The purpose of the “check” meter will be to validate the accuracy of the Suite Metering and to ensure that un-metered loads are not present within the building. The “check” meter shall not be used as a billing device and HOL shall not use deductive/subtractive metering as a method of determining a bill for unmetered elements within a premise for revenue metering. Therefore, all building loads must be accounted for by the metering installed for residential units, commercial units and public loads to comply with Measurement Canada regulations.

13.4.3 Owner/developers shall be responsible for reconciling the losses within their buildings that will appear as an observed difference between the summation of the consumption reported by the revenue meters and the consumption reported by the “check” meter, installed as per Section 9.10 of this document.

13.4.4 At HOL’s determination, if the losses exceed those determined to be caused by the transformer, Line Side, or Customer owned transformation losses, the owner/developer shall seek professional support, to reconcile the observed losses to the satisfaction of HOL.

13.5 Residential Condominiums with Customer Owned Dry-Core Transformers

13.5.1 A building that contains multiple residential units fed by a 3-Phase service may use a Customer owned dry-core transformer to modify the service voltage to be suitable for residential use. The dry-core transformers, for this purpose, are typically found ahead of the meters used to measure the residential unit’s consumption.

13.5.2 MCMS metered premises that have residential metering installed down-stream, or on the “secondary” (low voltage) side, of Customer owned dry-core transformers shall require the following:

13.5.2.1 They shall have a “public” service installed for all common load components.
13.5.2.2 All unmetered Customer owned dry-core transformer(s) and line losses shall be applied to the “public” service account, based on the HOL Billing Process.

13.6 Fire Pump Metering

13.6.1 If electrical supply for the Fire Pump service is connected Upstream of the Service Entrance main disconnect, it shall be metered separately. Metering of the fire pump service shall meet the requirements of Section 15.0 of this document.

13.7 Common Service Metering

13.7.1 All common building and public loads shall be consolidated into a single circuit and metered by a conventional ‘glass’ meter and associated equipment that is separate from the MCMS. The conventional public meter shall be installed as per the requirements of this document.

13.8 Commercial Service Metering

13.8.1 All commercial loads, regardless of voltage or current rating, shall be individually metered by conventional “glass” metering that is separate from the MCMS equipment. Conventional commercial metering equipment shall be installed as per the requirements of this document.

14.0 Interval Metering Requirements (New Installations)

14.1 General Service Class: 347V/600Y (Greater than 200A), 3-Phase Service, or 120V/208Y (800A or more), 3-Phase Service

14.1.1 Interval metering is used by commercial Customers that consume large amounts of energy and settle their energy usage with the IESO. The interval meter shall be interrogated remotely, using the telephone line provided and maintained by the Customer to retrieve the interval meter data by a central computer located at HOL.

14.1.1.1 Temporary 347V/600Y 3-Phase services with an ampacity of 400A, or less, are exempt from this requirement; refer to Section 16.2.5 of this document for more information.
14.1.2 The Customer shall compensate HOL for all incremental costs associated with the interval meter, including the capital cost of the interval meter itself, the installation costs associated with the interval meter, and costs associated with ongoing Maintenance (including allowance for meter failure), verification and re-verification of the meter, infrastructure Upgrade, installation, and ongoing provisions of the communication line, or communication link, with the Customer’s meter.

14.2 Meter Requirements

14.2.1 The prerequisites for the installation of the interval meter shall have been completed by the Customer prior to the installation; including the requirement for an active phone line or communication link.

14.2.2 The Customer shall supply and install a plywood mounting surface, that meets the requirements of Section 9.8 of this document, with a minimum size of (H x W x D) 1200 mm x 1200 mm x 16 mm [48" x 48" x 5/8"] or 1200 mm x 1200 mm x 19 mm [48" x 48" x 3/4"], for a 13-Jaw transformer rated combination base metering enclosure, and external modem enclosure for the exclusive use for HOL’s metering plant, equipment and communications.

14.2.3 The Customer shall supply and install an approved 13-Jaw transformer rated combination base metering enclosure, with provisions for a 10-pole metering Test Switch, which shall be installed at a height that satisfies the requirements of Section 7.4.1 of this document The Meter Socket base shall be installed such that it shall be as level and plumb as Practicable.

14.2.4 The Customer shall supply and install an external modem enclosure and the enclosure shall be installed such that the bottom of the enclosure is mounted at the same height as the bottom of the 13-Jaw transformer rated combination base metering enclosure. The specification of this enclosure can be found in Section 14.3 of this document.

14.2.5 The distance from the external modem enclosure to the 13-Jaw transformer rated combination base metering enclosure shall be between 75 mm [3"] and a maximum of 130 mm [5"].

Refer to Table 5A, located at the end of this document, for a list of HOL approved commercial 13-Jaw Meter Socket bases and HOL Specifications MCS0025, MCS0026, and MCS0066 for construction details.

14.2.6 The Customer shall supply and install EMT conduit to house the conductors connecting the Instrumentation Transformer cabinet, or Compartment, and the 13-Jaw transformer rated combination base metering enclosure in the electrical room. The conduit used shall meet the requirements already contained in this document; see Section 5.2.1 of this document for more information.
14.3 Revenue Interval Metering Communication Requirements

The following meter location provisions shall be provided and installed by the Customer in a location approved by HOL’s Metering Services.

14.3.1 Prior to the installation of an interval meter, the Customer shall provide and install a continuous 13 mm [1/2"] diameter EMT conduit complete with bushings at both ends, from the telephone entrance equipment (punch-board) to the external modem enclosure. The continuous conduit shall contain a 2 pair (4 conductors) dedicated, direct dial analog, voice quality telephone line. A RJ-11 (4 pin) telephone jack receptacle is also to be provided and terminated on the telephone cable within the modem enclosure with 300 mm [12"] to 460 mm [1' 6"] telephone cable to allow for mounting the telephone jack inside the enclosure.

14.3.2 The telephone line shall meet, or exceed, the technical requirements contained in HOL document ECS0012.

14.3.3 A tag, or label, bearing the phone number for the telephone circuit shall be attached to the RJ-11 jack at the modem enclosure.

14.3.4 The Customer shall install an enclosure to house the communications equipment. The enclosure:

14.3.4.1 Shall meet the requirements for metering enclosures already contained in this document; see Section 5.1.1 of this document for more information.

14.3.4.2 Shall be no smaller than (H x W x D) 400 mm x 400 mm x 150 mm [16" x 16" x 6”].

14.3.4.3 Shall be installed within 75 mm [3"], to a maximum of 130 mm [5"], of linear distance between the enclosure and the Meter Socket.

14.3.4.4 Shall have 19 mm [3/4"] diameter continuous EMT conduit between it and the Meter Socket. The conduit shall house the communications conductors from the meter to the enclosure. The conduit shall meet the requirements of this document; see Section 5.2.1 of this document for more information.

14.3.5 The enclosure containing the communication equipment shall be serviced by a dedicated 120VAC, 15A duplex grounded plug, fed from the “public load” panel and protected by a dedicated single-pole double-throw Circuit Breaker. The breaker shall be such that it can be locked in the “closed” position with a Standard HOL Padlock while still able to maintain trip-free operation in the event of a Fault. The conductors shall be housed in continuous EMT conduit that shall meet the requirements of Section 5.2.1 of this document.
14.3.6 The telephone cable terminating in the telephone room is to be clearly labelled “HYDRO OTTAWA METERING”.

14.3.7 Prior to the interval Meter Installation by HOL, the dial type dedicated telephone line shall be thoroughly tested by the premise-wiring contractor to verify the following:

14.3.7.1 Dial tone is available.

14.3.7.2 Outbound calls can be made.

14.3.7.3 Inbound calls can be received.

14.3.7.4 The assigned phone number, and extension (if applicable), is correct.

Plugging a standard telephone set into the jack to make an outbound call and receive an inbound call can accomplish this testing.

14.3.8 When the Customer notifies HOL that the installation of an operational telephone line has been completed, HOL shall schedule the interval Meter Installation Upgrade. HOL’s Meter Technician shall verify that the telephone line is operational. If the telephone line is operational, the Metering Technician shall install the interval meter, connect the telephone line, and establish communications with HOL’s central metering data collection system.

14.3.9 If the telephone line is not operational, the Meter Installation shall not be upgraded, and the Customer shall be required to correct the defect. When the Customer notifies HOL of the defect correction, HOL shall revisit the site and Upgrade the Meter Installation.

14.3.10 Under limited circumstances, an individual Customer may use a single phone line to support multiple meters; contact HOL to determine feasibility.

**Note:** Two (2) Customers, where each has individual meters, may not share a single phone line.

14.3.11 A Customer owned phone line may be deemed as an acceptable substitute of a dedicated phone line, at HOL’s determination, if the meter can be accessed via a dedicated extension from the Customer’s phone system. The phone extension used by the metering equipment shall be for its exclusive use; it cannot be shared with any other telephony device (i.e. fax machines, answering machines, voice mailboxes, etc.). The extension must be accessible via direct dialing a telephone number followed by entering an extension. Further, the extension must be such that it permits inbound calls at all times and permits only local outbound calls. The labour and any cost of assigning the extension and any programmatic changes shall be at the Customer’s expense.
14.4 Customer Request for Interval or Non-Interval Meter with KYZ Output for Load Analysis

14.4.1 KYZ outputs are subject to the availability of interval meters capable of providing KYZ metering outputs from HOL’s meter vendor. Customer requests for KYZ metering outputs shall be fulfilled on a first-come first-served basis until the supply of meters capable of providing KYZ metering output available to HOL is depleted.

14.4.2 When the Customer requests KYZ outputs, the Customer shall consult with one of HOL’s Key Accounts Coordinators for the outline of the conditions and technical requirements, and alternatives that may be equally suitable, for the metering installation.

14.4.3 Prior to providing KYZ outputs, the revenue metering equipment that will act as the source of the KYZ outputs shall be upgraded to meet current HOL and Measurement Canada requirements as per the following:

14.4.3.1. This includes, but is not limited to, when an ESA permit is issued for work done around or near the revenue metering equipment.

14.4.3.2. This includes, but is not limited to, the replacement of obsolete metering, including the replacement of 2.5-Element metering with 3-Element metering as per Measurement Canada document E-24.

14.4.3.3. This includes, but is not limited to, the replacement of non-standard and/or obsolete services and equipment as per Appendix G of HOL’s Conditions of Service, HOL document ECS0012.

14.4.4 The Customer shall compensate HOL for all incremental costs associated with the interval or non-interval meter, including the capital cost of the interval meter itself, the installation costs associated with the interval meter, and costs associated with ongoing Maintenance (including allowance for meter failure), verification and re-verification of the meter, infrastructure Upgrade, installation and ongoing provisions of the communication line, or communication link, with the Customer’s meter.

14.4.5 Interval or non-interval meters shall be installed for any Customer requesting KYZ pulses for peak load control, and load profile or wishing to participate in unique market pricing. The meter provision, installation, Maintenance, and service costs shall be at the Customer’s expense. An agreement for supply, sale, and service can be found in Schedule 12 of this document, shall be required to be signed by the Customer. The agreement shall be used if the meter is requested on a new service or is being requested on an upgraded service.

14.4.6 Prior to the installation of an interval or non-interval meter, the Customer shall provide and install all supporting equipment for the transfer of the meter KYZ pulses to the Customer’s termination block/or strip at the meter location.
14.4.7 No more than 24V AC/DC shall be applied to KYZ inputs on the meter. If the normal operation of HOL’s metering equipment is interfered with, or damaged, as a result of being exposed to damaging voltages or currents from the Customer owned equipment, the Customer shall be held responsible for the cost of repairing or replacing the damaged metering equipment. If the Customer owned equipment is damaged as a result of damaging voltages from the meter, HOL shall not be responsible for the cost of repair or replacement of the Customer owned equipment. Therefore, the Customer must put provisions in place to protect sensitive equipment attached to the KYZ outputs.

14.4.8 Refer to Section 14.2, Meter Requirements, of this document for interval Meter Installation with KYZ metering outputs.

14.4.9 Refer to Section 14.3, Communication Requirements, of this document for details pertaining to interval Meter Installation with KYZ metering outputs.

14.4.10 Should the interval meter become non-communicative Section 14.6 of this document outlines the steps that shall be undertaken to remedy the issue.

14.4.11 Refer to HOL Specification MCS0066 for construction details.

14.5 Interval Metering Output Request for Load Analysis

14.5.1 Industrial Customers metered with certain types of interval meters may request access to the metering data directly from the metering equipment via an external communications port, or may request from HOL reports containing interval metering data at their expense.

14.5.2 Contact HOL Key Account Coordinators to determine the pre-requisites, availability, and requirements for this type of access.

14.6 Manual Collection of Interval Data

14.6.1 If HOL is unable to retrieve the interval meter data, used when calculating a Customer’s bill, using the dedicated telephone line then HOL shall visit the meter location and collect the data using a manual data retrieval system. At a minimum, such visits are required when the account is due for billing purposes but may occur more frequently to comply with the OEB’s Retail Settlement Code.
14.6.2 If the inability to retrieve meter data is due to a failure of the telephone line used to communicate with the meter or the 120VAC plug used to provide supply to the communications equipment, HOL shall notify the Customer of such failure, and the Customer shall be responsible for repairs. If necessary, HOL shall collect the metered data manually for up to five (5) business days (not including statutory holidays) starting the next business day after notifying the Customer of the issue. Thereafter, if the issue has not been remedied to HOL’s satisfaction, HOL shall continue to collect the data manually at either the HOL Conditions of Service, HOL document ECS0012 - Appendix G, approved manual meter reading charge or the actual time and material charge applicable for each site visit and shall be billed to the Customer at HOL’s determination.

15.0 Fire Pump Services

15.0.1 The intent of this section of the document is not to permit more than one supply point per property but to allow the Customer to take supply for the fire pump, and related equipment, Upstream of the Service Entrance disconnect and HOL owned revenue metering equipment for the building served by the fire pump.

15.0.2 As per OESC, the building’s fire pump service can take supply from one of the following:

15.0.2.1 A second Service Entrance that takes supply from the same source of supply as the Service Entrance of the building the fire pump serves. The additional Service Entrance shall be for the exclusive use of the fire pump service or fire pump Service Box.

15.0.2.2 Immediately Upstream from Service Entrance disconnect of the building the fire pump serves.

15.0.2.3 Immediately Downstream of the Service Entrance disconnect of the building the fire pump serves but Upstream of the building’s revenue metering equipment. This shall be subject to OESC requirements and ESA approval.

15.0.2.4 Downstream of both the Service Entrance disconnect and the revenue metering equipment of the building the fire pump serves. This shall be subject to OESC requirements and ESA approval.

15.0.3 The OESC permits the installation of a separate fire pump Service Box in addition to the Service Entrance of the building the fire pump serves. If supply for the fire pump service or fire pump service box is taken Upstream of either the building’s Service Entrance disconnect or the building’s revenue metering equipment, the proposed installation shall be subject to review (with the building’s electrical SLD) and approval by HOL.
15.0.4 If fire pump service takes supply as per Section 15.0.2.1, Section 15.0.2.2, or Section 15.0.2.3 of this document, the Customer at their expense shall make provisions for the following:

15.0.4.1 The installation of conventional metering equipment for each fire pump service supplied. The intent of the conventional metering equipment is to register the consumption of the fire pump service.

15.0.4.2 A means of disconnection device on the Line Side and within sight of each revenue meter, and ancillary equipment, of each fire pump service supplied. The intent of the separate means of disconnection is to isolate an individual fire pump service from its source of supply. The disconnection type, location, and labelling shall be as per Section 32 (Rule 32-204 and Rule 32-206) of the OESC.

15.0.5 Refer to HOL document MCS0020 for a typical secondary metering for a multiple unit building.

15.1 Fire Pump Service Permanent Labelling and Tagging

15.1.1 If supply for the Customer’s fire pump service is taken Upstream of the Service Entrance main disconnect, then the Customer shall provide nomenclature and signage, in addition to nomenclature and signage provided to satisfy OESC requirements, for the fire pump service that shall conform to the following:

15.1.1.1 Label must read “Fire Pump Installed Ahead of Main Breaker. Two (2) separate secondary services exist in this room. There is a possibility of electrical back feed.”

15.1.1.2 Laminated warning label must be located and posted at both the Service Entrance main disconnect for the Fire Pump service and at the main disconnect for the main secondary service (permanently affixed).

15.1.1.3 Label shall be presented on a red background with white lettering. Lettering height shall be a minimum of 13 mm [1/2"] in size.

15.1.1.4 Laminated label shall be installed such that it shall be as level and plumb as Practicable.

15.1.2 The type of metering that shall be installed is dependant of the size of the Fire Pump Service required. Refer to HOL Specification MCS0020 for more information.
15.2 Fire Pump Service Conductor Size Considerations

15.2.1 Conductors supplying the Customer’s shall be taken from Upstream of the Service Entrance disconnect. If the fire pump circuit conductor is rated for 200A, or less, then the Meter Installation for the Fire Pump service shall follow the requirements outlines in Section 10.10.1 or Section 10.10.2 of this document depending on the service voltage. If the conductor is rated for 225A, or greater, then the Meter Installation for the Fire Pump service shall follow the requirements outlines in Section 10.12 of this document and shall be dependent on the service voltage.

16.0 Temporary Services

16.1 A Temporary service is a metered service, as defined in HOL Conditions of Service, HOL document ECS0012. The technical details of the service shall be determined by HOL Design and Construction in consultation with the Customer requesting the service.

16.2 Metering for a Temporary Service shall be subject to both HOL’s Conditions of Service, HOL document ECS0012, and all of the following:

16.2.1 The Customer shall be responsible for all associated costs for the installation, safeguarding, and removal of metering equipment required for a Temporary 120V/240V 1-Phase or 347V/600Y 3-Phase service.

16.2.2 If the Temporary service is 120V/240V 1-Phase and:

16.2.2.1 Takes supply from an overhead circuit, then the Temporary 1-Phase service shall have a nominal Ampacity of no more than 400A.

16.2.2.2 Takes supply from an underground circuit, then the Temporary 1-Phase service have a nominal Ampacity of no more than 400A.

16.2.3 If the Temporary service is 347V/600Y 3-Phase, it shall be provided as a 4-Wire Grounded-WYE connected service. If the Temporary 3-Phase service:

16.2.3.1 Takes supply from an overhead circuit, then the Temporary 3-Phase service shall have a nominal Ampacity of no more than 200A.

16.2.3.2 Takes supply from an underground circuit, then the Temporary 3-Phase service shall have a nominal Ampacity of no more than 400A.

16.2.4 For overhead supplied temporary services, either Copper or Aluminum conductor can be used to connect the meter socket base to the overhead service at the service’s weather-head, provided it meets the requirements of Section 9.2.1.1 of this document.
16.2.5 Temporary 347V/600Y 3-Phase services with an ampacity of 400A, or less, are not required to install interval metering; non-interval revenue metering shall be used.

16.2.6 The number of Temporary services that can be installed per premise shall be limited to the number permitted in HOL’s Conditions of Service, HOL document ECS0012.

16.2.7 The available Ampacity for a Temporary service will be dependent on both HOL’s plant availability and spare capacity on its distribution circuits in the vicinity of the requested Temporary service, as per HOL’s Conditions of Service, HOL document ECS0012.

16.2.8 Temporary service, fed from a pole, requires a Weatherproof cabinet of a sufficient size to house the main Service Entrance disconnect/breaker and metering equipment. The Weatherproof cabinet shall meet the requirements for a metering enclosure, already described in Section 5.1.1 this document, and shall be mounted on a separate structure that does not include HOL owned utility poles and pad-mounted equipment; it is permitted to mount equipment on Customer owned power poles.

16.2.9 Metering on the Temporary service shall be disconnected and removed by HOL within the allotted time specified in HOL’s Conditions of Service, HOL document ECS0012, after the Customer receives a Permanent utility supply of power to their Service Entrance. Multiple sources of supply, on a single premise, are a potential hazard and therefore must be eliminated at the earliest opportunity.

16.2.10 Should it be discovered that supply is being taken from the Line Side of the meter by the Customer, or by its electrician or contractor, for any reason, HOL shall disconnect the Temporary service immediately and, at its determination, recover the cost of the disconnection and reconnection from the Customer.

16.2.11 The use of portable “Sea Can” shipping containers as a Temporary electrical room shall be restricted to supporting a Temporary service. The shipping container shall be subject to all of the following:

16.2.10.1 It shall be subject to both the requirements of an electrical room as described in Section 5.3 this document.

16.2.10.2 Each “Sea Can” shipping container shall be used on a single Temporary service.

16.2.10.3 It shall be installed such that it is as plumb and level as Practicable.

16.2.10.4 It shall be subject to both an ESA inspection and approval prior to the installation of metering equipment.

16.2.10.5 It shall be Weatherproof.
16.2.10.6 It shall provide for secure access, protecting the equipment inside from unauthorized access. It shall be locked such that it provides access for both the Customer and HOL personnel.

16.2.10.7 Prior to relocating, or removing, the shipping container, HOL shall be notified to disconnect the Temporary service and remove the metering and its related equipment as soon as Practicable.

17.0 Emergency Power Supplies: Back-Up Generators

17.0.1 Customers with permanently connected ‘emergency power supply’ (as defined in Section 46 of the OESC), or has provisions to connect a portable emergency power supply, shall comply with all applicable criteria of the OESC, and CSA C282.

17.0.2 The Customer shall ensure the output from the Customer’s emergency power supply cannot back feed in to HOL’s distribution system or back feed through HOL’s revenue metering equipment.

17.0.3 The Customer shall also be subject to the following:

17.0.3.1 All of the requirements outlined for Back-Up Generators within HOL’s Conditions of Service, HOL document ECS0012.

17.0.3.2 The Customer shall consult with, HOL Distribution Design Department, prior to the installation of a Permanent generator. The Customer shall provide a SLD showing the provision for the installation of the Permanent generator.

17.0.3.3 The Customer shall supply and install a transfer switch on the Load Side of the revenue metering external to the utility supply Compartment if required. The transfer switch shall meet the following requirements:

17.0.3.3.1 In the absence of explicit HOL authorization, it shall disconnect the Customer’s service entrance from utility supply prior to taking supply from the Customer’s generating equipment; this is referred to as a Break-Before-Make Transfer Switch or as an Open Transition Transfer Switch.

17.0.3.3.2 If the Customer instead wants to use a Make-Before-Break Transfer Switch instead, they shall consult with HOL prior to commencing any electrical work to prevent back feed in to HOL’s distribution system or back feed through HOL’s revenue metering equipment from the Customer owned equipment.
17.0.3.4 Automatic Open Transition Supply Transfer systems installed on an outdoor meter socket base shall be permitted for 120V/240V, 1-Phase, up to 200A services only. Transfer switches installed on the Customer’s meter socket base:

17.0.3.4.1 HOL personnel shall be required on both the installation and removal of the transfer switch, for breaking and installation of new seals respectively. The Customer shall be responsible for all the associated costs incurred by HOL.

17.0.3.4.2 The equipment shall meet the requirements of Section 5.0.11 of this document.

17.0.3.4.3 Shall be connected electrically Downstream from the revenue meter.

17.0.3.4.4 Shall require steel locking rings and meter Seals to secure the Automatic Open Transition Supply Transfer meter socket adapter to the meter socket base and the revenue meter to the Automatic Open Transition Supply Transfer meter socket adapter.

17.0.3.4.5 The Automatic Open Transition Supply Transfer system, if used, shall meet the following requirements:

17.0.3.4.5.1 It shall disconnect the Customer’s Service Entrance from utility supply prior to taking supply from the Customer’s generating equipment; this is referred to as a Break-Before-Make Transfer Switch or as an Open Transition Transfer Switch.

17.0.3.4.5.2 It shall allow the revenue metering equipment to take supply from the utility supply regardless of where the Customer’s Service Entrance is taking supply from. The intent is to allow the revenue metering equipment to operate while utility supply is present.

17.0.3.4.5.3 It shall carry the approval markings of either CSA or ULC. In their absence, the customer shall obtain the ESA’s approval of the equipment prior to energization; in this case, the equipment shall carry the markings of ESA’s approval.

17.0.3.4.6 The Customer shall contact HOL’s Service Desk (refer to HOL’s Conditions of Service, HOL document ECS0012, for contact information), prior to installation to obtain a Service Layout from HOL, stating they wish to install a transfer switch on their meter socket base to ensure the service is isolated the Customer’s service. The Customer shall indicate if they intend to use a licensed electrician to perform the installation.
17.0.3.4.7 As per OESC and ESA Bulletin DIB-06/12, the installation of an Automatic Open Transition Supply Transfer switch onto a Customer’s meter socket base (this includes, but is not limited to, Generlink collars and other devices deemed by ESA as “Meter Base Mounted Transfer Devices”) shall be as per one of the following:

17.0.3.4.7.1 Installed by a licensed electrician: HOL does not require an ESA inspection and approval prior to re-installing the revenue meter and re-energizing the Customer’s service.

17.0.3.4.7.2 Installed by someone other than a licensed electrician: HOL requires notification from ESA (in the form of an ESA Connection Authorization Certificate) indicating the installation has been inspected and approved by ESA. This shall be done prior to HOL re-installing the revenue meter and re-energizing the Customer’s service.

17.0.3.5 The transfer switch shall supply utility power to the meter in the “normal” state and shall disconnect the service from the utility supply when in its “emergency” state.

17.0.3.6 Customers that use Back-Up Generators, or plan on installing generators, capable of providing 3-Phase power shall install an Appropriately sized transfer switch. It shall be capable of selecting supply from either the utility supply or the generator’s output, but not both simultaneously. Further, the transfer switch shall be capable of isolating the utility supply from the generator’s output in either the forward or reverse direction.

17.0.3.7 Refer to HOL Specification ECG0002 for more information.

18.0 Net Metering

18.1 Subject to the requirements outlined in the latest revision of the Distribution System Code, the latest revision of Ontario Regulation 541/05, and the latest revision of HOL’s Conditions of Service, HOL document ECS0012, HOL shall offer ‘net’ metering to eligible Customers on a first-come, first-served basis.

18.2 Refer to the following HOL specifications for more information (reprinted here for convenience) on net-metered services:

Hydro Ottawa – MCS0083 – ERF/Res 120V/240V, 1PH, 3W, ≤200A Load Displacement with Single Socket Base

Hydro Ottawa – MCS0084 – ERF/Res 120V/240V, 1PH, 3W, ≤400A Load Displacement with Ganged Meter Trough
18.3 Customers who own generating equipment capable of delivering energy within acceptable parameters back into HOL’s distribution system may be eligible to have ‘net’ metering installed. A single ‘net’ Bi-Directional Meter can be used to determine the amount of energy delivered to a Customer’s Service Entrance and received into the HOL system on a separate register in lieu of having two (2) meters (one measures the amount of energy delivered to the Customer, the other measures, records, and reports how much energy was received from the Customer to HOL’s distribution system).

18.4 Installations such as these can be used by Customers that are primarily interested in off-setting their consumption of utility supplied energy by using their own generating equipment. The Customer may intend to consume all of their generating capacity within the premise and not deliver any energy to HOL’s distribution system. Net Metering measures only the received energy that is delivered to the HOL system after all the loads in the Customers’ premise have been offset by generation. There is therefore a difference between the total generation of the premise and the net of what is received by HOL.

18.5 Contact HOL to consult with either HOL Distribution Design Services or a HOL Service Layout Agent to determine eligibility and requirements.

19.0 Distributed Generation and Energy Resource Facilities: Revenue Metering Requirements

19.0.1 HOL metering services shall provide metering equipment for Energy Resource Facility (ERF) equipment capable of delivering less than or equal to 10kW (commonly referred to as microFIT) and over 10kW, both small and mid-sized as defined by the IESO (commonly referred to as FIT). In addition to the prerequisites and requirements for metering discussed in this document, it shall be subject to all of the additional requirements of this section.

19.0.2 Prior to committing to the purchase of any equipment and prior to retaining the services of others, Customers shall consult with HOL to determine the installation prerequisites, requirements, restrictions, and any applicable fees that may be required.
19.0.3 Note that Customers who own ERF or distributed generation installations (capable of delivering either less than 10kW or more than 10kW) may opt for Net Metering (see Section 18.0 of this document for details) in lieu of installing two (2) separate meters to measure first the premise load and second the consumption of utility supplied energy and the energy delivered back to the distribution system from the generator circuit. This option may be more desirable if the Customer is more interested in offsetting their consumption of utility supplied power.

19.0.4 In addition to ESA and OESC requirements, and the requirements contained in all the previous sections of this document, Refer to the following HOL Specifications for additional requirements (repeated here for convenience and clarity):

Hydro Ottawa – ECG0006 – Embedded Generation Technical Connection Guideline
Hydro Ottawa – ECG0008 – Distribution System Voltage and Power Quality
Hydro Ottawa – ECG0011 – MicroFIT DG (10kW and Less) Single Phase Parallel Generator Connection To Overhead System (Construction Detail)
Hydro Ottawa – ECG0013 – MicroFIT DG (10kW and Less) Single Phase Parallel Generator Connection To Underground System (Construction Detail)
Hydro Ottawa – ECG0015 – ERF/Com 1PH or 3PH, Secondary Commercial Service ≤500kW 1PH or >10kW 3PH
Hydro Ottawa – ECS0012 – Conditions of Service
Hydro Ottawa – MCS0053 – ERF 120V/240V, 1PH, 3W, ≤200A Overhead Service Entrance Parallel Metering <10kW Wiring Detail
Hydro Ottawa – MCS0057 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Secondary Parallel Service Wiring Detail
Hydro Ottawa – MCS0058 – ERF 120V/240V, 1PH, 3W, ≤200A, and 120V/208Y or 347V/600Y, 3PH, 4W, ≤200A Secondary Parallel Construction Detail
Hydro Ottawa – MCS0063 – ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub-SERVICE with Splitter Trough
Hydro Ottawa – MCS0064 – ERF 1PH or 3PH, ≤400A, ≤500kW Generator Sub-SERVICE with Metering Centre
Hydro Ottawa – MCS0075 – ERF 1PH or 3PH, ≤200A Outdoor Enclosure Metering Installation
Hydro Ottawa – MCS0076 – ERF 1PH or 3PH, ≥200A to 600A Outdoor Enclosure Metering Installation with Separate Instrument Transformer Cabinet
Hydro Ottawa – MCS0078 – ERF/Res 120V/240V, 1PH, 3W, 400A Transformer Rated Service Upgrade to use Combination Meter Socket Base
Hydro Ottawa – MCS0079 – ERF 120V/208Y or 347V/600Y, 3PH, 4W, 400A to 600A Secondary Service Construction and Wiring Detail
Hydro Ottawa – MCS0083 – ERF/Res 120V/240V, 1PH, 3W, ≤200A Load Displacement (NET-Metering) with Single Socket Base
19.0.5 Note: All ERF and distributed generation installations can generate a hazardous amount of energy that can cause damage to property, physical harm to an individual, or death. It is the Customer’s responsibility to ensure the safe-guarding of their equipment to prevent unauthorized access. This includes, but is not limited to, installation of Customer owned locks on Customer owned distributed generation disconnection switches to prevent unauthorized access.

Similarly, all ERF or generation equipment must be maintained and operated in the manner it was intended by the manufacturer and installer. This type of equipment must be installed and maintained by competent personnel or companies to ensure they do not back feed into HOL’s distribution system during an outage (when the supply of utility supplied energy has been temporarily interrupted), potentially putting HOL personnel, the public, and property at risk.
19.0.6 HOL shall not energize any ERF installation until the entire installation has been inspected and approved by ESA, as per HOL’s Conditions of Service, HOL document ECS0012. HOL requires notification and a copy of the ESA Connection Authorization Certificate indicating that an ESA inspection has been conducted prior to energization of the parallel DG service. Further, the ESA Connection Authorization Certificate shall be subject to Section 5.0.19 of this document.

HOL shall not energize any service whose ESA Connection Authorization Certificate is not accurate, as Practicable; refer to HOL document ECS0012 for more information.

19.0.7 Unless noted otherwise, all enclosures used to satisfy the requirements of this section of this document shall meet, or exceed, the requirements of Section 5.1 of this document.

19.0.8 Unless noted otherwise, all disconnection switch enclosures shall be subject to all of the following:

19.0.8.1 The disconnection switch shall be mounted at a height that meets the requirements of Section 5.1.3 of this document.

19.0.8.2 Shall not be used to house additional equipment not intended by its manufacturer as per Section 5.3.1.11 of this document.

19.0.8.2.1 This requirement does not apply to a single set of spare fuses stored inside the enclosure of the disconnect they are intended to be used with, provided there is ample space within the disconnect’s enclosure.

19.0.8.3 Shall not take supply from more than one source of supply and shall provide a single source of supply to a single Downstream device.

19.0.9 **Safety**: Like any source of electricity, distributed generation systems have the potential to be dangerous to both people and property, and require protection devices to protect the distribution system, utility workers, utility Customers, and the general public. Large industrial Customers have been generating power on-site for many years, but interconnecting photo voltaic, wind turbines, co-generation, micro-turbines, and other relatively small generation systems to operate in parallel with the grid at residential and commercial locations is an increasing recent trend. Utilities are concerned with generators supplying energy to one of their lines that is otherwise thought to be isolated. This is known as islanding.

19.0.10 **Islanding**: A condition where a portion of the utility system that contains both loads and a distributed generation source becomes separated from the remainder of the utility system but remains energized.

---

8 – Adapted from the Halton Hills Hydro document “Generation Connection Package”.
Where a Fault occurs on the distribution system, automatic isolation of a utility protective device occurs. Since automatic reclosing is normally used on distribution systems to clear Temporary faults it is essential that the ERF or distributed generation equipment disconnects from the distribution system before the first automatic reclose occurs.

The performance item is that if the ERF or distributed generation equipment does not disconnect fast enough: a) the distributed generation may feed the Fault; and b) when the utility protective device(s) attempts to reclose, it will be closing back in on a line that is being supplied by distributed generation resulting in possible equipment damage, overloading or power quality issues.

Historically with central generation and transmission, an LDC could be sure that if an electrical circuit was isolated “Upstream” and was not being fed from an alternative source that it was isolated. HOL may want to isolate the of line for Maintenance purposes and would normally do that through opening switches. While a utility can be sure that all of its own electricity sources are either shut down or isolated from the area that needs work, the distributor must now factor in distributed generation to ensure that it too is isolated and not supplying the line section.

19.0.11 ERF and distributed generation equipment creates a source of energy inputs to the utility system that HOL does not control. If the distributed generation is potentially capable of islanding it can back feed electricity onto distribution system creating potential hazards to the system and those working on it. As such, at this time, all distributed generation must have automatic anti-islanding capabilities so as to disconnect the generation source from the utility system in the event of a utility outage.

19.0.12 Unless noted otherwise, the DG System Fused Disconnect shall be labelled by HOL as follows (as per HOL specification MCS0102):

19.0.12.1 The label shown in Figure 1 shall be applied to one of the following devices:

19.0.12.1.1 The DG System Fused Disconnect switch (either 1-Phase or 3-Phase commercial application). Refer to HOL Specification MCS0058 for more information.
Or:

19.0.12.1.2 “Generator Isolating Disconnect” switch located at the gang Meter Socket base (1-Phase residential or commercial application). Refer to HOL Specifications ECG0011 and ECG0013 for more information.

19.0.13 Unless noted otherwise, all of the DG Source Disconnect switch, DG Meter Socket base, enclosures used to house HOL owned ancillary revenue equipment, and DG System Fused Disconnect shall carry the following label to be supplied and installed by HOL (as per HOL specification MCS0102):

![Warning label](image)

**Figure 2:** DG System Two Power Sources Warning label

19.0.13.1 The Customer is responsible for labelling all splitter troughs, ganged meter troughs, metering centres, distribution panels, or disconnects that may become energized by distributed generation equipment.

19.0.14 The Customer shall submit the proposed design for the Distributed Generator installation to HOL for review and comment prior to ESA plan approval submission. The proposed design submission shall include the following:

19.0.14.1 Electrical SLD showing both the proposed design and any changes made to the existing building electrical distribution system.

19.0.14.2 Proposed floor layout plan for the electrical room, if being used; further a to-scale elevation detail drawing of electrical room if different from HOL Specification MCS0058, otherwise note compliance with HOL Specification MCS0058.

19.0.15 Unless noted otherwise, and in the absence of permission from HOL:

19.0.15.1 No Customer owned equipment shall be connected electrically between a DG disconnect and HOL owned revenue metering equipment.

19.0.15.2 No Customer owned equipment shall be physically installed between a DG disconnect and HOL owned revenue metering equipment. In the absence of explicit HOL authorization, this requirement also includes:

19.0.15.2.1 The area between the floor and the DG disconnect and HOL owned revenue metering equipment.
19.0.15.2.2 The area between the ceiling and the DG disconnect and HOL owned revenue metering equipment.

19.0.16 If there is already an existing dedicated HOL owned pad-mounted transformer, or vault distribution transformers, up to two (2) secondary service connections may be connected to the Load Side of the existing transformer(s) with HOL’s authorization. Consult with an HOL Service Layout Agent or Design Services to determine eligibility.

19.0.17 The use of multi-barrel mechanical lugs may be used where Practicable. The termination of two (2), or more, conductors within the same mechanical lug barrel shall not be permitted.

19.0.18 Customers with existing transformer rated services that use a separate Instrumentation Transformer enclosure may be requested to Upgrade their service to use a combination socket base metering enclosure. Refer to HOL specification MCS0078 for more information.

19.0.15.1 Instrumentation Transformer enclosures shall only contain HOL owned revenue metering equipment as per Section 9.1.1 of this document.

19.0.19 Customer owned equipment connected electrically between the DG System Fused Disconnect switch and HOL owned revenue metering equipment or between HOL owned revenue metering equipment and the DG Source Disconnect switch shall not be permitted.

19.0.20 The Customer shall demonstrate correct operation of appropriately rated LOP protective equipment in the event the Customer installs a 3-Phase Distributed Generator or Energy Resource Facility connected to HOL’s distribution system; this shall be done in accordance with Rule 84-018 of the OESC.

19.0.21 LOP protective equipment, if required, shall have the equipment that senses the LOP (which may include, but is not limited to, power electronics and Instrumentation Transformers), regardless of where the equipment that performs the disconnection is installed, between the Load Side of the DG Source Disconnect switch and the Line Side of the Customer owned Distributed Generator equipment:

19.0.21.1 The equipment that senses the LOP can be installed in an indoor or outdoor location such that the accessibility, serviceability, and maintainability, and not hindered.

19.0.21.2 The equipment that senses the LOP shall be located beside (as close as Practicable), and within easy and obvious sight of, the supplying DG Source Disconnect switch in the event that it is not integrated as part of the Customer’s DG or ERF equipment. In the event it is integrated as part of the Customer’s DG or ERF equipment, it shall be within easy and obvious sight of the DG Source Disconnect as much as Practical.
19.0.22 All isolating disconnect switches:

19.0.22.1 Shall be equipped with a factory installed cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.

19.0.22.2 Shall be able to accept a Standard HOL Padlock for the purposes of securely locking the switch handle in the “OFF” position. The intent is to provide the ability to de-energize and isolate HOL revenue metering, and ancillary equipment.

19.0.22.3 It is encouraged the isolating disconnect switch(es) have the means of securing its cover against unauthorized access. If used, it shall be factory installed or be provided by the disconnect’s manufacturer and installed in the field.

19.0.22.4 Both the DG System Fused Disconnect and DG Source Disconnect switch shall contain integrated, factory installed, over-current protection.

19.0.22.4.1 Over-current protection shall limit the current to one of the following thresholds, whichever is larger:

19.0.22.4.1.1 80% of the rated fault-amps the Customer’s ERF or DG equipment is capable of supplying.

19.0.22.4.1.2 100% of the rated FLA the Customer’s ERF or DG equipment is capable of supplying.

19.0.22.4.2 If this requirement conflicts with other codes or regulations (including, but not limited to, specific ESA or OESC requirements) or creates a hazard it shall not apply; the over-current protection may need to operate at a lower threshold.

19.0.22.4.3 The Customer, as part of their submission to HOL, shall include the nominal ratings of their over-current protective devices to meet the requirements of this document.

19.0.22.4.4 Use of over-current protection operating at a lower threshold can be used at the Customer’s discretion.

19.0.23 Customer owned secondary distribution switchgear, as described in Section 11.1 of this document, shall be used only with Customer owned DG and ERF equipment intended to be used for load-displacement only. The intention behind this requirement recognizes the limited amount of space available (for this type of installation) for both the DG System Fused Disconnect and DG Source Disconnect switches.
19.0.24 Unless directed by a HOL technical specification, the DG System Fused Disconnect shall be installed within 1800 mm [6'] of the meter socket containing HOL owned metering equipment it takes supply from where Practicable.

**19.1 Distributed Generation, Up To 10kW: Individual Residential Customers, 120V/240V, 1-Phase, 200A to 400A Services**

19.1.1 The installation of metering equipment used in conjunction with a distributed generation project on an individual residential service, not including townhouses, shall be subject to all of the following:

19.1.1.1 In the case of single metered services, 120V/240V, 1-Phase, up to 200A, a self-contained Bi-Directional Meter shall be installed for the Distributed Generator’s service.

19.1.1.2 The proposed Distributed Generator installation shall comply with HOL Engineering standards and the OESC.

19.1.1.2.1 Existing transformer rated services that use a separate enclosure to house the Instrumentation Transformer(s) shall to Upgrade their service to use a combination socket base metering enclosure. Refer to HOL specification MCS0078 for more information.

19.1.1.3 Aluminum or Copper conductor, meeting the requirements of Section 9.2.1.1 of this document, shall be used to connect the distributed generation system disconnect switch to the bi-directional revenue meter, to connect the bi-directional revenue meter to the DG Source Disconnect switch.

19.1.1.4 The installation of Customer owned equipment, connected electrically between the bi-directional revenue meter and the distributed generation system disconnect switch or between the bi-directional revenue meter and the DG Source Disconnect switch shall not be permitted, except where directed by the ESA, the OESC, or HOL.

19.1.1.5 Prior to energizing the distributed generation service, HOL requires the following Permanent labeling installed:

19.1.1.5.1 Customer shall post a Lamacoid plated electrical SLD at the electrical service. The SLD must be plainly and permanently marked identifying switching arrangements. The disconnect locations, and the type and nameplate rating of the Distributed Generator.
19.1.1.5.2 Customer shall post a Lamacoid plated label at the DG Source Disconnect switch indicating the generators:

19.1.1.5.2.1 Label which reads “DG Source Disconnect”

19.1.1.5.2.2 Rated operating current and voltage.

19.1.1.5.2.3 Rated open circuit voltage.

19.1.1.5.2.4 Rated short circuit current. The rating is based on the generation facility nameplate rating. However for inverter based systems, indicate the rating of the generation source array and inverter.

19.1.1.6 Metering equipment shall be installed in one of the following locations:

19.1.1.6.1 Outdoors on a Permanent wall subject to the requirements described in Section 5.1.1, Section 10.2 (if the Customer’s service is up to 200A), and Section 10.4 (if the Customer’s service is greater than 200A but less than 400A).

19.1.1.6.2 In a single enclosure, subject to the requirements described in Section 5.1 of this document; all conductors shall be housed in EMT conduit subject to the requirements of Section 5.2 of this document.

19.1.1.7 All metering socket bases shall be mounted a height that satisfies the requirements of Section 7.4.1 of this document. It shall be installed such that they are to be as level and plumb as Practicable.

19.1.1.8 If the Customer’s Service Entrance is connected to an overhead circuit, the Customer shall provide and install an approved overhead double-ganged 200A meter base. Refer to HOL Specification ECG0011 for suitable dimensions and additional requirements and Table 7, located at the end of this document, for a list of approved Meter Socket base types.

19.1.1.9 If the Customer’s Service Entrance is connected to an underground circuit, the Customer shall provide and install an approved underground double-ganged 200A or 400A meter base. Refer to HOL Specification ECG0013 for suitable dimensions and additional requirements and also Table 2 and Table 8, located at the end of this document, for a list of approved Meter Socket base types.

19.1.1.10 All of the additional metering equipment shall be connected as per HOL Specification ECG0015.
19.1.1.11 In addition to the requirements from Section 19.1.1.4, the generator isolating disconnect switch from the Distributed Generator is required to be Service Entrance rated with over-current protection and provision for grounding of the Neutral (identified) conductor. Both the system disconnect switch and generator isolating disconnect switch must be CSA certified as “Suitable For Service Equipment” and shall provide a visible open point; molded breakers are not acceptable.

19.1.1.12 The Customer shall also provide and install a generator isolating disconnect switch between the output of the distributed generation equipment and the double-ganged Meter Socket. The switch shall be used to isolate the double-ganged Meter Socket from the output of the distributed generation equipment.

19.1.1.13 The generator isolating disconnect switch shall be installed on the same wall as the double-ganged Meter Socket, within view of the double-ganged Meter Socket. The design shall be as found in either HOL Specifications ECG0011 or ECG0013, whichever is most relevant.

19.1.1.14 The enclosure for the DG isolating disconnect switches shall meet, or exceed, the requirements of Section 5.1 of this document, and shall be installed at a height that meets the requirements of Section 5.1.3 of this document.

19.1.1.15 The DG isolating disconnect switches shall be equipped with at a minimum:

19.1.1.15.1 Cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.

19.1.1.15.2 Pad-locking provisions that can accept a Standard HOL Padlock for the purposes of locking the switch handle in the “OFF” position.

19.1.1.15.3 Pad-locking provision for the cover useable by HOL to place a tamper prevention Seal.

19.1.1.16 The Customer shall provide and install PVC conduit, with provisions that allow for linear expansion due to a change in temperature, to house all of the conductors between the dual-ganged Meter Socket base and the distributed generation disconnection switches. This shall be done subject to the requirements of the ESA, the OESC, and Section 5.2.1 of this document.
19.1.1.17 HOL shall provide two (2) Smart Meters, one to measure the consumption of utility supplied energy for the load Customer and also a Bi-Directional Meter capable of measuring both the amount of delivered energy consumed by the generation equipment (at times when the generation equipment is not generating power) and the amount of energy received back to the distribution system from the Distributed Generator.

19.1.1.18 Refer to HOL Specification MCS0053 for meter base wiring details.

19.1.1.19 All HOL revenue metering equipment, and ancillary equipment, shall have minimum clearances from Gas related equipment as per Section 5.0.16 of this document.

19.1.1.20 All revenue metering equipment, and supporting ancillary equipment, shall be installed a maximum of 1500 mm [5'] of horizontal distance from the corner of the residence, on the side closest to the electrical service’s Demarcation Point or Supply Point.

19.1.1.21 The revenue metering equipment shall be installed on a Permanent wall.

19.1.1.22 The revenue metering equipment shall not be recessed into the wall it’s mounted on.

19.1.1.23 If installed on the side of a residence, the revenue metering equipment shall be a minimum of 1000 mm [3’ 4"] of horizontal distance between the meter base and the Customer’s property line.

19.2 Distributed Generation, Up To 10kW: Residential Townhouses (120V/240V, 1-Phase, Up To 200A) and Apartment Buildings with Multiple Residential Units (120V/208Y or 347V/600Y, 3-Phase, Grounded-WYE Connected, Up To 200A)

19.2.1 In the case of the following service types up to 200A, a self-contained Bi-Directional Meter shall be installed for the following distributed generation Service Entrance types:

19.2.1.1 120V/240V, 1-Phase, 3-Wire Service.

19.2.1.2 120V/208Y, 3-Phase, 4-Wire, Grounded-WYE Connected Service.

19.2.1.3 347V/600Y, 3-Phase, 4-Wire, Grounded-WYE Connected Service.

19.2.2 The proposed distributed generation installation shall comply with HOL Engineering standards and the OESC.
19.2.3 Aluminum or Copper conductor, meeting the requirements of Section Error! Reference source not found. of this document, shall be used to connect:

19.2.3.1 The distributed generation system disconnect switch to the bi-directional revenue meter.

19.2.3.2 The bi-directional revenue meter to the DG Source Disconnect switch.

19.2.4 The installation of Customer owned equipment, connected electrically between the bi-directional revenue meter and the distributed generation system disconnect switch or between the bi-directional revenue meter and the DG Source Disconnect switch shall not be permitted, except where directed by the ESA, the OESC, or HOL.

19.2.5 The installation of metering equipment used in conjunction with a distributed generation project on multiple residential services, including townhouses, shall be subject to all of the following:

Note: The Customer requesting the installation of additional metering equipment to support the installation of their distributed generation shall be responsible for the cost of upgrading the existing metering equipment and enclosures.

19.2.6 HOL shall not energize any service whose ESA Connection Authorization Certificate is not as accurate as Practicable, as per Section 19.0.6 of this document.

19.2.7 Prior to energizing the distributed generation service, HOL requires the following Permanent labeling installed:

19.2.7.1 Customer shall post a Permanent Lamacoid plated electrical SLD at the DG System Fused Disconnect switch. The SLD must be plainly and permanently marked identifying switching arrangements. The disconnect locations, and the type and nameplate rating of the Distributed Generator.

19.2.7.2 Customer shall post a Lamacoid plated label at the DG Source Disconnect switch indicating the generator:

19.2.7.2.1 Rated operating current and voltage.

19.2.7.2.2 Rated open circuit voltage.

19.2.7.2.3 Rated short circuit current. The rating is based on the generation facility nameplate rating. However for inverter based systems, indicate the rating of the generation source array and inverter.
19.2.8 Engineering SLD shall be signed and sealed by a Professional Engineer for the following facilities:

19.2.8.1 Multi-residential (that have two (2), or more, units) premises.

19.2.8.2 All commercial premises.

19.2.8.3 Installations that use HOL owned net-metering.

19.2.9 3-Phase Distributed Generator shall be accepted on HOL’s Grounded-WYE (4-Wire) system and not on to HOL’s Delta (3-Wire) system.

19.2.10 Generators shall meet the requirements contained within HOL Specification ECG0008.

19.2.11 Metering equipment shall be sized to the load-break fused system disconnect switch and generator isolating disconnect switch and not the fuse size.

19.2.12 The DG system disconnect switch from the Distributed Generator is required to be Service Entrance rated with over-current protection and provisions for grounding of the Neutral (identified) conductor. The switch must be CSA certified as “Suitable for Service Entrance Equipment” and shall provide visible isolation. Molded case breakers are not acceptable. The disconnecting means shall have nomenclature marked “DG System Disconnect”.

19.2.13 The DG Source Disconnect switch shall meet ESA requirements when a Neutral (identified) conductor is required by code. There shall be provision for grounding that conductor. The DG Source Disconnect switch from the Distributed Generator shall plainly indicate whether the switch is in the open or closed position, and shall have contacts verifiable by direct visible means.

19.2.14 Distributed generation installation on a 3-Phase Supply Points shall be Three-Phase generators. If any phase(s) on the distribution grid or from the Distributed Generator source is out of the electrical tolerance specification, all three (3) Distributed Generator phases shall be isolated from providing power to the distribution system.

19.2.15 If Customer owned intermediate transformation is used to adjust the distributed generated output to the Service Entrance voltage, the equipment that senses LOP (which may include, but is not limited to, power electronics and Instrumentation Transformers) shall be installed on the Load Side of the DG Source Disconnect switch. The installation of the equipment that senses LOP shall meet the requirements of Section 19.0.21 of this document.

19.2.16 Refer to HOL Specification MCS0057 for meter base wiring details.
19.2.17 Additional revenue metering equipment, DG Source Disconnect, and DG System Fused Disconnect shall be installed in one of the following:

19.2.17.1 Mounted in a single walk-in enclosure that meets, or exceeds, the requirements of Section 5.1 of this document or Permanent Customer constructed Weatherproof structure that meets OBC requirements, that is separate and apart from the building being served, and shall be subject to all of the following:

19.2.17.1.1 It shall be permanent.

19.2.17.1.2 The Customer constructed Weatherproof structure shall consist of Permanent walls covered in brick, siding, or stucco, and shall be covered by a Permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of both the OBC (for including, but not limited to, residential buildings, electrical walk-in enclosures, and storage sheds) and Section 5.3 of this document.

19.2.17.1.4 It shall be located and oriented such that HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.

19.2.17.1.5 If located in the vicinity of a road, the enclosure and any bollards shall be set back:

19.2.17.1.4.1 It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.

19.2.17.1.4.2 It shall not obstruct any vehicular traffic while its doors are in the open position.

19.2.17.1.4.3 HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.

19.2.17.1.4.4 The Customer shall provide mechanical protection for the enclosure in the form of bollards, if required, as per Section 10.17.2.5 and Section 10.17.2.6 of this document.

19.2.17.1.4.5 A minimum of 1000 mm [3’ 4"] from the travelled portion of the road if the road has a curb but does not have a sidewalk.
19.2.17.1.4.5.2 A minimum of 4000 mm [13’ 1-1/2"] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

19.2.17.1.4.5.3 A minimum of 1000 mm [3’ 4"] from the sidewalk away from the travelled portion of the road if the road has both a curb and sidewalk.

19.2.17.1.6 An outdoor public light shall be installed on the exterior of the structure as close as Practicable to the main entrance for the purpose of illuminating the structure’s entrance.

19.2.17.1.7 Remove any graffiti on a regular basis or when requested.

19.2.17.1.8 If a landing has been constructed outside the exterior door, then both the landing and staircase shall have CSA approved handrails.

19.2.17.1.9 The Customer, at their expense, shall install one of the following:

19.2.17.1.8.1 A metered “public” service for the purposes including, but not limited to, supplying the heater, and convenience outlet. This may also be used to supply lighting if the Customer chooses to install interior lights.

19.2.17.1.8.2 A service, that takes supply from the output of their generation equipment, suitable for the purposes including, but not limited to, supplying the heater and convenience outlet. This may also be used to supply lighting if the Customer chooses to install interior lights.

The heater, 120V / 15A convenience outlet, and optional interior lighting, can be supplied from either the utility supply or the output of the customer’s generation equipment – not both. Further, no equipment shall be installed that permits supply to be switched from the utility supply to the output of the customer’s generation equipment or vice-versa.

19.2.17.1.10 The entrance to the structure shall be kept free of snow, and debris, at all times to permit easy and safe access.

19.2.17.1.11 The entrance to the structure shall be both obvious and visible from the road allowance nearest to it, and labelled to indicate that it contains HOL revenue metering equipment.
Or:

19.2.17.1 Mounted in a single outdoor enclosure or pedestal that meets, or exceeds, the requirements of Section 5.1 of this document and also subject to all of the following:

19.2.17.2.1 It shall be Weatherproof.

19.2.17.2.2 It shall meet all the requirements of an electrical room as per Section 5.3 and Section 10.17.2 of this document.

19.2.17.2.3 The exterior shall be either painted gray (as close as Practicable to colour ASA 61 [RGB # 129, 134, 130]), as defined in ASTM document D1535, or be polished stainless steel. This colour is also referred to as ANSI 61.

19.2.17.2.4 An outdoor public light shall be installed on the exterior of the enclosure, as close as Practicable to the main entrance for the purpose of illuminating the structure’s entrance.

19.2.17.2.5 Subject to the City of Ottawa Utility Pedestal Guidelines.

19.2.17.2.6 It shall be located and oriented such that:

19.2.17.2.6.1 It shall not obstruct any sidewalk, walkway, or pedestrian traffic while its doors are in the open position.

19.2.17.2.6.2 It shall not obstruct any vehicular traffic while its doors are in the open position.

19.2.17.2.6.3 HOL personnel shall have minimal exposure to passing traffic when walking near, entering, or exiting the structure. This includes locating the structure away from the vicinity of both “drive-thrus” and driveways.

19.2.17.2.6.4 The Customer shall provide mechanical protection for the enclosure in the form of bollards, if required, as per Section 10.17.2.5 and Section 10.17.2.6 of this document.
19.2.17.2.6.5 If located in the vicinity of a road, the enclosure and any bollards shall be set back:

19.2.17.2.6.5.1 A minimum of 1000 mm [3’ 4”] from the travelled portion of the road if the road has a curb but does not have a sidewalk.

19.2.17.2.6.5.2 A minimum of 4000 mm [13’ 1-1/2”] from the travelled portion of the road if the road does not have a curb and does not have a sidewalk.

19.2.17.2.6.5.3 A minimum of 1000 mm [3’ 4”] from the sidewalk away from the travelled portion of the road if the road has both a curb and sidewalk.

19.2.17.2.6.6 The bottom of the doorway shall be a minimum of 460 mm [1’ 6”] above grade to a maximum that permits the top of:

19.2.17.2.6.6.1 The pedestal to be less than 1830 mm [6’] above finished grade.

Or:

19.2.17.2.6.6.2 The top of the walk-in to be less than 2130 mm [7’] above finished grade.

19.2.17.2.7 Remove any graffiti on a regular basis or when requested.

19.2.17.2.8 The Customer, at their expense, shall install one of the following:

19.2.17.2.8.1 A metered “public” service in the structure, that takes supply from the utility supply, suitable for the purposes including, but not limited to, supplying the heater and convenience outlet. This may also be used to supply lighting if the Customer chooses to install interior lighting.
19.2.17.2.8.2 A service, that takes supply from the output of their generation equipment, suitable for the purposes including, but not limited to, supplying the heater and convenience outlet. This may also be used to supply lighting if the Customer chooses to install interior lighting.

This shall be installed such that the heater, 120V convenience outlet, and optional interior lighting can be supplied from either the utility supply or the output of the customer’s generation equipment – not both. Further, no equipment shall be installed that allows supply to be switched from the utility supply to the output of the customer’s generation equipment or vice-versa.

19.2.17.2.9 The entrance to the enclosure shall be both obvious and visible from the road allowance nearest to it, and clearly labelled that it contains HOL revenue metering equipment.

19.2.17.2.10 The enclosure shall be kept free of snow, and debris, at all times to permit easy and safe access.

19.2.18 If the existing metering is done through a splitter trough or a metering centre, the Customer shall supply and install a plywood mounting board, as per Section 9.8 of this document.

19.2.19 For 1-Phase services, the Customer shall supply and install an approved 4-Jaw meter base to be installed as per HOL Specification MCS0064 and Table 1 located at the end of this document. For 3-Phase services, the Customer shall supply and install an approved 7-Jaw meter base to be installed as per HOL Specification MCS0064 and Table 5 located at the end of this document.

19.2.20 All metering socket bases shall be mounted a height that satisfies the requirements of Section 7.4.1 of this document. They shall be installed such that they are to be as level and plumb as Practicable.

19.2.21 The approved meter base, an approved DG System Fused Disconnection switch, and an approved DG Source Disconnection switch shall be mounted onto the plywood mounting board. Installation shall be as per HOL Specification MCS0063 or HOL Specification MCS0064, whichever is most Appropriate. Refer to HOL Specification MCS0058 for construction detail.

19.2.22 The Customer shall provide and install EMT conduit to house all of the conductors between the meter centre or splitter trough, the additional Meter Socket base, the distributed generation disconnection switches, and the first enclosure containing distributed generation equipment. This shall be done subject to the requirements of Section 5.2.1 of this document.
19.2.23 For 3-Phase installations the Neutral conductor shall meet the requirements already included in this document; see Section 9.6 of this document for more information.

19.2.23.1 If the Customer does not require the Neutral conductor of the 3-Phase service to be connected to their generating equipment, the Neutral conductor shall be terminated at the first Customer owned device; the “DG Source Disconnect” switch may be used to terminate the Neutral conductor.

19.2.24 The “DG System Disconnect” and “DG Source Disconnect” switches shall each be equipped with at least:

19.2.24.1 Cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.

19.2.24.2 Pad-locking provisions for the switch handle in the “OFF” position.

19.2.24.3 Pad-locking provision for the cover useable by HOL to place a tamper prevention Seal.

19.2.25 HOL shall provide an additional bi-directional Smart Meter to measure the amount of energy delivered from the distribution system to the Customer also the energy received back to the distribution system from the Distributed Generator.

19.3 Distributed Generation, Greater Than 10kW: Revenue Metering Requirements

19.3.1 The metering requirements for Customer’s distributed generation capable of delivering more than 10kW installations shall be subject to all the requirements of the OESC, ESA, the requirements of HOL’s Conditions of Service, HOL document ECS0012, and all of the requirements already discussed in this document.

19.3.2 All DG or ERF revenue metering equipment, including disconnection devices, isolation devices, shall be installed in a single location within view of each other. The purpose of this is to ensure that HOL Meter Technicians can visually check the state of both disconnection and isolation devices prior to commencing work on the metering equipment. This will ensure that the state of the disconnection and isolation devices cannot be changed without the knowledge of the HOL Meter Technician while they perform their work on the metering equipment.

19.3.3 Distributed Generation, Greater Than 10kW: 120V/208Y or 347V/600Y, 3-Phase, Grounded-WYE connected, 4-Wire, service up to 200A: a self-contained Bi-Directional Meter shall be installed for the Distributed Generator’s service.
19.3.4 The installation of the metering equipment and disconnection and isolation devices shall be installed in one of the following locations:

19.3.4.1 A single dedicated electrical room; the electrical room itself shall be subject to Section 5.3.1 of this document.

19.3.4.2 In an enclosure that meets the requirements of Section 5.1.1.13 of this document.

19.3.4.2.1. With prior approval of HOL, the DG Source Disconnect and the DG System Fused Disconnect may be installed outside of the NEMA rated enclosure used to house the HOL owned revenue metering equipment. In this case, the disconnects shall be subject to the following requirements:

19.3.4.2.1.1. Each disconnect shall be installed adjacent to, and within easy and obvious sight of, the enclosure used to house the HOL owned revenue metering equipment.

19.3.4.3 A Permanent Weatherproof enclosure of the Customer’s own construction. It shall consist of Permanent walls covered in brick, siding, or stucco, and shall be covered by a Permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of the OBC. Use of “Sea Can” shipping containers as a Permanent Weatherproof enclosure shall not be permitted.

19.3.5 HOL shall not energize any service whose ESA Connection Authorization Certificate is not as accurate as Practicable, as per Section 19.0.6 of this document.

19.3.6 For Distributed Generator installations that do not have a suitable dedicated electrical room, pedestal mounted metering may be used at HOL’s determination. It shall meet all of the requirements of Section 10.17 of this document, with the exception that it may be installed in proximity to, and within sight of, the pad-mounted distribution transformer on the Line Side of the Service Entrance.

19.3.7 The installation of Customer owned equipment, connected electrically between the bi-directional revenue meter and the distributed generation system disconnect switch or between the bi-directional revenue meter and the DG Source Disconnect switch shall not be permitted.
19.3.8 Prior to energizing the distributed generation service, HOL requires the following Permanent labelling installed:

19.3.8.1 Customer shall post a Permanent Lamacoid plated electrical SLD at the DG System Fused Disconnect switch. The SLD must be plainly and permanently marked identifying switching arrangements. The disconnect locations, and the type and nameplate rating of the Distributed Generator.

19.3.8.2 Customer shall post a Lamacoid plated label at the “DG Source” disconnect switch indicating the generator:

19.3.8.2.1 Rated operating current and voltage.

19.3.8.2.2 Rated open circuit voltage.

19.3.8.2.3 Rated short circuit current. The rating is based on the generation facility nameplate rating. However for inverter based systems, indicate the rating of the generation source array and inverter.

19.3.9 Engineering SLD shall be signed and sealed by a Professional Engineer for the following facilities:

19.3.9.1 Multi-residential (that have two (2), or more, units) premises.

19.3.9.2 All commercial premises.

19.3.9.3 Single residential premise with greater than 10kW of distributed generation.

19.3.10 3-Phase Distributed Generators shall be accepted on to HOL’s Grounded-WYE (4-Wire) system and not on to HOL’s Delta (3-Wire) system.

19.3.11 Generators shall meet requirements contained in HOL Specification ECG0008.

19.3.12 Metering equipment shall be sized to the load-break fused DG system disconnect switch and not the fuse size.

19.3.13 The DG system disconnect switch from the Distributed Generator is required to be Service Entrance rated with over-current protection and provisions for grounding of the Neutral (identified) conductor. The switch must be CSA certified as “Suitable for Service Entrance Equipment” and shall provide visible isolation. Molded case breakers are not acceptable. The disconnecting means shall have nomenclature marked “DG System Disconnect”.
19.3.14 The DG Source Disconnect switch shall meet ESA requirements when a Neutral (identified) conductor is required by code. There shall be provision for grounding that conductor. The DG Source Disconnect switch from the Distributed Generator shall plainly indicate whether the switch is in the open or closed position, and shall have contacts verifiable by direct visible means.

19.3.15 Refer to HOL Specification MCS0057 for meter base wiring details.

19.3.16 Additional metering equipment shall be installed indoors, in a dedicated electrical room that meets the requirements of Section 5.3.1 of this document. It shall be installed in the same electrical rooms as the Distributed Generator generating equipment owner’s secondary consumption meter.

19.3.17 For 3-Phase service, the Customer shall supply and install an approved 7-Jaw meter base to be installed as per HOL Specification MCS0058 and Table 5 located at the end of this document.

19.3.18 All metering socket bases shall be mounted at a height that satisfies the requirements of Section 7.4.1 of this document. They shall be installed such that they are to be as level and plumb as Practicable.

19.3.19 The approved meter base, an approved DG System Fused Disconnection switch, and an approved DG Source Disconnection switch shall be mounted onto a single plywood mounting board. Installation as per HOL Specification MCS0058.

19.3.20 For 3-Phase installations, the Neutral conductor shall meet the requirements already included in this document; see Section 9.6 of this document for more information.

19.3.20.1 If the Customer does not require the Neutral conductor of the 3-Phase service to be connected to their generating equipment, the Neutral conductor shall be terminated at the first Customer owned device connected between the DG Source Disconnect switch and the output of the generating equipment.

19.3.21 The “DG System Disconnect” and “DG Source Disconnect” switches shall each be equipped with at least:

19.3.21.1 Cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.

19.3.21.2 Pad-locking provisions for the switch handle in the “OFF” position.

19.3.21.3 Pad-locking provision for the cover useable by HOL to place a tamper prevention Seal.
19.3.22 The installation shall require a dedicated NEMA or CSA rated outdoor Weatherproof cabinet when installed outdoors. The Weatherproof cabinet shall be installed on a Permanent wall and shall be subject to the requirements of Section 5.1.1 of this document.

The Customer shall install the following in support of the metering equipment to be installed:

19.3.23 Aluminum or Copper conductor, meeting the requirements of Section Error! Reference source not found. of this document, shall be used to connect:

19.3.23.1 The DG System Fused Disconnect switch to the bi-directional revenue meter.

19.3.23.2 The bi-directional revenue meter to the DG Source Disconnect switch.

19.3.24 The Customer shall provide and install a suitably rated, and approved, load-break fused distributed generation disconnection switch as per HOL Specification ECG0015.

19.3.25 The Customer shall provide and install an approved Meter Socket base (see tables located at the end of this Section of the document for a list of approved Meter Socket bases) for the purposes of installing a Bi-Directional Meter. The Bi-Directional Meter shall be supplied and installed by HOL as per HOL Specification ECG0015.

19.3.26 The Customer shall provide and install a suitably rated, and approved, load-break DG Source Disconnect switch as per HOL Specification ECG0015.

19.3.27 If Customer owned intermediate transformation is used to adjust the distributed generated output to the Service Entrance voltage, the equipment that senses LOP (which may include, but is not limited to, power electronics and Instrumentation Transformers) shall be installed on the Load Side of the DG Source Disconnect switch. The installation of the equipment that senses LOP shall meet the requirements of Section 19.0.21 of this document.

19.3.28 If installed in a dedicated electrical room, all equipment shall be installed on a plywood mounting board that meets the requirements of Section 9.8 of this document.
19.4 Distributed Generator, Greater Than 10kW, 120V/208Y or 347V/600Y, 3-Phase, Grounded Grounded-WYE Connected, 4-Wire, Greater Than 200A Services

Services of this configuration shall be subject to all of the following requirements:

19.4.1 Metering shall be installed in a single dedicated electrical room; the electrical room shall be provided and be subject to Section 5.3.1.

19.4.2 The installation of Customer owned equipment, connected electrically between the bi-directional revenue meter and the distributed generation system disconnect switch or between the bi-directional revenue meter and the DG Source Disconnect switch shall not be permitted.

19.4.3 Aluminum or Copper conductor, meeting the requirements of Section 9.2.1.1 of this document, shall be used to connect:

19.4.3.1 The DG System Fused Disconnect switch to the bi-directional revenue meter.

19.4.3.2 The bi-directional revenue meter to the DG Source Disconnect switch.

19.4.4 HOL shall not energize any service whose ESA Connection Authorization Certificate is not as accurate as Practicable, as per Section 19.0.6 of this document.

19.4.5 Prior to energizing the distributed generation service, HOL requires the following Permanent labeling installed:

19.4.5.1 Customer shall post a Permanent Lamacoid plated electrical SLD at the DG System Fused Disconnect switch. The SLD must be plainly and permanently marked identifying switching arrangements. The disconnect locations, and the type and nameplate rating of the Distributed Generator.

19.4.5.2 Customer shall post a Lamacoid plated label at the “DG Source” disconnect switch indicating the generator:

19.4.5.2.1 Rated operating current and voltage.

19.4.5.2.2 Rated open circuit voltage.

19.4.5.2.3 Rated short circuit current. The rating is based on the generation facility nameplate rating. However for inverter based systems, indicate the rating of the generation source array and inverter.
19.4.6 Engineering SLD shall be signed and sealed by a Professional Engineer for the following documents:

19.4.6.1 Multi-residential (that have two (2), or more, units) premises.

19.4.6.2 All commercial premises.

19.4.6.3 Single residential premise with more than 10kW of distributed generation.

19.4.7 3-Phase Distributed Generators shall be accepted on HOL’s Grounded-WYE (4-Wire) system and not on HOL’s Delta (3-Wire) system.

19.4.8 Generators shall meet the requirements contained within HOL Specification ECG0008.

19.4.9 Metering equipment shall be sized to the load-break fused system disconnect switch and generator isolating disconnect switch and not the fuse size.

19.4.10 Services that exceed 200A shall require communications equipment. See Section 14.3 for requirements of the communications equipment.

19.4.11 The DG system disconnect switch from the Distributed Generator is required to be Service Entrance rated with over-current protection and provisions for grounding of the Neutral (identified) conductor. The switch must be CSA certified as “Suitable for Service Entrance Equipment” and shall provide visible isolation. Moulded case breakers are not acceptable. The disconnecting means shall have nomenclature marked “DG System Disconnect”.

19.4.12 The DG Source Disconnect switch shall meet ESA requirements when a Neutral (identified) conductor is required by code. There shall be provision for grounding that conductor. The DG Source Disconnect switch from the Distributed Generator shall plainly indicate whether the switch is in the open or closed position, and shall have contacts verifiable by direct visible means.

19.4.13 Additional metering equipment shall be installed indoors, in a dedicated electrical room that meets the requirements of Section 5.3.1 of this document. It shall be installed in the same electrical rooms as the Distributed Generator generating equipment owner’s secondary consumption meter.

19.4.14 For 3-Phase services, the Customer shall supply and install an approved 13-Jaw Transformer Rated Meter base to be installed as per HOL Specification MCS0058 and Table 5A located at the end of this document.

19.4.15 All metering socket bases shall be mounted at a height that satisfies the requirements of Section 7.4.1 of this document. They shall be installed such that they are to be as level and plumb as Practicable.
19.4.16 The approved meter base, an approved DG System Fused Disconnection switch, and an approved DG Source Disconnection switch shall be mounted onto a single plywood mounting board. Installation as per HOL Specification MCS0058.

19.4.17 The “DG System Disconnect” and “DG Source Disconnect” switches shall each be equipped with at least:

19.4.17.1 Cover/door interlock mechanism preventing opening of the cover with the disconnect switch in the “ON” position.

19.4.17.2 Pad-locking provisions for the switch handle in the “OFF” position.

19.4.17.3 Pad-locking provision for the cover useable by HOL to place a tamper prevention Seal.

19.4.18 The installation shall require a dedicated NEMA, or CSA, rated outdoor Weatherproof cabinet when installed outdoors. If a Weatherproof cabinet is used, it shall be installed on a Permanent wall and shall be subject to the requirements of Section 5.1.1 of this document. If a Weatherproof enclosure of the Customer’s own construction is used, it shall consist of Permanent walls covered in either brick, siding, or stucco, and shall be covered by a Permanent, shingle or corrugated galvanized steel covered (where by-laws permit), roof and meet the requirements of the OBC.

19.4.19 The Customer shall install the following in support of the metering equipment to be installed:

19.4.19.1 The Instrumentation Transformer cabinet shall meet the requirements already included in this document; see Section 9.1 of this document for more information.

19.4.19.2 The instrument transformer secondary conductors and conduit shall meet the requirements already included in this document; see Section 9.3 of this document for more information.

19.4.19.3 The conductor loops shall meet the requirements already included in this document; see Section 9.5 of this document for more information.

19.4.19.4 For 3-Phase installations the Neutral conductor shall meet the requirements already included in this document; see Section 9.6 of this document for more information.

19.4.19.4.1 If the Customer does not require the Neutral conductor of the 3-Phase service to be connected to their generating equipment, the Neutral conductor shall be terminated at the first Customer owned device connected between the DG Source Disconnect switch and the output of the generating equipment.
19.4.19.5 The connection to metering equipment shall meet the requirements already included in this document; see Section 9.7 of this document for more information.

19.4.19.6 The plywood mounting board shall meet the requirements already included in this document; see Section 9.8 of this document for more information.

19.4.19.7 The Instrumentation Transformers shall meet the requirements already included in this document; see Section 9.9 of this document for more information.

19.4.19.8 The Customer shall provide and install a suitably rated, and approved, load-break fused distributed generation disconnection switch as per HOL Specification ECG0015.

19.5 Distributed Generator, 10kW or More: Additional OESC Requirements

19.5.1 Rule 14-100 of the of the OESC states that the DG Source Disconnect switch must be installed within 3000 mm [10'] of the Service Entrance disconnect. The load-break DG System Fused Disconnect switch must be located within 1500 mm [5'] of the Service Entrance disconnect.

19.5.2 The OESC requires the installation of a DG Source Disconnect; including:

19.5.2.1 If the Customer already has a dedicated electrical room suitable for the installation of the additional equipment needed to support their Distributed Generator installation, they shall re-arrange, or expand, their electrical room configuration to accommodate disconnects, and LOP Protection (as per rule 84-018 of the OESC and Section 19.0.21 of this document) when required if the service is less than 200A. If the service is greater than 200A then the Customer shall supply and install an approved Instrumentation Transformer cabinet within the same electrical room or Weatherproof enclosure as the Bi-Directional Meter.

19.5.2.2 Where dedicated pad-mount transformer exists on a private property consult with HOL for feasibility for a second connection at the Service Entrance transformer secondary spades to accept the output from the Distributed Generator installation as per HOL Specification ECG0015, Option 3.

19.5.2.3 The Customer shall supply and install LOP protective device, as required, as per Section 19.0.20 and Section 19.0.21 of this document. If Customer owned intermediate transformation is required to adjust the distributed generated output to the Service Entrance voltage as per HOL Specification ECG0015, inside an enclosure that meets, or exceeds, the requirements of Section 5.1 of this document.
19.5.2.4 The 2nd connection at the transformer secondary spades is only feasible for generation with the following Service Entrance types:

19.5.2.4.1 Generation connected to an underground service at less than 400A and fed from a 3-Phase overhead bank of transformers.

19.5.2.4.2 Generation connected to an underground service at less than 800A fed from a 3-Phase pad-mounted transformer.

19.5.2.5 The following table provides the list of HOL Specifications that may contain additional requirements for a Customer’s Distributed Generator installation and indicates where to find an Appropriate Meter Socket base for the Bi-Directional Metering, depending on the type of service required:

**Table 12: Summary of Service Entrance and HOL Specifications**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Type of Service</th>
<th>No. of Phases</th>
<th>No. of Wires</th>
<th>Ampacity</th>
<th>Hydro Ottawa Documents with Additional Requirements</th>
<th>Type of Meter Socket Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td></td>
<td>1</td>
<td>3</td>
<td>400A to 600A</td>
<td>ECG0015 MCS0087 MCS0090</td>
<td>See Table 4 of this Document</td>
</tr>
<tr>
<td>120V/208Y or 347V/600Y</td>
<td></td>
<td>3</td>
<td>4</td>
<td>≤ 200A</td>
<td>ECG0015 MCS0057 MCS0058</td>
<td>See Table 5 of this Document</td>
</tr>
<tr>
<td>120V/208Y or 347V/600Y</td>
<td></td>
<td>3</td>
<td>4</td>
<td>&gt; 200A</td>
<td>ECG0015 MCS0079 MCS0089</td>
<td>See Table 5A or Table 6 (whichever is most Appropriate) of this Document</td>
</tr>
</tbody>
</table>
20.0 Primary Metering

20.1 Where primary metering is required, as per HOL’s Conditions of Service, HOL document ECS0012, the Customer shall seek approval from HOL’s Distribution Design Department, prior to manufacturing, for specifications. Refer to HOL’s Engineering Specification Document GCS0002 to develop a service supply vault or pad-mounted primary metering centre.

20.2 In the event an existing service, that uses primary metering, shall not be installed on a service that is used in conjunction with a step-down transformer that is used to accommodate DG equipment whose output is at a Low-Voltage.

20.2.1 An existing primary metered Customer who wishes to install DG equipment, whose output is at a Low-Voltage, shall replace their primary metered service with a secondary metered service.

20.3 Depending on the number and types of Instrumentation Transformers required, the lead time needed by HOL to order and install them may vary; consult with HOL as early as possible if needed.

20.4 Metering shall be installed at the Service Entrance voltage. Primary metering shall be allowed on only industrial / commercial services and in limited special circumstances (such as campus metering) subject to approval from both the HOL Distribution Design Department and HOL Metering Services.

20.5 Modifications, or upgrades, where the service would be better served by secondary revenue metering equipment, rather than primary revenue metering equipment. HOL, at its determination, may require a change or replacement of the primary metering equipment with ‘secondary’ revenue metering equipment with the intent of minimizing the use of primary metering.

20.6 HOL does not normally stock either Primary Metering Transformer Units or Primary Metering Transformers (PMT) for new or upgraded services. This equipment typically has procurement lead times in the range of 6 to 8 months with the vendor.

20.7 For pole-mounted primary metering equipment, HOL shall supply and install primary metering Instrumentation Transformers as required.

20.8 For pad-mounted primary metering equipment, HOL shall supply and ship the Instrumentation Transformers to the manufacturer for installation into the switchgear. The manufacturer shall not disassemble, tamper with, modify and/or replace the HOL supplied equipment.

20.9 Revenue metering PTs shall be installed such that their secondary terminal blocks are located in the front of the Customer owned switchgear, as near to the front access doors as Practicable. Further, the PTs shall be connected electrically on the Line Side of the CTs. CTs shall be installed such that their polarity marks are pointing towards the incoming HOL supply.
20.10 Customer owned metering, or ancillary devices, shall not be installed on the Line Side of the HOL revenue metering or in the same cell as the revenue metering without prior approval from HOL. Customer owned load management equipment shall be installed on the Load Side of the primary metering equipment.

20.11 Visible disconnecting devices, that can be locked out using a Standard HOL Padlock, shall be required, both before and after the metering cell, for the purposes of isolating the revenue metering circuitry while performing work on the metering equipment. Both disconnects shall be lockable in the “open” position, using a Standard HOL Padlock, and have a visible and obvious means of verifying its state. The owner of the disconnect(s) shall permit HOL personnel to operate, in concert with the Customer’s electrical control authority (where applicable) in the operation of, these primary disconnect switches in order for HOL personnel, agents, or contractors to perform work on the metering equipment as necessary.

20.11.1 When primary metering is installed for a wholesale metering point, HOL shall install an Appropriately sized Load Side disconnect within sight, of the revenue metering equipment. The purpose of this disconnect is to isolate the revenue metering equipment from the distribution system while performing work on the metering equipment.

20.12 Revenue metering cell shall have provisions such that it can be secured against unauthorized access with both a Standard HOL Padlock and Seal.

20.13 Grounding studs, for the purpose of grounding the busses being metered, shall be subject to all of the following:

20.13.1 One set of grounding studs shall be installed inside the fusing compartment and connected to Load Side of the protective fusing for the revenue metering PTs.

20.13.2 A second set of grounding studs shall be installed inside the metering compartment and connected to the Load Side of the revenue metering installation.

20.14 A potential indicator light, connected to the Load Side of the revenue metering PTs, shall be required.

20.15 A viewing window that permits easy and obvious viewing into the revenue metering cell shall be required.

20.16 Pad-mounted primary metering equipment shall have a heater to maintaining a minimum ambient temperature and control moisture inside the Switchboard cells. The heater shall be capable of maintaining a minimum ambient temperate as per Section 5.3.1.13.1 of this document, preventing excessive moisture from accumulating inside the cells containing revenue metering equipment.
20.17 Both the revenue metering PTs and its protective fusing shall be installed in a fixed position.

20.17.1 Both “draw-out” and “swing-out” fusing shall not be considered acceptable.

20.18 Revenue metering CTs shall be bonded to ground with conductor that is no smaller than 2/0 AWG Copper conductor.

20.19 Number of revenue metering CTs required:

20.19.1 If 3-Element metering is used, then provisions to accommodate three (3) revenue metering CTs shall be required.

20.19.2 If 2-Element metering is used, then provisions to accommodate two (2) revenue metering CTs shall be required.

20.20 Mimic Bus shall be affixed to the outside of the Customer owned switchgear compartment’s front access door and subject to the following:

20.20.1 It shall indicate the internal electrical connections and arrangement of the equipment in each compartment.

20.20.2 Shall be clear and obvious.

20.20.3 Shall be mechanically fastened to the front of the panel and be resistant to fading from UV light.

20.20.4 If the switchgear has rear access doors then both the front and rear access doors shall have identical Mimic Bus affixed to the outside of them.
Table 1: Hydro Ottawa Acceptable Criteria For Meter Base Socket For Overhead 120V/240V, 1-Phase, 3-Wire, 100A Or 200A Services

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Meter Base Rating</th>
<th>Meter Base Minimum Dimensions (H x W x D)</th>
<th>Meter Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/240V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Phase</td>
<td>100A, 600V</td>
<td>346 mm x 187 mm x 105 mm [13-5/8” x 7-3/8” x 4-1/8”]</td>
<td>CSA approved Overhead weather-proof type NEMA Type 3R King size metal Meter Socket base c/w:</td>
</tr>
<tr>
<td>3-Wire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100A</td>
<td></td>
<td></td>
<td>High strength non-tracking blocks</td>
</tr>
<tr>
<td>120/240V</td>
<td></td>
<td></td>
<td>Mechanical lugs on Line Side</td>
</tr>
<tr>
<td>1-Phase</td>
<td>200A, 600V</td>
<td>432 mm x 305 mm x 121 mm [17” x 12” x 4-3/4”]</td>
<td>Safety shields on Line Side</td>
</tr>
<tr>
<td>3-Wire</td>
<td></td>
<td></td>
<td>Metal screw type lock Sealing Ring</td>
</tr>
<tr>
<td>200A</td>
<td></td>
<td></td>
<td>Suitable standard 4-Jaw socket base acceptable to the ESA</td>
</tr>
</tbody>
</table>
Table 1A: Hydro Ottawa Acceptable Criteria For Meter Socket Base For Underground 120V/240V, 1-Phase, 3-Wire, ≤200A Services

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Meter Base Rating</th>
<th>Meter Base Minimum Dimensions (H x W x D)</th>
<th>Meter Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td></td>
<td></td>
<td>CSA approved Underground Weatherproof type NEMA Type 3R King size metal Meter Socket base c/w:</td>
</tr>
<tr>
<td>1-Phase</td>
<td></td>
<td></td>
<td>• High strength non-tracking blocks</td>
</tr>
<tr>
<td>3-Wire</td>
<td>200A, 600V</td>
<td>432 mm x 305 mm x 121 mm [17” x 12” x 4-3/4”]</td>
<td>• Compression lugs on Line Side; [1/2”] studs</td>
</tr>
<tr>
<td>100A or</td>
<td></td>
<td></td>
<td>• Safety shields on Line Side</td>
</tr>
<tr>
<td>200A</td>
<td></td>
<td></td>
<td>• Metal screw type lock Sealing Ring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Suitable standard 4-Jaw socket base acceptable to the ESA</td>
</tr>
</tbody>
</table>

Note: All Underground Meter Socket Bases must have Compression Lug Terminations for the Secondary Supply Conductors.

Due to voltage drops from the distribution transformer to the Meter Socket base, the residential Customer shall provide, and install, 63 mm [2-1/2"] conduit on all underground, 1-Phase, secondary services, when installing 250 kcmil Copper secondary conductors. Installation as per HOL specification ECS0002.
Table 2: Hydro Ottawa Approved Underground Multi-Position Meter Gang Socket Trough For Residential 120V/240V, 1-Phase, 3-Wire, 400A Multi-Unit Service

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Enclosure Size (H x D x W)</th>
<th>2 – 6 Multi-Gang Meter Socket Requirements</th>
</tr>
</thead>
</table>
| 120V/240V      | CUTLER-HAMMER (EATON) | 2KU4CLX Series to 6KU4CLX Series | 579 mm x 156 mm x 941 mm [22-13/16” x 6-1/8” x 37-1/16”] to 564 mm x 156 mm x 1881 mm [22-3/16” x 6-1/8” x 74-1/16”] | Factory Bussed 400A Main 200A 600V per position CSA Weatherproof enclosure 3 rating c/w:  
• Two blank compartments  
• Extended buss bars  
• [1/2”] Compression studs  
• One knock out for incoming cable for 100 mm [4"] conduit  
• 4-Jaw Meter Socket  
• Screw type metal lock Sealing Rings  
• Underground Services Only                                                                 |
| 1-Phase        | HYDEL               | MSC820TW Series to MSC860TW Series | 578 mm x 159 mm x 949 mm [22-3/4” x 6-1/4” x 37-3/8”] to 578 mm x 159 mm x 1886 mm [22-3/4” x 6-1/4” x 74-1/4”] |                                                                                                              |
| 3-Wire         |                     |                                 |                                                   |                                                                                                              |
| 400A Service   | THOMAS & BETTS (MICROLECTRIC) | BSC42-VG Series to BSC46-VG Series | 511 mm x 162 mm x 889 mm [20-1/8” x 6-3/8” x 35”] to 511 mm x 162 mm x 1778 mm [20-1/8” x 6-3/8” x 70”] |                                                                                                              |

Note: All Underground Multi-Gang Meter Socket Trough must have Compression Lug Terminations for the Secondary Supply Conductors.
Table 3: Hydro Ottawa Approved Weatherproof Combination Base Metering Enclosure  
For Underground 120V/240V, 1-Phase, 3-Wire, 225A To 400A Service

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Base Metering Enclosure Requirements</th>
</tr>
</thead>
</table>
| 120V/240V      | THOMAS & BETTS (MICROLELECTRIC) | JS4AB-TW | CSA approved Underground Weatherproof type NEMA Type 3R metering base enclosure c/w:  
• Line Side terminations: double [1/2"] studs to accommodate compression lugs for underground service (1 x 500 kcmil or 2 x 250 kcmil)  
• Load Side terminations: tunnel type connectors, dual rated for 1 x 500 kcmil or 2 x 250 kcmil  
• Isolated Neutral Conductor  
• Twin covers allow access to either Compartment  
• Meter Socket configuration for 5-Jaw meter with self-shorting on left side  
• 4-pole metering Test Switch  
• (H x W x D): 78 mm x 514 mm x 213 mm [30-5/8" x 20-1/4" x 8-3/8"] |
| 1-Phase 3-Wire|              |                |                                      |
| 225A to 400A   |              |                |                                      |

Notes:

1) All Underground combination base metering enclosure must have compression lug Line Side terminations and a grounded Neutral conductor when utilized for residential Service Entrance.

2) The electrician shall supply and install the compression lugs on the secondary conductors for the service to the metering base enclosure. The enclosure Load Side terminations shall have mechanical lugs for the secondary conductors.

3) Units shall be provided without a 3-Wire CT. This shall be supplied and installed by HOL Metering Services on site.

Applications:

1) Instrument transformer rated enclosures are required for services that exceed 200A.

2) CTs provide low current directly proportional to the higher service current requirements.

3) For example, a 400/5, 3-Wire CT provides 5A to the 2-Wire meter when the current in the service is 400A.
Table 4: Hydro Ottawa Approved 1-Phase, 20A, 600V, Transformer Rated 5-Jaw Meter Socket Bases with Provision For Test Switch For 240V, 1-Phase, 3-Wire, >200A Service

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Meter Socket Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V 1-Phase 3-Wire</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>TSU5</td>
<td>CSA approved 20A, 600V transformer rated Weatherproof NEMA Type 3R Meter Socket base c/w:</td>
</tr>
<tr>
<td>400A or 600A</td>
<td>DURHAM</td>
<td>RSTL5-2K</td>
<td>• Meter Socket configuration for 5-Jaw meter</td>
</tr>
<tr>
<td></td>
<td>HYDEL</td>
<td>CTS405PW</td>
<td>• CSA approved for use with Copper conductors only</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>CT105</td>
<td>• Conductor range for #14 AWG - #10 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Metal screw type lock Sealing Ring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Provisions for metering Test Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Bottom cover is lockable and sealable</td>
</tr>
</tbody>
</table>

Applications:

1) Instrumentation Transformer rated Meter Sockets are required for services that exceed 200A.

2) CTs provide low current directly proportional to the higher service current requirements.

3) For example, a 400/5, 3-Wire CT provides 5A to the 2-Wire meter when the current in the service is 400A.
Table 5: Hydro Ottawa Approved Commercial 7-Jaw Meter Socket Bases For 120V/208Y and 347V/600Y, 2-Phase and 3-Phase, 100A and 200A Services

<table>
<thead>
<tr>
<th>System</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/208Y or 347V/600Y</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>P17-0-IN1, P27-IN2</td>
</tr>
<tr>
<td>3-Phase 4-Wire</td>
<td>HYDEL</td>
<td>SFC703PW, STC703RK</td>
</tr>
<tr>
<td>Individual Network Service</td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>PL17-INTCV, PL27-INTCV</td>
</tr>
<tr>
<td>2-Phase AND Neutral</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>P17-0-IN1, P27-IN2</td>
</tr>
<tr>
<td>120V/208Y</td>
<td>HYDEL</td>
<td>SFC703PW, STC703RK</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>PL17-INTCV, PL27-INTCV</td>
</tr>
</tbody>
</table>

Isolated Neutral Requirements:

1) A full size Neutral conductor shall be provided to all 7-Jaw Meter Socket bases.

2) The Neutral conductor must be terminated in the Meter Socket base on an isolated neutral block and a white #10 AWG Copper Neutral tap shall be supplied to the 6th jaw in the 7-Jaw Meter Socket base.
### Table 5A: Hydro Ottawa Approved Commercial 13-Jaw Transformer Rated Meter Socket Bases For 3-Phase, 4-Wire, >200A Secondary And Primary Services

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Meter Socket Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/208Y Y or 347V/600Y Y</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>TSU13</td>
<td>13-Jaw Meter Socket base are required for a 3-Phase, 4-Wire, 3-Element, Secondary and Primary Service.</td>
</tr>
<tr>
<td>3-Phase 4-Wire &gt;200A Service</td>
<td>DURHAM</td>
<td>RSTL13-2K</td>
<td>CSA approved Weatherproof type NEMA Type 3R, 20A, 600V Meter Socket base c/w:</td>
</tr>
</tbody>
</table>
|                      | HYDEL | CTS130PW | • CSA approved for Copper only  
|                      |       |          | • Conductor range for #14 AWG - #8 AWG  
|                      |       |          | • Metal screw type lock Sealing Ring  
|                      |       |          | • Provisions for 10-pole metering Test Switch  
|                      |       |          | • Bottom cover is lockable and sealable  
|                      | THOMAS & BETTS (MICROLECTRIC) | CT113 |
Table 5B: Hydro Ottawa Approved Commercial 8-Jaw Transformer Rated Meter Socket Base For 3-Phase, 3-Wire, "Delta"-Connected, Primary Service

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Meter Socket Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>600V Δ</strong></td>
<td>CUTLER-HAMMER (EATON)</td>
<td>TSU8</td>
<td>8-Jaw Meter Socket base are required for a 3-Phase, 3-Wire, 2-Element, Primary Service</td>
</tr>
<tr>
<td>3-Phase</td>
<td>DURHAM</td>
<td>RSTL8-2K</td>
<td>CSA approved Weatherproof type NEMA Type 3R, 20A, 600V Meter Socket base c/w:</td>
</tr>
<tr>
<td>3-Wire</td>
<td>HYDEL</td>
<td>CTS800PW</td>
<td>• CSA approved for Copper only</td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td></td>
<td>• Conductor range for #14 AWG - #8 AWG</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>CT108</td>
<td>• Metal screw type lock Sealing Ring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Provisions for 10-pole metering Test Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Bottom cover is lockable and sealable</td>
</tr>
</tbody>
</table>

************ HOL no longer provides New 600V “Delta” Connected Secondary on New Installations  ************

**Note:** A 600V, 3-Phase, 3-Wire Delta connected secondary service is **not** a standard HOL service voltage. HOL does not provide self-contained 600V, 3-Phase, 3-Wire Delta meters for new, added, or upgraded secondary services.
# Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear for Agricultural, Residential, Commercial and Distributed Generation Services

<table>
<thead>
<tr>
<th>Service Voltage</th>
<th>Phase</th>
<th>Wire</th>
<th>Service Rating (A)</th>
<th>Maximum Conductor Size (Conduit)</th>
<th>Conductor Type</th>
<th>Instrument Transformer Cabinet Dimension (H x W x D)</th>
<th>Instrument Transformer Compartment In Switch Gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td>1</td>
<td>3</td>
<td>400A</td>
<td>Single Run: Up To 600 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36&quot; x 36&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 3/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36&quot; x 36&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Not Permitted</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 350 MCM</td>
<td>RW90 CU</td>
<td>1200 mm x 1200 mm x 300 mm [48&quot; x 48&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>120V/208Y or</td>
<td>3</td>
<td>4</td>
<td>400A</td>
<td>Single Run: Up To 600 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36&quot; x 36&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td>347V/600Y</td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 3/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36&quot; x 36&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>347V/600Y</td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Not Permitted</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>≥ 800A Amp</td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 350 MCM</td>
<td>RW90 CU</td>
<td>1200 mm x 1200 mm x 300 mm [48&quot; x 48&quot; x 12&quot;]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Notes:**

1) In Table 6, the term ‘Single Run’ denotes the use of a single conductor and the term ‘Single Parallel Run’ denotes the use of two (2) conductors.

2) 3-Phase, 4-Wire, service is not available for residential Customers.

3) 120V/240V, 1-Phase, 3-Wire, 600A and 120V/208Y or 347V/600Y, 3-Phase, 4-Wire 600A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 600A services will not accept conductors larger than 600 MCM; as per OESC Table 2, 600 MCM-Cu conductor does not provide sufficient Ampacity for a 600A service.
Table 6  Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear for Agricultural, Residential, Commercial and Distributed Generation Services (Continued)

Notes on Secondary Service Conductors:

4) The Line Side conductors shall be identical in type, number of conductors, and conductor size.

5) The Load Side conductors shall be identical in type, number of conductors, and conductor size.

6) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.

7) Secondary conductors shall enter and leave the Instrumentation Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged, then a (H x W x D) 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”] instrument transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs.

8) Where parallel conductors are required for the metering installation, the Customer shall provide properly sized double barrel mechanical lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the line and Load Side of the CTs.

9) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.

10) Where parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the material the conductors are comprised of.

11) The instrument transformers shall be supplied and installed on site by HOL Metering Services.
Table 6A: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Single Copper Conductors in Free Air (Coreflex)

<table>
<thead>
<tr>
<th>Service Voltage</th>
<th>Phase</th>
<th>Wire</th>
<th>Service Rating (A)</th>
<th>Maximum Conductor Size</th>
<th>Conductor Type</th>
<th>Instrument Transformer Cabinet Dimension (H x W x D)</th>
<th>Instrument Transformer Compartment In Switch Gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td>1</td>
<td>3</td>
<td>400A</td>
<td>Single Run: Up to 250 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up to 1/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Up to 500 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up to 3/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td>120V/208Y or 347V/600Y</td>
<td>3</td>
<td>4</td>
<td>400A</td>
<td>Single Run: Up to 250 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up to 1/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Up to 500 MCM</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up to 3/0 AWG</td>
<td>RW90 CU</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note:
In Table 6A, the term ‘Single Run’ denotes the use of a single conductor and the term ‘Single Parallel Run’ denotes the use of two (2) conductors.
Table 6A: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Single Copper Conductors in Free Air (Coreflex) (Continued)

**Secondary Service Conductors:**

1) All Line Side conductors shall be identical in type, number of conductors, and conductor size.

2) All Load Side conductors shall be identical in type, number of conductors, and conductor size.

3) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.

4) Secondary conductors shall enter and leave the Instrumentation Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged, then a (H x W x D) 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”] Instrumentation Transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs.

5) Where parallel conductors are required for the metering installation, the Customer shall provide properly sized double barrel mechanical lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the line and Load Side of the CTs.

6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.

7) Where parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors.

8) The Instrumentation Transformers shall be supplied and installed on site by HOL Metering Services.
Table 6B: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear for Agricultural, Residential, Commercial and Distributed Generation Services

<table>
<thead>
<tr>
<th>Service Voltage</th>
<th>Phase</th>
<th>Wire</th>
<th>Service Rating (A)</th>
<th>Maximum Conductor Size (Conduit)</th>
<th>Conductor Type</th>
<th>Instrument Transformer Cabinet Dimension (H x W x D)</th>
<th>Instrument Transformer Compartment In Switch Gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td>1</td>
<td>3</td>
<td>400A</td>
<td>Single Run: Not Permitted¹</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 250 MCM</td>
<td>RW90 AL</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Not Permitted²</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 500 MCM</td>
<td>RW90 AL</td>
<td>1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>120V/208Y OR 347V/600Y</td>
<td>3</td>
<td>4</td>
<td>400A</td>
<td>Single Run: Not Permitted¹</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 250 MCM</td>
<td>RW90 AL</td>
<td>900 mm x 900 mm x 300 mm [36” x 36” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600A</td>
<td>Single Run: Not Permitted²</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Parallel Run: Up To 500 MCM</td>
<td>RW90 AL</td>
<td>1200 mm x 1200 mm x 300 mm [48” x 48” x 12”]</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buss Bar</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>≥ 800A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Notes on Secondary Aluminium Conductors:

1) 400A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 400A services will not accept conductors larger than 600 MCM; as per OESC Table 4, 600 MCM-AL conductor does not provide sufficient Ampacity for a 400A service.

2) 600A services are not permitted to take supply from a single-run of conductor. Lugs on CTs used with 600A services will not accept conductors larger than 600 MCM; as per OESC Table 4, 600 MCM-AL conductor does not provide sufficient Ampacity for a 600A service.

3) In Table 6B, the term ‘Single Parallel Run’ denotes the use of two (2) conductors per phase.
Table 6B: Hydro Ottawa Acceptable Criteria For Instrument Transformer Cabinets and Utility Compartments in Switch Gear for Agricultural, Residential, Commercial and Distributed Generation Services (Continued)

Notes on Secondary Aluminium Conductors: (Continued)

4) 3-Phase, 4-Wire, service is not available for Residential Customer. Aluminum conductor terminated using compression lugs to the Line Side and Load Side of the (in-line) CT(s) within the Instrumentation Transformer cabinet; mechanical lugs are not permitted to be used with Aluminum conductor for these types of installations.

5) The Line Side conductors shall be identical in type, number of conductors, and conductor size.

6) The Load Side conductors shall be identical in type, number of conductors, and conductor size.

7) The minimum length of each conductor for both the Line Side and Load Side of the bar type (in-line) CTs will be 1200 mm [4’] shall be provided within the Instrumentation Transformer cabinet. This will enable the conductors to be trained in place for the termination and to ensure that strain is not applied to the CTs for the metering installation.

8) Each conductor shall be identified with electrical phasing tape as per Section 9.2.1.6 of this document.

9) Secondary conductors shall enter and leave the Instrumentation Transformer cabinet through the sides opposite lower sides or the bottom of the cabinet. If this cannot be arranged then (H x W x D) 1200 mm x 1200 mm x 300 mm [48” x 48” x 12”] Instrumentation Transformer cabinet shall be used to enable the secondary conductors to be trained in place for termination and to ensure that strain is not applied to the bar-type (in-line) CTs. Refer to Schedule 2, Schedule 4, Schedule 6, and Schedule 8, of this document, for Instrumentation Transformer cabinet layout details.

10) Parallel conductors are required for the metering installation, the Customer shall provide properly sized compression lugs for the connection between the bar-type (in-line) CT(s) and the conductors for each phase, to the Line Side and Load Side of the CTs.

11) The Customer will train the secondary conductors and cut the length of the conductors, and shall be responsible for the pressing of the compression lugs for termination to the bar-type (in-line) CT (s).

12) HOL Metering personnel shall be responsible to complete the terminations to the bar-type (in-line) CT(s) for the installation.

13) Where a Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full size Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker or switch to the instrument transformer cabinet, terminating on the neutral conductor terminal block. The Neutral conductor shall be installed prior to the installation of the metering equipment.

14) Parallel Neutral conductors are used, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have both a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors. The isolated neutral block shall be made of a material that is compatible with the type of conductors.

15) “Stranded Bi-Metallic Pin Terminals” shall not be permitted when transitioning from Aluminum conductor to Copper conductor for the metering installation, as per Section 9.2.1.1.5 of this document.

16) The Instrumentation Transformers shall be supplied and installed on site by HOL Metering Services.
Table 7: Hydro Ottawa Approved 2 to 6 Multi-Gang Meter Socket Trough for Overhead, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services

<table>
<thead>
<tr>
<th>Overhead Service</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Enclosure Size (H x D x W)</th>
<th>Multi-Gang Meter Socket Requirement(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V 1-Phase</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>2KN1 Series to 6KN1 Series</td>
<td>308 mm x 121 mm x 589 mm [12-1/8&quot; x 4-3/4&quot; x 23-3/16&quot;] to 308 mm x 121 mm x 1376 mm [12-1/8&quot; x 4-3/4&quot; x 54-3/16&quot;]</td>
<td>2 - 6 Multi-Gang Meter Socket Requirements:</td>
</tr>
</tbody>
</table>
| 3-Wire 100A Service | HYDEL | SD220PW Series to SD620PW Series | 305 mm x 127 mm x 381 mm [12" x 5" x 15"] to 305 mm x 127 mm x 1143 mm [12" x 5" x 45"] | Factory Bussed 200A Main, 100A, 600V per position CSA Weatherproof enclosure NEMA Type 3R rating c/w:  
- Tunnel style line, load and neutral lugs  
- 4-Jaw Meter Socket  
- Screw type metal lock Sealing Ring |
| 120V/240V 1-Phase | THOMAS & BETTS (MICROLECTRIC) | BE2-V or BE2-VH Series to BE6-V or BE6-VH Series | 371 mm x 132 mm x 406 mm [14-5/8" x 5-3/16" x 16"] to 371 mm x 132 mm x 1220 mm [14-5/8" x 5-3/16" x 48"] | 2 - 4 Multi-Gang Meter Socket Requirements: |
| 3-Wire 200A Service | CUTLER-HAMMER (EATON) | 2K2 Series to 4K2 Series | 384 mm x 130 mm x 665 mm [15-1/8" x 5-1/8" x 26-3/16"] to 384 mm x 130 mm x 1110 mm [15-1/8" x 5-1/8" x 43-11/16"] | Factory Bussed 200A Main, **200A, 600V per position**, CSA Weatherproof enclosure NEMA Type 3R rating c/w:  
- Tunnel style line, load and neutral lugs  
- 4-Jaw Meter Socket  
- Screw Type meter lock Sealing Rings |
| 200A Service | HYDEL | H22R Series to H24R Series | 384 mm x 137 mm x 451 mm [15-1/8" x 5-3/8" x 17-3/4"] to 384 mm x 137 mm x 895 mm [15-1/8" x 5-3/8" x 35-1/4"] | 2 - 4 Multi-Gang Meter Socket Requirements:  
- Tunnel style line, load and neutral lugs  
- 4-Jaw Meter Socket  
- Screw Type meter lock Sealing Rings |
| 200A Service | THOMAS & BETTS (MICROLECTRIC) | BD2-V or BD2-VH Series to BD4-V or BD4-VH Series | 394 mm x 138 mm x 445 mm [15-1/2" x 5-7/16" x 17-1/2"] to 394 mm x 138 mm x 889 mm [15-1/2" x 5-7/16" x 35"] | 2 - 4 Multi-Gang Meter Socket Requirements:  
- Tunnel style line, load and neutral lugs  
- 4-Jaw Meter Socket  
- Screw Type meter lock Sealing Rings |
Table 8: Hydro Ottawa Approved 2 – 6 Multi-Gang Meter Socket Trough for Underground, 120V/240V, 1-Phase, 3-Wire, 100A and 200A Services

<table>
<thead>
<tr>
<th>Underground Service</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Enclosure Size (H x D x W)</th>
<th>2 - 6 Multi-Gang Meter Socket Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V 1-Phase</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>2KNU1CLX Series to 6KNU1CLX Series</td>
<td>308 mm x 121 mm x 589 mm [12-1/8&quot; x 4-3/4&quot; x 23-3/16&quot;] to 308 mm x 121 mm x 1376 mm [12-1/8&quot; x 4-3/4&quot; x 54-3/16&quot;]</td>
<td>Factory Bussed 200A Main, 100A, 600V per position, CSA rated Weatherproof enclosure NEMA Type 3R rating c/w</td>
</tr>
<tr>
<td></td>
<td>HYDEL</td>
<td>MCC220TW Series to MCC620TW Series</td>
<td>305 mm x 127 mm x 572 mm [12&quot; x 5&quot; x 22-1/2&quot;] to 305 mm x 127 mm x 1321 mm [12&quot; x 5&quot; x 52&quot;]</td>
<td>• 4-Jaw Meter Socket</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>BEC2-V or BEC2-VH Series to BEC6-V or BEC6-VH Series</td>
<td>384 mm x 127 mm x 614 mm [15-1/8&quot; x 5&quot; x 24-3/16&quot;] to 384 mm x 127 mm x 1464 mm [15-1/8&quot; x 5&quot; x 57-5/8&quot;]</td>
<td>• Blank wiring Compartment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1/2” Studs to accommodate compression type main line and neutral lugs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Screw type metal lock Sealing Rings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Underground Services Only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Underground Service</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Enclosure Size (H x D x W)</th>
<th>2 - 4 Multi-Gang Meter Socket Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V 1-Phase</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>2KU2CLX Series to 4KU2CLX Series</td>
<td>384 mm x 130 mm x 665 mm [15-1/8&quot; x 5-1/8&quot; x 26-3/16&quot;] to 384 mm x 130 mm x 1110 mm [15-1/8&quot; x 5-1/8&quot; x 43-11/16&quot;]</td>
<td>Factory Bussed 200A Mains, 200A, 600V per position CSA rated Weatherproof enclosure NEMA Type 3R rating c/w:</td>
</tr>
<tr>
<td></td>
<td>HYDEL</td>
<td>MSC22R Series to MSC24R Series</td>
<td>384 mm x 137 mm x 673 mm [15-1/8&quot; x 5-3/8&quot; x 26-1/2&quot;] to 384 mm x 137 mm x 1118 mm [15-1/8&quot; x 5-3/8&quot; x 44&quot;]</td>
<td>• 4-Jaw Meter Socket</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>BDC2-V or BDC2-VH Series To BDC-4V or BDC-4VH Series</td>
<td>397 mm x 133 mm x 667 mm [15-5/8&quot; x 5-1/4&quot; x 26-1/4&quot;] to 397 mm x 133 mm x 1111 mm [15-5/8&quot; x 5-1/4&quot; x 43-3/4&quot;]</td>
<td>• Blank wiring Compartment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• 1/2” Studs to accommodate compression type main line and neutral lugs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Screw type metal lock Sealing Rings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Underground Services Only</td>
</tr>
</tbody>
</table>

Note: All Underground Multi-Gang Meter Socket Trough must have Compression Lug Terminations for the Secondary Supply Conductors.
Table 9: Meter Sockets

Meter Socket types that are required for all services up to 200A. The requirements are indicated below and refer to HOL Specifications MCS0016 and MCS0018 for wiring details.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Number of Phases</th>
<th>No. of Wires</th>
<th>Configuration</th>
<th>Ampacity</th>
<th>Meter Socket Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td>1-Phase</td>
<td>3-Wire</td>
<td>Not Applicable</td>
<td>≤ 200A</td>
<td>4-Jaw Socket Base</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;200A to 600A</td>
<td>5-Jaw Socket Base</td>
</tr>
<tr>
<td>120V/208Y</td>
<td>2-Phase</td>
<td>3-Wire</td>
<td>Grounded-WYE</td>
<td>≤ 200A</td>
<td>7-Jaw Socket Base (if in Stand-Alone Meter Base)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5-Jaw Socket Base (if part of Metering Centre)</td>
</tr>
<tr>
<td></td>
<td>2-Phase</td>
<td>3-Wire</td>
<td>Grounded-WYE</td>
<td>≤ 200A</td>
<td>7-Jaw Socket Base</td>
</tr>
<tr>
<td></td>
<td>3-Phase</td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>≤ 200A</td>
<td>7-Jaw Socket Base</td>
</tr>
<tr>
<td>347V/600Y</td>
<td>3-Phase</td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>≤ 200A</td>
<td>7-Jaw Socket Base</td>
</tr>
</tbody>
</table>
Table 10: Secondary Services

Transformer Rated Meter Socket Types and Number of Required Metering Instrumentation Transformers:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>No. of Phases</th>
<th>No. of Wires</th>
<th>Configuration</th>
<th>Ampacity</th>
<th>Meter Socket Type</th>
<th>Meter</th>
<th>No. of Metering Inst. Transformers (Provisions For)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V</td>
<td>1-Phase</td>
<td>3-Wire</td>
<td>Not Applicable</td>
<td>&gt;200A to 600A</td>
<td>5-Jaw Meter Socket Base</td>
<td>1-Phase, 1-Element, 10A, 240V, 2-Wire</td>
<td>1 – 3-Wire 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 – 2-Wire</td>
<td>0</td>
</tr>
<tr>
<td>120V/208Y</td>
<td>3-Phase</td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>&gt; 200A</td>
<td>13-Jaw Meter Socket Base</td>
<td>3-Phase, 3-Element, 10A, 120V, 4-Wire</td>
<td>3 – 2-Wire 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>347V/600Y</td>
<td>3-Phase</td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>&gt; 200A</td>
<td>13-Jaw Meter Socket Base</td>
<td>3-Phase, 3-Element, 10A, 120V, 4-Wire</td>
<td>3 – 2-Wire 3</td>
</tr>
</tbody>
</table>
### Table 10A: Primary Services

Transformer Rated Meter Socket Types and Number of Required Metering Instrumentation Transformers:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>No. of Phases</th>
<th>No. of Wires</th>
<th>Configuration</th>
<th>Meter Socket Type</th>
<th>Meter</th>
<th>No. of Metering Inst. Transformers (Provisions For)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CTs</td>
</tr>
<tr>
<td>8.3kV</td>
<td>3-Phase</td>
<td>3-Wire</td>
<td>Delta</td>
<td>8-Jaw Meter Socket Base</td>
<td>3-Phase, 2-Element, 10A, 120V, 3-Wire</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>13-Jaw Meter Socket Base</td>
<td>3-Phase, 3-Element, 10A, 120V, 4-Wire</td>
<td>3</td>
</tr>
<tr>
<td>13.2kV</td>
<td>3-Phase</td>
<td>3-Wire</td>
<td>Delta</td>
<td>8-Jaw Meter Socket Base</td>
<td>3-Phase, 2-Element, 10A, 120V, 3-Wire</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>13-Jaw Meter Socket Base</td>
<td>3-Phase, 3-Element, 10A, 120V, 4-Wire</td>
<td>3</td>
</tr>
<tr>
<td>27.6kV</td>
<td>3-Phase</td>
<td>3-Wire</td>
<td>Delta</td>
<td>8-Jaw Meter Socket Base</td>
<td>3-Phase, 2-Element, 10A, 120V, 3-Wire</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Wire</td>
<td>Grounded-WYE</td>
<td>13-Jaw Meter Socket Base</td>
<td>3-Phase, 3-Element, 10A, 120V, 4-Wire</td>
<td>3</td>
</tr>
</tbody>
</table>

For Hydro Ottawa Use Only © 2016           GCS0008 Rev. 5     Page 201 of 225
Table 11: Hydro Ottawa Approved Utility Pedestal Services 600V, 1-Phase, 100A, 4-Jaw Meter Socket Base And Circuit Breaker With For 240V, 1-Phase, 3-Wire, 30A Service

Note: The equipment listed in this table is restricted for use on services described in Section 7.5.2 of this document.

<table>
<thead>
<tr>
<th>Service Rating</th>
<th>Manufacturer</th>
<th>Catalog Number</th>
<th>Meter Socket Base Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/240V 1-Phase</td>
<td>CUTLER-HAMMER (EATON)</td>
<td>RC1N BRH230</td>
<td>CSA approved 100A, 600V rated Weatherproof type NEMA Type 3R Meter Socket base c/w:</td>
</tr>
<tr>
<td>3-Wire 30A Service</td>
<td>HYDEL</td>
<td>JA000PWSD</td>
<td>• Meter Socket configuration for 4-Jaw meter</td>
</tr>
<tr>
<td></td>
<td>THOMAS &amp; BETTS (MICROLECTRIC)</td>
<td>CO1-30 (Siemens Q Type Breakers Included)</td>
<td>• CSA approved for Copper only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Conductor range for #6 AWG to #1/0 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Metal screw type lock Sealing Ring</td>
</tr>
</tbody>
</table>
Schedule 1: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

Figure 3: 1-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, for 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.
Schedule 1: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 1-Phase, NEMA Type 1 rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.

   2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 3, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering group after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) The installation shall utilize a 3-Wire bar type (in-line) CT.

6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor shall not be part of the metering circuit.

7) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 2: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

Figure 4: 1-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, for 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]

Note: Drawing is not to scale.
Schedule 2: 1-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 1-Phase, NEMA Type 1 rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.

   2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 4, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) The installation shall utilize 3-Wire bar type (in-line) CT.

6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor is not part of the metering circuit.

7) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 3: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

Figure 5: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Removable Back Plate (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"]

Note: Drawing is not to scale.
Schedule 3: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 1-Phase, NEMA Type 3 or NEMA Type 3R rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.

   2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 5, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering group after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) The installation shall utilize a 3-Wire bar type (in-line) CT.

6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor shall not be part of the metering circuit.

7) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 4: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

![Diagram of 1-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory installed Removable Back Plate (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]]

Figure 6: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]

Note: Drawing is not to scale.
Schedule 4: 1-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 1-Phase, NEMA Type 3 or NEMA Type 3R rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of cabinet.

   2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 6, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CT.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) The installation shall utilize 3-Wire bar type (in-line) CT.

6) For 120V/240V, 1-Phase, 3-Wire installations, the Neutral conductor is not part of the metering circuit.

7) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 5: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

Figure 7: 3-Phase, NEMA Type 1 Rated Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, for 900 mm x 900 mm x 300 mm [36" x 36" x 12”]

Note: Drawing is not to scale.
Schedule 5: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 3-Phase, NEMA Type 1 Rated Instrumentation Transformer cabinets and enclosures that are 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:
   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
   2.2) There shall be a maximum of 1830 mm [6’] between the finished floor and the top of the cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 7, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed in the center at the bottom of the cabinet as shown in Figure 7. This terminal block is required regardless if the Neutral conductor continues past the Instrumentation Transformer cabinet to the Customer’s equipment or not.

6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker, or switch, to the Instrumentation Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.

7) Where parallel Neutral conductors are required, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors.

8) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 6: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

Isolated Neutral Block, Centered in Enclosure

Note: Drawing is not to scale.
Schedule 6: 3-Phase, NEMA Type 1 Rated, Instrumentation Transformer Cabinet Layout with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"]Cabinet (Continued)

Notes:

1) This schedule applies only to 3-Phase, NEMA Type 1 Rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.

   2.2) There shall be a maximum of 1830 mm [6"] between the finished floor and the top of the cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 8, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) An isolated neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed in the center at the bottom of the cabinet as shown in Figure 8. This terminal block is required regardless if the Neutral conductor continues past the Instrumentation Transformer cabinet to the Customer’s equipment or not.

6) A Neutral conductor is an integral part of a 3-Phase120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker, or switch, to the Instrumentation Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.

7) Where parallel Neutral conductors are required, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors.

8) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 7: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet

Figure 9: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Removable Back Plate

(H x W x D)
900 mm x 900 mm x 300 mm
[36" x 36" x 12"]

Isolated Neutral Block, Centered in Enclosure

Note: Drawing is not to scale.
Schedule 7: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 900 mm x 900 mm x 300 mm [36" x 36" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 3-Phase, NEMA Type 3 or NEMA Type 3R rated Instrumentation Transformer cabinets that are (H x W x D) 900 mm x 900 mm x 300 mm [36" x 36" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:
   
   2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.
   
   2.2) There shall be a maximum of 1830 mm [6‘] between the finished floor and the top of the cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from the bottom corners of the enclosure, as shown in Figure 9, following ESA guidelines for conductors within conduit. This is required to enable the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed on the cabinet’s back plate or mounting plate, at the bottom of the cabinet as shown in Figure 9. This terminal block is required regardless if the Neutral conductor continues past the Instrumentation Transformer cabinet to the Customer’s equipment or not.

6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker, or switch, to the Instrumentation Transformer cabinet, terminating on the isolated Neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.

7) Where parallel Neutral conductors are required, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors.

8) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 8: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet

Figure 10: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated Instrumentation Transformer Cabinet with Factory Installed Removable Back Plate (H x W x D)
1200 mm x 1200 mm x 300 mm
[48" x 48" x 12"]

Note: Drawing is not to scale.
Schedule 8: 3-Phase, NEMA Type 3 or NEMA Type 3R Rated, Instrumentation Transformer Cabinet with Factory Installed Back Plate Layout, For 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] Cabinet (Continued)

Notes:

1) This schedule applies only to 3-Phase, NEMA Type 3, NEMA Type 3R, rated Instrumentation Transformer cabinets and enclosures that are (H x W x D) 1200 mm x 1200 mm x 300 mm [48" x 48" x 12"] in size.

2) The Instrumentation Transformer cabinet shall be mounted such that:

2.1) There shall be a minimum of 100 mm [4"] of clearance between the finished floor and the bottom of the cabinet.

2.2) There shall be a maximum of 1830 mm [6'] between the finished floor and the top of the cabinet.

3) All entry and exit points on the enclosure shall be within 150 mm [6"] from either the top or bottom corners of the enclosure, as shown in Figure 10, following ESA guidelines for conductors within conduit. This is required to allow the conductors to be trained in place for termination and to ensure that undue mechanical strain is not applied to the CTs.

4) The Customer’s electrician installing the Instrumentation Transformer enclosure shall inform HOL Metering Services after the enclosure has been mounted and all secondary conductors have been pulled into the Instrumentation Transformer cabinet.

5) An isolated Neutral conductor terminal block, of suitable size and made of a compatible metal, shall be installed on the cabinet’s back plate or mounting plate, at the bottom of the cabinet as shown in Figure 10. This terminal block is required regardless if the Neutral conductor continues past the Instrumentation Transformer cabinet to the Customer’s equipment or not.

6) A Neutral conductor is an integral part of a 3-Phase 120V/208Y or 347V/600Y metering circuit. A full sized Neutral conductor (white) shall be installed connecting the Neutral buss of the main breaker, or switch, to the Instrumentation Transformer cabinet, terminating on the isolated neutral conductor terminal block. The Neutral conductor shall be installed, by the Customer, prior to the installation of the metering equipment.

7) Where parallel Neutral conductors are required, only one (1) of the conductors is required to be connected to the isolated neutral block. The isolated neutral block shall have either a 10-32 screw and washer or it shall have a mechanical connector suitable for terminating three (3) individual #10 AWG conductors.

8) Any deviation from these requirements requires prior approval from HOL Metering.
Schedule 9: Residences Separated by a Non-Shared Driveway that is at least 3000 mm [10'] in Width

Figure 11: Two residences separated by a non-shared driveway that is at least 3000 mm [10'] in width

Note: Drawing is not to scale.
Schedule 10: Residences Separated by a Shared Driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in Width

![Diagram of two residences separated by a shared driveway]

**Figure 12:** Two residences separated by a shared driveway that is at least 3000 mm [10'] in width but less than 3600 mm [12'] in width

**Note:** Drawing is not to scale.
Schedule 11: Residences Separated by a Shared Driveway that is at least 3600 mm [12'] in Width

Figure 13: Two residences separated by a shared driveway that is at least 3600 mm [12'] in width

Note: Drawing is not to scale.
Schedule 12: Sale and Service Agreement for KYZ Outputs as per Section 14.4.5

The next two pages contain the text of the agreement to be signed by the Customer when they request KYZ pulse outputs for new or existing service, as per Section 14.4.5 of this document.
END USER LICENSE AGREEMENT FOR METERING PRODUCTS

BETWEEN:  

Hereinafter called the “Purchaser”

AND:  

Hydro Ottawa

In consideration of a payment by the Purchaser of $____________ to Hydro Ottawa for the purchase of the meter(s) provided, the Purchaser agrees to the following terms and conditions.

This Hydro Ottawa End User License Agreement accompanies Measurement Canada Approved metering products and any related legal metrology materials. Please read this Agreement carefully. At the end, you will be asked to accept this agreement.

Upon acceptance of this Agreement, Hydro Ottawa shall provide this product to the Purchaser with the understanding that the Purchaser will adhere to the guidelines set out. Hydro Ottawa shall retain the ownership of the revenue meter through the course of its installation on the customers premise and after the end of its useful in service life.

Requirement for Legal Metrology

The Purchaser as the end user shall be aware that metering products sold by Hydro Ottawa are Measurement Canada approved meters and are suitable for installation and use for revenue metering. The Government of Canada has specific requirements for legal metrology as administered by Measurement Canada through the Electricity and Gas Inspection Act and Specifications.

Hydro Ottawa shall sell a meter to the Purchaser, sealed, certified, with an accredited Hydro Ottawa meter certificate or that of a Measurement Canada recognized meter verifier.

Warranty

The meter(s) are provided with a one year manufacturer’s warranty, transferable from the original manufacturer (_____________), which is applicable from the date of delivery. Hydro Ottawa makes no warranty, expressed or implied, as to the meter(s) use or performance. Hydro Ottawa does not and cannot warrant the performance or results the Purchaser may obtain by using the meter(s). Hydro Ottawa makes no warranties, expressed or implied, as to non-infringement of third party rights, merchantability, or fitness for any particular purpose.

Indemnification

The purchaser agrees to indemnify and save harmless Hydro Ottawa, its agents and employees from all actions, causes of action, claims and demands for or in respect to any loss, damage or injury to property or persons, including third parties, agents or others, arising from or incidental to the operation or use of the meter being purchased.
Governing Law and General Provisions.

This agreement will be governed by the laws of the province of Ontario. If any part of this agreement is found void and unenforceable, it will not affect the validity of the balance of the agreement, which shall remain valid and enforceable according to its terms. This agreement shall automatically terminate upon failure by the purchaser to comply with its terms. This agreement may only be modified in writing signed by an authorized signing officer of Hydro Ottawa. This agreement is binding upon the purchaser’s heirs, executors, administrators, successors, agents or assigns.

The Purchaser’s acceptance of the foregoing agreement shall become binding upon signature below by an authorized signing officer.

In witness whereof, this agreement is executed this _____ day of ______________, 20__ at ________________, in the Province of ____________________.

________________________________________, 9
Signing officer’s printed name

________________________________________, 9
Authorized signing officer’s signature (seal)

________________________________________.
Purchaser’s full address and phone number

________________________________________, 9
Witness’ printed name

________________________________________, 9
Witness’ signature (seal)