

STATIC SIGNAGE

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1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for signage Work in accordance with the Contract Documents including but not limited to the following:

1.2 **REFERENCES**

- .1 AAMA 2605, High Performance Organic Coatings on Architectural Extrusions and Panels.
- .2 AAMA CW-10, Care and Handling of Architectural Aluminum from Shop to Site.
- .3 ANSI, H35.1M Alloy and Temper Designation Systems for Aluminum (Metric).
- .4 ASTM A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
- .5 ASTM B209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate Metric.
- .6 ASTM B221M, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes Metric.
- .7 ASTM D1781, Standard Test Method for Climbing Drum Peel for Adhesives.
- .8 ASTM F738M, Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .9 CAN/CGSB-1.108-M, Bituminous Solvent Type Paint.
- .10 CAN/CGSB-12.12-M, Plastic Safety Glazing.
- .11 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standards for Electrical Installations.
- .12 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.
- .13 Metrolinx, Design Requirements Manual.

- .14 Metrolinx, Static Signage Catalogue.
- .15 Ministry of Transportation Ontario, Manual of Uniform Traffic Control Devices.
- .16 Ministry of Transportation Ontario, Ontario Traffic Manuals.
- .17 TAC; MUTCDC.
- .18 NAAMM, The National Association of Architectural Metal Manufacturers.

1.3 DESIGN REQUIREMENTS

- .1 Design signage work in accordance with Contract Documents, Metrolinx Standards, and Manufacturer's written instructions utilizing material types, accessories and methods indicated and required to provide a complete signage package, assuring maximum durability on permanent signs.
- .2 Design of signage to be in accordance with Metrolinx's Design Requirements Manual & Static Signage Catalogue; the Ministry of Transportation and Communications Manual of Uniform Traffic Control Devices & Ontario Traffic Manuals, and other agencies, as may be applicable, giving attention to best practices and compliance with OBC (Ontario Building Code), AODA (Accessibility for Ontarians for Disabilities Act), FLSA (French Language Services Act) and Corporate branding standards.
- .3 Design signage work to withstand live, dead, lateral, wind, seismic, handling, transportation, and erection loads and with a deflection not exceeding $L/360$.
- .4 Design signage in accordance with climatic design data contained in the Ontario Building Code to accommodate thermal movements of the components and structural movements to provide an installation free of oil canning, buckling, delaminating, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
- .5 Design signage work to accommodate heat and moisture dissipation by approved non-staining, concealed methods.
- .6 Design connections to substrates and structures to withstand live, dead, lateral, seismic, and other imposed loads for the locations they are installed.
- .7 Design miscellaneous, additional structural framing members as required to complete the Work, where not indicated on Contract Drawings.

- .8 Provide adequate ventilation to maintain acceptable operating temperatures in accordance with manufacturer's written requirements.

1.4 SUBMITTALS

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with the Conditions of the Contract indicating:
 - .1 Products, compliance with appropriate reference standards and specifications.
 - .2 Product transportation, storage, handling and installation requirements.
- .2 Samples:
 - .1 Submit following samples in accordance with the Conditions of the Contract:
 - .1 Two 300 x 300 mm samples of each vinyl type and colour minimum 2 weeks before vinyl is required.
 - .2 Two 300 x 300 mm samples of each digital vinyl print type and colour minimum 2 weeks before vinyl is required.
 - .3 Two 300 x 150 mm draw downs of each ink colour and type minimum 2 weeks before inks are required.
 - .4 Two 300 x 150 mm draw downs of each paint colour and type minimum 2 weeks before paints are required.
 - .5 Identify each sample with Contract number and title, colour reference, date, and name of applicator.
 - .6 Colour match to existing colours and output resolution where applicable.
- .3 Shop drawings:
 - .1 Submit shop drawings in accordance with the Conditions of the Contract indicating:
 - .1 Elevations, sections, details, materials, thicknesses, sizes, finishes, colours, removable and interchangeable components, access panels, anchorage to substrate, mounting methods, schedule of signs.
 - .2 Submit full size templates drawn-to-scale details for individually fabricated or incised lettering indicating word and letter spacing.
 - .3 Submit Full or 1/2 scale artwork for pictographs.
 - .4 Submit complete electrical wiring diagrams including electrical schematics, component specifications, power loads, LED layouts, wiring terminal box locations, lamp centres and overlaps.

- .4 Samples: Submit one sample of each sign type as requested in accordance with the Conditions of the Contract.
- .5 Reports and plans:
 - .1 Submit written field quality control test reports within five working days after completion of testing.
 - .2 Submit an installation/safety plan for overhead works including any related hoarding, safety watches, estimated work timing and duration and any related issues.
- .6 Closeout submittals: Submit maintenance data for each sign type for incorporation into Operations and Maintenance Manuals in accordance with the Conditions of the Contract.

1.5 **QUALITY ASSURANCE**

- .1 Retain a Professional Engineer, licensed in Province of Ontario, with experience in signage Work of comparable complexity and scope, to perform following services as part of Work of this Section:
 - .1 Design of non-illuminated and illuminated signage work.
 - .2 Design of connections for attaching signs to structure, posts, and suspended from structure.
 - .3 Review, stamp, and sign shop drawings and design calculations.
- .2 Installer's qualifications:
 - .1 Perform Work of this Section by a company that has a minimum of five years proven experience in project of a similar size and nature.
 - .2 Contractor shall have completed or will complete GO and/or CN/CP safety contractor training as required for on site or Rail Right of Way (ROW) work.
- .3 Mock-up:
 - .1 Construct one mock-up of two (2) selected sign types in location acceptable to Consultant.
 - .2 Arrange for Consultant's review and acceptance; allow 48 hours after acceptance before proceeding with Work.
 - .3 Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work.
- .4 Execute welding by firms certified in accordance with CSA W47.1 Division 1 or 2.1.

- .5 Ensure welding operators are licensed per CSA W47.1 for types of welding required by Work.
- .6 Be responsible for the verification, with Metrolinx, of all text (English & French) used throughout the signage program, including proper insertion of accents and other punctuations.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Handle signs in accordance with AAMA CW-10.
- .2 Protect prefinished surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
- .3 Be responsible for handling and delivery of products. Protect products from damage during handling, storage and installation.
- .4 Deliver store and handle items in accordance with manufacturer's instructions and as specified.
- .5 Be responsible for all costs of delivery, loading and off-loading, and for transportation back to its origin for correction, if required, due to damage or defect.
- .6 Manufacture, pack, ship, deliver, and handle Products so that no damage occurs to structural qualities and finish appearance, or in any other way which is detrimental to their function and appearance.

2 Products

2.1 MATERIALS

- .1 Unless detailed or specified herein, standard products will be acceptable if construction details and installation meet intent of Drawings and Specifications.
- .2 Include all materials, products, accessories, and supplementary parts necessary to complete assembly and installation of Work of this Section.

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- .3 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight and true profiles, free of burrs or sharp edges.
- .4 Aluminum extrusions, posts, plates, and reinforcements: ASTM B221 and ANSI H35.1 AA6063 alloy, T6 temper.
- .5 Aluminum sheet (sign faces): AA5052 alloy, temper as indicated, in accordance with ASTM B209M and ANSI H35.1, minimum 1.5 mm thick unless otherwise indicated. Except as otherwise noted, signs up to 300 x 450 are 0.064" and signs up to 600 x 750 are 0.081 (5052-H36 or H38 grade) etched and anodized aluminum blanks; (5052-H32 grade for signs with designed bends.)
- .6 Aluminum plate, bar, channels, angles, tube, post, reinforcements, and shapes: ASTM B221 and ANSI H35.1 AA6063 alloy, T6 temper, anodizing quality.
- .7 Composite aluminum panel:
 - .1 Two thin layers of aluminium sheeting sandwiching a plastic core, in a continuous process; available in a variety of panel thicknesses and colours.
 - .2 Use material selections as indicated on approved design drawings.
- .8 Acrylic sign face: Clear or translucent as indicated, in accordance with CAN/CGSB-12.12. Thickness as indicated.
- .9 UV stabilized polycarbonate sheet: Sizes and shapes as indicated, minimum 3.0 mm thick unless otherwise specified, non-glare, polycarbonate plastic having the following minimum characteristics:
 - .1 Specific gravity (ASTM D792): 1.2.
 - .2 Light transmission (3 mm thick ASTM D1003): 88%.
 - .3 Chemical resistance (ANSI Z26.1): Passes.
 - .4 Tensile strength, Ultimate (ASTM D638): 9,500 psi.
 - .5 Flexural strength (ASTM D790): 13,500 psi.
 - .6 Compressive strength (ASTM D695): 12,500 psi.
 - .7 Modulus of elasticity (ASTM D638): 340,000 psi.
- .10 Expanded PVC sheet: Expanded homogenous closed cell PVC foam board, thickness, sizes and shapes as indicated and having the following minimum characteristics:
 - .1 Density (ASTM D792): 0.70.
 - .2 Water absorption (ASTM D570): 0.3.
 - .3 Impact strength (ASTM 256): 0.53.
 - .4 Tensile strength (ASTM D638): 3,000 psi.
 - .5 Finish and colours as indicated.

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- .11 Adhesives, paints, sealants and solvents for acrylic, polycarbonate, and expanded PVC sheet: type recommended by sheet manufacturer for applicable condition.
- .12 Vinyl sheet: Types, thicknesses, and colours, as indicated on drawings and having the following minimum characteristics:
 - .1 Film: Cast vinyl.
 - .2 Tensile strength: Minimum 0.9 kg/cm at 23 deg. C.
 - .3 Applied shrinkage: Maximum 0.3 mm.
 - .4 Exposure temperature: -40 deg. C to 107 deg. C.
- .13 Vinyl adhesive: Synthetic elastomer based sprayable adhesive as recommended by vinyl and foil manufacturer.
- .14 Decals: silk screened or digital printed images, film thickness as indicated, with self-stick adhesive backing. Protect image with laminated film overlay of same material as decal base; clear matte finish, as required.
- .15 Laminated film overlay shall be a colourless transparent, enhanced UV screening film in a range of matt finishes offering resistance to sunlight degradation, atmospheric pollutants, graffiti and chemical resistance, impermeable to greases and oils allowing ease of cleaning.
- .16 Aluminum finish: (Sign box and supports) Epoxy polyester or powder coating with light texture.
- .17 Wiring: as specified and in compliance with applicable standards.
- .18 LED sign component: as required to suit.
- .19 Metal Posts: Metal sign posts for parking lot signs shall consist of either:
 - .1 A single galvanized 50 KSI maximum steel U-channel of sufficient length to ensure a safety clearance of 2.13 metres from grade to bottom of signs, including associated hardware and 2.75" ID, unsplit yellow HDPEUV stabilized post marker tubes.
 - .2 Two pieces of galvanized 50 KSI maximum steel U-channel post consisting of a lower 1.5 metre 50 KSI maximum steel U-channel and an upper post of sufficient length to ensure a safety clearance of 2.13 metres from grade to bottom of signs, including associated hardware and 2.75" ID, unsplit yellow HDPEUV stabilized post marker tubes as detailed on the contract drawings.

- .3 A single galvanized steel round or square post of sufficient length to ensure a safety clearance of 2.13 metres from grade to bottom of signs, including associated hardware.
- .20 High bond, 2 sided tape: Minimum 1.0 mm white closed cell acrylic foam carrier, double sided, pressure sensitive adhesive, tape type to suit substrates being adhered to and having the following minimum characteristics:
 - .1 Adhesive: Multi-Purpose Acrylic.
 - .2 Density: 720 kg/m³.
 - .3 Peel adhesion: 350 N/100 mm.
 - .4 Normal tensile: 585 kPa.
 - .5 Dynamic shear: 480 kPa.
- .21 Silicone adhesive: ASTM C920, RTV clear silicone adhesive or approved alternative.
- .22 Screws, bolts and other fasteners: Low profile stainless steel type 316 in accordance with ASTM F738M. Provide lock washers where vibration may occur.
- .23 Drilled inserts: Heavy-duty, stainless steel, sizes to suit intended end use and having the following minimum characteristics:
 - .1 Anchor type: Mechanical.
 - .2 Working principle: Torque controlled expansion.
 - .3 Type of fixing: Through-fastening.
 - .4 Thickness fastening range: 1 mm to 20 mm.
 - .5 Required tightening torque: Approximately 59 ft-lbf.

2.2 FABRICATION

- .1 Fabricate Work in accordance with reviewed shop drawings and manufacturer's written instructions utilizing material types, accessories and methods described.
- .2 Text fonts to conform to Metrolinx Static Signage Catalogue.
- .3 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with true and well defined corners. Sharp edges to be removed.
- .4 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply frame sealant at joints for weatherproof seams.

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- .5 Fabricate Work free from defects impairing function, appearance, strength and durability.
- .6 Fabricate stiffeners and framing members used to impart the necessary flatness or uniform curvature to face sheet of the assemblies shall have sufficient rigidity to impart the necessary final flatness and structural strength to the assembly.
- .7 Ensure all extrusions are properly capped and finished at sign ends and other locations where raw extrusion would otherwise be visible in finished work. Fabricate extrusions with true and well defined corners. Sharp edges to be removed.
- .8 Allow for thermal movement without distortion of components.
- .9 Conceal anchors, reinforcement and attachments from view, as specified.
- .10 Provide continuous gasket along edges of sign enclosures.
- .11 Fabricate anchors, hangers, suspension and support for signage as per approved drawings. Provide temporary spacers where required for maintaining correct placement. Signage supports to be smooth metal members.
- .12 Clean and dress metal components free of burrs, tool and mould marks prior to finishing.
- .13 Install wireway strips, mounting channels, wiring, lighting fixtures and lamps, lighting troughs, and coved lighting troughs to details shown on reviewed shop drawings.
- .14 Cut away the sides of the wireway strip where required. Fit a cover plate over the cut away position of the wireway strip.
- .15 Place CSA labels in a neat alignment with manufacture's labels on side of sign box.

2.3 WELDING

- .1 Perform steel welding by electric arc process and aluminum welding by Tungsten or Tigwelding process.
- .2 Execute welding to avoid damage or distortion to Work. Execute welding in accordance with following standards:
 - .1 CSA W48.1-M, for Electrodes. If rods are used, only coated rods are allowed.
 - .2 CSA W59-M, for design of connections and workmanship.
 - .3 CSA W59.2-M, for design of connections and workmanship.

.4 CAN/CSA W117.2-M - for safety.

.3 Thoroughly clean welded joints and expose metal for a sufficient distance to perform welding operations. Provide continuous welds ground smooth and polished to match finish.

.4 Test welds for conformance and remove Work not meeting specified standards and replace to Consultant's acceptance.

2.4 APPLICATION OF VINYL GRAPHIC

.1 Prepare surfaces to receive vinyl graphics in accordance with manufacturer's written instructions.

.2 Electronically cut and produce vinyl graphics in accordance with manufacturer's written instructions and Contract Documents.

.3 Apply vinyl graphics to substrates in accordance with the Contract Documents and manufacturer's written instructions.

.4 Shop apply vinyl graphics to signs where practical. Apply screening inks to vinyl in accordance with manufacturer's written instructions.

.5 Apply vinyl graphics to painted concrete and masonry surfaces in correct location, level, square, at proper elevations in locations shown.

.6 Ensure vinyl is applied free of wrinkles, twists, and any other imperfections to the satisfaction of the Consultant.

.7 Remove registry marks and mark-up lines used to align graphics without marring or damaging the graphics or paint coating.

.8 Seal edges of vinyl at painted concrete and masonry surfaces with specified edge sealer in accordance with the manufacturer's written instructions.

2.5 FINISHES

.1 Prepare substrates to be finished free of scratches, gouges, crazing, foreign matter and other imperfections.

- .2 Prepare surfaces to be finished free of wax, oil, grease and other contaminants. Fill surface defects with patching compound acceptable to finish manufacturer and sand smooth. Tack wipe to remove dust and sanding residue.
- .3 Shop apply primer and topcoat in strict accordance with manufacturer's instructions.
- .4 Finish sign exteriors in colours indicated. Sign interiors including fasteners, reinforcements, etc., to be white

3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

3.2 INSTALLATION

- .1 All frames, foundations, posts, must be engineered and stamped for structural integrity.
- .2 Install signage in accordance with the reviewed shop drawings, Metrolinx Standards, approved clearances (e.g. to buried and overhead utilities) and manufacturer's written instructions in locations indicated. Contractor shall be responsible for repair or replacement of any damaged utilities.
- .3 Install signage in accordance to plan and in a manner and time frame as to cause the least disruption to customer flow, access and/or services.
- .4 Install parking lot and traffic control signage in accordance with reviewed shop drawings, Metrolinx Design Requirements Manual and other Authorities having Jurisdiction.
- .5 All sign installations shall be in conformance with the most recent version of the "Manual of Uniform Traffic Control Devices" & "Ontario Traffic Manuals", as published for the Ministry of Transportation in the Province of Ontario or as better specified herein and on the contract drawings.
- .6 All existing signs in conflict with the proposed work of this contract shall be removed under this item and salvaged for re-use where possible. Any signs damaged during the work shall be replaced where required at the Contractor's expense. All sign posts and mounting hardware from removals shall be salvaged for re-use where possible.

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- .7 Coordinate with the Consultant, General Contractor, and GO representative, installation and connections of security work and electrical connections with signage work prior to commencement of the work.
- .8 Install Work securely, in correct location, level, square, plumb, at proper elevations and correct orientation, free of warp or twist. All fastenings to be concealed or have colour matched heads.
- .9 Stainless steel banding and related mounting brackets are to be used to mount signs onto light standards and/or canopy supports on rail/bus platforms and within parking lot areas, wherever possible.
- .10 Galvanized steel U-cannel posts are typically used to display signs within the parking lot interior areas, access lanes, walkways or station apron areas. For the installation of these sign posts, the Contractor is to perform the following:
 - .1 Core drill a minimum 75mm diameter hole deep enough to clear the thickness of asphalt or concrete at each post location identified on the contract drawings, where applied.
 - .2 Drive post into underlying base to a depth determined by the type of post used, being careful not to damage top of flange post. Ensure post alignment is correct to properly display sign heads.
 - .3 A type I installation of U-channel post where a single post is used, shall be driven into the ground to the greater of the manufacturer's recommended specification or a depth of 600 mm. Select post length to accommodate minimum safety clearances from grade to bottom of sign.
 - .4 A type II installation of U-channel post where two piece posts are used, the lower post shall be driven into the ground to the greater of the manufacturer's recommended specification or a depth of 900 mm. Select upper post length to accommodate minimum safety clearances from grade to bottom of sign. (Refer to Metrolinx Design Requirements Manual).
 - .5 Sign Post marker tubes are used with U-channel and Square sign mounting posts. These post markers are un-split, highly visible yellow HDPE UV stabilized plastic. Design dimensions are 70mm (2.75") i.d. by 2130mm (84") long with a 2mm (.080") wall thickness. The tubes may be cut to the required length and slid over the post immediately after installation. Where core drilling has been required, the tubes shall fit into the bore hole ensuring a clean finished look.

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- .6 The minimum height requirements for the sign post for any configuration is 2130 mm from the ground to the bottom of the sign.
- .7 Fill each hole flush to adjacent surface with minimum 25 MPa air-entrained concrete in walkway and station apron areas.
- .8 Fill each hole flush to adjacent surface with compacted hot or cold mix asphalt in the parking lot interior areas.
- .11 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .12 Perform electrical work in accordance with CSA C22.1 and the Ontario Hydro Electrical Safety Code.
- .13 Mechanical attachment:
 - .1 Mechanical fasteners on exterior to be non-staining, non-ferrous, invisible type.
 - .2 To concrete or solid masonry use lag screws and expansion bolts or screws and fibre plugs, as appropriate for stresses involved.
 - .3 To hollow masonry use toggle bolts or equivalent.
 - .4 To steel use bolts with nut and lock washers, self-tapping screws, welding, as appropriate for stresses and metal thicknesses.
 - .5 Stainless steel pin type, mounted to substrate in accordance with reviewed shop drawings.
 - .6 Fabricate special fasteners as required for installation conditions.
 - .7 Mechanical fasteners and methods of attachment subject to Consultant's approval. Obtain Consultant's approval before fixing to structural steel, concrete or precast concrete.
 - .8 Install individual letters adhered to substrate with silicone adhesive.
 - .9 Install signs on doors with a minimum of fasteners per sign.
 - .10 Attachment locations to be at the underside or sides of beams whenever possible.

- .11 Attachment to the underside of a roof deck should be carefully considered under the guidance of the architect / engineer who will ensure the integrity of the roof assembly.
- .14 Completed sign work shall be free from distortion or defects detrimental to appearance or performance.

3.3 **FIELD QUALITY CONTROL**

- .1 Test completed signs to the satisfaction of the Consultant and provide signs with a CSA label or an Ontario Power Generation special inspection label affixed to the sign frame.

3.4 **CLEANING**

- .1 Touch up any damaged finishes with appropriate materials. Leave signs clean.
- .2 Remove all packaging and debris from the site and interior of sign boxes. Remove any soil accumulated during the work.

END OF SECTION