

**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.MUNI 510	Construction Specification for Removal
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

Large Frame Utility Adjustments means adjustments to frame and covers that are not owned by the City and are in excess of 1000 mm any dimension.

Metro Frame and Cover means the large former Metro frame and covers including OPSD 402.030 for the large meter and valve chambers.

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
Precast Risers**

Adjustment units and risers 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 high early strength Portland cement (HE) 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 only be performed by Contractors approved by the appropriate utility company. The Contractor shall be responsible to contact the appropriate utility companies to seek approval for their subcontractors and to organize the work and make arrangements for any new components that may be required. The material supplied by the utility company shall be at no cost to the Contractor, but they may be required to pick up new components from the utility company's yard.

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 precast or poured in place maintenance holes, valve chambers and catch basins, adjustment units shall consist of brick and mortar or precast concrete adjustment units. The total depth of existing and new adjustment units shall not exceed 300 mm. Where the total depth exceeds 300 mm, the Contractor shall remove all adjustment units down to the top of the sound structure and install precast concrete or poured in place concrete risers. The top of the riser shall allow for 50 mm to 100 mm depth of adjustment units to be installed between the riser and the underside of the frame.

For maintenance holes, valve chambers and catch basins that are constructed of brick, the Contractor shall remove all loose and broken bricks and reinstate the brick structure using brick and mortar. Precast concrete adjustment units may only be used if directed by the Contract Administrator.

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:

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- 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.
 - 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 Risers*

For poured in place risers, 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 precast risers, the top of the concrete on the existing structure shall be thoroughly cleaned and smoothed to allow the proper installation of butyl tape.

For catch basins, lateral adjustments may be made by sloping the concrete riser 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.

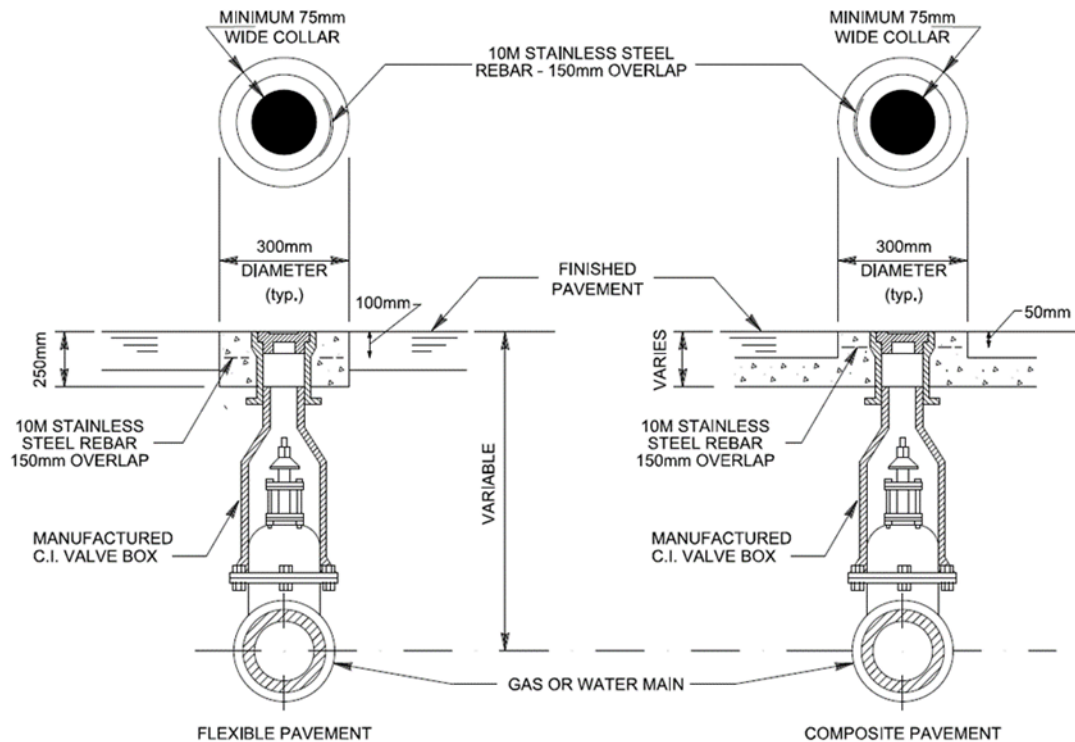
TS 4.50.07.04 Concrete Collars

Valve frame and covers, within the roadway, whose width or diameter of the frame is less than 200 mm shall require the installation of a concrete collar to stabilize the adjustment. Enbridge Gas frame and covers are exempt from the requirement for concrete collars. All collars shall be constructed of concrete meeting the specifications of TS 1350 for road base, except that 37.5 mm aggregate is not permitted. All collars shall be formed using 300 mm diameter sonotube. 10M stainless steel rebar bent into a circular shape, with a minimum overlap of 150 mm. The diameter of the rebar circle shall be so that the cover is equal on both sides—that is 150 mm cover shall have rebar of diameter 225 mm. The rebar shall be placed with a minimum of 50 mm cover, but no greater than 65 mm, from the top of the collar. All pieces of rebar shall be wired together prior to the concrete placement.

The finished surface shall be flush with the frame and cover and the surrounding asphalt surface. The frame and cover and concrete collar shall be fully protected during the Work, especially when milling and paving base course asphalt.

In flexible pavement, the concrete collar shall be a minimum 250 mm thick regardless of the depth of asphalt and placed on compacted granular material. In composite pavement, the collar shall be poured monolithic with the concrete base. If the composite pavement is not to be replaced, the Contractor shall remove a minimum 350 mm square section of concrete road based centred on the valve frame in order to facilitate the installation of the collar.

SMALL FRAME ADJUSTMENT COLLARS



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 is rejected, after the placement of the final lift of asphalt, it shall be corrected 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
Large Frame Utility Adjustments

For measurement purposes, a count shall be made of the number of adjustments performed. The height of the adjustment shall be measured from the top of the concrete structure or remaining adjustment units to the bottom of the frame and cover. Adjustment heights 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, including any necessary concrete risers. Measurements will be made to the nearest 10 mm increment.

All utility adjustments, except for Large Frame Utility Adjustments shall be prorated in accordance with Table 2. Large Frame Utility Adjustments shall be paid at a rate of one each.

Table 2: Adjustment distance and rate

Utility	Rate
Standard frame and covers whose width or diameter of the frame is between 500 mm and 1000 mm	1
Small frame and covers whose width or diameter of the frame is less than 500 mm without concrete collars	1/3
Small frame and covers whose width or diameter of the frame is less than 500 mm with concrete collars	1/2
Metro Frame and Covers	3

TS 4.50.09.02 New Frame and Covers
New Metro Frame and Covers

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

New utility frame and covers supplied by the utility companies shall be considered incidental to the adjustments. No separate measurement shall be made.

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 other debris, the supplying and placing of brick or precast adjustment units, supply and installation of concrete risers, supply and installation of any necessary steps, 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 Large Frame 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 other debris, the supplying and placing of brick or precast adjustment units, supply and installation of concrete risers, supply and installation of any necessary steps, the coordination of utility owners with the contract staging, picking up and delivering to the site any new frame and covers, completing work by approved contractors 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.

New utility frame and covers supplied by the utility companies shall be considered incidental to the adjustments. No separate payment shall be made.