

6.0 Design Drawings

6.1 General

All development documents shall include design and servicing drawings. The Applicant shall ensure that pre-consultation takes place with the Infrastructure Services Department prior to the preparation of any design drawings.

Drawings shall be prepared in accordance with **Appendix E** - "Guidelines, Professional Engineers Providing Land Development/Redevelopment Engineering Services, 1994".

In general, the drawings shall be on "C" size paper (550 mm x 850 mm), shall be signed and sealed by a Professional Engineer licensed in Ontario, and shall include the following:

- Benchmark Location and Description (referred to geodetic elevations), with reference to the coordinate system used
- Key Plan
- Legend and Index
- Existing Conditions and Removals
- Road Alignment, Road Elevations, Pavement Widths
- Plan and Profile Sheets (showing road grades, sewer grades, watermain grades, manhole locations, sizes, and materials)
- Storm and sanitary sewer design sheets
- Utility Cross Sections
- Grading Plans (including lot grading)
- Power Distribution and Road Lighting Plans
- Miscellaneous Details (including bedding and backfill)
- Stormwater Flow Details
- Stormwater Retention Pond Details (size, landscaping)
- Landscaping Plans (stamped by a registered Landscaping Architect)

The drawings shall refer to Ontario Provincial Standard Drawings wherever applicable, except as amended or extended by the Town Essex requirements.

The Consulting Engineer shall complete contract drawings for site services in metric units and in electronic format for review by the Town of Essex. Drawings shall generally include the level of design detail outlined in **Section 4.0**, as required.

All geographic data must be submitted in a standard real-world coordinate system. The preferred projected coordinate system is NAD83 (CSRS) UTM Zone 17N. If another system is used it must be documented.

6.2 Electronic Drawing Requirements

The following are minimum requirements for the submission of electronic drawing files to the Municipality.

6.2.1 AutoCAD Version

Drawing files should be submitted in **AutoCAD 2018** or a more recent version.

6.2.2 Lettering Sizes

Minimum size for existing features should be L60.

Minimum size for new construction features should be L80 with L100 used for notes.

Where non-standard text fonts are used, these font files must be provided with the drawings.

6.2.3 Pen Weight

The following table lists suggested pen sizes from the PSPC National CADD Standard, Ontario Region:

Table 5: Pen Sizes

Pen No.	Line Width	% Intensity	Printed Colour
1 (Red)	0.25	100%	Black
2 (Yellow)	0.18	100%	Black
3 (Green)	0.35	100%	Black
4 (Cyan)	0.25	100%	Black
5 (Blue)	0.06	100%	Black
6 (Magenta)	0.35	100%	Black
7 (White)	0.35	100%	Black
8 (Gray)	0.18	100%	Black
9	0.18	100%	Black
10	0.18	100%	Black
11	0.25	100%	Black
12	0.25	100%	Black
13	0.06	100%	Black
14	0.6	100%	Black
15	0.7	100%	Black
16	0.25	100%	251 (Medium-dark gray)
17	0.35	100%	251 (Medium-dark gray)
18	0.5	100%	251 (Medium-dark gray)

Pen No.	Lind Width	% Intensity	Printed Colour
19	0.7	100%	251 (Medium-dark gray)
20	0.25	100%	Pen colour
21-24	0.25	100%	Pen colour
25	0.18	100%	Black
26-29	0.25	100%	Pen colour
30	0.5	100%	Black
40	0.25	100%	Pen colour
80	0.25	100%	Pen colour
100	0.25	100%	253 (Gray)
101	0.35	100%	253 (Gray)
102	0.5	100%	253 (Gray)
103	0.7	100%	253 (Gray)
104	0.25	100%	250 (Dark gray)
105	0.35	100%	250 (Dark gray)
106	0.5	100%	250 (Dark gray)
107	0.7	100%	250 (Dark gray)
108-109	0.25	100%	Pen colour
110	0.12	100%	Black
111-149	0.25	100%	Pen colour
150	0.06	100%	Object colour
151-210	0.25	100%	Pen colour
211	1	100%	Black
212	1.5	100%	Black
213	2	100%	Black
214-255	0.25	100%	Pen colour

6.2.4 Layers

In general, all different object types should be on separate layers. Nothing shall be drawn on layer 0.

The following is a suggested layering method:

- Property lines, right-of-way lines, SIB's, IB's, etc., should be on their own layers (eg. Right-of-Way lines should be on layers PL, SIB's and IB's should be on layer SIB).

- Existing features and utilities should be on layers with prefix X so that they may be manipulated easily (eg. Existing Bell should be on layer XBELL and existing edge of pavement should be on layerXEP).
- New utilities should be on layers with the prefix U (new sanitary sewer on USAN, new storm sewer on USTORM, etc.).
- New road features (ditches, edge of pavement, sidewalks, etc.) should be on layers with the prefix RN (RNDITCH, RNEP, RNWS).
- All profile layers should have the prefix P.

6.2.5 Multiple Drawings

Where multiple drawings are used to develop a final drawing, all individual drawings should be coordinated about insertion point 0,0,0 and, where possible, be coordinated in the World Coordinate System.

Individual drawings should be inserted intact on layer O and not need to be scaled, rotated or manipulated in any way.

When the size of drawings dictates, hatch should be done on separate drawings using the same layering method as stated above.

6.2.6 Elevation Data

Features which contain a third dimension or elevation data (z value) must have the elevation value within the attribute data. Elevation data submitted in CAD format must be part of the feature.

6.2.7 File Transfer

Large drawings (larger than 10MB) should be transferred as multiple disk zip files using Winzip or Pkzip. Older compression programs should not be used.

If you wish to use other compression programs than those mentioned above, please confirm that the Town of Essex has access to this program.

6.3 Documentation

A list of all files being submitted is required.

CAD data shall include metadata for each layer including within the file. This documentation will provide information on the source of the data, feature type (point, line, polygon, etc.), source date and a general description of what is shown on the layer(s). It should be clearly defined, the period for which the drawings are relative (Construction drawings, As-built Drawings, etc.).

GIS data submissions must include all items from b. above as well as metadata for each of the featured geographic data attributes. This will include a complete description of each attributes definition as well as a description of what each of the attribute values mean for each field.

Methods used for data collection and the horizontal and vertical accuracy should be documented and submitted for all data deliverables.

6.4 Drawing Accuracy

All line and arc segments in the digital drawing file must be drawn to legal survey accuracy and must mathematically close to form the perimeter of each lot or block. All files are to be projected to the North American Datum 1983 (NAD 83) Geographic Coordinate System.

The distances and bearings of each line and arc segment in the digital file must coincide with the distances and bearings of each line segment on the hard copy plan of subdivision registered at the Land Titles office.

It is acknowledged that it is not possible to mathematically close each lot or block on the digital plan of subdivision using the distances and bearings of each line and arc segment described on the hard copy plan of subdivision.

It is acceptable to round off the units and angles in the digital plan of subdivision in order for the distances and bearings of each line and arc segment to coincide with the distances and bearings on the hard copy plan of subdivision.

6.5 Ontario Provincial Standard Drawings (OPSD)

The latest OPSD shall be referenced as part of the contract documents and shall include any amendments or extensions as outlined herein. In case of a conflict between OPSD and Municipal Standard Drawings (MSD), the MSD shall govern. There are currently no amendments or extension to the OPSD.

6.6 Municipal Standard Drawings

The current Municipal Standard Drawings are included in the **Appendix B**.