



**Subdivision Servicing:  
Complete Design and Installation Standard**

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**SUBDIVISION SERVICING**

**SUBDIVISION DESIGN STANDARD**

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## **D.S.1 DESIGNING DEFINITIONS**

- i) “**SPECIFICATION**” means the specification to do the Work, Bonds, Securities, Specifications and all other documents referred to or connected to said Specifications.
- ii) “**EWU**” means ENWIN Utilities Ltd.,
- iii) “**DEVELOPER**” means the person, persons or Corporation who is responsible for developing the subdivision, including all work detailed in this Specification.
- iv) “**WORK**” means all labour, materials and other things required to be done, that are shown, described or implied in the Specification, and includes all extra and additional work and material that may be ordered by the Engineer.
- v) “**ENGINEER**” means the Chief Engineer of ENWIN Utilities Ltd., or such other EWU Employee or Agent authorized by the Engineer.
- vi) “**TST**” means EnWin Utilities Ltd. Technical Service Technologist who is assigned as liaison; administrative coordinator of the development.
- vii) “**INSPECTOR**” means an inspector for the Engineer.
- viii) “**PLANT**” means every temporary or accessory piece of equipment necessary or required to carry on or complete the work and extra work.
- ix) “**DRAWINGS**” means all Plans, Profiles, Drawings, Sketches or copies thereof exhibited, used or prepared for or in connection with the Work embraced under the Specification.
- x) “**ACCEPTANCE DATE**” is the date that the Interim Acceptance Certificate is issued to the Developer.
- xi) “**MAINTENANCE PERIOD**” is a **one** year period that commences on the acceptance date. During this period all repairs that are due to imperfections of or damage to the work, for any reason are to be done by ENWIN Utilities Ltd. and paid for by the Developer.
- xii) The words “*authorized*”, “*directed*”, “*required*”, “*requested*”, “*approved*”, “*ordered*”, “*sanctioned*”, and “*satisfactory*”, unless some other meaning is obvious from the context, mean respectively authorized, directed, required, requested, approved, ordered or sanctioned by or satisfactory to the Engineer.
- xiii) The words “*shall*”, “*may*”, “*herein*”, “*person*”, “*writing*”, “*written*”, “*surety*”, and “*security*” and words used in the singular number or the masculine gender, shall have the same meaning and effect as given in The Interpretation Act of the Revised Statutes of Ontario.
- xiv) “**STANDARD SUBDIVISION DISTRIBUTION**” system will include single and three phase high voltage 1/0 aluminum cables meeting ENWIN Utilities Ltd. specifications in providing electrical power to the subdivision phase being developed or subsequent phases. It shall also include the use of a conduit system for the above which shall consist of two or four

5” ducts encased in screening, splicing vaults as required, switching units, 100 or 167 kVA Mini-pad transformers, and bases, secondary distribution equipment up to the individual property line.

- xv) **“STANDARD DESIGN CRITERIA”** for a subdivision is:
- to have 16 secondary services per transformer.
  - transformer bases must be installed with the edge on the property line.
  - to place splicing vaults at intersections where primary cable installation is in a direction perpendicular to the main trunk route.
  - to place splicing/transformer vaults a maximum of 120 m (400 ft.) apart.
  - to place splicing vaults/transformer as required to balance the loads between supply phases.
  - secondary service conductors are to be stubbed in the center of the property at the edge of the easement or the property line, whichever is closest to the house.
  - single-phase transformer bases will have no other energized phases than that feeding the transformer all others must be ducted around it.
  - driveways, including approaches, shall not be constructed closer than 1 m (one meter) from the edge of a transformer.
  - poles must be located a minimum of 3 m (10 ft.) from fire hydrants.
- xvi) **“DEVELOPER’S ENGINEER”** is an Electrical Engineer licensed by the PEO (Professional Engineer in the province of Ontario) shall design and stamp all drawings associated with the electrical servicing of the subdivision.
- xvii) **“DESIGN CHANGES”** includes all engineering changes, pre-construction and ‘field’ changes. The Developers are to submit ALL documents as identified in Subdivision Design and Construction Step 5, associated with the requested change to the Engineer.
- xix) **“SITE NUMBER”** Transformer identification numbers. These numbers will be given to the Developer’s engineer prior to final design by the Engineer.

## **D.S.2 DESIGN PROCESS**

1. Developers must submit the following to EWU:
  - a. Overall plan of development area – 3 bond copies
  - b. Detail of specific plan of subdivision and outline of future phases – 3 bond copies
  - c. CD/DVD of survey and CD/DVD of site plan
2. EnWin TST will provide the Developer with the following:
  - a. Outline describing Residential Development Servicing Guideline
  - b. Copy of Subdivision Servicing: Complete Design and Installation
  - c. Blank copy of the Subdivider’s Agreement
  - d. List of EWU key internal contracts
3. EnWin TST will schedule a pre-engineering meeting with the Developer’s Engineer for the following:
  - a. Layout Discussion

- b. Feed location(s)
  - c. List of internal contacts
  - d. Address plans – The City of Windsor provides this after a separate application is submitted to them from the Developer
4. Direct interaction between EnWin’s TST and the Developer’s Engineer will continue until the working drawing is completed, approved, and signed and dated by the Developer’s Engineer.
  5. Developer must submit the following to EWU in bond and digital format. The following must meet City of Windsor specs and have approved EWU specifications attached.
    - a. Overall plan for development area indicating proposed stages for development
    - b. Single line electrical schematic showing the layout for the proposed area
    - c. Complete sets of ALL drawings associated with the project. All EWU plant is to be shown on all drawings. Future phases must be faded out on all drawings. By-pass of ducts around transformer bases shall be clearly detailed. All drawings must show road crossings. Spare ducts shall be clearly marked.
    - d. The Developer must comply with the following City of Windsor road cross-section details found in Appendix C:
      - i. Drawing #AS-206A - 17 Meter (55’) R.O.W.
      - ii. Drawing #AS-206B – 22 Meter (72’) R.O.W.
      - iii. Drawing #AS-206C – 15 Meter (50’) R.O.W.
      - iv. Drawing #AS-206D – 20 Meter (66’) R.O.W.

These drawings take precedent over any other specifications relating to road cross-sections in subdivisions. If the Develop wishes to use non-standard road cross-sections then the Develop must provide approval from the City of Windsor.
    - e. Street Lighting layout and design, which must:
      - i. Identify the classification of the road type i.e. Arterial, Collector or Residential.
      - ii. Show how Street Lighting wires are connected.
      - iii. Meet the City of Windsor Street Lighting Policy and Standards.
      - iv. Be performed using Simply Lighting or equivalent software package (using methodology for point by point calculations as described in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook) and provide computer printout verifying all design criteria and lighting level plot layout.
      - v. Luminance is the preferred method for conventional roadway lighting design and City of Windsor Street Lighting Policy recommended values shall be used. The illuminance method is an acceptable alternative as long as City of Windsor Street Lighting Policy recommended values are also used.
      - vi. Poles and luminaires must be equally spaced along the roadway.
      - vii. The lighting values in intersections shall be at least equal to the sum of the values provided on the roadways that form the intersection.
  6. EnWin's TST will work directly with Developer with regards to bonding and securities required for the Subdivider’s Agreement.
  7. The Developer shall setup a pre-construction to review all drawings and address concerns and/or scheduling requirements. The Developer must provide three sets of drawings and

single line electrical schematics. There must be a minimum of 48 hours written notice before the meeting. The EWU field inspector must attend the meeting.

8. The following documentation must be submitted to EWU prior to commencement of work:
  - a. One set of switchgear shop drawings
  - b. Report of test results on primary cables
9. Construction may commence once all concerns that were discussed at the pre-construction meeting have been resolved.
10. The field inspector will be responsible to inspect all material and hydro infrastructure installation procedures to ensure that it meets EWU specifications.
11. If a field change is required, excluding any changes that refer to the Subdivision Agreement (ex. number of poles, number of lots, number of road crossing, etc.) it will be handled with direct communication between the Developer and EnWin TST. (See D.S.1 – “Design Changes”).
12. Energization of the subdivision will commence on average five (5) working days after the EnWin TST has received acceptable as-built construction drawings, Hydro and Streetlight Plant actual costs, and written confirmation that any field deficiencies are corrected (if applicable) as specified in the Subdivider’s Agreement.
13. Inspection of the streetlights will be conducted within five (5) working days of the written request to EnWin’s TST. Correction of any deficiencies shall be performed within sixty (60) days of notification to the Developer or will be carried out by EWU at the sole cost and expense of the Developer. The energization of the streetlights will occur within five (5) working days after inspection has been accepted. The Interim Acceptance Certificate will be issued after the streetlights have been energized.
14. The Developer will be responsible for the cost associated with labour, material, trucking, and services required to repair and/or replace any defective or damaged plant in the subdivision during the maintenance period.
15. A Final Acceptance Certificate will be issued by EWU within five (5) working days after inspection has been accepted to denote the end of the maintenance period (see Appendix E for an example).

### **D.S.3 MAPS AND MATERIAL DOCUMENTATION**

1. Prior to the issue of an Interim Acceptance Certificate, the Developer must provide EWU accurate as built drawings and material documentation for the Work that has been completed.
2. The as-built drawing(s) shall show the accurate location of streetlight poles, vaults, ducts, road crossings, trenches, lateral poles, transformers, and switches. The location shall specify if the measurement is taken from the curb and no dimensions shall be taken with a house as a reference point. Only fixed, readily accessible landmarks will be considered appropriate

reference points from which as-built dimensions may be taken. (e.g. fire hydrants, catch basins, MH covers). Dimensions referencing a property line of SIB will not be considered acceptable as these points of reference may not be easily determined at later dates when locates are to be conducted by *ENWIN* Personnel. Road crossings and splicing vaults shall be dimensioned from the nearest fixed object as specified above.

3. The phase and route of the primary cable is to be identified as well as the secondary bus from each transformer. Each secondary service must be linked with the correct municipal address. Addresses, transformer site numbers, and streetlight pole numbers shall all be labeled clearly.
4. Drawing base data is to be captured via total station survey equipment or survey grade GPS equipment and geo-referenced to the NAD 93 UTM, zone 17 (original) coordinate system.

Design and as-built record drawings are to be submitted as AutoCAD .dwg format, utilizing *ENWIN*'s standard feature blocks, texts, line types and layering, as provided in the accompanying SAMPLE-DRAWING\_LAYOUT.dwg in Appendix F – Sample Drawings.

**All relevant imported scanned files or xref files must be included with the submission with paths established.**

5. The as-built map(s) shall show the accurate location of streetlight poles, vaults, ducts, road crossings, trenches, lateral poles, transformers and switches. The location shall specify if the measurement is taken from the curb and no dimensions shall be taken with a house as a reference point. Road crossings and splicing vaults shall be marked from the nearest fixed object on site (i.e. fire hydrant, streetlight pole etc.). The phase and route of the primary cable should be drawn as well as the secondary bus from each transformer. Each secondary service must be linked with the correct municipal address. Addresses, transformer site numbers, and streetlight pole numbers shall all be labeled clearly.
6. Information must be supplied prior to energizing the subdivision to facilitate the creation or addition to primary distribution maps. This is essential for *ENWIN* Utilities Ltd. Systems Control Room to coordinate and write up a switching order prior to energizing the equipment.



**SUBDIVISION SERVICING**  
**INSTALLATION STANDARD**

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### **I.S.1 DESCRIPTION OF WORK**

The work will include all excavation, punching, installing road crossings not in place, trenching, disposal of native fill, supply of concrete, screenings and sand backfill, supply and placing of precast concrete transformer foundations, supply and placing of 5” (127mm) PVC duct in screening and concrete, supply and placing of pre-cast concrete submersible splicing vaults, triplexed 600 volt rated secondary cable, supply and installation of all transformers and switches, supply and installation of all primary cable, supply and installation of street lights and street light cable, ploughing where practicable, removal and replacement of concrete and asphalt. EWU will supply and install all splices, terminations, elbows, grounding connections and dressing of all transformers. EWU will not supply any tools to be used in the Work.

The Developer will be required to place Bell Telephone and/or Cable TV cable in a common trench with hydro cable. This joint trenching applies to direct buried cable ONLY. Bell and Cable are not permitted to bury duct in EWU trenches or use EWU ducts. The cost of placing the Bell Telephone and/or Cable TV is to be negotiated directly with Bell Telephone and Cogeco, who will also provide the telephone and Cable TV cable and inspection of their plant.

### **I.S.2 SAFETY**

The Developer while working on the site, shall be governed by the pertinent safety requirements of the Provincial and Municipal Governments.

EWU Safety Supervisor may visit the site at his discretion to check on compliance by the Developer with the pertinent safety requirements.

### **I.S.3 COMPETENT PERSONNEL**

The Developer shall provide competent, certified trades personnel, required on the job site at all times and shall work in a safe manner, obeying all pertaining rules and laws. Any electrical work shall be done by a qualified electrical contractor, as approved by the Engineer, who must be members of E&USA. Electrical work shall include installation of secondary and primary cables and installation of streetlights. When the contractor is pulling (installing) high voltage cable or is working around energized high voltage equipment (within 10 feet), he shall employ the service of a journeyman cable splicer or a lineman familiar with this type of installation.

### **I.S.4 UTILITIES**

The Developer shall locate the exact position of all structures and utilities in the field before starting any excavations. The Developer assumes all liability for damages to them.

The Developer shall support any cable, main, line pole, etc. to the satisfaction of their individual owner.

If the relocation of an existing utility is required, the owner will pay for the cost of the relocation only.

The Developer is responsible for performing all hydro locates in the subdivision prior to energization.

#### **I.S.5 ENGINEERING OF SUBDIVISION**

Please refer to SUBDIVISION DESIGN STANDARD

#### **I.S.6 PREPARATION FOR WORK**

The Developer shall arrange with other site Contractors for the removal of any obstructions which prevents the installation of duct, cable, precast concrete foundations or precast concrete transformer foundations in the pre-determined locations.

All worn or damaged tools shall not be used but replaced.

#### **I.S.7 APPROVED MATERIAL LIST**

The following materials from listed suppliers shall be used in order to maintain the standard set by EWU. Materials from other sources must be submitted for review and approval prior to installation. All materials used in this work must be new and of the highest quality. Prior to the commencement of work, a list of materials must be submitted to and approved by EWU. Any deviation from this list must have written approval from EWU. Approval by EWU does not in any way guarantee the performance of these materials. Materials needed to complete the work but not included in this list should be submitted and given written approval by EWU before being included in the Work.

A list of Approved Material can be found in Appendix A.

#### **I.S.8 TRANSFORMER SELECTION**

The Developer is to purchase ALL transformers through ENWIN Utilities Stores, contact Director of Purchasing.

#### **I.S.9 EWU SPECIFICATIONS**

The following EWU specifications, found in Appendix B, form part of the subdivision specification.

60-2	1/0, 28V single conductor concentric neutral cable
60-2-15	Quadruplex and triplex underground secondary cable
60-3	27.6kV triplex conductor concentric neutral cable

Dead front switching unit specifications are currently under development. Please contact *ENWIN* to receive the latest version of these specifications if a switching unit is required in your design.

### **I.S.10 CONSTRUCTION DRAWINGS**

The following list of drawings, found in Appendix C, form part of the Specification. The drawings are to be used in the construction of the various materials.

AS-206A	17 meter (55') R.O.W.
AS-206B	22 meter (72') R.O.W.
AS-206C	15 meter (50') R.O.W.
AS-206D	20 meter (66') R.O.W.
OPSD2112.02	Electrical hand hole precast concrete with cover 460mm dia.
61-1-20C	Concrete splicing vault
61-1-20D	Concrete splicing vault c/w concrete load bearing cover
61-1-20E	Concrete splicing vault c/w manhole cover and flange
61-1-7 A,B	Manhole cover
12-1030 – 1,2	30' concrete pole
SG-20	Access area and min clearance req for mini-pad transformer
65-1-15 A,B,C	Single phase transformer foundation

Dead front switching unit specifications are currently under development. Please contact *ENWIN* to receive the latest version of these specifications if a switching unit is required in your design.

### **I.S.11 INSTALLATION DRAWINGS**

The following list of drawings, found in Appendix D, form part of the specification. The drawings are for installation purposes only and are not to be used in the construction of the various items and shall be used by the contractor to install the appropriate material.

11.0.1.AO-1	Underground streetlight standard
11.0.1.AO-2	
11.0.1.G	Standard concrete streetlight pole wiring detail (u/g feed)
11.0.1.J.2	Standard concrete streetlight bonding detail (u/g feed) - LED
11.0.1.Q	Washington ornamental standard - 180° light distribution
11.0.1.R	Washington ornamental standard - 360° light distribution
11.0.1.S	Washington ornamental standard – twin arm
11.0.1.U	Granville ornamental standard
61-1-13 F,G,H	Concrete splicing vault – installation drawing
61-1-20 C,D,E	Concrete splicing vault
62-1-13	Compaction of sewer and utility trenches
62-1-14	Service stub details
62-1-15	Typical trench details
62-1-17,A	Typical trench details and road crossings in a subdivision
63-1-18	Typical round pylon detail

63-1-18A	Typical round pylon detail – screening
63-1-18B	Typical round pylon detail – concrete – 3 ducts
63-1-18C	Typical round pylon detail – screening – 3 ducts
63-1-18D	Typical round pylon detail – concrete – 4 ducts
63-1-18E	Typical round pylon detail – screening – 4 ducts
65-1-13	Typical equipment protection and grounding arrangement for 300-2000kVA transformers w/ sufficient property
65-1-13A	Typical equipment protection and grounding arrangement for 300-2000kVA transformers w/ insufficient property
65-1-16	Typical cable arrangement for 1 phase low profile transformer
65-1-25	Typical 1 $\Phi$ low profile trans. foundation installation detail

## **I.S.12 TRENCHING, BACKFILL & REINSTATEMENT OF SOD**

Excavation shall be done to give a narrow clean trench of 508mm (20") minimum or 610mm (24") maximum width. The depth of the trench shall be 1067mm (42") for 1/0 primary cables in duct and 838mm (33") for low voltage cables or as otherwise specified. Refer to EWU drawing 62-1-15.

The trench shall not deviate from its assigned location, in any direction, by more than 152mm (6").

Rocks, debris or sharp objects shall be removed from the excavated trench and 0 - 1/4" crushed stone bed with 76 mm (2.5") shall be installed prior to any placing of 5" (127mm) duct.

Fill shall be placed in a manner so as not to damage the ducts or cable. Screening composed of 0 - 1/4" crushed stone shall be used to encase the 2 – 5" (127mm) ducts completely to a minimum height of 762mm (3") above the duct.

At road crossings, the Developer shall excavate carefully to expose the ends of the ducts without damaging the ends and slope the trench to provide a smooth transition between new and existing duct runs.

Only clean fill sand meeting the gradation requirements of OPSS 10.10 for granular B type I shall be used for backfilling trenches. In all cases, crushed stone screening or low strength concrete shall be used to cover the 5" (127mm) ducts to a depth as indicated.

Fill placed adjacent to curbs, crossings or roads, driveways and sidewalks shall be compacted to 100% Proctor density. Unsuitable backfill is to be replaced at the Developer's cost plus any repairs to curbs, etc. attributed directly to faulty backfilling. Refer to EWU drawing 62-1-17.

The Developer is responsible for restoration of driveways and landscaping. When excavating existing sodded areas the Developer shall install new sod. The Developer is responsible for any surface settling for a period of 1 year.

## **I.S.13 PRECAST CONCRETE TRANSFORMER FOUNDATION**

The concrete transformer foundations should be installed according to EWU drawing 65-1-18, for 3 phase and 65-1-25 for single phase transformer foundations, respectively. A typical cable

arrangement for a single phase, low profile transformer can be found in EWU drawing 65-1-16.

Excavation shall not be larger than that required to place the precast concrete foundation and provide working space for placing cables. Any excavation to a depth greater than required shall be filled with fill sand.

The precast concrete foundation shall be placed so that the top will be 150mm (6") above the final grade, any adjustments within twelve months of acceptance of the Developer's work shall be at the sole Developer's cost.

The surrounding grades shall be arranged to prevent water and mud run-off entering the pre-cast concrete foundation. Any mud which has been allowed to enter shall be removed before cable splicing is started.

Backfill around a pre-cast concrete foundation shall be completed to City of Windsor specifications.

Splicing vaults and foundations shall be oriented such that ducts or duct bank entries have an angle of 90° between the vault wall and the axis of the ducts or duct banks.

Sand, up to the depth of 300mm (12") below grade shall be used to backfill around the walls of all precast and poured-in-place structures.

All rigid ducts entering foundations shall be installed with standard end bells placed flush with the inside of the wall of the window.

Precast vault and foundations will be supplied equipped with pre-installed bell ends and couplings to permit easy duct connection.

The contractor shall clean out all debris from vaults and foundations upon completion and prior to acceptance of the work by the Engineer.

#### **I.S.14 CABLE SPLICING VAULT**

Splicing vaults shall be placed on property lines except under conditions when it is unfeasible to do so. The appropriate measures shall also be taken to ensure that splicing vaults do not end up underneath driveways, roads or other structures that will restrict access to the vault.

The cable splicing vault shall be installed according to EWU installation drawings 61-1-13a,b. If it is unavoidable to place the concrete splicing vault under the future site of a driveway, the splicing vault shall be constructed with a manhole frame and cover and installed according to EWU alternate installation drawing 61-1-13alt.

Excavation shall not be larger than that required to place the precast concrete vault and provide working space for placing duct. Any excavation to a depth greater than that required shall be filled with crushed stone and compacted to 100% proctor density.

The vault shall be placed 305mm (12") below final grade, any adjustments within one year of acceptance of the contracted work shall be at the Developer's cost.

The surrounding grades shall be arranged to prevent water and mud run-off entering the vault. Any mud which has been allowed to enter shall be removed before cable splicing is started.

All vaults shall be installed with the covers on. Covers shall remain in place, except for any work that requires access to the vault, in such cases covers will be re-installed as soon as possible. The covers shall be installed according to Drawing 61-1-13b. If the splicing vault is constructed with manhole frame and cover, see EWU alternate drawing 61-1-13alt

Backfill around a vault shall be compacted to City of Windsor specifications.

An electronic marker shall be placed on the cover before backfill.

16 bell ends and 4 pulling eyes must be installed in each cable splicing vault as detailed in EWU drawing 61-1-20C,D,andE.

When the splicing vault is being installed, one barrel shall be placed on the roadside of the vault as depicted in EWU drawing 61-1-13b. The barrel should remain until all construction in that area is complete. A notice sticker shall be supplied and placed on the barrel by ENWIN personnel.

### **I.S.15 PLACING OF DUCTS AND CABLE**

All ducts must be placed with care in the trenches according to the sectional detail on the EWU drawing 62-1-15. All duct joints shall be glued together with an approved PVC cement.

Two – 5” (127mm) inch ducts placed side by side shall be used in all cases, unless otherwise specified.

All cable shall be pulled through the duct. The cable shall be well lubricated to prevent any damage caused by excessive pulling tensions. An approved type cable-end basket shall be used to fasten the end of the cable to the pulling rope. After pulling, 610mm (2’) of the cable-end fastened to the basket shall be cut off and thrown away.

Primary cable shall have a length of 6.10m (20’) for terminating in vaults, 2.44m (8’) for splicing in splicing vaults and low voltage cable shall have a length of 2.44m (8’) for terminating.

The low voltage secondary cable end shall be brought to the surface and secured to a wooden stake in the centre of each lot at the property line or easement line. No splices shall be used on the secondary cable

All cable ends in a pre-cast concrete foundation or vault shall be tagged: the primary cable having the transformer site number reference and the low voltage service cables identified with the municipal address of the lot at which the other end terminates.

All cable ends are to be individually taped to seal ends to prevent entrance of water along the conductor strands or between insulation and cable jacketing.

Ducts that are extruded for future use shall be capped and have an electronic marker on their end.

### **I.S.16 TESTING OF DUCTS**

On completion of a duct installation, each duct shall be cleaned and tested. Each duct shall permit a hard wood mandrel to be drawn through without interference.

The mandrel shall not be less than 305 millimetres in length with a centre section of 88 millimetres, being not less than 90% of the nominal diameter of the duct being tested. The end sections shall be tapered to eye rings, each ring being securely connected together through the mandrel.

On completion of a satisfactory test, a 6.4 millimetre polypropylene line shall be left in the duct with each end secured.

EWU's Inspector must witness and approve any testing of duct. Any tests undertaken without his presence will not be accepted.

### **I.S.17 GROUNDING**

All grounding attachments will be performed by EWU staff. An example of the grounding of a padmount transformer is shown in EWU drawing 65-1-13.

### **I.S.18 STREETLIGHT INSTALLATION**

The Developer will provide a plan designating the position of each streetlight, the size of the pole to be used and the wattage assigned to each streetlight for review and approval by EWU and ESA. If necessary a meeting with the developer's contractor will be set up to review all aspects of the street lighting installation. The new ESA and EWU requirements are for an external means of disconnect for each Streetlight Circuit. See EWU Drawing # 11.0.1.A0-1

Bell and Cable wires should not become entangled with Hydro streetlight cables in the trench between the main trench and the streetlight pole.

A wiring detail for the streetlight pole is found in drawing 11-0-1-G. Please note that the grounding wire for the concrete pole is connected to the neutral wires at the aperture.

All luminaires are to be untilted and oriented perpendicular to the roadway.

Two (2) round washers shall be placed on the bolt that holds the streetlight bracket. One shall be between the bolt head and the bracket, the other shall be between the nut and the pole.

The photocell sensor should point north on all streetlight poles.

Energization of the subdivision may commence even if the streetlights have deficiencies. However,



EWU will not energize the lights nor issue an Interim Acceptance Certificate until the deficiencies are corrected. If contractor delays repair greater than 90 days after the energization of the subdivision EWU will do the necessary repair and charge the developer.

The Developer will be required to pay for any pole relocation associated with driveway conflict during the course of the maintenance period.

The City has decided that any new streetlight installations must be LED. *ENWIN* has currently approved two manufacturers for standard LED Streetlights (see Appendix A). *ENWIN* is currently in the process of piloting decorative streetlights and long life photocells. If a decorative streetlight is desired please contact an *ENWIN* representative to discuss options on a case by case basis until a pre-approved manufacturer is selected. Developers can continue to use the standard Solid State ALR SST-PV Blue photocell until a long life alternative is approved by *ENWIN*.

### **I.S.19 TRANSFORMER INSTALLATION**

When the transformer is being installed, two barrels shall be placed at each corner of the roadside side of the transformer as depicted in EWU drawing 65-1-25. The barrels should remain until all construction in that area is complete.

### **I.S.20 LABELLING OF CABLE**

All cable and every leg for every service must be tagged using the labeling tags specified in the approved material list. The tags must be stamped (imprinted) with information as directed by the Inspector and painted with the appropriate colour.

### **I.S.21 CONFLICTS AND OMISSIONS**

Neither party to the Contract shall take advantage of any apparent error or omission in the plans or specifications, but the Engineer shall make such corrections and interpretations as may be necessary for the fulfillment of the intent of the Plans and Specifications.

### **I.S.22 DAMAGES TO UTILITY SYSTEMS**

Damage to any Utilities' buried cables, lines, pipes or other plant shall be repaired to the satisfaction of the Utilities concerned by the Developer. The Developer shall pay all expenses arising directly or indirectly from the incident.

## **REVISIONS**

- Sep 13 1996**
1. Added cat # for PMH4 & PMH 9 (pg 5)
  2. Added 2" PVC Type II duct & coupling, and 2" electrical non-metallic tubing & plug (pg 8)
  3. Reprinted pages because material list was shifted (pg 9&10)
- Oct 17 1996**
1. Added concrete, electrical manhole and manhole cover (pg 5)
  2. Added submersible secondary connector and ¼" orange, 3 strand polypropylene rope (pg 6)
- Jan 4 1999**
1. Revised to meet 1999 Subdivision Requirements.
- Aug 7 2001**
1. Revised and updated with new company ENWIN Utilities Ltd. (EWU).
- Aug 12 2002**
1. Revised and updated drawings and standards to include the concrete splicing vault with a steel load bearing cover.
- Jun 30 2004**
1. Revised Concrete Splicing Pit Drawings back to the concrete Plug except that it is traffic rated
  2. Revised Streetlight Drawings to meet Installation Requirements of ESA.
- Feb 8 2011**
1. Revised and updated new company *ENWIN* Utilities Ltd. (EWU)
  2. Revised section D.S.3, MAPS AND MATERIAL DOCUMENTATION
  3. Revised section I.S.9, EWU SPECIFICATIONS:  
15-1, CAD and Field Survey Specification, deleted.
- Aug 8 2013**
1. Revised section I.S.7 APPROVED MATERIAL LIST  
Moved material list to a table in APPENDIX A,
  2. All appendices shifted one letter down.
  3. All references to Switching Unit specs and foundations changed to Dead-Front
  4. Added list of documents in each Appendix
  5. I.S.8 TRANSFORMER SELECTION contact changed from VP to Director Purchasing
  6. I.S.18 STREETLIGHT INSTALLATION added that any new streetlights must be LED going forward and that decorative and long life photocells are currently is the piloting stage.
  7. Added "(127 mm)" to all references to 5" duct
  8. Removed all standards for 3 phase transformers and cable
  9. Removed 25' streetlight poles
- Dec 12 2013**
1. Added 61-1-13 F, G, H Concrete splicing vault – installation drawing and 65-1-13 & 65-1-13A Typical equipment protection and grounding arrangement for 300-2000kVA transformers w/ sufficient & insufficient property. CAD files distributed to developers between revision updates.
- Jul 4 2014**
1. Approved Long Life Photocell, and Decorative LED manufacturer and model specified in Appendix A.
  2. Phillips removed from the approved LED luminaire manufacturer in Appendix A

## Appendix A – EWU Approved Material List

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<b>28KV PRIMARY CABLE</b>		
70171	28KV #1/0 TRIPLEX ALUM, XLPE, CONNEUTRAL	ALUMINIUM CABLE 28KV #1/0 TRIPLEX CONDUCTOR XLPE CONCENTRIC NEUTRAL TO MEET ENWIN SPECIFICATION 60-3, REVISED: MARCH 23, 2012. 400 METRE REEL TO BE SEQUENTIALLY METRE MARKED, FROM HIGH TO LOW. THE NUMBER SHOWN AT THE EXPOSED END SHOULD BE THE QUANTITY IN METRES REMAINING ON THE REEL. THE LETTER M SHOULD APPEAR NEXT TO THE NUMBER TO INDICATE METRES ESA APPROVED PRODUCTS UECC-1 1997 SPEC NEXANS: 613703, PRYSMIAN: 203091C
70174	28KV,750MCM TRIPLEX ALUM, XLPE, CONNEUTRAL	ALUMINIUM CABLE 28 KV 750 MCM TRIPLEX CONDUCTOR XLPE CONCENTRIC NEUTRAL CABLE TO MEET ENWIN SPECIFICATION NO. 60-3 REVISED: FEBRUARY 22, 2013. 200 METRE REEL TO BE SEQUENTIALLY METRE MARKED, FROM HIGH TO LOW, THE NUMBER SHOWN AT THE EXPOSED END SHOULD ALWAYS BE THE QUANTITY IN METRES REMAINING ON THE REEL. THE LETTER M SHOULD APPEAR NEXT TO THE NUMBER TO INDICATE METRES CSA APPROVED PRODUCTS PRYSMIAN: QZ4819C
70175	750MCM,28KV, SINGLE COND, ALUM, XLPE	ALUMINIUM CABLE 28 KV 750 MCM SINGLE CONDUCTOR XLPE CONCENTRIC NEUTRAL CABLE TO MEET ENWIN SPECIFICATION NO. 60-2 REVISED: FEBRUARY 22, 2013. 600 METRE REEL TO BE SEQUENTIALLY METRE MARKED, FROM HIGH TO LOW, THE NUMBER SHOWN AT THE EXPOSED END SHOULD ALWAYS BE THE QUANTITY IN METRES REMAINING ON THE REEL. THE LETTER M SHOULD APPEAR NEXT TO THE NUMBER TO INDICATE METRES CSA APPROVED PRODUCTS PRYSMIAN: QXU485C
70179	28KV #4/0 TRIPLEX, XLPE ALUM, CONNEUTRAL	ALUMINIUM CABLE 28 KV #4/0 TRIPLEX CONDUCTOR XLPE CONCENTRIC NEUTRAL, TO MEET ENWIN UTILITIES SPECIFICATION 60-3 REVISED: MARCH 23, 2012. 430 METRE REEL TO BE SEQUENTIALLY METRE MARKED, FROM HIGH TO LOW THE NUMBER SHOWN AT THE EXPOSED END SHOULD ALWAYS BE THE QUANTITY IN METRES REMAINING ON THE REEL THE LETTER M SHOULD APPEAR NEXT TO THE NUMBER, TO INDICATE METRES CSA APPROVED PRODUCTS NEXANS: 446534, PRYSMIAN: 203660C
70181	28KV,#1/0 SINGLE COND, ALUM CABLE,600M	ALUMINIUM CABLE 28 KV, #1/0 SINGLE CONDUCTOR XLPE CONCENTRIC NEUTRAL TO MEET ENWIN UTILITIES SPECIFICATION 60-2, REVISED: MARCH 23, 2012. 600 METRE REEL SAID SPECIFICATION IS RECOGNIZED AS PART OF THE PURCHASE CONTRACT AS IF IT WERE WRITTEN AT LENGTH ON THE FACE OF THE PURCHASE ORDER TO BE SEQUENTIALLY METRE MARKED, FROM HIGH TO LOW THE NUMBER SHOWN AT THE EXPOSED END SHOULD ALWAYS BE THE QUANTITY IN METRES REMAINING ON THE REEL, THE LETTER M SHOULD APPEAR NEXT TO THE NUMBER TO INDICATE METRES CSA APPROVED PRODUCTS UECC-1 1997 SPEC NEXANS: 652539, PRYSMIAN: 206031C

SECONDARY CABLE		
70010	#2-7 STR CU CABLE, BARE, SOFT, 300M	COPPER CABLE, BARE #2 7 STRAND SOFT DRAWN STANDARD ROUND STRANDING 300 METRE REEL TO MEET ASTM-B8 SPECIFICATION. ESA APPROVED PRODUCTS NEXANS: 288571
70017	#4/0-19 STR CU CABLE, BARE, SOFT, 300M	COPPER CABLE, BARE, #4/0, 19 STRAND SOFT DRAWN STANDARD ROUND STRANDING 300 METRE REEL TO MEET ASTM-B8 SPECIFICATION. ESA APPROVED PRODUCTS NEXANS: 212167
70047	#4-7STRAND CU CABLE, POLY, WEATHER PROOF, 762M	COPPER CABLE #4 -7 STRANDED MEDIUM/HARD DRAWN POLYETHELENE, WEATHERPROOF, 762 METRE REEL TO MEET CSA C22.2 NO 48-09 SPECIFICATION. ESA APPROVED PRODUCTS: NEXANS: 601649 (#4 7W MDHCU PE)
70164	#3/0-3C,18/19 STR POLY ALUM,600V	ALUMINIUM TRIPLEX CABLE 3/0 - 3 CONDUCTORS: 18 OR 19 STRAND POLY INSULATION, PVC COMPOUND JACKET, FOR 600 VOLTS THE PHASE CONDUCTOR JACKETS SHALL BE BLACK AND RED THE NEUTRAL WHITE 610 METRE REEL TO MEET ENWIN SPECIFICATION 60-2-15 REVISED: APRIL 4, 2012. ESA APPROVED PRODUCTS NEXANS: 639625
70252	FLAMESEAL CU,RWU90,#6-7 STR,1000V BLACK	FLAMESEAL COPPER WIRE RWU 90, #6 - 7 STRAND 1000 VOLT, BLACK 300 METRE REEL CSA APPROVED PRODUCTS: SOUTH WIRE :6-7 RWU BLACK, PRYSMIAN: 6-7 RWU BLACK
70253	FLAMESEAL CU,RWU90,#6-7 STR,1000V WHITE	FLAMESEAL COPPER WIRE RWU 90, #6, 7 STRAND 1000 VOLT, WHITE 300 METRE REEL CSA APPROVED PRODUCTS: SOUTH WIRE: 6-7 RWU WHITE, PRYSMIAN: 6-7 RWU WHITE
70812	FLAMESEAL CU,RWU90,#12-7 STR,1000V BLACK	FLAMESEAL COPPER WIRE RWU 90, #12-7 STRAND 1000 VOLT, BLACK 300 METRE REEL CSA APPROVED PRODUCTS: SOUTHWIRE: 55-69-79-03 BLACK, PRYSMIAN CABLE: 12-7 RWU BLACK
70814	FLAMESEAL CU,RWU90,#12-7 STR,1000V GREEN	FLAMESEAL COPPER WIRE RWU 90, #12, 7 STRAND 1000 VOLT, GREEN 300 METRE REEL CSA APPROVED PRODUCTS: PRYSMIAN CABLE:12-7 RWU GREEN, SOUTH WIRE: 12-7 RWU GREEN
70816	FLAMESEAL CU,RWU90,#12-7 STR,1000V WHITE	FLAMESEAL COPPER WIRE RWU 90, #12, 7 STRAND 1000 VOLT, WHITE 300 METRE REEL CSA APPROVED PRODUCTS: ESSEX WIRE: 12-7 RWU90 WHITE, SOUTHWIRE: RWU90 #12-7, PRYSMIAN CABLE: RWU90 XLPE #12-7

SWITCHGEAR		
-	OTHER	ENWIN HAS RECENTLY SWITCHED FROM A LIVE FRONT TO A DEAD FRONT STYLE SWITCHING UNIT AND IS CURRENTLY WORKING ON A STANDARD FOR FUTURE INSTALLATIONS. IF A SWITCHING UNIT IS REQUIRED AND DOES NOT APPEAR IN THE LIST ABOVE PLEASE CONTACT ENWIN'S STANDARD ENGINEER TO DISCUSS THE CORRECT MATERIAL FOR YOUR APPLICATION.

CABLE ACCESSORIES		
60215	PULLING EYE EXTENSION 7/8 X 9"	PULLING-IN IRON (EYE) -7/8" X 9" EXTENSION MEET CSA C83.48 ESA APPROVED PRODUCTS: DOMINION BRIDGE: U-4709 SLACAN 9119**
22301	1/4"X394 M,POLY ROPE, YLLW, 3 STR, NOSPIRAL	POLYPROPELENE ROPE YELLOW 1/4" - 3-STRAND INDUSTRIAL GRADE NON SPIRAL CONSTRUCTION 394 METRE REEL ESA APPROVED PRODUCTS: BRIDGELINE: 1/4 X 394 MTR** CANADA CORDAGE: 38050 POLI-TWINE

CIVIL STRUCTURES		
60201	SPLICING VAULT-ROAD, EWUTL DWG 61-1-20C	SPLICING VAULT SUBMERSIBLE PRECAST CONCRETE, TO MEET ENWIN UTILITIES SPECIFICATION 61-1-20C, 20D, REVISED MAY 9, 2007, EACH ORDER WILL INCLUDE: 1) INSPECTION OF REBAR FRAME PRIOR TO CONCRETE POUR, FIRST UNIT 2) INSPECTION OF FIRST FINISHED PRODUCT, BEFORE CONSTRUCTION OF THE BALANCE OF ANY ORDER 3) TEST RESULTS PROVIDED FOR STRENGTH OF CONCRETE USED IN FOUNDATION. APPROVED SUPPLIER IS UNDERGROUND SPECIALITIES.
60208	TRANSFORMER VAULT COVER, STEEL	STEEL TRANSFORMER VAULT COVER, TO BE FABRICATED AS PER ENWIN UTILITIES DRAWING NO. 3786 REVISED OCTOBER 1990. APPROVED SUPPLIER IS UNDERGROUND SPECIALITIES.
60209	MANHOLE FRAME & COVER, 30" ROUND, HYDRO	MANHOLE FRAME AND COVER ENWIN CAST IN COVER TO MEET ENWIN UTILITIES SPECIFICATION 61.1.7A & 61.1.7B DRAWING REVISED: 8/18/00 ESA APPROVED PRODUCTS: BIBBY: JW500FR/CO, MUELLER: EL-251/EL-252, LAPERLE: C50MS
60211	TRANSFORMER FOUNDATION,300-750 kVA, 3Φ	TRANSFORMER FOUNDATION FOR 300 TO 750 KVA THREE PHASE PER ENWIN UTILITIES DRAWING 65-1-18A AND DRAWING 65-1-18C FEBRUARY 2005. APPROVED SUPPLIER IS UNDERGROUND SPECIALITIES
60222	FOUNDATION, MINIPAD, DWG 65-1-15A-15C	FOUNDATION, PRECAST CONCRETE FOR SINGLE PHASE LOW PROFILE MINI-PAD TRANSFORMER TO MEET ENWIN UTILITIES DRAWING NO. 65-1-15A, 15B TO C, REVISED: FEBRUARY 1, 2005. SHOP DRAWINGS, APPROVED BY AN ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO WILL BE PROVIDED PRIOR TO MANUFACTURE EVERY ORDER WILL INCLUDE: 1) INSPECTION OF REBAR FRAME PRIOR TO CONCRETE POUR, FIRST UNIT 2) INSPECTION OF FIRST FINISHED PRODUCT, BEFORE CONSTRUCTION OF THE BALANCE OF ANY ORDER 3) TEST RESULTS PROVIDED FOR STRENGTH OF CONCRETE USED IN FOUNDATIONS. APPROVED SUPPLIER IS UNDERGROUND SPECIALITIES.
-	STEEL BARREL	STEEL BARREL – 23” IN DIAMETER BY 34.5” IN HEIGHT.
-	SWITCHING UNIT FOUNDATION	TO BE DESIGNED TO MATCH SWITCHGEAR. CONTACT <i>EnWin</i> TO DETERMINE DIMENSIONS REQUIRED DEPENDING ON THE SWITCHGEAR REQUIRED.

DUCT		
60015	FEMALE COUPLING, 5", PVC, SOLVENT WELD	COUPLING, RIGID PVC 5" FEMALE SOLVENT WELD ENDS ESA APPROVED PRODUCTS: IPEX: EC60 (77011) ** ROYAL: REC60
60022	PIPE ADAPTOR,5"/II-5" PVC, SOLVWELD, FEML	PIPE ADAPTOR, 5" DUCT TO RIGID PVC FEMALE SOLVENT WELD ENDS ESA APPROVED PRODUCTS: ROYAL: ARIG50 (00709)
60029	ADAPTOR,5",RIGID PVC FML SOLWLD-FML THRD	5" RIGID PVC FEMALE ADAPTER FEMALE SOLVENT WELD ONE END FEMALE THREADED ONE END ESA APPROVED PRODUCTS: IPEX: 69051 ROYAL: RFA60
60036	BELL END,5" PVC SUPER DUCT, SOLVENT WELD	BELL END, SUPER DUCT 5" FEMALE SOLVENT WELD ENDS ESA APPROVED PRODUCTS: ROYAL: BEL05 IPEX: 29065
60055	PVC COUPLING, 5" TYPE II, SOLVENT WELD	PVC COUPLING 5" LONG SIZE, TYPE II DUCT SOLVENT WELD ENDS ESA APPROVED PRODUCTS: ROYAL: SWC05 JM EAGLE: DB2/ES2 IPEX: 029518
60067	PVC DUCT, 5", TYPE II, 20 FT LENGTH	DUCT, DIRECT BURY TYPE II PVC 5" X 20 FT BELL & STRAIGHT END ESA APPROVED PRODUCTS: IPEX: "SUPER DUCT" (08251) ROYAL: "ULTRA DUCT" (DB20 05) NATIONAL PIPE: DB2005 JM EAGLE: DB2/ES2
60106	COUPLING,5"-5DGR,PVC SOLVENT WELD, TYPEII	COUPLING, 5" 5 DEGREE LONG STYLE FOR TYPE II PVC DUCT SOLVENT WELD ENDS ESA APPROVED PRODUCTS: ROYAL: SWC505 IPEX 029916 J.M.EAGLE: DB2/ES2
60129	BEND,5"X42" R,22.5 DEG, PVC, SOLVENT WELD	ELBOW, LONG SWEEP 5", 22 1/2 DEGREE 42" RADIUS FOR 5" PVC DUCT SOLVENT WELD ENDS BELL ONE END ESA APPROVED PRODUCTS: ROYAL: 22B5X42 IPEX 029249
60131	BEND,5"X42" R,90 DEG, PVC, SOLVENT WELD	ELBOW, LONG SWEEP 5" 90 DEGREE 42" RADIUS TYPE II PVC DUCT SOLVENT WELD ENDS BELL ONE END ESA APPROVED PRODUCTS: ROYAL: 90B 5X42 IPEX 029097
60132	BEND,5"X42" R,45 DEG, PVC, SOLVENT WELD	ELBOW, LONG SWEEP 5" 45 DEGREE, 42" RADIUS TYPE II PVC DUCT SOLVENT WELD ENDS BELL ONE END ESA APPROVED PRODUCTS: ROYAL: 45B 5X42 IPEX 029117
60150	PLUG,5" DUCT TYPE II, PVC, RIBBED, TAPERED	PLUG, RIBBED, TAPERED 5" TYPE II DIRECT BURIAL DUCT ESA APPROVED PRODUCTS: IPEX: 77436-UPP60 ROYAL: PLU05**
60348	5" DUCT SPACER,PVC,INTERMEDIATE, 2 WAY	DUCT SPACER - 5" 2 WAY COMBINATION MONOBLOC TYPE II USED AS AN INTERMEDIATE OR BASE SPACER 5" X 1 1/2" X 1 1/2" X 3" ESA APPROVED PRODUCTS: IPEX: 29494



<b>STREETLIGHT MATERIAL</b>		
<b>STANDARD STREETLIGHT POLES</b>		
121030	30 FT CONCRETE POLE, CLASS B	CONCRETE POLE 30 FT. ROUND CLASS B TO MEET ENWIN SPECIFICATION 12-1030.1 REVISED FEB. 14, 2011. CSA APPROVED MANUFACTURER STRESSCRETE LTD; E300-BPR-G-M00 (REFERENCE DRAWING 106A0818-1 REVISION B DATED 12/04/12)
<b>BRACKETS</b>		
52106	ELLIPTICAL BRACKET, 2"X6', ALUM, MED DUTY	ELLIPTICAL BRACKET ALUMINIUM 2" X 6 FT. MEDIUM DUTY TAPERED WITH HOLE ON THE BOTTOM SIDE NEAR THE POLE ATTACHMENT FITTING USED FOR MOUNTING ON WOOD CONCRETE OR ALUMINIUM POLES TO MEET MEA SPECIFICATION MSL-92 ADDITIONAL REQUIREMENT FOR MAXIMUM WINDLOAD: MUST BE ABLE TO WITHSTAND 100 M.P.H. WINDS ESA APPROVED PRODUCTS: USS: TER6MA ALUM LIGHTING STD: ALS-RE6M T&B: RE6MA
52108	ELLIPTICAL BRACKET, 2"X8', ALUM, MED DUTY	ELLIPTICAL BRACKET ALUMINIUM 2" X 8 FT. MEDIUM DUTY TAPERED WITH HOLE ON THE BOTTOM SIDE NEAR THE POLE ATTACHMENT FOR WOOD, CONCRETE OR ALUMINIUM POLES TO MEET MEA SPECIFICATION MSL-92. ADDITIONAL REQUIREMENT FOR MAXIMUM WINDLOAD: MUST BE ABLE TO WITHSTAND 100 M.P.H. WINDS ESA APPROVED PRODUCTS: ALUM LIGHTING STD: ALS-RE8M USS MANUFACTURING INC: TER8MA T&B: RE8MA
<b>LUMINAIRES</b>		
-	LED LUMINAIRE	ESA APPROVED PRODUCTS: LED ROADWAY LIGHTING: SAT-48S-0-R-T2-280-GY-1-A-NS, SAT-48S-0-R-T2W-280-GY-1-A-NS
<b>STREETLIGHT DUCT</b>		
60063	NON METALLIC ELECTRICAL TUBING, 1", 750' RL	TUBING, 1" ELECTRICAL NON METALLIC APPROX. 750' ON REEL ESA APPROVED PRODUCTS: IPEX: 12019 OYAL: ROYAL-FLEX RF100-1000*
60066	DUCT, 2"X20', TYPE II, DIRECT BURY, BELLEND	DUCT, DIRECT BURY TYPE II, 2" X 20 FT. LENGTH C/W BELL & STRAIGHT END ESA APPROVED PRODUCTS: CANON: "PERMA-DUCT" ROYAL: ULTRA DUCT (DB20 02)** SCEPTER: "SUPER DUCT"
60064	NON METALLIC ELECTRICAL TUBING, 2", 500' RL	TUBING, 2" ELECTRICAL NON METALLIC APPROX. 500 FT REEL ESA APPROVED PRODUCTS: IPEX: 12044 ROYAL: ROYAL-FLEX RFR200
60010	FEMALE COUPLING, 2", PVC, SOLVENT WELD	COUPLING, RIGID PVC 2" FEMALE SOLVENT WELD ENDS ESA APPROVED PRODUCTS: IPEX: EC35 (77006)** ROYAL: REC35
60149	PLUG-TAPERED-2" POLY TUBE	PLUG 2", NON METALLIC TUBING TAPERED POLY ESA APPROVED PRODUCTS: IPEX: CAP35 (77426)
<b>MISC STREETLIGHT MATERIAL</b>		
10265	5/8" X 8" MACHINE BOLT, SQHEAD, GALV	MACHINE BOLT SQUARE HEAD 5/8" X 8" GALVANIZED MEET CSA SPEC C83.15 ESA APPROVED PRODUCTS: HYDEL: 858.M JOSLYN: J8808 KABAR: K307-8 COOPER POWER: DF3B8 SLATER: 9808 ALMAT: A307-8 ABCHANCE: C8808
10788	5/8" LOCK WASHER, GALVANIZED	5/8" LOCK WASHER GALVANIZED .156 X .203 ESA APPROVED PRODUCTS: DOMINION BRIDGE: L-4043 JOSLYN: J139 KABAR: K3-3 MCGRAW-EDISON: DF7W5** SLATER: 22335
280027	SPLIT BOLT CONNECTOR FOR #14 WIRE	CONNECTOR, SPLIT BOLT FOR #14 WIRE APPROVED PRODUCTS: BURNDY: KS-90 ILSCO: 1K8 PENN-UNION: S-8**
40913	LIMITRON FUSE, 600 VOLT, 10 AMP	LIMITRON FUSE 600 VOLT, 10 AMP, ESA APPROVED PRODUCTS: GOULD: ATMR-10 BUSSMAN : KTK-10 ** LITTLE FUSE KLK-10
41835	FUSED CONNECTOR KIT, 10&12 STR, LINE &	FUSED CONNECTOR KIT LINE-SIDE AND LOAD SIDE, 10-12 STRAND ESA APPROVED PRODUCTS: HOMAC: SLK-M FUSETEK: 65U

	LOAD	
70814	FLAMESEAL CU, RWU90, #12-7 STR, 1000V GREEN	FLAMESEAL COPPER WIRE RWU 90, #12, 7 STRAND 1000 VOLT, GREEN 300 METRE REEL CSA APPROVED PRODUCTS: PRYSMIAN CABLE:12-7 RWU GREEN SOUTH WIRE 12-7 RWU GREEN
50463	1.25X3" GALVANIZED NIPPLE, W/TWO LOCKNUTS	1 1/4" X 3" GALVANIZED NIPPLE, WITH TWO LOCKNUTS ESA APPROVED PRODUCTS: NP12030-2XC1-1710
50460	DISTRIBUTION PANEL, OHSTLT, R3 ENCLOSURE, 60A MBRKR	ELECTRICAL DISTRIBUTION PANEL 120/240 VOLT SERVICE ENTRANCE RATED 60 AMP MAIN BREAKER R3 ENCLOSURE ESA APPROVED PRODUCTS: SQ D: CQO24L60NRNM
50465	SINGLE POLE BREAKER, 20 AMP, 120 V AC	SINGLE POLE BREAKER, 20 AMP, 120 VOLT AC 22,000 AMP INTERRUPT CAPACITY ESA APPROVED PRODUCTS SQ D: Q0120VH
50464	GROUND PLATE, GALV, 1/4X10X16, BRNZ CNTCT, 3/0	GROUND PLATE, GALVANIZED, 1/4 X 10 X 16", BRONZE GROUND CONNECTOR 3/0 - #6 AWG 2 PER BOX ESA APPROVED PRODUCTS: T&B: 1016BTB
-	STREETLIGHT NUMBER ADHESIVES	MUST BE BLACK NUMBERING ON YELLOW BACKGROUND. APPROVED PRODUCT IS NEDCO: ALMETEK INDUSTRIES' PS2.5-#. THE # SIGN SHOULD BE REPLACED WITH THE ACTUAL NUMBER THAT IS BEING ORDERED.
-	LONG LIFE 20 YEAR PHOTOCELL	TYCO ELECTRONICS (TE), ALR 8000 LONG LIFE PHOTOCELL

DECORATIVE STREETLIGHTS		
58850	CONCRETE POLE, 15', SNGL, JADE GREEN, KING	POLE, ORNAMENTAL SPUN CONCRETE, 15 FT DIRECT BURY, SINGLE CHROMIUM OXIDE FINISH GREEN POLE MATRIX AZTEC JADE GREEN (F63TXG7092) ETCHED FINISH 2" O.D. RACEWAY INSIDE THE POLE FOR WIRE 2 APERTURES BELOW THE BASE OF THE POLE, 180 DEGREES OPPOSITE ON THE CENTRE LINE OF THE HAND HOLE ABOVE, PER DRAWING. WINDSOR 5 DATED 1996 06 2. ESA APPROVED PRODUCTS: KING LUMINAIRE: KS15-G-E51-DB S/F K6
58851	CONCRETE POLE, 15', DBL, JADE GREEN, KING	POLE, ORNAMENTAL SPUN CONCRETE, 15 FT DIRECT BURY, DOUBLE CHROMIUM OXIDE FINISH GREEN POLE MATRIX AZTEC JADE GREEN (F63TXG7092) ETCHED FINISH, 2" O.D. RACEWAY INSIDE THE POLE FOR EASE WIRING, 2 APERTURES BELOW THE BASE OF THE POLE 180 DEGREES OPPOSITE ON THE SAME CENTRE LINE AS THE HAND HOLD ABOVE, AS DWG. NUMBER: WINDSOR 6, DATED 1996 03 13. ESA APPROVED PRODUCTS: KING LUMINAIRE: KS14-G-E51-DB C/W 140-35/140
58890	CONCRETE POLE, ORNAMENTAL, 20', GREY, SKYCST	POLE, ORNAMENTAL, CONCRETE 20 FT (6.1 METRES) IN LENGTH OCTAGONAL, DIRECT BURY POLISHED FINISH, TENON TOP CARPATHIAN BRONZE COLOUR AS PER ATTACHED (1 PAGE) ENWIN UTILITIES LTD. DRAWING 11-0-1ZB, DATED 2001/01/01 ESA APPROVED PRODUCTS: SKY CAST: SC061AOCBPDTGP
58856	POLE ARM, COSHOCTON, DOUBLE, JADE GREEN	POLE ARM, COSHOCTON DOUBLE AZTEC JADE E-51 GREEN (F63TXG7092) ETCHED FINISH FOR KING LUMINAIRE: K118-EAR-V-100 (MOG)HPS-120- K16-K16R-PR TYPE V DOUBLE LUMINAIRES TO FIT ON KING LUMINAIRE: KS14-G-E51-DB 14 FT. ORNAMENTAL SPUN CONCRETE POLE PER (1 PAGE) DRAWING NUMBER: WINDSOR 3, DATED 1996 03 13 ESA APPROVED PRODUCTS: KING LUMINARIE: KA63-GN
-	DECORATIVE LED STREETLIGHT	KING LED - K118R-B3AR-IV-75(SSL)-1036-120-K6-GN, K118R-B3AR-IV-75(SSL)-1036-120-K9-GN

OTHER MATERIAL		
11320	1/2-13 UNC X 4", SCREW, CAP, HEXHD, SILBRZ	HEX HEAD CAP SCREW 1/2-13 UNC X 4" GRADE ALLOY 651 SILICONE BRONZE ESA APPROVED PRODUCTS: BELL: FASTN CNTR: STAR: 8H50C400
20005	EXPANSION ANCHOR, HEAVY DUTY STEEL, 1/2" BOLT	HEAVY DUTY, EXPANSION DROP-IN ANCHOR, STAINLESS STEEL, INTERNAL THREAD FLANG-TOPPED NON-BOTTOM BEARING ANCHOR PRE-ASSEMBLED PLUG FOUR WAY SLOT FOR 1/2" BOLT ULTIMATE PULLOUT: 8544 LBS ULTIMATE SHEAR: 6502 ESA APPROVED PRODUCTS: RED HEAD: SRM-12 UCAN: IPS1258
20765	3/4"X10' GROUND ROD, CU CLAD, MACHINE PT	COPPER CLAD GROUND ROD 3/4" DIA X 10 FT. MACHINE POINT TO MEET ANSI/UL 467-1984 ESA APPROVED PRODUCTS: SLACAN: GR3410C, THOMAS & BETTS: 7510 KABAR: K64-10 ERICO: 613400
40026	ARRESTOR, LGTNG, 21kV, PVR, 18" LEAD, BIRD COVER	LIGHTNING ARRESTOR 21 kV DISTRIBUTION METAL OXIDE, TYPE PVR RISER POLE, SURGE WITH MOUNTING HARDWARE 18" LINE LEAD, BIRD COVER AND ISOLATOR PACKAGED INDIVIDUALLY ESA APPROVED PRODUCTS: OHIO BRASS: 221-617-75-14 COOPER: URS21105D1D1A1A
50001	STAINLESS STEEL BAND, 5/8X100' TYPE 201	BANDING, STAINLESS STEEL 5/8" X 100 FT. TYPE 201 ESA APPROVED PRODUCTS: BANDIT: C205 PUNCHLOK: PB205 BAND N'GO: BSS58
50003	CLIP, BANDIT, 5/8" STAINLESS STEEL, TYPE 201	BANDING CLIP STAINLESS STEEL FOR 5/8" BANDING, TYPE 201 ESA APPROVED PRODUCTS: BANDIT: C255 PROLOK 08-12255C PUNCH LOK: PB255** BAND N'GO: 5/8 BANDING BUCKLES
60267	SCOTCH MID-RANGE MARKER, RED, HYDRO, 8.25"	SCOTCH MARK, MID RANGE MARKER 8 1/4" DIAMETER COLOUR CODED RED FOR HYDRO POWER APPLICATION ESA APPROVED PRODUCTS: 3M: SCOTCH MARK 1256EMS**
60268	6"X1000' MARKING TAPE, RED, BURIED CABLE	PLASTIC MARKING TAPE UNDERGROUND, RED 6" X 1000 FT. ROLL MARKED "CAUTION BURIED ELECTRIC LINE" ESA APPROVED PRODUCTS: AMT: 1006RE BLACKBURN: RT6 BRADY: 91296 CONDUX: 85265-01 ELECTROMARK: 4006R PANDUIT: HTDU6R-E STRANCO: TOP TAPE: BT61052 PLYAMT:
80351	PVC PIPE STRAP 5" , 2 HOLE	PIPE STRAP 5" 2 HOLE GALVANIZED WITH 5/8" HOLES ESA APPROVED PRODUCTS: COMMANDER: CI-1540**
110640	POLY TAG, WHITE 5"X2.5"X.220", 5/16" HOLE	TAG, POLYETHYLENE WHITE 5"L X 2 1/2"W X. 220" THICK -5/16" HOLE 3/8" FROM TOP CENTRED ON WIDTH HIGH DENSITY POLYETHYLENE WEATHER- PROOF SUITABLE FOR USE WITH LETTER/NUMBER STAMP
110641	POLY TAG, WHITE 5"X1"X.220", 5/16" HOLE	TAG, HIGH DENSITY POLYETHYLENE WHITE 5" L X 1" W X .220" THICK, 5/16" DIAMETER HOLE 3/8" FROM TOP CENTRED ON WIDTH WEATHERPROOF SUITABLE FOR USE WITH LETTER & NUMBER STAMP
110707	LOCK, KEYLESS, EQUIPMENT, ALUM BODY, FARGO	EQUIPMENT LOCK, KEYLESS TAMPERPROOF SOLID ALUMINIUM ALLOY BODY WITH HEX HEAD SCREW, 25 PER BAG ESA APPROVED PRODUCTS: FARGO: GM320 CMC: PCL4
1000105	STONE CRUSHED, GRANULAR "B", TYPE 1	STONE CRUSHED, GRANULAR "B", TYPE 1

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## Appendix B - EWU Specifications

60-2	1/0, 28V single conductor concentric neutral cable
60-2-15	Quadruplex and triplex underground secondary cable
60-3	27.6kV triplex conductor concentric neutral cable

(see attached DVD)

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## Appendix C - Construction Drawings

AS-206A	17 meter (55') R.O.W.
AS-206B	22 meter (72') R.O.W.
AS-206C	15 meter (50') R.O.W.
AS-206D	20 meter (66') R.O.W.
OPSD2112.02	Electrical hand hole precast concrete with cover 460mm dia.
61-1-20C	Concrete splicing vault
61-1-20D	Concrete splicing vault c/w concrete load bearing cover
61-1-20E	Concrete splicing vault c/w manhole cover and flange
61-1-7 A,B	Manhole cover
12-1030 – 1,2	30' concrete pole
SG-20	Access area and min clearance req for mini-pad transformer
65-1-15 A,B,C	Single phase transformer foundation

(see attached DVD)

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## Appendix D - Installation Drawings

11.0.1.AO-1	Underground streetlight standard
11.0.1.AO-2	
11.0.1.G	Standard concrete streetlight pole wiring detail (u/g feed)
11.0.1.J.2	Standard concrete streetlight bonding detail (u/g feed) - LED
11.0.1.Q	Washington ornamental standard - 180° light distribution
11.0.1.R	Washington ornamental standard - 360° light distribution
11.0.1.S	Washington ornamental standard – twin arm
11.0.1.U	Granville ornamental standard
61-1-13 F,G,H	Concrete splicing vault – installation drawing
61-1-20 C,D,E	Concrete splicing vault
62-1-13	Compaction of sewer and utility trenches
62-1-14	Service stub details
62-1-15	Typical trench details
62-1-17,A	Typical trench details and road crossings in a subdivision
63-1-18	Typical round pylon detail
63-1-18A	Typical round pylon detail – screening
63-1-18B	Typical round pylon detail – concrete – 3 ducts
63-1-18C	Typical round pylon detail – screening – 3 ducts
63-1-18D	Typical round pylon detail – concrete – 4 ducts
63-1-18E	Typical round pylon detail – screening – 4 ducts
65-1-13	Typical equipment protection and grounding arrangement for 300-2000kVA transformers w/ sufficient property
65-1-13A	Typical equipment protection and grounding arrangement for 300-2000kVA transformers w/ insufficient property
65-1-16	Typical cable arrangement for 1 phase low profile transformer
65-1-25	Typical 1 $\Phi$ low profile trans. foundation installation detail

(see attached DVD)

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# Appendix E – Sample Acceptance Certificates

April 17, 2013

Project # HN.0###

1234 Street  
Windsor, ON  
A1B 2C3  
Attention: John Doe

Dear Mr. John Doe

**RE: FINAL ACCEPTANCE LETTER OF CERTIFICATE FOR ABC SUBDIVISION**

The maintenance period for the above subdivision was completed April 11, 2013. ENWIN has inspected the above and identified the following deficiencies:

1. Front of 1222 Riverside - Streetlight leaning. (pole 5)
2. Front of 1227 Riverside - Streetlight leaning. (pole 3)

These deficiencies will be completed as our schedule permits and you will be invoiced accordingly. Once the invoice is paid securities will be released. If you require further information, please contact <Technologist> at (519)251-7300 ext ###.

Sincerely,

Manager, Engineering  
ENWIN Utilities  
TEL: (519) 251-7300  
FAX: (519) 251-7306

cc: Director, Operations  
Finance Dept.  
Technologist  
Deficiency Work Order # 2200#####

AB/cd

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## Appendix F – Sample Drawings

SAMPLE-DRAWING\_LAYOUT.dwg  
ENWIN.ctb

(see attached DVD)

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