

No.	Title	No. of Pages
-----	-------	--------------

DIVISION 01

01005	General Instructions	8
01340	Shop Drawings, Product Data, Samples, and Mockups	3
01410	Testing and Laboratory Services	1
01500	Temporary Facilities	1
01561	Environmental Protection	3
01562	Management and Disposal of Excess Material	6
01570	Traffic Control	2
01600	Materials and Equipment	2
01705	Health and Safety	4
01720	Project Record Documents	1

DIVISION 02

02315	Excavating, Trenching and Backfilling.....	2
02582	Direct Buried Underground Cable Ducts	2

DIVISION 16

16010	Electrical General Requirements.....	4
16051	Installation of Cables in Trenches and in Ducts	2
16122	Wires and Cables 0 – 1000 V.....	1
16151	Wire and Box Connectors – 0-1000 V.....	1
16505	Lighting Equipment.....	1

DRAWING – INSTALLATION METHODOLOGY

Sheet 660.5.5	Aluminum Extension Post – Fusing and Wiring Detail	1
---------------	--	---

1 DESCRIPTION OF WORK

The General Contractor shall have expertise or hire a sub contractor with expertise in both the civil and electrical aspects of roads/pathways electrical systems.

The General Contractor shall supply, install, test and commission the equipment, and services including but not limited to the following:

- Remove all identified equipment and materials by Tender Documents.
- Procure all new replacement materials and equipment identified in the tender documents.
- Install all new replacement materials and equipment identified in the tender documents.
- To subcontract all related mechanical and/or civil work required.
- To perform start-up and commissioning of the upgraded system and provide all warranties.
- Provide as built-drawings.
- Provide O&M manuals and Training/demonstration to NCC maintenance contractor/staff as required.
- Provide fuses and wiring for each new street light and install as per Drawing Sheet 660.5.5.

2 CODES

- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of:
 - .1 contract documents,
 - .2 specified standards, codes and referenced documents.

3 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop drawings.
 - .5 Change orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Copy of approved work schedule.
 - .9 Manufacturers' installation and application instructions.
 - .10 Copy of approved on-site traffic and equipment operation plan

4 WORKMANSHIP

- .1 It is a requirement of this contract, that qualified tradesmen execute each type of work specified.
- .2 Example: Landscape Contractor for landscape work, mason for masonry work, etc.
- .3 Work unsatisfactorily completed by unqualified tradesmen shall be redone and paid for by the Contractor.

5 SITE CONDITIONS

- .1 No geotechnical or borehole data is available for this project.

6 SITE VISIT

- .1 Parties intending to submit tenders on the work must visit the site and obtain for themselves all information pertaining to existing conditions affecting the proper execution and completion of the work. Date of the site visit will be confirmed during the tendering stage. The submission of a tender shall be deemed as proof that the tenderer and his subtrades have complied with this requirement. Claims for additional compensation will not be entertained for any items of labour or material required to complete the work that could have been reasonably ascertained by a Site Examination.

7 PAYMENT

- .1 Any minor or miscellaneous items indicated on the drawing as being part of the work of this contract and for which there are no specific pay items listed on the unit price table must be included by the Contractor in his overhead and indirect charges and incorporated into the unit prices which are listed on the unit price table.
- .2 No separate payment will be made for work performed in respect to any of the special provisions for which there is no specific pay item on the unit price table. The cost of these works must be appropriated among, and included in, the unit prices bid for the pay items listed.
- .3 Included in the unit prices bid for the respective items shall be, in addition to the actual cost of construction, all other items of work required to complete the contract to the extent indicated on the drawings and specified herein.
- .4 Measurement for Payment
 - .1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.

8 CONTRACTOR'S USE OF SITE

- .1 Use of site: exclusive and complete within the construction area as defined in the contract drawings for execution of work except as follows:
 - .1 Contractor may not operate any equipment outside of the limits of work area as identified in the contract drawings.
 - .2 Vehicle access to site is limited to North River Road.
 - .3 All trenches shall be closed up daily prior to shutdown to permit vehicle access.
- .2 Areas for work and storage:
 - .1 No material, equipment or vehicles shall be stored/parked on lands other than NCC land.
 - .2 Work and storage area shall be limited. The contractor shall coordinate with the NCC to identify an acceptable location.
- .3 All areas used for work and storage shall be maintained by the contractor and any asphalt, sod, pavers, curbs, trees, etc that are damaged due to the contractors use of the area shall be repaired/ reinstated at the contractors cost.

9 PROJECT MEETINGS

- .1 The Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes. The contractor shall be obligated to attend all meetings at no additional cost.

10 SETTING OUT OF WORK

- .1 Prior to commencement of work only, and not afterwards, the Engineer will provide two survey control points.
- .2 Contractor shall set grades and lay out work in detail from control established by the Engineer.
- .3 Contractor shall assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .4 Contractor shall provide devices needed to lay out and construct work.
- .5 Contractor shall supply such devices as straight edges and templates required to facilitate Engineer's inspection of work.
- .6 Contractor shall supply stakes and other survey markers required for laying out work.

11 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Engineer of impending installation and obtain his approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Engineer.

12 CUTTING, FITTING AND PATCHING

- .1 Execute cutting (including excavation), fitting and patch as required to make work fit properly.
- .2 Make cuts straight, with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

13 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to pedestrian and vehicular traffic.
- .2 Before commencing work, establish location and extent of all service lines in area of Work and notify Engineer of findings.
- .3 Submit schedule to and obtain approval from Engineer for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered immediately advise Engineer and confirm findings in writing.
- .5 Remove abandoned service lines within 2 m of new structures. Cap or otherwise seal lines at cut-off points as directed by Engineer.
- .6 Record locations of maintained, re-routed and abandoned service lines.

14 ADDITIONAL DRAWINGS

- .1 Engineer may furnish additional drawings for clarification. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract documents.

15 RELICS AND ANTIQUITIES

- .1 Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work.
- .2 Give immediate notice to Engineer and await Engineer's written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain her Majesty's property.

16 SCHEDULING OF WORK AND RESTRICTIONS:

- .1 Provide in form acceptable to Engineer, within 5 working days after Contract award, schedule showing dates for:
 - .1 Submission of shop drawings, material lists and samples.
 - .2 Commencement and completion of work of each Section of Specification.
 - .3 Final completion date within time period required by Contract documents.
- .2 Interim reviews of work progress based on work schedule will be conducted as decided by Engineer and schedule updated by Contractor in conjunction with and to approval of Engineer.
- .3 The contractor shall submit to the Engineer a proposed monthly cash flow chart identifying price breakdown per trade for review and acceptance by the Engineer prior to commencement of the work.
- .4 The contractor shall update the schedule as requested by the Engineer. The contractor shall adhere to the approved schedule and cash flow charts.
- .5 The contractor shall schedule the work activities to minimize any disruption to the existing building occupants and their operations. Disruptive work activities and their scheduling shall be done in co-ordination with the Engineer. The contractor shall coordinate commencement of work on site in a manner that material delivery will not hold up the construction process.
- .6 Shop drawing submittal: To accommodate long delivery dates on specific items, contractor shall submit shop drawings of such long delivery items within 5 days of receipt of letter of intent to award from the Owner. Refer to section 01340 Shop Drawings, Product Data, Samples and Mock-Ups.

.7 Scheduling Constraints:

- .1 Standard authorized hours of work are Monday to Friday, 07:00 hours to 18:00 hours. Obtain prior permission through Engineer for work outside of the standard authorized time frame. Assume any extra costs for labour, material or equipment associated with work performed outside of the standard time frame unless specifically requested (in writing) by the Engineer.
- .2 Peak traffic hours: Maintain one full lane in each direction at all times during peak traffic hours defined as follows: 07:00 to 09:00 and 15:30 to 17:30 hours.
- .3 Construction work on site will start upon receipt of Environment Authorization Certificate which will be obtained by NCC.

17 DAMAGES:

- .1 Existing plant material, landscaping, roadways, pathways, structures, finishes and public utilities damaged during the execution of the work of this contract, will be restored to their original condition, replaced, or adequate compensation made to affected parties by the contractor as directed by the contract administrator.
- .2 It is understood that restored or replaced work includes labour, equipment and material costs.

18 PERMITS AND BY-LAWS:

- .1 The Contractor shall make himself fully acquainted with all Provincial, Local and other by-laws relating to the work of this contract, as he will be required to comply with such by-laws without extra compensation of any nature.
- .2 Obtain and pay for permits, factory inspector's approval, and other licenses required for this project and also pay any other charges incidental to such permits.

19 WEIGHING OF MATERIALS:

- .1 Unit Price Items, measured by the tonne for payment purposes, must be accompanied by delivery tickets issued by the supplier of the material, indicating what type of material and net weight in tonnes. Upon arrival at the site and before off loading, the loads must be approved and delivery ticket signed by the commissions on site representative. A duplicate copy of the signed ticket will be retained by the commission's representative, the original of which shall be retained by the contractor for submission with invoices at the time of payment.
- .2 Weight shown on the delivery ticket must be the net weight of the materials only

as weighed on a scale, which is tested and approved by the weight inspectors of the Government of Canada at least once per year. The Engineer retains the right to require the Contractor to provide on-site scales without additional charge to the Commission if, in his opinion, he considers the method being followed unsatisfactory.

20 ADDENDAS

- .1 Answers to questions directed to the Engineer, and any amendments to the drawings and specifications during the tender period will be communicated in the Form of Addenda to all General Contractors tendering. Such Addenda to be considered as and read as part of the specifications, and thereby included in the Contract Documents.

21 COORDINATION

- .1 Co-ordinate operations of those involved in the work so that it progresses effectively and efficiently.
- .2 Contractor shall notify and get approval from the NCC Representative to work during non-normal working hours.
- .3 Ensure, before any trade or operation starts, that preceding or preparatory work is completed, and that conditions are appropriate to receive work of such trade or operation.
- .4 Ensure that sub-contractors provide properly qualified superintendents on site to supervise trades involved in work. Do not permit change of personnel, except when approved.

22 ENVIRONMENTAL EMERGENCY PLAN

- .1 The contractor shall have an Environmental Emergency Plan in place.

An Environmental Emergency Plan is required in view of accidental events that could degrade the environment. This Plan must identify such things as the site's designated equipment maintenance areas (ie. refueling, oil changes, lubrication, cleaning) and hazardous materials storage area, which must be at least 30 metres from any watercourse. Properly constructed and maintained spill pans and tarps will be required for all machinery and storage tanks utilized. The contractor must have a spill kit on-site at all times. In the event of an accidental spill of fuel or other pollutant, the Contractor will immediately advise the NCC Emergency Service at 239-5353.

23 GUARANTEES AND WARRANTIES

- .1 Before completion of work, collect all manufacturer's guarantees and warranties,

and deposit to NCC Representative.

24 OPERATIONS AND MAINTENANCE

- .1 Include the following information plus data specified:
 - .1 maintenance instructions;
 - .2 copy of hardware and paint schedules;
 - .3 description: operation of the equipment;
 - .4 guarantees, warranties, and bonds showing:
 - .1 name and address of project;
 - .2 guarantee commencement date (date of Final Certificate of Completion);
 - .3 duration of Guarantee;
 - .4 clear indication of what is being guaranteed and what remedial action will be taken under guarantee;
 - .5 signature and seal of contractor.

END OF SECTION

1 GENERAL

- .1 This section specifies general requirements and procedures for contractors submissions of shop drawings, product data, samples and mock- ups to Engineer for review. Additional specific requirements for submissions are specified in individual sections of Divisions 2 to 16.
- .2 Do not proceed with work until relevant submissions are reviewed by Engineer.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submissions.
- .6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review of submission, unless Engineer gives written acceptance of specific deviations.
- .8 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer.
- .9 Notify Engineer, in writing, when resubmitting, of any revisions other than those requested by Engineer.

2 SUBMISSION REQUIREMENTS

- .1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow 5 days for Engineers review of each submission.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .4 Submissions shall include:
 - .1 Date and revision dates.

- .2 Project title and number.
- .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .5 After Engineer's review, distribute copies.

3 SHOP DRAWINGS

- .1 Shop drawings: original drawings, or modified standard drawings provided by Contractor, to illustrate details of portions of Work, which are specific to project requirements.
- .2 Maximum sheet size: 595 x 840 mm.
- .3 Submit shop drawings as follows:
 - .1 opaque diazo prints [number Contractor requires for distribution plus 3 copies which will be retained by Engineer].
 - .2 Digital (PDF) submissions for 11" X 17" drawings and smaller are acceptable. Larger drawings must be submitted in hard copy.
- .4 Cross-reference shop drawing information to applicable portions of Contract Documents.

4 PRODUCT DATA

- .1 Product data: manufacturers catalogue sheets, brochures, literature,

performance charts and diagrams, used to illustrate standard manufactured products.

- .2 Submit 3 copies of product data.
- .3 Sheet size: 215 x 280 mm, maximum of 3 modules.
- .4 Delete information not applicable to project.
- .5 Supplement standard information to provide details applicable to project.
- .6 Cross-reference product data information to applicable portions of Contract Documents.

5 SAMPLES

- .1 Samples: examples of materials, equipment, quality, finishes, workmanship.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.
- .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

6 MOCK-UPS

- .1 Mock-ups: field-erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations acceptable to Engineer.
- .3 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.

7 SHOP DRAWINGS REVIEW

- .1 The review of shop drawings by the National Capital Commission is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that the National Capital Commission approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

END OF SECTION

1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Engineer are specified under various sections.

2 APPOINTMENT AND PAYMENT

- .1 Engineer will appoint and pay for services of testing laboratory except for the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Engineer.
 - .6 Additional tests specified in paragraph 2.2.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Engineer may require to verify acceptability of corrected work.

3 CONTRACTOR'S RESPONSIBILITIES

- .1 Furnish labour and facilities to:
 - .1 Provide access to work to be inspected and tested;
 - .2 Facilitate inspections and tests;
 - .3 Make good work disturbed by inspection and test;
 - .4 Provide storage on site for laboratory's exclusive use for storage of equipment and cure test samples.
- .2 Notify Engineer sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Engineer.

END OF SECTION

1 ACCESS

- .1 Provide and maintain adequate access to project site.
- .2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads. Clean access roads (sweep/flush as necessary) at the end of each day or as directed by the Engineer.

2 STORAGE SHEDS

- .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment that are subject to damage by weather.

3 SANITARY FACILITIES

- .1 Contractor to provide private washroom facilities complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
- .2 Maintain in clean condition.

4 TEMPORARY FENCING OF WORK AREA

- .1 The contractor shall erect and maintain black snow fencing around the perimeter of the working areas adjacent to North River Road works or as directed by the Engineer.
The existing pedestrian pathway or temporary pathway shall be separated from construction activities with steel pedestrian fencing.

5 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Engineer.

END OF SECTION

1 FIRES

- .1 Fires and burning of rubbish on site not permitted.

2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site unless approved by Engineer.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

3 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Contractor to apply for and receive a permit to take water from the Ontario Ministry of Environment (MOE).
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local MOE requirements.

4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Install construction fencing per contract drawings prior to commencement of construction and as described below:
 - .1 Black plastic snow fencing 1.25 m. high
 - .2 Metal "T" bar stakes spaced every 2.4 metres or as required to keep fence stable and secure within the shallow soil condition
 - .3 Be prepared to relocate fence to accommodate temporary pedestrian by-pass as directed by the engineer.
 - .4 Maintain the fence during the entire construction period, until machinery is no longer on site.
- .2 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .3 Minimize stripping of topsoil and vegetation.

- .4 Restrict tree and shrub removal to areas indicated or designated by Engineer. Obtain confirmation from the Engineer of all trees and shrubs to be removed prior to removal.

5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

6 SPILLS REPORTING

- .1 Be financially responsible to ameliorate the adverse effects of a spill. The discharger is expected to contain and clean up the spilled contaminant or arrange for the contaminant to be contained and cleaned up. He is also expected to restore the spill site to essentially pre-spill conditions where this can reasonably be expected. To achieve this, the discharger may have to remove the contaminated soil and debris and dispose of these materials in an acceptable manner at an approved disposal site.
- .2 The person in charge of a pollutant, at the time of a spill, is considered to have taken a foreseeable risk for which he can prepare himself.
- .3 Prior to commencing construction, the Contractor is to prepare and submit for approval a contingency plan for the control and clean up of a spill. Said submission must adhere to the requirements and regulations of the WHMIS (Work Hazardous Material Information System) and shall include the applicable MSDS (Material Safety Data Sheet) for each substance.
- .4 Any equipment utilized by the contractor which develops a fluid leak shall be immediately removed from the site by the contractor.
- .5 In the event of a spill or other emission of a pollutant into the natural environment, every person responsible for the emission or who causes or permits it must forthwith notify:
 - .1 The Ministry of the Environment Spills Action Centre (SAC)
Tel: 1-800-268-6060.
 - .2 The City of Ottawa.
 - .3 The Owner of the pollutant, if known.

- .4 The person having control of the pollutant, if known, of the spill, of the circumstances thereof, and of the action taken or intended to be taken with respect thereto.

7 WATERCOURSE PROTECTION

- .1 The Contractor shall ensure that no contamination, waste or other substances which may be detrimental to marine life or quality of water shall enter any watercourse as either a direct or indirect result of construction and the Contractor shall meet the requirements of Government authorities or agencies with respect to environmental protection.
- .2 The Contractor shall be prepared to immediately clean up any spills of contamination, waste or other substances which may be either detrimental to marine life or quality of water. In the event of a spill, the Contractor shall immediately commence a clean up operation. The Contractor shall be liable for all damages and/or charges laid which result, either directly or indirectly, from the spill, or contamination of any kind which results from his construction operations.
- .3 The Contractor shall exercise reasonable care to ensure that sediment run-off does not enter watercourses. Berms, silt screens and other works, as required, shall be constructed at appropriate locations to ensure that turbidity shall be kept to a minimum as determined by the Government authorities and agencies.
- .4 Run-off from construction materials and any stockpiles shall be contained and discharged in a manner that will prevent entry of sediment to watercourses.
- .5 Where dewatering is required, effluent shall be discharged in a manner that will prevent entry of sediment to watercourses.
- .6 Where the Contractor requires work in watercourses or on the banks of watercourses, operation of equipment within such areas shall be kept to a minimum necessary to perform the specified work and proceed in a continuous manner that will minimize the duration of such work.
- .7 The Contractor shall submit a plan indicating how he intends to provide for securing the site against erosion and watercourse siltation problems for the full duration of the construction period, i.e. from start of construction to final completion. The Contractor shall not proceed with excavation of watercourse banks until approval of the sediment control plan is received from the Engineer.
- .8 Various concerned Government agencies will likely be on site during construction and the Contractor shall provide easy access and meet the requirements of those agencies without delay.
- .9 The Contractor shall immediately clean up and dispose of any floating debris which accumulates on the watercourse bed or banks as a result of construction.
- .10 The Contractor shall not make any claim for extra compensation for the cost of fulfilling the obligations set out herein.

END OF SECTION

1 GENERAL

1.1 General Conditions

- .1 The requirements of this specification take precedence over the requirements of any other specification for the management and disposal of excess material.

1.2 Section Includes

- .1 Requirements for management and disposal of excess materials.
- .2 Specific Site Selection Notification and Property Owner's Release forms necessary for certain excess materials handling.

1.3 Related Work

- .1 Sections

1.4 Definitions

- .1 Bituminous pavement: any combination of asphaltic material and aggregate, excluding asbestos modified asphaltic material.
- .2 Concrete: concrete mixtures produced with Portland cement, which may include blended hydraulic cement, supplementary cement materials, spent debris and silica sand abrasive blasting media from abrasive cleaning of concrete and reinforcing steel, concrete brick, block and associated mortar. Can include embedded steel, and excludes asbestos modified Portland cement concrete mixtures.
- .3 Disposable fill: excess material, other than that disposed of at a certified disposal site, that is managed in berms and mounds, and as fill, other than in road embankments.
- .4 Earth: all soils except those defined as rock, and excludes stone masonry, concrete and other manufactured materials.
- .5 Excess material: Material removed as a result of Work outlined in the Contract, for which management is not specified. Includes surplus and unsuitable materials.
- .6 Fabricated metal and plastic products: metal and plastic products such as culverts, fence materials, and guide rails. Does not include containers, other packing materials, storage tanks, septic tanks, and ancillary equipment associated with sanitary sewage systems, septic systems, and fuel/lubricant dispensing and storage systems.
- .7 Groundwater: subsurface water and water that occurs beneath the water table in soils and rock formations that are fully saturated.
- .8 Masonry: clay brick, stone and associated mortar.
- .9 Natural wood: stumps, trunks, branches, and debris, from tree and shrub removal, and wood products that are not treated, coated or glued.

- .10 Non-Hazardous contaminated material: material identified as unsuitable for re-use on site or unsuitable for disposal as clean fill off-site and must be disposed of as a non hazardous waste at an MOE approved landfill if removed from the site.
- .11 Re-use: utilization, processing, re-processing or recycling of excess material into a construction material or other useful product, and management by these means for the Contract and other work.
- .12 Rock: natural beds or massive fragments, of the hard, stable, cemented part of the earth=s crust, igneous, metamorphic, or sedimentary in origin, which may or may not be weathered, and includes boulders having a volume of 1 m or greater.
- .13 Swamp material: materials within the swamp excavation limits, except those defined as rock, and excludes stone masonry, natural wood and manufactured materials.
- .14 Waste: excess material managed by re-use or as disposable fill.
- .15 Waterbody: any body of water or watercourse or wetland, or a portion thereof, and excludes ditches other than those functioning as natural watercourses.

1.5 Submission Requirements

- .1 Copy of Site Selection Notification form shall be submitted to Engineer when property is to be used for:
 - .1 Stockpiling for re-use and for disposable fill.
 - .2 Management as disposable fill.
- .2 Notification shall be submitted prior to commencement of such work.
- .3 After work is complete, copy of Property Owner's Release form shall be provided to Engineer.
- .4 Where excess material audit or inventory is imposed by statute, or is condition of the Contract, copy of document shall be provided to Engineer.

2	PRODUCTS	Not applicable
----------	-----------------	----------------

3 EXECUTION

3.1 Construction

- .1 Management of excess material shall be as described below:
 - .1 Earth, aggregate, swamp material, rock and natural wood: Manage by re-use or disposal off-site.
 - .2 Bituminous pavement, concrete, masonry, fabricated metal and plastic products: Manage by disposal off-site.
 - .3 Where excess materials are suspected of being contaminated or if types of materials are encountered which are not addressed in this specification, direction on management shall be obtained from Engineer.

- .4 Excess material that is mixture of materials shall be disposed of according to most stringent conditions associated with any one of individual constituents.
- .5 Excess materials shall be managed using methods which prevent their entry into waterbodies and other sensitive areas. These may be identified in Contract. Exceptions may be made when materials are re-used in accordance with requirements specified elsewhere in Contract.
- .6 Notification requirements shall be complied with and approvals, releases, and agreements shall be obtained that are necessary for management of excess material.
- .2 Management by-re-use shall be as specified. When not specified, management by re-use shall be outside Commission's property.
 - .1 Distance separations described in Table 1 do not apply for:
 - .1 Re-use of excess materials for same purpose.
 - .2 Re-use of bituminous pavement, concrete and masonry within road right-of-way.
 - .3 Re-use of concrete as aggregate in bituminous pavement.
 - .4 Re-use of concrete as rip rap, gabion stone or rock protection in compliance with requirements specified elsewhere in this contract.
- .3 Management as disposable fill, within Commission's property and on other property designated in Contract, shall be as specified.
- .4 Management by open burning is not permitted.
- .5 Stockpiling on the Commission's property and on other property designated in contract shall be as specified, otherwise it shall be outside Commission's property.
 - .1 Stockpiles of bituminous pavement, concrete and masonry shall be located minimum of 30 m from waterbodies and minimum of 100 m from residences unless:
 - .1 Stockpiles are located within the road right-of-way or on property with boundary common to right-of-way. Both must be within Contract limits and be for period not exceeding one hundred and twenty calendar days..
 - .2 Stockpiles are located within provincial or municipal works yards or commercially licensed pit or quarry.
 - .2 Stockpiling of natural wood is subject to management conditions in Table 1. These conditions only apply to stockpiles to be in place for period exceeding one hundred and twenty calendar days.

**TABLE 1: EXCESS MATERIAL MANAGEMENT
DISTANCE SEPARATION REQUIREMENTS**

ADJACENT FEATURE	MINIMUM DISTANCE SEPARATION
Groundwater	2 m (above)
Waterbodies	30 m
Water Wells	100 m
Residences	100 m

END OF SECTION

SITE SELECTION NOTIFICATION FOR MANAGEMENT AS DISPOSABLE FILL

Contract Information

Contract No. _____ Owner: _____

The following describes the notification process between the National Capital Commission and the Contractor, wherein the Contractor formally notifies the NCC that agreement has been reached with a third party property owner for the deposition of Contract generated excess material. Such excess material, managed as disposable fill shall be limited to one or a combination of: earth; aggregate; swamp material; rock and natural wood, provided the conditions on management are satisfied.

Site Information

Property Owner(s) for the subject property: _____

Site Location: _____

Quantity and Type of Excess Material used as fill: _____

This is to notify the NCC that permission has been obtained from the property owner(s) named herein for the management of excess materials from this Contract. The property owner has also been provided with a copy of this form and has been advised that a Property Owner=s Release Form will be required. The use of this management site will comply with the following:

Conditions on Management

Bituminous pavement, concrete, masonry, and metal, plastic and polystyrene products will not be accepted for management as disposable fill.

These conditions do not supersede any constraints imposed on this property by Federal, Provincial or Municipal statute or regulations and bylaws made thereto.

Dated this _____ day of _____ 19____

Print Contractor=s Name & Field Representative=s Name_____
Contractor=s Field Representative Signature_____
Property Owner(s) Signature(s)

96/01/19

Section 01562
Form 2
Page 1 of 1

SITE SELECTION NOTIFICATION FOR MATERIALS STOCKPILING

Contract Information

Contract No. _____ Owner: _____

The following describes the notification process between the National Capital Commission and the Contractor, wherein the Contractor formally notifies the NCC that agreement has been reached with a third party property owner for the stockpiling of Contract generated excess material. Such excess material, stockpiled for re-use, may be one or a combination of: earth; aggregate; swamp material; rock; concrete; masonry; bituminous pavement; natural wood; metal, plastic and polystyrene, provided the conditions on management are satisfied.

Site Information

Property Owner(s) for the subject property: _____

Site Location: _____

Quantity and Type of Excess Material stockpiled: _____

This is to notify the NCC that permission has been obtained from the property owner(s) named herein for the management of excess materials from this Contract. The property owner has also been provided with a copy of this form and has been advised that a Property Owner=s Release Form will be required. The use of this management site will comply with the following:

Conditions on Management

It is understood that materials are stockpiled to be re-used.

Stockpiles of bituminous pavement, concrete and masonry may only be located:

- .1 a minimum of 30 m from waterbodies; and
- .2 a minimum of 100 m from residences unless such stockpiles are located within a provincial or municipal works yard or in a commercially licensed pit or quarry.

These conditions do not supersede any constraints imposed on this property by Federal, Provincial or Municipal statute or regulations and bylaws made thereto.

Dated this _____ day of _____ 19 _____

Print Contractor=s Name & Field Representative=s Name

Contractor=s Field Representative Signature

Property Owner(s) Signature(s)

cc: Engineer, Property Owner(s), Contractor

96/01/19

Section 01562
Form 3
Page 1 of 1

PROPERTY OWNERS RELEASE

Contract No. _____

Work description: _____

Site Location: _____

I/We _____ being the owner(s) of the above Site, verify that the contractor for the above noted work has placed excess material from the above noted Contract on my/our property with my/our permission. I/We have been advised by the Contractor of the conditions of section 01562 of the specification and have been assured by the contractor that these conditions have been met.

Where materials are managed as disposable fill, I/We agree to be responsible for any subsequent relocation and management of the material so placed.

Dated this ____ day of _____, 19 ____

Print Contractor=s Name & Field Representative=s Name

Contractor=s Field Representative Signature

Property Owner(s) Signature(s)

1 GENERAL

1.1 REFERENCES

- .1 Ontario Traffic Manual (OTM), Book 7, Temporary Conditions, March 2001

1.2 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out work or haul materials or equipment.
- .2 When working on traveled way:
 - .1 Place equipment in position to present minimum of interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of traveled way.
 - .3 Do not leave equipment on traveled way overnight.
- .3 Do not close any lanes of road without approval of Engineer and the City of Ottawa. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Book 7 of the Ontario Traffic Manual.
- .4 Keep traveled way graded, free of potholes, and of sufficient width for required number of lanes of traffic.
- .5 Provide and maintain road access and egress to property fronting along work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Engineer.

1.3 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Book 7, Temporary Conditions of the Ontario Traffic Manual.
- .3 Place signs and other devices in locations recommended in OTM.
- .4 Meet with Engineer prior to commencement of work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Engineer.

- .5 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

- .1 Maintain one lane of traffic in each direction at all times. Exception may occur during periods of off peak hour active construction. Peak hours include weekdays (AM) 07:00 to 09:00 and (PM) 15:30 to 17:30. For all exceptions traffic control must be provided as per OTM book 7.
- .2 Provide flag persons, trained in accordance with, and properly equipped as specified in, OTM manual in following situations:
 - .1 When public traffic is required to pass working vehicles or equipment that block all, or part of traveled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on traveled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workmen, working equipment and public traffic is not provided by other traffic control devices.

END OF SECTION

1 GENERAL

- .1 Use new material and equipment unless otherwise specified.
- .2 Within 5 days of written request by Engineer, submit following information for materials and equipment proposed for supply:
 - .1 name and address of manufacturer,
 - .2 trade name, model and catalogue number,
 - .3 performance, descriptive and test data,
 - .4 manufacturer's installation or application instructions,
 - .5 evidence of arrangements to procure.
- .3 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

2 MANUFACTURERS INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify Engineer in writing of any conflict between these specifications and manufacturers instructions. Engineer will designate which document is to be followed.

3 DELIVERY AND STORAGE

- .1 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
- .3 Store material and equipment in accordance with suppliers instructions.
- .4 Touch-up damaged factory-finished surfaces to Engineer's satisfaction. Use primer or enamel to match original. Do not paint over name plates.

4 SUBSTITUTION

- .1 No substitutions will be permitted without prior written approval of Engineer.
- .2 Proposals for substitution may only be submitted after award of contract. Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by Engineer if:
 - .1 materials selected by tenderer from those specified, are not available;

- .2 delivery date of materials selected from those materials specified would unduly delay completion of contract, or
- .3 alternative material to those specified, which are brought to the attention of and considered by Engineer as equivalent to the material specified and will result in a credit to the Contract amount.
- .4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.
- .5 Amounts of all credits arising from approval of substitutions will be determined by Engineer and Contract Price will be reduced accordingly.

5 CONSTRUCTION EQUIPMENT AND PLANT

- .1 On request prove to the satisfaction of Engineer that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
- .2 Maintain construction equipment and plant in good operating order.

END OF SECTION

Part 1 General

1.1 PRECEDENCE

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.2 RELATED SECTIONS

- .1 Section 01340 – Shop Drawings, Product Data, Samples & Mock-ups

REFERENCES

- .2 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. [1990 as amended 213/91].

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01340 – Shop Drawings, Product Data, Samples & Mock-ups.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports contract administrator weekly.
- .4 Submit copies of reports or directions issued by Federal, and Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit Material Safety Data Sheets (MSDS) to Contract Administrator.
- .7 Contract Administrator will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Contract Administrator within 3 days after receipt of comments from Contract Administrator.

- .8 Contract Administrator's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Contract Administrator.
- .10 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Contract Administrator prior to commencement of Work.

1.7 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section Regulatory Requirements.

1.8 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Contract Administrator may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Health and Safety Act and Regulations for Construction Projects.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Ontario having jurisdiction. Advise Contract Administrator verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 2 years of site-related working experience specific to activities associated with contaminated material (overburden) removal.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Ontario having jurisdiction, and in consultation with Contract Administrator.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Contract Administrator.
- .2 Provide Contract Administrator with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Contract Administrator may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.16 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

1 RECORD DRAWINGS

- .1 Engineer will provide two sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and record accurately deviations from Contract documents.
- .3 Survey, using Total Station Co-ordinates, all underground utilities and any major deviation of layout of project. This information is to be provided to NCC Survey and Mapping Section on ASCII diskette.
- .4 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to Engineer.
- .5 Record following information:
 - .1 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .2 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .3 Field changes of dimension and detail.
 - .4 Changes made by Change Order or Field Order.

END OF SECTION

1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01562 – Management and Disposal of Excess Material.

1.2 **MEASUREMENT PROCEDURES**

- .1 Work performed under this Section will be incidental to Work in Section 01562.

1.3 **REFERENCES**

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000-98-A5-98, Portland Cement
 - .2 CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction

1.4 **PROTECTION OF EXISTING FEATURES**

- .1 Protect existing features in accordance with Section 01500 – Temporary Facilities
- .2 Confirm locations of buried utilities by careful test excavations.
- .3 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
- .4 Record location of maintained, re-routed and abandoned underground lines.
- .5 Confirm locations of recent excavations adjacent to area of excavation.
- .6 Where required for excavation, cut roots or branches as approved by Engineer.

2 **PRODUCTS – Not applicable**

3 **EXECUTION**

3.1 **SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 **STOCKPILING**

- .1 Stockpile fill materials in areas designated by Construction Manager. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.3 **DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.

3.4 **EXCAVATION**

- .1 Advise Engineer at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Remove concrete masonry and other obstructions encountered during excavation in accordance with Section 01562 – Management and Disposal of Excess Material.
- .3 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .4 Do not obstruct flow of surface drainage or natural watercourses.
- .5 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

3.5 **BACKFILLING**

- .1 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .2 Backfilling around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

3.6 **RESTORATION**

- .1 Upon completion of Work, remove waste materials and debris , trim slopes, and correct defects as directed by Construction Manager.
- .2 Replace topsoil as indicated.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by Construction Manager.

END OF SECTION

1 **GENERAL – Not applicable**

2 **PRODUCTS**

2.1 **PVC DUCTS AND FITTINGS**

- .1 Rigid PVC duct: to CSA C22.2 No. 211.1, Type DB2/ES2, with moulded fittings, for direct burial expanded flange ends. Nominal length: 6.0 m plus or minus 12 mm.
- .2 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .3 Rigid PVC 90° and 45° bends.
- .4 Rigid PVC 5° angle couplings.
- .5 Expansion joints as required.

2.2 **SOLVENT WELD COMPOUND**

- .1 Solvent cement for PVC duct joints.

2.3 **CABLE PULLING EQUIPMENT**

- .1 6 mm stranded nylon pull rope tensile strength 5 kN.

2.4 **MARKERS**

- .1 Concrete type cable markers: as indicated, with words: "Cable", "Joint" or "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.

3 **EXECUTION**

3.1 **INSTALLATION**

- .1 Install duct in accordance with manufacturer's instructions.
- .2 Clean inside of ducts before laying.
- .3 Ensure full, even support every 1.5 m throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 During construction, cap ends of ducts to prevent entrance of foreign materials.
- .6 Pull through each duct steelmandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 In each duct install pull rope continuous throughout each duct run with 3.0 m spare rope at each end.

- .8 Install markers as required.

END OF SECTION

1 **General**

1.1 **GENERAL**

- .1 This Section covers items common to Sections of Division 16. This section supplements requirements of Division 1.

1.2 **CODES AND STANDARDS**

- .1 Do complete installation in accordance with CSA C22.1-2012 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3No.1-M1987 except where specified otherwise.
- .3 Abbreviations for electrical terms: to CSA Z85-1983.

1.3 **CARE, OPERATION AND START-UP**

- .1 Instruct operating personnel in the operation, care and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.4 **VOLTAGE RATINGS**

- .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 **PERMITS, FEES AND INSPECTION**

- .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Pay associated fees.
- .3 Consultant will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- .4 Notify Consultant of changes required by Electrical Inspection Department prior to making changes.
- .5 Furnish Certificates of Acceptance from Electrical Safety Authority (ESA) and any other authorities having jurisdiction on completion of work to Consultant.

1.6 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.
- .2 Factory assembled control panels and component assemblies.

1.7 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

1.8 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
- .2 Nameplates:
 - .1 Lamicoid 3 mm thick plastic engraving sheet, white face, black core, mechanically attached with self-tapping screws.

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters
- .3 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
- .4 Wording on nameplates and labels to be approved by Consultant prior to manufacture.
- .5 Allow for average of twenty-five (25) letters per nameplate and label.
- .6 Identification to be English and French.
- .7 Use one nameplate or label for each language both languages.
- .8 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .9 Disconnects and contactors: indicate equipment being controlled and voltage.

.10 Terminal cabinets and pull boxes: indicate system and voltage.

.11 Transformers: indicate capacity, primary and secondary voltages.

1.9 **WIRING IDENTIFICATION**

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring in each pole, the panel number and circuit number.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1-1986.

.4 Use colour coded wires in communication cables, matched throughout system.

1.10 **CONDUIT AND CABLE IDENTIFICATION**

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	yellow	
up to 600 V	yellow	green
up to 5 kV	yellow	blue
up to 15 kV	yellow	red

1.11 **WIRING TERMINATIONS**

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.12 **MANUFACTURERS AND CSA LABELS**

.1 Visible and legible after equipment is installed.

1.13 **WARNING SIGNS**

.1 As specified and to meet requirements of Electrical Inspection Department and Consultant.

.2 decal signs, minimum size 175 x 250 mm.

1.14 **MOUNTING HEIGHTS**

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

1.15 **LOAD BALANCE**

- .1 Measure phase current to panel boards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Submit, at completion of work, report listing phase and neutral currents on panelboards and dry-core transformers, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.16 **CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.

1.17 **FIELD QUALITY CONTROL**

- .1 Insulation resistance testing.
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
 - .4 Carry out tests in presence of Consultant.
 - .5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
 - .6 Submit test results for Consultant's review.

1.18 **CO-ORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

END OF SECTION

1 **General**

1.1 **RELATED SECTIONS**

- .1 Section 16010 – Electrical General Requirements.

2 **Products – not applicable**

3 **Execution**

3.1 **CABLE INSTALLATION IN DUCTS**

- .1 Install cables as indicated in ducts.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of colour coded multi-conductor control cables reel off in same direction during installation.
- .6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

3.2 **MARKERS**

- .1 Mark trench continuously along duct run.
- .2 Where markers are removed to permit installation of additional cables, reinstall existing markers.

3.3 **FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 16010 – Electrical General Requirements.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

- .5 Acceptance tests.
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Provide Consultant with list of test results showing location at which each test was made, circuit tested and result of each test.
- .7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Section 16151 – Wire and Box Connectors – 0 – 1000 V.

1.2 REFERENCES

- .1 CSA C22.2 No.0.3-92, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No.131-M89(R1994), Type TECK 90 Cable.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01340 – Shop Drawings, Product Data, Samples and Mock-ups.

2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RWU90.

3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In underground ducts in accordance with Section 16051.

3.2 INSTALLATION OF TECK CABLE 0 – 1000 V

- .1 Install cables.
- .2 Group cables wherever possible on channels.
- .3 Terminate cables in accordance with Section 16151 – Wire and Box Connectors – 0-1000 V.

3.3 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Section 16151 – Wire and Box Connectors – 0-1000 V.

END OF SECTION

1 **General**

1.1 **REFERENCES**

- .1 CSA C22.2 No. 65-1956(R1965) Wire Connectors.
- .2 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

2 **Products**

2.1 **MATERIALS**

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for round copper conductors.
 - .2 Clamp for stranded copper conductors bar.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper bar.
 - .5 Bolts for aluminum bar.
 - .6 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured cable, flexible conduit as required.

3 **Execution**

3.1 **INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.
 - .3 Install fixture type connectors and tighten. Replace insulating cap.
 - .4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

1 **General**

1.1 **REFERENCES**

- .1 American National Standards Institute (ANSI)
 - .1 ANSI C82.1-1995, Specifications for Fluorescent Lamp Ballasts.
 - .2 ANSI C82.4-1992, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-1991, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137-88(1993), Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.

1.2 **SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.3 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Work plan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

2 **Products**

LUMINAIRES

- .1 Light standards and fixtures as indicated on the drawings

3 **Execution**

3.1 **INSTALLATION**

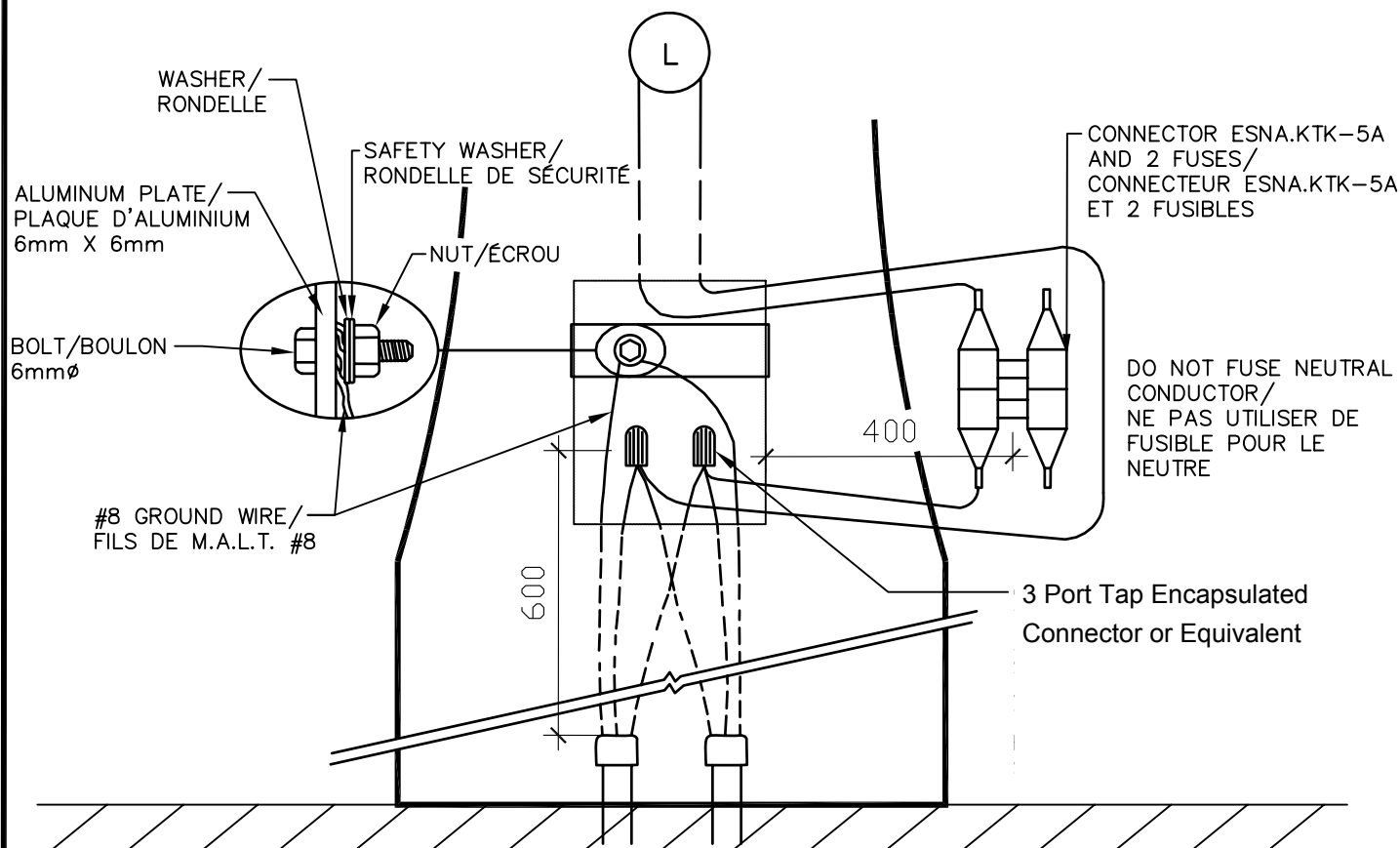
- .1 Locate and install luminaires as indicated.

3.2 **WIRING**

- .1 Connect luminaires to lighting circuits as indicated.

END OF SECTION

ÉLECTRICAL / ÉLECTRIQUE



NOTE:

POLE WIRE SIZE – AWG 14 x LINE SOLID,
600 V WIRING – LEAVE 400 mm (16")
FOR CONNECTION TO LIGHTING FIXTURES
AND 200 mm (8") ALLOWANCE AT
BOTTOM OF POLE.

GROSSEUR DES FILS POUR LE POTEAU
AWG 14 x FIL PLEIN. 600 V
CÂBLAGE – LAISSER 400 mm (16") POUR LE
RACCORDEMENT AUX LUMINAIRES ET 200 mm
(8") AU BAS DU POTEAU.



National Capital Commission
Commission de la Capitale nationale

Design and Construction
Design et construction

project
projet

drawing ALUMINUM EXTENSION POST /
dessin POTEAU DE RALLONGE EN ALUMINIUM

designed by
conçu par

reviewed by
revu par

project no.
no. du projet

ENGINEERING/
GÉNIE

Canada

scale
échelle NTS / SE

date FEB/FÉV 2008

sheet no. 660.5.5
no. de la feuille