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.01 DEFINITIONS

The following definitions shall apply:

- (i) **"Existing Road Grade"** - means the centre-line elevation of the existing road and/or allowance.
- (ii) **"Proposed Road Grade"** - means the centre-line elevation of the road Work proposed under this Contract.
- (iii) **"Future Road Grade"** - means the centre-line elevation of a future road beyond the scope of this Contract.
- (iv) **"Private Drain"** - means that part of the drainage system that connects the yard sewer to the main sewer and is situated within the limits (road allowance) of the highway.
- (v) **"Yard Sewer"** - means that part of the drainage system from a point 1 metre from the face of a facility on a parcel of land to the private drain or any other place of disposal. Also includes that part of a drainage system between a catch basin and storm water private drain.
- (vi) **"Lateral", "drain"** - shall mean any part of drainage system situated within the limits (road allowance) of the highway, other than the main sewer. (e.g. catch basin drain)

.02 MATERIALS AND APPLIANCES

Unless otherwise specified, the Contractor shall at their expense, provide all materials, labour, water, tools, equipment, light, and power necessary for the execution of the Work.

.02.01 Ordering Responsibility

It shall be the sole responsibility of the Contractor to ascertain (and follow up until delivered), that all material or equipment, whether directly under their or under their Sub-Contractor's jurisdiction, which is not available from stock" (check same), but which requires longer manufacturing or delivery time, is ordered immediately after award of the Contract, and that all Shop Drawings which must be prepared before fabrication and all samples requested to be submitted for the City's selection, be so prepared or submitted by the responsible Sub-Contractors right away.

It is stressed that no deviations from Specifications or acceptance of substitutes, which may be proposed by the Contractor in order to compensate for tardiness in ordering or failure to expedite deliveries, or acceptance of Work for which Shop Drawings had not been submitted and reviewed by the City, shall be permitted.

Immediately upon the receipt of shipment(s), all Contractors and Sub-Contractors shall thoroughly check all shipments for correctness and completeness in order to avoid discovering the incorrectness or incompleteness of shipment(s) when installation of the same is due.

.02.02 Approved Products and Materials Lists

All products and materials that are supplied by the Contractor shall be new and shall be listed on the appropriate Approved Products Lists, issued by the City. Reuse of existing materials is not permitted.

Where a product or material needed to complete the Works is not specified in the Contact Documents and is not on the current Approved Product List, the Contractor shall verify its use with the City prior to the start of any Works.

The City shall reserve the right to not allow a product that is listed on the Approved Products and Materials List, if for any reason, its use in a given application is deemed to be inappropriate.

.03 SHOP DRAWINGS – Submittals and Review

After the award of the Contract, prior to ordering the delivery of equipment to be supplied and in sufficient time to permit the satisfactory progress of the Work, the Contractor shall submit to the Project Manager for review, additional drawings or prints in triplicate of such equipment, together with other information in such detail as may be necessary to permit the Project Manager to become informed of the design of the equipment which the Contractor proposes to use.

Shop drawings and schedules shall be furnished by the Contractor for review and comments showing all piping components, fittings and appurtenances.

The Contractor shall make changes to the shop drawings as may be found necessary upon review by the Project Manager to make the same conform to the Specifications. Tabulated lists shall be provided by the Contractor of minor items of equipment for which drawings are not required. These lists shall show the name of the manufacturer, the catalogue type number, leading dimensions and other pertinent data.

Upon review and no further comments, shop drawings, lists and specifications shall become a part of the Contract and the materials and equipment furnished and installed shall conform with the final revision of shop drawings. Final shop drawings, lists and specifications shall not in any way release the Contractor from its responsibility for the proper fulfilment, by any equipment or material, of the requirements of the Contract, and of the purpose for which the said equipment and materials are installed, nor from its liability to replace the equipment and/or materials should they prove defective or fail to meet specified requirements.

.04 INFORMATION TO BE SUBMITTED AT PRE-CONSTRUCTION MEETING

The Contractor shall make available to the City the following information at the Pre-Construction Meeting.

- a) Proposed Work schedule and cash flow schedule
- b) Where blasting is anticipated, the name of the independent inspection company, together with the pre-construction survey report.

- c) The addresses of all dump sites to be used to deposit materials together with letters of permission from the property owners involved.
- d) Executed agreements and/or letters of permission for dumping will also be required from any municipalities involved, and where applicable, conservation and/or other authorities having jurisdiction.
- e) The names and addresses of manufacturers and/or suppliers of all materials required in the Contract, including but not limited to the following: pipe, concrete, precast manholes, chambers, catch basins, asphalt, granular materials together with its sources and castings (when applicable).
- f) Copy of the Contractor's company health and safety policy and program.
- g) Notice of Project from Ministry of Labour.
- h) Contractor's 24-hour hotline phone number
- i) Impact on parking, access, garbage pickup and the anticipated disruption of services – water, sewer, postal delivery, schools.
- j) Methods of bulkheading and/or weir construction in downstream sewer manhole(s) to prevent siltation to existing downstream sewer system.
- k) The hourly rates of Contractor's staff ie. foreman, labourers, operators, pipe layers and the percent of corresponding burdens.
- l) All types of equipment and their hourly and daily rates.

When, in the opinion of the Project Manager, the Contractor does not provide the required information in time for the pre-construction meeting, the Project Manager reserves the right to delay the start of construction and to immediately commence to charge Working days against the Contractor.

.05 PRE-CONSTRUCTION PHOTOGRAPHY

The Contractor shall provide the City with one set of pre-construction photographs (colour prints or digital files) prior to commencement of construction of the project.

The photographs shall be 3 1/2 x 5 inch (min.) colour prints, legibly marked on the back, showing location, house no. etc.

Digital photograph shall be in colour. File names shall indicate the building's municipal address.

Photograph prints shall be labelled showing location, house no. etc. in a manner not to obstruct the images.

A minimum of 2 photographs per typical residential property or the number required to show both sides of driveways, all vegetation, utilities, ditches, culverts, hydrants

etc. A series of photographs may be required to show long frontage properties (max. spacing of 20m), extra photographs of particular items such as culvert crossings, damaged buildings, etc. All photographs shall be overlapping and continuous. Photographs shall show general condition of pavement, curbs, walks, shoulders, ditches (as applicable). A series of all intersecting streets shall be supplied as well.

All photographs shall be of 35mm quality and clarity. The Contractor must have negatives available up to the end of the projects maintenance period. There will be no specific payment item for providing these photographs. Where a digital camera is used, the City will accept a CD with all the required photos.

All photographs shall be taken and provided to the City no later than 1 (one) week prior to the start of construction.

.06**WORK SITE LIMITS**

All aspects of this entire item shall be at the Contractor's expense.

The site which may be occupied by the Contractor during the prosecution of this Contract will be limited to the areas shown on the drawings as the public road allowances. No plant, equipment, materials or temporary buildings shall be stored or erected and no roads shall be constructed by the Contractor outside the designated areas except as required by the Contract with the prior written permission of the Project Manager.

The Contractor shall be entirely responsible for providing and properly maintaining adequate temporary access roads to, and detour roads around, the designated areas.

If private lands are to be traversed or otherwise occupied by the Contractor, they shall complete all necessary legal arrangements with the owners for rights over access to and from, or occupancy of the private lands, or any combination thereof, and submit to the Project Manager acceptable proof that these legal arrangements have been completed prior to entering upon such lands. Upon completion of the Contract, the Contractor shall file with the City a release and indemnification absolving the City from all obligations with respect to damages claimed and incurred as a consequence of using said private lands.

On all lands to be used by the Contractor for any reason, the Contractor shall strip all topsoil and vegetation from areas to be disturbed and stock-pile this on the site for future restoration of the site. The Contractor shall be responsible for its own access. That portion of the site that will be used by the Contractor for the purposes of vehicular traffic, material storage purposes and temporary shelter, shall be properly drained and provided with a granular working pad that shall be kept free from mud and debris at all times.

The Contractor shall clearly define all limits of easements in order to confine operations to such areas.

Prior to entering the easements with any materials and/or equipment, the Contractor shall verify all survey markers along the limits of the easements. Upon such verification it shall be the Contractor's responsibility to install and maintain for the duration of the Contract, steel posts spaced at maximum intervals of 15.24m (50') continuously strung with brightly coloured plastic tape or such other method of marking as may be approved by the Project Manager.

The Contractor should note that the above requirement will be strictly enforced and that indiscriminate damaging of adjacent properties will not be tolerated.

Should the Contractor be found not confining its operations strictly to easement lands or designated areas, the Project Manager reserves the right to stop Work on the project until such time as the Contractor has supplied and temporarily installed snow fences along the limits of the easements and completely restored all damaged areas to the satisfaction of the Project Manager, all at the Contractor's own expense.

.06.01 Postal Services

Along the route of the Work, where mail boxes must be removed to facilitate construction, the Contractor shall temporarily relocate such mail boxes and posts to a safe location and shall make other arrangements suitable to the residents and Canada Post to facilitate uninterrupted postal delivery. All costs entailed shall be the responsibility of the Contractor.

.06.02 Temporary Access

The Contractor shall provide temporary roads, street approaches, walks, ramps, stairs and other means of access to the Site as required or ordered by the Project Manager or other authorized City representatives.

.06.03 Sanitary Convenience and Shelter

The Contractor shall provide, and properly maintain, in a clean condition, suitable and convenient privy or water closet accommodation for all workers employed on the Work such that it shall not be a source of inconveniences, complaint, or nuisance to the public or the residents in the vicinity of the Works.

The Contractor shall provide, at its own expense, an adequate, comfortable shelter, accessible during the noon hour and inclement weather, to all Workers employed on the Work, and its location shall be approved by the Project Manager.

Such sanitary conveniences shall meet all current applicable regulations and shall be otherwise satisfactory to the Project Manager.

.06.04 Contractor's Identification Signs

Signs, bearing the Contractor's name and 24 hour emergency phone number shall be supplied and installed by the Contractor on barricades, flashers or steady light stands at each end of all barricaded sections of the Work. Signs shall be constructed of weather-resistant materials with lettering a minimum of 75mm in

height, of contrasting colour with its background, clearly legible and neat in appearance.

All Contractor identification signs shall be positioned to be clearly visible to traffic at all times, repositioned as required and maintained by the Contractor for the duration of the Contract.

The Contractor is to supply a 24 hour phone number (hotline) available to the public and City at any time. This number is to be shown on the Contractor's identification signs as indicated above.

.06.05 Field Office

The Contractor shall provide and maintain in good condition for the exclusive use of the Project Manager, Inspector and assistants, one (1) insulated, weather- proof construction field office, having a floor space of not less than 12 sq. metres. The office's location on, or in the immediate vicinity of the project shall be determined by the Project Manager, and shall be constructed so that it can be moved to another site (if required) and shall be in operation within one week of commencement of the Contract.

The site office shall be of a standard equal to that usual in the trade for such construction and shall comply with the following requirements:

The site office shall be constructed and equipped as per current Occupational Health and Safety requirements and shall not be limited to the following:

- a) All entrances are to be equipped with steel security doors and exterior type locks
- b) All windows are to be equipped with heavy gauge steel bars or cages to prohibit entrance from outside
- c) All windows are to be capable of being opened to the outside to allow natural ventilation of the office
- d) A supply of fresh cold and hot drinking water
- e) A fire extinguisher mounted next to all entrances
- f) First Aid kit, including a portable eye wash kit
- g) A designated location for the storage of photocopies of all locates obtained by the Contractor for the project.
- h) A printer / scanner complete with a supply of paper and toner.
- i) An internet connection shall be provided for the use for the Project Manager and Inspector.

- j) The site office shall be cleaned weekly to the satisfaction of the Project Manager and Inspector.
- k) The Contractor shall service, maintain and carry insurance on the site office and contents and provide evidence of insurance to the Project Manager before Work commences.

The office shall be provided with sufficient natural and electrical light, shall be adequately heated to maintain a minimum temperature of 20°C, and shall be adequately air-conditioned to maintain a maximum temperature of 24°C depending upon outside temperature conditions.

The office shall be equipped with a sloped plan table, two (2) chairs and a bench. The office shall be equipped with a minimum of one (1) electrical outlet.

Silent portable generators will be permitted when absolutely necessary with the approval of the Project Manager.

The Contractor shall make available to the Public Works Staff such ablution and sanitary facilities as provided for its own forces.

There will be no specific payment item for providing this office, including the cost of erecting it, relocating it if necessary, furnishing it, supplying it with heat/air-conditioning (as required), light and printer/scanner, and eventually removing it at the termination of the Contract. Upon removal of field office, the site shall be cleaned up and restored to original condition.

The Contractor shall note the above requirements will be strictly enforced and that a field office is required on all construction projects unless deemed not required by the Project Manager.

.07 ACCIDENT AND FIRST AID

The Contractor shall provide, at the site, such equipment and medical facilities as are necessary to furnish first aid to anyone who may be injured in connection with the Work.

The Contractor must promptly report, in writing, to the Project Manager, all accidents arising out of, or in connection with the performance of the Work, whether on, or adjacent to the site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, in case of death, serious injuries or damages, the accident shall be reported immediately by telephone, to the Project Manager. If any claim is made by anyone against the Contractor or any Sub-Contractor, on account of any accident, the Contractor shall promptly report the facts in writing to the Project Manager, giving full details of the claim.

.08 SAFETY MEASURES

The Contractor shall, at all times, comply with all safety by-laws, Municipal by-laws and Safety Acts of the Province of Ontario, Government of Canada and any staff instructions issued by the Project Manager, or through any Inspector appointed or

so recognized by the City.

All aspects of the Work under any Contract must meet all requirements of the Occupational Health Safety Act including Regulations for Construction Projects, as amended.

The Contractor shall file a "Notice of Project with the Ministry of Labour as required under the Occupational Health Safety Act.

.08.01 Special Protection

The Contractor shall take reasonable and required measures, including those required by authorities having jurisdiction, to protect the public and those employed on the Works from bodily harm and to protect adjacent public and private property and City property from damage. Without limiting the generality of any other provision in this Contract, the Contractor shall:

- a) Provide and keep available in the Construction Office, safety helmets for authorized visitors to the site.
- b) Protect excavation, trenches and building from damage by rainwater, ground water, backing up of drains or sewers and other water, frost and other weather conditions. Provide sheeting, piling, shoring, pumps, equipment, temporary drainage and enclosures if any as required. Provide necessary pumps, including spare pumps, for keeping the project free of water throughout the duration of the project.
- c) Provide fences, hoarding, guard rails, barriers, night lights and pavement protection as required for protection of the public and of public and private property and constructed in accordance with and as required by law and authorities having jurisdiction. Erect sturdy railings around shafts, stairwells and the like to protect Workmen, supervisory personnel and the public from injury.
- d) Provide and maintain guard lights at barricades, railings, obstructions in roads or sidewalks.
- e) Properly secure the Job Site at night, on Saturdays and Sundays, on statutory holidays and other times when the Work is not in progress.

The Contractor shall make full restitution of such harm and damage resulting from failure to take adequate protective measures, and shall make good any damage to the Work from whatever cause.

.09 MATERIAL SAFETY DATA SHEETS

M.S.D.S. data sheets must be supplied and be readily available on the job site at all times and be issued to City staff if so requested.

.10 TRANSPORTING MATERIALS ON STREETS

The Contractor shall, if so directed by the Project Manager, provide tight trucks, approved by the Project Manager, to haul soft or wet material over the streets, in order to prevent litter on the street. In all cases where any materials are dropped from the trucks of the Contractor, the Contractor shall clean up the same as often as directed and also keep all roads and sidewalks clean and free from dirt and mud.

If the Contractor refuses or neglects to clean up said litter when ordered to do so by the Project Manager, the City shall do the necessary cleaning up, and the costs of same shall be deducted from monies due to the Contractor.

.11 TEMPORARY SUPPLY OF WATER, POWER, AND OPERATION OF CITY HYDRANTS

.11.01 Use of Hydrants

The City of Hamilton will allow Contractors to use existing fire hydrants as a source of water for construction Works. Where a Contractor requires the use of a hydrant, they shall obtain and complete a "Water Hydrant Use Agreement" from the Water Distribution Division and shall be bound by the rules and be responsible for all costs associated by the permit and the use of the hydrant.

The Contractor shall call 905 546-4426 to obtain the permit.

All persons operating a hydrant shall have sufficient knowledge on hydrant operation and water distribution systems. Guidelines for Obtaining Water from City Hydrants have been provided in Appendix A. All persons operating a hydrant must follow these guidelines and must complete the Hydrant Use Log Sheet provided each time a hydrant is used.

For those Contracts where the use of a hydrant is permitted, flushing of watermains shall be conducted during regular Working hours whenever possible. Prior to any flushing operation, the Contractor shall notify the Water Maintenance Section at 905 546-4426 to ensure that the after hours desk is aware of flushing operations. Hydrants shall have a hose connected directing water to the gutter and catch basins. An approved backflow preventer shall be used to prevent back siphon. No free flowing hydrants will be permitted.

All materials and arrangements of valves and piping required to provide temporary use by the Contractor shall be in accordance with the Project Manager's requirements to prevent freezing and contamination of service and watermain. All arrangements and costs for the above shall be paid by the Contractor.

The Contractor shall see that no waste of water is permitted and that water shall not be left running when not in use.

The Contractor shall take all necessary measures and precautions to prevent any icy conditions of the roadways developing as a result of use of water from the above service.

Any repairs to service or watermains made necessary as a consequence of damage due to the Contractor's operations, shall be made by the City's forces at the Contractor's expense.

.11.02 Power and Water Supply

The Contractor shall make all necessary arrangements and be responsible for all costs to provide themselves with an adequate supply of power to operate its equipment and to provide for lighting, etc. They shall bear all costs entailed.

The Contractor may arrange with the City, Public Works Department for a water service or services, to be installed at the Contractor's expense, from an existing watermain near the site or sites of its Work operations.

When the Contractor's need of temporary services (power and water) terminates, they shall make proper arrangements for their discontinuance.

.12 DRAINAGE AND DEWATERING

Ditches, culverts and gutters shall be kept open at all times. Any flow of water shall not be directed across or over pavements except through pipes or properly constructed troughs. The Contractor shall keep all portions of their Work properly and efficiently drained during construction and until completion. They will be held responsible for all damages until completion. They will be held responsible for all damage which may be caused by, or result from water backing up or flowing over, through, from or along any part of the Work, or which any of its operations may cause to flow elsewhere.

All trenches and other excavations shall be kept free of water at all times. The Contractor shall employ adequate means to remove the water in a manner that will prevent loss of soil and maintain the stability of the excavation.

The Contractor shall provide for the disposal of such water in a manner that will not be a danger to the public health, private property or to any portion of the Work completed or under construction either by them or any other Contractor, nor cause an impediment to the use of the streets by the public, and provide sediment control as required.

Drainage of the trench or other excavations through newly laid storm sewer pipe will be allowed only with the express permission of the Project Manager.

When drainage is directed to existing catch basins, the catch basins must be regularly inspected, and, cleaned of debris and sediment by the Contractor.

The Contractor shall not hold the City or other Contractors liable for leakage encountered by them in its Work from existing sewers, watermains, or drains, or from other sewers or drains under construction.

.13 NOISE**.13.01 Acceptable Noise Levels**

The noise levels of construction equipment operating in built-up areas shall not exceed the values stated in the City of Hamilton's Noise By-Law to control noise.

The use of chainsaws and other types of power-saw on the site shall be limited to hours of the day when noise from this source will produce no complaints from the residents living in the vicinity.

.14 OVERTIME WORK

In general, Night, Sunday and Holiday Work requiring the presence of a Project Manager or Inspector, will not be permitted, except in case of an emergency, and then only to such an extent as deemed advisable and with the written permission of the Project Manager. It may be necessary or expedient in the judgment of the Project Manager to do Work at these times or after regular Working hours. When requested in writing by the Project Manager to perform such Work, the Contractor shall be entitled to additional payment as per Form 200.06. This additional payment shall be limited to include the overtime (plus 15%) of hourly paid labourers and the use of extra necessary equipment. The Contractor shall submit vouchers showing the hours worked and the type of additional equipment used.

.15 PRESERVATION OF SURVEY MONUMENTS

The location of existing survey monuments (eg. concrete monuments, stone monuments, iron bars, etc.) which have been established to indicate right-of-way, subdivisions and other surveyed limits of the ground surface, shall be ascertained by the Contractor prior to its entry onto the site, or sites, of the Work. The Contractor shall mark all concrete monuments, iron bars, etc., with a 50mm by 50mm by 1.2m marker which has been dipped in red paint for the upper 100mm.

During the course of the Work, when it is absolutely necessary to remove existing survey monuments, the Contractor shall arrange and pay for the establishment of proper reference points of the original markers by an Ontario Land Surveyor (OLS) before their removal. The Contractor shall provide the name and contact information of the Ontario Land Surveyor to the City for approval.

Reference points shall be clear of the Work and shall be marked in the manner specified in the foregoing paragraph. The Contractor shall arrange to replace any removed survey monuments in their original locations after completion of the Work, by the same Ontario Land Surveyor used to establish the reference points. Where the City is not satisfied with the survey services provided, it reserves the right to complete the works using an Ontario Land Surveyor and deduct any costs incurred from monies owing to the Contractor.

.16 SHORING EXISTING STRUCTURES

The Contractor shall at its own cost and expense, shore up or otherwise support or protect, any buildings, bridges, walls, fences, pavements, or other structures which may show defects or which, in the opinion of the Project Manager or the Contractor, may be liable to injury or to be endangered during the Work, and in the case of injury, damage or disturbance to any such structure during construction, herein contracted for, whether directly or indirectly by and because of the construction of said sewer and watermain, or of any extra Work entering into this Contract, the Contractor shall, at its own expense and costs, proceed to restore, repair, rebuild or otherwise make good, the damage, injury, or the disturbance noted, and put the said buildings, fences, walls or other structures, in a condition the same as or equal to that existing previous to its beginning the Work.

.17 ENVIRONMENTAL CONSIDERATION**.17.01 Equipment Fuelling and Maintenance**

Equipment fuelling and maintenance shall be done in such a manner that no fuel or oil can gain access to surface water or ground water. This Work shall therefore not be done in or near any drainage ditch or watercourse.

.17.02 Cleaning Equipment and Construction Debris Disposal

The cleaning of equipment machinery in ditches or watercourses shall not be permitted. All construction and equipment debris must be contained and disposed of in locations approved by the Project Manager. Construction equipment shall be cleaned prior to entering public roadways, but not in areas where the debris can gain access to storm sewers, watercourses or ditches. Should such cleaning be impractical, the Contractor shall see to it that all trucks either its own or those rented, shall drive on the roadway shoulders only, until all mud and debris has been removed from the wheels. Contaminated shoulders and pavements shall be cleaned and protected from generating air-borne dust.

.17.03 Exhaust Emissions

Exhaust emissions shall be minimized through efficient machine maintenance. The Project Manager may require evidence that regular maintenance is carried out. Should any equipment show visible signs of exhaust emission problems, the Project Manager may require same-day service, or removal of the equipment from the Work site.

.17.04 Soil Erosion Control

This item shall be read in conjunction with the Hamilton Conservation Authority - Erosion & Sediment Control guideline for Hamilton Harbour Watershed.

Erosion of soil shall be prevented. Stabilization of disturbed areas shall be completed as soon as practical after completion of each section of Work. In areas not prone to surface erosion, stabilization may be delayed until more practical units of Work has accumulated. No areas or Work should remain uncompleted, however,

at the approach of the unsuitable weather season. Where soil erosion is expected to occur, vegetation strips shall be maintained between the disturbed areas and adjacent sensitive areas and watercourses. Provision shall be made to intercept site drainage at short distance intervals into settling ponds or permeable ground cover, to minimize sediment discharge. Snow fencing shall be placed between any Working areas and adjacent to sensitive areas and watercourses where endangered by construction machinery operations.

.18 PRESERVATION OF EXISTING STRUCTURES AND PLANTINGS

The Contractor will be required to remove, without extra remuneration, all boulders, stones, rocks, stumps, roots, trees, walls or other obstructions found upon the line of Work, and to fill up all unauthorized openings. All such filling shall be made using approved materials. The Contractor shall provide proper protection to prevent the fill from spreading on private property. Privately owned fences, hedges, trees, shrubs, walls, etc., encroaching on the line of the Work will normally be removed by the owner. In the event that such removal has not been carried out, the Contractor will be required to carefully remove the encroaching object and place safely on the owner's property (or remove from site if so authorized). No extra payment will be made for Work of this nature.

The Contractor will not be required to re-erect or replace any items removed under this paragraph.

Inconvenience to all owners whose properties abut on the proposed Works, shall be kept to a minimum by the Contractor, wherever and whenever it is in its power to do so. Doing this will tend to foster harmonious relations with the affected parties during the period of construction.

Lawns, or other landscaped areas, damaged or otherwise disturbed in the course of the Work, shall have a minimum of 100mm of approved topsoil. Topsoil shall be that of previously removed from the site and stockpiled, or approved imported material at the Contractor's expense.

When lawns have been cut or otherwise damaged, the Contractor shall, in addition to topsoiling, replace all sod. The sod shall be No. 1 Nursery Sod of a quality equal to or better than that which existed before commencing Work. The Contractor shall be responsible for maintaining and watering sod until such time as it is thoroughly established to the satisfaction of the Project Manager.

The Contractor will be required to remove all rubbish and material from boulevards and lawns adjoining the Work and restore same to as good and clean a condition as existed before commencement of the Work.

.19 TREES ENCOUNTERED DURING CONSTRUCTION

.19.01 Tree Removal

Under no circumstances shall the Contractor remove trees or tree limbs without prior permission to do so by the Project Manager. Trees subject to damage shall be fully protected by the Contractor to the satisfaction of the Project Manager.

The purpose of these specifications is to preserve and prevent damage to existing trees during construction projects.

- a) Excavating within two metres of the vicinity of the base of any tree must be done by hand digging. Construction shall be done in such a way as to ensure the roots will not be damaged.
- b) During construction any item which may cause soil compaction or damage to the tree will not be permitted within the dripline of any tree. Excavation soil, equipment, supplies or debris must not be piled even temporarily over the roots.
- c) Any roots contacted or exposed during excavation will be root pruned. Make a clean square cut (flush) three inches back from the damage with a saw.
- d) Any limbs damaged/broken during construction will be trimmed with a square cut (flush) three inches back from the damage with a saw.
- e) No change of grade will be permitted within the dripline of any tree. If a major grade change is required a retaining wall or tree well will be built in order to maintain the original grade around a city tree. No foundations or retaining walls will be constructed where severing of major roots will occur.
- f) Backfilling will consist of good topsoil free from debris, bricks, lumber, nails, steel stake, etc.
- g) When installing underground connections within the dripline of a municipal or City of Hamilton tree, proper auguring techniques as specified by the Arborist shall be used.

.20 UTILITIES

.20.01 Co-ordination With Other Contractors and Utilities

The Contractor shall co-operate and co-ordinate with all other Contractors and/or utility companies that may have Work to complete adjacent to or within the limits of the Contract. The Contractor shall permit access to the Work site by these other Contractors/Utilities when required.

The Project Manager reserves the right to alter the methods of operations in the Contract to avoid interference with other Work.

.20.02 Verify Locations and Elevations of Utilities

The Contractor shall verify the elevations and locations of all utilities in the vicinity of its proposed trenches. Excavation of all such utilities shall be carried out far enough ahead of its pipe laying crews to permit deflection of the proposed installation if required without requiring additional fittings.

Where utilities are found to conflict with the proposed installations as shown on the Contract Drawings, the Contractor shall immediately notify the Project Manager.

.20.03 "Ontario One Call"

Contractors shall use "Ontario One Call", telephone number 1-800-400-2255 utility locating service. Some utilities have not subscribed to "Ontario One Call" and it is the responsibility of the Contractor to ensure all field locates have been ordered from the pertinent authorities and are available prior to any construction.

.20.04 Protection of Existing Plant, and Utilities, Overhead and Underground

It shall be the Contractor's responsibility to contact all pertinent owners of plant and utilities and to verify the location of all underground plants in the vicinity of its trenches and Work. All such plant and utilities endangered by the Contractor's Work shall be adequately supported and protected from damage by the Contractor, at its own expense, to the satisfaction of the Project Manager and the plant or utility owner involved. See Ontario One Call Form 300.20.03.

The Contractor shall restore all plant and utility, underground and above ground, disturbed or damaged by construction to the satisfaction of the Project Manager and the local authorities having jurisdiction over the same. All restoration is to be done at the Contractor's expense.

.20.05 Procedures for Excavating Near Utilities

(Applies to all Utilities except Bell Canada)

It is a requirement for all Contractors to ascertain the location of any utilities that they may come in contact with during the course of its construction activities.

.20.05.01 Notification

The first requirement is that the Contractor must contact the Utility (note Call Ontario One Call service) and request a locate of plant in the area of the Construction. When a field locate has been given and that locate indicates that a potential conflict with the proposed construction exists, the following procedures will be used:

.20.05.02 Initial Exposure

After a locate has been provided, the Contractor will not use *mechanical equipment within one metre of any such locate without first digging a test hole to determine the plant's depth.

* The term "mechanical equipment" refers to backhoes, graders, heavy earth moving equipment, augers and other earth piercing equipment. Jackhammers and concrete saws are not considered to be "mechanical equipment".

The normal procedure for digging this hole, or test holes, would be to stop the mechanical equipment 1.0m away from the locate mark and have a labourer dig laterally in towards the Utility at various depths until the plant is found. If this is not possible due to the location and direction of construction activity in relationship to the located plant, then a test hole should be dug off to the side of the roadway,

entirely by hand, to determine the depth of the plant at that location. After this initial test hole is dug by hand, then mechanical equipment may be used to dig further test holes as close as 0.3m to the plant. Regardless of the location of the preliminary test holes, it is necessary that one test hole be located in the centre of the proposed trench or excavation directly over the Utility.

In any case, the last 0.3m must be excavated by hand. Whenever mechanical equipment is used closer than 1.0m to the Utility, a labourer must be used in conjunction with the mechanical equipment to probe and hand dig for the plant in the excavation. Whenever physically possible, the mechanical equipment shall be operated parallel to rather than perpendicular to the direction of the plant when excavation is within 1.0m of the Utility.

If it is not possible to dig the test hole off to the side of the roadway, then the test hole will be dug over the utility in the roadway with mechanical equipment, subject to the following conditions:

A concrete saw or jackhammers are only permitted to break the concrete. A backhoe may be used to remove these cut pieces of concrete. Excavation below the concrete is to be done by hand.

If another layer of concrete is encountered, the Utility and Project Manager should be consulted with, as the layer could be a concrete encased duct.

If there are other layers of concrete, or similar hard materials (not to include frozen ground), a backhoe may be used to excavate and remove this concrete providing that it does not excavate in more than 150mm swaths, and that a labourer is used to probe for the plant, by hand, between each swath. Once the initial test hole is completed, further test holes must be dug at sufficient short horizontal intervals as determined by the Contractor to ensure that possible variances, such as altered plant depths, are recognized. Mechanical equipment may be used with the labourer to dig these further test holes, provide that mechanical equipment is not used closer than 0.3m to the plant.

.20.05.03 Continuous Exposure

Once the plant has been located by the various test holes, then the Contractor must expose the plant along its length which is in conflict with the proposed construction. Mechanical equipment must not be used closer than 0.3m and the last 0.3m must be dug by hand. What is meant by exposing here is to uncover the top of the plant along its length of conflict.

It is of importance here that exposing the plant is not necessary when the test holes have determined that the proposed construction will maintain a 0.3m buffer of undisturbed soil between the mechanical equipment and the plant.

Once the plant is physically exposed, digging with mechanical equipment is allowed up to 150mm of plant, the last 150mm must be hand dug.

.20.05.04 Damages

If during the exposure procedure any damage is caused to sheath integrity for telecommunication, power cables or external damage to pipeline coatings, the appropriate utility shall be notified in order for repairs to be made.

.20.05.05 Breakout Existing Road At Existing Bell Structures

To facilitate road excavation required around any existing Bell structure which is clay pipe or conduit without concrete encasement, the Contractor must conform to the following minimum requirements:

1. Structure must be uncovered using the Bell approved procedures with the exception that mechanical excavation may be used within 0.3m alongside the structure once it has been exposed.
2. Manual excavation is required to expose the top of the structure. Saw cutters and jackhammers should not be used over the structure.
3. There can be NO heavy equipment or trucks working on top of the structure or crossing the structure once it has been exposed - i.e. the road surface has been removed from the top of the support of the existing soil beside the structure has been removed.
4. The structure cannot be undermined at any location without complete bridging in place. The bridging must be installed with a support at either end on original soil. The support area at each end must equal 30% of the intended open span under the structure.
5. The structure must not rest directly on any hard material after construction - i.e. watermains, sewer pipes, concrete, unshrinkable fill, etc. There must be a minimum of 150mm of properly compacted sand cushion between the bottom of the structure and any installation under the structure.
6. Compaction equipment must not run over the structure at any time, nor can such equipment be used within 0.5m alongside the structure.
7. Where the structure has been exposed and is adjacent to an excavated area, shoring may be required, at Bell Canada's discretion, to prevent collapse.
8. All costs associated with protective measures noted above or identified later (including during construction) will be borne by the Contractor.
9. Adherence to these requirements or any to be determined later does not absolve any party from normal responsibility for loss due to damages.
10. Bell Canada's on site Inspector must be informed of the location of any excavation activities taking place within 1.0 m of the structure 24 hours in advance.

11. Any damage, incidental or otherwise, must be reported to the Bell Inspector, or in its absence, to Bell Canada repair at 611.

To facilitate both road excavation and traffic requirements the haulage trucks must be loaded on the hardtop behind the backhoe, i.e. no "third lane" loading.

.20.06 Notification of Existing Utilities

Should any utility or structure, within the limits of this Contract and interfering with the laying of the sewer or watermain, be unexpectedly encountered, the Contractor shall immediately notify the Project Manager in writing, giving the location and conditions. The point may be passed over until satisfactory arrangements are made without any claim for damage, or extra compensation arising from the delay, the Contractor being allowed an extension of time as provided.

.20.07 Sub-Surface and Other Site Conditions

The information shown on the Contract Drawings regarding sub-surface and other site conditions is, at best, a guide to assist in the determination of conditions that will probably be encountered when excavating. The City assumes no responsibility for the accuracy of this information, and the Contractor shall have no claim against the City due to it encountering conditions other than those indicated on the Contract Drawings.

It is expected that Contractors shall make, at their own expense, such tests, inspections, and other on-site investigations as they consider necessary to satisfy themselves as to the nature of the conditions to be met with and the quantities of the various kinds of Work to be done.

However, should the Contractor encounter, in the course of construction, conditions more difficult than those anticipated on the basis of its investigations, they shall have no claim against the City on this account.

.21 CONNECTING TO EXISTING PLANT

As part of its construction procedure the Contractor shall, prior to construction, verify the positions and elevations, by excavating if necessary, of all existing watermains, sewers and manholes that are required to connect to. All such verifications shall be carried out far enough ahead of its pipe installation operations to permit approved adjustments to alignment and/or grade of the proposed Works. All costs entailed shall be included by the Contractor in the prices bid for the items involved.

All costs involved to remove, re-install or correct its Work in any way, due to the Contractor's negligence in carrying out the above investigations shall be borne by the Contractor.

.21.01 Maintain Flow

The Contractor shall supply all labour and materials to maintain flow in all existing sewers, private drains, watermains, and water services involved in this Contract. Any existing services cut shall be permanently repaired by the Contractor at no cost

to the City and all materials will be supplied by the Contractor to the satisfaction of the Project Manager.

.21.02 Connection to Existing Watermain

A reduced pressure zone backflow preventer is required on all temporary supply lines used for filling and flushing of all water lines. Only approved backflow preventer valves are permitted.

The Contractor shall test, swab, and chlorinate the new systems, to the satisfaction of the Project Manager, in accordance with Form 400, Appendix 'A' – Procedure for the Disinfection, Testing and Connection of Watermains, prior to connection to existing watermains.

The Contractor shall supply and install all temporary caps or plugs, pipe closure, oversized, and adapter pieces as required in order to connect to existing watermains.

All costs arising from these requirements shall be included in the respective unit prices.

.22 COLD WEATHER WORK

The Project Manager may permit Work to be done when the air temperature is below freezing, in which case the Contractor shall, at its own cost and expense, furnish sufficient temporary protection and take all necessary precautions to protect the Work so as to prevent damage.

The Contractor shall protect all water pipe from freezing, but the City Project Manager reserves the right to do this Work and charge cost of same to the Contractor.

In the event of stoppage of the flow through any watermain or water service due to frost, or in the event of any watermain or water service is damaged due to the Contractor's operations, while they are on the Worksite or after leaving, due to trench settlement or other cause, the Contractor shall thaw the frozen watermain or water service, or repair the damaged watermain or water service at their own expense. If the Contractor does not properly and promptly thaw or repair the frozen or damaged watermain or water service, the Project Manager may arrange to thaw, repair or replace the same and the associated cost to do so will be deducted from any sum or sums due, or to become due to the Contractor.

.23 EXCAVATED MATERIALS

Where applicable, this section will be superseded, in its entirety, by the Special Provisions contained within the Contract Documents.

The Contractor shall strip all topsoil from those areas which will suffer disturbance in the course of performing the required Work. This topsoil shall be neatly stockpiled near the site, as directed by the Project Manager, and shall be disposed of later as directed. The cost of this Work shall be borne by the Contractor.

All surface or excavated materials which in the opinion of the Project Manager, are suitable for reuse in future surfacing, repaving, backfilling, or otherwise, shall be properly stored in such suitable places as directed by the Project Manager.

.23.01 Disposal of Surplus or Unsuitable Materials From All Operations For Which Excavation is Required

Material excavated in carrying out the Work of the various tender items included in this Contract which is unsuitable for, or which is surplus to the requirements for backfill or embankment construction, shall be disposed off site at locations arranged for by the Contractor at its own expense. The disposal/site location shall be submitted to the Project Manager and the Governing Conservation Authority for review and approval, before any material is permitted to leave the site. Conservation Authority approval shall be solely based on the area in which it has jurisdiction and does not relieve the Contractor from compliance with any other applicable law.

See also Form 300.04 - "Information to be submitted at Preconstruction Meeting".

.24 WORK ON AND UNDER RAILWAY COMPANY RIGHTS-OF-WAY

It shall be the sole responsibility of the Contractor to contact and arrange with the appropriate officials for such access routes as they may require across Railway property.

The Contractor shall immediately advise the Chief Engineer or Representative of the Railway Company, in writing, at least forty-eight (48) hours in advance of any Work being performed on or near Railway property in order that a Railway Inspector can be made available.

Flagmen, Inspectors or other staff as required and provided by the Railway Company will be at the expense of the Contractor and all other mandatory requirements of the Railway Company with respect to Work performed or under the Railway right-of-way, shall be complied with by the Contractor at its expense.

The Contractor shall be responsible for all damage and injury to the facilities of the Railway Company resulting from its construction operations and other Work attendant thereon. In the event of settlement, or injury to, these facilities as a consequence of inadequate, insufficient or otherwise unsuccessful method or means of support employed in its construction operations, then the Railway Company may proceed to regrade and realign such tracks, and restore facilities to the condition similar to that existing to commencement of Work on the Contract, at the Contractor's expense.

.25 TIDINESS

The Contractor shall at all times, keep its Work sites free from accumulation of waste materials and rubbish due to their employees or the Work.

Cleaning up, to the satisfaction of the Project Manager, shall be a mandatory

condition to the final acceptance of the Work.

.25.01 Dust Control

The Contractor will supply and apply calcium chloride to areas along the route of the Contract at intervals as required to effectively control dust created by the Contractor's construction operations. This is a provisional item and will only be required when, in the opinion of the Project Manager, such control is necessary.

Quantities shown in the Schedule of Prices are an approximate estimate only and payment will be made on the unit price stated for the actual amount.

Concrete cutting shall be done using wet saws or by methods that minimize concrete dust emissions.

.25.02 Progress Clean-up Restoration and Public Relations

To maintain good public relations the Contractor shall, during construction, attend to the following:

- a) All trenches to be backfilled on progressive basis each day (no more than 12m (40 feet) open at any time).
- b) All disturbed areas to be graded after backfill to maintain drainage on a progressive basis.
- c) All excess material to be removed as the job progresses.
- d) Restoration shall be completed as soon as possible.

The Contractor shall respond to the direction of the Project Manager regarding the above or any other complaints in a positive manner and within 48 hours. If the Contractor does not co-operate, the Project Manager reserves the right to have the Work done by others, and to charge the costs to the Contractor.

In addition to the above, if the Contractor continues to ignore proper clean-up, restoration and/or attending to Public Relations the Project Manager reserves the right and may deduct 15% of any monies due to the Contractor on progress payments.

.26 MATERIALS TO BE SALVAGED

Where the City has indicated that materials are to be salvaged, the Contractor will arrange for the delivery of such items to the appropriate City Yard as directed by the Contract Documents and/or the Project Manager.

All cost associated with the collection, delivery and unloading of the materials to be salvaged shall be deemed to be included in the prices provided.

.27 CONSTRUCTION EQUIPMENT

All equipment, including plant and machinery, to be used for the required construction shall be furnished by the Contractor at its own expense. Equipment to be used shall be subject to the Project Manager's approval, but approval, or failure to approve, of the equipment, on the part of the Project Manager, shall not relieve the Contractor of responsibility for proper performance of the Contract, or from its liability thereunder.

.28 STOPPAGE OF WORK

If the Work, or any part thereof is suspended or left uncompleted by the Contractor, for what is in the opinion of the Project Manager, an unreasonable length of time, the Contractor shall in the instance of a trench or other excavation, and when so directed by the Project Manager, refill such trench or excavation or part thereof, and temporarily repave over the same at its own expense. If the Contractor refuses, neglects or fails to completely refill such trench and temporarily repave over the same within 48 hours, after the receipt of a notice in writing to do so, the City may refill and temporarily repair the pavement over the trench, at the Contractor's expense.

.29 SHEATHING AND SHORING

The Contractor shall furnish at its own expense, place and maintain such sheathing, shoring and bracing, and at such locations and elevations as are necessary, or as may be directed to support and protect the excavation and to prevent any movement which could in any way disturb or weaken the supporting materials, adjacent pavements, property, buildings or other Works.

"Close Sheathing" is defined as vertically placed sheathing in which the edge of the adjacent individual members comprising it are in full contact with each other throughout the entire length of the sheathing place, so as to prevent adjacent soil from entering the trench either below or through such sheathing.

.30 TUNNELLING, BORING AND JACKING OF PIPES

.30.01 General

Pipe tunnel details may be shown on the Plans, or alternatively tunnels may be constructed at the Contractor's option in place of trench excavation. In the latter case for a continuous tunnel greater than 6 metres in length, the Contractor shall submit its proposed plan of tunnel operation to the Project Manager for approval. This request for approval shall include drawings showing the following details.

- (a) The tunnel shaft bracing and dimensions
- (b) Tunnel supports
- (c) Method of back packing tunnel supports
- (d) Bracing to prevent pipe shifting and floating

.30.02 Jacking Operations

Where shown on the drawings or where the Contractor elects to jack pipe in place of tunnelling, or deep trench excavations, the Contractor shall submit details of the

jacking pit bracing, jacking head and method, for approval by the Project Manager.

The leading section of conduit shall be equipped with a jacking head securely anchored thereto to prevent any wobble or variation in alignment during the chamber operation. Excavation shall be performed entirely within the jacking head and no excavation in advance thereof shall be permitted. Every effort shall be made to avoid any loss of earth outside the jacking head.

Excavated material shall be removed from the conduit as excavation progresses and no accumulation of such material within the conduit will be permitted. The Contractor shall excavate, maintain and restore all required jacking and receiving pits that may be necessary to complete the Work. Once the jacking operation has commenced, it shall be continued uninterrupted, until the conduit has been jacked between its specified termination points.

Upon completion of the jacking operation, all voids around the outside of the conduit shall be filled by grouting. Grouting equipment and approved material shall be on the site before jacking operations are started in order that grouting around the jacked conduit may be started immediately after the jacking operation is finished.

.31

RESTORATION

The Contractor shall repave and/or restore all surfaces, cut or otherwise damaged in the course of the Work, to a condition at least equivalent to that existing prior to the commencement of the Work.

The schedules provide for payment of the major items required to restore areas cut or damaged by construction. It is however a Contract requirement that all areas and items disturbed by construction be completely restored to original conditions by the Contractor. Items include but are not necessarily limited to the following:

The reconstruction of ditches to original conditions;

The reconstruction of fences, signs, guiderails, barricades, etc., removed to facilitate construction;

The restoration of all areas of roadways, roadway shoulders, driveways, private walks, grassed areas, etc. cut or damaged by construction;

The replacement of all culverts cut or damaged by construction with new 2.0mm wall thickness, galvanized corrugated, steel culverts as per OPSS.MUNI 421 and OPSS 1801, of the same diam. and length as existing. The culverts shall be installed to the same elevations and grades as existing in a minimum of 150mm granular "A" encasement.

The seed supplied shall contain not less than 35% Marion or Kentucky Blue Grass by weight and shall be uniformly spread at a rate of not less than 1.81 kg. per 93 sq. metres (4 lbs. per 1,000 sq. ft.) and thoroughly raked into the top soil.

All fences, signs, posts, etc. removed to facilitate construction shall be reinstated by the Contractor in the same locations as existing prior to construction.

For purposes of this Contract, the Contractor shall include all costs of restoration as specified, in its prices bid for the various items in the Schedule of Prices to which restoration pertains.

.31.01 Repaving Roads

When the Contractor closes an excavation in a paved street they shall, repave the area of the Work in accordance with the City's Standard Specifications and Standard Drawings, RD-100.01 and RD-100.02, for the type of roadway pavement required to be restored.

.31.02 Repairs to Curbs, Sidewalks and Roads

The Contractor shall replace all curbs, sidewalks and roads as soon as possible but consistent with its operations, in the area and according to the requirements concerning concrete Work during the appropriate season. All restoration of curbs, sidewalks and roads shall conform to City of Hamilton Public Works Department Standard Specifications.

If so directed by the Project Manager, the Contractor shall make temporary repairs to curbs, sidewalks and roads immediately, as specified and shall maintain the Work until permanent repairs can be made.

.31.03 Temporary Closing of Excavation

If the Contractor elects to stop its operations at an excavation with the intention of returning to it at a later date, more than four (4) weeks removed, they shall close the excavation in a manner safe for traffic to be restored to normal.

Notice, 10 days in advance, shall be given if the Contractor intends to temporarily close an excavation. With this notice, he shall submit details of its proposed temporary surface, making the site safe for traffic.

The Contractor shall not temporarily close an excavation before receiving the approval of the Project Manager.

.31.04 Grading and Excavation Behind the Sidewalks and Curbs (All Sections)

- a) All grading, excavation and/or filled areas to be sodded shall be included in the prices for sodding per square metre.
- b) All grading and excavation for driveway repairs shall be included in the unit prices stated for driveway repairs.
- c) All grading and excavation for private concrete repairs shall be included in the prices per square metre for private Work repairs.

.31.05 Saw Cutting of Pavement

Prior to excavation in areas not subject to reconstruction, the Contractor shall saw cut existing pavements back to a minimum of 300mm beyond trench edges. Cuts

shall be to depths sufficient to allow removal of pavements, and base without damaging adjacent surfaces.

.31.06 Cutting, Fitting and Patching

The Contractor shall co-ordinate the Work of all cutting, fitting and patching necessary to make the various parts of the Work come together properly. The Contractor shall also co-ordinate the cutting, fitting and patching as required to connect the Work on this Contract with that of any separate Contractor.

.32 TRAFFIC CONTROL DURING CONSTRUCTION

.32.01 Provision for Traffic, Construction and Maintenance of Detours and Roadways

The Contractor shall at all times carry on the Work in a manner that will create the least interference with traffic consistent with the faithful performance of the Work. The Contractor shall not close the road or provide any detour except with the approval of the Project Manager, in writing. The Contractor, at its own expense, shall at all times provide for the safe passage and control of traffic by supplying, placing, maintaining, changing, and removing such barricades, signs, lights, and traffic controllers as are required for the proper notification and protection of the public approaching or passing through any part of the Contract area and all devices so used shall be in accordance with the Ministry of Transportation of Ontario, Traffic Control Manual and the Ontario Traffic Manual Book 7 - Temporary Conditions and all aspects of the Work shall conform to Occupational Health and Safety Act as amended.

Where, with the approval of the Project Manager, the road is closed and the traffic is diverted to any other public roads, the Contractor shall, at its own expense supply and erect barricades, lights and such other protection as may reasonably be required by the Project Manager at all points where traffic might enter on that portion of the road so closed to traffic. The Contractor, when required by the Project Manager, shall supply traffic control personnel, to protect the barricades and direct traffic at each end of the portion or portions of the highway closed to traffic.

The City will erect signs and lights and maintain such approved detours over other public roads which may be used during the said closure of the road.

The Contractor will not be required to maintain any existing public road within the limits of the Work of the Contract until such time as they have commenced operations on the said road. Once the Contractor has commenced operations, they shall maintain at all times, the existing road or any roadside detour unless otherwise specifically provided.

The Contractor shall at its own expense and prior to the acceptance of the Work, rectify to the satisfaction of the Project Manager, any defacement of the road allowance due to the construction and maintenance of detours.

If, at any time, the Contractor fails to provide for the safe passage and control of traffic on any existing road or detour for which, under these General Conditions he is responsible, and if the Contractor fails to correct forthwith such an unsatisfactory

condition upon being so directed in writing, the Project Manager may immediately correct the unsatisfactory condition and take such other action as they deem necessary for the safe passage and control of traffic. The City may deduct from any monies due or to become due to the Contractor, on any account, any cost or expense incurred by the City under this paragraph.

Failure to act on the part of the Project Manager under this subsection shall not relieve the Contractor from its responsibilities under this Contract.

The Contractor shall co-ordinate the removal and reinstallation of any existing parking meters, Traffic Control Signals or Street Signing with the City of Hamilton Traffic Department.

The Contractor shall restore all parking meters or traffic control signs, or signals damaged by construction to the satisfaction of the Project Manager and the City of Hamilton Traffic Department. All restoration is to be done at the Contractor's expense.

A Traffic Co-ordination Meeting shall be arranged, where required, at least 2 weeks in advance of the start of construction.

Wherever roadway plates are required they must be saw cut in, flush with the road surface, and be skid resistant.

The Contractor shall provide Traffic Protection Plans, as required, to meet all requirements of the Ministry of Labour and the Occupational Health and Safety Act.

The Contractor will be required to strictly adhere to all requirements for barricading, lighting, and traffic control as specified by the City of Hamilton, and the Ministry of Transportation, Ontario Traffic Manual, Book 7 - Temporary Conditions.

Wherever possible, the Contractor shall avoid working on arterial roadways with high traffic volumes during peak traffic periods. In general the peak traffic periods shall be considered to be 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. on weekdays. Any exceptions to this requirement shall be at the discretion of the Project Manager. The Contractor shall have no basis for increased working time due to this requirement.

Where there is no item in the Schedule of Prices for traffic control, all costs for the above shall be deemed to be included and no separate payment will be made.

.32.02

Hamilton Street Railway (HSR) and School Bus Services

Wherever possible, HSR and school bus traffic shall be maintained at all times, including the provision for suitable, clean areas for bus stops. At temporary bus stops, a flat platform shall be constructed of granular "A" material for pedestrian use. In addition, a safe walkway must be maintained between the temporary bus stop and any adjacent sidewalk.

Prior to closing any roadway, the Contactor shall ensure that all school bus operators using that route are notified well in advance.

The Contractor shall contact and notify the City and the HSR at 528-4200, Ext. 1810, at least one week prior to:

- a) Closing or restricting lanes on any local streets or arterial roads with HSR routes. The Contractor will notify the HSR two weeks prior to closing any arterial roads in this Contract so bus traffic can be maintained and to give sufficient time for the HSR to notify its customers. All bus movements must be approved by the HSR and/or authorities having jurisdiction over school bus traffic.
- b) Working in areas of existing bus shelters to co-ordinate their removal and/or identify and maintain any underground electrical conduit
- c) The removal and/or relocations of any bus stops during construction
- d) The pouring of concrete or laying asphalt for any landing pad or shelter pad, in order to ensure they are properly located and any inserts for the bus stops are supplied

.32.03 Traffic Control – Police Services

The Contractor shall be responsible for arranging for and full payment of all costs for the use of Hamilton Police Services or other Police forces having jurisdiction where:

- a) The use of Police Officers is required for the safe passage of traffic through construction detours and/or traffic signals
- (b) In the opinion of the Project Manager, construction operations require the use of Police Officers as a safety precaution

.33 UTILITY FRAME AND COVER RAMPING/BARRICADING

The Contractor shall note if a street is opened to traffic prior to completion of construction the Contractor shall:

- a) Temporarily ramp all utility frames and covers with hot mix asphalt.
- b) Temporarily barricade all utility frames and covers where necessary.

.34 DAMAGE BY VEHICLES AND OTHER EQUIPMENT

If at any time, in the opinion of the Project Manager, damage is being done or is likely to be done to any highway or any improvement thereon, other than such portions as are part of the Work, by the Contractor's vehicles or other equipment whether licensed or unlicensed, the Contractor shall, on the direction of the Project Manager and at the Contractor's own expense make changes in or substitutions for such vehicles or other equipment or shall alter loading or shall in some other

manner remove the cause of such damage to the satisfaction of the Project Manager, except that where such a change, substitution, alteration or removal is made in circumstances that could not have been foreseen by the Contractor at the time of tendering and in respect of a vehicle hauling a load within its licensed capacity, it shall be at the expense of the City.

.35 EXCESS LOADING OF MOTOR VEHICLES

Where a vehicle is hauling material for use in the Work under this Contract, in whole or in part upon a public highway and where motor vehicles registration is required for such vehicles, the Contractor shall not cause or permit such vehicles to be loaded beyond the capacity for which it is licensed whether such vehicle is registered in the name of the Contractor or otherwise, except upon those areas within the limits of the Contract as designated in the special provisions.

The Contractor shall bear the onus of weighing disputed loads. Notwithstanding any other provision of this Contract, where a vehicle is hauling material which is being measured for payment by weight, over any portion of highway on which overloading is not permitted by this Contract, no payment shall be made by the City to the Contractor for any part of the load carried in said vehicle that exceeds the licensed capacity of the vehicle.

.36 BLASTING AND USE OF EXPLOSIVES

.36.01 Blasting Provisions

Should the Contractor, in its excavating, find it expedient to use explosives, they shall observe and be governed by the applicable provisions of the regulations in accordance with Form 300.08.

In reference to statutory and other regulations, it is to be understood that each reference is to the latest version, and that all amendments made before or during the performance of the Work are equally binding.

In addition to Form 200.03.21, the following shall apply:

Where blasting is anticipated the Contractor must hire an independent Inspection Company, at its own expense, to conduct a pre-construction inspection of the properties within 100 metres of the construction area which must be completed prior to carrying out any blasting operations.

This will include all structures considered to be of potential risk, including, but not limited to buildings, driveways, sidewalks, swimming pools, patios, etc.

The pre-construction survey report shall include as a minimum the following information and shall be made available to the City at the pre-construction meeting:

- 1) Type of structure, including type of construction, and the date if possible, when built.
- 2) Any differential settlements: visible cracks in walls, floors and ceilings shall

be identified and described, including a diagram, if applicable, room by room.

- 3) Any other apparent structural or cosmetic damage or defect must also be noted.
- 4) The report shall use positive dimensions whenever practical to do so, instead of general terms, e.g. "sagging 1 to 2 inches" as opposed to "sagging badly".
- 5) Clear quality photographs, as deemed necessary for proper recording of significant concerns.

The standard inspection procedure will include the provision of an explanatory letter to the building owner with a formal request for permission to carry out an inspection.

In the event that free access cannot be gained to any property, or after three (3) attempts being made, or through refusal by the owner or tenant, it shall be considered a complete inspection. If after three calls, the occupant cannot be contacted, the exterior of the building will be inspected if accessible.

The Contractor shall provide, at the pre-construction meeting, at no expense, a copy of the pre-construction survey report to the Project Manager. The survey report shall indicate the address of each of the properties inspected, the refusals received, and an evaluation of any evident or potential hazards that exist.

The Contractor shall employ, at its own expense, the services of a Specialist experienced in seismic investigations to determine and control the permissible intensity of vibrations which will result from blasting operations. Investigations shall be carried out by the Contractor and the Specialist before any rock excavation is started in order to determine the maximum explosive charges that can be used at different locations throughout the area of rock excavation. The Contractor shall submit a report to the Project Manager outlining the results of the investigations and tests made, and detailing the control required during blasting, throughout the area of rock excavation.

Further seismic readings shall be taken by the Specialist during blasting operations. Such readings shall be on a continuous basis and shall be taken where buildings and structures are located within 60 metres (200 ft.) of the blast area.

Within the area of the above, building and structures, the monitoring equipment shall be placed to obtain representative readings. As construction proceeds, the monitoring equipment shall be repositioned on an on-going basis.

In addition to the above, vibrations generated shall not exceed a vibrational peak particle velocity of 50mm (2 inches) per second when monitored at the nearest building or structure.

If the monitoring station is not at the nearest structure, then the allowable particle velocity shall be reduced in accordance with the increased distance from the blast and shall be determined by the blasting specialist.

Additional monitoring and readings shall be obtained in other sensitive areas where the pre-blast survey indicates the need.

The Contractor and Specialist shall visit the Owners of properties and buildings where test and/or investigations are required and shall describe blasting and seismic investigations to them and obtain their permission to carry out the necessary investigations and notify them of the blasting schedule. In addition, all property owners with 300m of the blast area shall be provided with the blasting schedule. In addition all property owners having had their property surveyed shall be provided with a card, stating that a copy of the pre-blast survey, of their property will be provided upon written request.

The Specialist will be an advisor to the Contractor and the acceptance of his/her reports and recommendations by the Project Manager will, in no way relieve the Contractor of any responsibility for damage or injury by blasting.

.36.02 Tunneling

Where blasting methods are employed in tunneling operations all conditions and requirements as stated herein shall be met and adhered to by the Contractor.

The blasting specialist shall be present and monitor the first ten (10) blasts detonated at the tunnel heading as a trial section. If it is found that the maximum allowable particle velocity has not been exceeded at any time during the test section, the City will allow the Contractor to continue its operation employing seismic recorders only.

The recorders shall be supplied and installed by the blasting Specialist, repositioned on an on-going basis as Work progresses and shall be checked for accurate operation at intervals not to exceed three (3) Working days.

Should the Contractor elect to alter its blasting methods they shall immediately notify the Specialist and the City and have another trial section of ten (10) blasts recorded in the presence of the Specialist at the Contractor's own expense.

If at any time during construction, the recordings indicate that the maximum allowable particle velocity has been exceeded, the Project Manager will require the blasting Specialist to be present at each and every further detonation or until such time as the Project Manager is satisfied that all requirements are being adhered to, all at the Contractor's own expense.

All costs incurred by the Contractor in the employment of the Specialist in seismic investigations shall be deemed to be included in the items in the Contract under which any rock excavation is required.

.36.03 Blasting Mats

Where blasting methods are employed by the Contractor in the vicinity of buildings, structures or other properties subject to damage by flying material, the Contractor shall supply and place blasting mats or use such other methods as may be

approved by the Project Manager to prevent damage by air borne materials.

.37 SHORT TERM PAVEMENT MARKINGS

All short term and temporary pavement markings shall be installed in accordance with the Contract Documents, OPSS 710 and the Ontario Traffic Manual unless otherwise noted.

In general, short term pavement markings refer to any marking that is required to provide delineation and positive guidance to road users until permanent pavement markings can be installed. Short term pavement markings are typically used where the road surface has been altered in such a manner as to obscure existing pavement markings however the road and general lane arrangement is unaffected (i.e. road resurfacing where a milled surface will be left for an extended period of time before final paving or where there is a time lag between final paving and the application of permanent pavement markings).

In general, temporary pavement markings refer to any marking that is required to provide delineation and positive guidance to road users through work zones where the general lane arrangement of the road is altered to facilitate construction (i.e. lane shifts, lane reductions, lane narrowing etc.)

Under no circumstances shall short term or temporary pavement markings conflict with any permanent pavement marking. Furthermore, only Temporary Preformed Plastic Pavement Marking Tape shall be used on road surfaces that are not being reconstructed or resurfaced unless otherwise specified in the contract documents or agreed to by the parties.

For short term pavement markings involving directional dividing line and lane lines, Table 1 of OPSS 710 is amended as follows.

TABLE 1: SHORT TERM PAVEMENT MARKINGS

Type of Roadway	Min. Line Length	Max. Gap Length	Max. Duration*
All roads, Speed Limit < 90 km/h	0.3 m	6.0 m	15
All roads, Speed Limit ≥ 90 km/h	0.3 m	9.0 m	15
* Maximum number of Working Days before permanent markings must be placed.			

.38 PROPOSED ROAD, CURB AND SIDEWALK GRADES AND ELEVATIONS

The Contractor shall calculate all proposed road, curb and sidewalk grades and elevations and shall submit them to the Project Manager for review, prior to construction.

The proposed grades for road, curb and sidewalk construction shall be determined using the following design criteria:

1. All gutter grades shall be 0.75% minimum slope to catch basins.
2. Radii to be improved where possible, up to 9 metres maximum where there is sufficient property. Contractor to verify property lines for improvements, with the City prior to construction.
3. All driveway repairs to have a minimum slope of 2% toward the road.
4. All apron approaches shall not exceed a maximum slope of 8% toward the road.
5. At all arterial cross streets, road cross fall shall be 1%.
6. At all local cross streets, road cross fall shall be 2%.
7. Sidewalk cross fall shall be 2%.
8. Boulevard cross fall shall be 4%.
9. All variations from specified criteria shall be approved by the Project Manager.

.39

METHOD OF PAYMENT FOR EXTRA WORKS BY FORCE ACCOUNT

For the purpose of this section,

"Work" means the Extra Work approved by the Project Manager pursuant to Form 200.02.08, which is to be paid for on a time and material basis.

"cost of labour" means the amount of wages and payroll burden paid or incurred directly by the Contractor for or in respect of the labour forces and for or in respect of supervision by foreman actively and necessarily engaged on the Work. Costs will be based on the recorded time and hourly rates of pay for such labour and supervision, but shall not include any payment or costs incurred for general supervision, administration or management or any wages, or payroll burden for which the Contractor is compensated by any payment made by the City for equipment.

"payroll burden" means the payment in respect of Worker's compensation, vacation pay, employment insurance, public liability and property damage insurance, sickness and accident insurance, pension fund, and shall include any costs or expense of food, lodging and incidental expenses such as the Project Manager may approve when such costs are assumed by the Contractor as a condition of employment of those directly and actively engaged in the extra Work.

"cost of material" means the cost of materials by the Contractor for the extra Work as shown by itemized invoices and the cost of material from the Contractor's stock used on the Work valued at current prices.

Subject to such exceptions as the Project Manager may permit in writing, the Work performed by the Contractor under this section shall be subject to all the terms, conditions, specifications and provisions of this Contract.

Daily Work records prepared by the Project Manager or Inspector reporting the labour and equipment employed and the material used on the Work shall be reconciled with and signed each day by the Contractor's representative.

The City shall pay the Contractor for labour on the Work, at the rate of 135% on the first \$3,000.00 of the cost of labour, and at the rate of 120% on the cost of labour in excess of \$3,000.00.

The City shall pay the Contractor for material used in the Work, 120% at the rate of the cost of material, up to \$3,000.00 and at the rate of 115% over \$3,000.00 excluding the costs of materials for which compensation is included in the rental rates for construction equipment. Material originally supplied and used by the Contractor in the Work, and subsequently salvaged by the Contractor in reusable condition shall be accepted by the Contractor and 50% of the costs of such material shall be deducted from the amount payable to the Contractor.

Where the Contractor arranges for Work on a Time and Material Basis, or a part of it, to be performed by Sub-Contractors on a Time and Material Basis and has received approval prior to the commencement of the Work, in accordance with the requirements of OPSS.MUNI 100 subsection GC3.09, Sub-Contracting by the Contractor, the Owner will pay the cost of Work on a Time and Material Basis by the Sub-Contractor calculated as if the Contractor had done the Work on a Time and Material Basis, plus a mark-up calculated on the following basis:

- (a) 20% on the first \$3,000; plus
- (b) 15% on the amount from \$3,000 to \$10,000; plus
- (c) 5% on the amount in excess of \$10,000.

No further mark-up will be applied regardless of the extent to which the Work is assigned or sublet to others. If Work is assigned or sublet to an associate, as defined by the Securities Act, no mark-up whatsoever will be applied.

Equipment owned by the Contractor used in the Work shall be paid for in accordance with the Ministry of Transportation, Ontario "Schedule of Rental Rates for Construction Equipment, Including Model and Specification Reference", as set out in the OPSS 127, hereinafter called the "127 Rate". Each period of time during which the equipment is actively and of necessity engaged in performing the Work, and the first two hours of each immediately following period during which the equipment is not so engaged but the Work is otherwise proceeding, shall be considered Working time for which the City shall pay the Contractor the "127 Rate". Equipment owned by the Contractor that is not covered by the "127 Rate", shall be paid at a negotiated price.

The City will pay the Contractor for the Working Time of all equipment other than

Rented Equipment and Operated Rented Equipment used on the Work on a Time and Material basis at the "127 Rates" with cost adjustments as follows:

- (a) Cost \$10,000 or less - no adjustments
- (b) Cost greater than \$10,000 but not exceeding \$20,000 - payment \$10,000 plus 90% of the portion in excess of \$10,000; and
- (c) Cost greater than \$20,000 - \$19,000 plus 80% of the portion in excess of \$20,000.

The City will pay the Contractor for the Working Time of Rented Equipment used on the Work on a Time and Material Basis at 110% of the invoice price approved by the Project Manager up to a maximum of 110% of the "127 Rate". This constraint will be waived when the Project Manager approves the invoice price prior to the use of the Rented Equipment.

The City will pay the Contractor for the Working Time of Operated Rented Equipment use on the Work on a Time and Material Basis at 110% of the Operated Rented Equipment invoice price approved by the Project Manager prior to the use of the equipment on the Work on a Time and Material Basis.

Any period of time, or part thereof, which is not herein considered Working time, and during which the equipment owned by the Contractor is required to remain on the site of Work, shall be considered standby time. The wages, salary and payroll burden of the operator or operating crew who cannot be otherwise employed during standby time shall be included in the cost of labour. In addition the City shall pay one-third of the "127 Rate" for that portion of standby time which together with the Working Time does not exceed 10 hours in any one day.

When equipment owned by the Contractor is being transported by float within the limits of the Contract to or from the site of the Work, payment shall be made by the City only in respect of the float. When equipment owned by the Contractor is being moved under its own power, it shall be deemed to be working. The Project Manager shall negotiate payment for transporting such equipment from sources outside the limits of the Contract.

"Rental Equipment" means equipment that is rented or leased for the special purpose of Work on a Time and Material Basis from a person, firm or corporation that is not as associate or affiliate of the lessee as defined by the Securities Act, and is approved by the Project Manager.

Notwithstanding any other provision of this Section, no payment shall be made to the Contractor for or in respect of hand tools or equipment that are tools of the trade.

Except where there is agreement in writing to the contrary, the compensation as herein provided shall be accepted by the Contractor as compensation in full for all costs and expenses arising out of the Work including all costs of general supervision, administration and management time spent on the Work and no other payment or allowance shall be made in respect of such Work.

The Contractor shall submit to the City a separate invoice in triplicate for the Work within thirty days of the completion of the Work. Each invoice shall include the number and covering dates of the Work, and shall itemize separately labour, materials and equipment, and submitted with the invoice shall be receipted invoices for materials, rented equipment, and other charges incurred by the Contractor on the Work.

**APPENDIX A - GUIDELINES FOR OBTAINING WATER FROM CITY HYDRANTS FOR
AUTHORIZED CONTRACTORS AND CITY STAFF.**

1. General

- a. This document provides procedural guidelines to Contractors and City Staff authorized to operate City Hydrants for the purpose of obtaining water.
- b. Water obtained from City hydrants shall be solely used for the operations related to City of Hamilton business. The City may require that water usage is metered.
- c. Any person operating a hydrant shall have sufficient knowledge on hydrant operation and water distribution systems.
- d. Only hydrants included in the approved hydrant list should be used. The List is updated yearly and can be obtained from Engineering Services, Asset management Section, Subsurface Group.
- e. All persons operating a hydrant must maintain a Hydrant Use Log Form by entering the required information each time a hydrant is used. Completed forms are to be submitted to the City Inspector weekly.
- f. A hydrant pump must be used to pump out water each time a hydrant is used if the water in the hydrant body does not drain properly, especially during the months of November, December, January, February and March. Hydrant pump shall be disinfected with 1% Sodium Hypochlorite spray before use. This will occur regardless of the outside temperature. The City inspector will perform periodic spot checks utilizing a camera to ensure that pumping has been successful and no ice has built up that could possibly limit hydrant operation. In the event an issue is discovered, the inspector shall be notified immediately. The Inspector shall call CSR's to schedule a WDO to inspect the hydrant.
- g. In the case where prolonged use of a fire hydrant is required, Inspector is to call "hydrant out of service" with the CSR's for the communication with Fire Department and update in Hansen system. Inspector is to call "hydrant back in service" with CSR's when operations are completed.

2. Hydrant Operation - Normal Operation

- a. Verify direction of operation by visual observation of arrow on top of hydrant and/or the presence of black painted "L" on body.
- b. Only City of Hamilton approved hydrant wrenches are to be used in the operation of a fire hydrant.
- c. Remove cap of port to be used while ensuring that remaining port caps are tightly secured. If front port is to be used, install appropriate adaptor as required.
- d. All hydrants are to be operated in the fully open position with a hydrant adaptor / backflow preventer installed for control. The hydrant adaptor shall be disinfected with 1% Sodium Hypochlorite spray before each use.

- e. Open all hydrants slowly. Initially flow the hydrant just enough to remove branch water and then open a minimum of three to four turns to ensure the main valve drains are fully open. Proceed to open hydrant to full open position. If flow must be regulated, a 2 ½" gate valve must be used.
- f. Close hydrant slowly. Once the flow has stopped, turn the operating nut ½ a turn in the open direction to take the strain off the operating parts of the hydrant while ensuring that the hydrant is fully off.
- g. Verify that the hydrant is draining following closure by looking in the open port to see if the water level is dropping. If the hydrant does not drain or does not shut off completely, notify the City inspector immediately.
- h. In the event that the hydrant body does not drain, pumping out the water with a hydrant pump shall be used. Hydrant pump shall be disinfected with 1% Sodium Hypochlorite spray before each use.
- i. Replace cap of port used slightly to ensure air has been released and tighten.
- j. Replace hydrant marker flag if one was present.

3. Connection / Disconnection of Hydrant Adaptor

- a. Before installing the hydrant adaptor, the hydrant adaptor shall be disinfected with 1% Sodium Hypochlorite spray.

After disconnection of hydrant adaptor, the hydrant should be inspected for proper operation and sufficient drainage of hydrant body.



Guidelines for Obtaining Non-Potable Water from City Hydrants Authorized Contractors & City Staff Only City of Hamilton - Hydrant Use Log Form

1	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

2	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

3	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

4	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

5	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

6	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES

7	Date (MM/DD/YY)	Time ON	Time OFF	Hydrant ID	Address
		AM PM	AM PM		
	Operator's Name (First, Last)		Operator's Signature		Review
		X			Hydrant Draining? YES NO - Had to be Pumped Hydrant Operation? GOOD ISSUES - Inspector Notified Adaptor Disinfected before use? YES