THE CITY OF WINDSOR
ONTARIO, CANADA

STREET LIGHTING DESIGN & INSTALLATION GUIDELINES

Version 1

INTRODUCTION

The purpose of the guideline is to outline the best practice for the design and the installation of the streetlight infrastructure in a subdivision within the City of Windsor. The guidelines is applicable to all new subdivisions, the City of Windsor streetlight upgrades and maintenance activities. All existing installations shall be grand fathered in and will be maintained as installed. The Designer & the Contractor shall contact the City of Windsor for any questions or concerns.

The material included reflects current standards at the time of publication; in the future, it will be necessary to update this manual as regulations, design standards, municipal policies and best practices change. The City of Windsor reserves the right to revise this manual at any time without notice. Users of the manual are responsible to ensure they are referencing the current version. The City of Windsor shall not be held liable in any manner for damages incurred by a third party resulting from the use of the information provided.

Revision Summary

VERSION	DATE	REVISED BY	DESCRIPTION
1	October - 2021	Traffic & Signals Department	Initial Publication

GENERAL

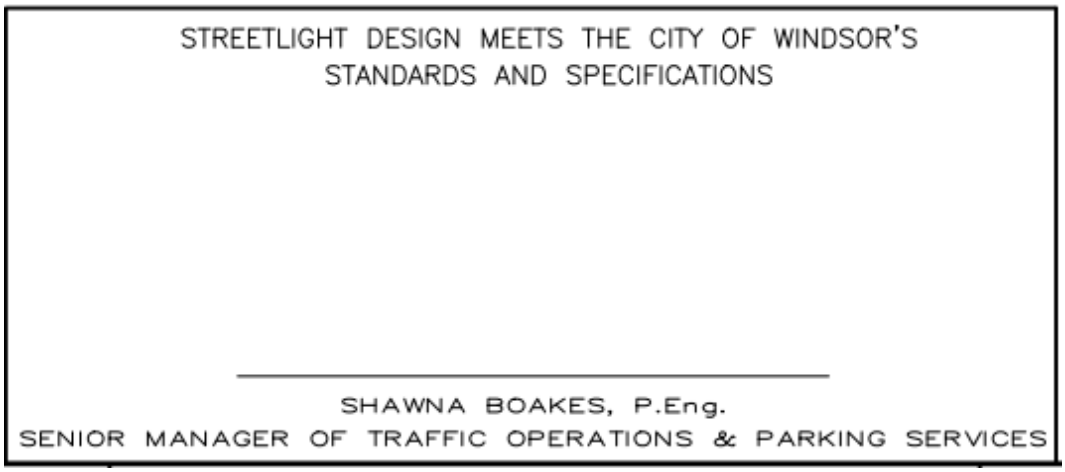
All the streetlight design and the installation shall be completed in accordance with the Ontario Electrical Safety Code (Latest Edition) including local amendments and by-laws, Provincial and Municipal Codes and ENWIN construction standards. In the event of any conflict or inconsistency among the standards, such inconsistency shall be resolved by observing the following order of precedence:

a) Ontario Electrical Safety Code (Latest Edition)

b) ENWIN Utilities Construction Standards (Latest Revision)

c) Ontario Provincial Standards (OPSS)

The Contractor shall ensure that the construction and the installation of the street lighting infrastructure shall be completed in accordance with the contract documents. The Designer and the Contractor shall contact ENWIN at tst@enwin.com for the latest revisions of streetlight construction standards and approved materials. For the subdivision drawings, the Designer shall prepare streetlight drawings in their respective title blocks and shall include below section in their streetlight drawings.



All streetlight drawings shall be signed off by the City Engineer and Sr. Manager of Traffic Operations and Parking Services before the electrical drawings are issued for Tender.

The Contractor shall note that all the street lighting installations will require an Electrical Safety Authority inspection. All the fees in coordination with the ESA inspection are to be covered by the Contractor. Before the connection request is sent to ENWIN Utilities and the final connection is made, the Contractor will provide hand marked as-built drawings and will fill out and return the "Contractor Streetlight Data Collection Sheet" to the City of Windsor within two (2) working days after the ESA inspection. The Designer shall submit the as built CAD files and pdfs to the City and ENWIN Utilities after the project completion.

Photometric Study Recommendation

- All photometric studies performed within the City of Windsor shall follow and meet IES RP-8 (Latest Edition).
- The Designer shall use AGi32 software for the lighting calculation and will need an approval from the City of Windsor if the Designer is planning to use any alternate software for the study.
- Luminance design method with a continuous calculation grid shall be used for the calculation of roadway lighting levels and illuminance design method for the intersections, curved road sections, roundabouts and cul-de-sacs.
- The calculation grid for the intersections shall include the crosswalks and the conflict areas as recommended in RP-8 (Latest Edition).
- The Designer shall use 0.80 as a Light Loss factor (LLF) in their study.
- The Designer shall submit AGI32 files along with the pdf drawings for the City's review.

Design and Installation

1.1 Streetlight Conduit

Streetlight conduit shall be 53mm heavy-duty rigid PVC Schedule 40 in accordance with CSA 22.2 No 211.2 including trenching, excavation, backfilling and includes all fittings (bends, couplings, adaptors, end plugs, etc., in accordance with CSA Standard C22.2 - No. 85). The Contractor shall follow OPSS.MUNI 603 for the installation of the conduit, shall meet OESC standards (Latest Revision) and obtain ESA inspection. In a subdivision, streetlight conduit shall be placed in a common trench on the same level as the secondary cables in a joint utility trench as per ENWIN construction standards D-T17 and 62-1-17. Conduits shall be placed on one side of the trench and shall not be overlaid on top of secondary cables. Proper clearances shall be maintained between the streetlight conduit and other utilities. The Designer and the Contractor shall ensure the number of conduit bends do not exceed the requirements of the Ontario Electrical Safety Code (Latest Revision).

1.1.1 Streetlight conduit at a pole

41mm flexible PVC conduit shall be used at the pole aperture. There shall be continuous ducting between the flexible conduit and rigid conduit with no exposed cable. The Contractor shall refer to ENWIN construction standards D-SL1 & D-SL2 as a reference.

1.1.2 Streetlight conduit at the Load Centre

In a subdivision, two (2) 53mm rigid PVC conduits shall be used at a breaker panel. Each 53mm conduit is assigned to an individual breaker. ENWIN utilities will make provisions for the number of conduit holes punched and capped. The Designer and the Contractor shall refer to ENWIN construction standards 11.0.1.A0.1, 11.0.1.AC.1, 11.0.1.AC.2 & 11.0.1.AC.3 as a reference.

1.2 Streetlight cable

Streetlight cables for the luminaires shall be single conductor; stranded copper, low voltage cable rated 600 volts if they are installed underground. Cables shall be RWU 90 rated meeting the requirements of CSA C22.2 No.38. Overhead streetlight cables shall be either #4 duplex or #4 triplex based on the type/material of the streetlight pole that luminaires are connected to. Overhead connections shall meet CSA and OESC bonding requirements. The Contractor shall follow OPSS.MUNI 604 and ENWIN construction standards 11.0.1.G, 11.0.1.AD.1, 11.0.1.AD.2 & 11.0.1.AD.3, 11.0.1.I for the installation of cables.

For the underground connections, all the streetlight cables shall be installed in a conduit and all joints in the luminaire shall be made in the pole hand holes. Bare underground splices for the streetlight cable is not acceptable.

1.3 Poles

The Designer shall place the streetlight poles on the property line between residential lots and shall maintain following pole clearances during their streetlight design:

a. A minimum clearance of 3.0m shall be maintained from the centre of the pole to the edge of the transformer pad.
b. A minimum clearance of 3.0m shall be maintained from the centre of the pole to the centre of the fire hydrant.
c. A minimum clearance of 2.0m shall be maintained from the centre of the pole to the centre of a storm sewer, sanitary sewer and watermain.
d. A minimum clearance of 1.5m shall be maintained from the centre of the pole to the edge of the driveway.
e. A minimum clearance of 1.5m shall be maintained from the back of the curb to the centre of the pole.
f. A minimum clearance of 1.0m shall be maintained from the centre of the pole to the catch basin.
g. A minimum clearance of 0.5m shall be maintained from the centre of the pole to the edge of the junction box.

The Contractor shall follow OPSS.MUNI 615 for the installation of the streetlight poles and refer to ENWIN construction standard 11.0.1.D for pole details. It is not recommended to install a pole at the end of a permanent cul-de-sac. The location of the streetlight poles shall be as per the contract documents. The Contractor shall ensure not to damage any existing street lighting infrastructure or utilities during the installation of streetlight poles.

1.4 Luminaire and Brackets

The Contractor shall follow OPSS.MUNI 617 and ENWIN construction standards 11.0.1.A3.a, 11.0.1.A3.b, 11.0.1.V, 11.0.1.J.2 for the installation of LED luminaires and brackets.

1.5 Junction boxes/Electrical chambers

The Designer shall use a junction box if the streetlight conduit routing has more than four (4) 90° (degree) bends, including the bends located at the transformer/ breaker panel or at each streetlight pole. If the streetlight conduit is installed in a road crossing, it is recommended to use 1 (or 2) junction boxes based on the streetlight circuit design, one on either side of the road crossing.

The Contractor shall follow OPSS.MUNI 602 for the installation of junction boxes. All the conduits shall sweep in and out from the bottom and open base of the junction box. There shall be a foundation of 19mm clear crushed stone with the drainage pockets for the junction boxes. The conduits terminating in a junction box shall be provided with a bell end. The location of the boxes shall be confirmed with the City of Windsor & ENWIN Utilities. As a standard practice, it is recommended to install a junction box in a boulevard area and shall be protected throughout the construction. Junction box covers shall be levelled with the final grade after the overall completion of the construction. All the splices inside a junction box shall be made in weatherproof manner.

Specifications: ***Material***-Precast polymer concrete, Tier 22 - heavy duty, Colour: Gary, Lockable Lid with Penta Head thread bolts with washer. Lid must be marked as "ELECTRIC".

Size-

- 12" (W) x 18" (L) x12(D)" in a subdivision (Manufacturer- Channell, Cat# BULKU111812). Interior Dimension: 10" (W) x 18" (L) x12(D)", HDPE junction box, Grade Level c/w cover to support, Road rated, Slip Resistance Tread pattern on the lid cover.

- 12" (W) x12" (L) x12" (D) where a handhole is required to be installed near a streetlight pole in a concrete pavement (Manufacturer –Synertech, Cat#1212).

1.6 Grounding

The Designer shall show grounding rods at the end of each streetlight circuit on the applicable streetlight drawings. The Contractor shall install all ground rods and wiring details including all connections and fittings required in ducts on poles for a complete installation. Grounding and bonding material used for streetlight application should all conform to CSA C22.2 No 41-07(Latest Edition). Ground rods shall be 3048mm x 19mm copper-clad steel rods. Ground plates shall be 254mm x 400mm x 6mm-galvanized steel with a minimum surface area of 0.2 square meters. The entire street lighting infrastructure shall be adequately grounded as per OPSS.MUNI 609, ENWIN construction standards & OESC standards.

1.7 Streetlight Conduits in a Road Crossing

The Designer shall show two (2) 53mm conduits in a combined utility road crossing if the streetlight circuit is crossing a street. The Designer shall also provide the connections details between the conduits which are installed at the road crossing and at the trench. The Contractor shall follow ENWIN construction standard 62-1-17 for the installation of streetlight conduit in a road crossing.