Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps, roads, or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

.2 Maintain access to and from all process equipment, including leachate tanks, at all times for City employees.

1.2 USE OF SITE AND FACILITIES

.1 Contractor to ensure that the Contract Administrator is aware of their arrival on site and before starting work.

.2 If requested by CA, Contractor to meet with CA to review site specific issues prior to starting any work and to sign City of Ottawa Safe Work Permit. **NO WORK IS TO PROCEED** without having a valid, completed City of Ottawa Safe Work Permit

.3 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the City Representative at least 48 hours in advance to facilitate work as stated. Plant process shall not be impacted by construction activities.

.4 Maintain existing services to adjacent buildings and provide for personnel and vehicle access.

.5 Contractor is to provide sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.6 Closures: protect work temporarily until permanent enclosures are completed.

.7 Unless formally directed, no contractor is to operate any valves, switches or any other controls related to process equipment

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises. Arrange with the City Representative to facilitate execution of work.

.2 Design, construct, and maintain temporary protection around areas of work within and nearby the existing structure and ensure the safety of the employees, members of the public and all workers.

1.4 EXISTING SERVICES

.1 Notify the City Representative 48 hours in advance, and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give the City Representative 96 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.

.3 Provide for personnel, pedestrian and vehicular traffic as required.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.5 When working near water retaining or conveying structures, Contractor to ensure no foreign materials, waste or tools fall into the liquid. Contractor to advise CA or City Project Manager immediately to avoid potential damage to equipment.

1.5 SPECIAL REQUIREMENTS

.1 Ensure that Contractor personnel employed on site become familiar with the City's policies and obey regulations including safety, fire, traffic and security regulations.

.2 Keep within limits of work and avenues of ingress and egress.

.3 Contractor to provide all necessary equipment and safety personnel to undertake all works in designated confined spaces in accordance with O.Reg. 632/05.

.4 The City may require the Contactor to provide and use a gas monitor in some spaces which are not deemed confined spaces. In accordance with Section 01 35 30 Health and Safety 1.6

.5 When work is to be done in areas not designed for human occupancy and with the potential of atmospheric change/hazards, all workers must undergo proper confined space entry training and have documentation available prior to entry. (Short duration or on-line confined space "awareness" training is not acceptable)

.6 When working in certain plant areas the Contractor shall be required to disinfect tools, equipment, clothing, and boots. Disinfection at a minimum will require these items to be sprayed with a sodium hypochlorite solution. Specific disinfection procedures will be provided by the City Contract Administrator prior to commencing the job.

.7 Certain areas may have limited access to ducts, tanks, clear wells via hatches, and ladders and may be wet, requiring sand bagging or a dewatering pump.

.8 Contractor is required to undertake their own hot work procedure required for open sparks, flames, welding or any other potential fire causing work. The Contractor must obtain all relevant permits, fire watch, and post work fire watch as required.

.9 Contractor is required to submit an MSDS for the sandblasting media to be used for City approval, prior to commencing the work.

.10 Contractor is to ensure sandblasting media used does not contain any designated substances.

1.6 CONSTRUCTION EQUIPMENT /NOISE CONTROL

.1 If exhaust or other sources of dust and fumes cause discolouration or unclean surfaces, the Contractor will clean and/or repaint such areas to the Owner's satisfaction.

.2 The Contractor shall take steps as may be required to prevent dust and noise nuisance resulting from his operations.

.3 Where work requires the sawing or grinding of concrete; blades and grinders of wet type shall be used together with sufficient water to prevent the incidence of dust. The cost of all such preventive measures shall be borne by the Contractor unless the contract administrator directs the contractor to construct a full wood frame type enclosure .

.4 Protect all existing materials and equipment from damage arising from the work of this Contract, and make good any damage.

1.7 PROTECTION

.1 Protect finished work against damage until take-over.

.2 Use of low dust generating technologies such as vacuum abrasive blasting or extreme high pressure water blasting.

.3 The use of drop sheets attached to scaffolding to contain debris and dust.

.4 Instruct workers on proper dust control methodologies.

.5 Monitor dust conditions visually and vigilantly and take measures immediately to suppress and mitigate sources.

.6 Use new or well maintained equipment within the operational specifications.

.7 Protect the work and the existing facilities from damage by ice, flooding and/or other adverse climatic conditions.

.8 Protect adjacent work and property against the spread of dust, dirt, over-spray and other deleterious substances beyond the work areas.

.9 Contractor shall be responsible for repairing damage due to spread of deleterious substances.

.10 Contractor shall be responsible for preventing dust and all other contaminants from entering other work areas of the building.

.11 Protect workers, other users of the site and the public from all hazards.

.12 Any items to be removed, stored on site and reinstated shall be stored in dry locations and protected from damage. Any items damaged shall be replaced or repaired to the approval of the Contract Administrator, at no extra cost.

.13 Existing piping shall be protected from damage during construction. Protection plans shall be submitted where major protection measures are required, or when requested by the Contract Administrator. Any piping damaged shall be replaced or repaired to the approval of the Contract Administrator, at no extra cost.

. 14 Keep gates and doors locked for public safety except when workmen or materials are being moved.

.15 Protect all new materials and equipment from damage during the work of this contract

1.8 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

.2 No smoking on site.

Part 2 AVAILABILITY AND SCHEDULING

2.1 RESPONSE TIME

.1 When called up, contractor has 4 hours to respond. If no response is received within 4 hours the City reserves the right to call up the next contractor on the list

Part 3 BILLING

3.1 INVOICING

.1 Invoice pricing shall match units and rates as agreed to in the contract.

.2 Invoiced quantities shall match what has been agreed to on site with Contract Administrator

.3 Incorrect invoices will be cancelled and returned

END OF SECTION 01 14 00

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittals.

.2 Submit site-specific Health and Safety Plan: Within 14 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to City Representative and authority having jurisdiction, if required.

.4 Submit copies of reports or directions issued by Provincial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets.

.7 The City Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to City Representative within 7 days after receipt of comments from the City Representative.

.8 Any review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

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

1.4 SAFETY ASSESSMENT

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

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1.5 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 The City Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.3 Observe and enforce construction safety measures required by Ontario Building Code, The Occupational Health and Safety Act, and Regulations for Construction Projects, Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations - made under the Occupational Safety Act, Workers' Compensation Board and municipal statutes, authorities, and Workplace Hazardous Materials Information System (WHMIS).

1.6 WORK IN HAZARDOUS AREAS

.1 The use of gas or propane powered tools inside the process areas is not permitted unless written approval is obtained from the Contract Administrator.

.2 Before commencing the day's work and while working in areas which may contain an explosive, toxic or oxygen deficient atmosphere, test for explosive or toxic gases, or oxygen deficiency. If a hazardous condition is found, make the work area safe before commencing or continuing work.

.3 Provide and maintain a suitable detection meter. Use this meter continuously. Calibrate the meter to sound an alarm at a preset warning level.

.4 Recalibrate the meter at times recommended by the manufacturer.

.5 Use non-sparking tools in an area where an explosive atmosphere may exist.

.6 Construction activities that occur in hazardous location require continuous combustible gases monitoring by the Contractor.

.7 Conform to all procedures and stipulations of the City of Ottawa Emergency Guidelines.

.8 Metering for Toxic, Combustible Gases and Oxygen Deficiency

.9 Contractor to provide own confined space rescue team to be reviewed by the city. A Confined space rescue team can be refused by the city. A list of acceptable/approved confined space recuse team contractors can provided at the CA's discretion.

1.7 WORKING AT HEIGHTS

.1 Contractors are required to adhere to Working At Heights, and other associated legislation while performing work on City of Ottawa Property

.2 Contractor is to provide their own fall arrest equipment, hoisting equipment and elevated work platforms (scissor lift, cherry picker, ladder etc.) The City will not provide these items.

.3 Contractor to provide own anchor points or to ensure safety of existing anchor points for tie off.

1.8 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c. 0.1 O. Reg. 213/91.

.2 Where applicable, the Contractor shall be designated the "Constructor", as defined by Ontario Act.

.3 Notify the Ontario Ministry of Labour before commencing work on this project as required by the regulations.

.4 No employee shall enter or be permitted to enter a hazardous confined space unless such entry is made in compliance with the Occupational Health and Safety Act and O.Reg. 632/05.

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Ontario having jurisdiction and advise the City Representative verbally and in writing.

.2 In event of conflict between any provisions of above authorities, the most stringent provision will apply.

1.11 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have minimum 2 years' site-related working experience specific to activities associated with construction health and safety.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

1.12 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Ontario jurisdiction, and in consultation with the City Representative.

.2 Ensure completed city of Ottawa “Safe Work Permit” is signed by all parties and readily available during work.

1.13 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the City Representative.

.2 Provide the City Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 The City Representative may stop Work at the cost of the contactor if non-compliance of health and safety regulations is not corrected.

1.14 WORK STOPPAGE

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

1.15 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure, and safe manner, in accordance with CSA Z797-09 (R.201.4) and Occupational Health and Safety Act.

1.16 LOCKOUT PROCEDURE

.1 See attached Appendix 1

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION 01 35 30

APPENDIX 1

LOCK BOX PROCEDURE

When more than 5 isolation points are required or when the Manager/Supervisor who is responsible for the machinery, equipment or infrastructure deems it necessary, the following actions must be taken to use Lock Boxes.

The Supervisor or his/her designate shall initiate the Orders to Operate Procedure

The Supervisor or his/her designate shall place lock box locks and red tags on all appropriate primary energy sources.

The Supervisor or his/her designate shall ensure the release of stored or residual energy from affected machinery, equipment or infrastructure and verify all energy is in a zero state.

The Supervisor or his/her designate will place all used lock box lock key(s) into a “Lock Box” and then will lock the box with their Personal Lock. This lock will remain on the lock box until completion of the shift or until completion of the work. Information on the affected machinery, equipment or infrastructure shall be posted within the vicinity of the Lock Box.

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Each group affected by this lockout, including as a minimum the Operators, shall affix a Work-group lock and Green Tag on the Lock Box.

Each person performing work in / on equipment, machinery, infrastructure affected by this lockout will affix a Personal lock and Red Tag on the Lock Box.

Each person shall remove his/her personal lock when no longer working in / on the affected equipment, machinery or infrastructure.

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Part 1 General

1.1 REFERENCES

.1 Work shall conform to the requirements of the Ontario Building Code and all amendments and all local, municipal, and provincial building by-laws and ordinances.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs that adhere to CSA requirements (height and design)

1.4 DUST TIGHT SCREENS

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Contractor to provide ventilation if required. Exhaust point to be verified with the City.

.3 Maintain and relocate protection until such work is complete.

1.5 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

.2 As required, ensure operators have access to valves, local control panels, MCC’s or other items critical to the process

1.6 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.7 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.9 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION 01 56 00

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in a safe and tidy condition, free from tripping hazards. accumulation of waste products and debris, other than that caused by the City or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the City Representative. Do not burn waste materials on site, unless approved by the City Representative.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris.

.5 Dispose of waste materials and debris off site.

.6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by the City or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by the City Representative. Do not burn waste materials on site, unless approved by the City Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.9 Remove and clean concrete splatter from floor, walls and finished concrete surfaces

.10 When formwork is required, contractor to use clean, new wood as not to leave any staining on finished surfaces.

.11 Clean lighting reflectors, lenses, and other lighting surfaces.

.12 Sweep and wash clean paved areas. Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.13 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION 01 74 11

Part 1 General

1.1 REFERENCES

.1 Standard Specifications (latest edition) except where modified by this section or the Contract Drawings, the specifications listed below shall govern:

.1 Canadian Environmental Assessment Act (CEAA), latest edition.

.2 CSA Standard S350 Code Practice for Safety in Demolition of Structures.

.3 CAN/CSA-S269.3 Access Scaffolding for Construction Purposes.

1.2 PROTECTION

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, and adjacent grades. Provide bracing, shoring as required. Repair damage caused by demolition as directed by the City Representative.

.2 If directed by City Representative, Contractor to install Tell-Tale Crack Monitoring Gauges at existing cracks on adjacent structures to monitor movement. Readings to be taken before, during and after demolition activites

.3 Support affected columns and adjacent floor structure and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures and then cease operations and notify the City Representative.

.4 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.

.5 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

.6 Do not pump water containing suspended materials into storm or sanitary sewers or onto adjacent properties.

.7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.8 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.9 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all affected levels.

.10 Contain debris as not to allow any material to fall into liquid containing tanks. Contractor to notify City representative immediately to prevent damage to critical equipment.

1.3 ALTERATION PROJECT PROCEDURES

.1 Materials: match existing Products and work for patching and extending work.

.2 Employ skilled and experienced installer to perform alteration work.

.3 Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original condition.

.4 Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

.5 When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to the City Representative for review.

.6 Patch or replace portions of existing surfaces which are damaged, lifted, discoloured, or showing other imperfections.

.7 Finish surfaces as specified.

1.4 REGULATORY REQUIREMENTS

.1 Conform to applicable codes for demolition work, dust control, products requiring electrical disconnection.

.2 Ensure work is performed in compliance with CEAA, and all applicable provincial regulations.

.3 Obtain required permits from authorities.

.4 Do not close or obstruct egress width to any building or site exit.

.5 Do not disable or disrupt building fire or life safety systems.

.6 Conform to procedures applicable when hazardous or contaminated materials are discovered.

1.5 SCHEDULING

.1 Ensure project time lines are met without compromising specified minimum rates of material diversion. Notify City Representative in writing of delays.

1.6 PROJECT CONDITIONS

.1 Conduct demolition to minimize interference with adjacent and occupied building areas.

.2 Cease operations immediately if structure appears to be in danger and notify City Representative. Do not resume operations until directed.

Part 2 Products

2.1 GENERAL

.1 Equipment and heavy machinery to meet or exceed all applicable emission requirements.

.2 If fuel burning equipment is being used during demolition; the contractor shall follow the Ministry of Labour's recommended precautions for carbon monoxide poisoning in enclosed or semi enclosed areas.

.3 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Provide, erect, and maintain temporary barriers and partitions at locations indicated.

.2 Erect and maintain temporary partitions to prevent spread of dust, odours, and noise to permit continued occupancy by City staff.

.3 Protect existing materials which are not to be demolished.

.4 Notify affected utility companies before starting work and comply with their requirements.

.5 Mark location and termination of utilities.

3.2 SAFETY CODE

.1 Do demolition work in accordance with CSA Standard S350 Code Practice for Safety in Demolition of Structures.

3.3 DEMOLITION

.1 Demolish parts of structure in accordance with approved schedule and construction phasing option.

.2 Stockpile materials as directed by the City Representative. Eliminate double handling where possible.

.3 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.4 At end of each day's work, leave work in safe and stable condition.

.5 Removal from site.

.1 Remove stockpiled material as directed by the City Representative, when it interferes with operations of project construction. Supply separate, clearly marked disposal bins for categories of waste material.

.2 Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved haulers and receiving organizations in accordance with applicable regulations.

.4 Written authorization from the City Representative is required to deviate from haulers and receiving organizations.

.5 Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

.6 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

.7 Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

.8 Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

.9 Remove temporary Work.

3.4 SALVAGE AND PROTECTION

.1 Salvage and protect items noted on drawings.

END OF SECTION 02 41 19

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Part 1 General

1.1 SCOPE OF WORK

.1 Supply all labour, plant, tools, equipment and materials necessary to carry out injection of all cracks in the exposed concrete perimeter wall and slab concrete as specified.

1.2 SUBMISSION AND DESIGN REQUIREMNTS

.1 The Contractor shall make available, at the CA's request, a copy of manufacturer's specifications and have MDS sheets available for all products incorporated into the crack injection process.

.2 The Contractor shall be an approved applicator and must submit certificate(s) indicating they have successfully completed relevant training programs by the manufacturer.

.3 The Contractor shall submit written certification from expansion joint manufacturer that all materials comply with ANSI/NSF 61 for usage in potable water.

1.3 MATERIAL AND INSTALLATION REQUIREMENTS

.1 Inspect concrete surfaces to identify cracks requiring repair. Only cracks between 0.5 mm and 6 mm in size can be injected. Mark any observed injectable cracks. The Contract Administrator will review the cracks. Reach agreement with the Contract Administrator on the extent of required crack injection

.2 The spacing of the injection ports shall be designed to achieve full depth penetration of the cracks.

.3 The temperature of the exterior concrete and the ambient temperature shall be a minimum of 5°C during preparation injection and curing.

.4 All installation procedures and details shall be completed in full accordance with manufacturer's instructions.

.5 Where details shown on the drawings or in the specification are not in accordance with manufacturers requirements, notify the City Representative.

1.4 QUALIFICATIONS

.1 Personnel performing crack injection shall have at least five (5) years proven satisfactory experience in crack injection and have adequate equipment to expediently complete this work.

1.5 RELATED BY-LAWS AND STANDARD SPECIFICATIONS

.1 Work shall conform to the requirements of the Ontario Building Code (latest edition) and all amendments and all local, Municipal, and Provincial building by-laws and ordinances.

.2 Except where modified by this section or the Contract Drawings, the specifications (latest edition) listed below shall govern.

1.6 SURFACE COATINGS

.1 After completion of crack injection, all surface coatings, including paint, waterproofing membrane, sealers, etc. shall be reinstated.

.2 All new surface coatings shall be of colour and texture to blend into the existing building surface to highest degree possible.

.3 Contractor to include cost of surface coating reinstatement in unit prices for concrete repair work.

1.7 MEASUREMENT FOR PAYMENT

.1 Payment shall be based on a lineal measurement of cracks injected. Crack injection shall be measured by the City Representatives in the presence of the Contractor to the nearest 0.1 metre. The Contractor shall not exceed beyond the limits of the repair areas which have been agreed upon without prior authorization by the City Representative.

.2 The unit prices for crack injection shall be full compensation for the, surface preparation, port installation, port removal, and for the supply and installation of the crack injection material of the type as specified.

1.8 WARRANTY

.1 The Contractor shall provide a written warranty for a period of 3 years from the date of final completion of the project as certified by the City Representatives. The Contractor shall warrant that the crack injection repairs will be free of defects related to workmanship or material deficiency. Any repair required under the warranty will be carried out in accordance with the recommendations of the City Representative.

Part 2 Materials

2.1 INJECTION

.1 All products and chemicals used shall conform to the requirements of ANSI/NSF 61.

.2 Polyurethane Elastomer Grout shall be:

.1 Flexible Resin as manufactured by Multiurethanes Ltd.

.2 Sika HH LV as manufactured by Sika Canada Inc.

.3 Equivalent as approved by addendum.

.3 Epoxy Resin shall be:

.1 Sikadur 35 as manufactured by Sika Canada Inc.

.2 Equivalent as approved by addendum.

.4 Injection points shall be sealed with:

.1 Sikadur 31 High-Mod by Sika Canada Ltd or an adhesive compatible with the product being used

.5 Unless otherwise indicated, the material used for crack injection shall be polyurethane for active cracks and epoxy resin for passive cracks. All column cracks shall be injected with epoxy resin

.1 Active cracks are defined as a crack in concrete with plane surfaces that are expected to be in a state of movement relative to each other.

.2 Passive cracks are defined as a crack in concrete with plane surfaces that are not expected to be moving relative to each other.

.6 Any active cracks at wall-to-wall or wall-to-floor junctions that are leaking at the time of repair shall be injected with SikaFix HH LV by Sika, or approved equivalent.

2.2 INJECTION PORTS

.1 The injection ports shall be removable or non-metallic and shall be insert type units. All injection ports shall be equipped with a shut-off valve or other mechanical means of closure under pressure.

.2 Surface mounted ports shall not be used.

Part 3 Execution

3.1 AREAS OF REPAIR

.1 Contractor to confirm with the City Representative the exact areas requiring repair prior to commencing work.

.2 Contractor will delineate and mark areas with approval of the City Representative.

3.2 CLEANING AND FLUSHING

.1 The cracks shall be flushed with an air-water mixture or an alternating air and water flush to remove all deleterious material prior to injection of the grout. The flushing material shall be injected through the injection port and continued until it exudes from the adjacent injection port and crack is thoroughly cleaned. The flushing shall proceed from one end of the crack to the other.

.2 A final flush shall be made with air only to remove all free water

3.3 SURFACE PREPARATION AND SEALING

.1 Prepare surface as per manufacturer's instructions. Seal as required prior to injection.

.2 The surface of the concrete for a distance of 25mm each side of the crack sections shall be mechanically cleaned to prepare a clean substrate for bonding of the surface sealing compound. The surface sealing and preparation shall be as recommended by the manufacturer of the sealing material

.3 The surface sealing material shall completely confine the injection grout to the crack section with only the injection ports providing access. The surface sealing material shall withstand the maximum injection pressure without developing leakage along the the crack section.

3.4 POLYURETHANE ELASTOMER GROUT

.1 Drill inclined holes at 45° through concrete in order that the holes penetrate the crack at roughly mid depth of the wall/roof. Spacing of the holes as per manufacturer's instructions.

.2 Epoxy the plastic injection ports in place and seal between the cracks using containment epoxy. Do not carry out water testing until the epoxy as completely cured.

.3 Carry out injection of all cracks using water to flush out all debris to ensure free flow of injection material.

.4 Commence injection (using a hand gun, pressure pot or injection machine, the pressure shall not exceed 0.2 MPa) at the lowest port on a vertical face. Continue injection until pure uncontaminated material flows from the adjacent port. The volume of polyurethane material to be used per injection shall equal 1/3 of the volume of the crack to be filled over a 300 mm interval.

.5 Where there is insufficient moisture present in the crack to facilitate the proper reaction with the polyurethane resin, inject a suitable amount of water into the each hole to ensure adequate reaction prior to injection of the resin material.

.6 Pump grout into injection port until grout starts to come out of the adjacent port.

.7 Close the adjacent injection port.

.8 Repeat steps 6 and 7 for all remaining ports.

3.5 EPOXY INJECTION

.1 Drill the ports to a minimum of 12mm in depth with a vacuum attached swivel drill chuck and hollow drill bits.

.2 Epoxy the plastic injection ports in place and seal between the cracks using containment epoxy. Do not carry out water testing until the epoxy has completely cured.

.3 Carry out injection of all cracks using water to flush out all debris to ensure free flow of injection material.

.4 Commence injection (using a hand gun, pressure pot or injection machine, the pressure shall not exceed 0.2 MPa) at the lowest port on a vertical face. Continue injection until pure uncontaminated material flows from the adjacent port. Cap the injection port and proceed with the adjacent port until all ports have been injected.

.5 After the injection material has completely cured all ports shall be removed.

3.6 FINAL CLEANUP

.1 Upon completion remove all debris and excess material from the site.

.2 Wash with water all surfaces, including concrete slab, wall, signage, doors, etc., to remove dust. Use high pressure washing except at areas adjacent to exposed lights or sprinkler head, etc., which may be damaged. Low pressure cleansing and brushing as necessary will be required in these areas.

.3 Prior to leaving the site accompany the City Representative in a final inspection of all work areas.

3.7 **SURFACE FINISHING AND PORT REMOVAL**

.1 The surface finishing shall not proceed until the curing period, as specified by the manufacturer, has elapsed. Surface finishing shall consist of removal of the injection ports and the surface sealant flush with the original concrete profile. Core holes and holes left after the removal of injection ports shall be filled with an approved cementitious non-shrink grout after the surface sealant has cured.

.2 Where the crack is not completely filled to the injection surface and the crack shall be filled with a compatible material approved by the CA. The material shall be installed as per the manufacturers recommendation

END OF SECTION 03 64 23

Part 1 General

1.1 SCOPE OF WORK

.1 Supply all materials, labour, plant tools and equipment necessary to complete concrete repairs as specified and as shown on the drawings.

1.2 CERTIFICATES

.1 Provide certification that plant, equipment and materials to be used in concrete comply with requirements of CAN 3-A23.1.

.2 Submit product data sheets and Material Safety Data Sheets (MSDS) for any products and chemicals used on site. This include chemical admixtures, bonding agents, and proprietary repair materials.

.3 Submit mix designs for concrete. Mix designs shall be submitted on standard City of Ottawa forms following the City of Ottawa procedures.

.4 Submit copies of tickets for each truck load of concrete.

1.3 MIX DESIGN

.1 The mix design shall be submitted in accordance with the RMCAO and shall include a breakdown of the constituent components for each mix.

1.4 STANDARD SPECIFICATIONS

.1 Except where modified by this section or the Contract Drawings, the specifications (latest edition) listed below shall govern:

.1 CAN3-A23.1 Concrete Materials and Methods of Construction.

1.5 MEASUREMENT FOR PAYMENT

.1 The repair areas shall be the projected surface area in square metres. The surface area dimensions shall be measured to the nearest 0.1 metre. Measurements shall be carried out by the City Representative in the presence of the Contractor. Final measurements for payment of all concrete repairs to be carried out shall be measured and agreed upon by the City Representative and the Contractors prior to removal.

1.6 SURFACE COATINGS

.1 After completion of concrete repairs, paint coatings on columns and walls shall be reinstated. New surface coatings shall be of colour and texture to blend into the existing building surface to highest degree possible.

.2 Surface coatings shall conform to ANSI/NSF 61.

.3 Contractor to include cost of surface coating reinstatement in unit prices for concrete repair work.

Part 2 Materials

2.1 CONCRETE

.1 Cementing materials for cast-in-place concrete shall include the following:

.1 Conform to CSA A23.1, exposure Class: C-1, unless modified herein.

.2 Cement to give a compressive strength of 35 MPa in 28 days with 19 mm nominal aggregate size.

2.2 ADMIXTURES

.1 Admixtures shall conform to ANSI/NSF 61.

.2 Concrete admixtures shall be compatible with one another, and used in accordance with manufacturer's instructions, and CAN3-A266.4, "Guidelines for Use of Admixtures in Concrete".

2.3 Crystalline Waterproofing

.1 Cementitious crystalline waterproofing shall conform to ANSI/NSF 61.

.2 Approved cementitious crystalline waterproofing

.1 Xypex Concentrate.

.2 Equivalent as approved by CA.

2.4 BONDING AGENTS

.1 Bonding agents shall conform to ANSI/NSF 61.

.2 Cement bonding slurry be made of a 1:1 ratio of Portland cement to fine aggregate by weight with sufficient water to form a cream like consistency.

2.5 NON-SHRINK GROUT

.1 Non-shrink grout shall conform to ANSI/NSF 61.

.2 Non-shrink grout shall be:

.1 MasterFlow 928 as manufactured by BASF Group.

.2 Equivalent as approved by addendum.

Part 3 Execution

3.1 AREAS OF REPAIR

.1 Contractor will delineate and mark delaminated areas on the concrete surface using hammer sounding techniques and/or by chain dragging.

.2 Repair procedures for concrete repairs are to follow the instructions on the contract Drawings.

.3 Soffit delamination repairs will be broken through from above except where directed by the City Representative.

3.2 SHORING

.1 Design the shoring to safely support the loads it will be subjected to during construction. The shoring shall be designed by a Professional Engineer registered in the Province of Ontario and experienced in shoring design. Shoring installation shall be reviewed by the City Representative prior to commencement of any concrete removal.

.2 Shoring shall be installed in accordance with the reviewed shop drawings. Ensure that all installed shores are vertically plumb and snug at all times.

3.3 FORMWORK

.1 The Contractor shall construct all formwork including shoring and bracing to resist loads due to the weight of wet concrete, self-weight of forms and fluid pressure of concrete and to the requirements of CAN3-A23.1.

.2 Formwork shall be constructed with joints sufficiently tight to prevent leakage of grout or concrete. The edges of all plywood sheets shall be backed or supported to prevent separation or opening.

3.4 DELAMINATED CONRETE REMOVAL

.1 No larger than 14 kg class chipping hammers shall be used for removal of concrete cover to reinforcing steel. No larger than 7 kg class chipping hammers shall be used for removal of concrete around and behind reinforcing steel.

.2 The concrete in the repair area shall be removed until sound concrete is reached or to a minimum depth of 25 mm below the reinforcing steel. Concrete shall not be removed beyond this limit except where authorized by the City Representative.

.3 Chipping shall extend along all reinforcing bars to the point where the exposed bars are free of heavy rust.

.4 Upon completion of initial chipping, the concrete surface immediately surrounding the repair area should be sounded for local delamination. Chip additional delaminated areas as required.

.5 The perimeter of the patches shall be saw cut to a minimum of 13 mm (1/2") deep to provide a vertical surface.

.6 Contractor responsible to protect existing conduits and equipment that may be struck by debris and or equipment in their work area

3.5 CONCRETE PATCH REPAIRS

.1 Concrete patches are to be filled with approved proprietary patch materials or concrete, Method of placement shall be approved by the CA

.2 New reinforcing steel or wire mesh is to be secured to existing reinforcing steel or to corrosion resistant anchors set into the concrete with galvanized wire. Maximum spacing of such anchors is 300mm. Anchors to be capable of resisting a pull out force of 1.0 kN

.3 Bonding agent to be applied to repair area and existing reinforcing steel prior to placement or repair material. Proprietary bonding agents shall be applied according to the manufacturers instructions

.4 Surface and ambient temperature restrictions shall be maintained by proper warm or cold weather protection methods.

3.6 ABRASIVE BLAST CLEANING

.1 The reinforcement shall be sandblasted to SSPC-SP10 (near-white blast cleaning). The Contractor must ensure that adequate precautions are undertaken to protect the surrounding environment from damage resulting from blast cleaning operations.

3.7 SURFACE PREPERATION

.1 Roughen smooth surfaces of existing concrete against which new concrete or patch material is to be placed to a minimum depth of 6 mm

.2 Existing reinforcing steel shall be cleaned by wire brush, mechanical means, and/or water blast to remove corrosion product and other contaminants

.3 Remove dust, particles, laitance, oil, grease, debris and other contaminants from surfaces on or against which new concrete or patch repair material will be placed, using suitable mechanical means and/or water blast.

.4 Surfaces of existing concrete against which new concrete or patch material is to be placed shall be saturated surface dry (SSD) when new concrete or patch material is placed. Contractor to use potable water. Use of process water will result in rejected concrete.

.5 The approved bonding agent shall be applied to the concrete surface prior to the placement of the repair mortar. The bonding agent shall be scrubbed into the surface, fully filling all voids and irregularities.

3.7 CONCRETE PLACEMENT

.1 Provide 20 mm x 20 mm chamfers at all exposed edges unless noted otherwise

.2 Verify that cast in place accessories, inserts and reinforcement are set in the proper location and elevation, and are not disturbed during concrete placement.

.3 Apply concrete mix when bonding agent is still wet. If bonding agent is allowed to dry, then an additional coat of bonding agent will be required. Pencil vibrators shall be used for consolidation.

.4 All aggregates shall be handled to prevent segregation and inclusion of any foreign substances, and to obtain uniformity of materials.

.5 Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement. Concrete not to be dropped more than 2m for placement. Contractor to use an elephant trunk style chute if required.

.6 The rate of delivery of concrete during concreting operations shall be such that the development of cold joints will not occur.

.7 Concrete shall be compacted thoroughly and uniformly to obtain a dense, homogeneous structure, free of cold joints, fill planes, voids and honeycombing.

.8 Carefully vibrate concrete around conduits, waterstops and other embedded items to ensure intimate contact.

3.8 PRESSURE GROUTING

.1 Apply grout in accordance with the manufacturers recommended. If bonding agent is allowed to dry then an additional coat will be required.

.2 The non-shrink grout shall be mixed and placed in accordance with the manufacturer's recommendations.

3.9 FINISHING

.1 Finish concrete in accordance with CAN/CSA-A23.1

.2 Repair surfaces shall be finished to the same level as the surrounding surfaces unless instructed otherwise.

3.10 FINISHING FORMED SURFACES

.1 Remove face formwork as soon practical to facilitate repair of surface defects. Surface defects include formwork tie holes, bug holes with nominal diameter or depth greater than 6 mm, honeycombing, fins, projections, irregularities, offsets, spalled corners, and other defects

.2 Avoid damaging edges and corners. Cut formwork ties 25 mm from surface of concrete. Fill depressions and bug holes with approved repair mortar

.3 Grind smooth fins, irregularities, projections and offsets including those at visible construction joints. Where irregularities and offsets cannot be remedied by grinding, chip concrete surfaces sufficiently deep and apply thoroughly bonded approved repair mortar.

.4 Repair localized areas of honeycombing as localized concrete repairs, where approved by the Contract Administrator. Remove a minimum depth of 25 mm of concrete.

3.10 FINISHING CONCRETE SLABS

.1 Initial finishing operations consist of placing, consolidating and screeding, followed by straight edge, bull floating and darbying. Complete leveling and

.2 After initial finishing and floating, trowel surface with steel hand or power trowel in accordance with CSA A23.1. Leave surface smooth, dense, of fine uniform texture and free of blemishes.

.3 Do not use power trowel when concrete has not attained necessary set to allow finishing. Do not introduce high and low spots in slab during trowelling

.4 Slab finish classification shall be Class A, unless otherwise approved by the Contract Administrator.

3.11 CURING

.1 Cure concrete in accordance with CAN/CSA-A23.1. Contractor to provide proper cold weather curing methods when temperatures are below 5c or expected to be so in the next 24 hours

.2 Contractor to provide proper warm weather curing methods when temperature is above 25c or expected to be so in next 24 hours

.3 Concrete showing sings of freezing or excessive cracking from rapid drying will be rejected and replaced at the contractors own cost

3.12 QUALITY ASSURANCE

.1 Ready mix concrete supplier to be a certified member in good standing with the local Ready Mix Concrete Association

.2 The Contract Administrator will arrange and pay for quality assurance testing of concrete including compressive strength testing, slump and air testing

.3 Sampling and testing to be in accordance with CSA A23.2

.4 Provide access, concrete samples and facilities on site for housing of test cylinders

.5 Provide concrete for one air test, 1 slump test and 4 cylinders for each $30m^3$ of each class on concrete placed on a given day. Minimum of one test if total is under $30m^3$

.6 If an air test falls outside the allowable limit, provide concrete for another sample. If the second test falls outside the limit, provide air tests for each load until control as been re-established, at the discretion of the contract administrator

.7 When measured slump or air content falls outside of the required limits, provide concrete for a check test on another sample from the same load. If the second test fails, the truck load of concrete will be considered to have failed the requirements and is to be removed from site.

3.13 FIELD QUALITY CONTROL

.1 Inspection and testing of the concrete and concrete material will be carried out by a designated testing laboratory and in accordance with CAN/CSA A23.1 and as directed by the City. The cost of the testing will be paid under a cash allowance.

END OF SECTION 03 70 00

Part 1 eneral

1.1 REFERENCES

.1 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.2 Material Safety Data Sheets (MSDS).

1.2 QUALIFICATIONS

.1 The contractor performing the work under this section shall:

.1 Have adequate equipment and skilled personnel to expediently complete this work.

.2 Approved systems must be capable of adequately performing on all the specified surfaces and shall be applied in strict accordance with the instructions provided by the manufacturer.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

.2 Materials shall be kept dry and protected from damage, weather and deterioration at all times. Store materials in warm and dry areas.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.5 WARRANTY

.1 The sealant shall be guaranteed with a written warranty to be free of defects in workmanship and materials for a period of two (2) years from the date of completion of this contract as certified by the City Representative.

.2 Any repair required under the warranty will be carried out in accordance with the recommendations of the City Representative.

Part 2 Products

2.1 SEALANTS

.1 Sealants shall conform to the requirements of ANSI/NSF 61.

.2 Colours to be approved by the City.

.3 Sealants shall be:

.1 Sikaflex-1a as manufactured by Sika Canada Inc.

.2 Equivalent as approved by addendum.

2.2 BACK-UP MATERAILS

.1 Back-up materials shall be an extruded closed cell foam backer rod. Size shall be oversize by 30 to 50%.

2.3 Primer

.1 Primer shall be as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup:

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION 07 92 10