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DIVISION 01

Part 1 General

1.1 DESCRIPTION OF THE ITEMS ON THE SLIP

.1 Building site organization:

This item will be paid as a lump-sum amount in accordance with the tender form for all costs incurred that are required to facilitate the execution of the work and the costs not forming part of other payable items on the tender form according to the requirements of the specification. The lump sum on the tender form must include the requirements of the sections of Division 01 and those that are not imputed directly or in the manner related to any of the different items on the tender form, but not limited to:

.1 Site organization;

.2 The coordination of site activities and building operations;

.3 The signaling and setting up of any device and equipment required to ensure the safety of users such as traffic signs, signaling, parking reservations, etc.;

.4 Permanent protection of existing equipment;

.5 The contractor's obligations related to occupational health and safety;

.6 The establishment of sanitary facilities for workers, where appropriate;

.7 The maintenance of all entry points to the building for occupants and emergency vehicles;

.8 The general cleaning of the construction site and all areas contaminated by the work;

.9 Construction site fences, access points and truck waiting areas, the storage areas for construction materials, electricity, water and site lighting if necessary;

.10 The contractor's required coordination with Departmental Representatives, the city of Montreal and other possible stakeholders including the obtention of all permits required for the completion of the work;

.11 The maintenance of traffic flow and impact management for the full duration of the project including coordination with the city of Montreal and all requirements for the set-up and maintenance of detour signage and the management of vehicular, pedestrian and cyclist traffic and site access;

.1 The supply, installation, maintenance, upkeep, relocation and dismantling of all vehicle and bicycle traffic management equipment (visual cues, work panels, arrows of light signals, barriers, etc.) for all work contracted in accordance with the laws and standards in place and the requirements of all contract documents;

.2 The supply, installation, maintenance, relocation and dismantling of all additional traffic signs and devices necessary for the project according to the vehicular and cycling traffic maintenance plans and signage approved by the Departmental Representative;

.3 The management of any existing traffic signs that conflict with temporary vehicular and cycling traffic signs (masking, unmasking of panels);

.4 Expenses related to the existing traffic coordinator, the construction site manager, the signal crews and the signage maintenance teams;

.5 The associated costs for special meetings related to traffic management;

.6 The associated costs for any coordination with project adjacent construction sites that may hinder traffic flow.

.7 All incidental expenses;

.12 Environmental protection measures and the methods taken by Contractor to meet the laws, standards and requirements of environmental impact mitigation measures;

.2 Exploratory excavations:

1. The excavations are paid to the unit.
2. This remuneration constitutes full compensation for the sawing, removal of surface coatings, excavation, search and localization of items determined by the Departmental Representative, the taking of technicals informations, the transmission to the Departmental Representative of information collected in geodetic coordinates (x,y,z) and the temporary filling of excavations.

3. A unit represents an excavation for the search of one or more elements located in the same trench. This work is done at the request of the Departmental Representative.

.3 Temporary maintenance of underground infrastructure:

1. The Contractor must support and protect all municipal services (sewers, manholes, electrical rooms, etc.) or public utilities (Massifs of the Montreal Electric Services Commission, gas, etc.) near the works. He must, always, support them against subsidence and protect them against breakage and frost. In addition, the Contractor must himself, enter into agreements with the companies concerned as to how to proceed with the program of work to be performed and must transmit this program to the Departmental Representative at least forty-eight (48) hours before the start of the work to be performed.
2. All public utility service poles (lighting) or any other types identified in the plans or that the Contractor deems necessary to support, in relation to the excavation methods that he intends to use for the performance of the contract, must be supported in accordance with the requirements of the companies concerned. To this end, he must submit to the Departmental Representative and the owner of the pole a method of support, as well as drawings showing the materials and dimensions of the recommended facilities.

3. From the beginning until the end of the work, the Contractor must leave in function all the underground massifs and equipments associated with it, Hydro, Bell, etc. To do this, he must protect them adequately. Construction methods must meet the standards of the various utilities and be in good standing with the health and safety laws of the CNESST.
4. Additional costs arising from the difficulties that the Contractor may encounter in view of the existence of these wires and / or underground massifs and equipments and the protection thereof, shall be included in the prices units of the bid. Any breakage of

existing elements (Hydro-Québec, Bell Canada or as the case may be) caused by the Contractor must be repaired as existing.

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5. At locations where existing work passes through existing utilities or existing lines to be retained, unshrinkable fill must be used by the Contractor to replace the base of the utilities services concerned.

6. The Contractor assumes sole responsibility for any damage and / or delays caused by insufficient capacity or lack of adequate support devices. Before installing a retaining device, the Contractor must submit a plan signed and sealed by an engineer member of the OIQ.

.4 Architectural element removal:

.1 The removal of architectural elements will be paid as a lump-sum amount according to the tender form. The Contractor shall provide all material, tools, and labour needed to complete the work. The price on the tender form includes, but is not limited to::

1. Removal of calcareous stones;
2. Removal of the sill of the panel door treshold;
3. Removal of prefabricated concrete panels;
4. Removal of limestone supports;
5. Removal of concrete masonry filler;
6. Removal of membranous flashing;
7. Removal of metal fasteners;
8. Removal of extruded polystyrene insulation;
9. Removing the outside ashtray.

.5 Electrical element removal:

.1 Electrical element removal will be paid as a lump-sum amount according to the tender form. The Contractor shall provide all material, tools, and labour needed to complete the work. The price on the tender form includes, but is not limited to:

1. Removal of light fixtures and projectors, conduits, wiring and boxes;
2. Rehabilitation of surfaces and sealing of openings;
3. Temporary measures to ensure the continuation of services during the work;
4. Update of electrical distribution panel schedules;
5. Materials disposal;

.6 Demolition of site elements :

.1 The demolition of site elements will be paid as a lump-sum amount according to the tender form. The Contractor will provide all material, tools, and labour needed to complete the work. The price submitted must include the excavation or dismantling of materials and accessories, loading, transporting, disposing and, if necessary, filling for the installation of new structures. The price on the tender form includes, but is not limited to:

1. Removal of concrete edges;
2. Removal of concrete walls;
3. Removal of concrete blocks;
4. Removal of concrete clumps;
5. Removal of concrete slabs with apparent aggregates;
6. Removal of billboards and their return to the client;
7. Removal of concrete billboard bases;
8. Removal of bollards and concrete bases;
9. Removal of concrete steps and staircase;
10. Removal of the concrete wall and planter;
11. Removal of flagpoles and concrete bases;
12. Removal of concrete anchors from the art installation;
13. Removal of prefabricated concrete bins;
14. The falling, clearing and off-site disposal of trees;
15. Drains;
16. Sumps.
17. Removal of electrical pipe. 1

.7 Excavation, loading, transportation and disposal of soils, including soils in the <B contamination range

.1 Work includes costs related to excavation, loading for off-site transportation, transportation and disposal of soils <B at treatment or disposal sites authorized by the MELCC. The unit rate is in $ / metric ton. This item is paid on the basis of soil removed on presentation of vouchers (transport voucher / weighing) in metric ton. This work includes all types of excavation work to be carried out in the project.

.2 The contractor shall carry out excavations respecting the theoretical excavation lines indicated in the plans, standards of the CNESST and BNQ 1809-300. Any excavation beyond the theoretical trench lines will be at the expense of the Contractor.

.8 Segregation, temporary storage, loading, transport and disposal of residual materials

.1 The work includes the costs associated with the excavation of residual materials (metal, concrete, asphalt or other non-recoverable residual materials), segregation of residual materials by type, temporary stacking, loading, transport and disposal of residual materials in a site authorized by the MDDELCC. The unit rate is in $ metric ton. This amount is paid on the basis of residual materials recycled or disposed of based on the presentation of a ticket (transport/weight) in metric tons. This procedure includes all the types of work to be done in the project.

.9 Backfilling:

.1 The backfilling work will be paid per metric ton as indicated on the bid form. The Contractor shall supervise the work and provide all labor, equipment, tools, materials, compaction, transportation to perform all the work described and

specified in the plans and specifications including, but not limited to: backfilling with approved granular materials and compaction to fill the facilities of all types of backfilling included in the scope of this project. This item is paid in $ / metric ton on presentation of vouchers (transport voucher / weighing).

.10 Foundation for paving

.1 Paving foundation work will be paid at a lump sum as per the bid form. The Contractor must provide all equipment, tools, materials and labor required for the complete performance of the work. The price list includes, without limitation:

1. Preparation and layout of the pavement infrastructure.
2. Installation of geotextile as specified in this specification.
3. Installation of rigid styrofoam insulation.
4. Supply and installation of backfill without shrinkage.
5. Supply and installation of sub-foundations in modified MG-112 granular materials.
6. Supply and installation of crushed stone top foundation type MG-20.
7. Evacuation and off-site transportation of unused materials.
8. Excavation and backfilling work are remunerated separately at the items provided for this purpose on the bid form.

.11 Precast concrete pavers

.1 Prefabricated concrete pavers will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. Prefabricated concrete pavers of format 600 mm x 600 mm, 300 mm x 600 mm and 300 x 300 mm, granite grey colour with grinded finish;
2. Prefabricated concrete pavers of format 600 mm x 600 mm, 300 mm x 600 mm and 300 x 300 mm, granite grey colour with Grained textured finish;
3. Bedding sand layer;
4. Sand for polymer stabilized joints;
5. Cutting work;
6. Removal and transport of unused materials to an off-site location.

.12 Removal and reinstallation of existing prefabricated concrete pavers

.1 The removal and reinstallation of existing prefabricated concrete pavers will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. Removal, storage and reinstallation of prefabricated concrete paving stones;

2. Supply of similar concrete pavers if damaged during work;
3. Bedding sand layer;
4. Sand for polymer stabilized joints;
5. Cutting work;
6. Removal and transport of unused materials to an off-site location.

.13 Urban furniture

.1 Urban furniture installation work will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. A Corten steel decorative block measuring 600 mm x 600 mm x 300 mm (block A);
2. A Corten steel decorative block measuring 600 mm x 600 mm x 600 mm (block B);
3. A decorative Corten steel illuminated cube measuring in 600 mm x 600 mm x 600 mm (block E);
4. Furniture block in Corten steel and wood 1800 mm x 600 mm x 450 mm (Type D);
5. Waste basket;
6. Tree frames and grates;
7. Flagpoles and concrete bases;
8. Transportation;
9. Installation;
10. Anchors;
11. Shop drawings;
12. Removal and transport of unused materials to an off-site location.

.14 Artwork restauration

.1 This article provides for an allowable amount. The Contractor will retain the restoration services of the Centre de Conservation du Québec (CCQ) under the Quebec Ministry of Culture according to the restoration practices that have been adopted by the Government of Canada. The work will be paid upon presentation of the CCQ's supporting documents without any increase or possible profits for the contractor. This allowance includes, but is not limited to:

1. The professional fees of the restorers for the coordination of this mandate;
2. Dismantling, packaging, transporting, restoring and reinstalling the art installation.

.15 Anchor base for the artwork

.1 Anchor base work for the artwork will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. The supply and installation of insulation under the base;
2. Concrete formwork;
3. The supply and laying of concrete;
4. The supply and installation of frames;
5. The supply and laying of the grout under the base plates of the new steel supports;
6. The supply and installation of anchors for the steel frame brackets;
7. The supply and installation of “HSS” steel supports, including their base plate and assemblies to existing structures;
8. The provision and fixing of new anchors between the existing supports of the art installation and the new supports;
9. The installation of the art installation with its supports, on the new base;
10. The provision of shop drawings as specified in the specifications;

.16 Cast in place concrete safety features

.1 The work for the cast in-place concrete safety features will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. The setting up of temporary support measures for existing works in the surrounding area;
2. The provision and installation of insulation under the bases (where required);
3. Concrete formwork;
4. The supply and laying of concrete;
5. The supply and installation of frames;
6. The finishing work of the non-soil portions for the concrete safety features.
7. The provision of shop drawings as specified in the specifications.

.17 Safety features and devices

.1 The work for the security features will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. Retractable bollards;
2. Bollard control unit;

3. Control box (buttons);
4. Leads, cables, conduits, accessories, hardware, power and control circuits, circuit breakers, transformer, switches, draw boxes and modifications to the existing electrical distribution;
5. Leads, cables, conduits, brackets, profiles, fasteners, anchorages, piercings, bases and spacers accessories, hardware, power circuits, circuit breakers and modifications to the existing electrical distribution;
6. The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;
7. Conduits, fittings, wiring control;
8. Piercings and sealing of openings;
9. The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;
10. profiles, brackets and hardware;
11. Excavation and backfill, drilling and sealing of openings;
12. Excavation and backfill, drilling, connectors and sealing of openings;
13. Measuring the dimensions of the building to determine the optimum path for the passage of the conduits and drivers and the installation of the equipment;
14. Commissioning;
15. Ducts, drainage fittings;
16. Configuration and programming;
17. Certification of the bollards;
18. Manufacturer inspections and assistance;
19. Tests and adjustments;
20. Transportation;
21. Installation;
22. Anchors;
23. Removal and transport of unused materials to an off-site location;
24. Training, commissioning and operating procedure;
25. Warranty;
26. Shop drawings.

.18 Architectural work

.1 Architectural work will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. Installation of new granite siding;
2. Installation of existing limestone siding at the same location;

3. Installations of new limestone stones;
4. Installations of prefabricated concrete elements existing in the same location;
5. Installation of new masonry in concrete blocks;
6. Installations of mechanical masonry fasteners;
7. Installation of membranous flashing;
8. Installation of self-adhesive sealing membrane;
9. Installations of masonry joints;
10. Installations of joints sealants;
11. Installation of a rigid insulating panel;
12. Installation of prefabricated drainage panels.

.19 Stormwater Sewers:

.1 The installation of the retention pipes and the storm sewer pipes will be paid at the flat rate amount as in the bid form. The Contractor shall provide supervision of the work and provide all the labor, equipment, tools, materials, transportation and other services necessary to complete and complete all work described and specified in the plans and in Contract documents, including, but not limited to: supply and installation of piping, connection to manholes and projected pipelines, fittings and accessories, construction of joints, connections with existing manholes, trench maintenance, water exhaustion in excavations, laying and embedding of pipes, required tests, cleaning and TV inspection of pipes, shop drawings, etc.

.2 Excavation and backfilling work are remunerated separately from the items provided for this purpose on the bid form.

.20 Trench drains (Channel)

.1 Trench drains installation work will be paid at the flat rate amount as per the bid form. The Contractor shall supply and install the prefabricated polymer concrete gutter, including the trench drain, catch basins, angle iron, stainless steel grilles, grid fasteners, weathertight gaskets, trench drains, foundation and reinforced concrete foundation poured into place, cleaning, embedding at the perimeter of the gutter with crushed stone, shop drawings as well as all other elements required by this specification.

.2 Excavation and backfilling work are remunerated separately at the items provided for this purpose on the bid form.

.21 Manholes

.1 The installation works of the regulation chamber 2150X1750 mm and the circular manhole 2100Ø mm will be paid in the lump sum as per the bid form. The Contractor shall provide supervision of the work and provide all the labor, equipment, tools, materials, transportation and other services necessary to complete all work described and specified in the plans and in Contract documents, including, but not limited to, the supply and installation of the regulation chamber, the circular manhole, the vortex flow regulator, the check valves with rubber flaps, fittings and accessories, joint construction, connections

with the projected pipes, trench maintenance, water exhaustion in the excavations, granular material bed and fill, required tests, shop drawings cleaning and the production of half benchs at the base of the manholes in the factory or on site, etc.

.2 .2 Excavation and backfilling work is remunerated separately at the items provided for this purpose on the bid form.

.22 Planting

.1 Planting work will be paid for in a lump sum amount as indicated on the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work. The price on the tender form includes, but is not limited to:

1. Soil
2. Maintenance work and warranty for one year;
3. The planting of deciduous trees;
4. Installation of continuous planting pit system for trees;
5. Perennials planting;
6. Removal and transport of unused materials to an off-site location;

.23 Relocation of existing trees off-site

.1 The relocation of existing trees to an off-site location will be paid at the unit price provided in the tender form. The Contractor will provide all material, tools, and labour necessary for the completion of the work.

.24 Site lighting

.1 The lighting of the site is paid to the lump sum such as the bid slip. The Contractor shall provide all material, tools, materials and manpower necessary for the complete completion of the work. The price on the slip includes, in a non-exhaustive manner:

1. Lighting fixtures, cables, connectors, draw boxes;
2. Brackets, fasteners, anchors, piercings;
3. The conductors, cables, conduits, accessories, hardware, power circuits, circuit breakers, switches and modifications to the existing electrical distribution;
4. The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;
5. profiles, brackets and hardware;
6. Lighting control including all equipment, power and control wiring, conduits, the painting of the conduits and accessories in factory, the hardware and accessories;
7. Excavation and backfill, drilling and sealing and fire proofing of openings and inspection of the structure;
8. A survey of the installations and the determination of the passages of ducts to minimize the repair of the surfaces;

9. Shop drawings.
10. Training, commissioning and operation procedures

.25 Architectural lighting

.1 Architectural lighting fixtures are paid at the lump sum amount as in the bid slip. The Contractor shall provide all material, tools, materials and manpower necessary for the complete completion of the work. The price on the slip includes, in a non-exhaustive manner:

1. Lighting fixtures, cables, power and control boxes;
2. Brackets, fasteners, anchors, piercings, bases and spacers;
3. The conductors, cables, conduits, accessories, hardware, power circuits, circuit breakers, switches and modifications to the existing electrical distribution;
4. The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;
5. Concrete slabs, profiles, brackets and hardware;
6. Lighting control including all equipment, power and control wiring, conduits, the painting of the conduits and accessories in factory, the hardware and accessories;
7. Drilling, sealing and fire proofing of openings and inspection of the structure;
8. A survey of the installations and the determination of the passages of ducts to minimize the repair of the surfaces;
9. The grounding of flagpoles;
10. Shop drawings.
11. Training, commissioning and operation procedures.

.26 Power supply of bollards

.1 The power supply of bollards is paid at the lump sum amount as in the bid slip. The Contractor shall provide all material, tools, materials and manpower necessary for the complete completion of the work. The price on the slip includes, in a non-exhaustive manner:

.1 Brackets, fasteners, anchors, piercings;

.2 Drivers, cables, conduits, accessories, hardware, power circuits, circuit breakers, Transformer, switches, draw boxes and modifications to the existing electrical distribution;

.3 The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;

.4 profiles, framing, brackets and hardware;

.5 Excavation and backfill, drilling, sealing and fire proofing of openings and inspection of the structure;

.6 Carry out the readings of the building and determine the optimum path for the passage of conduits and conductors;

.7 Architectural work;

.8 The supply and installation of all structural support elements of steels identified with structural drawings;

.9 The provision and installation of temporary support measures, adjustment shims and upgrading elements for steel framing elements;

.10 A survey of the installations and the determination of the passages of ducts to minimize the repair of the surfaces.

.11 Shop drawings

.12 Training, commissioning and operation procedures.

.27 Digital panel

.1 The digital panel is paid at the lump sum amount as in the bid slip. This item is optional when awarding the contract. The Contractor shall provide all material, tools, materials and manpower necessary for the complete completion of the work. The price on the slip includes, in a non-exhaustive manner:

1. The digital panel, cables, connectors, draw boxes;
2. Brackets, fasteners, anchors, piercings;
3. Drivers, cables, conduits, accessories, hardware, power circuits, circuit breakers, Transformer, switches, draw boxes and modifications to the existing electrical distribution;
4. The removal and reinstallation of ceiling tiles, the opening and closing of gypsum ceilings and the repair of surfaces;
5. profiles, framing, brackets and hardware;
6. Control computer, cabinet, power and control wiring, conduits including all equipment, conduits, the painting of the conduits and accessories in factory, the hardware and accessories;
7. Excavation and backfill, drilling, sealing and fire proofing of openings and inspection of the structure;
8. Carry out the readings of the building and determine the optimum path for the passage of conduits and conductors;
9. Architectural work;
10. The supply and installation of all structural support elements of steels identified with structural drawings;
11. The provision and installation of temporary support measures, adjustment shims and upgrading elements for steel framing elements;
12. The provision of workshop drawings as specified in the quotation;
13. A survey of the installations and the determination of the passages of ducts to minimize the repair of the surfaces.
14. Shop drawings
15. Training, commissioning and operation procedures

END OF SECTION

DIVISION 03

PART 1 General

1.1 DESCRIPTION

.1 Work covered by this section includes the provision of all materials, equipment supplies and services, labour and transportation to fully carry out the following:

.1 Design, construct, provide, assemble, dismantle and maintain all formwork, scaffolding and falsework required for the construction of all structures specified or shown on the drawings.

.2 Install sleeves, anchor bolts, anchoring components, anchor plates, embedded components, grooves, sockets, angle irons, accessory parts, drains and all parts embedded in concrete shown on the plans of all disciplines or described in the invitation to tender document.

1.2 RELATED SECTIONS

.1 The specialized Contractor is responsible for obtaining a copy of all the sections of these specifications even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications. The specialized Contractor must consult the table of contents of these specifications to have knowledge of the complete list of the specification sections.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.

.2 CSA-O86-09, Engineering Design in Wood.

.3 CSA O121-08, Douglas Fir Plywood.

.4 CSA O151-09, Canadian Softwood Plywood.

.5 CSA O153-M1980, Poplar Plywood.

.6 CAN/CSA-O325-07, Construction Sheathing.

.7 CAN/CSA 437.0-93, Standards on OSB and Waferboard.

.8 CSA S269.1-1975, Falsework for Construction Purposes.

.9 CAN/CSA-S269.2-M87, Access Scaffolding for Construction Purposes

.10 CAN/CSA-S269.3-M92, Concrete Formwork.

.2 Council of Forest Industries of British Columbia (COFI)

.1 COFI, Exterior Plywood for Concrete Formwork.

.3 Publications du Québec:

.1 S-2.1 ; Loi sur la santé et la sécurité du travail.

.2 S-2.1, r.4; Code de sécurité pour les travaux de construction.

.4 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S701-05, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 CONTRACTOR'S RESPONSIBILITIES

.1 Assume responsibility of concrete formwork and falsework. The Departmental Representative's review of the formwork and falsework shall not release the specialized Contractor from his responsibility regarding the provision of structures that fully comply with the drawings and specifications.

.2 The Contractor shall be aware of all laws and regulations that apply to the design and construction of formwork and falsework and shall comply with these requirements. Comply with regulations including the Quebec Safety Code, S-2.1, r.4, regarding shoring of concrete formwork.

.3 Before using the formwork and falsework, give the Departmental Representative a signed statement written by an Engineer who is a member in good standing of the Ordre des Ingénieurs du Québec, and which bears the Engineer's seal. The statement should certify that the formwork and falsework comply with the signed and sealed drawings, and that they may be used for their intended purposes.

1.5 ARCHITECTURAL CONCRETE

.1 The specialized Contractor shall take into account the fact that a significant part of the formwork is for concrete that will remain visible and must be considered architectural concrete.

.2 The concrete used to build the following components shall be considered architectural concrete.

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.3 The concrete used to build the following components shall be considered architectural concrete.

COMPONENTS	DESCRIPTION
1 ▪ Exposed aggregates grinded finish concrete for columns and slab ▪ ~~Staircase~~ ▪ ~~Shear walls~~ ▪ ~~Beams / columns~~	All visible surfaces ~~of these components above the main floor level.~~

1.6 SHOP DRAWINGS

.1 Produce shop drawings of formwork and falsework, which describe all the necessary components required to perform the work in compliance with the drawings and specifications.

.2 Have an Engineer who is a member in good standing of the Ordre des Ingénieurs du Québec sign these shop drawings and affix his seal.

.3 Before performing concrete formwork or falsework, submit these drawings to the Departmental Representative for review and comments. All documents shall be submitted in triplicate. A single (1) annotated copy shall be returned to the Contractor. The Contractor shall be responsible for making additional copies and distributing them.

.4 The shop drawings shall indicate, show or include the construction method and work schedule, procedures relating to shoring, the removal of forms, and the reinstallation of supports, the materials, the specific architectural characteristics of visible surface finishes, the location of joints, fasteners, ties and interior coatings, and the location of embedded falsework components. Comply with CSA S269.1 falsework drawing requirements. Comply with CAN/CSA-S269.3 formwork drawing requirements.

.5 Shop drawings shall indicate, show or include formwork data such as the allowable speed and temperature at which concrete may be placed into the forms.

.6 In addition to the details requested in 1.6.4., indicate on the shop drawings, at each location where the falsework is connected or leaning on an existing structure or a structure under construction, or already completed, the intensity and direction of maximum loads exerted on the load-bearing structure, taking into account construction site loads.

.7 Specify the order in which the concrete formwork and falsework are to be assembled and dismantled, according to the Departmental Representative’s directives.

1.7 FORMWORK AND FALSEWORK DESIGN

.1 Design the falsework according to trade practices making sure not to exert abnormal stress on the structure under construction.

.2 Take construction sequences into account when designing the falsework. Describe on the shop drawings or in an explanatory note how and in what order to use the formworks, the position of specified construction joints and the falsework and formwork reuse principle. Submit the explanatory note and the relevant shop drawings to the Departmental Representative for review.

.3 For vertical components, vertical construction joints shall be a maximum of 18 m apart. Submit the location of construction joints to the Departmental Representative.

.4 The specialized Contractor is entirely responsible for engineering, locating and building the formworks.

.5 The formworks are engineered to sustain the loads and lateral pressures described in Section 102 of the American publication “Recommended Practice for Concrete Formwork” (ACI 347). Wind loads are those recommended by the latest edition of the National Building Code.

.6 Engineering considerations and the allowable loads shall comply with Section 103 of the above mentionned U.S. publication.

.7 Every aspect of construction shall at all times comply with various government standards (municipal, provincial and federal standards) that govern the specialized Contractor’s duties regarding worker safety on construction worksites.

Part 2 Products

2.1 MATERIALS

.1 Submit all formwork material in direct contact with fresh concrete to the Departmental Representative for review.

.2 Construction Lumber:

.1 in contact with concrete: form plywood.

.2 other: structural timber not warped and sawed straight

.3 Formwork Materials

.1 To pour concrete with no particular architectural characteristics, use forms made of wood and wood products that comply with the CSA O121, CAN/CSA-O86, CSA 0437, CSA O151 standard[s].

.2 To pour concrete with specific architectural characteristics, use form materials that comply with the CAN/CSA-A23.1/A23.2 standard.

.3 Rigid insulating boards: that comply with CAN/ULC-S701 standard.

.4 In the case of exposed formwork surfaces (architectural concrete), use new formwork materials. The forms shall be made of 20 mm thick 1200 x 2400 plywood, sanded and covered with a coat of high quality form release oil. For lining only, use 7 mm thick three-ply plywood. ~~Exposed formwork surfaces are those indicated in Section 1.5 of these specifications and those shown on the Architect's plans.~~

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.5 Interior formwork liners

.1 Plywood: Douglas fir in compliance with the CSA O121.

.2 Waferboard: that complies with the CSA O437.0-93 standard.

.6 Form release agent: non-toxic, biodegradable, and with low VOC content.

.7 Form release oil: Colourless, non-toxic, biodegradable, low VOC content, mineral oil free from kerosene, whose viscosity is 15 to 24 mm^2/s at 40°C and whose flashpoint in an open crucible is at least 150°C.

.8 Falsework Materials: in compliance with the CSA S269-1, Table 1 standard. Identify the materials using a quality index or provide certificates, trial data or other attestations of compliance.

.9 Form ties can be:

.1 metal ties embedded in concrete, designed to be broken at least 25 mm under the surface of the hardened concrete after the forms have been removed;

.2 fixed or variable length metal ties whose ends are moveable bolts. The part of the tie embedded in the concrete is embedded at least 25 mm under the surface of the hardened concrete;

.3 Spacety and Acrow-Richmond brand ties equipped with moulded water barriers at each end, for all the work. Both ends of these formwork ties shall be equipped with plastic cones at least 25 mm in diameter, which provide a minimum 25 mm of coverage on the broken end of the tie embedded in the concrete.

.10 In the case of an exposed formed surface (architectural concrete), ties shall be equipped with plastic cones a maximum 38 mm in diameter, which provide a minimum 25 mm of coverage.

.11 In the case of concrete that requires architectural features, use ties equipped with plastic cones and pale grey concrete plugs.

.12 Sleeves, fasteners, anchors and other parts embedded in concrete meet the requirements of the drawings and specifications, and comply with Sections 6.2 and 6.7 of the CAN/CSA-A23.2 standard. Sleeves embedded in concrete shall be equipped with a steel water barrier able to withstand a minimum of [60 kPa] of hydrostatic pressure or the pressure in the line if it is greater.

Part 3 Performance

3.1 CONSTRUCTION AND ASSEMBLY

.1 Unless otherwise specified, build and use the formwork in compliance with the CAN/CSA-A23.1/A23.2 standard.

.2 Before using the forms, clean and treat the form surfaces with form release oil in compliance with Section 6.5.3.3 of the CAN/CSA-A23.1/A23.2 standard.

.3 Before starting formwork and falsework construction, check the alignments, levels and centrelines, and make sure the dimensions match those indicated on the drawings.

.4 Build and assemble the formwork in compliance with the CAN/CSA-S269.3 standard to obtain finished concrete structures whose shape, dimensions and levels comply with the indications and are situated in the locations indicated on the drawings and specifications.

Properly truss the forms and join them so as to keep the desired position and shape while the concrete is being poured and keep them trussed until the concrete has set.

.5 Location tolerances and tolerances regarding the geometric configuration of components embedded in concrete after removal of the forms according to indications in the drawings shall comply with Section 6.4 of the CAN/CSA-A23.1/A23.2 standard.

.6 Manufacture and build the falsework and assemble it in compliance with the CSA S269.1 standard and the COFI “Exterior Plywood for Concrete Formwork” guide.

.7 Obtain the Departmental Representative’s written approval before pouring concrete directly on the ground or making openings in a form component, which are not indicated on the drawings, but which may be required for construction purposes.

.8 Align the formwork joints and seal them to prevent any loss of cement. The formwork shall contain as few joints as possible. Adequate reinforcements shall be installed behind the joints between the plywood panels to ensure that the plywood panels form a smooth, continuous surface capable of withstanding all phases of the pour without losing their shape or shifting.

.9 Before pouring concrete directly on the ground, level the walls and the bottom of the excavated area, then remove the loose soil.

.10 Refer to the architectural drawings regarding concrete components with visible architectural finishes.

.11 The footings and supports installed on the ground shall not be assembled on a frozen surface.

.12 Design lot drainage to prevent the ground from being washed away from under the footings and the supports installed at ground level.

.13 Arrange all formwork joints and ties symmetrically on all concrete surfaces that will be visible (architectural concrete) after the forms are removed. Submit for inspection by the Departmental Representative.

.14 Build the grooves, dovetail joints, mouldings, mortises and tenons, openings, drips, recesses, expansion and construction joints according to the indications of the drawings and specifications. See Section 03 25 00 for isolation or expansion joint requirements.

.15 Place the formwork, trusses and supports so workers are able to remove them without causing any shocks or damage to the concrete.

.16 Forms may be reused except in the case of exposed formed surfaces. They may be reused after sufficient cleaning, providing their surfaces are not cracked or rough; cracked or rough forms must be trimmed and patched to the Departmental Representative's satisfaction.

.17 Install openings in the forms or other devices to enable workers to inspect and clean the forms, and to enable concrete placement and consolidation.

.18 Unless otherwise indicated, provide and install in the forms the sleeves, fasteners, anchors and other embedded components required in the drawings and/or specifications of all disciplines, in compliance with Section 6.7 of the CAN/CSA-A23.1/A23.2 standard. Immediately before pouring the concrete, use surveyor's equipment to check the dimensions required in the drawings and specifications and make sure that these parts meet specified tolerances.

.19 Before closing the forms, notify the Departmental Representative beforehand to allow him to perform the required inspections. The pouring of the concrete into the forms shall not take place before the Departmental Representative's written authorization has been received.

.20 Use 10 mm bevelled moulding for exterior corners, unless otherwise indicated.

.21 Build forms for the architectural concrete components and install the ties according to the indications or directives provided. At times, the location of the joints may preclude the use of standard-sized panels or reduce the maximum allowable space between ties.

3.2 ANCHORS, SLEEVES AND EMBEDDED PARTS

.1 Provide and install in the forms, the sleeves, fasteners, anchor plates and other embedded components required in the drawings and/or specifications, in compliance with Section 6.7 of the CAN/CSA-A23.1/A23.2 standard. The work shall comply with Section 03 25 00.

.2 Provide and install in the forms, the anchor bolts for fasteners and machinery as shown and detailed in the drawings, in compliance with Section 6.7 of the CAN/CSA-A23.1/A23.2 standard.

.3 Install in the forms, the sleeves, conduits and ducts provided by others at the levels and locations shown on the mechanical, electrical, procedural and architectural drawings.

.4 In all cases, comply with the installation tolerances specified in Article 6.7.3 of the CAN/CSA A23.1/A23.2 standard.

.5 In slabs, place conduits between the upper and lower rows of reinforcement.

.6 Install sleeves, conduits and ducts in compliance with the following requirements:

.1 The exterior diameter of the sleeves, conduits or ducts shall not exceed one third of the thickness of the beams, slabs or walls in which they are embedded;

.2 The centreline between adjacent components must be greater than or equal to three diameters;

.3 These parts shall not be positioned in a manner that reduces the strength of the structure;

.4 These parts shall not be embedded in ground slabs exposed to the weather;

.7 If the requirements of Article 3.2.6 cannot be met, notify the Departmental Representative and await his instructions on how to proceed.

.8 Make sure aluminium sleeves, conduits or ducts embedded in concrete are covered or adequately coated to protect them against aluminum corrosion.

.9 Submit a sleeve location plan for approval by the Structural Departmental Representative.

.10 Coordinate with subcontractors responsible for their supply the delivery (to the construction site) and the installation in the formwork of accessory parts.

.11 It is forbidden to place in the formwork any accessory parts which are not indicated in the drawings, or required in the specifications or the drawings referred to in Sub-article .2 above, unless the Departmental Representative so authorizes .

3.3 REMOVAL OF THE FORMS AND REINSTALLATION OF THE SUPPORTS

.1 Remove the formwork and dismantle the falsework in compliance with Article 6.5.3.5 of the CAN/CSA-A23.1/A23.2 standard, unless otherwise indicated.

.2 Do not disturb or remove the formwork or falsework as long as the concrete has not become strong enough to support its own weight and the load it supports.

.3 Have the Departmental Representative authorize the removal of the formwork and falsework.

.4 Leave the formwork in place after the concrete has been poured for the following lengths of time:

.1 Walls : 3 days;

.2 Columns: 7 days;

.3 The periods of time specified above represent a cumulative number of hours, days or fractions of days, not necessarily consecutive, during which the ambient temperature is maintained above 10°C.

.5 Reinstall all the supports required when frame components might be subject to additional loads during construction of the structure.

.6 Notwithstanding the provisions of Sub-article .4 above, do not remove the forms unless the Departmental Representative authorizes their removal because he is satisfied with the measures taken to ensure the concrete cures properly and the concrete is protected against cold or heat and the weather.

.7 However, the Departmental Representative may cancel the provisions of Sub-article .4 above if the non-destructive trials on the concrete placed in beam and slab forms indicate that the concrete has achieved 80% of the compression strength specified in Section 03 30 00 of these specifications. The non-destructive trials mentioned above shall have a recognized value and be approved by the Departmental Representative; he will determine beforehand the locations where they are to be performed. The costs of all these trials shall be borne by the specialized Contractor.

.8 Even when the Departmental Representative has authorized him to remove the forms, the specialized Contractor remains solely responsible for all damage caused to concrete components if action is taken prematurely.

.9 Depending on weather conditions, the placement of the concrete and curing conditions, the Departmental Representative may specify a minimum period of time that must elapse before the forms are removed from the various pours.

.10 Reuse the formwork and falsework, notwithstanding the requirements of the CAN/CSA-A23.1/A23.2 standard.

.11 The maximum spacing between the supports reinstalled at each of the main load inflection points is 2400 mm.

3.4 FILLING OF FORM TIE HOLES

.1 Fill all cone-shaped cavities left after removal of the plastic cones at the ends of the form ties. Moisten beforehand as required by the manufacturer. Carefully smooth the surface after applying the mortar so that it blends in with the adjacent concrete surfaces. Allow to cure.

.2 In the case of exposed surfaces (architectural concrete), check with the Architect whether the cone-shaped cavities need to be filled. Have the Architect approve the filling products used. The products used shall be of the same texture and colour as the concrete utilized.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies the requirements regarding the providing, placement, finishing, protection and curing of the cast-in-place concrete.

1.2 RELATED SECTIONS

.1 The specialized Contractor is responsible for obtaining a copy of all the sections of these specifications even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications. The specialized Contractor must consult the table of contents of these specifications to have knowledge of the complete list of the specification sections.

1.3 REFERENCES

.1 The following standards and publications are mentioned in this section of the specifications. They form an integral part of the specifications and their provisions apply, but are not limited by the other provisions of this section.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-16a, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens).

.2 ASTM C260-06, Air-Entraining Admixtures for Concrete.

.3 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.4 ASTM C332-09, Standard Specification for Lightweight Aggregates for Insulating Concrete.

.5 ASTM C494/C494M-08a, Chemical Admixtures for Concrete.

.6 ASTM C827/C827M-16, Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

.7 ASTM C939/C939M-16a, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).

.8 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.9 ASTM D624-00 (2012), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.

.10 ASTM D1751-04 (2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.11 ASTM D1752-04a (2013), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.2 CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.4 Canadian Standards Association (CSA)

.1 CAN/SA-A3000-08, Cementitious Materials Compendium (contain A3001, A3002, A3003, A3004 and A3005).

1 .2 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.

.3 CSA-A23.3-04, Design of Concrete Structures.

.4 CSA A283-06 , Qualification Code for Concrete Testing Laboratories.

.5 National Research Council Canada (NRC) and Régie du bâtiment du Québec:

.1 Code de construction du Québec, Chapitre I – Bâtiment, and National Building Code – Canada 2015 (modified) as well as the User Guide – NBC 2015 : Comments on calculation of structures (Part 4 of division B).

1.4 SAMPLES

.1 At least four (4) weeks before beginning the work, advise the Departmental Representative regarding the proposed source of supply for the aggregates, and allow him to access the source for sampling purposes.

1.5 CERTIFICATES

.1 At least (4) weeks prior to starting concrete work, provide the Departmental Representative with copies of the manufacturer's trial reports, as well as a certificate issued by a qualified independent testing and inspection laboratory attesting that the materials listed hereinafter will comply with the specified requirements.

.1 Portland Cement

.2 Blended Hydraulic Cement

.3 Supplementary Cementing Materials

.4 Grout

.5 Admixtures

.6 Aggregates

.7 Water

.8 Waterstops

.9 Waterstop Joints

.10 Joint Filler

.2 Provide the mix formulas for approval by the Departmental Representative and a certificate attesting that the selected mix will produce concrete of the required quality, strength and performance, and that it complies with the requirements of the CSA-A23.1/A23.2 standard.

.3 Provide a certificate attesting that the batching plant, equipment and materials that will be used to produce the concrete comply with the requirements of the CSA-A23.1/A23.2 standard.

.4 The Departmental Representative's acceptance of the cement mix or mixes shall in no way release the specialized Contractor from his responsibility to provide concrete whose properties, in both its elastic and hardened states, meet the requirements of these specifications.

.5 All documents will be submitted in one (1) electronic copy. One (1) annotated electronic copy will be returned to the Contractor.

1.6 QUALITY ASSURANCE

.1 At least four (4) weeks prior to starting concrete work, submit proposed quality control methods for approval by the Departmental Representative, regarding the following items:

.1 Hot weather concreting

.2 Cold weather concreting

.3 Curing

.4 Finishes

.5 Stripping

.6 Joints

Part 2 Products

2.1 MATERIALS

1 .1 Cement: Type GU and/or Gul Portland cement that complies with the CSA-A3001 standard.

.2 Fine aggregate: of normal density, complying with Article 4.2.3 of the CSA-A23.1/A23.2 standard. The aggregate may be natural sand or manufactured sand containing at least 20% natural sand.

.3 Coarse aggregate: of normal density, complying with CSA-A23.1/A23.2 standard. The particles shall be clean, durable and free from dust and harmful materials. The maximum aggregate size shall be 20 mm, unless otherwise indicated. Subject to the Departmental Representative's approval, a 13 mm maximum aggregate size may be used in certain areas where concrete flow is restricted. Coarse aggregates must be of normal density. The quantity of flat and elongated particles shall be in accordance with Table 12 of CSA-A23.1 / A23.2 standard.

.4 Mixing water: complies with CSA-A23.1/A23.2 standard.

.5 Air-entraining admixture: complies with the ASTM C260 standard.

.6 Chemical and pozzolanic mineral admixtures: comply respectively with the requirements of the ASTM C494/C494M and ASTM C1017/C1017M standards. The use of calcium chloride or admixtures that contain calcium chloride is not allowed. The Departmental Representative must approve accelerators or retarders during hot and cold weather concrete work.

.7 Non-shrink mortar for concrete repairs: pre-mixed Portland cement-based product containing a non-metal aggregate and a plasticizer, capable of achieving at least 35 MPa of compression strength at seven (7) days.

.8 Superplasticizer: complies with requirements of the ASTM C494/C949M standard.

.9 Supplementary Cementing Materials: comply with the CSA-A3001 standard.

.10 Cementitious hydraulic slag: complies with the CAN/CSA-A362 standard.

.11 Set retarders: comply with the ASTM C494/C494M water-based, low VOC content, solvent-free standard. The set retarder film shall never be exposed to humidity.

2.2 MIX DESIGN

.1 Assume responsibility for the mix of each type of concrete required, while taking into account the requirements described in Section 2.1 of these specifications and the following criteria in compliance with possibility No. 1 presented in Table 5 of the CSA-A23.1/A23.2 standard.

.1 Concrete type :

a) Exposed aggregates grinded finish concrete for columns and slab:

- self settling type
- exposure category (Table No. 1, CSA-A23.1/A23.2): C-1
- tested compression strength: 35 MPa at 28 days
- cement type: 70 % Gul (Limestone Portland ciment) and 30 % blast furnace slag
- air content: 6 to 9%

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- Fine aggregate: 0-5 mm white colour granite sand
- Coarse aggregate: 2.5 -5 mm white colour granite stone
- Slump for columns : 500 ± 50 mm après l`ajout de superplastifiant
- Slump for slab : 80 ± 30 mm after superplastifiant adding
- Silver coloring admixture properly mixed
- Shrinkage-reducing admixture
- Chemical admixtures: comply with the ASTM C494/C494M standard.
- normal density concrete
- final product must be alike the finish of granite grey grinded concrete pavers

b) Concrete base for flag pole support, base for retractable bollards, walls, structural slabs, floating slabs and footings:

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- minimum tested compression strength at 28 days: 35 Mpa
- cement type : GU
- exposure category (Table No. 11, CSA-A23.1/A23.2): C-1
- Chemical admixtures: comply with the ASTM C494/C494M standard.
- normal density concrete

.2 Obtain the Departmental Representative's approval for all admixtures used in concrete mixes (superplasticizers and required air-entrainers or other admixtures needed for any specific purpose, designated by the specialized Contractor). The use of calcium chloride is prohibited.

.3 Provide a sample of the admixture(s) used, at the Departmental Representative's request.

.4 Follow the manufacturer's instructions when using admixtures.

.5 The specialized Contractor is responsible for ensuring the admixtures are compatible with one another and with the materials included in the mix.

.6 Enter the type and quantity of the admixture(s) used on the concrete shipping slip.

.7 The use of an admixture shall never reduce the soundness of the concrete or its ability to withstand freezing and thawing.

1 ~~.8 For exterior concrete elements with a decorative apparent finish identified on the structural drawing and the landscape documents, aggregat color and appearance will have to comply with the specified finish and appearance in the landscape documents.~~

2.3 CONCRETE CONTROL

.1 Concrete quality control performed in compliance with the CSA-A23.1/A23.2 standard by a designated laboratory at the Main Contractor's expense.

.2 Submit to the laboratory for approval, proposed formulas for batching the mixes for each class of concrete; specify the type and brand of all admixtures used.

.3 Provide the laboratory with samples of the fine and coarse aggregates that will be incorporated into the concrete blends and identify the quarry they come from.

Unless otherwise directed in writing by the Departmental Representative, also provide the laboratory with a document signed by a recognized petrographer certifying that none of the

harmful alkali-aggregate and cement-aggregate reactions described in Appendix B of the CSA-A23.1/A23.2 standard are likely to occur in the concrete after it has been poured.

.4 Notify the laboratory at least 24 hours before each concrete pour, whatever the volume involved.

.5 Cooperate with sampling and facilitate testing. Provide free access to the structures. Provide the required concrete at no cost. If applicable, protect and provide a storage area for the samples taken.

.6 The concrete's compression strength shall be checked during construction by taking 3 core samples per 75 m^3 poured or at least 3 core samples per pour. The Departmental Representative may ask the laboratory to produce a fourth core sample and let it cure on the construction site as a control sample. A sample shall be crushed on the 7^{th} day; the two other samples shall be crushed on the 28^{th} day.

.7 The cylinders shall be numbered consecutively and the laboratory report shall indicate the exact location of the concrete they represent in the framework, as well as the number of the truck that delivered the concrete.

.8 The laboratory shall measure the concrete slump and air content every time it samples the concrete for strength tests and as often as necessary depending on the type of structure to be built.

.9 Provide a sheltered location on site where the concrete core samples can be stored at an ambient temperature ranging from a minimum of 10°C to a maximum of 25°C before they are shipped to the trial laboratory.

.10 If the core sample test results do not comply with Article 4.4.6.6 of the CSA A23.1/A23.2 standard, the Departmental Representative may require that Section 4.4.6.7 of the standard be applied.

.11 The specialized Contractor is solely responsible for the all concrete work required to complete the structures as indicated on the drawings or stipulated in the Specifications. All work that does not meet the requirements of the Specifications, for any reason whatsoever (quality of materials, batching, placement, strength, impermeability, etc.), shall be modified in compliance with the Departmental Representative's requirements, or it shall be completely demolished and rebuilt in compliance with the provisions of the Specifications and drawings, at the specialized Contractor's expense.

Part 3 Performance

3.1 REPARATION

.1 Ensure that the forms are erected and that they are clean and free of ice, snow and water, and that form reinforcement and hardware are installed in compliance with the requirements of Sections 03 10 00, 03 20 00 and 03 25 00 of the specifications.

.2 Before starting the work, obtain the Departmental Representative's approval of the concrete placement methods, which shall comply with Section 7.2 of the CAN/CSA-A23.1/A23.2 standard.

.3 Obtain the Departmental Representative's written authorization before performing the concrete work and notify him 24 hours before beginning the work. To notify the Departmental Representative, the "Avis de bétonnage" form from Dessau must be used and duly completed by the Contractor.

.4 Pumping concrete is [forbidden] [shall only be permitted once the equipment and the mix are approved].

.5 Ensure that the reinforcement and embedded components are not moved while the concrete is being poured.

.6 Before performing the concrete work, obtain the Departmental Representative's written authorization regarding the proposed method for protecting the concrete during the pour and the subsequent cure.

.7 No concrete shall be poured without the Departmental Representative's written authorization.

.8 Authorization to pour concrete shall only be provided once the Departmental Representative has completed his own inspection of the formwork and determined that the requirements of Article 3.1 appear to have been met.

.9 It is forbidden to pour concrete when it is raining or snowing, unless the Departmental Representative provides the required authorization, being satisfied with the measures taken to shelter the concrete while it is being transported and placed.

.10 The Departmental Representative's authorization to pour concrete when the outside temperature is below 5°C or above 25°C shall in no way release the specialized Contractor from his full responsibility regarding the strength and soundness of the concrete to be poured.

.11 Keep a concrete placement log, which indicates the date and location of each placement, the concrete's characteristics, the truck numbers, the ambient temperature, samples taken and other relevant information.

.12 Immediately before placing the concrete, carefully clean and remove all waste and debris of any kind from the space the concrete will occupy.

.13 In areas where new concrete is bonded to an existing structure, drill holes in the existing concrete and install steel dowels made of high adherence steel rebar in it and thoroughly embed the dowels with non-shrink epoxy grout to anchor and maintain them in the positions indicated.

.14 No load shall be exerted on the new concrete components until the Departmental Representative has provided the required authorization.

3.2 MANUFACTURE AND DELIVERY OF THE CONCRETE

.1 Provide ready-to-use concrete manufactured in a concrete plant, transported and discharged at the site in compliance with Section 5.2 of the CAN/CSA-A23.1/A23.2 standard, or provide concrete manufactured on site, in compliance with all the requirements of that same section. If the second alternative is chosen, submit the entire procedure to the Departmental Representative for approval.

.2 The manufacturer of the ready-to-use concrete is solely responsible for batching the concrete, and he shall personally, at his expense, take all necessary measures to ensure the quality and uniformity of his product.

.3 Require that the concrete supplier provide a delivery slip for each load of concrete and provide the Departmental Representative with a copy of these slips. The slips shall contain the following information: name and address of the supplier's company, truck number, specialized Contractor's name, project name and location, class of concrete, cumulative quantity, start of discharge, end of discharge, maximum size of aggregate, slump and air-entrainment required, types of admixtures used, quantity and type of cement and quantity of water.

.4 The addition of water to the mix after the initial batching shall only be carried out in strict adherence with Article 5.2.4.3.2 of the CAN/CSA-A23.1/A23.2 standard, but the maximum quantity used shall be 6 l/m^3. Submit all anticipated additions to the Departmental Representative for approval and control. Indicate on the delivery slip the quantity of all water added at discharge.

.5 Plan the manufacture of the concrete and schedule the deliveries to the site so that each pour can be performed without any interruptions. Each batch of concrete shall be completely discharged into the forms within two (2) hours of beginning of batching.

.6 Never remix concrete or mortar that has started to set.

.7 The temperature of the concrete at discharge shall be within the range presented in Table 1 of the CAN/CSA-A23.1/A23.2 standard and shall be controlled according to Article 5.2.4.4 of the same standard. Use all protective measures required for this purpose.

.8 No aluminum component shall be used to batch, transport or place the concrete.

3.3 IMPLEMENTATION

.1 Place the concrete in compliance with the requirements of the CAN/CSA-A23.1/A23.2 standard.

.2 Carry out the consolidation of the concrete using models and sizes of mechanical vibrators approved by the Departmental Representative.

.3 Select an appropriate type and number of vibrators and use them in accordance with Section 7.2.5 of the CAN/CSA-A23.1/A23.2 standard.

.4 Bind the fresh concrete with rock or hardened concrete in accordance with Section 7.2.2 of the CSA-A23.1/A23.2 standard.

.5 Saturate hardened concrete surfaces with water immediately before pouring concrete on these surfaces.

.6 Lay the concrete without interruption or in layers thick enough that each new layer will bind with the underlying layers before they have hardened enough to form cold joints.

.7 If difficulties arise during pouring, change the concrete formula following the laboratory's directives and use the admixture(s) prescribed by the laboratory, and assume all expenses for this procedure.

.8 Adding a superplasticizer to the concrete before it has been poured into the forms is mandatory when pouring walls (including retaining walls) and columns.

3.4 CONCRETE CURING

.1 The concrete shall be cured according to the requirements of section 7.4 of the CSA-A23.1/A23.2 standard. Walls and slabs 500 mm thick or thicker are considered mass concrete.

.2 The use of curing compounds is prohibited.

.3 The concrete of walls and other vertical elements shall be cured using two layers of jute kept moist at all times.

.4 The concrete of slabs shall be cured using a using a cover kept moist at all times,

.5 Slabs and other unformed surfaces shall be kept moist for a period of at least 7 days.

.6 Walls, beams, columns and other formed surfaces shall undergo the following 7-day curing schedule:

.1 forms left in place: 3 days;

.2 moist curing after removal of the forms: 4 days.

1 .3 Over 10° temperature 7 days moist curing with water supplied burlap over a long enough period necessary to obtain 70 % of specified resistance for exposed aggregates grinded finish concrete for columns and slab.

.7 When the outside temperature exceeds 20°C for mass concrete or otherwise 27°C, keep the forms moist before pouring the concrete and throughout the entire time they remain in place.

.8 In cold weather, water curing ends 12 hours before the end of protection.

.9 Throughout the entire cure, the concrete shall never be under any load and shall be adequately protected against violent shocks, excessive vibration, weather and other disturbances.

.10 The provision, installation and maintenance of all falsework and devices required for the curing and protection of the concrete in hot or cold weather, as well powering the equipment, are part of the contract work, for which all costs are to be assumed.

3.5 CONCRETE PROTECTION

.1 In hot weather, the concrete shall be protected according to Article 7.4.1.4 of the CSA-A23.1/A23.2 standard.

.2 Concrete components containing silica fume shall be protected from drying according to Article 7.4.1.2 of the CSA-A23.1/A23.2 standard.

.3 Other concrete components shall be protected from dryout based on Appendix D of the CSA-A23.1/A23.2 standard.

.4 In cold weather, the concrete shall be protected according to Article 7.4.1.5 of the CSA-A23.1/A23.2 standard.

.5 Methods for protecting concrete in cold weather are detailed in Chapter 7.4.1.5.3 of CSA-A23.1/A23.2 standard.

3.6 FINISHING OF FORMED SURFACES

.1 Clean and finish the formed surfaces in compliance with Section 7.7.2 of the CSA-A23.1/A23.2 standard. Visible surfaces in completed buildings require smooth formed surfaces in accordance with Article 7.7.3.6 of the CSA-A23.1/A23.2 standard. All other surfaces require a rough formed surface in accordance with Article 7.7.2.5 of the CSA A23.1/A23.2 standard.

.2 Fill the holes left by the form ties in compliance with Section 03 10 00 of these specifications.

3.7 CONCRETE PREPARATION

.1 Remove and replace all damaged or defective concrete with concrete that meets the specifications and requirements of the drawings.

.2 After the forms have been removed, the Departmental Representative shall examine all voids, honeycombs and other defects. If applicable, submit the methods for repairing the voids, honeycombs and other defects to the Departmental Representative for approval. Do not repair any of the surfaces before having received the Departmental Representative’s authorization.

.3 Wherever possible, repair formed surfaces as soon as possible after the forms have been removed.

.4 Cover the concrete surfaces with a cement-latex slurry or an epoxy-based glue before performing concrete or mortar repairs.

.5 The product used shall comply with Section 2.1.7 of this section.

3.8 CUTS, DRILL HOLES AND CUT-OUTS IN HARDENED CONCRETE

.1 Components that have already been poured shall never be cut, drilled or cut-out for any reason whatsoever, unless the Departmental Representative has authorized these procedures.

.2 Any cut, drill hole or cut-out in hardened concrete authorized by the Departmental Representative shall be performed at the specific location, using the exact dimensions he has approved. Use rotary tools that prevent the concrete from shattering.

3.9 TOLERANCES

.1 If the tolerances specified in Article 6.4 of the CSA-A23.1/A23.2 standard have not been met during the construction of any component of a structure shown on the drawings, the Departmental Representative may require that this component be demolished and rebuilt according to the tolerances of said article, at no additional expense to the Departmental Representative.

3.10 CONSTRUCTION JOINTS

.1 Follow the indications of Section 7.3 of the CSA-A23.1/A23.2 standard for construction joints.

.2 The Departmental Representative shall approve the location of the construction joints that demarcate each concrete pour. If the Departmental Representative deems it appropriate, he may require that these joints be brought closer together or relocated.

.3 None of the construction joints already indicated on the drawings shall be moved or eliminated without prior authorization from the Departmental Representative.

.4 Immediately before resuming pouring against a construction joint or above it, clean and score the surface of the hardened concrete to eliminate all loose fragments and any trace of bleeding, moisten the surface and allow to dry to obtain saturated, dry surface conditions.

.5 Install 80 mm thick shear keys on construction joints along the entire length/height of the component, of a width equal to one-third the thickness of the component. Slightly bevel the sides of the shear keys.

.6 For vertical components (walls, strip footings) construction joints shall be a maximum of 20 m apart. For structural raft foundation and slabs install construction joints with maximum 20 m x 20 m spacing. Submit the location of the construction joints to the Departmental Representative.

.7 Allow a section to cure for a minimum of 7 days before pouring a new section next to it.

3.11 ON-SITE QUALITY CONTROL

.1 A testing laboratory designated by the Main Contractor shall inspect and test the concrete and its constituents in accordance with the CSA-A23.1/A23.2 standard.

.2 The owner shall assume all costs for the trials.

.3 The Laboratory shall take additional core samples during cold weather concrete work. These core samples shall be cured on site, under the same conditions as the concrete pours they represent.

.4 Non-destructive concrete trials shall be performed according to the methods described in the CSA-A23.1/A23.2 standard.

.5 The inspection and trials performed by the Laboratory shall not replace or finalize the quality control performed by the Contractor, nor shall they release the Contractor from his contractual obligations in this respect.

3.12 CLEANING

.1 Provide on site, adequate space for safe washing of concrete trucks.

.2 Dispose of waste in accordance with the requirements of provincial/territorial and federal local regulations.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 This section specifies the requirements for the finishing of concrete for concrete columns and slabs with exposed aggregates and grinded finishing work. Include the costs related to the finishing work of concrete surfaces in the batches of concreting work prescribed in the various items on tender form requiring this work.

1.2 RELATED SECTIONS

.1 The specialized Contractor is responsible for obtaining a copy of all the sections of these specifications even if they do not appear to pertain to his speciality. If he does not, it shall be understood that he agrees to the clauses and requirements of all sections in these specifications. The specialized Contractor must consult the table of contents of these specifications to have knowledge of the complete list of the specification sections.

1.3 REFERENCE STANDARDS

.1 CSA International

.1 CAN/CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content in g/L.

1.5 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Minimum 4 weeks prior to starting concrete finishing work, provide proposed quality finishing control procedures for review by Departmental Representative.

.3 Mock-Ups:

.1 Provide site mock-up for concrete finishes indicating methods and materials, and procedures proposed to achieve concrete finishes in accordance with Section 01 45 00 - Quality Control, and to comply with following requirements, using materials indicated for completed work:

.1 Build 2 - 600 X 600 X 150 mm vertical grinded finishing and 2 - 600 X 600 X 150 mm horizontal grinded finishing mock-ups and store them on site as directed by Departmental Representative.

.2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up to be used throughout construction period and used as standard of acceptance for subsequent architectural concrete work.

.3 Mock-up wont form part of permanent structure when accepted by Representative repair or replace unacceptable mock-ups at no additional cost to Owner.

.4 In presence of Departmental Representative, damage part of exposed face for each finish, colour, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

1.7 SITE CONDITIONS

.1 Temporary lighting: Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.

.2 Electrical power: Provide sufficient electrical power to operate equipment normally used during construction

.3 Work area: Make work area water tight protected against rain and detrimental weather conditions.

.4 Temperature: Maintain minimum 10 degrees C ambient temperature for 7 days before installation and minimum 48 hours after completion of work and maintain relative humidity maximum 40% during same period.

.5 Moisture: Ensure concrete substrate within moisture limits prescribed by manufacturer.

.6 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.

Part 3 Execution

3.1 EXAMINATION

.1 Verify site conditions surfaces ready to receive grinded finishing work.

3.2 PREPARATION OF SURFACES

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.

.2 Saw cut control joints to CAN/CSA-A23.1, 24 hours maximum after placing of concrete.

.3 Use mechanical stripping to remove chlorinated rubber or existing surface coatings.

.4 Use respiratory equipment, protective clothing and eye protection] during work.

3.3 IMPLEMENTATION

.1 Grinded finish must be alike the finish of granite grey grinded concrete pavers.

.2 After 21 days, proceed with grinding with adequate grinding equipment in order to achieve specified grinded finish.

.3 Protect all horizontal and vertical surfaces and all elements nearby from grinding residues. Submit protection method for approval.

.4 Concrete grinding, in order to obtain exposed aggregates grinded finish concrete, shall start only when concrete has hardened sufficiently to prevent the dislodging of large aggregate particles.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Grinding residues must be removed periodically.

.2 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.5 PROTECTION

1. Use plywood sheets to protect finished surfaces from work on construction field.

END OF SECTION

DIVISION 31

Approved: 2012-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33 - excavating, trenching and backfilling.

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 Ministry of Transport of Quebec

.1 CCDG – cahier des charges et devis généraux du ministère des transport du Québec (dernière édition).

.3 Underwriters Laboratories of Canada (ULC)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.4 EXISTING CONDITIONS

.1 Examine subsurface investigation report which is attached at the end of this document.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan.

.3 Refer to dewatering in Section 31 23 33 - Excavating, Trenching and Backfilling.

Part 2 Products

2.1 MATERIALS

.1 Fill material according to 31 23 33 - Excavating, Trenching and Backfilling.

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~~**.2 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.**~~

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for rough grading installation in accordance with manufacturer s written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 STRIPPING OF TOPSOIL

.1 Remove topsoil and other organic matter from the entire surface of the lot.

.2 Evacuate topsoil to an appropriate waste site and in accordance with MELCC's Soil Protection and Contaminated Sites Policy.

3.3 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 At the time of rough leveling, give the ground a slope according to the indications in the plan of leveling in architecture of the landscape.

.3 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.4 Compact filled and disturbed areas to corrected maximum dry density to ASTM D698, as follows:

.1 95 % under paved and walk areas.

3.4 TESTING

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by Departmental Representative. In accordance with 01 29 83 - Payment Procedures for Testing Laboratory Services and 01 45 00 - Quality Control.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION

.1 Protect and/or transplant existing, landscaping, buildings, surface or underground utility lines and benchmarks which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

.3 Special attention to the work near the structure of the ville-marie tunnel located under the right-of-way.

END OF SECTION

DIVISION 32

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 32 11 16.01 – Granular sub-base

1.2 PRICE AND PAYMENT PROCEDURES

.1 See Section 01 29 00 - Payment

1.3 REFERENCE STANDARDS

.1 ASTM International

- .1 ASTM C136-13, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.

.2 Canada Green Building Council (CaGBC)

- .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007].
- .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .3 LEED Canada 2009 for Design and Construction-2010, LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.
- .4 LEED Canada for Existing Buildings, Operations and Maintenance 2009, LEED Canada 2009 Leadership In Energy and Environmental Design Green Building Rating System Reference Guide.

.3 CSA Group

- .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CAN/CSA-A179-04 (R2009), Mortar and Grout for Unit Masonry.
- .3 CSA A231.1/A231.2-06 (R2010), Precast Concrete Paving Slabs/Precast Concrete Pavers.
- .4 CSA A283-06 R2011), Qualification Code for Concrete Testing Laboratories.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data

.1 Submit manufacturer s instructions, printed product literature and data sheets for precast concrete unit paving. Product data to include product characteristics, performance criteria, physical size, finish and limitations.

1 .3 Shop Drawings

.1 Not required.

.4 Samples

.1 Submit full size sample of each type paver.

.5 Test and Evaluation Reports

.1 Submit following sampling and testing data:

.1 Sieve analysis for gradation of bedding and joint material.

.2 Unit paver sampling and testing.

.3 Evaluation of cleaning and [sealing compound.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Sustainable Design Submittals

.1 LEED Canada Submittals: N/A

.2 Construction Waste Management

.1 Submit project Waste Reduction Workplan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50% of construction wastes were recycled or salvaged.

.3 Recycled Content

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products. Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial content, and total cost of materials for project.

.4 Regional Materials: submit evidence that project incorporates required percentage

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company or person specializing in precast concrete paver installations approved by manufacturer with documented experience.

.2 Mock-ups

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct 2.4 x 2.4 m area mock-up.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.2 To determine surcharge of bedding layer, joint sizes, lines, laying pattern and texture.

.3 For testing to determine compliance with performance requirements.

.4 Perform the following tests: Locate where directed.

.5 Allow 24 hours for inspection of mock-up before proceeding with work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Mock-up may remain as part of the finished work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements

.1 Store materials in dry location off ground and in accordance with manufacturer’s recommendations in clean, dry, well-ventilated area.

.2 Store and protect precast concrete units from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse of pallets as specified in Waste Reduction Workplan, in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 CONCRETE PAVERS

.1 Concrete pavers: to CSA A231.1/A231.2 and as follows:

.1 Dimensions: 600mmX600mmX100mm, 300mmX600mmX100mm

.2 Shapes: square and rectangular as per the installation diagram on the plan

.3 Finish: granite grey colour with grinded finish and Grained textured finish according to the arrangement on the plan.

.4 Standard end, corner, border units as required.

.5 In order to avoid pavers cuts, the followings formats should also be used :

.1 Dimensions: 300mmX600mmX100mm et 300mmX300mmX100mm

.2 Shapes: square and rectangular as per the installation diagram on the plan

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.3 Finish: granite grey colour with grinded finish and Grained textured finish according to the arrangement on the plan.

.2 Manufactured in moulds, with spacers, suitable for installation and delivered on site in cubes of laying panels, in protective wrapping.

.3 Pigment in concrete pavers: to ASTM C979/C979M.

2.2 BEDDING AND JOINT MATERIAL

.1 Determine bedding sand hardness as follows:

.1 Randomly select single [1.4] kg sample from sand source.

.2 Dry sample for 24 hours at 115 degrees C to 121 degrees C.

.3 Obtain 3 sub-samples each weighing 0.2 kg by passing original sample several times through riffle box.

.4 Carry out sieve analysis test on each sub-sample in accordance with CSA A23.1/A23.2.

.2 Remix each sub-sample and place in nominal litre capacity porcelain jar with two 25 mm diameter steel ball bearings weighing 75 +/-5 g each. Rotate each jar at 50 rpm for six [6] hours. Repeat sieve analysis. Record individual and average sieve analysis.

.3 For each sample tested, maximum increase in percentages passing each sieve and maximum individual percent passing is in accordance with table as follows:

Sieve Size	Maximum Increase	Maximum Passing
0.075 mm	2%	2%
0.150 mm	5%	15%
0.300 mm	5%	35%

.4 Bedding: granite origin, clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.

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.5 Joint sand: polymer stabilized, colour light grey, clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.

.6 Gradation: to CSA A23.1/A23.2, Table 4 - Grading Limits for Fine Aggregate, and CAN/CSA-A179 as follows:

Sieve Size	% Passing for Bedding Sand	Joint Sand
10 mm	100	
5 mm	95 -100	100
2.5 mm	80 – 100	95 – 100
1.25 mm	50 – 90	60 – 100
630 microns	25 – 65	
600 microns		35 – 80
315 microns	10 – 35	
300 microns		15 – 20
160 microns	2 - 10	
150 microns		2 - 15

2.3 EDGE RESTRAINTS

1. Edging for pavements 100 mm thick: Industrial Type PVC border designed for pedestrian, vehicular and commercial applications with rear support.

1. L-shaped with triangular reinforcement section.

2. L-shape dimensions: 17, 93mm wide x 17, 93mm height x 2, 54mm thick.

3. Dimension of the triangular reinforcing section: 50, 80mm wide x 25, 40mm high x 50.80 mm at angle x 2, 54mm thick.

4. Pre-drilled perforated holes at all 304, 80mm for galvanized steel nails of 9, 53mm diameter.

5. The contractor must install the 254 mm long galvanized steel nails supplied by the manufacturer to pre-drilled perforated holes.

2.4 CLEANING COMPOUND

.1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.

.2 Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on pavers.

2.5 SEALING COMPOUND

.1 Clear, exterior type, water based, specially formulated for application on precast concrete pavers.

.2 Clear, exterior type, specially formulated for application on precast concrete pavers.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit paving installation in accordance with manufacturer s written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 STRUCTURAL SURFACE

.1 Verify that structural surfaces conform to section 32 11 16.01 – Granular sub-base and levels and compaction required for installation of unit pavers. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Verify that top of structural surface (top of base) does not exceed plus or minus 10 mm of grade over 3 m straightedge.

.3 Ensure that structural surface is not frozen or standing water is present during installation.

3.3 INSTALLATION OF EDGE RESTRAINTS

.1 Install restraints true to grade, in accordance with manufacturer's recommendations.

.2 Execute perfectly straight or perfectly curved lines in according with the instructions given on the installation plan.

.3 Secure the edge restraints with the metal spikes supplied with the edge restraints by the distributor. Place one stake every 300 mm centre-to-centre.

3.4 PLACING OF BEDDING MATERIAL

.1 Ensure bedding material is not saturated or frozen at all times until installation is complete.

.2 Spread and screed material on structural surface to achieve 20 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.

.3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

3.5 INSTALLATION OF CONCRETE PAVERS

.1 Lay pavers to pattern[s] indicated. Joints between pavers: 3 to 5 mm wide.

.2 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures. Reproduce the original chamfer using a suitable tool.

.3 Installation by mechanical equipment:

.1 Prepare installation sequence and obtain approval of sequence by Departmental Representative.

.2 Place paver pallets and other materials without exceeding load bearing capacity, or otherwise detrimentally affecting installations.

.3 Run equipment approved for installation only on paving surfaces vibrated in place.

.4 Complete installation after placing each 5 m width of installation.

.5 Inspect pavers and remove chipped, broken or otherwise damaged pavers if structural performance or aesthetics is adversely compromised, as directed by Departmental Representative.

.6 Replace pavers removed without altering layout and structural quality.

.4 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.

.5 Inspect, remove, and replace chipped, broken and damaged pavers.

.6 Sweep dry joint sand material into joints.

.7 Settle sand by vibrating pavers with plate compactor.

.8 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1 m of unrestrained edges of pavers.

.9 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each work day.

.10 Sweep off excess joint material when installation is complete.

.11 Proof roll street pavements with at least two passes of a 10 T rubber-tired roller.

.12 Final surface elevations not to exceed plus or minus 10 mm under 3 m long straightedge.

.13 Surface elevation of pavers: 2 to 3 mm above adjacent catch basins, drainage inlets, concrete collars or channels.

.14 Ensure conformance of final elevations.

3.6 PRECAST CONCRETE UNIT CLEANING

.1 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound, immediately prior to sealing and as directed by Departmental Representative.

.2 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.

.3 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer s recommendations.

.4 Final surface to be free of contamination.

3.7 SEALING

.1 Ensure paver surfaces to be sealed are clean, free of extraneous materials and efflorescence, dry and appropriately cured.

.2 Apply two coats of sealant, each in accordance with manufacturer's recommendations.

.3 Protect sealed surfaces from trespass until sealer has dried and hardened.

3.8 FIELD QUALITY CONTROL

.1 Retain concrete testing laboratory accredited in accordance with CSA A283.

.2 Sample and test in accordance CSA A23.1/A23.2.

.3 Do sampling and testing once for each 200 square metres of material on site, as directed by Departmental Representative.

.4 Departmental Representative will select 10 pavers for testing from material on site for each sampling.

.5 Submit test results to Departmental Representative for approval of precast concrete pavers.

3.9 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 10 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION