

Construction Specification for Utility Adjustments

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TS 4.50.01 SCOPE

This specification covers the requirements for the adjustment of all the utilities frames and covers, including catch basins, maintenance holes, valve boxes and valve chambers.

TS 4.50.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

TS 3.40	Construction Specification for Concrete Road Base
TS 501	Amendment to OPSS.MUNI 501 – Construction Specification for Compacting
TS 1010	Amendment to OPSS.MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material
TS 1350	Amendment to OPSS.MUNI 1350 – Material Specification for Concrete – Materials and Production

Ontario Provincial Standard Specifications

OPSS 180	General Specification for the Management of Excess Material
OPSS 919	Construction Specification for Framework and Falsework
OPSS.MUNI 1004	Material Specification for Aggregates – Miscellaneous
OPSS 1351	Material Specification for Precast Reinforced Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers
OPSS 1850	Material Specification for Frames, Grates, Covers and Gratings

Canadian Standards Association

A82-06 (R2011)	Fired Masonry Brick Made from Clay or Shale
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TS 4.50.03 DEFINITIONS – Not Used

TS 4.50.04 DESIGN AND SUBMISSION REQUIREMENTS

Any required submissions shall be in writing. All submissions shall be submitted to the Contract Administrator at least three weeks prior to the beginning of the work.

The requirements for design and submission requirements shall be according to TS 1350.

TS 4.50.05 MATERIALS

TS 4.50.05.01 Granular Material

All granular material shall be Granular A and shall be according to TS 1010.

TS 4.50.05.02 Concrete

Concrete shall be according to TS 3.40 for concrete road base.

TS 4.50.05.03 Precast Adjustment Units

Adjustment units for maintenance holes, valve chambers and catch basins shall be according to OPSS 1351.

Approved precast adjustment unit tape shall be used between the units. The tape shall be stored in a dry location where the temperature does not exceed 25°C or falls below 10°C. Any such tape that experiences temperatures outside the above range shall not be used.

TS 4.50.05.04 Adjustment Bricks

Bricks shall be of hard, dense, thoroughly burnt clay and shall be according to CSA A82 (Type S). They shall be of compact texture, free from injurious cracks or checks and shall be free from stones, pebbles and organic impurities. The sides, ends, and faces shall be plane surfaced, at right angles and parallel to each other.

Bricks shall not be less than 57 x 95 x 203 mm nor more than 76 x 102 x 216 mm. Minimum compressive strength shall be 20 MPa and absorption shall not exceed 15 per cent according to CSA A82.

Concrete bricks shall not be used.

TS 4.50.05.05 Cement Mortar

Cement mortar shall consist of three parts sand and one part Portland cement meeting the requirements of OPSS 1004 for mortar sand, except that the gradation shall be as follows:

Table 1: Cement mortar gradation

Sieve number	Per cent passing
2.36 mm	100
300 µm	15–40
150 µm	0–10
75 µm	0–5

TS 4.50.05.06 New Frame and Covers

All new frame and covers shall meet the requirements of OPSS 1850.

TS 4.50.06 EQUIPMENT

Forms shall be of steel, wood or metal plate and shall meet the requirements of OPSS 919. They shall be of sufficient cross section and strength, and secured so as to resist the pressure of the concrete when placed, and the impact and vibration of any construction equipment they support without springing or settlement.

Forms shall be cleaned and coated with form oil before each use.

TS 4.50.07 CONSTRUCTION

TS 4.50.07.01 General

The Contractor shall adjust all water boxes, raise or lower frame and covers of all maintenance access units and other related castings, gratings and appurtenances within the area of work, to the required grade, providing for the transverse and longitudinal slope of the finished surface. The tolerance from the plane of the finished pavement shall not exceed ± 3 mm when tested with a 3 m straightedge. Where steps exist, the top shall be a maximum of 450 mm below the finished grade.

The adjustment of all appurtenances belonging to utility companies shall not be performed by the Contractor. The Contract Administrator shall arrange for work orders and contact names and phone numbers for the respective utility companies. The Contractor shall be responsible for organizing and coordinating this work with the respective utility company. The Contractor shall assist by excavating to the edge of the appurtenances and indicating the required grade of the new road for adjustment.

Frame and covers requiring replacement will generally be worn smooth, cracked or have covers sitting below frame rims.

The Contractor shall remove all frames that require adjusting, being careful not to damage that part of the structure that is to remain.

For maintenance holes, valve chambers and catch basins, if the total depth of bricks or adjustment is 300 mm or less, brick and mortar or precast concrete adjustment units shall be used. If the frame is to be raised more than 300 mm, poured concrete shall be used with one or two courses of brick or precast concrete adjustment units immediately below the frame.

Where adjustment requires the lowering of the frame, the contractor shall break out the concrete or masonry to the required level and seat the frame on a 12 mm mortar levelling pad.

For all adjustments, the remaining concrete, masonry and mortar shall be sound and solid, with no loose or separated joints or cracks.

All sewer maintenance holes and catch basins, utility chambers, valve chambers and valve boxes within the contract limits, whether they were adjusted or not, shall be thoroughly cleaned of debris prior to the completion of the contract, regardless of the source of the debris. The debris shall be disposed of off the site at the Contractor's expense, according to OPSS 180. The cleaning of any other utility chambers made necessary due to the Contractor's operations shall be done by the owner of the utility at the Contractor's expense.

All sewer maintenance holes are to be cleaned without any disruption to the normal flows. Under no circumstances shall the Contractor divert, block or interrupt the flow in the storm or sanitary sewers, by pumping or any other action. If the debris is such that it constitutes any impedance or blockage to normal flows or cannot be removed without diverting the flow by pumping or further interference with normal flows, the Contractor shall immediately advise the Contract Administrator who will seek assistance of the department with the responsibility for maintenance and operation of the sewer and its appurtenances. In the absence or unavailability of the Contract Administrator, the Contractor may directly contact the emergency section of the appropriate department for assistance. In either case, the Contractor shall provide whatever equipment and assistance necessary to facilitate actions by the operating department to overcome the difficulties, including providing and clearing a separate, clearly defined work area for the forces of the operating department.

TS 4.50.07.02 Precast Concrete Adjustment Units

The use of precast modular concrete units for the adjustment of catch basins, maintenance holes, and valve chambers shall be permitted provided the following conditions are met:

- a) All existing bricks are removed.
- b) The walls are in sound condition or have been properly repaired using concrete material.
- c) The precast concrete units are fully and uniformly supported on the top of the walls of the catch basin, maintenance hole or valve chamber.
- d) The precast modular concrete units shall be reinforced and be parallel faced.
- e) No cracked, broken or chipped units will be accepted.
- f) The total depth of adjustment does not exceed 300 mm

Where adjustment to the chamber tops of water valves or maintenance holes, is necessary, or if the chamber is constructed entirely of brick, only hard red clay sewer bricks shall be used for any necessary adjustment of the chamber top.

TS 4.50.07.02.01 *Installation Procedure*

The foundation on which the adjustment units are to be placed must be sound and solid, with no loose or separated joints or cracks.

The installation of the adjustment units shall be as follows:

- 1) A 10 to 15 mm layer of mortar shall be placed to level the top of the valve chamber, maintenance hole or catch basin. The adjustment units shall sit level. Adjustments for grade and slope are to be made on the final layer of mortar.
- 2) The first unit shall be set upside down (feet/key up) on the levelling layer of mortar.
- 3) For stepped maintenance holes, the Contractor shall place step units in proper sequence to provide the correct distance between steps, and be sure to set the first unit in the correct orientation so that the steps line up vertically.
- 4) The Contractor shall place a continuous strip of precast adjustment unit tape sealer on the upper surface, pressing down firmly. The sealer shall be placed along the centre of the precast adjustment unit section. The surface shall be clean and dry for the precast adjustment unit tape to adhere. The Contractor shall remove the paper backing from the precast adjustment unit tape.
- 5) The Contractor shall place the second and subsequent units with the keys in the proper direction to interlock. Precast adjustment unit tape shall be placed on each and every unit to provide a seal.
- 6) A 3 to 15 mm layer of mortar shall be placed on the top of the final unit. The mortar shall be shaped to provide the necessary grade and slope for the frame.
- 7) Under no circumstances shall pebbles or broken pieces of masonry, brick or concrete be used to set frames to grade, crossfall and slope. Any adjustments completed using such material will be rejected and the units will be removed and replaced at the Contractor's expense.

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- 8) For catchbasins, lateral adjustments may be made by shifting – corbelling – the adjustment units to conform to the curb adjustment. The slope shall be limited to 100 mm horizontal to 300 mm vertical. The resulting opening shall not be less than 375 mm measured at right angles to the curb.

TS 4.50.07.02.02 *Adjustment Bricks*

The installation of the adjustment bricks for the precast units shall be as specified in the Contract Documents, except for the following:

- a) No precast adjustment unit tape is required.
- b) No lateral adjustment or corbelling is permitted.
- c) All bricks shall be completely covered, on the sides adjacent to the structure, frame or other bricks, with a uniform layer of cement mortar having a thickness of 5 mm. The inside face of the innermost bricks shall be fully parged with cement mortar.

TS 4.50.07.03 **Concrete Extensions**

Formwork shall be used on all sides of the extension. The top of the concrete on the existing structure shall be thoroughly cleaned and roughened to ensure a satisfactory bond. For catch basins, lateral adjustments may be made by sloping the concrete extension to conform to the curb alignment. The slope shall be limited to 100 mm horizontal to 300 mm vertical, and the resulting opening shall not be less than 375 measured at right angles to the curb.

TS 4.50.08 **QUALITY ASSURANCE**

Quality assurance for the concrete and mortar shall be according to TS 1350.

The grade, cross-fall and slope of the adjustment shall be within the specified surface tolerance of the adjacent material.

The Contract Administrator shall inspect all adjustments prior to the placement of the frame and cover. If the Contractor has been found to be using pebbles, broken pieces of masonry, brick, concrete or any other non approved methods of adjusting the utility, all adjustments to date shall be deemed to have been done in a similar fashion and therefore all adjustments shall be rejected.

Adjustments that do not meet the requirements of this specification will be rejected and shall be made good by the Contractor at no extra cost to the City.

All rejected adjustments shall be completely removed to the full depth of the original adjustment, except those that have been rejected solely on the requirements surface tolerance. Adjustments rejected, based solely on surface tolerance, shall be removed only as deep as necessary to correct the situation.

If the adjustment was rejected, after the placement of the final lift of asphalt, it shall be made good by the Contractor at no extra cost to the City.

All costs associated with the repair of any and all rejected adjustments shall be borne by the Contractor.

TS 4.50.09 MEASUREMENT FOR PAYMENT**TS 4.50.09.01 Utility Adjustments**

For measurement purposes, a count shall be made of the number of adjustments performed and prorated in accordance with Table 2. Changes in height of 300 mm or less will be paid at the specified rate. For changes in height of more than 300 mm, the rate will be prorated based on a height of 300 mm. Measurements shall be made to the nearest 10 mm increment.

Table 2: Adjustment distance and rate

Utility	Rate
Standard frames and covers whose width or diameter of the frame is between 500 mm and 1000 mm	1
Small frames and covers whose width or diameter of the frame is less than 500 mm	$\frac{1}{3}$
Large frames and covers whose width or diameter of the frame is larger than 1000 mm	2

TS 4.50.09.02 Concrete Extension

Measurement for the above item shall be by height of extension, including up to two courses of bricks and mortar or adjustment units in metres (m) and will be paid at the specified rate according to Table 2. Measurements shall be made to the nearest 10 mm increment.

TS 4.50.09.03 New Frame and Covers

For measurement purposes, a count shall be made of the number of new frame and covers installed.

TS 4.50.10 BASIS OF PAYMENT**TS 4.50.10.01 Utility Adjustments – Item**

Payment at the Contract Price shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include, the removal and disposal of loose brick and material, the supplying and placing of brick or precast adjustment units, supply and installation of any necessary steps adjusting the appurtenance to final grade, the coordination of utility owners with the contract staging and the cleaning of all utility chambers, maintenance holes, valve boxes and catch basins within the contract limits.

No additional payment shall be made for any interim adjustments to raise or lower the appurtenance, in order to perform the work as specified.

Adjustment of any valves, utility frame and covers within the sidewalk area shall be considered part to the Contract Price. No separate payment shall be made.

TS 4.50.10.02 Concrete Extension – Item

Payment at the Contract Price shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include, the removal and disposal of debris, existing bricks and adjustment units, the construction of concrete extensions, supply and installation of any necessary steps adjusting the appurtenance to final grade, the supply and installation of one or two courses of brick and mortar or adjustment units, the coordination of utility owners with the contract staging and the cleaning of all utility chambers, maintenance holes, valve boxes and catch basins within the contract limits.

No additional payment shall be made for any interim adjustments to raise or lower the appurtenance, in order to perform the work.

Adjustment of any valves, utility frame and covers within the sidewalk areas shall be considered part of the Contract Price. No separate payment shall be made.

TS 4.50.10.03 New Frame and Covers – Item

Payment at the Contract Price shall be full compensation for all labour, Equipment and Material to do the work and shall include all adjustments required. No separate payment shall be made for utility adjustments when new frame and covers are installed.