TS 807
FOOTINGS AND BAYS

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1.0 Scope

This specification covers the requirements for the installation of footings and reinforced sidewalk bays required for mounting of electrical equipment.

The requirements of TS 1.00 and TS 801 shall apply to this work.

2.0 References

Toronto Transportation:

TS 1.00	Maintenance of Traffic
TS 2.10	General Excavation
TS 5.00	Sodding
TS 5.10	Topsoil
TS 13.00	Non-Structural Concrete
TS 13.10	Unshrinkable Fill
TS 801	Electrical Work
TS 803	Ducts
TS 815	Removals

Ontario Provincial Standard Specifications:

TS 904 Concrete Structures
TS 905 Steel Reinforcement for Concrete
TS 904 Concrete Structures - Table 1
TS 919 Formwork and Falsework
TS 1010 Aggregates - Granular A,B,M
TS 1308 Joint Filler

American Standard for Testing and Materials:

ASTM A53/A53M-02 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A193/A193M-03 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

ASTM A325M-03 - Standard Specification for Structural Bolts, Steel Heat Treated 830 MPa Minimum Tensile Strength (Metric)

American National Standards Institute/Society for Automotive Engineers:

SAE J403h - November 2001 - Chemical Composition of SAE Carbon Steel

Canadian Standards Association:

CAN/CSA G164-M92 (R2003) - Hot Dip Galvanizing of Irregularly Shaped Articles
CSA W59-03 - Welded Steel Construction (Metal Arc Welding)
G40.20-04/G40.21-04- General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel

3.0 Construction & Materials

Imperial equivalent sizes of nuts, bolts and washers will be acceptable.

3.1 Concrete Footings in Earth

The work for concrete footings in earth regardless of types or sizes, shall include earth excavation, sleeves and ducts, anchor assemblies, reinforcing steel, concrete, granular backfill, grading, removals and restoration, and site trimming.

3.1.1 Earth Excavation

Where footings are to be installed in asphalt boulevards, the dry cutting of the asphalt shall include all applicable measures and procedures as per the City of Toronto Measures and Procedures for Roadwork with Asphalt Containing Asbestos Fibres.

Unless otherwise approved, earth excavation for footings shall be carried out by the use of a vacuum excavator.

Where unsuitable materials are encountered in the excavation, they shall be removed and disposed of according to TS 204.

3.1.2 Sleeves and Ducts

Ducts and fittings shall be CSA approved.

Sleeves for footings shall be accurately located to suit incoming ducts or cable systems and shall be securely tied to steel reinforcement prior to placing concrete.

All sleeves or ducts shall be cut off cleanly above the footing at the height indicated in the contract.

Sleeves and ducts shall be temporarily plugged or sealed until wiring is installed. Where ducts or sleeves are 'spare' or intended for future use, the ducts or sleeves shall be plugged with plastic plugs at both ends.

The location of sleeves or ducts shall be marked on the top of the concrete footing with a 50mm x 50mm cut or formed cross.

3.1.3 Anchor Assemblies

Anchor assemblies, anchor assembly bolts shall conform to grade SAE 1020 steel as detailed in ANSI/SAE J403h. Galvanized steel anchor bolts shall be of the high strength type 1 conforming to ASTM A325M-03. Galvanized steel nuts and flat washers shall conform to ASTM A325M-03.

Complete anchor assemblies shall be hot dip galvanized conforming to CAN/CSA G164-M92 (R2003).

Anchor assemblies of the size and type indicated in the contract shall be accurately positioned in the footings. Anchor bolts are to be greased prior to the concrete pour.

For alignment of the bolts refer to the layout drawings. Anchor assemblies shall be securely tied to reinforcing steel and be provided with a wood template to maintain the position of the bolts during placing of concrete. Anchor bolts are to be fully threaded into the ferrules and the wood templates shall remain in place until poles are to be installed.

No portion of the anchor assembly shall be cut or removed before concrete pour.

Unless otherwise specified, Wedge Type Expansion Anchors are to be installed to secure the controller cabinet to the concrete footing for the controller cabinet. The Wedge Type Expansion Anchors are to be 13 mm (1/2 inch) diameter x 108 mm (4 ¼ inches) long hot dipped galvanized units Red Head Trubolt Carbon Steel Wedge anchors or approved equivalent.

3.1.4 Reinforcing Steel

Reinforcing steel shall be installed, as indicated in the contract, conforming to TS 905.

3.1.5 Concrete

Concrete shall be 30 MPa class. Concrete shall be placed, cured, protected and finished conforming to TS 13.00 or TS 904 and shall be poured as one monolithic slab and vibrated. Wood template is to be temporarily removed to finish the top of the concrete. Wood template to be in place for curing period. Top of concrete is to be marked where the ducts enter footings.

In earth, concrete shall be placed directly against the undisturbed materials or shall be formed in place providing that a minimum 300mm width is available for placing backfill.

When concrete is placed immediately adjacent to other concrete structures or pavement, 5mm thick expansion joint filler of premoulded bituminous fibre type shall be installed around the abutting edge of the footing.

Expansion joint filler shall be type A or B conforming to TS 1308.

The concrete finish for footings installed in concrete barrier wall shall match the barrier wall finish.

3.1.6 Unshrinkable Fill

Unshrinkable fill conforming to TS 13.10 shall be placed around footings.

3.1.7 Grading

The Contractor shall excavate and place fill materials to finished grade elevation conforming to TS 204 and TTD 807.025.

3.1.8 Removals and Restoration

Removals and restoration work shall conform to TS 815.

3.2 Reinforced Sidewalk Bays

The work for reinforced sidewalk bays regardless of type or size, shall include granular bases, concrete, sleeves and ducts, and the work described in sub-section 3.1 for reinforcing steel, grading, removal and restoration, and site trimming.

3.2.1 Granular Bases

Granular bases shall be installed as foundations for reinforced sidewalk bays. Granular material type A or B shall be placed in conjunction with the installation of ducts under the reinforced sidewalk bays. Granular bases shall be compacted conforming to TS 1010.

3.2.2 Concrete

Concrete shall be 30 MPa class. Concrete shall be placed, cured, protected and finished conforming to TS 13.00 or TS 904 and shall be poured as one monolithic slab and vibrated.

When concrete is placed immediately adjacent to other concrete structures or pavement, expansion filler shall be installed around the abutting edge of the reinforced sidewalk bays.

Expansion joint filler shall be type A or B conforming to TS 1308.

Formwork shall be removed prior to placing granular backfill. Where openings in reinforced sidewalk bays are required, the Contractor shall ensure that concrete is not poured around ducts entering the opening.

3.2.3 Sleeves and Ducts

Ducts and fittings shall be CSA approved.

Sleeves in reinforced sidewalk bays shall be located such that cables may be installed vertically to the cable terminations in the sidewalk bay equipment. Ducts shall be installed below sidewalk bays conforming to TS 803 and shall be suitably aligned for connection to exterior duct or cable systems.

4.0 Quality Assurance

The Engineer may perform all tests required for concrete conforming to TS 13.00. The Engineer may perform all tests required for compaction conforming to TS 1010.

5.0 Measurement for Payment

5.1 Actual Measurement

5.1.1 Concrete Footings in Earth Reinforced Sidewalk Bays

The unit of measurement is each.

5.2 Plan Quantity Measurement

5.2.1 Concrete Footings in Earth Reinforced Sidewalk Bays

Measurement is by Plan Quantity, as may be revised by Adjustment Plan Quantity. The unit of measurement is each.

6.0 Basis of Payment

6.1 Concrete Footings in Earth Reinforced Sidewalk Bays

Payment at the contract price for the above tender item(s) shall be full compensation for all labour, equipment and materials required to do the work.