

S-5 CONCRETE CURB AND GUTTER SYSTEMS

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5.01 SCOPE OF WORK

This specification covers the requirements for the construction of concrete curb and gutter, setbacks, gutter outlets, and bullnoses together with the installation of catchbasin frames and grates that lie within the flow lines of the curb and gutter system.

5.02 REFERENCES

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

- S-4 Granular Base and Aggregates
- S-7 Concrete Pavement and Concrete Base
- S-9 Concrete
- S-14 Sodding
- S-15 Seeding
- S-34 Topsoil
- OPSS 353 and OPSS.MUNI 353
- OPSS.MUNI 1308
- AS 103

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- AS-208 & 208A
- AS-216
- AS-506
- AS-535
- AS-546

5.03 MATERIALS

The Contractor will supply all materials. Materials shall meet the requirements of the following:

5.03.01 CONCRETE

Concrete shall be as per City of Windsor Standard Specification S-9 – Concrete.

5.03.02 JOINT MATERIALS, FORMS AND STEEL REINFORCEMENT

Joint materials, forms, and steel reinforcement shall be as per requirements of OPSS 353 and the following requirements:

The forms shall be of wood, metal, or other suitable material that is straight and free from warp, having sufficient strength to resist the pressure of the concrete without deflection or loss. Division plates shall be metal.

5.03.03 CATCH BASIN FRAMES AND GRATES

Catch basin frames and grates shall be according to OPSS.MUNI 353.

5.03.04 CURING COMPOUND

Curing compound shall be as per City of Windsor Standard Specification S-9 Concrete.

5.04 CONSTRUCTION

Prior to starting the work, documentation shall be submitted, verifying that the Contractor's representative of the placing crew shall be on site and shall have valid Municipal Exterior Flatwork Certification, ACI Flatwork Certification or an approved equivalent.

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5.04.01 GRANULAR BASE

Granular materials for the construction of a base shall be of the type and depth specified in the contract drawings and be according to City of Windsor Standard Specification S-4 Granular Base and Aggregates.

The foundation shall be excavated and filled with suitable material to the required grades and lines. Filled sections shall be compacted and extend a minimum of 0.3 metres (1 foot) outside the form lines.

Compaction shall be according to specified compaction requirements in the contract drawings, City of Windsor Standard Specification S-4 and OPSS.MUNI 353.

5.04.02 FORMWORK

Formwork shall be according to OPSS.MUNI 353 and shall be set true to the lines and grades specified in the contract documents and in direct contact with the granular foundation.

The front and back of the forms shall extend for the full depth of the concrete. All of the forms shall be braced and staked so that they remain in both horizontal and vertical alignment until their removal. They shall be cleaned and coated with an approved form-release agent before concrete is placed against them.

The concrete shall be deposited into the forms without segregation and then it shall be tamped and spaded or mechanically vibrated for through consolidation. Low roll or mountable curbs may be formed without the use of a face form by using a straightedge and template to form the curb face. When used, face forms shall be removed as soon as possible to permit finishing. Front and back forms shall be removed without damage to the concrete after it has set.

5.04.03 JOINTS

5.04.03(a) Contraction Joints

Transverse weakened-planed contraction joints shall be constructed at right angles to the curb line. When concrete curb and gutter is constructed adjacent to concrete pavement, the transverse joint spacing of the curb and gutter shall coincide with that of the concrete pavement. When concrete curb and gutter is constructed adjacent to asphalt pavement, transverse joints shall have a uniform spacing not exceeding 5m.

The width of the contraction joint shall be 3 to 5 mm and a minimum depth of 65 mm.

Contraction joints maybe sawed, hand-formed, or made by 3mm thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness

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into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and while the forms are still in place.

5.04.03(b) Expansion (Isolation) Joints

Expansion joints shall be constructed between the curb and abutting immovable structures, including catchbasin frames, abutting sidewalks, driveways, gutter outlets or any other structures where cracking is likely to occur.

When the curb and gutter system is placed adjacent to the concrete pavement, longitudinal joints, as shown in the contract documents, shall be sawn between a curb and gutter system and concrete pavement. The joint shall be sealed with liquid joint sealer. All the work shall be according to City of Windsor Standard Specification S-9 Concrete and S-7 Concrete Pavement and Concrete Base.

Expansion joint material shall be set in place before concrete placement begins and shall be supported by removable forms. Filler material for isolation joint shall be furnished in a single 12-20mm thick piece for the full depth and width of the joint and meet the requirements of OPSS.MUNI 1308, except that cork expansion fillers will not be accepted.

Joint filler panels shall be set in a vertical position and, if for transverse joints, shall be set normal to the inside edge of the structure.

Panels shall be pre-cut from a single piece to the shape of the cross-section as shown on the standard drawings, but so as to provide a 6mm recess on the exposed surfaces. Cutting and tolerances shall conform to OPSS.MUNI 1308.

All concrete immediately above the filler material shall be carefully removed to form a 6 mm deep, 12 mm wide recess then finishing both edges of each joint to 5 mm radius with a suitable short edging tool.

Expansion joints in a slipformed curb or curb and gutter shall be constructed with an appropriate hand tool by raking or sawing through partially set concrete for the full depth and width of the section. The cut shall be only wide enough to permit a snug fit for the joint filler. After the filler is placed, open areas adjacent to the filler shall be filled with concrete and then trowelled and edged. Alternately, an expansion joint may be installed by removing a short section of freshly extruded curb and gutter immediately, installing temporary holding forms, placing the expansion joint filler, and replacing and reconsolidating the concrete that was removed. Contaminated concrete shall be discarded.

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5.04.03(c) Construction Joints

A 5-mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing the placement of concrete curbs and gutters.

5.04.04 CONCRETE PLACEMENT

Concrete placement shall be according to City of Windsor Standard Specification S-9 and the following requirements:

- a) Concrete shall not be placed until the foundation and the forms or stringline have been inspected and approved by the City Engineer.
- b) The concrete shall be placed and consolidated such that segregation of the aggregate does not occur. The concrete shall be placed and consolidated against all formwork; all entrapped air shall be eliminated.
- c) Concrete shall be placed continuously. Contact with partially set concrete shall be avoided. When placement of concrete is interrupted, it shall be at a vertical form. 5 mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing placement of concrete.
- d) The concrete shall be placed either by an acceptable slipform/extrusion machine, or by formed method, or the combination of these methods. The forms or stringline shall be set true to the lines and grades specified in the Contract Documents and in direct contact with the subgrade or granular course.

The restriction of concrete placement shall be as per City of Windsor Standard Specification S-9 Concrete.

5.04.05 MACHINE PLACEMENT

The slipform/extrusion machine approved shall be so designed as to place, spread, consolidate, screed, and finish the concrete in one complete pass in such a manner that a minimum of hand finishing will be necessary to provide a dense and homogeneous concrete section. The machine shall shape, vibrate, and/or extrude the concrete section being placed. It shall be operated with as nearly a continuous forward movement as possible. All operations of mixing, delivery, and spreading concrete shall be so coordinated as to provide uniform progress, with stopping and starting of the machine held to a minimum.

5.04.06 CONCRETE FINISHING

Concrete finishing shall be according to City of Windsor Standard Specification S-9, OPSS.MUNI 353 and the following requirements:

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- a) The concrete on the upper surfaces shall be finished smooth, if necessary, by means of magnesium or aluminum trowels and then it shall be given a final surface texture using a light broom or burlap drag. The finished surfaces shall be free of open texturing, plucked aggregate and local projections.
- b) Back edges shall be rounded by use of a 5 mm radius edging tool. Neat cement shall not be used as a drier to facilitate finishing. Care shall be taken to avoid over finishing or working more mortar to the surface than is actually required.

5.04.07 CONCRETE CURING AND PROTECTION

The curing and protection of the completed curbs and gutters, including winter protection for concrete, shall be according to City of Windsor Standard Specification S-9 and the following requirements:

- a) The protection of concrete structures until their acceptance onto maintenance by the Corporation shall be the sole responsibility of the Contractor. The presence of footprints or other markings on the completed joint location of the curbs and gutters shall require saw cutting, removal, and replacement of the complete section at the Contractor's expense, unless otherwise directed by the City Engineer.
- b) The deficiency markings on the non-joint locations shall be repaired by the Contractor at the Contractor's expense at the direction of the City Engineer.

5.04.08 CONCRETE TOLERANCES

The exposed surfaces of the finished concrete shall be such that, when tested with a 3 m long straight edge placed anywhere along the surface parallel to the edge of curb face, there shall be no deviation greater than 3 mm between the bottom of the straight edge and the surface of the concrete nor shall there be any deviation from alignment in excess of 3 mm.

5.04.08(a) Temporary Asphalt Box Outs at Precast Catchbasins (Gutter outlet)

In staged construction where the surface asphalt will not be placed at the time of construction, the concrete box outs for standard pre-cast catchbasins shall not be constructed. The Contractor shall be required set catchbasin frames and covers with the base asphalt and construct a temporary asphalt box out with proper drainage grading and a raised curb behind the catchbasin. The length of the asphalt curb shall be included in the measurement of the catchbasin. No other payment will be made for this work. The costs for the work specified under this item shall be included in the tender item for the placement of catchbasin.

5.04.08(b) Temporary Road Drainage at Curb Inlet Catchbasins (setbacks)

Where curb inlet catchbasins are installed as per AS-546 and the surface asphalt course will not be placed until the following year, a temporary “V” groove shall be left in the concrete pan of the curb inlet box out for temporary road drainage purpose or as directed by the City Engineer. The costs for the work specified under this item shall be included in the tender item for the placement of catchbasin.

5.05 BACKFILLING

As soon as the City Engineer permits, the Contractor shall backfill the spaces in front and back of curbs with suitable material to the required elevation. The fill material shall be thoroughly tamped in layers.

Where boulevard restoration is required, it shall be done as described in the following City of Windsor Standard Specifications:

- S-34 for Topsoil
- S-14 for Sodding
- S-15 for Seeding.

5.06 DAMAGE TO ADJACENT BOULEVARDS AND PAVEMENTS

The Contractor will be required to make good, as directed, all damage done to the roadway or pavements while the work is in progress.

The Contractor will be required to remove all rubbish and material from the pavement and boulevards adjoining the curb and gutter system and restore the same to as good and clean condition as they were before commencing the work. Should the Contractor choose to use plastic as their method of protection, when removed from the concrete, all plastic is to be removed and disposed of at the Contractor’s expense. If any of the sod beyond the area of construction is destroyed by the Contractor or his employees, he will be required to replace it, at his expense, with new sod to the approval of the City Engineer.

5.07 TESTING AND QUALITY ASSURANCE

The testing and quality assurance for all concrete poured for curb and gutter system shall conform to the requirements contained in the City of Windsor Standard Specification S-9 for Concrete and the following requirements:

- a) The Contractor shall be responsible for the line and grade of the forms as provided by the City Engineer or will be responsible to match existing conditions when required.

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- b) The Contractor shall be responsible for the concrete work during the curing time and when the forms are removed until the work is accepted by the City Engineer.
- c) In no case shall ponding water over allowable drainage duration or exceed the specified grade at gutter lines be accepted. All areas with pond water or having insufficient/excessive cross fall, including those caused by poor construction and finishing methods, shall be removed and replaced at the Contractor's expense.

5.08 MEASUREMENT FOR PAYMENT

5.08.01 CONCRETE CURBS AND GUTTERS

Measurement will be made in linear meters along the base of the curb or along the flow of the gutter, of the total length of curb and gutter installed whether straight or circular and without separation into types.

5.08.02 SETBACKS AND GUTTER OUTLETS

For measurement purpose, a count will be made of the number of setbacks (curb-inlet catchbasin) and gutter outlets (standard catchbasin) installed without separation into types.

5.08.03 CONCRETE SPILLWAYS

Measurement shall be made in metres along the flow line from the end of the gutter outlet to the spillway termination.

5.08.04 GRANULAR BASE COURSE

Measurement shall be made in tonnes. This item shall be included in the measurement and unit price submitted for the supply and placement of granular materials.

5.08.05 WATER

This item shall be included in the unit price submitted for the placement of the new concrete curb and gutter system since no separate measurement and payment shall be made for this item.

5.08.06 REMOVAL OF OLD CURB AND GUTTER

Measurement shall be made in square meters of the total hard surface area removed as directed by the City Engineer. This item shall be included in the measurement and unit price submitted for the removal of existing road pavement, unless otherwise listed in the contract documents.

5.09 BASIS OF PAYMENT

- Concrete Curbs and Gutters – Item
- Setbacks (Curb in-let Catch Basin) – Item
- Concrete Gutter Outlets (Standard Catch Basin) – Item
- Concrete Spillway – Item

The Contract prices for the various components making up the curb and gutter system will be full compensation for supplying all labour and equipment and completely installing in accordance with this specification, the curb and gutter system as called for in the plans and for supplying all materials.

Excavation required to set the various components to the required line and grade will be considered as part of the work of installing the curb and gutter system; however, should such excavation overlap excavation required for any other work under the contract, then payment shall be made in accordance with the specification for such other work as though no excavation were required for the curb and gutter system construction.

There will be no separate payment item for concrete used for fillets in bullnoses. The costs shall be included under this item unless otherwise specified in the contract documents.

5.09.01 GRANULAR BASE COURSE – INCLUDED IN ITEM FOR GRANULAR MATERIALS

Payment will be made at the contract unit price per tonne for the measured quantities. This item shall be paid under a separate item for the supply and placement of granular materials; therefore the item shall be excluded in the unit price submitted for the construction of curbs and gutter unless otherwise stated in the tender documents.

5.09.02 HOT MIX ASPHALT

Hot mix asphalt used in the construction of curb and gutter system shall be paid for at the Contract price for the appropriate Hot Mix Asphalt tender item.

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6.01 SCOPE OF WORK

This specification covers the requirements for the construction of concrete sidewalk, including commercial and residential driveway approaches.

6.02 REFERENCES

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

- S-9 Concrete
- S-4 Granular Base and Aggregates
- AS-204
- AS-222
- AS-401 to AS-404
- AS-506
- OPSS 351 and OPSS.MUNI 351
- OPSS 501
- OPSS.MUNI 1308

6.03 MATERIALS

The Contractor will supply all materials. Materials shall meet the following requirements:

- a) Concrete shall be as per City of Windsor Standard Specification S-9 for Concrete.
- b) Joint filler material shall be according to OPSS 1308

6.04 CONSTRUCTION

Prior to starting the work, documentation shall be submitted, verifying that the Contractor's representative of the placing crew shall be on site and shall have valid Municipal Exterior Flatwork Certification, ACI Flatwork Certification or an approved equivalent.

6.04.01 Removal of Existing Materials

All existing sidewalks and driveway approaches, as indicated, shall be removed, and the Contractor shall dispose of the material at his own discretion.

The Contractor shall indemnify the owner from all damage caused by him to any private or public services at any time during the construction of the sidewalk or drive and for any other damage caused by any neglect on his part of this or any other condition of this contract.

Any private walks that are cut, damaged, or altered in any way shall be repaired in a manner satisfactory to the City Engineer.

The Contractor shall remove the existing sidewalk in small portions only, sufficient to carry on the day's work and so as to interfere with the business of the street as little as possible.

The Contractor may remove larger sections than stated above upon approval of the City Engineer. The Contractor shall provide accessible access to all affected properties adjacent to where the removals have taken place at the end of each working day before leaving the site, to insure safety to the public.

6.04.02 Location

Where the location and elevation of the sidewalk is not indicated specifically on a plan, a location and elevation shall be established in the field as per the applicable City of Windsor AS drawing and approved by the City Engineer. The cross fall on the boulevard from the sidewalk to the curb shall not be less than 2%, and not be more than 8% or as directed by the Engineer. In all cases, positive drainage of the boulevard shall be maintained.

When sidewalks are to be constructed or reconstructed and drive approaches are present, the sidewalk shall be placed through the existing drives or drive approaches. This will ensure that the finish and colour of the sidewalk will be consistent through all drives and drive approaches.

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When sidewalk are constructed or reconstructed in close proximity to existing buildings, steps shall be taken, whenever possible, to construct the sidewalk so as to provide unrestricted wheelchair access. Any sidewalk which can be constructed within the minimum and maximum cross fall specified herein shall be so constructed to provide wheelchair access. All requests for wheelchair access shall be considered by the City Engineer.

Unless the distance between the curb and the front of the sidewalk exceeds 1.2 metres, the sidewalk will be poured integral with the driveway. Transverse deep-cut trowel joints or saw cuts will delineate the driveway from the walk. No longitudinal trowel joints or saw cuts to delineate the sidewalk will be permitted. If the driveway requires contraction joints, the saw cuts will be placed to provide panels of generally equal size. Where possible, the jointing shall generally conform to match the jointing pattern of the existing driveway. Where the distance between the back of curb and sidewalk exceeds 1.2 metres, the Contractor will have the option of placing the sidewalk independently of the remaining driveway section. Both the panel in front of the sidewalk and the panel in back of the sidewalk shall be at least 1.2 metres wide. Consideration will be given to the size of the panels being matched. The condition of the existing drive will be taken into consideration. If the sidewalk is poured independent of the driveways, care will be taken to ensure that the grade is generally an extension of the driveway. The grade of the remaining driveway line will be considered and care taken that the transition is smooth and an acceptable grade is achieved. When placing the sidewalk independent of the driveway, care will be taken to stay consistent with the method used for driveways on the remainder of the block (i.e., integral or independent). When replacing all driveways on a block as part of the restoration of road or sewer work, one method will be used for the entire block.

When the distance between the back of curb and front of sidewalk is less then 600mm, the sidewalk shall extend to the back of the curb with a minimum width of 1.5m.

6.04.03 Excavation

Excavation shall be to the depth as shown on the plans or as required during the course of the work by the City Engineer, and the disturbed material in the bottom of the excavation shall be thoroughly consolidated to the satisfaction of the City Engineer. Water shall be used as an aid to compaction where required. The base of the excavation shall be compacted and shall be witnessed and documented by the site inspector. Surplus excavated materials, not required for backfilling, shall be disposed of at the Contractor's cost. The work of excavation shall include any clearing and grubbing encountered.

The Contractor shall ensure that during excavation no damage to any existing trees or the root systems of any trees occurs. Should damage occur due to the negligence of the contractor, the City Forester will be notified to assess the damage. The monetary value of the damage shall be borne by the Contractor.

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Additional excavation to remove unsuitable sub grade material shall be at the direction of the City Engineer and shall be paid at the direction of the City Engineer. Any additional Granular 'A' or required engineered fill shall also be paid at the direction of the City Engineer.

6.04.04 Base

On the sub-grade, brought to the correct line and elevation, as above described, shall be placed a layer of Granular 'A' Base Course, which shall have a minimum uniform thickness of at least fifty (50) millimetres. The Granular 'A' Base Course shall be compacted according to OPSS 501 and S-4 and shall be witnessed and documented by the site inspector.

The field density determination will be made in accordance with OPSS 501 and S-4. The surface of the base shall have a minimum 2% cross fall towards the road. The subgrade shall be well wetted prior to the placing of the concrete. At no time shall the Contractor place concrete on a frozen granular sub-base.

6.04.05 Forms

Forms shall be of wood or metal and of sufficient strength to resist springing, tipping or other displacement due to the placing of concrete and such other loads as may be superimposed during construction. Forms shall be free from warps, splits, holes, and bulges and all bolts, rivets and fittings shall be countersunk. Forms shall be erected without the use of internal ties and shall be sufficiently tight to prevent the leakage of mortar. The faces of forms against which concrete is to be placed shall, before the placing of concrete, be thoroughly cleaned and coated with an approved release agent or other approved material. Forms when tested with a 3-metre straight edge or curved template shall not deviate on the top surface more than 3mm nor on the inside faces more than 6mm from the testing edge of the template.

6.04.06 Contraction Joints

Transverse weakened-planed contraction joints shall be constructed at right angles to the sidewalk line.

Contraction joints shall be placed transversely as shown on drawing AS-401 and AS-403. The width of the contraction joint shall be 3 to 5 mm and a minimum depth of 65 mm or at least one fourth of the thickness of the concrete depth.

Contraction joints maybe sawed, hand-formed, or made by 3mm thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and

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while the forms are still in place. All longitudinal contraction joints and transverse contraction joints longer than 1.8m in length shall be sawcut.

Deep trowel joints must be constructed in a workman like manner, to the satisfaction of the City Engineer.

6.04.07 Full Depth Expansion (Isolation) Joints

Full depth isolation joints shall be used on all driveways, change in sidewalk direction, and where the sidewalk meets the curb at all intersections. Isolation joints will be placed at both the curb and where the new driveway approach abuts an existing hard surface at or toward private property. Existing surfaces will be cut to a true, full depth vertical face so that the jointing material will fit flush to the existing surfaces. Extra full-depth saw cutting and chipping may be required to achieve this. Full-depth isolation joint material will be placed between all buildings, driveways, change in sidewalk direction, and sidewalks. Transverse full-depth isolation joints will be required from time to time to intercept or change contraction joint patterns, at areas of expected differential movement, or where directed by the City Engineer.

Isolation joints shall be formed with 12mm thick full-depth joint filler material meeting the requirements of OPSS 1308, except that cork expansion fillers will not be accepted. Preformed sponge rubber expansion joint material shall be 12mm thick and may only be used in conjunction with the areas outlined in Section 6.04.09. In all other areas, non-extruding and resilient bituminous type expansion joint is to be used, unless approved by the City Engineer.

Panels of expansion joint shall be pre-cut from a single piece to the shape of the cross-section as shown on the standard drawings, but so as to provide a 5 mm recess on the exposed surfaces. Cutting and tolerances shall conform to OPSS 1308.

Transverse expansion joints shall have a maximum spacing of 18 metres. In addition to the foregoing, expansion joints shall be constructed wherever shown on the standard plans.

6.04.08 Construction Joints

A 5-mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing the placement of concrete sidewalks or driveways.

6.04.09 Appurtenances in the Sidewalk and Driveways

The Contractor must carefully fit the sidewalk and/ or driveways around all permanent openings and must take special care to prevent damage to any utility, which may be in or under the sidewalk and/ or driveways. The Contractor shall remove iron gratings, covers, etc., for areaways, etc., and shall replace them in position in a neat and competent manner.

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Any and all appurtenances to the sidewalk and/ or driveways shall be designed and constructed in such a manner so as not to negatively affect the longevity, performance, and safe use of the sidewalk and/ or driveways. Poles, hydrants, structures, and driveways shall be isolated with full-depth isolation joint material. Manholes, junction boxes, water valves, cleanouts etc. shall be set to exactly match the finished grade of the sidewalk and/ or driveways

Raised planters and landscaped curbs shall be a minimum of 150mm high and shall be permitted only in areas where a minimum 1.5m clear walkway can be maintained.

Any and all appurtenances shall not adversely affect the drainage pattern of the sidewalk/boulevard areas. The installation of catchbasins shall be considered an option when the placement of a sidewalk and/ or driveways adversely affect the drainage pattern by restricting or altering any drainage areas.

A minimum clearance of 300mm from the closest edge of the sidewalk and/ or driveways, shall be provided for street lighting/hydro poles, fire hydrants and other vertical obstructions.

Street furniture installation on a sidewalk shall be as per City of Windsor Street Opening permit requirements or as approved by the City Engineer.

6.04.10 Concrete Placement

Concrete placement shall be according to City of Windsor Standard Specification S-9 and the following requirements:

Concrete shall not be placed until the foundation and the forms have been inspected and approved by the City Engineer.

Concrete is to be placed at or near its permanent location and consolidated such that segregation of the aggregate does not occur. The concrete shall be placed and consolidated against all formwork; all entrapped air shall be eliminated.

Concrete shall be placed continuously. Contact with partially set concrete shall be avoided. When placement of concrete is interrupted, it shall be at a vertical form. 5 mm bituminous fibre joint filler shall be placed at the point of interruption before recommencing placement of concrete.

The concrete shall be placed true to the lines and grades specified in the Contract Documents.

The restriction of concrete placement shall be as per City of Windsor Standard Specification S-9 – General Concrete Specification

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6.04.11 Finishing

The surface of concrete sidewalks and driveways shall be given a broomed finish, after finishing with a magnesium or aluminum float, unless otherwise specified by the City Engineer. The protection of concrete structures until their acceptance onto maintenance by the Corporation shall be the sole responsibility of the Contractor. The presence of footprints or other markings on the completed sidewalk/driveway shall require saw cutting, removal, and replacement of the complete section at the Contractor's expense. Exterior paths of travel shall only be given a broom finish and never a "stamped" concrete finish. When a "stamped" concrete finish has been specified for a drive approach or a specific accent area not intended for pedestrian traffic, it shall be imperative that water does not pond due to improper application and finishing procedures with the specified patterns. Areas adversely affected by the application of stamping moulds shall be removed and replaced at the Contractors expense.

Unless otherwise provided, back edges shall be rounded by use of a 6mm radius-edging tool. While it is not necessary to remove the edger mark, the method will be consistent for the entire contract. Care shall be taken to ensure that the plastic concrete is firm enough to prevent ridges from forming from the concrete slurry while finishing the edging.

In no cases shall sidewalks pond water or exceed the specified grade to be accepted. All areas which pond water or have insufficient/excessive cross fall, including those caused by poor construction and finishing methods, shall be removed and replaced at the Contractor's expense.

6.04.12 Curing and Protection

The curing and protection of the completed sidewalk and driveway shall conform to the requirements contained in the Standard Specification for Concrete (S-9).

6.04.13 Backfilling and Shouldering

As soon as the City Engineer will permit, the Contractor shall backfill at each edge of the walk and shall place earth shouldering at the edges of the sidewalk with an approved backfill material to grades approved by the City Engineer. If the forms are stripped from the concrete, but not immediately backfilled behind the removal operation, the Contractor shall cure or protect all exposed areas where the forms were removed, as outlined in Standard Specification for Concrete (S-9), unless otherwise directed by the City Engineer.

6.05 PROTECTION OF THE SIDEWALK AND DRIVEWAY FROM TRAFFIC

The Contractor shall by barricades, guards, or by other means, protect all sidewalk surfaces from harm by traffic until the City Engineer authorizes the sidewalk to be opened to public

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use. This period shall, for pedestrian traffic, not exceed 72 hours and for the opening of lane or driveway crossing, not exceed 7 days.

The Contractor shall at all times, prior to the opening to traffic, provide suitable bridging as other means of access to adjacent properties, but will only be required to do so at existing traffic points.

The Contractor shall be held responsible for any damage or defacing done to the finished work by other parties until the finished work is accepted by the City Engineer and shall repair or replace any damaged or defaced portion of the work as required by the City Engineer.

6.06 DAMAGE TO ADJACENT BOULEVARDS AND PAVEMENTS

The Contractor will be required to make good, as directed, all damage done to the roadway or pavements while the work is in progress.

The Contractor will be required to remove all rubbish and material from the boulevards adjoining the sidewalk and restore the same to as good and clean condition as they were before commencing the work. Should the Contractor choose to use plastic as their method of protection, when removed from the concrete, all plastic is to be removed and disposed of at the Contractor's expense. If any of the sod beyond the area of construction is destroyed by the Contractor or his employees, he will be required to replace it, at his expense, with new sod to the approval of the City Engineer.

6.07 QUALITY ASSURANCE

The quality assurance for all concrete poured for sidewalks and driveways shall conform to the requirements contained in the Standard Specification for Concrete (S-9).

The Contractor shall be responsible for the line and grade of the forms as provided by the City Engineer or will be responsible to match existing conditions when required.

Prior to any concrete being poured, the forms and granular base shall be inspected by the City Engineer. The Contractor shall notify the City Engineer a minimum 24 hours before the concrete pour is to take place to allow sufficient time to review the granular base and forms.

The Contractor shall be responsible for the concrete work during the curing time and when the forms are removed until the work is accepted by the City Engineer.

Positive drainage shall be constructed and maintained in all finished work areas including sidewalks, adjacent driveway & boulevard, and wheelchair ramps.

6.08 MEASUREMENT FOR PAYMENT

6.08.01 Sidewalk

Measurement will be made in square metres of the total area of sidewalk installed.

6.08.02 Driveway Approaches

Measurement will be made in square metres of the total area of driveway approaches installed.

6.08.03 Granular Base Course

This item shall be included in the unit price submitted for the placement of the new concrete unless otherwise stated in the tender documents.

6.08.04 Water

No measurement for payment required for this item.

6.08.05 Removal of Old Sidewalk and Driveway Approaches

Measurement will be made in square metres of the total area removed as directed by the City Engineer.

6.09 BASIS OF PAYMENT

6.09.01 Sidewalk and Driveway Approaches

The Contract prices for the various components making up the sidewalk or the driveway approaches will be full compensation for supplying all labour and equipment and completely installing in accordance with this specification, the sidewalk or driveway approach as called for in the plans and for supplying all material.

Excavation required to set the various components to the required line and grade will be considered as part of the work of installing the sidewalk or driveway approach; however, should such excavation overlap excavation required for any other work under the contract, then payment shall be made in accordance with the specification for such other work as though no excavation were required for sidewalk or driveway approach construction.

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CONCRETE SIDEWALK AND DRIVE APPROACHES

6.09.02 Granular Base Course

This item shall be included in the unit price submitted for the placement of the new concrete unless otherwise stated in the tender documents.

6.09.03 Water

This item shall be included in the unit price submitted for the placement of the new concrete.

6.09.04 Removal of Old Sidewalk and Driveway Approaches

Payment will be made at the contract unit price per square metre for the measured quantities.

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7.01. SCOPE OF WORK

This specification refers to the requirements for the construction of concrete pavement and concrete base.

7.02. REFERENCES OR RELATED DOCUMENTS

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

- S-9 Concrete
- S-4 Granular Base and Aggregates
- OPSS 350
- OPSS 369
- OPSS 1306
- OPSS 1308
- OPSS 1441 & 1442
- OPSS.MUNI 908
- OPSS 919
- OPSS.MUNI 1350

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- OPSD 552.010
- OPSD 551.032
- AS – 210 and AS - 211
- AS – 225 to 227
- AS – 201
- AS – 553
- AS -103

7.03. MATERIALS

The contractor will supply all materials in accordance with this specification and the contract documents.

7.03.01 Concrete

All concrete shall meet the requirements of S-9 unless otherwise specified and pre-approved by the City Engineer.

7.03.02 Tie Bars and Load Transfer Devices

Tie bars shall be according to OPSS 1442.

Load Transfer Devices shall be according to OPSS 1441

7.03.03 Joint Filler Material.

Joint filler material shall be according to OPSS 1308

7.03.04 Burlap

All burlap used in surface texturing shall be according to OPSS 1306

7.03.05 Forms.

All forms shall be according to OPSS 919

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7.04. CONSTRUCTION

Prior to starting the work, documentation shall be submitted, verifying that the Contractor's representative of the placing crew shall be on site and shall have valid Municipal Exterior Flatwork Certification, ACI Flatwork Certification or an approved equivalent.

7.04.01 Granular Base

The type and thickness of the base shall be that which is specified in the contract documents and is to be according to S-4 Granular Base and Aggregates.

All design grades and tolerances must be approved by the City Engineer prior to concrete placement.

Before placing concrete on granular base, the granular immediately ahead of the concrete placing operation shall be wetted down thoroughly to the satisfaction of the City Engineer.

7.04.02 Formwork

Formwork shall be according to OPSS 919, be constructed wood or metal, and be of sufficient strength to resist springing, tipping or other displacement due to the placing of concrete and such other loads as may be superimposed during construction. Forms shall be free from warps, splits, holes, and bulges and all bolts, rivets and fittings shall be countersunk. Forms shall be erected without the use of internal ties and shall be sufficiently tight to prevent the leakage of mortar. The faces of forms against which concrete is to be placed shall, before the placing of concrete, be thoroughly cleaned and coated with an approved release agent or other approved material. Forms when tested with a 3-metre straight edge or curved template shall not deviate on the top surface more than 3mm nor on the inside faces more than 6mm from the testing edge of the template.

7.04.03 Maintenance holes and Utility Valves.

All maintenance holes in concrete pavement shall be according to telescopic manhole frame and cover drawing AS-553

All other valves or appurtenances shall be isolated from the pavement by means of a permanent and appropriately sized PVC or rigid plastic sleeve. The inside sleeve diameter is to match the diameter of the valve within 20mm. The sleeve is to be placed around the obstruction, ahead of the concrete placement and shall be true to the finished grade and extend continuously to the base.

Joint patterns and spacing shall be adjusted to accommodate manholes and sleeve isolated valves such that the projections fall on the center of a joint or at least 900mm away from a joint. When necessary, longitudinal and transverse joints can be skewed to satisfy these requirements as per OPSD 551.032.

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7.04.04 Joints

All joints shall be of the type and at the location shown on the contract drawings.

For typical joint detail drawings refer to OPSD 552.010 with the exception that there are no "key way" joints permitted.

7.04.05 Contraction Joints

Transverse weakened-planed contraction joints shall be constructed at or near right angles to the direction of pavement. Longitudinal contraction joints shall be mostly parallel to pavement direction. The width of the contraction joint shall be 3 to 5 mm and a minimum depth of 65 mm or at least one-third of the depth of the concrete slab. Contraction joints maybe sawed, hand-formed, or made by 3mm thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a place of weakness into the plastic concrete, or (2) inserting 3mm thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and while the forms are still in place.

Longitudinal panel lengths shall not exceed 4.5 m or be less than 2.0 m and are to be approved by the City Engineer prior to concrete placement.

Tie bars shall be placed where specified in the contract. Tie bars shall be at the midpoint of the pavements depth, be perpendicular to the joint are to be between 760mm and 600mm center to center. Tie bars across a longitudinal joint will not be placed within 600mm of a transverse joint that contains load transfer dowels.

Load Transfer devices / dowel bars shall be placed where specified in the contract. The location of the dowel bars shall be marked to ensure joint forming or cutting operations fall directly and precisely over the center of the dowels. Dowels shall be set within a tolerance of +/- 6mm in the vertical and horizontal planes of the pavement. Where transverse joints are skewed to accommodate utilities the dowels are to be similarly skewed so as to remain in the direction of the pavement. (Not necessarily perpendicular to the joint)

Dowels are to be placed at 300mm center to center and be between 300mm and 450mm from the panel's edge or any utility feature that falls on the joint.

No damaged or contaminated tie bars or load transfer devices shall be used.

All load transfer devises and tie tars location and condition are to be approved by the City Engineer prior to commencement of concrete placement.

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7.04.06 Expansion (Isolation) Joints

Isolation joints shall be formed with full-depth joint filler material meeting the requirements of OPSS 1308, except that cork expansion fillers will not be accepted. In all other areas, non-extruding and resilient bituminous type expansion joint is to be used, unless approved by the City Engineer. The thickness of the expansion joint material panels shall be at the discretion of the City Engineer and will not be less than 12mm. Expansion material shall extend the full depth of the pavement and be so placed as to eliminate all concrete to concrete contact at the joint. Panels of expansion joint material shall be pre-cut from a single piece to the shape of the cross-section as shown on the standard drawings, but so as to provide a 6mm recess on the exposed surfaces. Cutting and tolerances shall conform to OPSS 1308.

When an expansion joint falls at a transverse joint which contains load transfer devices, the ends of the dowels shall be fitted with approved isolation caps to provide a clear space at the end of the dowels that is at least equal to the thickness of the expansion joint filler material.

7.04.07 Construction Joints

A construction joint shall be formed or cut and is required at the end of the days paving or at a point of interruption. Such joints shall be full depth, vertical, be perpendicular to the pavement direction, are to include all specified bars or dowels and are to coincide with joint patterns in adjacent lanes.

7.04.08 Concrete Placement

Placement of concrete shall be according to S-9 and the following:

- a) Concrete shall not be placed until the foundation and the forms or string line have been inspected and approved by the City Engineer.
- b) No exposed concrete pavement shall be placed in the rain.
- c) Concrete is to be placed at or near its permanent location in such a manner so as to avoid segregation. The concrete shall be placed and consolidated against all formwork; all entrapped air shall be eliminated.
- d) Contact with partially set concrete shall be avoided.
- e) The concrete placing operation shall be continuous and at a speed that allows complete, proper, and timely finishing operations to follow. When an interruption of more than 45 minutes occurs, a true, vertical construction joint (OPSD 552.010) shall be formed.

The concrete shall be placed either by an acceptable slip form/extrusion machine, or by formed method, or the combination of these methods. The forms or string line shall be set true to the lines and grades specified in the Contract Documents and be in direct contact with the granular base course.

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The restrictions on concrete placement shall be as per City of Windsor Standard Specification S-9 – General Concrete Specification

7.04.09 Material Consolidation

All concrete pavements greater than 150mm thick shall be consolidated by means of handheld internal vibrators or machine mounted in the case of a paving machine. The vibrator shall be inserted at regular intervals along the width of pavement and are not to be operated longer than 15 seconds in a single location. Vibratory consolidation shall be completed within ten (10) minutes of the material being deposited.

In the case slip form machine paving, the vibrators shall not operate when the paver is stopped.

Vibrators shall not come into contact with the base material, the forms, tie bars or the dowel bar assemblies.

Pavement less than 150mm thick may be placed without hand held vibrators provided the material is struck off by means of an approved mechanical vibrating screed to the satisfaction of the City Engineer.

7.04.10 Finishing

No water or chemical agent shall be applied to the concrete surface for finishing purposes.

For concrete pavement that is formed or where concrete is placed adjacent to existing concrete the edge of the new pavement shall be finished with a radius of 6mm prior to surface texturing.

The surface of the concrete shall be shaped, smoothed, and finished to line and grade by means of machine and or hand floats such that the surface tolerance requirements are met after finish texture is applied. Care should be given not to “over work” the surface of the material.

The surface texture shall be uniform across the full panel width and be of the type specified in the contract drawings to the satisfaction of the City Engineer.

7.04.11 Finished Surface Tolerances

The exposed finished surfaces shall be uniform, true to grade and in all cases free from displaced aggregate particles and local projections.

The surface of the concrete shall be free of any deviation greater than 3mm when tested with a 3 m straight edge in any direction. This requirement holds true across all joints except those that are a designed grade changes. This requirement holds true across all utility valves and maintenance hole lids cast in the pavement structure.

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Diamond grinding may be required to ensure the concrete surface meets these requirements.

7.04.12 Identification Stamp

The Contractor shall imprint his official name and the date with a steel stamp, as per City of Windsor AS-103, once per block, per side and or at least one stamp per one hundred cubic metres.

The edge of the stamp shall be four hundred and fifty millimetres (450mm) from the face of the curb and not fall at a joint, with the one hundred and fifty millimetre (150mm) side parallel to the curb. The depth of imprint shall not be less than 6mm.

7.04.13 Curing

Concrete shall be cured according to S-9.

7.04.14 Joint Sealing

Joint sealant shall be of the type and at locations specified in the contract and shall be according to OPSS 369

7.04.15 Protection

The contractor is solely responsible for protection of the surface of the plastic concrete and shall further protect the concrete pavement from any loading until adequately set. Any damage or surface blemish from rain, work or pedestrian traffic what so ever is at the contractors cost.

The concrete pavement shall not be subjected to any loads other than required foot traffic and rubber wheeled joint cutting equipment until the compressive strength field cured cylinders attain 70 % of the specified 28 day design strength.

Any damage to existing, adjacent pavement or curb or new pavement from construction or other activities are the responsibility of the contractor until the pavement is accepted by the City Engineer.

7.04.16 Backfilling

No work shall be performed adjacent to freshly placed concrete pavement until sufficient strength has been attained. No vibratory compaction effort shall take place on materials placed near new pavement until the concrete as developed 70% of the design compressive strength.

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7.05. DAMAGE TO ADJACENT BOULEVARDS AND PAVEMENTS

The Contractor will be required to make good, as directed, all damage done to the adjacent roadway or pavements while the work is in progress.

The Contractor will be required to remove all rubbish and material from the pavement and boulevards adjoining the new concrete pavement or concrete base and restore the same to as good and clean condition as they were before commencing the work. Should the Contractor choose to use plastic as their method of cure protection, when removed from the concrete, all plastic is to be removed and disposed of at the Contractor's expense. If any of the sod beyond the area of construction is destroyed by the Contractor or his employees, he will be required to replace it, at his expense, with new sod to the approval of the City Engineer.

7.06. TESTING AND QUALITY ASSURANCE

The testing and quality assurance for all concrete pavements shall conform to the requirements contained in the S-9 for Concrete and the following requirements:

The Contractor shall be responsible for the line and grade of the forms as provided by the City Engineer or will be responsible to match existing conditions when required.

The Contractor shall be responsible for the concrete work during the curing time and when the forms are removed until the work is accepted by the City Engineer.

All areas not conforming to the requirements of this specification due to poor construction or finishing methods are to be corrected or replaced at the contractors expense to the satisfaction of the City Engineer.

7.07. MEASUREMENT OF PAYMENT

Measurement of payment for concrete will only be made of that material and work accepted by the City Engineer.

The unit of measurement will be that provided for in the tender.

7.08. BASIS OF PAYMENT

Payment will be made at the unit prices bid in the contract documents and for the quantities determined by the applicable method of measurement.

Such payment shall constitute full compensation for supplying, delivering, placing, finishing, curing, and protecting and any other cause whatsoever for all work performed in connection with the material and ant other incidentals necessary to complete the items that are not herein specified for payment otherwise.

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REPLACEMENT OF PRIVATE DRAIN CONNECTIONS

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35.01 SCOPE OF WORK

The work shall include the supply of all necessary labour, equipment, and materials to investigate and replace the existing sanitary private drain connections or constructing a new sanitary private drain connection from the exit of any dwelling to the main sewer, or designated place of disposal. The work shall also include all necessary equipment and fittings to complete the work to the satisfaction of the City Engineer.

A private drain connection replacement shall include the following:

The use of the existing tee at the municipal sewer or the installation of a new tap, tee, or similar approved apparatus as described elsewhere in this document. The private drain connection shall consist of a 150mm diameter pipe, having positive grade from the municipal sewer to the cleanout. A 150mm cleanout with terminal cleanout cap and tee fitting on the new connection shall be provided at or near the property line on the street side, where ever possible. The cap

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shall be plastic when located within a boulevard or landscaped area, or cast iron when located within a paved area such as sidewalk, driveway, lead walk, etc. The private drain connection, from the 150mm cleanout at property line, to the dwelling may be either a 150mm diameter pipe or 100mm diameter pipe with positive grade from the cleanout to the interior of the dwelling, extending a maximum of 0.91m into the dwelling. The connection on the interior of the dwelling shall include a 100mm terminal cleanout for access purposes to grade and a finished floor, as the case may be, in accordance with Ontario Building Code or applicable regulations.

When connecting to a combined municipal sewer, a backwater valve shall be included, to be situated on the sanitary connection, within the dwelling interior.

A sump pit and pump may also be included at the owner's discretion as optional work.

35.02 REFERENCES

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

- AS-207A
- AS-207B
- AS-207C
- AS-221
- AS-222
- AS-313
- AS-325
- AS-401
- AS-504
- AS-527
- AS-536
- S-1
- S-4
- S-6
- S-8
- S-9
- S-10
- S-24
- S-29

35.03 BUILDING PERMIT REGULATIONS

The contractor shall, at all times, comply with the regulations imposed by the City Engineer. To this end, the contractor shall pay for and obtain any required Permits from The Corporation of the City of Windsor's Building Department who will inspect that portion of the work on private property. The contractor shall acquaint himself with these requirements.

35.04 WORK ON STREET OR HIGHWAY

The contractor shall obtain a Street Opening Permit from The Corporation of the City of Windsor's Engineering Department prior to work commencing. Fees shall include indemnities as determined appropriate by the City Engineer. All work carried out on the public right-of-way shall be subject to the regulations as amended from time to time which may be imposed by the City Engineer relative to excavation, backfill method and materials, compaction, provision for tunnelling under pavement, restoration, etc.

35.05 OTHER AGENCIES

All work shall be subject to all requirements of any municipal, provincial or federal regulations that may from time to time apply.

35.06 MATERIALS

All pipe supplied shall be PVC plastic pipe CSA Standard B182.1-11 - Polyvinylchloride (PVC) and chlorinated polyvinylchloride (CPVC) drain, waste, and vent pipe and pipe fittings, with the exceptions that (i) the Dimensional Ratio (DR) shall be no greater than 28 and the pipe stiffness, F/Y, shall not be less than 100 psi (ASTM D2412-73), and (ii) the impact of the pipe at -18°C (0°F.) shall be 45 ft. lb. minimum when tested as described in B182.1-11.

The pipe shall have a locked-in gasket integral bell joint.

High Density Polyethylene (HDPE) for trenchless applications must meet requirements of Ontario Building Code Part 7.

A Structural Liner is considered as an acceptable alternative for approval by the City Engineer. All Structural Liner installations must be pre approved by the City Engineer and follow City of Windsor Standard Specification S-8.

35.06.01 SPECIAL FITTINGS AND OTHER REQUIREMENTS

All sewer connections shall be provided with a 150mm x 150mm x 150mm tee, together with a terminal cleanout located on the public right-of-way side at the property line and extended to grade level as described in Section 35.07(k). The contractor shall supply and install all necessary wyes, tees, elbow, pipe sections, reducers and adaptors, and any other fitting that is required to complete the work. Cleanout situated in paved areas shall be provided with a

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cast-iron sewer cap. Any connection to an existing plastic or PVC main or any new tap to a 300mm diameter pipe or smaller shall be by a tee section inserted into the main line unless approved by the City Engineer. The lump sum bid shall compensate for this cost and there will not be any claim for additional costs related to this item.

The connection to the public sewers shall be 150mm diameter and made with a connection approved by the City Engineer for the sewer in question.

35.06.01(a) ASBESTOS/CEMENT PIPE

All taps into asbestos/cement pipe shall require the use of a saddle with stainless steel straps or a manufactured tee. This tee shall be cut into the existing line and secured with mechanical couplings conforming to CSA Standard B602 to ensure a sound and watertight joint. If the saddle is used, the opening must be machine cut to exact dimensions. In all cases, a sound and watertight connection must be assured.

35.06.01(b) PVC PIPE

All connections to PVC sewers shall be made using a manufactured tee cut into the line and secured with PVC repair sleeve couplings.

35.06.01(c) VITRIFIED CLAY PIPE

When vitrified clay pipe is encountered, a section of this pipe must be removed and replaced with either a vitrified clay manufactured fitting or a PVC fitting. Mechanical couplings conforming to CSA Standard B602 shall be used to ensure a sound and watertight joint.

35.06.01(d) CONCRETE PIPE

Concrete pipe 375mm diameter and larger may be field tapped in place. Care shall be taken to ensure the connecting tee or A.C. coupling/adaptor does not protrude into the main sewer. A non-shrinking, fast setting grout shall be used and a curing period of 12 hours minimum is required before backfilling.

The use of alternative connection methods such as saddles that require the use of a compression gasket may be used if the contractor demonstrates to the satisfaction of the City Engineer that a watertight joint can be achieved.

When connecting to concrete pipe smaller than 375mm diameter, a section of pipe must be removed and a manufactured fitting of either concrete or PVC shall be installed. Mechanical couplings conforming to CSA Standard B602 shall be used to ensure a sound and watertight joint.

35.06.01(e) BRICK SEWERS

When brick sewers are encountered, a field tap shall generally be allowed. A non-shrinking, fast setting grout must be used and a minimum of 12 hours setting time is required before backfilling. A concrete, vitrified clay or asbestos cement fitting is required. A plastic fitting is not acceptable. The City Engineer reserves the right to consider other methods but in all cases a sound and watertight joint must be achieved and the City Engineer will be the sole judge in determining the acceptability of the alternate method(s).

35.06.01(f) RELINED SEWERS

New tap to a mainline sewer that is 300mm or less – When a new mainline tee is cut into a previously relined mainline sewer, the host pipe material of the mainline sewer shall be removed as necessary to allow the mechanical joint coupling to be securely fastened to the new inside liner, ensuring a water tight seal.

New tap to a mainline sewer that is greater than 300mm – Follow the construction methods as outlined above

35.06.01(g) MECHANICAL COUPLINGS

Mechanical couplings conforming to CSA Standard B602 are available to join PVC pipe to vitrified pipe, PVC pipe to concrete pipe, vitrified pipe to concrete pipe, and concrete pipe to concrete pipe. Contractors shall take note that in many cases the bells of pipes will have to be removed. This must be done in a manner that leaves a smooth and straight pipe. Where the inside diameters of the connecting pipes are slightly different, care shall be taken to minimize the lip at the connecting joint. A mechanical coupler cannot be used to transition between pipes of two different diameters.

The contractor shall, by an approved method, ensure that all joints between pipes and connections are sound and watertight. When a grout or mortar is used, it must be a fast setting non-shrinking variety. If a field tap requires grout, the joint or tap must be left undisturbed for a minimum of 12 hours. Care must be taken to ensure that the stem of the bell does not protrude into the main line. When pipes of different outside diameters are connected, care must be taken to ensure that the inverts of pipes are relatively flush.

All costs for the tapping of main sewers shall be included in the lump sum bid submitted.

The requirements of the Ontario Building Code Part 7 shall be used for cleanout spacing and size.

35.06.02 ASBESTOS CEMENT OR ASBESTOS CONTAINING MATERIAL

Any person(s) performing works on municipal sewers suspected of containing Asbestos Cement (AC) or Asbestos Containing Material (ACM) must follow methods and procedures

established under the O.H.S.A. - Ont. Reg. 278/05, and the Environment Protection Act - Reg. 347.

35.07 CONSTRUCTION PROCEDURE

Notwithstanding drawings and sketches provided by the City Engineer, the contractor shall be responsible for locating the existing sewer connection to be replaced and the mainline sewer to which it is to be connected. No additional remuneration will be made to the contractor to carry out this investigation.

Existing taps to the municipal sewers are to be used where ever possible. If the existing tap is not reused, it must be capped at the main sewer with the new tap conforming to City of Windsor Standards.

At the end of any workday, the existing sanitary private drain connection shall be temporarily connected to the new sanitary private drain connection or arrangements made to keep the existing connection in service as approved by the City Engineer.

The following requirements/procedures are to be considered when completing all replacements.

(a) Open Cut:

Permitted whenever the sewer is to be constructed under lawns or any other unimproved surface or area.

(b) Sodding:

The contractor is required to take up, store, preserve, relay and supply additional sod and/or topsoil and watering unless otherwise defined in the Contract. Unit cost shall be provided with tendered cost in the event the owner is responsible for restoration.

(c) Pavement Excavation:

Is an opening over the main municipal sewer or private drain connection in the road surface or other paved surface (i.e. Driveways, lead walks, etc.) to access the municipal sewer or drain connection for the purpose of connecting to an existing tee, constructing a new tee or abandoning an existing tee, or constructing a new private drain connection, cleanout, or any part thereof.

The pavement opening and restoration shall be in accordance with City of Windsor Specification S-29 and Standard Drawing AS 207A, B, C.

All backfill under pavement (roads, sidewalks, and driveways) within the right-of-way shall be placed in accordance with City of Windsor Specifications S-24.

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(d) Remove and Replace Sidewalk:

Sidewalk shall be constructed as per City of Windsor Specification S-6 and Drawing AS-401 with this note "Note: the width of the sidewalk replaced must match the width of the walk removed at the location. See AS-401."

(e) Connection to Existing Approved Sanitary Private Drain Connection:

This shall include all costs for materials necessary to make the connection to a known sanitary private drain connection in the public right-of-way. Including the cleanout and required permits (Building Permit and Engineering Permit).

(f) Abandonment of a Connection/Tap:

For all sewers it shall mean making the main whole to the satisfaction of the City Engineer. Excavation and restoration for removal of all redundant connections to the main shall be in accordance with City Standards.

(g) Opening in Basement:

An Opening in a basement shall include opening the floor in the basement and making the connection to the internal plumbing pipe, at a maximum of 0.91m within interior building wall as approved by the Building Department. It shall include all necessary fittings to make the connection, acceptable fill material to support the work and the floor and also include the restoration of the concrete floor. This item shall include any permits required by the Building Department.

(h) Opening in Crawlspace:

Opening in Crawlspace shall include excavating to the internal plumbing pipe and making the connection to the internal plumbing pipe, at the main plumbing stack as approved by the Building Department. It shall include all necessary fittings to make the connection and shall include backfilling and satisfactory restoration of the crawlspace. This item shall include any permits required by the Building Department.

(i) Backwater Valve:

Backwater Valve shall include the supply and installation of a "Mainline Fullport Backwater Valve" or an approved equal, in accordance with the Ontario Building Code Part 7. It shall include opening the floor; making the connection to the internal plumbing pipe, within 0.91m of dwelling interior building wall; all necessary fittings to make the connection; including 100mm riser, acceptable backfill material to support the work and floor and satisfactory restoration of the concrete floor. This item shall include any permits required by the Building Department. Unit cost shall be provided with tendered cost.

(j) Sump Pump:

Sump Pump shall include; supply of a CSA approved sump pump; breaking the floor and excavating for a minimum 95 Litres Sump liner; All necessary piping, and fittings to hook the

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sump pit to the weepers; as well as an exterior discharge pipe and fittings in accordance with the Ontario Building Code Part 7; restoring all damaged concrete floors and walls. This item shall include any permits required by the Building Department. Unit cost shall be provided with tendered cost.

(k) Supply/Install 150mm Riser and Plastic/Cast Iron Cap at Property Line:

Shall include all materials, labour, and equipment necessary to install a 150mm cleanout which shall include a 150mm x 150mm tee, 150mm riser section, and a 150mm plastic cap on a complete sanitary private drain connection replacement. A cast iron cap shall be provided where the same is located in a paved area (i.e. driveway, sidewalk, etc.). (Standard Drawing AS-325)

(l) Concrete Residential Driveway:

Openings in driveways required to make the tap or connection to the existing sewer, shall be reinstated in accordance with Standard Drawing AS-222.

(m) Asphalt Residential Driveway:

Openings in driveways required to make the tap or connection to the existing sewer, shall be reinstated in accordance with Standard Drawing AS-221.

(n) Supply/Install 100mm Riser and Plastic/Cast Iron Cap on private property:

Shall include all materials, labour and equipment necessary to install a 100mm cleanout as per the Ontario Building Code and approved by the Building Department on a new complete sanitary private drain connection replacement. A cast iron cap shall be provided where the same is located in a paved area (i.e. driveway, lead walk, etc.). (Standard Drawing AS-325)

35.08 EXCAVATION BACKFILL AND PAVEMENT REINSTATEMENT

When required to do so by the City Engineer, the contractor shall take up, store, preserve, and relay all sod, topsoil, and shrubbery such that the completed work is in a condition equal to or better than the original. The contractor shall supply and place new sod, topsoil and shrubbery at no additional cost, when, in the opinion of the City Engineer, the contractor has failed to satisfactorily preserve same.

All excavation and protection shall be carried out in strict accordance with Occupational Health and Safety Acts; the regulation for construction projects, Ontario Regulation 213/91 as amended by Ontario Regulation 631/94 and other prescribed legislation and regulations as they may pertain to the work.

All backfill under pavement shall be in accordance with City of Windsor Specification S-24. The Contractor shall provide a receipt for the Unshrinkable fill used on the job site to the City of Windsor Engineering Department Inspector for confirmation of materials used.

All backfill under boulevards shall be in accordance with City of Windsor Specification S-4.

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The contractor shall reinstate all pavement removed. The pavement opening and restoration shall be in accordance with City of Windsor Specification S-29 and Standard Drawing AS 207A, B, C. Equivalent material having received approval from the City Engineer may be used.

35.09 PROTECTION OF SERVICE AND OTHER WORKS

The contractor shall familiarize himself with the Occupational Health and Safety Act, current edition. All work carried out under the tender shall comply with the Act at all times.

The contractor, at all times, shall protect and maintain all utility services such as water mains, gas mains, hydro and communication conduit encountered during construction. Any damage to these services shall be repaired at the expense of the contractor.

The contractor shall tunnel, bore, punch under or take up and replace all driveways, sidewalks or other structures. All replacement work shall be according to the current specifications for these works.. Throughout construction, the contractor shall keep all house services in operation and provide a minimum inconvenience to the residents.

35.10 BORING UNDER PAVEMENTS

Whenever the sewer connection is to be constructed under road pavements or driveways or other paved areas, the contractor shall bore under the pavements by means of a mechanical boring machine. The diameter of the borehole shall not be more than 50mm larger than the outside diameter of the pipe being installed.

The contractor shall open the pavement or driveway over the mainline municipal sewer as required to make the tap or connection to the existing sewer, and restoration shall be in accordance with City of Windsor Specification S-29 and Standard Drawing AS-207A, B and C for road openings or as directed by the City Engineer for driveways. All work to be done to the satisfaction of the City Engineer.

35.11 CCTV INSPECTION OF PRIVATE SEWER

The contractor must have equipment available to CCTV inspect and record the inside condition of the private drain connections as well as the underground plumbing of the home by means of a TV monitor and provide a digital copy of the video to the City for review.

This equipment must be capable of accessing 100mm, 125mm and 150mm sewers to record the inside condition of the private drain connection and the underground plumbing as directed by the City Engineer.

Eeling of the sanitary private drain connection to permit video inspection may be required, and shall be provided by contractor and included in lump sum bid.

CCTV inspection of the completed private drain connection by City Staff will be required as a condition of final inspection and approval by the Chief Building Official, City Engineer, at no

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additional cost to The Corporation of the City of Windsor. Reference S-32 – *CCTV Sewer Inspection* for further details.

35.12 METHOD OF PAYMENT

Payment, on the basis of the lump sum bids submitted, shall be considered full compensation to the contractor for all work herein specified. No additional remuneration shall be made to the contractor for soil conditions, for winter conditions, or for size or depth of main sewer except as herein provided. The contractor shall take all of these factors into consideration when tendering on the work. The contractor shall submit to the City Engineer after the completion of the project, a statement showing the value of the work executed. Payment shall be as follows:

- a) For Completed Projects:
 - 90% of the lump sum bid.
 - 10% to be held until forty-five (45) days after the project is completed.
- b) For Projects that are not Completed due to Weather Conditions or Time of Year:
 - 80% of the lump sum bid.
 - 20% to be held until forty-five (45) days after the project has been completed.

35.13 DEFINITIONS:

Project:

The work described in each Purchase Order.

Completed Projects:

Shall be defined as a sanitary private drain connection in the ground and connected to the dwelling and the municipal main sewer, CCTV inspection record for the replaced PDC has been reviewed and accepted by the City Engineer, having passed the Building Department inspection, backfill to grade and final road patch completed and accepted by the City Engineer. The contractor shall be responsible for lawn restoration, unless the owner signs a form assuming responsibility for lawn rehabilitation.

For Work commenced in the Summer Months:

Work commenced in the summer months, defined as being from May 1st until September 30th, shall be completed within a thirty (30) calendar day period. The thirty (30) day period should be from the day the purchase order was issued until the day of the approved final inspection.

For Work commenced in Winter Months:

Work commenced in the winter months, defined as being from October 1st until April 30th, shall only be charged one (1) day and then the remainder of the days shall commence being charged on May 1st and must have approved final inspection within twenty-nine (29) calendar days from May 1st.

NOTE:

Any replacement (project) having progressed to the billing stage as stated in Section 35.12 prior to the time periods as mentioned above, must be totally complete to the satisfaction of the City Engineer within the time periods as mentioned above or the City Engineer may cause such necessary repairs to be completed and the cost of these repairs will be deducted as follows.

The Corporation may deduct any amount due under this section from any monies that may be due or payable to the contractor on any account whatsoever. The liquidated damages payable under this paragraph are in addition to, and without prejudice to any other remedy, action or other alternative that may be available to the Corporation.

35.14 TIME LIMIT

The contractor shall have sufficient equipment and labour available to undertake and complete with reasonable dispatch, the work as noted in these Specifications. Within three (3) working days after having been instructed thereto by the City Engineer, the contractor shall relieve the blockage and maintain the connection in a running condition until the work is finalized.

If The Corporation of the City of Windsor is required to maintain any sanitary private drain connection having been given to the contractor as specified above, the contractor will be assessed any and all costs incurred.

35.15 REASONABLE DISPATCH:

Commencement means the contractor must start the project within fourteen (14) days after having been instructed thereto by the City Engineer unless the Chief Building Official, City Engineer provide an extension, as deemed appropriate.

35.16 WARRANTY OF WORK

The Contractor shall ensure all restoration (including seeding/sodding, settlement, paving) is free from defects from workmanship for a period of one (1) year from final inspection.

The contractor shall ensure the new sanitary private drain connection is free from defects from workmanship (dips, out of round pipe, poor joints) for a period of 30 days from discovery for a period of a maximum five (5) years under the Replacement of Private Drain Connection Contract.