



Standard Specifications

CITY OF KITCHENER

Development Services Department
Engineering Services
Revised January 2020

City of Kitchener Standard Specifications (CKSS)

The Corporation of The City of Kitchener Standard Specifications are supplemental specifications and amend and take precedence over the Ontario Provincial Standard Specifications, the Ministry of Transportation of Ontario, the Regional Municipality of Waterloo Standard Specifications (RWSS) and Special Provisions (RWSSP), the Region of Waterloo and area municipalities Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS), and the City of Kitchener Development Manual (CKDM).

Where these specifications are used for work done by a utility proponent or other Contractors not working on a City of Kitchener contract, clauses in these specifications related to “Measurement of Payment” and “Basis for Payment” do not apply.

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Definitions

Boulevard means that part of the road from the edge of the roadway to the nearest property line.

Driveway means that part of the City or Regional Road that provides vehicular access to and from the roadway and an adjacent property.

kg means kilograms

m means metres

mm means millimetres

PGAC means Performance Graded Asphalt Cement.

Proponent means a person who undertakes Work on a City or Regional road, not including any person working under contract with the City or Region.

Provide means supply labour, materials and equipment required for complete installation of the work.

Region means The Regional Municipality of Waterloo.

Regional Road means a road under the jurisdiction of the Region.

road includes, but is not limited to, a common and public highway, street, avenue, un-assumed public right-of-way, parkway, driveway, square, place, bridge, viaduct or trestle, any part or which is intended for or used by the general public for the passage of vehicles and includes the area between the property lines thereof.

roadway means that part of a City or Regional road either that is improved, designed or ordinarily used for vehicular traffic including cycling lanes, shoulders and curb and gutter.

sidewalk means that part of a City road with a surface improved with asphalt, concrete or gravel for the use of pedestrians.

vehicle includes, but is not limited to, a motor vehicle, trailer, traction engine, farm tractor, road-building machine, bicycle and any vehicle drawn, propelled or driven by any kind of power including muscular power.

CKSS 150

ALLOWANCE FOR WATER TREATMENT

150.01 General

The allowance for water treatment is intended to cover the cost of contaminated groundwater treatment and disposal as outlined in the Form of Tender should they be required over the course of this project.

150.02 Basis for Payment

The allowance for water treatment is intended to cover the cost of contaminated groundwater treatment and disposal as per the items in the Form of Tender.

All payments under this item shall be approved in advance, and in writing, by the Contract Administrator and the Owner. Under no circumstances shall the Contractor proceed with expenditure of this item without prior knowledge of the Owner and approval from same. In the event that all or a portion of the allowance is not expended on this project, the Contractor shall not be entitled to payment of this lump sum Contract item.

CKSS 151 CONSTRUCTION NEAR TREES

REFERENCES

City of Kitchener Municipal Tree By-Law

151.01 Definitions

Border Trees means trees that have only part of their trunk, at ground level, growing on municipal lands. These trees have joint ownership.

City Tree means trees that are owned fully by the municipality and are those trees where the full trunk, at ground level, is located on municipal lands.

Critical Root Zone (CRZ) means the area that extends from the trunk of the tree to at least the outer limits of the crown of the tree. Unless specifically stated the TPZ does not extend into the roadway, but does extend into the front lawn where trees are located in the boulevard.

DBH means the Diameter at Breast Height, taken 1.4 metres above ground level.

Guide for Plant Appraisal means the Council of Tree & Landscape Appraisers, most recent edition.

Root Habitat Conservation Zone (RHCZ) means the area that extends 1 to 2 times beyond the tree's dripline, and reflects the root habitat required for healthy, mature trees. In residential areas this zone includes the boulevard, front lawns, driveways and side lawn. Tree root growth is highly variable.

Root Plate means the area at the base of a tree where the roots and stem merge, see the Tree Management Plan Detail for more information.

Scaffolds means the primary structural branches of the crown

Tree Protection Zone (TPZ) means the area of ground surface being protected from damage by mechanical excavation, including sidewalk.

Urban Forestry means a representative from Operations Division, Design and Development or its designate.

151.02 General

Where it has been determined that the Contractor has 1) failed to comply with the required tree protection measures and / or 2) causes unauthorized damage to a City or Border tree the Contractor will be responsible for the following as determined by Urban Forestry and Contract Administration Services.

1. For each incident for which the Contractor is responsible, the Contractor will:
 - 1.1. Be charged an assessment fee of \$1,500 for each tree not identified as being a Significant Tree.
 - 1.2. Be charged an assessment fee of \$2,500 for each tree identified as being a Significant Tree.
 - 1.3. On projects of high value, Urban Forestry in consultation with the Contract Administrator may decide to set higher values for specific projects. Higher values will be identified in the tender documents.

- 1.4. Be responsible for any additional costs borne by Urban Forestry in excess of those stated in Part 1.1 and 1.2. This may include, but not be limited to: tree inspection / consulting / assessment costs and any required remedial arboricultural treatments (e.g. tree pruning, wound treatment, watering).
- 1.5. Provide any assistance in terms of on-site equipment, labour requested by Operations at no cost to the Owner.
- 1.6. Adhere to any written direction by Urban Forestry and the Contract Administrator to prevent additional damage.
2. Where Urban Forestry identifies a long-term concern regarding the trees' structural integrity and health because of unauthorized construction damage the Contractor will also be responsible for the following:
 - 2.1. For a period of two years, the Contractor will be responsible for any additional costs borne by Urban Forestry in excess of those stated in all of Part 1. This includes, but is not limited to; tree inspection / consulting / assessment costs and any required remedial arboricultural treatments (e.g. tree pruning, fertilization, watering).
 - 2.2. Where the tree has been damaged to the degree that it is unsafe or deemed unworthy of preservation, either; 1) at the time of the incident or 2) during the two year period after the contract, the Contractor will be responsible for the value of the tree as determined by the Guide for Plant Appraisal, along with the removal and replacement costs of the tree as determined by Urban Forestry and the Contract Administrator.
3. When a Subcontractor is working on the site all costs all fees associated with damage will be assigned to the General Contractor.
4. All assessed and associated costs identified in the foregoing sections will be deducted from the total amount payable to the General Contractor through the contract between the Owner and the General Contractor.
5. All tree issues on public lands, unless otherwise noted, are the responsibility of Urban Forestry. Urban Forestry is solely responsible for the assessment of all damage to trees, tree appraisal, and decisions regarding remedial arboricultural treatments, decisions regarding any tree removals and all recommendations regarding new tree plantings.

151.03 Kitchener's Municipal Tree Bylaw

Section 690.4.1 states that; "Any Contractor, commission or corporation or any other organization, person or individual, having a contract for paving streets, constructing sidewalks or excavating or doing any work on City property, shall when executing such work or contract take all necessary steps to avoid injuring any tree and in this connection, shall obey any lawful direction given by a responsible officer of the Department."

151.04 Tree Protection During Construction

Where protective measures are not taken around trees, construction activities can have a significant and long-term effect on trees resulting in their decline and death.

- Under Chapter 690.4.1 these specifications state the standard practices that will be carried out while working around City / Border Trees.

- In reading this document the Contractor shall also refer to the tender documents, the tree management and planting plan, and details in the drawing set. Additional tree protective measures for specific projects are stated in the Tree Management Plan. Where a difference in the level of protection exists between this Specification and the Tree Management Plan, the level of protection stated in the Tree Management Plan will be followed.
- During the length of this contract the Urban Forestry Representative may request additional tree protective measures.
- Where the Contractor fails to carry out the required tree protective measures and / or cause unauthorized damage, the Contractor will be responsible for any costs and associated responsibilities assigned to the Contractor.
- With respect to this contract, Urban Forestry is solely responsible for the assessment of all damage to trees, tree appraisals, and decisions regarding remedial arboricultural treatments, tree removals and recommendations regarding new tree plantings.

151.05 Tree Management Plan

151.05.01 Critical Root Zone (CRZ)

Critical Root Zones extend from the trunk of the tree to at least the outer limits of the trees crown. Urban Forestry may identify larger protection zones for Significant Trees. Unless stated in the Tree Management Plan, the Critical Root Zones does not extend into the roadway.

151.05.02 Significant Trees

Significant Trees are high value old growth trees that have special tree maintenance and protection measures applied. Urban Forestry may also identify other trees as being significant due to their social, heritage or environmental values. Significant Trees are identified with an “S” on the drawings. All standard protective measures and any additional measures stated in the Tree Management Plan apply. Significant trees have larger CRZ, and higher damage assessments.

151.05.03 Protective Fencing

Prior to the commencement of any construction activity that may injure a tree on the site; the Contractor shall install all tree protective fencing identified on the Tree Management Plan. The Contractor will notify the Urban Forestry representative prior to starting construction to confirm that the tree protection is in place.

No work can occur within the TPZ unless authorized by the Urban Forestry Representative.

Protective fencing will remain in place until the site is ready for sod and tree planting.

If some fill or excavated material shall be temporarily located near the tree protection barrier, a wooden barrier shall be used to ensure no material enters the TPZ.

The Urban Forestry representative may request that fencing be installed closer to the back of curb or edge of paved surface.

151.05.03.01 Trees located within boulevard

Fencing will fully enclose the TPZ (except where limited by an existing paved surface). It is to be installed 300 mm behind the curb, and 200 mm from the edge of all other paved surfaces (sidewalk, driveway ramps etc.)

151.05.03.02 Trees located within the front lawn

Fencing will be placed along the full length of the TPZ (except where limited by an existing paved surface) and be installed 300 mm in from the back of sidewalk.

151.05.04 Tree Signage

Urban Forestry will install Tree Protection Signs along the protective fencing. Signs will not be removed without the approval of Urban Forestry and will be returned to the Kitchener Operations Facility at 131 Goodrich Drive at the end of the contract.

151.06 Restrictions within Tree Protection Zones

Except where stated in this specification and approved within the Tree Management Plan the following activities and practices are prohibited within the Critical Root Zone;

- 1.1. No mechanical damage to the trees root plate, tree trunk or scaffolds will occur at any time. Excessive and careless damage to tree branches is also prohibited.
- 1.2. No open excavation will occur within the Critical Root Zone.

Exception: Where approved in the Tree Management Plan the Contractor will carry out Boring \ Hydrovacating \ Excavating as directed within the Critical Root Zone to establish services to the property line. For all lateral sanitary sewers the Contractor will identify and mark the location of the lateral sewer using an electronic pipe and cable locator. The location of the pipe will be marked on the surface from the edge of the road to one (1) metre beyond property line. The Contractor, Urban Forestry Representative and Contract Administrator will review all works within the Critical Root Zone prior to any work starting. Urban Forestry will determine the appropriate work method including open excavation, hydrovacating, or the use of a small excavator. Urban Forestry may request that exploratory root work with the use of a hydrovac is carried out first. Once the work method is approved all roots greater than 2.5cm will be cut cleanly with a pruning saw, no roots larger than 10cm will be cut without the approval of Urban Forestry. Backfilling will occur as soon as possible and soil will be placed along the edge of the root cut zone to minimize root desiccation. Where backfilling cannot occur immediately after the work, the Contractor will cover the hole with plywood to protect the roots of all Significant Trees.

- 1.3. No construction materials, excavated soil, waste material, construction trailers, storage areas, chemical or washout water will be deposited or stored within the critical root zone habitat or root habitat conservation zone.

Exception: Where approved by Urban Forestry the Contractor may temporarily store excavated soils within the Critical Root Zone or RHCZ. All excavated material will be placed on plywood sheets so that all excavated material is confined to the plywood area. Excavated material will not be stored in the Critical Root Zone for more than 24 hours.

- 1.4. No equipment will be parked or move through the tree protection zone.

Exception: Where approved the Contractor may operate equipment within the Critical Root Zone. Wherever possible hydraulic shovels will operate from the roadway. If equipment must be physically located within the Critical Root Zone the Contractor will follow all directions specified by Urban Forestry and the Contract Administrator.

1.5. No construction vehicle within the roadway will be left idling under a tree unless it is being used.

151.07 Tree Roots within the Roadway

Critical Root Zones do not extend into the existing roadway unless stated in the Tree Management Plan. Where roots are encountered within the roadway the following procedures will be carried out.

1.1. Where a Significant Tree has been identified in the Tree Management Plan as requiring a root inspection no road excavation will occur until the root inspection has been completed. A root inspection by the Urban Forestry Representative will be carried out after the asphalt and curbs have been removed. The Contractor will provide any assistance requested by Urban Forestry. Additional protective measures may be applied to these trees after the inspection.

1.2. Where excavation within the roadway occurs within 2m of a tree not identified as Significant the Contractor will cut cleanly all roots greater than 2.5cm at the limits of excavation.

151.08 Tree Roots and Curb Removal / Installation

Curb removal will be done with care, if necessary curb removal will be done by hand to minimize damage. Within the Critical Root Zone no excavation beyond the original curb will occur until reviewed by the Community Services Representative and Project Contract Administrator. To minimize root damage the Contractor may be required to hand form, limit excavation from back of curb or carry out other steps.

151.09 Sidewalk Reconstruction

Where identified in the Tree Management Plan existing sidewalks will be left intact within the Critical Root Zone.

Sidewalk removal within the Critical Root Zone will be done with care. If required the Contractor will manually remove the sidewalk to minimize tree damage. Equipment used to remove sidewalks will work as much as possible outside of the Critical Root Zones. Equipment working within the Critical Root Zone and travel through the zone will be limited and done with care.

The Project Contract Administrator and the Urban Forestry Representative will review all sidewalk construction within Critical Root Zones, prior to sidewalk reconstruction, to identify any conflicts with existing roots and the new sidewalk. Where necessary changes in the sidewalk grade, design or construction may be required.

The Contractor will use appropriate work practices so as not to tear, or damage any roots under or adjacent to a sidewalk, unless approved for removal. All roots approved for removal that are larger than 5cm will be cut cleanly with a pruning saw. No root will be left exposed and all roots to be protected will be covered immediately to minimize desiccation.

151.10 Landscape Restoration

No re-grading or restoration will occur within the limits of the Critical Root Zone, unless approved by Urban Forestry. Only disturbed areas previously approved will be restored. Where required restoration will be limited to top dressing and seeding, work within this area may require hand work.

151.11 Tree Removals, Pruning, Stumping

Unless identified on the Tree Management Plan the Contractor will not remove any City or Border Tree, or carry out any arboricultural treatments unless approved by Urban Forestry.

Where the Contractor is permitted to remove trees and grind stumps all work will be carried out by qualified and competent tree workers with demonstrated work experience within urban residential areas. The work will be done using approved arboricultural practices (e.g. tree removals, rigging, aerial lifts, etc.) and will be consistent with all provincial regulations and industry standards.

The Contractor shall not remove any trees on the site, regardless of their designation on the Tree Management Plan prior to seeking approval from Urban Forestry.

151.12 Private Trees

Urban Forestry has no jurisdiction over trees growing on private property, however the City has the same level of interest in protecting private trees as it does City trees. The Contractor will follow all direction by the Contract Administrator and Urban Forestry to work around and protect private trees.

CKSS 152

PERFORMANCE, LABOUR, AND MATERIAL PAYMENT BONDS

152.01 General

The value of the performance bond shall be equal to one hundred percent (100%) of the contract price.

The value of the labour and materials payment bond shall be equal to fifty percent (50%) of the contract price.

152.02 Measurement for Payment

Payment of this item shall be fifty (50) percent of the lump sum unit price upon mobilization by the Contractor to the site. The remaining amount shall be pro-rated to match the percentage of the work completed at the time of each progress payment certificate.

152.03 Basis for Payment

The work of this item shall include all costs associated with providing these bonds.

CKSS 153 SITE SPECIFIC HEALTH AND SAFETY PLAN

153.01 General

To ensure such that workers and public are protected from any adverse effects due to excavation and/or handling of impacted materials. A Site Specific Health and Safety Plan (HASP) relating to construction activities shall be prepared by the Contractor prior to commencing field work. The HASP should be designed to identify potential hazards, which will likely be encountered by personnel at the Site during assessment or construction activities. All activities at the site shall be conducted in compliance with applicable federal, provincial, and municipal regulations.

Regular Health and Safety meetings will be held by the Contractor to review compliance.

As a minimum, the Contractor shall consider in its Health & Safety Plan:

153.02 Spill Procedures

The following are spill procedures which are to be posted at the site trailer:

- Determine nature of spill and method of safe response;
- Terminate the spill and contain spilled material;
- Contact the MOECC Spill Action Centre at 1-800-268-6060;
- Undertake clean-up and appropriate verification sampling; and,
- Provide proper waste manifesting and disposal to a facility licensed to accept the material.

153.03 Fire

Any fire would be reported to the local fire department and MOECC Spills Action Centre for appropriate response.

153.04 Workplace Accident

Respond with first aid, and then notify the local Hospital of situation and transport injured person or call 911 Emergency as the severity of the case requires; and, Contractor to advise the Ministry of Labour as per the requirements of the Occupational Health and Safety Act.

153.05 Levels of Protection

Required personal protective equipment; chemical-resistant or leather boots, with CSA approved safety toe and steel shank; shirt and pants under disposable or site dedicated coveralls; hard hat; optional personal protective equipment; chemical resistant outer gloves; safety glasses with side shields, or splash goggles, or face shield; and, hearing protection.

Contractors Site Safety Officer shall:

- Choose protective clothing and equipment (PPE);
- Conduct regular safety meetings with workers;
- Provide appropriate disciplinary action when unsafe acts or practices occur;
- Provide emergency treatment and decontamination procedures for the specific type of exposure that may occur at the site;
- Periodically inspect protective equipment;
- Ensure that protective clothing and equipment are properly stored and maintained;

- Ensure entry and exit at the Access Control Points;
- Confirm each team member's ability to perform;
- Monitor the works parties for signs of stress;
- Monitor on-site hazards and conditions;
- Know emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control centre, fire department, and police department;
- Coordinate emergency medical care;
- Set-up decontamination lines and decontamination solutions appropriate for the type of chemical contamination on site;
- Control the decontamination of all equipment and personnel; and,
- Ensure that all required safety equipment is available and in proper working order.

153.06 Air Monitoring Program

When contaminated fill is encountered during on-site excavation and construction activities, monitoring of air quality will be completed by the Contractor's Site Safety Officer for worker protection and adherence to the Contract, and in order to ensure the protection of human health and the environment.

The lab results of the air quality will be reported to the Owner on a daily basis, and will be used by the Owner for evaluating the effectiveness of the control measures employed by the Contractor, during the work.

Hand-held, real time measurement devices can be used to collect on-going information related to the presence of air borne dust and contaminants during soil excavation. A meteorological station can be set up in order to evaluate wind direction, speed and ambient temperatures.

Ambient air quality shall be monitored in order to confirm that dust and airborne contaminant control measures are effective, and to ensure that any potential off-site air quality impacts caused by the operations are minimized. Air quality monitoring shall be conducted during excavation at upwind/downwind locations as per O. Reg. 419/05. These measures will be used to verify that fence line concentrations of relevant parameters are within acceptable limits, as defined by MOECC and/or assist in identifying the need for specific control measures.

Portable testing equipment includes but may not be limited to:

- Photo-Ionization Equipment – monitor for the presence of VOCs; and
- Multi-Gas Meter(s) – monitor the excavation and breathing zone for levels of oxygen, methane, carbon monoxide, hydrogen sulphide, and combustible vapours.

153.07 Basis for Payment

Payment for this item shall include time required to make any revisions based on comments by the Owner, Ministry of Labour, or other stakeholders, as well as a training seminar conducted by the Site Safety Officer to present the HASP to all project personnel. This item also includes payment for the Site Safety Officer along with necessary monitoring and reporting, equipment / supplies, to carry out their duties throughout the project. Reporting to consist of weekly summaries in a format suitable to the Owner, and to include at a minimum a summary of air quality data collected, odour complaints received, visitation by regulatory authorities, incidents, direction to the Contractor (if any).

Payment will be made on a pro-rated basis determined on each payment certificate based on the percentage of project completed.

CKSS 154 LINES AND GRADES

154.01 General

Any work done without lines and levels, or to improperly set grade stakes or without the supervision of an inspector when an inspector is required to be in attendance by the provisions of the contract or by the order of the Contract Administrator, shall not be paid for. Such work may, at the discretion of the Contract Administrator, be ordered removed and replaced by correctly aligned and inspected work at no cost to the Owner.

If requested by the Contractor in writing, the Contract Administrator will provide, if available, electronic data to assist the Contractor in laying out the works. The software format and version supplied to the Contractor will be the same version as that used to create the files. The Contractor Administrator will not convert the electronic data between software platforms or versions of the same software platform. It is the Contractor's responsibility to ensure that the electronic data is the same as the Contract Drawings. In the event of any discrepancy between the Contract Drawings and the electronic data, the Contract Drawings shall take precedence and govern. Any discrepancies shall be reported immediately to the Contract Administrator.

Any manipulation of any part or parts of the electronic data by any party, including a Contractor, proponent, or any party or parties carrying on any work associated with the project, is at the sole risk and responsibility of such party or parties.

The electronic data provided will normally include but may not be limited to:

- Existing topographic survey
- Survey control points and benchmarks
- Original ground triangulated irregular network (TIN) surface
- Road alignments
- Location of the proposed works
- Road profiles
- Watermain alignment and profile
- Sanitary and storm sewer layout and profiles
- Proposed TIN surface

154.02 Measurement for Payment

Payment for this item will be pro-rated to match the percentage of the work completed at the time of each progress payment certificate.

154.03 Basis for Payment

Payment for all labour, materials and equipment for the Contractor to provide construction layout shall be paid under the lump sum bid price for the item provided in the Form of Tender.

CKSS 180 MANAGEMENT OF EXCESS MATERIALS

REFERENCES

OPSS 180 – Management of Excess Materials
OPSS.MUNI 206 – Grading

180.01 General

Excess materials shall be managed in accordance with OPSS 180, as supplemented and amended by the following additional requirements. The Contractor shall make every effort to reuse excess material as suitable backfill.

All excavations shall be done in accordance with the latest edition of the Occupational Health and Safety Act, and provincial regulations. The Contractor shall be responsible for the condition of all excavations. All slides and cave-ins shall be removed without extra compensation, at whatever time and under whatever circumstances they may occur.

Excess material that includes asbestos waste shall be managed in accordance with all applicable legislation, including but not limited to, Ontario Regulation 278/05 (as amended).

180.02 Characterization of Excess Material

The Contract Administrator may conduct analytical sampling (at Owner's expense) during and upon the completion of soil excavation activities to review the excess soil management and disposal alternatives and to assess the environmental quality of the soil at the final limits of the excavations (walls and floor). Analytical sampling should be completed according to the MOECC's "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario – 1996", with sample collection frequency according to Table 4.1A of the document. Analytical samples will be compared to the MOECC 2011 Table 2 Standards (Community Use).

Where the Contract Administrator has collected soil samples for laboratory analysis, the Contractor is advised that receipt of analytical results may take approximately 3 to 5 business days. As a result, the Contractor shall guide its operations accordingly, and without claim for project delay.

Should the presence of elevated concentrations of contaminants above the MOECC Table 2 Standards be identified, collecting additional samples for Toxicity Characteristic Leaching Procedure (TCLP) will be required in order to assess the appropriate disposal approach, as discussed below.

Currently in Ontario, the requirement for classifying a waste soil pile as hazardous or non-hazardous for disposal purposes, is TCLP testing, as per Ontario Regulation 558/00. The Owner will complete all required TCLP sampling and testing performed by a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) in accordance with Ontario Regulation 558, and provide the results to the Owner and the Contractor.

The Contractor shall provide 48 hours' notice to the Contract Administrator to arrange for suitable environmental inspection of the excavation, and shall cooperate fully and coordinate his forces accordingly to allow for the timely sampling of the material. No areas may be backfilled until the Contractor is directed to do so by the Contract Administrator. At the direction of the Contract Administrator, the Contractor shall backfill the area with approved material that includes the reuse of non-impacted excavated soil and clean imported fill. No compensation will be provided to the Contractor for delays while the Owner's representative is sampling the soil from the excavation and assessing the analytical results. If the analytical results indicate that the contaminants were not fully removed to allow

the work to proceed, the Contractor may be required to excavate further (vertically and laterally) only upon approval of the Owner, to remove the impacted soils. The determination to remove additional material (fill or native materials) from the work area will be made by the Contract Administrator and direction provided to the Contractor.

180.03 Document Submission Requirements

Any excess excavation shall be disposed of at a site provided by the Contractor and approved by the Contract Administrator upon receipt of OPSF 180-2. At the completion of the project, the disposal site shall be levelled to the satisfaction of the disposal site owner and the Contract Administrator and a release letter (OPSF 180-3) from the Owner(s) of such disposal site(s) shall be provided by the Contractor to the Contract Administrator prior to Certification of Substantial Performance.

180.04 Conditions on Management by Disposal as Non-Hazardous Waste

All excess materials (including, but not limited to: bituminous pavement; concrete; fabricated metal and plastic; wood; masonry; pipes; surplus or unsuitable excavated earth and rock; and other wastes) that are not otherwise designated for salvage or reuse by the Owner shall be removed from the Working Area and properly transported and re-used or disposed off-site in accordance with all applicable legislation at the Contractor's sole expense. In particular, impacted soil material, exceeding the MOECC Table 2 Standards, excavated from the work area shall be transported to a licensed landfill facility for final disposal.

OPSS 180.07.05 b) is deleted in its entirety.

The Contractor shall remove contaminated soils beneath the municipal road right-of-way to the limits and grades directed and approved by the Contract Administrator. Abandoned or redundant foundations or piping that is removed by the contractor shall not be mixed with contaminated materials for disposal offsite at a landfill unless specifically authorized by the Contract Administrator. During excavation activities, asbestos transite piping may be encountered. The contractor will be required to source separate this piping and dispose of it offsite at an MOECC approved landfill in accordance with all applicable regulations.

Contaminated soils that may be wet may require blending with a stabilizer for solidification before off-site disposal in order to pass slump tests. Suggested examples of stabilizers include cedar chips, sawdust, or a commercially available product.

180.05 Conditions on Management by Re-Use

Following removal of the asphalt pavement, the Owner's Representative will retest the granular road base to determine whether the material is environmental and geotechnically suitable for reuse as backfill (meet MOECC Table 2 Standards). The Contractor shall cooperate with the Owner and construct stockpiles in locations as to not interfere with the conduct of the work. The Owner will furnish results and instructions to the Contractor regarding reuse of the material within five (5) working days.

180.06 Hauling, Receiving, and Disposal Site

The Contractor shall comply with the Environmental Protection Act, including Ontario Regulation 347/90 (as amended), and shall use appropriately licensed haulers and receivers for all waste transportation and disposal, as required.

The Owner has not designated or identified specific haulers, receivers, and/or disposal sites for excess materials generated under this Contract. The Contractor is solely responsible for identifying and selecting appropriate haulers, receivers, and/or disposal sites required to complete the work of this Contract.

The Contractor shall name all haulers, receivers, and/or disposal sites for all excess materials in the spaces provided in the Tender Bid and shall attach additional sheets as necessary.

Depending on the sample results (i.e. contaminant concentrations), the material will then either be accepted as non-hazardous waste, with applicable tipping fees being applied, or rejected based on the criteria of the landfill's Environmental Compliance Approval (ECA). If contaminated soil is rejected by the designated receiving landfill at any time during the contract, the Contractor will still be responsible to haul the material to an alternate landfill location, licensed by the MOECC and approved by the Contract Administrator that will accept the specific non-hazardous waste, at no extra cost to the Owner.

Upon confirmation that contaminated soils are classified as non-hazardous for disposal, the Owner will provide direction to the Contractor to load and haul the impacted fill to an MOECC approved site. It is the responsibility of the Contractor to ensure appropriate disposal of all the contaminated soils. All sites to be verified by the Contract Administrator for acceptability. As a specific requirement on this project, the Contractor's waste hauler shall possess a valid Ministry of the Environmental Compliance Approval for Waste Management System to haul non-hazardous waste to a disposal site. It is the responsibility of the Contractor to ensure that this requirement is met.

The Contractor is responsible for all arrangements with the waste hauler, and site facility, including any analytical data required by the disposal site. The Contract Administrator will provide the Contractor with all available characterization data.

If the Contractor chooses to use an alternate disposal site, relevant contact information will be provided to the Owner prior to beginning the excavation. The Contract Administrator shall review and verify all ECAs furnished by the Contractor for compliance with the specifications herein and Ontario Regulations.

180.07 Basis for Payment

The Form of Tender provides an estimate of the quantities of materials that fall under the various standards provided in O. Reg. 153/04 (as amended). Under no circumstances shall the Contractor claim additional payment from the Owner related to the characterization of quality, designation of waste types, delineation of quality and extent of excess material, estimation of quantity, and costs (whether accurate and correct or not) associated with excavation, removal, segregation, temporary stockpiling, loading, transportation and re-use or disposal of excess materials, including excess earth and rock generated by the Contract work.

No additional payment will be made for the excavation, handling, and disposal or re-use of material excavated from the site which meets the MOECC Table 1 Standards, SAR, and Electrically Conductive (EC) soil.

180.07.01 Reuse of Material On-site

Where material that has been tested and determined by the Owner's Representative to be suitable for backfill onsite, the work will be paid per the cubic metre as determined through field measurements as agreed upon by the Owner and the Contractor.

CKSS 201 CLEARING, CLOSE CUT CLEARING, GRUBBING

REFERENCES

OPSS 201 – Construction Specification for Clearing, Close cut Clearing, Grubbing, and Removal of Surface and Piled Boulders

201.01 Construction

201.01.01 Mechanical Stump Cutting

The work for this item shall consist of mechanical cutting of stumps and buttress roots to a depth of 150mm below finished grade. Stump cutting will be done using an arboricultural stump grinder. All excess woody material will be removed from the site upon completion of the cutting.

201.02 Measurement for Payment

Payment will be made for each stump ground.

201.03 Basis for Payment

This work shall include all labour, equipment and materials required to grind the stump to a satisfactory depth as specified in the contract documents or as directed by the Contract Administrator.

CKSS 206 GRADING

REFERENCES

OPSS.MUNI 206 – Construction Specification for Grading
OPSS 501 – Construction Specification for Compacting

206.01 Construction

The Contractor shall exercise due care at all times to prevent the granular base and sub-base materials from becoming contaminated by clay or other types of deleterious materials.

The Contractor and the Contract Administrator shall jointly inspect the sub-grade prior to placement of granular materials for the road base.

206.02 Measurement for Payment

Payment will be made on a percentage completion basis to complete all work. The quantity includes roadway, driveway ramp, driveway, trails, parking areas, and boulevard shaping, grading, compaction and preparation for placement of the specified material.

206.03 Basis for Payment

This work shall include all labour, equipment and materials to shape the subgrade to the satisfaction of the Contract Administrator.

CKSS 209 EMBANKMENTS

REFERENCES

- OPSS 209 – Construction Specification for Embankments over Swamps and Compressible Soils
- OPSS 501 – Construction Specification for Compacting

209.01 Construction

Earth subgrade materials shall be compacted to a density of 95% Standard Proctor Dry Density.

In no case will the Contractor be permitted to construct the embankment by side dumping.

Embankment construction shall not commence until approved and operative compacting, shaping and watering equipment is on site.

CKSS 310 HOT MIX ASPHALT

REFERENCES

OPSS 310 – Construction Specification for Hot Mix Asphalt
OPSS 501 – Construction Specification for Compacting
OPSS 1150 – Material Specification for Hot Mix Asphalt

310.01 Submittals

At the request of the Contract Administrator the Contractor shall submit a Traffic Management Plan for the provision of access to properties during paving operations. The plan shall be submitted to the Contract Administrator five (5) working days in advance of paving operations.

310.02 Material

OPSS 310.05.01 is amended to specify the use of reclaimed asphalt pavement (RAP) shall be permitted in binder course only. Up to 20% by mass of RAP shall be permitted in the HL 4 and HL 8 binder mix.

No RAP will be permitted for HL 3, HL 3F HL 4, and HL 4F surface course mixes.

310.02.01 Quality Assurance

The Contractor shall provide samples of aggregate and asphalt cement to the Owner's authorized material testing company at least three weeks in advance of any paving operations in order to determine a proper asphalt mix design.

The Contractor shall pave a trial batch prior to accepting an asphalt mix design.

310.02.01 Aggregate Gradation and Asphalt Cement Content Acceptance

Aggregate gradation and asphalt cement content tolerance requirements shall be as per OPSS 310 Table 7.

Acceptance or rejection of HMA according to Table 7 shall be as per OPSS 310.08.04.

310.03 Construction

The Contractor shall give the Contract Administrator at least 48 hours' notice before commencement of any paving operations or continuation of paving operations after delay of more than five days at the discretion of the Owner or Contract Administrator, in order to ascertain whether the roadway is in the proper condition for paving.

The Owner's standard practice is to leave frames and grates at binder asphalt elevation. When frames and grates have been left at surface asphalt elevation as directed by the Contract Administrator or when the road is being prepared for surface asphalt paving, asphalt padding or ramp shall be placed around all catchbasins maintenance holes, valves, edge of existing pavement and gutter or where directed by the Contract Administrator until the surface course of asphalt is completed.

310.03.01 Operational Constraints

The asphalt binder course shall be laid no earlier than April 15th, and no later than November 30th, or as directed by the Contract Administrator.

The asphalt surface course shall be laid no earlier than May 1st, and no later than October 30th, or as directed by the Contract Administrator.

310.04 Measurement for Payment

Hot mix asphalt pricing based on the liquid asphalt cement price index (applies to items paid on a tonnage basis only).

The Owner will adjust the payment to the Contractor based on changes to the Ministry of Transportation's (MTO) PGAC price index (the Contractor will not be permitted to opt out of the adjustment).. The price index will be published monthly in the MTO Contract Bulletin and displayed on the OHMPA (www.ohmpa.org) and MTO websites (www.raqs.mto.gov.on.ca). The price index will be used to calculate the amount of the payment adjustment per tonne of new asphalt cement accepted into the Work. The price index will be based on the price, excluding taxes, FOB the depots in the Toronto area, of asphalt cement grade PG 58-28 or equivalent. One index will be used to establish and calculate the payment adjustment for all grades.

A payment adjustment per tonne of new asphalt cement will be established for each month in which paving occurs when the price index for the month differs by more than \$15.00/tonne from the price index for the month prior to tender opening. When the price index differential is less than \$15.00/tonne, there will be no payment adjustment for that month. Payment adjustments due to changes in the price index are independent of any other payment adjustments made to the hot mix tender items. The payment adjustment per tonne will apply to the quantity of new asphalt cement in the hot mix accepted into the Work during the month for which it is established. The payment adjustment for the month will be calculated by the following means:

1. **When AC Prices are Rising** by more than a \$15.00/tonne difference: the payment adjustment to be paid to the Contractor is the result of subtracting the price index for the month prior to tenders closing from the price index in effect when paving took place, minus the \$15.00 float, multiplied by the number of tonnes of PGAC incorporated in the mix(s) as determined by field samples. If the answer is negative, no adjustment is made.
2. **When AC Prices are Falling** by more than \$15.00/tonne difference: the payment adjustment made in favour of the Owner is the result of subtracting the price index in effect when paving took place, plus \$15.00 from the price index for the month prior to tenders closing, multiplied by the number of tonnes of PGAC incorporated in the mix(s) as determined by field samples.

The quantity of new asphalt cement includes all grades of asphalt cement supplied by the Contractor with and without polymer modifiers. For each month in which a payment adjustment has been established, the quantity will be calculated using the hot mix quantity accepted into the Work and its corresponding asphalt cement content as required by the job mix formula except for mixes which contain reclaimed asphalt pavement.

For mixes which contain reclaimed asphalt pavement, the quantity of new asphalt cement will be determined from the difference between the asphalt cement content required by the job mix formula and the asphalt cement content of the reclaimed asphalt pavement incorporated into the hot mix, as calculated by the Contract Administrator.

Example 1 – AC Prices Increasing

- PGAC 64-28 specified, 3,000 tonnes of HL3 @ 5.0% AC (150.0 tonnes AC)
- Price Index on May 5th, 2014 on tender closing is the published April 2014 index \$760/tonne (PG 58-28)
- Price Index on July 17th-24th, 2014 actual paving dates – \$812/tonne (PG 58-28)
- Payment adjustment to be paid to the Contractor:
 $[(\$812 - \$15) - \$760] \times 150 \text{ tonnes AC} = \$37 \times 150 \text{ tonnes AC} = \$5,550.00$

Example 2 – AC Prices Decreasing

- PGAC 58-28 specified, 4,500 tonnes of HL4 @ 5.0% AC (225.0 tonnes AC)
- Price Index on May 5th, 2014 on tender closing is the published April 2014 index \$760/tonne (PG 58-28)
- Price Index on October 11th – 18th, 2014 actual paving dates - \$715/tonne (PG 58-28)
- Payment for hot mix items reduced by:
 $[\$760 - (\$715 + \$15)] \times 225 \text{ tonnes AC} = \$30 \times 225 \text{ tonnes AC} = \$6,750.00$

If the field sample shows that the percentage of AC exceeds the standard specification, then 5.0% shall be used for calculating AC adjustments.

Contractors should bid the hot mix asphalt item using the cost of the PGAC specified. The AC Price Index is only a tool for qualifying hot mix prices and is not intended as a standard AC price to be incorporated into the contract bid.

The payment adjustment calculated using this formula is full compensation for any and all PGAC grades specified.

There will be no AC price adjustment for asphalt placed on a square metre / per metre basis.

If the AC Index has not changed more than \$15.00 per tonne up or down, no adjustment will be applied. Only the amount of the change that is greater than \$15.00 is used to calculate payment adjustments.

Payment for asphalt will be paid at 90% of the unit rate upon placement with the remaining 10% being paid upon receipt of success test results.

310.05 Basis for Payment

Unless otherwise stated in the Contract it is expected that all work will be carried out during week days. However if it is deemed necessary to complete paving operations on weekends and such timing necessitates the Contractor paying over-time premiums for labour beyond that which the Contractor might normally pay, then the Contractor shall account for such extra labour costs in its prices.

Where delays beyond the control of the Contractor have pushed the completion of this work past October 31st, the Contractor will be entitled to payment for winter heat.

CKSS 311

ASPHALT DRIVEWAY, BOULEVARD, AND MULTI-USE TRAIL

REFERENCES

OPSS 311 – Asphalt Sidewalk, Driveway, and Boulevard and for Sidewalk Resurfacing

311.01 Construction

The surface of the asphalt driveway or paved boulevard shall be constructed in such a manner as to give a smooth transition between all new construction and existing driveway or boulevard to remain.

All joints with existing asphalt pavement shall be saw cut.

311.01.01 Pavement Structure

Unless stated otherwise in the Contract Documents driveways shall be constructed at the following minimum depths (after compaction) according to their listed use.

1. Commercial and Industrial Driveways, High Density Residential

Granular B	300mm
Granular A	150mm
HL 4	50mm
HL 3	40mm

2. Private Residential Driveways and Paved Boulevards

Granular A	150mm
HL 3F	50mm

3. Multi-use Asphalt Trails

Granular A	300mm
HL 4	50mm
HL 3	40mm

This specification refers to Multi-use Asphalt Trails which are to be constructed on the road right-of-way allowance only. For construction of Multi-use Trails on all other locations refer to the City of Kitchener Development Manual.

311.02 Measurement for Payment

Payment for each item shall be based on the unit of measure listed in the Form of Tender.

311.03 Basis for Payment

Payment for asphalt material will not be processed until all tests have been and received and are deemed acceptable by the Owner.

There will be no separate payment for the saw-cutting of all joints with existing asphalt driveways, boulevards, or trails.

Where delays beyond the control of the Contractor have pushed the completion of this work past October 31st, the Contractor will be entitled to payment for winter heat.

CKSS 314 UNTREATED GRANULAR, SUBBASE, BASE, SURFACE, SHOULDER, AND STOCKPILING

REFERENCES

OPSS 314 – Untreated Granular, Subbase, Base, Surface, Shoulder, and Stockpiling

314.01 Construction

314.01.01 Granular A for Temporary Access

All Granular A placed shall be on compacted native material or on Granular B as approved by the Contract Administrator and shall be flush with the adjacent existing sidewalk and/or driveway areas. Temporary voids left by sidewalk removal for service installations will be backfilled and shall be included and paid under the appropriate lateral service installation items.

314.01.02 Granular Base Scarify and Reshaping

Scarifying and reshaping of the granular base shall be required due to the existing asphalt mat being removed and it becomes necessary to redistribute quantities of the existing granular road base to meet the specified roadway profile without adding new granular material.

Following the completion of reshaping the granular roadway surface, the Contractor in the presence of the Contract Administrator shall inspect all structures including sanitary and storm maintenance holes, catchbasins, valve chambers, water valve boxes and gas valves. All debris caused by construction must be immediately cleaned at the Contractor's expense.

314.02 Measurement for Payment

314.02.01 Granular A for Temporary Access

Measurement will be by the tonne for walkways and vehicle access areas. Payment at the Contract unit price shall be full compensation for all specified and incidental work required to complete the item to the satisfaction of the Contract Administrator.

314.02.02 Granular Base Scarify and Reshaping

Payment will be measured by the square metre of area shaped. The Contractor shall notify the Contract Administrator when they intend to complete this work.

314.03 Basis for Payment

Payment for these items shall include the application of water as required to achieve compaction.

Monitoring and maintenance of the temporary access for pedestrian and vehicular use will be the responsibility of the Contractor and shall be considered to be included in the unit price.

314.03.01 Granular A for Temporary Access

The work of this item shall include all labour, equipment and materials required to provide a neatly trimmed, compacted Granular A surface for a temporary pedestrian access and walkway in sidewalk and access areas disturbed during construction.

In addition, this item shall be for the temporary provision of vehicle access in various driveway and access locations as may be required for temporary movement of vehicles during construction activities.

314.03.02 Granular Base Scarify and Reshaping

Payment of this item to the Contractor shall only be provided when the work is completed with a heavy equipment mechanical grader. Completion of this work with a trim dozer will not be deemed as an acceptable alternative.

CKSS 351 CONCRETE SIDEWALKS, DRIVEWAY RAMPS AND DRIVEWAYS

REFERENCES

OPSS 351 – Concrete Sidewalk
OPSS 501 – Construction Specification for Compacting
OPSS 1303 – Material Specification for Admixtures for Concrete

351.01 Material

Concrete shall be according to OPSS 1350 as amended by CKSS 1350.

351.01.01 Sealant

Where specified in the Contract Documents sealant shall be Hiac-Plus™ acrylic concrete sealer and Sure-Step™ slip-resistant additive or approved equal.

351.01.02 Nylon Fiber Reinforcement

Where specified in the Contract Documents Nylon Fiber reinforcement shall be 19mm long mono nylon fiber MULTMESH by Nycon (800-456-9266) or approved equivalent, mixed into the concrete at a rate of 0.6kg/m³. Concrete should be mixed for a minimum of five (5) minutes after additive is placed into the mixer to allow for proper distribution of the fiber.

351.02 Construction

The highest standards and quality of work will be required, and the Contractor's attention is drawn to the clauses on tolerances and curing.

The Contractor shall ensure that the concrete supplier utilizes appropriate aggregates that do not contain deleterious particles that cause concrete popouts. The maximum allowable tolerance for popouts will be 10 popouts per square metre of sidewalk placed. Any sidewalk with popouts greater than this tolerance shall be removed and replaced at the contractor's expense. A popout is defined as a deleterious particle size, a minimum of 13mm wide with a minimum depth of 3mm.

Where the minimum required thickness cannot be achieved, nylon fiber reinforcement shall be added to the concrete mix prior to placement.

351.02.01 Trial Section

The Contractor shall at the discretion of the Contract Administrator construct a thirty (30) metre trial length to establish the adequacy of its equipment and quality of work.

When coloured concrete is called for in the contract the Contractor shall construct a 0.6m x 0.6m (2ft. x 2ft.) square test patch 30 days prior to the planned construction of coloured concrete throughout the work. This will allow the Owner to verify that the colour palette used for the colouring of the concrete is correct as specified in the Contract Documents.

The adequacy of the Contractor's equipment and quality of work will be determined by the Owner or Contract Administrator on inspection of this trial section of sidewalk or driveway ramp before the Contractor is permitted to proceed with the remaining work.

Should the trial section fail to conform to the specification requirements in any respect, it shall be removed and replaced by the Contractor, at its own expense; otherwise, it shall remain a part of the work.

351.02.02 Grading Tolerances

Grading tolerances shall be as per OPSS 351.07.02.

351.02.03 Subgrade for Sidewalk and Driveway Base Preparation

351.02.03.01 Subgrade

The subgrade is that portion of the terrain upon which the base is constructed. All soft and spongy sections of the subgrade shall be excavated and filled with approved granular or site generated materials. Materials for fill shall be placed and compacted in 150mm layers.

351.02.03.02 Base

Thicknesses for Granular Base Course Class "A" shall consist of a minimum of 150mm for residential driveways and 200mm for commercial / industrial driveway entrances, unless noted in the contract documents.

The degree of compaction achieved shall be 100 % Standard Proctor Dry Density.

After completion, the base shall be maintained at its true grade and cross-section until the concrete slab has been placed thereon, and shall be checked for trueness of grade and cross section before the concrete is placed.

Immediately before placing the concrete, the subbase shall be wetted down or alternatively an impervious underlay used to prevent loss of water from the concrete.

351.02.04 Formwork

The forms for curbs, sidewalks and driveway ramps shall be free of warp and other defects and shall be of sufficient strength to resist breaking or bending out of shape. Forms which are not considered acceptable by the Owner or Contract Administrator shall be removed from the site.

Forms shall be firmly staked to the established lines and grades, and the tops of all forms shall conform to the proposed grade of the finished structure. The depth of forms shall be at least equal to the edge thickness of the slab and maintained in good working condition. Forms shall be checked for alignment and elevation before concrete is poured. The Owner or Contract Administrator reserves the right to change formwork as required.

351.02.05 Placing Concrete

The concrete shall be deposited on the base as closely as possible to its final position with a minimum of re-handling. The concrete shall be placed high and screened off with a template riding on the side forms to compress the concrete and bring it to the required elevation and contour. The concrete shall be spaded along the sides of the forms.

351.02.06 Thickness

At intersections the thickness of the concrete sidewalk shall be increased to 200mm from the extension of the end of radius at the curb perpendicular to the back of the sidewalk or to the extent shown on the Contract Drawings and as directed by the Contract Administrator. Concrete at commercial loading areas shall be 200mm thick. Thickness at all other locations shall be as per the City of Kitchener Development Manual.

Where standard thickness cannot be obtained due to obstructions (i.e. tree roots), nylon fiber reinforcement shall be added to the concrete mix.

351.02.07 Finish

Finishes, tooling and saw-cutting shall be done according to RMW Standard Drawing 261. Broom finishes for bus pads, sidewalks, and driveway aprons shall be perpendicular to the roadway.

The finish of connections to private sidewalks or driveways shall conform as closely as possible to that of the existing sidewalk.

After the side forms have been removed, any cavities, honey-combing or other defects shall be repaired.

Trip hazards greater than 10mm will not be accepted. The Contractor should make itself familiar with O. Reg. 239/02 in this regard.

351.02.08 Date Imprint

The Contractor shall install date imprints at intersection ramps and sections of sidewalk repair 7.5 metres or greater in length. The imprint shall include the numerals of the current year into the surface of the sidewalk and shall be not less than 6mm in depth and 75mm in height. No additional compensation shall be given to the Contractor for such imprinting beyond that provided for the construction of the said sidewalk.

For reconstruction projects where an existing street name / date imprint is embedded in the existing sidewalk, the Contractor shall take extreme care to remove the original street name / date stamp and place it in the new sidewalk as directed by the Contract Administrator.

351.02.09 Curing

Immediately after the surface has sufficiently hardened, the sidewalk shall be covered with canvas or burlap and kept moist throughout the period of six consecutive days.

The use of liquid membrane-forming curing compound is also permitted. The compound shall be applied behind the final finishing operation after all free water has disappeared from the surface but not later than one hour after the completion of finishing. The application rate shall be as specified in OPSS 351.07.12.

The application of curing compounds to vertical concrete surfaces shall be required immediately after the removal of forms if such forms are removed within a period of 72 hours from the time of placement of the concrete.

351.02.10 Backfilling

Where an existing sidewalk is repaired, the Contractor shall be required to carefully remove the existing sod and topsoil to enable the forming for the new sidewalk to be installed. This sod and topsoil shall be replaced to the satisfaction of the Owner or Contract Administrator upon removal of the forms. New topsoil and sod may be required as determined by the Owner or Contract Administrator.

In the case of new sidewalks, the edges of the walk shall be backfilled with the surrounding material once the forms are stripped. Such material shall be placed at a 1:1 slope between the surface of the sidewalk and the base.

351.02.11 Impressed Concrete

The installation of impressed concrete shall be carried out by specialist firms engaged in the type of work specified, and using workers skilled and experienced in the various aspects of such work. The Contractor or Subcontractor shall be able to demonstrate proof of ability and examples of impressed concrete installations. Impress concrete using mat forms approved by the Owner or Contract Administrator. Patterns of impression and the direction of forms to be used are to conform to detailed drawings and site directions from the Contract Administrator.

“Double Soldier Course” impressions provided by Proline Concrete Tools or approved equal shall be installed as brick banding behind the back of curb. For wider areas exceeding the width of the band (0.4m), a “Single Soldier Course” shall be provided around the perimeter of the pour with a “Cobble Stone” finish centre, provided by BRICKFORM or Solomon Colours Inc. or approved equal. Ensure all forms are clean and free of any contaminants.

The Contractor is expected to plan concrete pours to ensure impressing operations proceed at the optimum time in the curing schedule for each pour.

Provide a natural finish on the slab surface. The finished slab texture shall be sufficiently coarse for pedestrian and vehicular traffic, as determined by the Owner or Contract Administrator. Where the finished impressed slab surfaces are not acceptably coarse, the Contractor shall sandblast these to the satisfaction of the Owner or Contract Administrator. There will be no additional cost to the Owner for such work. The Contractor shall protect adjacent surfaces from exposure to sandblasting operations.

No steel trowels, steel floats, or power trowels shall be used on the finished surface. The finished impressed slab shall not be modified after removing mat forms prior to concrete set.

Sealants shall be applied to the finished slab. Saw cut finished slab according to detailed drawings and site directions from the Owner or Contract Administrator and according to control joint specifications. Special attention will be paid by the Contract Administrator to the specified tolerances of finished slab grades. Achieve positive drainage and slab tolerances.

351.02.11.01 Mat Forms

Supply mat forms to achieve the specified paving patterns. All mats shall be subject to the approval of the Landscape Architect. Mats shall be able to achieve a consistent slab surface with no grade variations except for dummy joints. Dummy joints shall produce impressions in the finished slab surface which measure no greater than 6.5mm in width and 6.5mm in depth.

351.02.11.02 Mat Forms Release Agent

The release agent shall only be an evaporating, non-staining liquid release agent which does not visually modify the finished appearance of the pigmented concrete slab.

351.02.12 Shut-Off Valves, Gas Boxes, Etc.

The Contractor shall adjust to the sidewalk surface all curb boxes, valve chambers and maintenance covers which are located in the walk and free of concrete debris. Care shall be taken to ensure that the extension barrels covering shut-offs are truly vertical. Where new valves or extension sleeves are necessary by reason of a change in grade, they will be supplied and installed by the relevant utility commission. The horizontal movement of any shut-off valve made necessary by a change in the width of the walk will be attended to by the relevant utilities at no expense to the Contractor.

The cost of adjusting curb stop boxes shall be included in the unit price bid for the sidewalk construction, unless otherwise noted. Valve chamber and maintenance cover adjustments shall be paid for at the unit price bid in the contract Form of Tender.

351.02.13 Bond Breaker

A bond breaker shall be placed between the back of curb and adjacent concrete poured against it.

351.02.14 Expansion Joints

Expansion joint material shall be Type "A" bituminous fiberboard, in accordance with OPSS 1308 "Material Specification for Joint Filler (Concrete), manufactured specifically for use in concrete driveway and sidewalk construction.

Expansion joint material shall be a minimum of 9mm to a maximum of 13mm in width and extend the full thickness of the concrete. Alternative materials such as 'Deck-o-foam' (manufactured by W.R.Meadows) or approved equal shall be considered by the Owner or Contract Administrator on a project by project basis.

Expansion joint material shall be cut to the full cross-sectional shape of the sidewalk and placed at the following intervals:

- Every 7th panel minimum - 9th panel maximum (i.e. - 1.5m panel lengths shall be placed every 10.5m to 13.5m).
- Where the sidewalk section to be replaced is less than 13.5m and greater than 6m in length, place the expansion joints at both ends of the new section.
- Adjacent to rigid structures, including, driveways, foundation walls, retaining walls, utility chambers and vaults and "box-outs" for other surface features, as illustrated in OPSD 310.020, 310.040 and CKDM Std. Dwg. 109

Expansion joint material shall be placed prior to pouring concrete and under no circumstances shall expansion material be forced into freshly poured concrete. Expansion joints shall be neatly cleaned off on both sides of the joint material so that the material is completely visible when finishing is completed. All rubble and imperfections that may affect the contact of expansion joint material with vertical faces, including burrs, gravel, etc. are to be removed prior to placement and pouring of concrete.

Expansion Joints shall be located to minimise the detrimental effects of thermal expansion and to minimise the negative impacts, including risk of trips, due to location and placement, including long term inherent deterioration of expansion material.

351.02.15 Contraction Joints

Contraction joints (for transverse and longitudinal crack control) shall be saw cut to a minimum depth of $\frac{1}{4}$ of the slab thickness mm. The width of the joint shall be 6mm maximum.

Sawing shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually within 6 to 24 hours of placement. Joints shall be saw cut day and night, if necessary, in order to prevent uncontrolled shrinkage cracking.

Contraction joints shall be provided using the following spacing and layout guideline:

- Sidewalks (up to 1.8m in width) shall be saw-cut at every panel.
- Wider sidewalks and areas of concrete paving shall be jointed as recommended by the Ready Mixed Concrete Association of Ontario (RMCAO) and the Canadian Portland Cement Association.
- Panel thickness, area of coverage, and location and dimensions of existing features shall all be taken into account in determining jointing details. A jointing detail plan will be required from the contractor, for approval, prior to approval of formwork for placement of concrete.
- Contract Administrator shall approve the layout of all chalk lines and/or provide direction on the Owner's requirements, prior to saw cutting.
- Large concrete paving areas (sidewalk and parking), generally, will not require tooling prior to saw cutting.
- Driveway ramps constructed of concrete may be poured monolithically with adjacent sidewalk, if directed by the Owner or Contract Administrator, to permit a smooth grade transition. Where expansion joints cannot be applied, the edge of sidewalk adjacent to concrete driveway ramps shall be tooled and saw cut to delineate the width of sidewalk area. The inclusion of edge curbs at the sides of residential concrete driveways is no longer a practice of the Owner. The need for side curbs at industrial, commercial and institutional driveway entrances shall be reviewed on a case by case basis.

351.02.16 Truncated Dome Detectable Warning Plates

Truncated dome detectable warning plates shall be installed as per Regional Municipality of Waterloo Standard Specifications RWSS 13 and RMW Standard Drawings 224 to 228.

RMW Standard Drawings 224 to 228 are amended to specify grooved directional lines shall not be used at City of Kitchener owned intersections.

351.03 Measurement for Payment

351.03.01 New Sidewalk

All sidewalks and combined walks shall be measured by the square metre. The reference line for measurement shall be along the centre line of the walk for the purpose of payment.

351.03.02 Impressed Concrete

The unit of measure for this work shall be by the square metre of concrete surface which has been impressed and/or coloured.

351.03.03 Truncated Dome Detectable Warning Plates

The unit of measure for this work shall be for each plate installed as per specifications.

351.04 Basis for Payment

The payment for the unit prices bid for concrete construction shall include the cost of all labour, equipment and materials required to perform the work necessary.

Where delays beyond the control of the Contractor have pushed the completion of this work past October 31st, the Contractor will be entitled to payment for winter heat and cold weather protection.

351.04.01 New Sidewalk

The unit price bid for new sidewalk shall be as stipulated in the Form of Tender and include normal excavation, expansion and contraction joints as required, application of curing compound and protection of the concrete from acts of vandalism, and the elements of weather such as extreme heat, cold and rain. Normal excavation is the volume calculated from the finished sidewalk grade to the bottom of the granular material. If additional excavation is required to meet the proposed sub-grade elevation of the sidewalk, the Contractor shall be paid under the appropriate unit price bid in the Form of Tender.

In a case where the elevation of the new sidewalk is to be increased, the Contractor shall supply and place the appropriate granular materials as directed by the Contract Administrator. The Contractor shall be paid under the appropriate unit prices bid in the Form of Tender.

Supply and placement of specified granular base material will be paid under the appropriate unit prices bid in the Form of Tender.

351.04.02 Panel Replacement Sidewalk

Basis for payment as stated below shall apply only where the work is being completed as a separate annual program.

The unit price bid for the replacement sidewalk shall include break-out, removal and disposal of the existing sidewalk as well as restoration of the existing topsoil and sod. New topsoil and sod shall be placed when directed by the Owner or Contract Administrator where the restoration using existing topsoil and sod is unsatisfactory.

In most cases, the existing granular base will be satisfactory and additional granular material will not be required. However, where additional granular material is required, the Contractor shall remove the existing base material as directed by the Owner or Contract Administrator. In this circumstance, the unit price bid shall include the excavation required. Any additional granular material shall be paid under a separate item in the Form of Tender.

351.04.03 Impressed Concrete

The work for this item shall include all the labour, equipment, and materials necessary to impress the concrete at locations as shown on the Contract Drawings and as directed by the Contract Administrator.

The price for this item shall also include the cost for the colour pigment admixture, and the concrete sealant.

351.04.04 Truncated Dome Detectable Warning Plates

The work for this item shall include all the labour, equipment, and materials necessary to supply and install truncated dome detectable warning plates at locations as shown on the Contract Drawings and as directed by the Contract Administrator.

CKSS 352 CONCRETE STEPS

REFERENCES

OPSS 1303 – Material Specification for Admixtures for Concrete

352.01 Material

Concrete shall be according to OPSS 1350 as amended by CKSS 1350.

352.02 Measurement for Payment

Payment will be made on the basis of the square metre area of the tread, which will include a 30cm wide strip at the top of each set of steps, to construct new steps as outlined in the Form of Tender.

352.03 Basis for Payment

The work for this item shall include all excavation, formwork, base preparation, reinforcing bars, concrete placement, finishing and curing, etc., all in accordance with OPSD 512.011.

Where delays beyond the control of the Contractor have pushed the completion of this work past October 31st, the Contractor will be entitled to payment for winter heat and cold weather protection.

CKSS 353 CONCRETE CURB AND GUTTER

REFERENCES

OPSS 353 – Construction Specification for Curb and Gutter
OPSS 1303 – Material Specification for Admixtures for Concrete

353.01 Material

Concrete shall be according to OPSS 1350 as amended by CKSS 1350.

353.02 Construction

353.02.01 Trial Section

Before proceeding with the curb work under this Contract, the Contractor shall at the discretion of the Contract Administrator construct a thirty (30) metre trial length to establish the adequacy of its equipment and quality of work.

The adequacy of the Contractor's equipment and quality of work will be determined by the Owner or Contract Administrator on inspection of this trial section of curb before the Contractor is permitted to proceed with the remaining work.

Should the trial section fail to conform to the specification requirements in any respect, it shall be removed and replaced by the Contractor, at its own expense, otherwise, it shall remain a part of the work.

353.02.02 Tolerances

Vertical tolerances for new concrete curbs shall not exceed ± 12 mm.

A cross-sectional variation of curb and gutter (at any one point) shall not exceed ± 6 mm.

353.02.03 Bench

The curb and gutter system shall be constructed with a 50mm bench throughout as per OPSD 600.040, 600.060, 600.080, 600.090, and 600.110. The bench height from the bottom of the curb shall vary due to the various types of curbs to be installed.

353.02.04 Depressed Curb

In circumstances where intersection ramps are adjacent, the top back portion of the curb shall be depressed 125mm through the entrance and 100mm depressed through driveway entrances. At driveways where concrete sidewalk is curb-faced, the top back portion of the curb shall be depressed 75mm through the entrance. All curbs shall be constructed in accordance with the latest revision of the Ontario Provincial Standard Drawings and City of Kitchener Standard Drawings.

353.02.05 Contraction Joints

When curb and gutter is placed by the extrusion method, contraction joints shall be formed by saw cutting the hardened concrete within 6 to 24 hours of placing the curb and gutter to prevent uncontrolled cracking. The width of the joint shall be 5mm maximum and the depth 60mm minimum. Maximum

spacing of contraction joints shall be 3.0m. Under no circumstances, shall wet-cut tooled joints be used on machine or hand placed curbs, unless directed by the Contract Administrator.

353.02.06 Finish

Broom finish for the curb is to be perpendicular to the roadway. Top edges of curbing shall be finished with a tool producing a rounded edge of not more than 13mm radius at the inside face.

353.02.07 Fish Plates

Owner supplied metal plates are to be installed in the new curb at all catchbasin grates within the project limits. Fish plates are to be requested by the Contractor at least 48 hours in advance of their planned installation by contacting The City of Kitchener's Stormwater Utility at 519-741-2200 ext. 7355. The fish plates will be available for pick up from The City of Kitchener's Operations Facility at 131 Goodrich Drive.

For placement of the fish plate the Contractor should refer to CKSD 410.010

Wet concrete installation shall be as follows:

- Concrete is to be finished and curing compound applied to the concrete per existing curb specifications. If curing compound is applied after the plate is installed, then the plate is to be protected from the compound using non-marking tape,
- Where a back arch has been installed at a catchbasin the plate shall be offset to either side of the back arch by a minimum of 50cm as directed,
- The plate shall be embedded 3mm into the wet concrete.

Dry concrete installation shall be as follows:

- The plate shall be fixed to the concrete using Sikaflex® Construction Sealant (gray colour) or approved equivalent following the manufacturer's specifications.

353.03 Measurement for Payment

Curbs and combined curbs and gutters shall be measured along the line of the face of curb on curves as well as straight lines.

353.04 Basis for Payment

The unit price bid for curb or curb and gutter construction shall include the excavation required to set the various components to the required line and grade as well as compaction of the base. Normally, the gravel base will be in place and additional gravel should not be required. However, where additional gravel is required, it will be paid for at the unit price bid in the Form of Tender.

The unit price bid for curb and gutter construction shall exclude the cost for all adjustments of any appurtenances located within the concrete. Maintenance covers, catchbasins, water and gas valves adjustments shall be paid separately under the appropriate unit prices bid in the Form of Tender.

No additional payment will be made for the placement of the fish plates.

Where delays beyond the control of the Contractor have pushed the completion of this work past October 31st, the Contractor will be entitled to payment for winter heat and cold weather protection.

CKSS 355 INTERLOCKING CONCRETE PAVERS

REFERENCES

OPSS 355 – Installation of Interlocking Concrete Pavers

355.01 Definitions

For the purposes of this specification, the following definitions apply:

unit means a single precast concrete paver block.

355.02 Material

The Contractor shall reuse the existing concrete pavers where salvaged and/or supply new ones as necessary to complete the work. New pavers used to supplement the salvaged ones shall be colour matched as closely as possible to the existing pavers.

The Contractor shall consult with the Contract Administrator while colour matching prior to ordering pavers.

355.02.01 Bedding Sand

Clean, sharp sand free from all debris and organic matter. Sand to be 100% passing the #16 sieve and 10% passing the # 200 sieve.

355.02.02 Permeable Pavers

Precast pavers for permeable pavement applications shall be ECO-OPTILOC™ by Unilock Ltd. (1-800-864-5625) or Enviro Midori by Oaks Concrete (1-800-709-6257) or approved equivalent.

All permeable concrete pavers shall have spacer bars on each unit.

Pavers shall meet the minimum material and physical properties as per ASTM C 936, Standard Specification for Interlocking Concrete Paving Units and CAN 3-A231.2, Standard Specification for Precast Concrete Pavers.

- The average compressive strength shall be 55 MPa with no individual unit under 50 MPa in accordance with ASTM C396 or CAN3-A231.2-M85.
- The average absorption shall be 5% with no unit greater than 7% when tested according to ASTM C 140.
- The resistance to 50 freeze-thaw cycles, when tested according to ASTM C67 or CAN3-A231.2-M85, with no breakage greater than 1.0% loss in dry weight of any unit. This test method shall be conducted not more than 12 months prior to delivery of units.

Pigment shall conform to ASTM C979.

355.02.03 Edge Restraints

Edge restraints shall be Snap Edge® or approved equivalent.

355.03 Construction

355.03.01 Standard Pavers

In the event that additional interlocking pavers are required to replace those salvaged from the site which have been damaged after removal, the Contractor shall replace the materials at their own cost.

All work that affects private driveways, walkways, paths and/or patios and like will require the Contractor to cooperate with the property owner(s) and to communicate the extent of the work, timing of impact and reinstatement, and to obtain a satisfactory sign off from the property owner(s) that the work of reinstatement has been completed to the private property owner(s)'s satisfaction.

Granular A shall be compacted to 95% SPDD and leveled to a finished depth of 150mm prior to placement of 25mm of bedding sand and concrete pavers and/or patio stones.

Where concrete pavers abut grass or landscaped/garden areas edge restraints shall be used to prevent lateral movement. The edge restraints shall be secured to the base as per manufacturer's specifications.

The surface of stones shall meet all adjacent walls and curbs flush and at precisely the same grade as adjacent surfaces or as directed by the Contractor Administrator.

All edges of paving stone, where abutting a curb, wall, maintenance hole cover or other material shall have a gap of no greater than 10mm or otherwise specified, between the edge of the paving stone and the abutting material.

After specified stone is laid in specified pattern, spread polymeric sand over surface, brush into joints, then compact. The paving stone shall be compacted with a vibrating plate tamper until the stones are firmly imbedded.

Finished surface shall run true to grade with no bumps or hollows.

355.03.02 Permeable Pavers

Prior to placement of the pavers the base material shall be inspected and removed of debris or any other foreign material.

The surface of the prepared base shall not deviate more than 10mm from the bottom edge of a 3m straight edge laid in any direction.

Before placement of the bedding aggregate course and the pavers the base shall be inspected by the Contract Administrator.

Pavers shall be free from foreign material prior to placement. Any chipped, damaged or discoloured pavers shall be replaced.

355.04 Measurement for Payment

Payment for this item shall be by the square metre at the unit price quoted in the Form of Tender.

355.05 Basis for Payment

The work for this item shall include all labour, equipment and material necessary to install salvaged concrete pavers, including the purchase and supply of additional pavers if required as indicated on the contract drawings to original conditions or better and as directed by the Contract Administrator.

CKSS 356

PERVIOUS CONCRETE PAVEMENT

REFERENCES

OPSS 356 – Pervious Concrete Pavement for Low-Volume Traffic Applications

356.01 Submission Requirements

The Contractor shall provide a detailed work plan and schedule specifically concerned with the successful placement of the pervious concrete. The work plan shall include; sequencing, method of storage of material on site to avoid contamination, method of forming concrete, etc.

The Contractor shall provide samples of aggregate to the Owner's authorized material testing company at least three weeks in advance concrete paving operations.

The Contractor shall provide a mix design to the Owner at least three weeks in advance of pervious concrete paving operations.

356.02 Materials

356.02.01 Expansion Joints

Expansion joint material shall be Type "A" bituminous fiberboard, in accordance with OPSS 1308 Material Specification for Joint Filler in Concrete.

Expansion joint material shall be a minimum of 9mm to a maximum of 13mm in width and extend the full thickness of the concrete. Alternative materials such as 'Deck-o-foam' (manufactured by W.R.Meadows) or approved equal shall be considered by the Owner or Contract Administrator on a project by project basis.

356.02.02 Pervious Concrete

The pervious concrete shall be Hydromedia® by LAFARGE. The pervious concrete may only be placed by approved applicators that have experience with the product. The approved applicator list is as follows and as supplemented by the Contract Documents;

Bevcon Construction and Paving
416-650-9393

UCC Group Inc.
416-675-7455

Alliance Site Construction
416-747-5030

Ro-Buck Contracting
519-455-1108

- Flexural strength of the concrete shall be 1.5 to 3.0 MPa,
- Slump shall be 150 mm,
- Void content minimum shall be 20%,
- Nominal aggregate size shall be 14mm

356.03 Construction

356.03.01 Preparation

Prior to placement of pervious concrete, the base material shall be inspected by the Contract Administrator and removed of any debris or any other foreign material by the Contractor.

356.03.02 Placement

Placement of the concrete shall be continuous and rapid. The Contractor shall avoid overworking the concrete. Do not over vibrate or work the top surface.

356.03.03 Compaction and Finishing

Pervious concrete shall be compacted with steel roller compactors or vibrating plates to height of the forms. Hand tamping shall be completed near edges and other places not reached. Compaction shall be completed within 15 minutes of placement. The Contractor shall not float or trowel the concrete. Minimize over working or movement of the surface after compaction, this includes walking on the surface.

356.03.04 Curing and Protection

Fog mist the surface of the concrete within 20 minutes of compaction. Cover the concrete with thin plastic sheeting within 20 minutes after placement and leave in place for 7 days. Additive curing compounds may be used as specified in the Contract Documents.

356.04 Measurement for Payment

The measurement for payment shall be by the square metre of pervious concrete poured. The Contractor shall receive 50% of the total value upon placement of the pervious concrete. The remaining 50% will be paid upon receipt of satisfactory QA/QC test results by the Owner's authorized material testing company and from the Contractor's Material supplier.

356.05 Basis for Payment

The Contractor shall include in its unit price for this item the equipment, labour and materials required to pour and place the pervious concrete at the location and to the dimensions as shown on the Contract Drawings and as directed by the Contract Administrator. The Contractor's price shall also include all required Quality Control and Quality Assurance tests. The Contractor will ensure a representative from the manufacturer is on-site to witness the pervious concrete placement. Payment shall include supply, placement and removal of a temporary tarp on top of the pervious concrete as necessary (to prevent contamination of the concrete and granular base) for light construction vehicle access during restoration activities.

CKSS 401 TRENCHING, BACKFILLING, AND COMPACTING

REFERENCES

OPSS 401 – Trenching, Backfilling, and Compacting
DGSSMS

401.01 Construction

401.01.01. Bedding

Unless otherwise specified in the Contract Documents all bedding shall be Class "B". Material for pipe bedding shall meet the requirements as specified in DGSSMS and OPSS 401.

401.01.02. Backfill

If, in the opinion of the Contract Administrator, the excavated material is unsuitable for use as backfill, (i.e. - if the Contractor cannot attain the minimum required degree of compaction using the excavated material as backfill), the Contractor shall be directed by the Contract Administrator (in writing) to either use appropriate site generated material or import fill as per the recommendation of the Geotechnical Consultant.

Backfilling of trenches shall be kept within 15 metres of pipe laying unless by permission or instruction of the Contract Administrator. At the end of each workday the trench shall be backfilled.

401.02 Measurement for Payment

With the exception of material used for infiltration trenches, payment shall be included in the unit price of the sewer, watermain, forcemain, and culvert.

401.03 Basis for Payment

The costs for sub-excavating and disposal of the unsuitable subsurface material shall be paid according to the rates as specified in the Form of Tender.

The work of this item shall include all labour, equipment and materials required to supply, place and compact suitable backfill of unspecified depth in areas specified by the Contract Administrator including grading and compaction, all in accordance with OPSS 401, except as extended or amended herein.

No payment shall be made for normal trenching to required subgrade elevations, for servicing (storm and sanitary sewers, watermain, culverts, forcemains, etc.). No payment shall be made for backfill and compacting with suitable excavated material.

CKSS 405 PIPE SUBDRAINS

REFERENCES

OPSS 405 – Pipe Subdrains
OPSD 216.021
DGSSMS

405.01 Material

Subdrains shall be 150mm corrugated high-density polyethylene 210 kPa tubing, perforated with geotextile sock filter. As per OPSD 216.021 the first 1m from the point of connection at the structure shall be non-perforated.

405.01.01 Bedding and Backfill

Bedding and backfill material shall be concrete sand meeting the gradation requirements of OPSS 1002 (Fine Aggregate for Concrete).

405.02 Construction

Subdrains shall be installed on the upstream side of catchbasins as per the City of Kitchener Development Manual and/or as directed by the Contract Administrator.

405.03 Basis for Payment

The work of this item shall include all labour, materials and equipment required to install and connect to catchbasins and catchbasin maintenance hole 150mm dia. subdrains in locations shown on the contract drawings, including specified bedding and backfill material as per OPSD 216.021.

CKSS 407 MAINTENANCE HOLE, CATCHBASIN, DITCH INLET AND VALVE CHAMBER INSTALLATION

REFERENCES

OPSS 407 – Maintenance Hole, Catchbasin, Ditch Inlet, and Valve Chamber Installation
DGSSMS

407.01 Material

407.01.01 Precast Structures

Precast maintenance holes for use with exfiltration pipes shall be a minimum of 1500mm nominal inside diameter unless otherwise specified.

407.01.02 Round PVC Drain Basins

In grassed areas with no traffic loading, Drain Basins shall be Nyloplast Drainbasin by ADS or approved equivalent.

If the maintenance hole is to be placed in a traffic loading area Chief Municipal Approval is required. Concrete collar shall be provided as per manufacturer's specification.

407.01.03 Catchbasin Quality Control Device

Quality control devices for catchbasins shall be CB Shield™ quality device by CB Shield Inc. (519-212-9161) or approved equivalent.

407.01.04 Hydrodynamic Separator

The hydrodynamic separator shall be certified as per the Canadian ETV Program General Verification Protocol (May 2013), where testing has been conducted by an independent 3rd party technology performance testing laboratory. Sediment scour and re-suspension performance testing and light liquid re-entrainment testing demonstrating that light liquids are captured after a spill are effectively retained during high flow rates must be included.

Hydrodynamic separator make and model shall be as shown on the contract drawings or as specified elsewhere in the Contract Documents.

No internal component shall be modified or replaced.

The Contractor shall ensure that the hydrodynamic separator unit supplied and installed perform to a level sufficient to removing the particle size distribution expected from the City of Kitchener as approved by the Agency.

The hydrodynamic separator shall be precast concrete, with inert materials used for internal component parts.

The separator shall remove sediment from storm water during frequent wet weather events, downstream to high flow bypass to prevent scouring. The separator shall treat a minimum of 90 per cent of the annual runoff volume and shall be capable of removing 80 per cent of the total suspended sediment load. The

separator must be capable of trapping silt and clay size particles from arterial road runoff with a particle size distribution as per Table 1 below. The PSD includes a broad range of particles from clay to coarse sand. Sediment removal performance shall be the equivalent of inorganic ground silica with a specific gravity of 2.65, uniformly mixed to meet the following particle size distribution.

Table 1 – Particle Size Distribution of Sediment

City of Kitchener PSD		
Particle Size (µm)	% Retained	Accum. Passing
<2	1.05%	0.00%
2	1.05%	1.05%
5	2.10%	2.10%
8	3.16%	4.21%
20	2.10%	7.36%
45	1.05%	9.47%
75	2.10%	10.52%
106	30.70%	12.63%
425	20.05%	43.33%
850	17.63%	63.38%
2000	12.20%	81.00%
4750	6.80%	93.20%
12500	0.00%	100.00%
19000	0.00%	100.00%

The hydrodynamic separator shall be installed underground as part of the storm sewer system and shall be structurally designed for Canadian Highway Bridge Design Code (CHBDC) traffic loading at the surface. The storage in the separator shall be vertically oriented. The separator shall be maintainable from the surface via one access point without requiring entry into the separator.

407.02 Construction

407.02.01 Precast Structures

All maintenance holes, including catchbasin maintenance holes to be benched regardless of sewer main pipe size as per OPSD 701.021. Benching shall be three quarters of the diameter of the largest pipe.

Diversion maintenance holes which include an internal weir and/or orifice plate shall not be benched.

Special maintenance hole structures shall be constructed according to the details shown on the contract drawings.

Unless otherwise noted on the contract drawings all frames and covers set in asphalt curb shall be set to base asphalt elevation as shown on the contract drawings. All frames and covers set in sodden, top-soiled or landscaped areas shall be set to finished grade elevation.

407.02.02 Connection to Existing

In the case of existing maintenance holes, the connection shall be deemed to include all maintenance hole reconstruction and re-benching.

407.02.03 Catchbasin Quality Control Device

Quality control devices shall be installed as soon as catchbasins are connected to the storm sewer main system to prevent clogging of LID facilities.

407.03 Measurement for Payment

407.03.01 Catchbasin Quality Control Device

Measurement for payment of this item shall be for each device installed by the Contractor.

407.03.02 Hydrodynamic Separator

Measurement for payment of this item shall be for each hydrodynamic separator device regardless of the depth.

407.04 Basis for Payment

407.04.01 Precast Structures

The cost to supply and install new maintenance holes and catchbasin frames and covers with adjustment units are **not** to be included in these unit prices and will be paid for separately. The cost to construct drop structures and install safety platforms shall be included in this item where shown on the Contract Drawings.

407.04.02 Catchbasin Quality Control Device

The price for this item shall be for all equipment, labour and materials required to supply and install the specified quality control device at locations specified in the contract documents and/or the approved contract drawings.

407.04.03 Hydrodynamic Separator

The price for this item shall be for all labour, equipment and materials required to supply and install the hydrodynamic separator including all internal components at locations shown on the contract drawings. The cost to supply and install frames and covers with adjustment units shall be included in the unit price of this item.

CKSS 408 ADJUSTMENT OF FRAMES AND COVERS

REFERENCES

OPSS 408 – Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers

OPSD 704.010 – Precast Concrete Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers

408.01 Construction

The Contractor shall adjust to the finished grade of the road or boulevard or whatever finished grade is applicable, frame and cover for all chambers, maintenance holes, catchbasins, valve boxes, water service boxes, gas valves, and other items required to be raised to finish grade. Access to water valves and gas valves shall be maintained at all times.

408.02 Measurement for Payment

Measurement for payment will be on an each basis for adjustments and payment at the Contract unit price and shall be full compensation for all specified and incidental work required to complete the item of work to the satisfaction of the Contract Administrator.

408.03 Basis for Payment

The work of this item shall include all labour, material and equipment required to adjust existing features as outlined in CKSS 408.01 to meet the final grades of boulevards, sidewalks, roadways or other finished areas, including excavation, removal of existing brickwork as applicable, supply and installation of precast/pre-manufactured adjustment units, parging, backfilling and compaction to 100% SPDD all in accordance with OPSS 501, except as extended or amended herein.

CKSS 409 CCTV SURVEY AND MANDREL TESTING OF SEWERS

REFERENCES

OPSS 409 – Closed-Circuit Television Inspection of Pipelines
DGSSMS

409.01 Construction

409.01.01 Pipeline Cleaning

The Contractor will flush and clean sewers, maintenance holes, and catchbasins, prior to testing and inspection. Testing shall be done in the presence of the Contract Administrator. The Contractor shall supply all water for cleaning and testing.

409.01.02 CCTV Inspection

All testing and inspection shall be completed after the placement of the base course of asphalt.

Inspection of the service laterals shall be from the main line connection to at least five (5) metres past the connection to the existing service. Inspection of all existing and constructed service laterals shall be video recorded.

Inspection of first downstream sewer main pipe segments, outside of project limits, shall be video recorded to ensure no migration of construction debris.

409.02 Final Documentation

The Contractor shall supply a hard copy report (with a map) and three (3) copies of a new DVD video record of all observations summarizing the CCTV Inspection to WRc standards.

409.03 Quality Assurance

A mandrel test shall be performed on all flexible pipes in accordance with OPSS 410 of which deflection of no more than 7.5% (CSA 182.11) of the nominal inside diameter will be deemed an acceptable installation. The test shall be completed on the sewers after the base asphalt has been laid. All maintenance holes, and catchbasins shall be inspected for defects and signs of leakage. Repair visible leaks or faults as approved by or as directed by the Contract Administrator.

No part of the work will be accepted until the sewers are clean and free from sand, earth, mud or other obstructions.

Any breaks, leakages, or other deficiencies found in the sewer system shall be repaired at the Contractor's expense.

If in the opinion of the Owner, re-inspection is required as a result of inadequate cleaning or any other deficiencies, the Contractor shall re-clean or make good all required repairs and re-inspect the sewer at no additional cost to the Owner. The Owner shall undertake at its cost, a final inspection of the sewers prior to the end of the two (2) year maintenance period. Any and all required deficiencies shall be the responsibility of the Contractor and shall be rectified by the Contractor prior to the Owner's final acceptance.

Final acceptance of the sewer system will not be granted until the inspection report and related data have been received and accepted by the Owner and all deficiencies corrected to the satisfaction of the Owner.

409.04 Measurement for Payment

The compensation at the set unit price shall be paid per lineal metre of sewer main or service lateral inspected and tested.

409.05 Basis for Payment

The unit price bid shall include all labour, equipment and materials to complete the work. Incomplete or non-compliant submissions returned for correction shall be corrected and resubmitted at no expense to the Owner.

CKSS 410 PIPE SEWER INSTALLATION

REFERENCES

OPSS 410 – Pipe Sewer Installation in Open Cut
DGSSMS

410.01 General

410.01.01 Service Laterals

The location of all existing service laterals is based where possible, on historic records and CCTV inspection. In some cases, the records of status and location of existing sanitary laterals and cellar drain connections may be incomplete. As a result, the exact location of laterals and drains will be determined at the time of installation. Both the sanitary lateral and the cellar drain (where present) shall be connected to the new main. It is the responsibility of the Contractor to investigate all lateral connections encountered in the course of replacing sanitary and other sewers.

410.02 Material

410.02.01 Sewer Main

In addition to the requirements of DGSSMS C.3.1.7 Profile HDPE pipe shall have integral bells.

410.02.02 Exfiltration Pipe

The pipe material shall be PVC with a smooth wall interior and a minimum diameter of 200mm. The pipe shall meet the requirements of OPSS 1841, and CSA B182.2. All piping shall use manufacturer and Owner approved couplings and fittings. Connections between the perforated and non-perforated sections shall be made with Owner approved fittings.

Perforated sections of storm sewer shall come with manufacturer installed perforations. On-site perforations of solid pipe sections shall not be considered equivalent perforated pipe and will not be accepted.

As a minimum, all pipes shall be marked to designate the pipe manufacturer, pipe class, and Manufacturer's Quality Assurance Stamp. Each fitting shall be marked to indicate its position in the pipeline.

410.02.03 Service Laterals

For trenchless installations service pipe shall be HDPE-DR17 pipe with no more than one butt fused joint per service. The connection at property line for a trenchless HDPE installed service shall be completed using a 200mm long Fernco Inc. coupler model number 1056-442 or approved equivalent.

410.02.04 Filter Sock

Filter sock shall meet the requirements of ASTM D6707 type A fabric.

410.02.05 Casing Pipe

Casing pipe shall be PVC DR-28 and a minimum of 100mm diameter. Where casing pipe needs to be larger based on the carrier pipe the casing pipe shall be a minimum of two (2) nominal pipe sizes larger.

410.03 Construction

410.03.01 Maintenance of Sewage Flows

In addition to the requirements of the Region of Waterloo's Sewer Use By-Law 1-90, and the Environmental Protection Act (O. Reg. 347/90), the Contractor will not be permitted to pump sanitary sewers outside of normal working hours (unless approved by the Owner), in the event there are pumping failures. The Contractor shall provide temporary, watertight, PVC, main reconnections at the end of each day's construction activities.

In addition, all service laterals exposed and intercepted shall be connected to the new main. Temporary service reconnections shall be watertight PVC connections. At no time will raw sewage be permitted to stand in open trenches.

The Contractor shall be required to provide for (Silent) pumps and generators to accommodate for a range of flow rates.

Upon request estimated flows can be obtained from the Contract Administrator.

410.03.02 Locate Existing Service Lateral

The Contractor shall investigate all existing lateral service pipes as shown on the Contract Drawings and as they are exposed in the roadway while installing the new sewer main.

Wherever possible the Contractor shall use dye tracing as the default method to determine sewer connection origin. However, when dye tracing is unsuccessful the Contractor is to either insert a plumber's fish tape into this service pipe and connect thereto the electronic pipe and cable locator tracing wire or complete a closed-circuit television inspection of the existing service lateral.

For services to be replaced by a method of trenchless excavation the Contractor shall supply a copy of the CCTV record of each existing service to the Contract Administrator two (2) weeks before the proposed service is to be installed.

This method of locating existing service laterals will be as directed by the Contract Administrator and undertaken when an exact location is required prior to excavating at the property line by the Hydrovac or mini-excavator method.

The Contractor shall use this method to identify the exact location of laterals and drains as necessary to ensure reconnection of all live systems.

410.03.03 Sewer Main Installation

Rubber gasket joints shall be used for horizontal elliptical concrete pipe where manufactured sizes allow. Mortar joints are to be as per ASTM C507.

The use of "Lox Seal" Sewer compound as supplied by National Coupling Limited, or approved equivalent may be considered by the Owner.

410.03.04 Exfiltration Pipe

Perforated piping shall not be used to make connections with maintenance hole or catchbasins within 2m of the storm structure. Perforated pipe shall not be used through clay seal/plug sections.

Perforated piping shall transition to the solid pipe sections as per CKSD 821.012. Transitions shall be made inside of the infiltration systems.

Ensure pipe interior and coupling surfaces are clean before laying the pipes. Do not use any type of shim to establish pipe slope. The exfiltration pipes shall be properly sloped and lead to a permanent positive outlet in accordance with connection details.

Filter sock shall be installed from end to end of pipe terminating at the maintenance hole structure. A minimum overlap of 500mm shall be provided.

As soon as the exfiltration pipes are connected to the maintenance hole the Contractor shall install the plugs to prevent the introduction of sediment contamination during construction.

410.03.05 Service Lateral Installation

Using the CCTV record the Contractor shall choose the appropriate method of trenchless replacement for a service lateral so as not to replicate a defect in the existing pipe (i.e. sag in service). The Contractor shall submit in writing their proposed method of trenchless replacement prior to completion of each service to be replaced.

When connecting a new 100mm diameter pipe to an existing 150mm diameter pipe, an eccentric adapter shall be used to provide a uniform transition at the inverts of these pipes. The possibility may arise where both the cellar drain and sanitary can be combined into one sound connection, with the use of proper wye connections, adaptors, reducers, etc. Where combined sewer connections are warranted, only one payment for the connection will apply, as per the appropriate tender item.

The trenchless method shall create an opening for the 100mm dia. sanitary service pipe, and (if required) a 25mm dia. water service pipe installation in the same tunnel.

Hydrovac excavations at the property line or as directed by the Contract Administrator should be completed to facilitate the reconnection of the service pipe. The Contractor may be allowed to excavate for the tunnel access pits at the property line with the use of a mini-excavator in lieu of the Hydrovac method, provided that the maximum trench opening at the surface does not exceed 2.0m X 2.0m.

Bedding and cover material on a trenchless services lateral at property line shall be 19mm clear stone.

If any of the additional existing service laterals are found to be connected to sump pumps, surface drains or to foundation weeping tiles, these connections are to be connected to the storm sewer system. If any connections are found to be combined sanitary, eaves trough and foundation weeping tile drains, the source of stormwater and/or groundwater entering into the these connections are to be disconnected from the sanitary sewer system and re-plumbed for connection to the storm sewer system or discharged to grade.

410.03.06 Joint Restraint Inside Casing

For sewer main and service lateral from 100mm to 300mm diameter the Cobra Lock™ System by Royal Pipe Systems (or approved equivalent) shall be used on all joints contained inside of the casing limits and up to three (3) metres outside from the end of the casing.

410.03.07 Connect to Existing

The Contractor shall construct all connections to join the work to existing services.

When a connection is to be made, the Contractor shall expose the end of the existing service or main for inspection by the Contract Administrator. All connections are to be watertight.

When connecting a new main to an existing maintenance hole the Contractor shall install a resilient connector in the structure as per manufacturer's specifications and contract drawings.

410.03.08 Filter Sock

The filter sock shall be installed from end to end of pipe terminating at the maintenance hole structure. A minimum overlap of 500mm shall be provided.

410.04 Measurement for Payment

410.04.01 Maintenance of Sewage Flows

Payment will be made on a percentage completed basis to complete all work.

410.04.02 Sewer Main Installation

Payment will be made on a prorated basis with ninety (90) percent being paid on completion of the appropriate section, with the remaining ten (10) percent being paid upon acceptance by the Owner of all testing.

410.04.03 Exfiltration Pipe

Payment will be made on a prorated basis with ninety (90) percent being paid on completion of the appropriate section, with the remaining ten (10) percent being paid upon acceptance by the Owner of all testing. The per metre rate shall be measured from centre of maintenance hole to maintenance hole.

410.04.04 Service Lateral Installation

Individual service lateral installation, with all necessary adaptors, reducers, etc., will be paid for on an each basis as outlined in the Form of Tender.

410.05 Basis for Payment

410.05.01 Exfiltration Pipe

The price for this item shall be for all equipment, labour, and materials to install perforated pipe and solid wall pipe in an exfiltration trench system, including all connections to storm structures, caps and couplers. The price per metre shall be for both exfiltration pipes from maintenance hole to maintenance hole. The cost for this work shall also include the supply and installation of the filter sock.

No additional payment shall be made for the supply and installation of permanent and temporary plugs at each end of the exfiltration pipe. The Contractor shall remove the temporary plug at their own cost.

410.05.02 Service Lateral Installation

Unless otherwise provided in the Schedule of Unit Prices, no additional payment shall be made to reconnect a service lateral to the existing service. The Contractor is responsible to allow for excavation, bedding, pipe installation, cover, and backfill a minimum of one (1) metre past the limit of the right-of-way.

The price for the trenchless items shall include review of the video inspection record to determine the appropriate method of replacement.

No payment will be made for the trenchless items listed in the Form of Tender if the Contract Administrator has not received the Contractor's proposal for trenchless method of replacement.

410.05.03 Locate Existing Service Lateral

The work of this item shall include all labour, equipment and materials required to locate existing sanitary, cellar drain and storm service pipes, by using an electronic pipe and cable locator, a plumber's fish tape, or CCTV video survey.

410.05.04 Connection to Existing

No claim by the Contractor shall be allowed for any delays due to changes in design which may be required due to the revealed conditions.

The work to connect proposed sewers to existing maintenance holes and catchbasin maintenance holes shall include the cost to re-bench the structure and bulkhead / plug abandoned inlet / outlet pipes at the structure, and installation of a resilient connector or brick and parging as required.

410.05.05 Casing Pipe

Where Casing pipe is required for the installation of service connections through LID stormwater facilities the work for this item shall also include the supply and installation of spacers, joint restraints and end seals.

CKSS 416 PIPELINE INSTALLATION BY JACKING AND BORING

REFERENCES

OPSS 416 – Pipeline and Utility Installation by Jacking & Boring

416.01 Definitions

For the purpose of this specification, the following definitions apply:

Casing Pipe is the pipe which houses the carrier pipe.

416.02 Basis for Payment

The unit price shall include the supply of all equipment, labour and materials necessary to install a steel casing to the diameter, wall thickness, length, and method as shown on the Contract Drawings and as indicated on the Form of Tender. The work for this item shall also include installation of spacers, joint restraints, end seals, welding, and anodes as per manufacturer's instructions.

CKSS 441 WATERMAIN INSTALLATION

REFERENCES

OPSS 441 – Watermain Installation in Open Cut
DGSSMS

441.01 Material

441.01.01 Valve Nut Extensions

Where required water valve nut extensions shall be Assembled Valve Stem Extensions by Bren Technologies Inc. (120 Walker Drive, Brampton, Ontario, Tel. 905-951-8118 or 1-888-688-2047) or approved equivalent.

441.01.02 Hydrants

Hydrants shall be greased by the manufacturer prior to being delivered to the site.

441.01.03 Valve Boxes

The City of Kitchener will only accept outside set screw type valve boxes.

441.02 Construction

441.02.01 Joint Restraint Inside Casing

For water main and service connections from 100mm to 300mm diameter the Cobra Lock™ System by Royal Pipe Systems (or approved equivalent) shall be used on all joints contained inside of the casing limits and up to three (3) metres outside from the end of the casing.

441.02.02 Connect to Existing

The Contractor shall be required to expose the existing watermain at the points of connection to determine the exact depth and location, so that the proper fittings can be pre-arranged for connection at a later date. New watermains shall not be connected to the existing watermains until they have been pressure tested, chlorinated, flushed, bacteriological tested and accepted by the Owner.

441.02.03 Services

The location records for existing water service laterals may be incomplete. The exact location of the service will be determined at the time of construction.

The Contractor will be permitted to deviate from straight-line installations to avoid disruption to trees/roots, etc. Hand excavation should be expected and will be required to avoid tree root damage. The Contractor shall install the new service from the point of connection at the main to the existing service at/or beyond the property line. All curb stop valves, main stops and service boxes will be replaced with new ones. The Contractor will be required to furnish all fittings needed to connect to the existing service regardless of its size, type and/or condition.

The Contractor shall supply and install a 12 lbs. anode attached to the private side metallic service.

441.02.03.01 Services Left in Place

Where an existing copper water service is found to be in good condition and means of its replacement may be deemed to be difficult due to above ground conflicts, Kitchener Utilities (KU) is to inspect the service to verify its condition. If KU deems that the service does not need to be replaced then the Contractor shall join to the existing service with same material as well as placement of an anode. For existing polyethylene pipe stiffeners (one on each side) and a 'Philmac' compression fitting or approved equivalent as per manufacturer's specification shall be installed.

441.02.03.02 Live Service Connection Tapping

Tapping of live mains are to be completed by Kitchener Utilities only. The Contractor will not be permitted to complete live main taps. The Contractor shall give Kitchener Utilities five (5) working days' notice for live tapping requests. Tapping requests should be made for after 9:00 am or later where possible.

441.02.04 Service Connection Pit

The Contractor shall backfill the service pit immediately after installation of the service pipe and hydrovac excavate at final connection. The use of temporary orange plastic construction fencing shall not be considered an acceptable method of maintaining a safe open pit. Options for maintaining a safe open pit during the work day available to the contractor are as follows:

- Temporary chain link construction fencing i.e. fast fence or approved equivalent,
- Metal plate covering with caisson.

All excavations shall be backfilled prior to the end of the work day unless permitted by the Contract Administrator.

441.03 Measurement for Payment

441.03.01 Live Service Connection Tapping

The Contractor shall be charged for stand-by time if the tapping area is not ready for Kitchener-Utilities to complete their work.

441.04 Basis for Payment

441.04.01 Watermain

The unit price bid shall include all labour, equipment and materials, including all bends, fittings, adaptors, tees, crosses, joint restraints, restraining glands, thrust blocks, tracer wire, anode, etc., to complete the work.

441.04.02 Connect to Existing

The price for this item shall include all labour, equipment and materials to connect to the existing water supply system. The work shall also include the exposure of the existing watermain at the points of connection to the new watermain prior to proposed installation as directed by the Contract Administrator.

441.04.03 Valves

The unit price bid shall include all labour, equipment and materials, including all restraining glands, thrust blocks, tracer wire, etc., to complete the work. The price for this item shall also include water valve nut extensions when they are required.

441.04.04 Services

The price for this item shall include supply of all labour (including hand digging around tree roots), equipment and materials to complete the work in accordance with Region of Waterloo SSMS Standard Drawings. The Contractor is responsible to allow for excavation, bedding, pipe installation, cover, and backfill a minimum of one (1) metre past the limit of the right-of-way. The connection of an anode to the existing metallic service on private property shall be included in the price for this item.

The Contractor shall include in their unit price for water services the cost to maintain a safe service connection pit.

CKSS 442 CORROSION PROTECTION OF WATERMANS

REFERENCES

DGSSMS
CKSD 1104.010

442.01 Construction

If the existing watermain is non-metallic, connect the new tracing wire to the existing tracing wire by using a copper split bolt wrapped with dielectric tape as per DGSSMS.

If the existing watermain is metallic, the tracing wire shall not under any circumstances be connected to the existing main or to metallic fittings or valves connected to the existing metallic main.

Installation of corrosion protection for metallic fittings shall be as per the DGSSMS.

442.01.01 Water Services

Corrosion protection for water services shall be as per CKSD 1104.010.

442.02 Measurement for Payment

Payment will be per each metallic fitting completed.

442.03 Basis for Payment

The payment for this item shall include all labour, equipment, and materials necessary to complete the work as described in the specifications.

CKSS 480 INFILTRATION SYSTEMS

REFERENCES

OPSS 410 – Pipe Sewer Installation in Open Cut
CKSS 410 – Pipe Sewer Installation

480.01 Submission Requirements

The Contractor shall provide a detailed work plan and schedule specifically concerned with the successful construction of the Infiltration System. The work plan shall include the following minimum details; sequencing, material source suppliers, method of storage of material on site to avoid contamination, method of avoiding contamination of the facility during construction, etc.

480.02 Material

480.02.01 Geotextile

Woven geotextile shall be TenCate Mirafi® RS380i or approved equivalent or as specified in the Contract Documents.

Woven or non-woven geotextiles shall be as per CKSS 1860 and OPSS 1860.

480.02.02 Seals

Seals may be either bentonite clay or low strength concrete unshrinkable fill as per CKSS 564.

480.03 Construction

480.03.01 Preparation

Execute excavating trench ensuring bottom and sides of excavation have been scarified and non-compacted (compacted for sections within roadway). Do not place clear stone bedding material prior to approval of excavation by Contract Administrator.

Care shall be exercised to prevent natural or fill soils from intermixing with the clear stone. All contaminated stone shall be removed and replaced with uncontaminated stone at the Contractor's own expense.

480.03.02 Erosion and Sediment Control

Areas designated for infiltration facilities should never serve as a sediment control device during construction. Construction runoff should be directed away from the proposed facility location. Upstream drainage from all sources should be intercepted with a temporary sediment control device as shown on the Contract Drawings and as directed by the Contract Administrator.

After the site is vegetated, temporary erosion and sediment control devices can be removed and the system brought online.

480.03.03 Seals

Seals shall be as per OPSD 802.095 to be used between each infiltration system and as specified on the Contract Drawings and as directed by the Contract Administrator.

480.03.04 Geotextile

Wrap excess geotextile overtop of aggregate used to cover the perforated pipe such that folds overlap by a min of 0.5m within the centre of the trench in order to provide separation between native and granular backfill and clear stone.

Solid pipe connections such as lead tie-ins or transitions from perforated to solid pipe sections which need to pass through the geotextile shall be established by creating an "X" in the geotextile and feeding the solid through the geotextile. The triangular folds of the "X" shall point away from the infiltration system and toward the source of the solid pipe sections and shall be secured to the outside of the solid pipe using zip ties. The Contractor shall ensure that no granular backfill used for the solid pipe sections shall be able to migrate and contaminate the open graded aggregate of the infiltration system. Should additional geotextile be required to ensure this requirement is met, additional geotextile pieces shall be provided at the Contractor's own expense.

480.04 Measurement for Payment

480.04.01 Geotextile

Payment for this item shall be per square metre of geotextile supplied and installed as part of an infiltration system.

480.05 Basis for Payment

480.05.01 Geotextile

The price for this item shall include all labour, equipment and materials required to supply and install geotextile wrap as part of an infiltration facility. The Contractor shall include in their price the work required to modify the geotextile based on site specific conditions as shown on the Contract Drawings and as directed by the Contract Administrator.

CKSS 481 OBSERVATION PORTS FOR INFILTRATION SYSTEMS

REFERENCES

CKSD 820.010 – Observation Port for Stormwater Management LID

481.01 Material

The observation port cap shall be a 6 Inch Cleanout cover (150mm) inside diameter by DomCast Components & Assemblies or approved equivalent.

Observation port caps shall have an H-20 traffic rating, a water resistant seal and a means of locking the cover.

The observation port standpipe shall be 150mm diameter PVC DR-11.

481.02 Construction

The observation port cap shall be fitted into the stand pipe collar extending from the surface through the profile of the infiltration facility. The observation port stand pipe collar shall be embedded in gravel filled sump, 300mm in diameter, and 200mm below the infiltration trench invert. The portion of stand pipe within the gravel filled sump layer shall be perforated. The flush mount well cap shall be set to base asphalt grade as per standard detail drawing CKSD 820.010 and as directed by the Contract administrator.

481.03 Measurement for Payment

Payment for this item will be for the complete installation of each observation port to finished base asphalt grade.

481.04 Basis for Payment

The price for this item shall include all labour, equipment and materials required to supply and install an observation port casing and cap at the locations specified on the contract drawings and as specified by the Contract Administrator.

CKSS 491

PRESERVATION, PROTECTION, AND RECONSTRUCTION OF EXISTING FACILITIES

REFERENCES

OPSS 491 – Preservation, Protection, and Reconstruction of Existing Facilities
CSA Standard Z662 – Oil and Gas Pipeline Systems; current version – Section 12 (Z662 Code)
Guideline for Excavation in the Vicinity of Utility Lines; current version; ESA and TSSA

491.01 General

To allow Kitchener Utilities (KU) staff to respond quickly to a natural gas emergency, valves necessary for shut-off shall be accessible and quickly located.

491.02 Construction

If the valve box is exposed for construction activities in its vicinity, it shall be protected from damage during construction and be accessible at all times.

Prior to backfilling, the valve box should be inspected to ensure it is upright and free of damage and the tracer wire is secure. If the valve box requires repair, call Kitchener Utilities (Gas Emergency Number) at 519-575-4505.

Valve boxes shall be set to the finished grade and contour of the street. Valve boxes shall be protected during backfilling of the road base and during the placing or replacing of road surfaces. After paving the asphalt shall be removed, and the valve box shall be flush to grade. Valve box repairs shall be made of original manufacturer's specific box size supplied by the City of Kitchener, if required.

Sand padding is to be placed 100mm below and 200mm above the valve and is to be physically compacted. Native material to be placed in 200mm lifts and compacted by mechanical means. During compaction ensure the centre point of the valve remains vertical.

491.03 Measurement for Payment

When specified in the contract documents the payment of this item will be according to the unit of measure specified in the form of tender, otherwise this work shall be considered to be included as incidental work by the Contractor required for completion of the project.

491.04 Basis for Payment

Payment at the Contract price for this work will include all equipment, materials and labour required to successfully preserve, protect, or reconstruct existing facilities.

CKSS 493

TEMPORARY POTABLE WATER SUPPLY SYSTEM

REFERENCES

DGSSMS

493.01 General

Temporary watermain shall be installed and commissioned prior to starting any removals.

The Contractor will be required to supply, install and maintain a temporary, potable water system and shall furnish for review and approval by Kitchener Utilities, a detailed work plan, supplemented with sketches, drawings and details as to how the system will be implemented as per the DGSSMS.

The Contractor shall visit the site prior to the tender submission to be certain of the necessary work required to complete the temporary watermain plan for fire suppression and potable water requirements.

493.02 Construction

493.02.01 Source Water Connection

The size of the backflow preventer shall be that of the largest diameter of the temporary watermain installed.

493.02.02 Pipeline Installation

Wherever the temporary watermain crosses a public sidewalk the pipe shall be buried below grade so that there is no vertical deflection along the travel path of the sidewalk. In order to maintain a clear pedestrian path the preferred location for the temporary watermain is 0.5m behind the back of the existing sidewalk where space permits.

Backfill at these locations shall be cold mix recycled asphalt compacted to 95% SPDD.

493.03 Measurement for Payment

Payment will be made on a pro-rated basis, 70% following supply and installation and 30% following removal of the system.

493.04 Basis for Payment

The price for this item shall include all labour, equipment, and materials (including backflow preventer), to implement and decommission the temporary watermain system, including preparation of the work plan, supply, installation, initial and ongoing bacteriological tests, and maintenance. The Contractor should also include the cost to provide sampling of the temporary watermain. The cost for burying the temporary main at public sidewalk crossings as well as the specified backfill material shall be included in payment for this item.

The price for temporary watermain shall include the cost to connect and disconnect to properties listed in the contract documents that require an after business hour (off peak) connection to the temporary watermain system.

CKSS 510 REMOVAL

REFERENCES

OPSS 510 – Removal

OPSS 610 – Removal of Electrical Equipment and Materials

510.01 Removal

510.01.01 Removal of Asphalt

Unless otherwise specified in the contract documents the Contractor may remove the asphalt using methods it deems appropriate, limits of asphalt removal shall however be governed by the Construction Staging Plan and as agreed upon by the Contract Administrator.

510.01.02 Removal of Asphalt, Partial Depth

The Contractor at the direction of the Contract Administrator and as directed on the contract drawings shall cold plane the existing asphalt pavement including temporary transverse and longitudinal ramping.

Where the entire thickness of the asphalt area is removed, the Contractor shall provide and maintain a reasonable road base surface for local access of motorised vehicles and pedestrians. In addition, the unit price bid shall also include the placement of temporary ramps using existing material at all intersections, entrances, driveways and walkways within the limits of the project. If new granular material is required for temporary ramp installation, the Contractor shall be paid under the appropriate unit price bid in the Form of Tender. Under no circumstance, shall an access or temporary ramp be removed for a significant amount of time prior to replacement of asphalt, without direction of the Contract Administrator.

The Contractor shall coordinate the cold planing of asphalt areas and subsequent replacement of the first course layer in a timely manner as not to cause a prolonged inconvenience to the public. The maximum time interval between these operations upon the completion of the asphalt removal shall not exceed a 2-day working period. Should the duration of these operations exceed this period, the Contractor shall maintain the moisture content of the road base materials as specified by the Contract Administrator by supplying and placing sufficient amounts of water and calcium chloride at their own expense.

Following the completion of the cold planning of asphalt areas, the Contractor in the presence of the Contract Administrator shall inspect all structures including sanitary and storm manholes, catchbasins, water valve chambers, water valve boxes and gas valves. All debris caused by construction must be immediately cleaned at the Contractor's expense.

510.01.03 Curb and Sidewalk

In reconstruction and/or rehabilitation projects the Contractor shall remove existing curbs or sidewalks in short sections only, as specified by the Contract Administrator. All traffic and pedestrian control procedures shall be in accordance with the latest edition of the "Occupational Health and Safety Act and Regulations for Construction Projects" and the manual of "Uniform Traffic Control Devices, Field Edition", as issued by the Province of Ontario. In any circumstance, wherever necessary, the Contractor shall maintain and supply temporary walkways and traffic thruways using delineators, barricades, and/or caution tape as directed by the Contract Administrator.

510.01.04 Soil (Inert) Disposal

Where and as directed by the Contract Administrator and/or the Geotechnical Consultant, the Contractor shall excavate unsuitable subsurface material (including trench excavation) and/or soft spots and dispose of the material off-site.

Material that is excess to the project that can be shipped to another property will be determined by the Owner's Representative through environmental and geotechnical testing. The Contractor shall excavate to the lines and grades specified in the contract and take all steps reasonable to control the flow of water for dewatering, minimize open lengths of trench, and to the extent reasonable and practicable, reuse approved native material.

510.02 Salvage

510.02.01 Landscaping Features

All material designated to be salvaged (i.e. pavers, retaining walls, etc.) shall be stored in a secure location and separated and catalogued from other like products and materials in order to maintain distinction as to its location of origin.

510.02.02 Traffic / Road Signs

The Contractor shall not remove any existing traffic or road signs. The City of Kitchener's Traffic Operations crews will remove traffic signs once the road has been closed.

510.03 Disposal

510.03.01 Poly Vinyl Chloride Pipe

All poly vinyl chloride (PVC) pipe removed from the trench by the Contractor shall be collected and delivered to the Owner's Operations Facility at 131 Goodrich Drive as part of The City of Kitchener's recycling program.

510.04 Measurement for Payment

510.04.01 Removal of Asphalt

Some driveways may have a coating of asphalt over the existing concrete and in this case, the concrete item removal will govern, i.e., one payment will be made for this removal, **not both**.

510.04.02 Removal of Asphalt, Partial Depth

The price for this item shall be measure per square metre of area planed off of the existing pavement regardless of the thickness removed.

510.04.03 Concrete

Measurement shall be per square metre for sidewalks, driveways and road base, per linear metre for curb and gutter, and per square metre area of the tread for steps.

510.04.04 Soil (Inert) Disposal

Payment for offsite movement of designated inert soils (approved by the Owner) to another property shall be measured by the tonne using scale house tickets. If tickets cannot be provided due to the location of the disposal site the Contractor shall declare such prior to shipment of material off-site and the truck box method will be used at the time of shipment in cubic metres, as agreed upon by the Owner.

For the purposes of calculating the removal of soil by the truck box method the following values shall be used:

<u>Haulage Equipment</u>	<u>Capacity (m³)</u>
Rear Dump, Tandem Rear Axle	7.5
Rear Dump, Triaxle	11.5

For the purposes of conversion to tonnes the following conversion rates will apply for each soil type:

<u>Soil type</u>	<u>Unit Weight (kg/m³)</u>
Clay	1,900
Gravel	2,000
Sand	1,800
Silt	2,100

For soil types not listed above or for a mixture of those shown, a unit weight shall be agreed upon between the Contractor and the Owner prior to any soil excavation. If the Contractor has removed soil which does not fall under a category listed above and a unit weight has not been agreed upon between the Contractor and the Contract Administrator, a unit weight of 1,800 kg/m³ shall be used.

The quantities specified for the unit prices are estimates based on the best available information. Variances of actual quantities from estimates shall not be considered as valid cause for price adjustments.

For removal of unsuitable subsurface materials measurement will be by the in-place cubic metre (m³) with no allowance for bulking and will be based on extension of the approximate average depth and approximate average square metre area of the sub-excavation based on measurements taken by the Contract Administrator's field representative at the time of work.

510.04.05 Watermain and Appurtenances

Measurement for payment for watermain and water service removal shall be per linear metre along the centre line of pipe including all inline facilities, bends, or other appurtenances, while removal of valve chambers and hydrants will be on each basis for the number of units removed under this item.

510.05 Basis for Payment

510.04.01 Asphalt

The work of this item shall include all labour, equipment, materials and sawcutting as required to remove asphalt pavement materials specified in the Schedule of Items and Prices, and disposal of the same off site.

510.04.02 Concrete

The work of this item shall include all labour, equipment, materials and sawcutting as required to remove concrete road base, reinforced concrete road base, sidewalks, curb and gutter, driveways, and driveway ramps, steps and disposal of the same off site.

510.04.03 Soil (Inert) Disposal

The work for these items shall include labour, equipment and materials required to excavate, load, transport, unload at another property, and written proof of acceptance of the material by the property owner. No additional payment shall be made for the Contractor to level, grade, or compact the material at the receiving site.

510.04.04 Watermain and Appurtenances

The work of this item shall include all labour, equipment and materials required to remove existing watermain pipe, valves, hydrants, watermain services and/or other appurtenances as specified in the Schedule of Items and Prices and/or as illustrated on the Contract Drawings, all in accordance with OPSS 510, except as extended or amended herein. Payment at the Contract unit prices shall be full compensation for all specified and incidental work required to complete the items of work to the satisfaction of the Contract Administrator.

CKSS 517

DEWATERING OF PIPELINE, UTILITY, AND ASSOCIATED STRUCTURE EXCAVATION

REFERENCES

OPSS 517 – Dewatering of Pipeline, Utility, and Associated Structure Excavation
Region of Waterloo Sewer Use By-Law 1-90

517.01 General

Surface and ground water shall only be discharged with the approval of the Owner. Water shall be tested by the Contractor (at an SCC accredited laboratory) and approved for discharge by the Owner. The Contractor shall make every effort to reduce the level of sediment in the discharge effluent.

517.02 Dewatering

The contractor shall be responsible for:

- Dewatering, depressurizing, draining, and maintaining trenches, tunnel excavations, sewer excavations, structural excavations, and foundation excavations in a stable condition;
- Protecting work against surface runoff, snow melts and rain waters;
- Providing a storage tank for temporary storage of water prior to discharge;
- Disposing of removed water as specified by OPSS 518 and CKSS 518; and
- Water control including both dewatering and depressurization of water bearing soil layers.

Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from cut slopes or bottoms of excavations, and disposing of removed water. The intent of dewatering is to increase the stability of tunnel excavations and excavated slopes; prevent dislocation of material from slopes or bottoms of excavations; reduce lateral loads on shoring; improve excavating and hauling characteristics of excavated material; prevent failure or heaving of the bottom of excavations due to hydrostatic pressure; and to provide suitable conditions for placement of foundations, backfill materials, waterproofing, drainage, and construction of structures and other installations.

Depressurization includes reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottoms.

Excavation drainage includes keeping excavations free of surface and seepage water.

Surface drainage includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect the work from any source of surface water.

Equipment and instrumentation for monitoring and control of the ground water control system as per conditions imposed by the MOECC Permit to Take Water (PTTW), the Region of Waterloo Sewer Use By-Law 1-90 and the Compliance Agreement as contained within the Contract Documents.

The Contractor shall not discharge any water from the storage tank without the written authority of the Owner.

The Contractor shall monitor operations to verify that the dewatering system lowers ground water piezometric levels at a rate required to maintain a stable excavation, resulting in a stable subgrade for carrying out subsequent operations.

Where hydrostatic pressures in confined water bearing layers exist below excavation, depressurize those zones to eliminate risk to uplift or other instability of excavation or installed works. The piezometric elevations shall be low enough to develop a workable condition for construction operations.

The Contractor shall remove ground water control installations and remove pumping system components (such as eductors, well points, or deep wells and piping) after the permanent dewatering system is fully functional.

The Contractor shall decommission piezometers and monitoring wells in accordance with Ontario Regulation 903.

The use of submersible drainage pumps pumping at a controlled rate installed in a sump lined with 19mm clear stone acting as a filter material may be permitted with the approval of the Contract Administrator.

517.02.01 Performance Requirements

Design a ground water control system to produce the following results:

- Reduce the hydrostatic pressure affecting the excavations, cut slope stability and foundation subgrades.
- Develop a stable subgrade for subsequent construction operations.
- Preclude damage to adjacent buildings, structures and utilities, and other work.
- Prevent the loss of fines, seepage, boils, quick condition, or softening of the foundation soils.
- Maintain stability of sides and bottom of excavations.

Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials, such as crushed stone and filter fabric, together with sump pumping. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.

Locate ground water control and drainage systems so as not to interfere with utilities, construction operations or adjacent properties.

Provide an adequate number of piezometers installed at the proper locations and depths as required to provide meaningful observations of the conditions affecting the excavations.

Protect monitoring wells installed during the site investigation.

Decommission piezometers and monitoring wells installed during site investigation as per O. Reg. 903.

517.02.02 Equipment and Materials

Equipment and material selection are the prerogative of the Contractor as necessary to achieve the desired results for dewatering.

Eductors, well points, or deep wells, where used, shall be furnished, installed and operated by a Contractor licensed by the MOECC as a well contractor regularly engaged in ground water control system design, installation, and operation. All equipment shall be in good repair and operating order.

Standby equipment and materials shall be kept available to ensure continuous operation, where required.

Provide thermal protection for the dewatering system against freezing temperatures where required.

517.02.02.01 Storage Tank for Dewatering Effluent

The storage tank supplied by the Contractor shall include a minimum of one (1) sample port as well as a digital flow meter. The tank shall be closed from the top and shall not be open to the environment to prevent contamination of dewatering effluent.

517.02.03 Submittals

Submit a Dewatering Plan for review by the Contract Administrator prior to start of any field work. The Plan shall be signed by a Professional Engineer registered in the Province of Ontario.

Submitted plan to include the following, but not limited to:

- A description of proposed groundwater control systems indicating arrangement, location, depth and capacities of system components, installation details and criteria, and operation and maintenance procedures.
- A description of proposed monitoring and control system indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics.
- Operating requirements, including piezometric control elevations for dewatering and depressurization.

Submit the following records upon completion of initial installation:

- Installation and development reports for well points, eductors, and deep wells.
- Installation reports and baseline readings for piezometers and monitoring wells.
- Initial flow rates.

Submit the following records on a weekly basis during operations:

- Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization.

Submit the following records at end of work:

- Decommissioning (abandonment) reports as per O. Reg. 903 for monitoring wells and piezometers installed by others during the design phase and left for Contractor's monitoring use, and those installed by the Contractor.

517.03 Water Control

The control of water shall be according to OPSS 518 and CKSS 518.

517.04 Measurement for Payment

517.04.01 Mobilization and Demobilization

Measurement of this item at the lump sum unit will be made regardless of the number pumps, wells etc. completed for the dewatering activity. Payment at 80% of the tendered value will be made once the dewatering system is fully operational, the remainder will be paid upon demobilization of all dewatering equipment and forces.

517.04.02 Well Point Dewatering

Measurement for this item shall be per metre of header pipe installed.

517.04.03 Storage Tank for Dewatering Effluent

Measurement for this item shall be per calendar day on-site while excavation activities are in progress.

517.04.04 Monitoring Well Decommissioning

Measurement shall be for each monitoring well (either installed as a part of the Work or installed prior to commencement of the contract) complete decommissioning, recording and delivery of recorded information to the Director of the appropriate branch of the Ministry of the Environment.

517.04.05 Lab Analysis of Water

Measurement shall be based on each site visit conducted for the collection of water samples regardless of the number of samples collected.

517.05 Basis for Payment

No extra payment for the removal of ground water from excavations will be made unless specific item(s) for well pointing systems are provided in the Form of Tender, and any method employed by the Contractor to this end, including the use of clear-stone, shall be carried out at the Contractor's own expense. Any clear-stone used for the aforementioned purpose shall be for dewatering purposes only and shall not be accepted in lieu of specified bedding or backfill material.

517.05.01 Well Point Dewatering

The work for this item shall include all labour, materials, equipment, techniques and methods to lower, control, remove sediment and handle ground water in a manner compatible with construction methods and site conditions; monitor effectiveness of the installed system; provide for continuous system operation, including nights, weekends, and holidays; and arrange for appropriate backup when electrical power failure occurs. The Contractor shall comply with conditions in the PTTW, the Compliance Program with the Region of Waterloo for discharge to the sanitary sewer (where applicable), The Occupational Health and Safety Act, The Environmental Protection Act, regulations for Construction Projects, local by-laws and all other regulations of the Ontario Ministry of Labour and MOECC Regulations for disposal of materials.

517.05.02 Storage Tank for Dewatering Effluent

The work for this item shall include all labour, equipment and materials required to supply, setup, operate, relocate and remove from the project site as required based on the Contractor's operations. There will be no direct compensation for work associated with the removal and off-site disposal of sediment from the storage tank.

If the Contractor fails to submit the flow rate data no payment will be made for this item.

517.05.03 Monitoring Well Decommissioning

The work for this item shall be for all labour, equipment and materials required to decommission monitoring wells complete within the project limits.

Payment of this item will be made only after the Owner has received a copy of the well decommissioning record.

517.05.04 Lab Analysis of Water

The unit price for this item shall include all costs associated with testing of water contained in the on-site temporary storage tank.

CKSS 518 CONTROL AND TREATMENT OF WATER FROM DEWATERING OPERATIONS

REFERENCES

OPSS 517 – Dewatering of Pipeline, Utility, and Associated Structure Excavation
OPSS 518 – Control of Water from Dewatering Operations
Region of Waterloo Sewer Use By-Law 1-90

518.01 General

Liquids handling, liquids treatment and disposal will be the responsibility of the Contractor during all excavation and backfilling operations.

518.02 Construction

518.02.01 Surface Water Control

Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. This includes temporary works required to protect adjoining properties from surface drainage caused by construction operations. Divert surface water and seepage water into sumps and pump it into designated drainage channels or storm drains. Provide settling basins as required.

518.02.02 Disposal of Water

The Contractor shall ensure that all groundwater entering excavations as well as surface water which has contacted the soils on site is collected.

518.02.02.01 Direct Discharge to Sanitary Sewer

Treatment of all dewatered liquids shall meet the Sanitary Sewer-Use By-law 1-90 criteria and any applicable permit criteria for discharge to the sanitary sewer.

The sampling requirements for discharge to the sanitary sewer by the Regional Municipality of Waterloo (RMOW) are expected to be as follows:

- Testing a batch volume of pre-treated effluent that would be stored, tested and results forwarded to the RMOW for approval prior to discharge. The Contractor shall allow for the temporary stopping and re-starting of dewatering operations while the Region is reviewing each of the three batch data sets. After three (3) consecutive batches that successfully meet the Sanitary Sewer-Use By-law 1-90 criteria, then discharge would occur directly to the sanitary sewer and water quality testing would occur as set out below.
- Pre-treated effluent will then be tested daily for the first week to confirm the system is functioning properly. After the first week, effluent will be tested weekly to confirm compliance with the Sanitary Sewer-Use By-law 1-90 criteria.

The above sampling requirements will be the responsibility of the Contractor.

Provided the dewatering effluent meets the Sanitary Sewer-Use By-law 1-90 and the sewer use agreement direct discharge to the sanitary sewer can commence following approval from the Region of

Waterloo and the Owner. Be advised that representatives from the Region of Waterloo may conduct Site inspections and sampling of treated effluent for their own independent verification that the terms of the Permit are being met. The Contractor will be in breach of the terms of this contract if it knowingly violates any condition or requirement for testing set out in the Region of Waterloo Compliance Program or described herein.

518.02.02.02 Water Treatment Prior to Discharge to Sanitary Sewer

Should the dewatering effluent fail to meet the conditions of the sewer use by-law and (where applicable) the sewer use agreement, then treatment of the water may be necessary prior to discharge to the sanitary sewer.

The Contractor shall provide access to the water treatment system to the Contract Administrator and RMOW's representative for inspection and testing purposes.

The Contractor is responsible for all maintenance of the water treatment system including winterization, filter changes, and any media (e.g. granular activated carbon) changes.

From an operational view, system maintenance and filter change-out would occur on a regular basis based on routine analysis, before any level that exceeds the specified maximum permissible limit. It is the responsibility of the Contractor to assess the condition of the effluent on a regular basis and to determine when maintenance is required and to ensure that effluent discharged to the sanitary sewer does not exceed the permissible limit.

A flow meter will be installed to record the actual volume of discharged water. Test ports before and after the treatment filters will allow for sampling collection for laboratory analysis of target compounds before treated groundwater is discharged to the sewer. The proposed effluent quality will not result in an odour concern within the sewer.

To confirm that the Contractor's mobile water treatment unit is functioning satisfactorily the Contractor shall proceed as follows:

- A batch volume of treated effluent would be stored and tested to confirm compliance with O.Reg. 511/09 (as amended) Table 2 Standards, the Region of Waterloo Sewer Use By-Law 1-90, and any other applicable limits as set out in the Compliance Program with the Region of Waterloo. If contaminants are detected above the respective limits in the effluent, the batch volume of water shall be retreated at the Contractor's expense. The retreated batch(s) of effluent will be retested at the Contractor's expense until compliance is confirmed.
- The Contract Administrator upon receipt of satisfactory laboratory analysis that confirms that the treated effluent does not exceed the respective limits will authorize the Contractor to discharge the treated effluent to the sanitary sewer with any and all conditions set out in the valid and proper Environmental Compliance Approval(s) (ECA), and/or Region of Waterloo Compliance Program.
- All subsequent operation and conformance to the ECA for discharge to the sanitary sewer shall be the responsibility of the Contractor. This shall include testing, reporting, monitoring requirements.

Operation of the treatment facility and discharge to the sanitary sewer shall not be permitted without written authorization from the Owner.

518.02.02.03 Water Treatment Prior to Discharge to Storm Sewer

When the Contract Documents call for discharge to the storm sewer the Contractor shall treat the dewatering effluent to Provincial Water Quality Objectives (PWQO) concentration levels.

From an operational view, system maintenance and filter change-out would occur on a regular basis based on routine analysis, before any level that exceeds the specified maximum permissible limit. It is the responsibility of the Contractor to assess the condition of the effluent on a regular basis and to determine when maintenance is required and to ensure that effluent discharged to the sanitary sewer does not exceed the permissible limit.

A flow meter will be installed to record the actual volume of discharged water. Test ports before and after the treatment filters will allow for sampling collection for laboratory analysis of target compounds before treated groundwater is discharged to the sewer. The proposed effluent quality will not result in an odour concern within the sewer.

To confirm that the Contractor's mobile water treatment unit is functioning satisfactorily the Contractor shall proceed as follows:

- A batch volume of treated effluent would be stored and tested to confirm compliance with O.Reg. 511/09 (as amended) Table 2 Standards, the Region of Waterloo Sewer Use By-Law 1-90 and Provincial Water Quality Objectives (PWQO). If contaminants are detected above the respective limits in the effluent, the batch volume of water shall be retreated at the Contractor's expense. The retreated batch(s) of effluent will be retested at the Contractor's expense until compliance is confirmed.
- The Contract Administrator upon receipt of satisfactory laboratory analysis that confirms that the treated effluent does not exceed the respective limits will authorize the Contractor to discharge the treated effluent to the storm sewer with any and all conditions set out in the valid and proper Environmental Compliance Approval(s) (ECA).
- All subsequent operation and conformance to the ECA for discharge to the storm sewer shall be the responsibility of the Contractor. This shall include testing, reporting, monitoring requirements.

Operation of the treatment facility and discharge to the storm sewer shall not be permitted without written authorization from the Owner.

518.02.02.04 Water Treatment Prior to Discharge to Grade

When the Contract Documents call for discharge to grade the Contractor shall treat the dewatering effluent to PWQO concentration levels. The Contractor shall dispose of the dewatering effluent in accordance with the sediment and erosion control plan.

A flow meter will be installed to record the actual volume of discharged water. Test ports before and after the treatment filters will allow for sampling collection for laboratory analysis of target compounds before treated groundwater is discharged to the sewer. The proposed effluent quality will not result in an odour concern within the sewer.

To confirm that the Contractor's mobile water treatment unit is functioning satisfactorily the Contractor shall proceed as follows:

- A batch volume of treated effluent would be stored and tested to confirm compliance with Provincial Water Quality Objectives (PWQO). If contaminants are detected above the respective limits in the effluent, the batch volume of water shall be retreated at the Contractor's expense.

The retreated batch(s) of effluent will be retested at the Contractor's expense until compliance is confirmed.

- The Contract Administrator upon receipt of satisfactory laboratory analysis that confirms that the treated effluent does not exceed the respective limits will authorize the Contractor to discharge the treated effluent to grade with any and all conditions set out in the valid and proper Environmental Compliance Approval(s) (ECA).
- All subsequent operation and conformance to the ECA for discharge to grade shall be the responsibility of the Contractor. This shall include testing, reporting, monitoring requirements.

Operation of the treatment facility and discharge to grade shall not be permitted without written authorization from the Owner.

518.03 Off-Site Water Disposal

If instructed by the Contract Administrator to dispose of groundwater to an MOECC approved disposal facility, the Contractor is solely responsible for arranging a disposal facility including manifesting and providing any analytical data that the disposal facility requires. The Owner shall provide the Hazardous Waste Information Network (HWIN) number to the Contractor.

518.04 Measurement for Payment

Payment for groundwater treatment items will only be made if the dewatering effluent does not meet regulated concentrations as set out in applicable legislations, by-laws or agreements.

Measurement for this item shall be per calendar day on-site while excavation activities are in progress.

518.05 Basis for Payment

518.05.01 Discharge

There will be no direct compensation for the labour, equipment and materials required to discharge dewatering effluent when no water treatment has been applied.

518.05.02 On-Site Water Treatment

Payment for mobilization and demobilization shall only be paid upon written authorization from the Contract Administrator permitting the Contractor to setup the mobile treatment facility on-site.

The Contractor is responsible for all maintenance of the water treatment system including winterization, filter changes, and any media (e.g. granular activated carbon) changes. The Contractor is also responsible for any costs incurred for the changing and disposal of any spent carbon or other media from the water treatment plant. Water quality may be variable indicating that concentrations of detected compounds may fluctuate. No additional payment or claim will be considered for any costs incurred such as changing of carbon units, filters.

Costs are to include all labour, equipment and supplies for cleaning, start-up, continuous operation and maintenance of the system and components for the duration of dewatering activities, including all mandatory reporting requirements. Costs also include all labour, equipment and supplies related to changes of filters and filter media.

No additional payment will be made for power supply and use, winterization, movement of the system and associated equipment within the limits of the project site, re-processing of treated water, site security,

malfunction of equipment, addition/removal of treatment components, standby time, system modification due to improper operation, maintenance, testing, or sampling pursuant to the ECA, Region of Waterloo Compliance Program and/or Provincial Water Quality Objectives are to be made by the Contractor.

No payment will be made for discharge of treated groundwater to the sewer without written approval from the Owner.

518.05.03 Off-Site Water Disposal

Payment for the handling and offsite disposal of wastewater to a licensed wastewater treatment facility to include all load manifests, testing fees by the receiver, reporting requirements, vacuum truck equipment, and miscellaneous pumps and hoses. No additional payment will be made for truck standby time during loading and unloading, loads rejected by the receiver, load restriction or surcharges.

CKSS 560

PRECONDITION SURVEY OF STRUCTURES

560.01 General

The Contractor will retain a specialist firm to conduct pre-condition inspections of structures in proximity to this project, record the condition of such structures, make arrangements for a program of vibration monitoring during the construction (as may be necessary), and conduct follow-up inspections and investigations (as maybe necessary).

The completion and verification, in writing to the Owner, that all pre-condition inspections of all structures shall be done before the scheduled start of construction. Failure to satisfy this condition may be treated, at the Owner's discretion and without claim of waiver, as a material breach of the contract.

560.02 Work

The general requirements for these surveys will include a video and photographic record, a fully documented (hardcopy and digital PDF) inventory and bound report(s) with photographic examples. The report shall include a reference map showing buildings surveyed by location and a summary of significant and/or notable deficiencies or matters of concern to the proposed project. The inspection and survey report shall document the following minimum information:

Conditions of:

Building Exterior - all exposed walls, doors, windows, roof if possible and any other permanent or fixed structures, including, retaining walls, garage(s), carport(s), landings, porches, etc.

Building Interior - all rooms, exposed walls, floor and ceiling, doors, windows, stairs and landings as well as any other pertinent fixtures.

Landscaping Features - such as fountains, garden walls, driveways and hard surfaced walkways (concrete, impressed concrete, etc.)

Before the pre-condition surveys are carried out, the Contract Administrator will provide an introductory letter explaining the purpose and procedure of the survey. The letter shall be delivered by the Contractor to each property owner prior to the survey being undertaken.

560.03 Measurement for Payment

Measurement for payment will be lump sum with 50% paid upon project startup and the remainder being paid in full once the final reports have been provided to the Owner.

560.04 Basis for Payment

This Item shall include all labour, equipment and materials required to provide a complete pre-condition survey of structures as required by the scope of the work, including the submission of the detailed survey results to the Owner prior to the scheduled start of construction, and follow up inspections as required.

CKSS 561

TEST PITS FOR SOIL CHARACTERIZATION

561.01 Construction

561.01.01 Test Pits During Construction

The Contractor shall excavate at locations agreed upon with the Contract Administrator test pits to a minimum of 1.2m below ground surface (b.g.s.) for the purposes of obtaining soil samples for characterization of contaminants.

The Contractor shall upon completion of the test pit backfill with the excavated material. For projects where this work forms the part of a larger contract, granular A shall be used for restoration to existing grade above the backfilled material, all granular material to be compacted to 100% SPDD.

561.01.02 Exploratory Test Pits

The Contractor shall upon completion of the test pit backfill with the excavated material and compacted to 95% SPDD. Asphalt edges shall be saw-cut in a diamond pattern in the direction of the flow of traffic. A minimum of 90 mm of HL4 (two lifts of 45mm) asphalt (compacted to 98% SPDD) placed to finished grade.

561.02 Basis for Payment

The work of this item shall include all labour, equipment, materials and sawcutting as required to excavate, stockpile, and backfill test pits for soil characterization to the depth specified in the Contract Documents and locations as directed by the Contract Administrator.

Payment for restoration items such as asphalt shall be paid for under their respective items in the Form of Tender.

CKSS 562
PROVIDE GARBAGE, RECYCLE, GREEN BIN AND YARD WASTE
PICK UP AND TRANSPORTATION

562.01 General

The Contractor will be required to pick up, transport, and return (in the case of bins) garbage, recycle, green bin and yard waste materials when access to these areas are denied because of the Contractor's activities or deemed unacceptable by the Region of Waterloo's Waste Management Division.

562.02 Measurement for Payment

Payment for this item will be pro-rated to match the percentage of the work completed at the time of each progress payment certificate.

562.03 Basis for Payment

The work of this item shall include all costs associated with the pickup and transportation of garbage, recycle, green bin and yard waste items, as required by the Regional Municipality of Waterloo, Waste Management Division as well as other waste collection firms.

CKSS 563

RAILWAY FLAGMAN AND INSPECTION

563.01 General

The Contractor shall be responsible for coordinating with the Railway Authority to arrange for their on-site inspector(s) to be present for the duration of any work within or adjacent to the Railway Right-of-way as required by the Railway Authority.

563.02 Basis for Payment

The Contractor shall be responsible for all Railway inspection costs, including all incidental items as provided in the Form of Tender. Any inspection costs over and above the amount listed in the Form of Tender shall be at the Contractor's expense and shall be considered a full part of the work.

CKSS 564 UNSHRINKABLE BACKFILL

REFERENCES

OPSS 1359 – Material Specification for Unshrinkable Backfill

564.01 Material

The controlled density fill material used shall be a ready mixed flowable fill as manufactured by ready mixed concrete producers. The controlled density fill shall consist of and meet the following requirements:

Cement

- Type 10 Portland Cement
- 25 kg/m³

Aggregates

- In accordance with CSA (CAN3-A23.1)

Slump

- 160mm to 200mm for trench backfill, or as per pumping specifications

Strength

- maximum 0.7MPa at 28 days

Air Entrainment

- In accordance with CSA (CAN3-A23.1)

564.02 Construction

The Contractor is to ensure the method and equipment being used will not damage the abandoned pipe.

564.03 Measurement for Payment

Payment shall be at the Contract unit price per cubic metre for filling abandoned pipe or for use as trench backfill, and shall be full compensation for all specified and incidental work, to the satisfaction of the Contract Administrator.

564.04 Basis for Payment

The work of this item shall include all labour, material and equipment required to supply and place controlled density fill, to fill in-situ voids and abandoned pipes inaccessible to mechanical compaction equipment, in order to provide protection and structural support to utilities and other plant as requested by the Contract Administrator.

CKSS 565 SITE OFFICE

565.01 General

The Contractor shall provide for the duration of the Contract, for the sole use of the Contract Administrator and its representatives, a field office in good, clean condition (mold free, dirt/dust free, secure from vermin and other pests) having a minimum floor area of 12.0m², a plan bench 1.0m wide x 2.4m long including a drafting stool, adequate windows, a telephone and an electrical service hookup (which shall be maintained by the Contractor at the Contractor's expense), a lockable door, a desk with drawers and four chairs. The office shall be heated and/or cooled (at the Contractor's expense), to maintain a temperature level between 20 degrees C and 24 degrees C. The office shall be erected and moved as, where and when the Contract Administrator directs. The office shall be maintained in a clean condition by the Contractor. On completion of the contract work, or as otherwise directed by the Contract Administrator, the field office shall be removed from the site by the Contractor. The site office shall remain the property of the Contractor.

The Contractor shall provide and setup a Wi-Fi internet connection in the site office. The cost for an Internet Service Provider shall be included in the unit price.

The Contractor shall also provide an air-conditioning window unit, fire extinguisher, and first aid kit for the site office.

565.02 Basis for Payment

Payment for this item will be pro-rated to match the percentage of the work completed at the time of each progress payment certificate and shall be for the supply, operation, maintenance, and removal of the site office as described herein.

Site offices delivered to the site in an unacceptable condition that does not meet the general requirements set out in CKSS 565.01 as determined by the Contract Administrator shall be refused and replaced at no additional cost to the Owner.

CKSS 603 INSTALLATION OF DUCTS

REFERENCES

OPSS 603 – Installation of Ducts
OPSD 2101.01 – Duct Installation in Trenches

603.01 Material

Unless otherwise noted on the Contract Drawings or in the Form of Tender the following approved materials should be used according to their corresponding installation method:

- Rigid PVC Type 2 (open cut installation)
- HDPE DR13.5 (trenchless installation)

603.02 Construction

Duct shall be complete with solvent welded joints for PVC, and butt fused for HDPE, caps on all open ends and a fish line as per OPSD 603 for cable pulling through the duct. A minimum of three (3) metres of fish line shall be rolled up at each end of the duct outside of the cap to provide sufficient working material for pulling.

A minimum of 100mm of sand compacted to 100% SPDD shall be used for bedding material, with a minimum cover above the largest duct obvert (in the duct bank) of 300mm of sand compacted to 98% SPDD.

603.03 Measurement for Payment

Payment will be made per linear metre of duct installed regardless of the method of installation unless otherwise indicated in the Form of Tender.

603.04 Basis for Payment

The work of this item shall include all labour, materials, equipment required to install duct at locations specified on the contract drawings. The price for this item shall also include the installation of electronic ball markers as provided by the Telecommunications Company and coordination with the respective stakeholder.

CKSS 609 GROUNDING

REFERENCES

OPSS 609 – Grounding

609.01. Construction

Where the remaining length of water service from a building face to the curb stop will be less than three (3) metres the Contractor shall ensure grounding for the building is being provided. The method of grounding shall be compliant with ESA regulations at the discretion of the Contractor.

609.02. Quality Control

The City will require an ESA certificate to ensure proper installation practices have been followed.

609.03. Measurement for Payment

Measurement for this item will be for grounding of each building.

609.04. Basis for Payment

The work for this item shall include all labour, equipment, materials, permits and inspections necessary to provide grounding to buildings. Payment in the full amount shall be made upon the Contract Administrator receiving the Certificate of Conformance from the Contractor.

CKSS 706

TRAFFIC CONTROL, VEHICULAR AND PEDESTRIAN SIGNAGE

REFERENCES

OTM Book 7
OPSS 706 – Traffic Control Signing

706.01 General

All traffic control devices shall be clearly marked with the contractor's name, shown on the non-retroreflective surface. The marking shall be a non-retroreflective colour.

706.02 Measurement for Payment

The work of this item shall include all labour, equipment and materials required to provide traffic control measures and installation/removal of signage in accordance with the Occupational Health and Safety Act for Construction Projects and as outlined in the Contract documents. The work shall also include all coordination efforts required by the Contractor to deal with traffic operations in conjunction with the City of Kitchener, the Regional Municipality of Waterloo, emergency services, Grand River Transit, School Board transit and other needs of the community.

706.03 Basis for Payment

Payment on a percentage of completion basis shall be considered compensation in full for all specified and incidental work required by the Contractor to coordinate traffic control and operations on this Contract. Payment will be made on a pro-rated basis determined on each payment certificate based on the percentage of project completed.

CKSS 710 PAVEMENT MARKINGS

REFERENCES

OTM Book 11
OTM Book 18
OPSS 710 – Construction Specification for Pavement Marking

710.01 General

Where the work is staged the Contractor shall install temporary pavement markings to delineate the centre line of the road, multiple vehicular lanes (as applicable) and stop bars.

The Contractor shall commence the installation of the permanent pavement markings following City (and Regional where applicable) staffs approval of pre-marking layout and within 48 hours of completing asphalt paving.

If the Contractor completes the permanent pavement marking application incorrectly without having gained approval from the Owner of the pre-marking layout prior to commencement of the permanent pavement marking, the Contractor will be required to remove the incorrect markings and reinstall them correctly at the cost of the Contractor.

710.02 Material

Material type shall be as specified on the pavement marking plan or as directed by the Contract Administrator.

Durable pavement markings are to be thermoplastic or cold plastic.

710.02.01. Temporary Pavement Markings

OPS 532.07.08 is amended by the deletion of the 4th paragraph and the following added:

Where the Contractor must apply Pavement Marking, Temporary Removable, the Contractor shall use 3M Stamark Wet Reflective Removable Tape (A780WR white or A781WR yellow) or approved equivalent wet reflective removable tape.

Temporary 3M Stamark Wet Reflective Removable Tape to be supplied by the Contractor.

710.03 Construction

Pavement marking configuration shall be applied in accordance with the pavement marking drawings, OTM Book 11, OTM Book 18, and as directed by the Contract Administrator. The City (and Region where applicable) shall approve the Contractor layout of pavement markings prior to commencing any installations.

710.03.01 Application

Stop bars shall be 60cm wide; crossing ahead markings shall be 30cm wide.

710.03.01.01 Thermoplastic Pavement Marking Material

Delete the first paragraph of OPSS 710.07.09.04 and replace with the following:

The minimum surface temperature for application shall be 10 degrees Celsius and a maximum surface temperature shall be 35 degrees Celsius. Maximum relative humidity shall not exceed 70%.

710.03.01.02 Water-Borne Traffic Paint

Two coats of water-borne paint shall be applied immediately regardless of atmospheric temperature.

710.04 Measurement for Payment

710.04.01 Water-Borne Traffic Paint

Payment will be made as per the unit of measure in the tender item. Measurement shall be continuous for each coat of paint applied.

710.05 Basis for Payment

The work of this item shall include all labour, material and equipment necessary to provide pavement markings, including temporary marking (as necessary where multiple stages exist) as shown on the Contract Drawings and as directed by the Contract Administrator.

CKSS 760 TRAFFIC SIGN INSTALLATION

REFERENCES

OTM Book 5

760.01 Material

All sign sleeve inserts, posts, and brackets for installation of signs are to be supplied by the Owner given 10 working days' notice.

All traffic signs to be installed will be supplied by the Owner.

760.02 Construction

Install sign sleeve inserts as indicated on the contract drawings or as directed by the Contract Administrator in accordance with RMW Standard Drawing 508. Sign sleeves to be PVC Conduit Sleeves set plumb and capped with duct tape.

A sign inventory will be supplied to the Contractor by the Owner for locations of traffic signs. The Traffic Project Coordinator will meet with the Contractor to review and pre-mark installation locations. Upon completion of installation the Contractor will notify the Owner for inspection purposes.

760.03 Measurement for Payment

Payment for the installation of traffic signs shall be per each location and not per traffic sign installed. Where a sleeve and post are installed in the same location they shall be measured as one (1) combined installation.

760.04 Basis for Payment

The Contractor shall be responsible for any relocation costs associated where the initial sign placement by the Contractor was incorrect.

The Contractor shall be responsible for any costs associated for replacement of signs due to damage or theft as a result of improper storage.

CKSS 801 TREE PROTECTION

REFERENCES

OPSS 801 – The Protection of Trees

801.01 Construction

The work of this item shall include all labour, equipment and materials required to supply, erect, and maintain temporary fencing (orange, plastic fence, 1.2 metre high with metal “T” bar supports at maximum 6 metre spacing) complete with a 10mm nylon top rope (woven through the top of the fencing). Fencing to be located around existing trees (as specified on the Tree Management Plan) and/or along both sides of the roadway (at the curb line or sidewalk area), to protect the trees and pedestrians from the Contractor’s activities. Fencing may also be located to delineate other construction activities as noted elsewhere in the Special Provisions.

801.02 Measurement for Payment

801.02.01 Tree Protection Fencing

Measurement for this item will be on a linear metre basis for all new temporary fencing installed on the project irrespective of the number of occasions the temporary fence may be relocated for construction purposes.

801.03 Basis for Payment

801.03.01 Tree Protection Fencing

The work for this item shall include all labour, equipment and materials necessary to setup, maintain and remove tree protection fencing as directed by the Contract Administrator.

The Contractor shall include in the pricing of this item, any and all costs required to remove and reinstate sections of the protective fencing as may be required for the removal and replacement of lateral services, utilities, and related work.

Payment shall be 70% of the unit price upon initial installation and the 30% balance upon removal.

CKSS 802 TOPSOIL

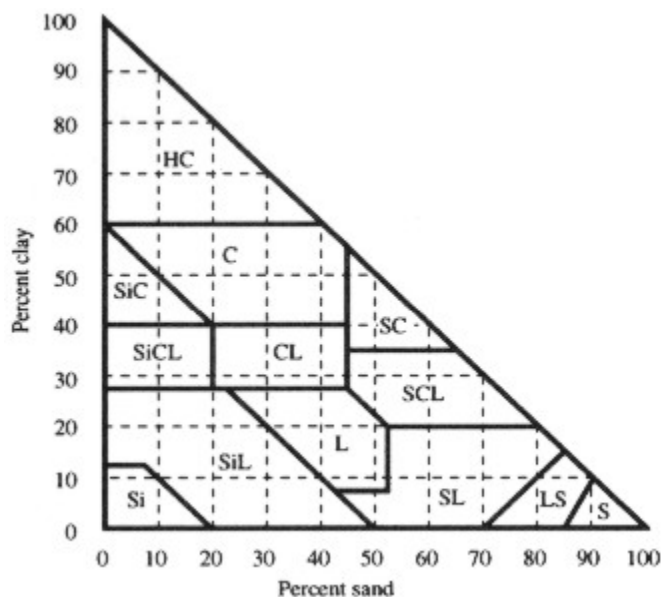
REFERENCES

OPSS 802 – Topsoil

802.01 Material

Topsoil shall be screened, friable, neither heavy clay nor of very light sandy nature; containing 2% organic material for sandy loams to a maximum of 20% by volume. Topsoil shall meet the classification of Sandy Loam or Loam as described in the Soil Texture Classes Triangle from Government of Canada Agriculture and Agri-Food Canada guidelines (see below). Imported topsoil shall be free from subsoil, roots, grass weeds, toxic materials, stones, foreign objects and with an acidity range (pH) of 6.5 to 7.5. Topsoil containing crabgrass, couchgrass or noxious weeds will not be accepted.

The Contractor shall provide certification of testing and compliance of all imported topsoil material prior to the material arriving on site. The contractor shall inform the Contract Administrator of any change in supplier or location of stockpile and an updated certification of testing and compliance shall be provided.



Digital web image, Government of Canada Agriculture and Agri-Food Canada,
<<http://sis.agr.gc.ca/cansis/taxa/cssc3/chpt17.html>>

Soild Texture Classes Triangle. Percentage of clay and sand in the main textural classes of soil; the remainder of each class is silt. Abbreviations for the texture classes are: HC, heavy clay; C, clay; SiC, silty clay; SiCL, silty clay loam; CL, clay loam; SC, sandy clay; SiL, silt loam; SCL, sandy clay loam; SL, sandy loam; Si, silt; LS, loamy sand; S, sand

802.02 Construction

Amendment to OPSS 802.07.03 – Placement of Topsoil

Replace subsection 802.07.03 in its entirety with the following:

Screened topsoil shall be spread to a minimum compacted depth of 150mm. The Contractor shall fine grade, to a uniform surface, the areas or locations to be dressed with topsoil. In order to ensure proper integration of the topsoil with existing surface, the latter shall be free of all vegetation and other debris and free of stones, and shall be loose to a depth of 25mm at the time of placing topsoil. The Contractor shall perform such mowing, raking and picking up of debris, and such discing, harrowing or other means of scarification as may be necessary to comply with this requirement, and shall dispose of all debris at the Contractor's expense. All clods or lumps shall be pulverized and any roots or foreign matter shall be raked up and removed by the Contractor. Surface shall then be rolled in two directions and all depressions filled and smoothed. Topsoil shall be level with the sidewalk and curb. All surfaces on which sod is placed shall be loose, at the time of placing the sod. The 150mm soil profile shall not exceed 200 psi of soil compaction within the warranty period as taken from the Dickie-John Soil compaction Tester (penetrometer) or similar testing equipment.

802.03 Measurement for Payment

Measurement for payment will be on a cubic metre basis, as per quantities placed; complete with submission of printed truck weigh tickets supplied upon delivery to site.

802.04 Basis for Payment

The work of this item shall include all labour, equipment and material required to import place and grade screened topsoil.

CKSS 803 SODDING

REFERENCES

OPSS 803 – Sodding

803.01 Material

803.01.01 Sod

Sod shall be No. 1 grade nursery grown sod to specifications published by the Canadian Nursery Trades Association. The sod shall be in vigorous growing condition, free from weeds and crabgrass, cut from well-established turf, permeated with roots and contains sufficient moisture to maintain its vitality during transportation and placing.

No. 1 Kentucky Bluegrass, Fescue sod shall be grown from minimum 40% Kentucky Bluegrass and 30% Creeping Red Fescue in accordance with the Classifications of the Nursery Sod Growers Association. Sod shall contain no more than 2% of other strains or species of grasses or clover of which twitch grass shall not constitute more than 0.5%. Sod shall be two years old from the time of original seeding be well rooted, free from stones, grubs and burned or bare spots, and shall be fresh at the time of lying.

803.01.02 Fertilizer

Fertilizer shall be granulated 8-32-16, complete synthetic slow release fertilizer with maximum 35% water soluble nitrogen. The first application of fertilizer shall be applied directly to the topsoil and incorporated in the top 25mm prior to the placement of sod. The second application of fertilizer shall be applied once the sod is aerated.

803.02 Construction

All sod shall be cut by able methods by machines designed for that purpose, to the supplier's length and width, plus or minus 12 mm in width and plus or minus five percent (5%) in length. Broken pieces and torn or uneven ends are not acceptable. Sod shall be cut at a uniform soil thickness (excluding top growth and thatch) of 15 mm plus or minus 5 mm.

All sod shall be delivered to the job within 24 hours of being cut and shall be placed within 36 hours of being cut. Tickets indicating time of cut shall be provided prior to the unloading of the sod from the delivery truck.

The sodded area shall be watered immediately (within 1 hour) upon completion until the area is saturated to the satisfaction of the Contract Administrator.

Fertilizer shall be delivered to the site in standard containers, labeled to indicate its weight, analysis and manufacturer. Fertilizer shall be stored in such a manner that it is kept dry and its effectiveness is not impaired.

803.02.01 Maintenance of Completed Sodding

OPSS 803.07.05 (Maintenance of Completed Sodding) is amended in that all references to a "30 day maintenance period" are replaced with a "60 day maintenance period".

Add the following to OPSS 803.07.05 - Maintenance of Completed Sodding

Water shall be applied to new sod immediately (within 1 hour) after placement and the sod is to be watered a minimum of once a day during the first 7 days and then regularly during the 60 day maintenance period. New sod is to be aerated within 45 days of placement at a rate of 36 cores/sq.ft or 7% of the overall area. The Contractor is also responsible to perform the first cut on all new sod. Residents will be notified that they are not to mow the sod until after the first cut has been completed by the contractor.

Any settlements in sodded areas arising from excavation work as part of this project will be the responsibility of the Contractor for the full duration of the 24 month warranty period. All replacement sod will be subject to the same placement, care and warranty requirements outlined within this specification. The Certificate of Final Acceptance for this project will be withheld until all sod in the above-mentioned rectification areas has met the time requirements described herein.

803.03 Quality Assurance

OPSS 803.08.01 (Performance Measure) and 803.08.02 (Acceptance) is amended in that all references to a "30 day maintenance period" are replaced with a "60 day maintenance period".

803.04 Measurement for Payment

Payment shall be on a square metre basis of sod laid, and shall be full compensation for all labour, equipment and material to do the work.

Payment shall be pro-rated based at 50% once the sod is laid and the remaining 50% being paid once the sod has been fertilized and aerated.

803.05 Basis for Payment

The work of this item shall include all labour, equipment, material, water, fertilizer and maintenance required to do the work.

CKSS 804 SEED AND COVER

REFERENCES

OPSS 804 – Seed and Cover

804.01 Materials

Unless otherwise specified, Permanent Seed Mix shall be:

40% Kentucky Bluegrass
30% Perennial Ryegrass
20% Creeping Red Fescue
10% Chewings Fescue

The seed mix shall be Certified Canada Grade No 1 grass seed.

804.02 Construction

804.02.01 Application Rates for Seed, Fertilizer, and Water

Permanent seed mix rates as shown in Table 2 are amended to be 150kg (rather than 100kg) per 10,000m².

804.02.02 Hydroseeding

Hydroseeding shall be completed upon the removal of the tree protection fencing to cover areas inside the tree protection zones that are not to be disturbed by mechanical excavation or laid with sod.

804.03 Measurement for Payment

Payment shall be on a square metre basis of area hydro-seeded, and shall be full compensation for all labour, equipment and material to do the work.

804.04 Basis for Payment

Payment at the contract price for the above item shall be full compensation for all labour, equipment and material to do the work.

Should growth of the seed not be acceptable to the Contract Administrator, the seeded area shall be weeded, cultivated and reseeded at the Contractor's own cost.

Maintenance holdback will be retained until secondary grass in the reseeded area is acceptable.

CKSS 805 TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES

REFERENCES

OPSS 805 – Temporary Erosion and Sediment Control Measures

805.01 Material

805.01.01 Sediment Fence

Sediment fence shall be Terrafence by Terrafix Geosynthetics Inc., or approved equivalent installed to manufacturer's silt fencing specifications.

805.01.02 Catchbasin Sediment Trap

Sediment control for catchbasin lids shall be various types of inlet protection devices available from Nillex Inc. (877-640-6002) or approved equivalent as chosen by the Contractor.

805.02 Maintenance

Sediment traps shall be inspected and cleaned daily for damage and / or sediment build-up.

805.03 Measurement for Payment

All erosion and sediment control measures shall be paid to the Contractor based on the following payment schedule:

- a) 40% for initial construction.
- b) 60% for removal.

805.03.01 Catchbasin Sediment Trap

For measurement purposes, a count shall be made for each sediment trap constructed, maintained and removed in a catchbasin lid. The use of filter fabric in the catchbasin lid is not an acceptable method of sediment control and will not be counted for payment.

805.03.02 Sediment Fence

Sediment fence shall be measure from end to end in plan view at locations placed on the site as directed by the Contract Administrator.

805.04 Basis for Payment

805.04.01 Catchbasin Sediment Trap

The work for this item shall include all labour, material and equipment necessary to construct sediment traps in existing catchbasin lids adjacent to the downstream limits of the project or newly installed catchbasin lids as identified by the Contract Administrator.

There will be no additional payment to replace damaged sediment traps at the direction of the Contract Administrator where the Contractor's negligent maintenance was the result of the sediment trap failure.

805.04.02 Sediment Fence

The work of this item shall be for all the equipment, labour, and materials required to install, maintain and remove temporary sediment fence as per manufacturer's specifications.

CKSS 850 TERRASEEDING

850.01 Material

The following specifications shall be applicable to all products and installation methods outlined below, regardless of brand name.

The following information pertains to Filtrexx™ GrowthMedia™ Blanket but construction and maintenance shall be applicable to an approved equivalent product selected by the Contractor to be utilized.

GrowthMedia™ used for Filtrexx™ GrowthMedia™ Blankets (or approved equivalent) shall be weed free and delivered from a well-decomposed source of organic matter. The media shall be produced using an aerobic composting process meeting or exceeding M.O.E. 101, C.C.M.E. Type “A” and Type “AA” regulations, and Compost Quality Assurance Program, (C.Q.A.) including time and temperature data indicating effective weed seed, pathogen and insect larva kill. The GrowthMedia™ shall be free of any refuse, contaminants or other materials toxic to plant growth. Non composted products will not be accepted. Test methods for the items shown below should follow USCC TMECC guidelines for laboratory procedures:

- a. PH – 5.0-8.0 in accordance with TMECC 04.11-A, “Electrometric pH Determinations for Compost”
- b. For seeded GrowthMedia™ Blankets, seed shall be incorporated at the time of application in the entire depth of the GrowthMedia™ blanket, at rates per sq. m as acceptable to the Contract Administrator. The following particle sizes shall also be followed: 100% passing a 50mm (2”) sieve, 99% passing 25mm (1”) sieve, minimum of 60% passing a 12.5mm (1/2”) sieve. All other testing parameters are to remain the same.
- c. Moisture content of less than 60% in accordance with standardized test methods for moisture determination
- d. Material shall be relatively free (i.e. less than 1% by dry weight) of inert or foreign man-made materials.
- e. A sample shall be submitted to the Contract Administrator for approval prior to being used and shall comply with all local, provincial and federal regulations

The GrowthMedia™ Blankets shall be placed at locations indicated on the drawings and as directed by the Contract Administrator. Unless otherwise specified, Filtrexx™ GrowthMedia™ Blanket shall be installed at a minimum depth of 75mm (3”) with Lock Down netting or adhesion additive in areas where the slope exceeds an angle that would be too steep to provide satisfactory binding of the blanket to the soil.

The Contractor shall routinely inspect the installation upon its completion and shall maintain the Filtrexx™ GrowthMedia™ Blanket in a functional condition at all times during the construction and maintenance phases of the project.

Should the GrowthMedia™ Blanket fail, separate or otherwise deteriorate, it shall be immediately repaired or replaced at the expense of the Contractor.

Seeding the Filtrexx™ GrowthMedia™ Blanket shall be incorporated for the entire depth of the blanket. Should germination of the seed not be satisfactory, the Contractor shall overseed the area.

The Contractor shall be a certified Filtrexx™ Installer as determined by Filtrexx™ Canada Inc. Certification shall be considered current if appropriate identification is provided during the time of bid or at time of application.

850.02 Measurement for Payment

Payment for this item shall be by the square metre with a depth of 75mm (3") of exposed slope face for work completed. In support of this criteria, the Contractor shall provide proof that a 75mm (3") depth of GrowthMedia™ Blanket has been applied. Depth of the blanket may be measured in random locations at the time of application.

850.03 Basis for Payment

The work for this item is to consist of the furnishing, installing, maintaining and terraseeding of existing and newly constructed portions of slope area that are unvegetated and includes the area disturbed by construction. Terraseeding shall consist of the application of a blanket with an approved seed mixture incorporated throughout the depth of the blanket.

CKSS 851 LANDSCAPING

851.01 Construction

Landscaped areas shall be restored to match original conditions or better. The Contractor shall use like materials wherever possible. All work that affects private property will require the Contractor to cooperate with the property owner(s) and to communicate the extent of the work, timing of impact and reinstatement.

851.02 Measurement for Payment

Payment for this item shall be measured by the square meter for areas requiring restoration to Landscaping.

851.03 Basis for Payment

The work for this item shall include all labour, equipment and materials required to reinstate landscaped areas instead of placement of sod.

CKSS 914 WATERPROOFING BRIDGE DECKS WITH HOT APPLIED ASPHALT MEMBRANE

REFERENCES

OPSS 914 – Waterproofing Bridge Decks with Hot Applied Asphalt Membrane

914.01 Measurement for Payment

The unit prices bid for this item, multiplied by the actual square meters of waterproofing satisfactorily placed as measured in the field.

914.02 Basis for Payment

The work for this item shall include all costs, such as but not necessarily limited to, all public safety protection, all paint, labour, materials, preparation of concrete deck surfaces and approach slabs, tack coating, membrane reinforcement fabric, hot applied rubberized asphalt waterproofing membrane and application of protection boards complete per OPSS 914.

CKSS 960 RETAINING WALL

960.01 Material

For new installations acceptable products are PISA2® (natural colour) by Unilock or GRANDE® Wall by Permacon or approved equivalent.

960.02 Construction

In the event that additional retaining wall blocks are required to replace those salvaged from the site, the Contractor shall supply replacement materials without additional cost.

All work that affects a private retaining wall will require the Contractor to cooperate with the property owner(s) and to communicate the extent of the work, timing of impact and reinstatement, and to obtain a satisfactory sign off from the property owner(s) that the work of reinstatement has been completed to the property owner(s)'s satisfaction.

The maximum allowable height for PISA2® wall shall be 840mm (2.75ft) with a maximum retained slope of 3 metres horizontal to 1 metre vertical.

The maximum allowable exposed height for GRANDE® Wall shall be 2800mm (9.18ft) with a maximum retained slope of 3 metres horizontal to 1 metre vertical.

The maximum heights listed above apply to gravity walls without geogrid restraint, the inclusion of geogrid in the retaining wall system shall be approved by the Owner.

Granular bedding, backfill and drainage shall be as per the manufacturer's specifications.

The Contractor shall submit shop drawings prepared by a Professional Engineer licensed in the Province of Ontario for review by the Contract Administrator.

960.03 Measurement for Payment

Payment for this item shall be measured by the square metre of wall face from the top of the granular bedding to the top of the coping unit along the entire length of the wall.

960.04 Basis for Payment

The work for this item shall include all labour, equipment and material necessary to install precast concrete retaining wall blocks as indicated on the contract drawings as directed by the Contract Administrator.

The cost for granular bedding and backfill, geogrid, filter cloth and sub-drain for drainage behind the wall shall be included in the unit cost for this item.

CKSS 1010 MATERIAL SPECIFICATIONS – BASE, SUBBASE, SELECT SUBGRADE, AND BACKFILL MATERIAL

REFERENCES

OPSS 1001 – Material Specification for Aggregates – General

OPSS 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill
Material

RWSSP 1010 – Granular “B”

1010.01.01 Granular B

The gradation for Granular B shall be as per RWSSP 1010, “Granular B”.

1010.01.02 ASTM No. 8 Gradation

Sieve Size	Percent Passing
12.5mm	100
9.5mm	85 to 100
4.75mm	10 to 30
2.36mm	0 to 10
1.16mm	0 to 5

CKSS 1303

MATERIAL SPECIFICATIONS – ADMIXTURES FOR CONCRETE

REFERENCES

OPSS 1303 – Material Specifications for Admixtures for Concrete

1303.01 Curing Compound

Curing compound shall meet the requirements of OPSS Form 1315 - Material Specification for White Pigmented Membrane Curing Compound for Concrete.

1303.02 Coloured Concrete

As required by the Contract Documents or as directed by the Contract Administrator the following specifications shall apply for the supply of coloured concrete pigment.

- a) “Black” coloured concrete shall refer to the following pigment: colour XB5599 “Charcoal Black”, by Davis Colors Inc., www.daviscolors.com
- b) “Red” coloured concrete shall refer to the following pigment: colour palette # 1117 “Tile Red”, by Davis Colors Inc., www.daviscolors.com
- c) On the Queen Street Corridor the “Red” coloured concrete shall refer to the following pigment: colour palette # 160 “Sunset Rose”, by Davis Colors Inc., www.daviscolors.com
- d) Portland to pigment ratio shall be 5%, unless noted in the Form of Tender
- e) Only a clean uncoloured curing compound may be used which will not affect the final colour of the pigmented concrete. A white pigmented curing compound may be used only upon natural, unpigmented concrete.

CKSS 1350

MATERIAL SPECIFICATIONS – CONCRETE

REFERENCES

OPSS 1350 – Material Specifications for Concrete – Materials and production

1350.01 Material

All concrete supplied shall comply with the requirements of the latest edition of C.S.A. Standard A23.1, "Concrete Materials and Methods of Concrete Construction".

All concrete supplied under this specification shall contain the following mix proportions:

- a) Water / cement ratio shall be 0.45 w/cm for C-2 Class of Exposure in accordance with C.S.A. Standard A23.1, Table 1, Definitions for C, F and N Classes of Exposure.
- b) Maximum nominal size of coarse aggregate shall not exceed 20mm and gradation limits shall meet the requirements of C.S.A. Standard A23.1, Section 4.2.3.3.2 / 4.2.3.4.2 Grading.
- c) Air entrainment shall be 5-8% in accordance with OPSS 1303, "Material Specification for Air Entrainment and Chemical Admixtures for Concrete".
- d) Minimum compressive strength for Normal and General Use (GU) Portland Cement Concrete shall be 32 MPa at 28 days. Alternative cement types, such as High-Early Strength (HE), may be considered by the Contract Administrator on a project by project basis.

1350.02 Slump

Slump tolerances specified in OPSS 1350.05.02.05 shall be deleted and replaced with the following:

Hand placed sidewalks, driveways ramps, driveways, steps, boulevards, bus pads and curb and gutter slump shall be 70mm ± 20mm.

Machine placed curb and gutter slump shall be 45mm ± 10mm.

CKSS 1860 MATERIAL SPECIFICATIONS – GEOTEXTILES

REFERENCES

OPSS 1860 – Material Specifications for Geotextiles

1860.01 Material

1860.01.01 Woven and Non-Woven Geotextiles

Woven slit film and non-woven heat bonded geotextile fabrics shall not be allowed for use as part of an infiltration system.