Request for Tender
RFT 19-146

Corridor Ceiling Abatement & Fireproofing
(HVAC Renovations – Phase I)
At
Oakwood Public School

Closing Date: June 12, 2019
Closing Time: 2:00 p.m.
Sealed RFTs will be received in the Main Reception Area Tender Box on or before 2:00 p.m., Eastern Daylight Time

Late, Facsimile Bids or E-mailed Bids will not be considered

May 22, 2019
Amanda Chatelaine
Senior Officer – Purchasing
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Form of Tender – 3 pages
Bonding Information – as required attached to Form of Tender
Appendix A – Declaration Signature Sheet – 1 page
Appendix B – Submission Label – 1 page
Appendix C – Approved List of Sub-Contractors – 2 pages
Scope of Work – 3 pages

Drawings & Specifications:
   Architectural Drawings – 4 Pages
   Mechanical Drawings – 2 Pages
   Electrical Drawings – 5 Pages
   Architectural, Mechanical & Electrical Specifications – 72 Pages
   Asbestos Abatement Specifications – 39 Pages
   Designated Substances and Hazardous Materials Survey – 37 Pages
Part A – Outline and Instructions

1. Introduction and Board Profile

The Halton District School Board is composed of approximately 104 school locations (86 elementary and 18 secondary schools). These locations service approximately 64,300 regular day school students (Junior Kindergarten to Grade 12). The Board employs approximately 6,600 employees. Please visit our website http://www.hdsb.ca for additional information.

2. General Terms of the RFT

The Halton District School Board, hereinafter referred to as HDSB, is seeking qualified Contractors to complete the corridor ceiling abatement and fireproofing at Oakwood Public School, located at 357 Bartos Drive, Oakville, Ontario, in accordance with the drawings and specifications provided. Specific details of the RFT are to be found in Appendix D - Scope of Work at the end of the document.

The Bidder must submit a Bid Bond in the value of ten percent (10%) of the Total Cost and a Surety Consent in favour of the Halton District School Board. The Surety Consent shall cover a Performance Bond and a Labour & Materials Payment bond, each in the amount of fifty percent (50%) of the contract price as a guarantee that the Bidder shall execute the contract upon award.

The Bid Security so submitted shall be irrevocable and valid for 90 from closing date set for the submission of tender.

In order to be considered for award, the Bidder shall submit as part of their Submission, a Surety Consent, completed by a Bonding Company. Any others will not be accepted.

Upon receipt of written notice from the Halton District School Board that it has been awarded the Contract, the successful Bidder shall provide, within five (5) working days of such notice, an original Performance Bond and a Labour and Material Payment Bond, each for the amount of fifty per cent (50%) of the total lump sum price, to guarantee the performance of all obligations of the Contract.

3. RFT Closing Information

Bidders must submit their Submission 1 hard paper copy on or before 2:00 p.m., Eastern Daylight Time on June 12, 2019 (the “Closing Time”) to the following address:

Halton District School Board
2050 Guelph Line
Burlington, Ontario L7P 5A8
Main Reception, Tender Box
Attention: Amanda Chatelain
To ensure consideration of your Submission it must be delivered and placed in the tender box prior to the Closing Time. The Declaration Signature Sheet (Appendix A) must be signed in the space(s) provided, in ink, in longhand, by a person who is authorized by the Bidder to bind the Bidder. **ANY UNSIGNED RESPONSE MAY BE DECLARED INVALID.**

The HDSB will not take responsibility for Submissions delivered to the HDSB but not submitted to the tender box in time. Submissions delivered after the date and time specified will not be considered, and will be returned unopened. Submissions delivered to an address other than as specified will not be considered. Fax and e-mail responses will not be considered. Notwithstanding anything to the contrary contained in any applicable statute relating to electronic documents transactions, including the Electronic Commerce Act, 2000, S.O. 2000, c. 17, any notice, submission, statement or other instrument provided in respect of the RFT may not be validly delivered by way of electronic communication, unless otherwise provided for in this RFT.

In the event the HDSB Board Office is closed due to inclement weather (or any other reason) on the Closing Date of this RFT, the Closing Date will be changed to the next business day. The Closing Time on the next business day will remain the same.

**4. Accuracy of Information/Liability for Errors or Omissions**

While the HDSB has used considerable efforts to ensure an accurate representation of information in this document, the information contained in it is supplied solely as a guideline for Bidders. Any data contained in this RFT or provided by way of Addenda are estimates only and are for the sole purpose of indicating to the Bidder the general size of what is being requested hereunder. The information is not guaranteed or warranted to be accurate by the HDSB, nor is it necessarily comprehensive or exhaustive. Nothing in this document is intended to relieve Bidders from forming their own opinions and conclusions with respect to the matters addressed in this RFT. It is the Bidder’s responsibility to avail itself of all the necessary information to prepare a Submission in response to this RFT.

**5. Communication After RFT Issuance**

All Communications regarding any aspect of this RFT must be emailed to the following RFT Purchasing Contact:

Name: Amanda Chatelaine  
Title: Senior Officer - Purchasing  
Email: chatelaina@hdsb.ca

Bidders that fail to comply with the requirement to direct all communications to the RFT Authority may be disqualified from this RFT process. Without limiting the generality of this provision, Bidders shall not communicate with or attempt to communicate with the following as it relates to this RFT:
• any employee or agent of the HDSB, other than the RFT Purchasing contact;
• any member of the HDSB governing body including, without limitation, the
director, officers, trustees, superintendents, and any advisors thereto;

Bidders shall promptly examine this RFT and all Appendices, including the Form of Tender, and:

• shall report any errors, omissions or ambiguities; and
• may direct questions or seek additional information on or before the Deadline for Questions to the RFT Purchasing contact.

It is the responsibility of the Bidder to seek clarification, by submitting questions to the RFT Purchasing Contact, on any matter it considers to be unclear. The HDSB shall not be responsible for any misunderstanding on the part of the Bidder concerning this RFT or its process.

In the event a Bidder has any reason to believe that an error, omission or ambiguity exists, the Bidder must notify the RFT Purchasing Contact in writing prior to submitting a Proposal.

If appropriate, the RFT Purchasing Contact will then clarify the matter for the benefit of all Bidders by publication on the same public platform, its website or by notice to Bidders who have requested a copy of this RFT in the same manner as set out in section 6 below.

In answering a Bidder’s questions, the HDSB will set out the question, without identifying the Bidder that submitted the question, and the HDSB may in its sole discretion:

• edit the question for clarity;

• answer similar questions from various Bidders only once.

Where an answer results in any change to the RFT, such answer will be formally evidenced through the issue of a separate addendum for this purpose.

6. Addenda

If the HDSB for any reason, determines that it is necessary to provide additional information relating to this RFT, such information will be communicated to all Bidders by addendum in the same manner the RFT was communicated. Each Addendum shall form an integral part of this RFT. This RFT may only be amended in accordance with this section.
All questions related to this Tender must be submitted in writing to the Purchasing Contact prior to 2 p.m. on June 3, 2019. Any addendum will be posted no later than June 5, 2019.

Any amendment or supplement to this RFT made in any other manner will not be binding on the HDSB.

All Addenda shall become an integral part of this RFT and shall be incorporated into any content. Each Bidder shall be responsible for verifying before depositing its Proposal that it has received all Addenda that have been issued.

7. Planned Schedule of Events – Project Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release of RFT</td>
<td>May 22, 2019</td>
</tr>
<tr>
<td>Mandatory Pre-bid Meeting</td>
<td>May 29, 2019</td>
</tr>
<tr>
<td>Deadline for Questions (2:00 p.m. on date noted)</td>
<td>June 3, 2019</td>
</tr>
<tr>
<td>Issuance of Final Addendum</td>
<td>June 5, 2019</td>
</tr>
<tr>
<td>RFT Closing</td>
<td>June 12, 2019</td>
</tr>
<tr>
<td>Project Timelines for Completion</td>
<td>August 31, 2019</td>
</tr>
</tbody>
</table>

8. Bidder’s Costs

Bidders shall bear all costs and expenses incurred relating to any aspect of its participation in this RFT process, including all costs and expenses relating to the Bidder’s participation in:

- the preparation, presentation and receipt of its Submission;
- the Bidders attendance at any meeting in relation to the RFT process, including any presentation or interview;
- the conduct of any due diligence on its part, including any information-gathering activity;
- the preparation of the Bidder’s own questions prior to the Deadline for Questions; and
- any discussion and/or finalization, if any, in respect of the Form of Agreement.
9. Bidding Format

Unless otherwise specified in these RFT documents or the final contract entered into between the HDSB and the successful Bidder, responses shall be for a stipulated sum without escalator clauses or other qualifications (when applicable). Bidders submitting a bid with escalator clauses or other qualifications that are not in accordance with the terms and conditions of this RFT may have their bid rejected.

All information entered on this RFT document must be type written or entered in ink. No pencil entries will be accepted. Erasure(s), overwriting or strike-out(s) must be initialed in ink by the person signing this Submission.

Respondents will use the following format for their submission:

- Form of Tender (complete form must be included with your submission, including bonds and any other information as may be required herein)
- Appendix A - Signed Declaration Sheet (must be included with your submission)
- Appendix B – Submission Label (must be affixed to the outside of your submission)

10. Pricing

Please do not add tax to base (unit) price. (when applicable). Early payment discounts may be considered part of the Submission. Credit Card payment acceptance may be considered part of the Submission.

11. Subcontractors

The Contractor agrees to preserve and protect the rights of the parties under the contract with respect to work performed under subcontract, and shall:

- enter into contracts or written agreements with their subcontractors to require them to perform their work in accordance with and subject to the terms and conditions of the contract. Further, the Contractor shall be fully responsible to the Owner for acts and omissions of their subcontractors and of any persons directly or indirectly employed by them as for acts and omissions of persons directly employed by them.
- therefore agree that they will incorporate the terms and conditions of the Contract Documents into all Subcontractor Agreements they enter into with their subcontractors.
The HDSB reserves the right, at its discretion to waive the requirement to utilize the mandatory list of pre-qualified sub-trades at any time during the tendering process based on market conditions.

12. **Mandatory Site Meeting (or Information Session, if required)**

There will be a **Mandatory Site Meeting** starting on May 29, 2019 at the main office of Oakwood Public School. The Mandatory Site Meeting will start at 10:00a.m. and end not later than 11:30a.m.

Bidders must sign in upon their arrival. Bidders arriving after the specified start time will not be permitted to participate in the meeting, will be disqualified from the project, and asked to remove themselves from the site. Failure to be present and to sign in at all site visits will result in the disqualification of your submission.
Part B – Standard Terms and Conditions

13. Scope

Unless otherwise expressly stated these Standard Terms and Conditions form a part of this document and apply in like force to contracts for the purchase of commodities as stated in this document. All Bidders will be bound by the terms and conditions set forth, except as specifically qualified in Special Terms and Conditions issued in connection with this document or any Addenda issued relating to this document.

14. Definitions

As used herein as well as in all RFSQ, RFQ, RFP, RFI, Tender or contract documents issued by the Halton District School Board, the following definitions will apply.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addenda/Addendum</td>
<td>an addition/change made to this document, subsequent to its printing or publication.</td>
</tr>
<tr>
<td>Applicable Law and Applicable Laws</td>
<td>means any common law requirement and all applicable and enforceable statutes, regulations, directives, policies, administrative interpretations, orders, by-laws, rules, guidelines, approvals and other legal requirements of any government and/or regulatory authority in effect from time to time.</td>
</tr>
<tr>
<td>Bid/Submission/Proposal</td>
<td>an offer from a Bidder in response to a Proposal/Tender which is subject to acceptance or rejection.</td>
</tr>
<tr>
<td>Proponent</td>
<td>a legal entity, being a company, partnership or individual who submits a Bid, Proposal, or Submission in response to a formal request for Bid, Proposal, or Submission.</td>
</tr>
<tr>
<td>Board/HDSB</td>
<td>means the Halton District School Board.</td>
</tr>
<tr>
<td>Contract</td>
<td>means the agreement, in writing, governing the performance of the Work and/or the purchase and sale of commodities and includes, without limitation, the document (including standard terms and conditions), Bidder Submission and the written document accepting the Bidder Submission (including any notice of acceptance or award).</td>
</tr>
<tr>
<td>Document</td>
<td>means the document describing the Goods and/or Services to be purchased and the terms upon which the Goods and/or Services are to be purchased and</td>
</tr>
<tr>
<td>Terms</td>
<td>Definitions</td>
</tr>
<tr>
<td>------------------------------</td>
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</tr>
<tr>
<td>includes, without limitation</td>
<td>those documents referenced on the index of the document and such Addenda as may be issued by the HDSB.</td>
</tr>
<tr>
<td>Goods or Services</td>
<td>product and/or any and all labour, vehicles or equipment used by a Bidder in fulfilling a Contract.</td>
</tr>
<tr>
<td>HST</td>
<td>means Harmonized Sales Tax.</td>
</tr>
<tr>
<td>Intellectual Property</td>
<td>means any trademark, copyright, moral right, patent, industrial design, trade name, domain name, trade secret, know how, integrated circuit topography or other intellectual property, industrial property or proprietary right owned by, licensed to, or used by any third person.</td>
</tr>
<tr>
<td>Mandatory Requirement</td>
<td>a minimum requirement – where the words “mandatory”, “must”, “required”, “shall” and/or “will” are referenced in this document and such requirement is identified as a Mandatory Requirement. Failure to comply will deem the submission non-compliant and the bid/submission will be disqualified.</td>
</tr>
<tr>
<td>Proposal/RFP</td>
<td>a sealed written offer to supply Goods and/or Services of any value, acceptance of which may be subject to negotiation.</td>
</tr>
<tr>
<td>Quotation/RFQ</td>
<td>a written offer to supply Goods and/or Services with a value that is less than $100,000.</td>
</tr>
<tr>
<td>Response</td>
<td>the package submitted by a Bidder in response to an RFP or RFT.</td>
</tr>
<tr>
<td>Specifications</td>
<td>those stated requirements for the Goods and/or Services set out in the document.</td>
</tr>
<tr>
<td>Subcontractor</td>
<td>a person, firm or corporation having a direct contract with the contractor to perform a part or parts of the Work, or to supply Goods worked to a special design according to the contract documents, but does not include one who merely supplies Goods not so worked.</td>
</tr>
<tr>
<td>Tender/RFT</td>
<td>a sealed written offer to supply Goods and/or Services with a value that is greater than $100,000.</td>
</tr>
<tr>
<td>Bidder Submission</td>
<td>means the document as completed by the Bidder for the purpose of offering to sell to the HDSB the services and/or goods specified in the document, and includes</td>
</tr>
</tbody>
</table>
but is not limited to Quotations, Tenders and Proposals.

| Work | means the Work to be undertaken by the Bidder pursuant to the provisions of the Contract. |

**15. Reserved Rights of the HDSB**

The HDSB reserves the right to:

(a) make public the names of any or all Bidders;

(b) request written clarification or the submission of supplementary written information in relation to the clarification request from any Bidder and incorporate a Bidder’s response to that request for clarification into the Bidder’s Submission;

(c) assess a Bidder’s Submission on the basis of:

   (i) a financial analysis determining the actual cost of the Submission when considering factors including quality, service, price and transition costs arising from the replacement of existing goods, services, practices, methodologies and infrastructure (howsoever originally established);

   (ii) information provided by references;

   (iii) the Bidder’s past performance on previous contracts awarded by the HDSB;

   (iv) the information provided by a Bidder pursuant to the HDSB exercising its clarification rights under this RFT process; or

   (v) other relevant information that arises during this RFT process;

(d) waive formalities and accept Submissions that substantially comply with the requirements of this RFT;

(e) verify with any Bidder or with a third party any information set out in a Submission;

(f) check references other than those provided by any Bidder;

(g) disqualify any Bidder whose Submission contains misrepresentations or any other inaccurate or misleading information;

(h) disqualify any Bidder or the Submission of any Bidder who has engaged in conduct prohibited by this RFT;
(i) disqualify a Bidder for any conduct, situation or circumstance that constitutes a Conflict of Interest, as solely determined by the HDSB and at any time.

(j) make changes, including substantial changes, to this RFT, provided that those changes are issued by way of addenda in the manner set out in this RFT;

(k) select any Bidder other than the Bidder whose bid reflects the lowest cost to the HDSB;

(l) review all Bidders utilizing the HDSB Vendor Performance Management Administrative Procedure, which can include suspension of Bidders who fail the meet the HDSB’s expectations or who are involved in litigation or threatened litigation against HDSB. The HDSB Vendor Performance Management Administrative Procedure is found at the attached link (www.hdsb.ca/our-board/Policy/VendorPerformanceManagement.pdf)

(m) award to one or more bidders according to their requirements;

(n) cancel this RFT process at any time and for any or no reason;

(o) cancel this RFT process at any stage and issue a new RFT for the same or similar deliverables;

(p) accept any Submission in whole or in part; or

(q) award to multiple bidders if circumstances are warranted;

(r) reject any or all Submissions;

(s) to limit the number of pre-qualified Bidders eligible to submit proposals for any future projects. HDSB shall not be obligated to provide all pre-qualified Bidders with the same opportunity to bid on all future projects within each stated category. By participating in this RFT, Bidders acknowledge that there is no guarantee that a Bidder will receive any assignments, work or projects and that there is no expectation that any specified number of projects will be made available during the pre-qualification term;

and these reserved rights are in addition to any other express rights or any other rights that may be implied in the circumstances.

In addition, the HDSB reserves the right at any time during normal business hours, and as often as the HDSB may deem necessary, to examine, the successful Bidder’s records with respect to the successful Bidder’s services under the Bidder’s purchase order and/or Submission and any Contract. The successful Bidder shall permit the HDSB to audit, examine, and make copies, excerpts or transcripts from such records, and to make audits of data relating to matters covered by a Submission, any purchase
order and/or any Contract. The successful Bidder shall maintain and retain all records and other documents related to a Submission, any purchase order, and/or any Contract for a period of seven (7) years from the date of final payment, except in cases where unresolved audit questions require a longer period of time for resolution, as determined by the HDSB.

**16. Litigation with the HDSB**

The HDSB may, in its absolute discretion, reject a Submission submitted by a Bidder prior to or after a Submission opening, if the Bidder:

(a) is or has in the past 10 years been a party to litigation with the HDSB; or

(b) directly or indirectly, including by common ownership or control or otherwise, is related to a party currently in litigation with the HDSB or a party that has in the past 10 years been in litigation with the HDSB; or

(c) intends to use a subcontractor in respect of a specific project who is, or has in the past 10 years been a party to litigation with the HDSB, or who is related to a party currently in litigation with the HDSB or a party that has in the past 10 years been in litigation with the HDSB.

For the purposes hereof, the phrase “litigation with the HDSB” includes cases in which the Bidder or prospective Bidder or any of the parties named above, has advised the HDSB in writing of their intention to commence litigation, or have commenced or have advised the HDSB of their intention to commence an arbitral proceeding against the HDSB (excepting only construction lien demands, notices or proceedings or arbitrations under O. Reg 444/98 of the Education Act).

In determining whether or not to exercise its discretion as set out herein, the HDSB will consider whether the litigation (past or current) is likely to affect a Bidder’s ability to work with the HDSB, its consultants and representatives, and whether the HDSB’s experience with the Bidder, the related party or subcontractor, as the case may be, in the matter giving rise to the litigation, indicates that the HDSB is likely to incur increased staff and legal costs in the administration of the Contract if it is awarded to the Bidder.

**17. Accessibility for Ontarians with Disabilities (AODA)**

The HDSB is committed to accessibility and preventing and removing barriers for persons with disabilities. Where practicable, the HDSB will incorporate accessibility features and criteria when procuring or acquiring goods, services and facilities, in which case, a Bidder must be capable of recommending and delivering same in an inclusive and accessible manner, consistent with the Ontario Human Rights Code (“OHRC”), the Ontarians with Disabilities Act, 2005 (“AODA”) and its Regulations, in order to achieve accessibility for Ontarians with disabilities. If the HDSB determines that it is impractical to do so an explanation will be provided upon request.
In accordance with Ontario Regulation 429-07 made under the AODA, the HDSB has established policies, practices and procedures governing the provisions of its services to persons with disabilities, which may be found at: https://www.hdsb.ca/our-board/Pages/Accessibility.aspx

18. Ability to Negotiate/Contract Negotiations

The HDSB reserves the right to enter into negotiations with any Bidder as it sees fit, or with another Bidder concurrently. The HDSB will not incur liability to any Bidder as a result of these negotiations.

The HDSB may, prior to and after Contract award, negotiate changes to the specifications, the type of materials or any conditions with the successful or preferred Bidder or one or more of the Bidders without having any duty or obligation to advise any other Bidder or to allow them to vary their bid prices as a result of such changes, and the HDSB shall have no liability to any other Bidder as a result of such negotiations or modifications.

19. Agree to Abide by the Established Process

It is vital to the HDSB that the process leading to the recommendation of a bidder(s) and the conclusion of an agreement for the provision of these services be, and be seen to be, open and fair and that each of the respondents is treated equally.

No respondent can be seen to be deriving, intentionally or otherwise, an advantage or information, which is not equally available to all other respondents. Nor is it acceptable that any advantage or information be sought or obtained from any unauthorized staff or representative of the HDSB, or any benefit derived from any special or personal relationships or contacts.

All communications, including requests for information, between respondents to this RFT and the HDSB should be between only the representative(s) of the HDSB who has been authorized and designated for that particular purpose. Bidders must not rely on information from any other source.

20. Assignment

Unless otherwise stated in this document, it is mutually agreed and understood that the successful Bidder will not assign, transfer, convey, sublet or otherwise dispose of the Contract (in whole or in part) or the right, title or interest therein, or the Bidder’s power to execute such contract to any other person, firm, company or corporation without the previous written consent of the HDSB. Any act in derogation of the foregoing shall be null and void. For the purposes hereof, the transfer or issuance of shares by a Bidder of more than fifty (50%) percent of the voting securities of a Bidder to any third party other than to an affiliate (as such term is defined in the Business Corporations Act (Ontario)) or the shareholder or shareholders of the Bidder as of the Closing Date, whether or not
such transfer or issuance of voting securities takes place in one or more transactions, shall, for the purposes of this Agreement, be deemed to be an assignment of the Contract requiring the consent of the HDSB, unless such transfer or issuance of shares is made pursuant to an initial public offering of common shares under the Securities Act (Ontario).

21. Award

The final award will be based on (but not limited to) the best value for money and quality service delivery from a Bidder who complies with the provisions of this Submission solicitation, including specifications, contractual terms and conditions, who can reasonably be expected to provide satisfactory performance on the proposed Contract based on reputation, references, performance on previous contracts, and sufficiency of financial and other resources, and provides a solution that is a fit with the HDSB’s requirements. The lowest price or bid shall not be the sole, determinative factor.

22. Breaking a Tie

In the event of a tie score, the HDSB will resolve same based on the earlier date/time stamp of when the bid was received by HDSB in accordance with this RFT.

23. Change Orders

A change order results when unforeseen conditions are identified from the original scope of work (Contract or Purchase Order) and is inextricably tied to the original scope.

The following steps should occur prior to issuance of a change order that does not originate from HDSB senior management:

- appropriate HDSB approval must be acquired prior to modifying any Contract or Purchase Order
- appropriate written HDSB approval must be obtained prior to commencing the work.

All requests or recommendations for Change Orders shall include the impact to both price and schedule for the work to be performed. HDSB shall have the right to retain consultants or experts to help identify the need or to verify the impact of the change order on the project.

No change in the work shall proceed without the written approval of the Owner. Any change shall be initiated by Owners "WORK ORDERS" which shall bear the change cost and the Contractor’s and Owner’s representative’s signatures as an instruction to proceed. All changes shall be restricted to five percent (5%) overhead and five percent (5%) profit applied to the labour and material cost.
24. Conflict of Interest

For the purposes hereof, “Conflict of Interest” includes:

(a) in relation to the Submission process, the Bidder has an unfair advantage or engaged in conduct, directly or indirectly, that may give the Bidder an unfair advantage, including:

   (i) having or having access to information in the preparation of the Submission that is confidential to the HDSB and not available to other Bidders;

   (ii) communicating with any person with a view to influencing preferred treatment in the Submission process; or

   (iii) engaging in conduct that compromises or could be seen to compromise the integrity of the open and competitive process and render that process non-competitive and unfair; or

(b) in relation to the performance of the Work, services or contractual obligations, the Bidder’s other commitments, relationships or financial interests:

   (i) could or could be perceived to exercise an improper influence over the objective, unbiased and impartial exercise of the Bidder’s independent judgments; or

   (ii) could or could be perceived to compromise or impair or be incompatible with the effective performance of the Bidder’s work, services or contractual obligations.

The Bidder shall:

(a) avoid any Conflict of Interest in the Submission process and in the performance of its contractual obligations;

(b) disclose to the HDSB without delay any actual or potential Conflict of Interest that arises during the Submission process or during the performance of its contractual obligations; and

(c) comply with any requirements prescribed by the HDSB to resolve any Conflict of Interest.

In addition to all other contractual rights or rights available at law or in equity, the HDSB may immediately disqualify a Submission or terminate the Contract upon giving notice to the Bidder where:
(a) the Bidder fails to disclose an actual or potential Conflict of Interest;

(b) the Bidder fails to comply with any requirements prescribed by the HDSB to resolve a Conflict of Interest; or

(c) the Bidder’s Conflict of Interest cannot be resolved.

This paragraph shall survive any termination or expiry of the Contract.

25. HDSB Confidential Information

For the purposes hereof, “HDSB Confidential Information” means all information of the HDSB that is of a confidential nature, including all confidential information in the custody or control of the HDSB, regardless of whether it is identified as confidential or not, and whether recorded or not, and however fixed, stored, expressed or embodied, which comes into the knowledge, possession or control of the Bidder in connection with the Contract. For greater certainty, HDSB Confidential Information shall:

(a) include:

(i) all new information derived at any time from any such information whether created by the HDSB, the Bidder or any third party;

(ii) all information (including Personal Information) that the HDSB is obliged or has the discretion not to disclose under provincial or federal legislation or otherwise at law; but

(b) not include information that:

(i) is or becomes generally available to the public without fault or breach on the part of the Bidder of any duty of confidentiality owed by the Bidder to the HDSB or to any third party;

(ii) the Bidder can demonstrate to have been rightfully obtained by Bidder without any obligation of confidence, from a third party who had the right to transfer or disclose it to the Bidder free of any obligation of confidence;

(iii) the Bidder can demonstrate to have been rightfully known to or in the possession of the Bidder at the time of disclosure, free of any obligation of confidence when disclosed; or

(iv) is independently developed by the Bidder;

but the exclusions in this subparagraph shall in no way limit the meaning of Personal Information or the obligations attaching thereto under the Contract or at law.

During and following the term of the Contract, the Bidder shall:
(a) keep all HDSB Confidential Information confidential and secure;

(b) limit the disclosure of HDSB Confidential Information to only those of its directors, officer, employees, agents, partners, affiliates, volunteers or subcontractors who have a need to know it for the purpose of carrying out its obligations under the Contract and who have been specifically authorized to have such disclosure;

(c) not directly or indirectly disclose, destroy, exploit or use any HDSB Confidential Information (except for the purpose of carrying out its obligations under the Contract or except if required by order of a court or tribunal), without first obtaining:

(i) the written consent of the HDSB; and

(ii) in respect of any HDSB Confidential Information about any third party, the written consent of such third party;

(d) provide HDSB Confidential Information to the HDSB on demand; and

(e) return all HDSB Confidential Information to the HDSB before the end of the Term, with no copy or portion kept by the Bidder.

26. Criminal Background Checks

The Bidder acknowledges that the HDSB must be in compliance with Regulation 521/01 of the Education Act (Ontario) - Collection of Personal Information with respect to criminal background checks and offence declarations. The Bidder covenants and agrees to assist the HDSB in complying with same by providing the HDSB, or such other entity as the HDSB may designate, with a criminal background check covering offences under the Criminal Code, the Narcotics Control Act, and any other offences which would be revealed by a search of the automated Criminal Records Retrieval System maintained by the RCMP or, in instances where the Bidder will have access to or is responsible for minors or vulnerable persons, a Vulnerable Persons Clearance certificate in addition to the above (“Criminal Background Check”), together with an Offence Declaration in HDSB approved form, for every individual or employee of the Bidder who may come into direct contact with students on a regular basis at a school site of the HDSB, or who may have access to student information.

For the purposes of this document, the HDSB shall determine in its sole and unfettered discretion whether an individual or employee of the Bidder may come into direct contact with students on a regular basis or may have access to student information. The Bidder agrees to indemnify and save harmless the HDSB from all claims, liabilities, expenses, and penalties to which it may be subjected on account of the Bidder’s failure to provide a Criminal Background Check and an Offence Declaration, as aforesaid. This indemnity shall survive the expiration and sooner termination of the Contract. In addition, and notwithstanding anything else herein contained, if the Bidder fails to provide a Criminal
Background Check and an Offence Declaration for an individual or employee of the Bidder who may come into direct contact with students on a regular basis at a school site of the HDSB or who may have access to student information, then the HDSB shall have the right to forthwith terminate the Contract without prejudice to any other rights which it may have in the Contract, in law or in equity.

27. Debrief

The HDSB, at the written request of a Bidder will conduct a debriefing. Bidders must submit their request within sixty (60) days of Contract award notification. The HDSB will only identify any weaknesses or strengths in the Bidder's submission. No information regarding other Bidders' submissions will be disclosed. The intent of the debriefing information session is to assist a Bidder in presenting a better Submission in subsequent procurement opportunities. Any debriefing provided is not for the purpose of providing any opportunity to challenge the procurement process.

28. Dispute Resolution

In the event that a Bidder wishes to review the decision of the HDSB in respect of any material aspect of the RFT process, and subject to having attended a debriefing, the Bidder shall submit a protest in writing to the RFT Authority within ten (10) days from such a debriefing.

Any request that is not received in a timely manner will not be considered, and the Bidder will be notified in writing.

A protest in writing shall include the following:

(a) a specific identification of the provision and/or procurement procedure that is alleged to have been breached;

(b) a specific description of each act alleged to have breached the procurement process;

(c) a precise statement of the relevant facts;

(d) an identification of the issues to be resolved; and

(e) the Bidder’s requested remedy.

For the purpose of a protest, the HDSB will review and address any protest in a timely and appropriate manner. HDSB’s decision in this regard is final.
29. Environmental Statement

The Board, when practically and financially feasible, will consider the acquisition of goods and services that will reduce the environmental footprint of the Board.

30. Force Majeure

Delays in or failure of performance by either party under the Contract shall not constitute default thereunder or give rise to any claim for damages if caused by occurrences beyond the control of the party affected, including but not limited to, decrees of Governments, acts of God, fires, floods, riots, wars, rebellion, sabotage, and atomic or nuclear incidents. Lack of finances, strikes, lockouts or other concerted acts by workers shall not be deemed to be a cause beyond a party’s control.

In the event that performance of the Contract in the reasonable opinion of either party is made impossible by an occurrence beyond the control of the party affected, then either party shall notify the other in writing. The HDSB shall either terminate the Contract forthwith and without any further payments being made, or authorize the Bidder to continue the performance of the Contract with such adjustments as may be required by the occurrence in question and agreed upon by both parties. In the event that the parties cannot agree upon the aforementioned adjustment, it is agreed by the parties that the Contract shall be terminated.

31. Guarantees and Warranties

All Work shall be done in a good and workmanship like manner. All materials, goods and services must meet the applicable specifications, either by the HDSB, its consultant on the project or the manufacturer. The Bidder warrants and guarantees that all materials, Goods; Services and workmanship will be free from defects and fit for the purpose intended by the HDSB. All Goods delivered by the Bidder must be new, in good working order and of the latest model possessing all accessories standard to the manufacturer’s stock model. The Goods and/or Services must be covered by written guarantees and warranties acceptable to the HDSB.

32. Health & Safety / WHMIS

Bidders and/or contractors must comply with the Occupational Health and Safety Act and its regulations. All Bidder’s contractors and sub-contractors and their respective employees will have received health and safety training appropriate to their trade, and will be able to provide proof thereof to the HDSB upon request. Contractors shall be held responsible for any sub-contractors where such are permissible by the HDSB. The HDSB may request and suppliers/contractors/sub-contractors will provide evidence of such training at any time.

Suppliers/contractors/sub-contractors shall comply with the HDSB policies, programs and procedures at all times while on site. All suppliers/contractors/sub-contractors are
required to sign in upon arrival/exit at a HDSB location prior to beginning and at completion of Work.

Suppliers and/or contractors/sub-contractors shall be held responsible for all fines and/or contraventions of legislation which have been incurred by the HDSB.

As per Ontario regulation 278/05 section 10 (5) the HDSB will provide contractors/sub-contractors performing work in HDSB buildings access to the site specific asbestos inventory. Site specific asbestos inventories are available at each HDSB site. Contractors/sub-contractors shall review the site specific asbestos inventory in relation to the scope of work they are undertaking, prior to the commencement of work. The requirements of the HDSB’s Asbestos Management Administrative Procedure are to be adhered to at all times. A copy of the HDSB’s Asbestos Management Administrative Procedure can be found at:

http://www.hdsb.ca/our-board/Policy/AsbestosManagementInFacilities.pdf.

All Work is subject to prior approval by the appropriate HDSB department.

Contractors shall examine carefully the HDSB’s Asbestos Register for the Work site, in addition to examining existing conditions for suspected Asbestos Containing Materials (ACM), on which completion of Work is dependent.

Upon discovery of unforeseen suspected ACM affecting completion of the Work, the Contractor shall cease any operations that may disturb said materials and notify the Owner immediately. The Contractor shall arrange for removal of ACM affecting completion of Work through a HDSB-approved ACM abatement contractor, and arrange for coordination of testing through HDSB Facility Services, if required.

Contractors shall be responsible for any sub-contractors in their employ with respect to the aforementioned requirements.

33. Indemnification and Liability

The Bidder hereby agrees to indemnify and hold harmless the HDSB, its directors, officers, trustees, employees and agents from and against all liability, loss, costs, damages and expenses (including legal, expert and consultant fees), causes of actions, actions, claims, demands, lawsuits or other proceedings, by whomever made, sustained, incurred, brought or prosecuted if:

(a) resulting from the Bidder’s failure to observe and conform to the standards established by law or by any other association which has established standards recognized by the Province of Ontario;

(b) relating to labour and equipment furnished for the Work; and
(c) involving inventions, copyrights, trademarks or patents, and rights thereto, used in doing the Work and in the subsequent use and operation of the Work or any part thereof upon completion.

34. Insurance and Liability

The successful bidder must indemnify the HDSB from any and all manner of damage or injury, risk, claims, demands, actions, penalties, causes of action, damages and any and all costs arising out of, or incurred by reason of provision of goods and/or services by the bidder. The cost of such insurance will be the responsibility of the Bidder.

The successful bidder(s) will obtain and provide current proof of insurance upon the award, that the successful Bidder will be covered by:

at least Two Million Canadian Dollars (C$5,000,000.00) of comprehensive commercial general liability insurance
for bodily injury, property damage, operations liability, contractual liability and tenant’s legal liability, including umbrella liability insurance covering liability arising from premises, operations, independent contractors, products-completed operations, personal injury and liability assumed under the Contract;

at least One Million Canadian Dollars (C$2,000,000.00) of business automobile liability insurance
and, if necessary, umbrella liability insurance for owned, hired and non-owned vehicles covering bodily injury and property damage: and

With an insurer licensed to carry on business in the Province of Ontario.

In the case of multi-year contracts, a copy of a valid certificate must be provided to the Halton District School HDSB annually thereafter, at least thirty (30) days prior to the anniversary date of the contract commencement date. At commencement of the Contract and throughout the Contract duration, certification shall be submitted on a Certificate of Insurance form with the above-mentioned coverage, thereby protecting the Halton District School Board against claims for property damage and bodily injuries, including accidental death, caused by the successful Bidder(s) or its employees and/or Sub-contractors during the performance of its obligations under the Contract.
The Halton District School Board must be named as additional insured, and the policy must contain a cross liability clause, and thirty (30) day prior notice clause of any cancellation, non-renewal or product change in coverage, terms or conditions. As a condition precedent to contract award, Certificates of all such insurance policies shall be filed with the HDSB by the successful Bidder and shall be subject to the HDSB’s approval as to the adequacy of protection.

All the above-mentioned insurance shall be maintained until the HDSB certifies that the work is complete.
35. Invoicing/Payment/EFT

To ensure that payment is not deferred, the following information shall be on all invoices:

- Bidder’s Name or Business Number, Address, Telephone Number and HST registration number
- Invoice Date
- Invoice Number
- Purchase Order Number, Name of Requester, Shipment Destination
- Name of Halton District School Board staff that issued this order
- Complete Good/Service Description (including hourly rates, service/delivery dates, service location)
- Attach Copy of Service Report/Work Order Completed
- Terms of payment
- Total of HST where applicable
- Total Amount Payable

The HDSB’s method of payment is by Electronic Funds Transfer (EFT). If the Bidder is a new vendor or current vendor who has not previously utilized the EFT payment service or has banking information which has changed, then an “Application of Vendor Direct Deposit” form is required to be completed, which is available through the Purchasing contact for this document. This form along with a voided cheque or letter from the Bidder’s bank should be sent to:

Halton District School Board  
Attention: Accounts Payable Department  
J.W. Singleton Centre,  
PO Box 5005 Stn LCD 1,  
Burlington ON L7R 3Z2 or

electronically to: apeft@hdsb.ca before any invoices are submitted to the HDSB for payment.

Payment terms are Net 28. Early payment discounts may be considered.

36. Irrevocability

The Submission will be open for acceptance by the HDSB and irrevocable by the Bidder for a period of one hundred and twenty (120) calendar days from the Closing Date.
37. Municipal Freedom of Information and Protection of Privacy Act ("MFIPPA")

(a) The Bidder acknowledges and agrees that the HDSB is subject to MFIPPA. The Bidder further expressly acknowledges and agrees that, upon the acceptance of a successful Submission and conclusion of this process (including execution and delivery of the Contract between the HDSB and the successful Bidder), subject to subsection (b) below, the Submission shall not be considered confidential for the purposes of Section 10 of MFIPPA and, in the event of an access request or at the discretion of HDSB, shall be subject to release in its entirety without redaction.

(b) Notwithstanding paragraph (a) above, the Bidder and the HDSB acknowledge and agree that the information listed below is considered to be supplied by the Bidder to the HDSB in confidence:

1. For Services: Hourly rates/fees and information from which such rates/fees could be reasonably deduced.

2. For Goods: Unit costs and information from which such unit costs could be reasonably deduced.

(c) Notwithstanding the foregoing, the Bidder acknowledges and agrees that, because the HDSB is subject to MFIPPA, all or part of any Submission, including information supplied in confidence, may be subject to release in response to an access request submitted pursuant to MFIPPA. In the event that the HDSB receives a request for access to all or part of a Submission supplied in confidence, the HDSB shall deliver the relevant notice to the Bidder, who shall bare all costs, legal or otherwise, with respect to any objection the Bidder may have in respect of the release of any or all parts of the Submission pursuant to MFIPPA.

38. No Guarantee of Work or Exclusivity of Contract

The HDSB makes no guarantee of the value or quality of goods or services or volume of work to be assigned to the successful Bidder. Any Contract executed with a successful Bidder may not be an exclusive Contract for the provision of the requested Goods or Services. Quantity where specified more or less, are estimates of previous consumption and are furnished without liability to the HDSB.

39. Non-Performance/Termination of Contract

If the Bidder delivers substandard, unapproved or defective items, which are rejected by the HDSB, the Bidder agrees to replace these items at the Bidder’s expense with items of a quality deemed acceptable to the HDSB within a 48-hour period of the mutual satisfactory agreement being reached. If the Bidder fails to replace the items within this
48-hour period, the parties agree that the HDSB may purchase substitutes for the rejected items in the open market at no additional cost or liability to the HDSB.

Where at any time the quality of the Goods or Service supplied by the successful Bidder is not of a satisfactory standard, the HDSB may issue a verbal warning outlining the deficiency in supply or other aspects of performance and requiring the successful Bidder to correct those deficiencies within such period of time as stated. If the deficiency is not corrected within the time specified, or having been corrected, there is a further instance of deficient performance, the HDSB may issue a written notice to the successful Bidder, identifying the deficiency in performance and setting a final date or time period for its correction, and advising that if corrective steps are not taken by that date or within that time, the HDSB may terminate the Contract and take corrective action itself.

Until the HDSB is satisfied that the unsatisfactory performance has been corrected, the HDSB may hold back from any payment an amount sufficient to rectify the unsatisfactory performance until its requirements have been met.

The HDSB reserves the right, in its absolute discretion, to terminate a Contract immediately without penalty, costs or damages of any kind whatsoever, where the Bidder has violated any laws or performed any of the following acts while performing work with the HDSB and further reserves the right to take that failure into account with respect to the award of any future contract.

a) over-billing or duplicate billing;
b) splitting of invoices;
c) charging for items not supplied;
d) charging for items not approved prior to invoicing;
e) charging for items of one grade, while supplying items of an inferior grade;
f) Misrepresentation as to the quality or origin of goods, their functionality or suitability for a purpose, or their performance characteristics;
g) not responding to the HDSB or, failure to complete contract.

40. Ownership

The Submission, along with all correspondence, documentation and information provided to the HDSB by any Bidder in connection with or arising out of the Submission, once received by the HDSB, shall become the property of the HDSB and may be appended to any Contract and/or purchase order with the successful Bidder.
41. Permits, Licenses and Approvals

Bidders shall obtain all permits, licences and approvals required in connection with the supply of the Goods and/or Services. The costs of obtaining such permits, licences and approvals shall be the responsibility of, and shall be paid for by the Bidder.

Where a Bidder is required by any Applicable Law to hold or obtain any such licence, permit, or approval to carry on an activity contemplated in its Submission or in the Contract, neither the acceptance of the Submission nor the execution of the Contract by the HDSB shall be considered an approval by the HDSB for the Bidder to carry on such activity without the requisite licence, permit, consent or authorization.

Without in any way limiting the generality of the foregoing, any electrical Goods being proposed for consideration pursuant to this RFT must be authorized or approved in accordance with the Electrical Safety Code or by a certification organization accredited with the Standards Council of Canada Act (Canada), and shall bear the certification organization’s mark identifying the Goods certified for use in Canada. Certification shall be to the standard that is appropriate for the intended use of the electrical Goods at any of the HDSB’s schools or facilities.

42. Co-operative Purchasing Provisions

This document is being issued by the HDSB to meet the HDSB’s requirements. The successful Bidder acknowledges that the Provincial Government encourages cooperative procurement initiatives by School HDSBs. Bidders shall indicate on the Form of Quotation if they are willing to extend pricing and submission terms to other District School Boards in the province of Ontario where the scope of work is deemed similar or the same and where both parties are in agreement, in which case they shall be deemed to have granted consent to the HDSB to share the Submission with such HDSBs, subject to such HDSBs agreeing to receive the Submission in confidence on the understanding that the Submission contains financial, commercial, technical and other sensitive information of the Bidder. The Bidder will not be penalized if it does not agree to this provision. The HDSB will not incur any financial responsibility in connection with any purchase by another School Board. Each School Board shall accept sole responsibility for its own contract management such as placing orders and making payments to the successful Bidder.

43. Proof of WSIB Coverage

If the Bidder is subject to the Workplace Safety and Insurance Act (“WSIA”) or the Workplace Safety and Insurance Amendment Act, 2008 (“WSIAA”), the Bidder shall submit a valid clearance certificate of Workplace Safety and Insurance Board (“WSIB”) coverage to the HDSB before commencing the performance of any work or services. In addition, the Bidder shall, from time to time during the term of the Contract and at the request of the HDSB, provide additional WSIB clearance certificates. The Bidder covenants and agrees to pay when due, and to ensure that each of its subcontractors
pays when due, all amounts required to be paid by it or its subcontractors, from time to time during the term of the Contract, under the WSIA and/or the WSIAA, failing which the HDSB shall have the right, in addition to and not in substitution for any other right it may have pursuant to the Contract or otherwise at law or in equity, to pay to the WSIB any amount due pursuant to the WSIA or the WSIAA unpaid by the Bidder or its subcontractors and to deduct such amount from any amount due and owing from time to time to the Bidder pursuant to the Contract together with all costs incurred by the HDSB in connection therewith.

44. Right to Withdraw

Submissions may be withdrawn prior to the Closing Time. Following Closing, no Submission may be withdrawn. Any Bidder who attempts to do so may have a negative Performance Evaluation placed on record with the HDSB in accordance with the Vendor Performance Management Administrative Procedure (www.hdsb.ca/our-board/Policy/VendorPerformanceManagement.pdf)

45. Smoking on HDSB Property

Smoking of any substance and in any manner is prohibited in all HDSB buildings and on all HDSB property. This includes, without limitation, tobacco, cannabis in any form and vaping.

46. Vehicle Operation on HDSB Property

The successful Bidder shall use due care and caution when motorized vehicles are in operation on school property while students are expected to enter or exit the school building and/or are visible outside the school building on school property or adjacent property, particularly during recess, lunch period and preceding and following the end of the school day. Vehicles operated in parking lot and driveway areas shall not be driven at a speed in excess of 8-kilometers/per hour.

Further, on school property drivers must turn off vehicles and remove the keys during any stop. At no time are vehicles to be left running while unattended. It is recommended that the vehicle be locked when left unsupervised. The HDSB will not be responsible for any theft of, or any theft from, vehicles operated by the successful Bidder.

Asphalt play areas around the exterior of the school building are not constructed to handle heavy vehicles. Bidders will be held responsible for any damage to HDSB property including but not limited to asphalt or natural surfaces as a result of using them for access of heavy vehicles. Making good of natural surfaces or asphalt areas that are damaged in the course of the work shall be to the original (new) condition irrespective of their condition prior to commencement of the work, or the condition of the adjacent unaffected areas. Vehicles are only permitted to access, stand or be parked in areas designated by administrative staff of HDSB, which for the purposes of this provision does not include principals of schools.
47. Bidder Conduct

When on HDSB property, the Bidder and its employees must:

- have proper identification (name badge, uniform with logo, photo I.D. etc).

- be dressed appropriately (the following are not appropriate: clothing that fails to contain the anatomy when the person is carrying out normal duties; clothing with printed slogans, advertising or designs that are obscene or could have a double meaning).

- use appropriate language.

- refrain from wearing scented products or fragrances such as perfume, cologne, after shave, shampoos (as required).

- work with dignity, courtesy and respect for self and others.

- not make noise or move in corridors during morning announcements, and playing of the national anthem.

- observe procedures during fire evacuation and lockdowns, whether they are actual or test (drills).

- park in spots designated by the Principal.

The Bidder must observe all HDSB policies and procedures including but not limited to: Smoke-Free Environment; Sexual, Racial and Ethno Cultural Harassment, etc.

The Bidder will ensure that the education program is not interrupted and that the health and safety of the students and staff is not compromised.

No person who is impaired by alcohol or drugs will enter and/or remain on HDSB property.

The Bidder agrees that its employees and sub-contractors will observe and comply with all standards, procedures, policies, rules and regulations of the HDSB, including but not limited to privacy, use of facilities, equipment, building security and computer technology.
FORM OF TENDER

Project: Corridor Ceiling Abatement & Fireproofing (HVAC Renovations – Phase I)

Project Reference #: RFT19-146

From (Bidder): __________________________________________

Company Name

____________________________________________________________________________

Street Address

____________________________________________________________________________

City, Province and postal code

____________________________________________________________________________

Phone Number

Email Address

To (Owner): Halton District School Board

2050 Guelph Line

Burlington, Ontario L7P 5A8

We, the undersigned, having examined the Tender Documents for the above-named Project, including Addendum, hereby offer to perform the Work in accordance with the Tender Documents, for the Stipulated Price of:

**Corridor Ceiling Abatement & Fireproofing (HVAC Renovations – Phase I)**

at **Oakwood Public School:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Bid Price</td>
<td>$</td>
</tr>
<tr>
<td>Contingency</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Total Cost (Excluding HST)</td>
<td>$</td>
</tr>
</tbody>
</table>
Please list the following Sub-Contractors as applicable.

Asbestos Abatement Contractor: ________________________________

Mechanical Contractor: ________________________________

Electrical Contractor: ________________________________

We, the undersigned, declare that:

a. We agree to perform the Work within the required completion time specified in the Tender Documents,

b. We have arrived at the Tender without collusion with any competitor,

c. This Tender is open to acceptance by the Owner for a period of 90 days from the date of Tender Closing,

d. All Form of Tender supplements called for by the Tender Documents from an integral part of this Tender.

Signature: ________________________________

LEGAL NAME OF BIDDER

______________________________  ____________________________  ____________________________

DATE

______________________________________________  &  ________________  ________________________________

AUTHORIZED SIGNATURE OF BIDDER  TITLE  PRINTED NAME

I have the authority to bind the Bidder

SEAL
APPENDIX A - DECLARATION SIGNATURE SHEET

1. I/WE DECLARE that this Submission is made without collusion, knowledge, and comparison of figures or arrangement with any other company, firm or person submitting a Submission for the same work.

2. I/WE DECLARE that to our knowledge no member of Halton District School Board is, will be or has become financially interested, directly or indirectly, in any aspect of the Contract other than in the appropriate discharge of his/her obligations as an employee/officer of Halton District School Board.

3. I/WE HAVE READ, Understood and agree to abide by the Agreement to Abide by the Established Process.

4. I/WE HAVE CAREFULLY examined the RFT documents, and have a clear and comprehensive knowledge of what is being requested hereunder. By submitting the Submission, the Bidder agrees and consents to the administrative procedures of the Board, as well as the procedures, terms, conditions and provisions of the RFT, including the Form of Tender.

5. I/WE have carefully examined all of the Proposal Documents, and that we have thoroughly reviewed all proposal documentation and addenda number _____ to _____, and hereby accept and agree to same as forming part and parcel of the proposed Contract.

6. I/WE ARE AUTHORIZED BY and have the authority to bind the Bidder.

DATE:________________________________________________________

NAME:________________________________________________________

Please Print

SIGNATURE:____________________________________________________

TITLE:________________________________________________________

COMPANY NAME:______________________________________________

ADDRESS:____________________________________________________

PHONE NUMBER:_______________________________________________

E-MAIL ADDRESS:______________________________________________

E-MAIL to Send PO:_____________________________________________
APPENDIX B – SUBMISSION LABEL

From: 

Contact: 

Telephone: 

Deliver to: 

Halton District School Board
2050 Guelph Line
Burlington, Ontario L7P 5A8
Main Reception Area Tender Box

Sealed Document For:

Proposal #: RFT19-146

Description: Corridor Ceiling Abatement & Fireproofing (HVAC Renovations – Phase I)

Closing Date/Time: June 12, 2019, 2:00 p.m.

For School Board Use Only

Time and Date Stamp:
**APPENDIX C – PRE-QUALIFIED SUB-CONTRACTORS**

### ASBESTOS ABATEMENT CONTRACTOR

<table>
<thead>
<tr>
<th>Firm Name</th>
<th>Contact Name</th>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>McGowan Insulations Ltd. (905) 549-1844</td>
<td>Dan Foley</td>
<td><a href="mailto:dfoley@mcgowan.on.ca">dfoley@mcgowan.on.ca</a></td>
</tr>
<tr>
<td>I&amp;I Construction Services Ltd. (905) 884-1290</td>
<td>John Watters</td>
<td><a href="mailto:jwatters@IandI.ca">jwatters@IandI.ca</a></td>
</tr>
<tr>
<td>QM Environmental (416) 253-6000</td>
<td>Mark Reinhardt</td>
<td><a href="mailto:mark.reinhardt@qmenv.com">mark.reinhardt@qmenv.com</a></td>
</tr>
<tr>
<td>Inflecter Environmental Services (416) 726-2817</td>
<td>Robert Miedema</td>
<td><a href="mailto:rmiedema@inflector.ca">rmiedema@inflector.ca</a></td>
</tr>
<tr>
<td>Caliber Environmental Construction Services Inc. (905) 884-5500</td>
<td>Jimmy Ball</td>
<td><a href="mailto:jimball@caliberev.com">jimball@caliberev.com</a></td>
</tr>
<tr>
<td>Biggs and Narciso Construction Services Inc. (866) 771-0859</td>
<td>James Graham</td>
<td><a href="mailto:james@biggsandnarciso.com">james@biggsandnarciso.com</a></td>
</tr>
<tr>
<td>Alliance Environmental &amp; Abatement Contractors Inc. (416) 298-4500</td>
<td>Dean Power</td>
<td><a href="mailto:info@allianceenvironmental.com">info@allianceenvironmental.com</a></td>
</tr>
<tr>
<td>JMX Environmental Inc. (905) 426-8315</td>
<td>Peter Bensley</td>
<td><a href="mailto:Peter.bensley@jmxenvironmental.com">Peter.bensley@jmxenvironmental.com</a></td>
</tr>
<tr>
<td>Ferro Canada Inc. (905) 841-8108</td>
<td>Peter Ferrante</td>
<td><a href="mailto:peter@ferrocanada.com">peter@ferrocanada.com</a></td>
</tr>
</tbody>
</table>

### MECHANICAL CONTRACTOR

<table>
<thead>
<tr>
<th>Firm Name</th>
<th>Contact Name</th>
<th>E-Mail</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airon HVAC and Control Ltd.</td>
<td>Ryan Haan</td>
<td><a href="mailto:info@airongroup.ca">info@airongroup.ca</a></td>
<td>905-331-6555</td>
</tr>
<tr>
<td>Arcadian Projects Inc.</td>
<td>Jeff Vidmar</td>
<td><a href="mailto:jeff@arcadianprojects.ca">jeff@arcadianprojects.ca</a></td>
<td>519-804-9697</td>
</tr>
<tr>
<td>L.J. Barton Mechanical Inc.</td>
<td>Jim Barton</td>
<td><a href="mailto:estimating@ljbarton.com">estimating@ljbarton.com</a></td>
<td>905-304-1976</td>
</tr>
<tr>
<td>Besseling Mechanical Inc</td>
<td>Cameron Besseling</td>
<td><a href="mailto:cameron@besselingmechanical.com">cameron@besselingmechanical.com</a></td>
<td>905-560-0200</td>
</tr>
<tr>
<td>Black &amp; McDonald Limited</td>
<td>Simon Watson</td>
<td><a href="mailto:swatson@blackandmcdonald.com">swatson@blackandmcdonald.com</a></td>
<td>289-919-1209</td>
</tr>
<tr>
<td>CEC Mechanical Ltd.</td>
<td>Devin Brown</td>
<td><a href="mailto:dbrown@beswickgroup.com">dbrown@beswickgroup.com</a></td>
<td>905-713-3711</td>
</tr>
<tr>
<td>Croft Plumbing &amp; Heating Inc</td>
<td>Graham Croft</td>
<td><a href="mailto:croftplumbing@sourcecable.net">croftplumbing@sourcecable.net</a></td>
<td>905-981-7187</td>
</tr>
<tr>
<td>Forrest Mechanical Inc.</td>
<td>David M. Mollison</td>
<td><a href="mailto:david@forrestmechanical.com">david@forrestmechanical.com</a></td>
<td>905-338-8109</td>
</tr>
<tr>
<td>Kirk Mechanical Limited</td>
<td>Robert Kirk</td>
<td><a href="mailto:kirkmech@bellnet.ca">kirkmech@bellnet.ca</a></td>
<td>905-681-0140</td>
</tr>
<tr>
<td>Lancaster Group Inc.</td>
<td>Jason Gray</td>
<td><a href="mailto:jgray@lancastergroup.ca">jgray@lancastergroup.ca</a></td>
<td>905-388-3800</td>
</tr>
<tr>
<td>Mattina Mechanical Limited</td>
<td>Domenic Mattina</td>
<td><a href="mailto:info@mattina.ca">info@mattina.ca</a></td>
<td>905-544-6380</td>
</tr>
<tr>
<td>Naylor Building Partnerships</td>
<td>Daniel Guidoni</td>
<td><a href="mailto:DGuidoni@naylorbp.com">DGuidoni@naylorbp.com</a></td>
<td>905-338-8000</td>
</tr>
<tr>
<td>Nutemp Mechanical Systems Ltd.</td>
<td>David McMichael</td>
<td><a href="mailto:info@nutemp.ca">info@nutemp.ca</a></td>
<td>905-338-5603</td>
</tr>
<tr>
<td>Roszell Plumbing &amp; Heating Ltd.</td>
<td>Ryan Roszell</td>
<td><a href="mailto:info@roszellplumbing.ca">info@roszellplumbing.ca</a></td>
<td>905-844-0418</td>
</tr>
<tr>
<td>Union Boiler Company of Hamilton</td>
<td>David Aldighieri</td>
<td><a href="mailto:unionboilerco@bellnet.ca">unionboilerco@bellnet.ca</a></td>
<td>905-528-7977</td>
</tr>
</tbody>
</table>
## ELECTRICAL CONTRACTOR

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Contact Person</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-Safe Electric Ltd</td>
<td>Brian Scheele</td>
<td><a href="mailto:firas@b-safe.ca">firas@b-safe.ca</a></td>
<td>905-872-7233</td>
</tr>
<tr>
<td>Bradco Electrical Services Ltd</td>
<td>Brad Groulx</td>
<td><a href="mailto:brad@bradcoelectric.com">brad@bradcoelectric.com</a></td>
<td>905-890-0506</td>
</tr>
<tr>
<td>CEC Services Limited (Aurora)</td>
<td>Dawna Van Loon</td>
<td><a href="mailto:dvanloon@beswickgroup.com">dvanloon@beswickgroup.com</a></td>
<td>905-713-3711</td>
</tr>
<tr>
<td>Integrity Fire and Control Systems</td>
<td>Jonathan Jackson</td>
<td><a href="mailto:jacksonj@integrityfire.ca">jacksonj@integrityfire.ca</a></td>
<td>905-690-0805</td>
</tr>
<tr>
<td>Kraun Electric Inc.</td>
<td>Kevin Krause</td>
<td><a href="mailto:estimating@kraun.ca">estimating@kraun.ca</a></td>
<td>905-684-6895</td>
</tr>
<tr>
<td>McCleary Electric Ltd.</td>
<td>Ron VanderMeulen</td>
<td><a href="mailto:mclearyelectric@bellnet.ca">mclearyelectric@bellnet.ca</a></td>
<td>905-634-7634</td>
</tr>
<tr>
<td>North Star Electric</td>
<td>Carlo Cece</td>
<td><a href="mailto:ccece@northstarelectric.ca">ccece@northstarelectric.ca</a></td>
<td>905-845-9063</td>
</tr>
<tr>
<td>PRL-GUITE Electric Ltd.</td>
<td>Paul Leaker</td>
<td><a href="mailto:estimating@prlguite.ca">estimating@prlguite.ca</a></td>
<td>905-549-6711</td>
</tr>
<tr>
<td>Nadalin Electric Co. (Ont) Inc.</td>
<td>Robert Nadalin</td>
<td><a href="mailto:rnadalin@bellnet.ca">rnadalin@bellnet.ca</a></td>
<td>905-878-4111</td>
</tr>
</tbody>
</table>
APPENDIX D - SCOPE OF WORK

1. GENERAL

1.1 Project OBJECTIVE

1. The Halton District School Board is soliciting the services of a qualified contractor to remove and replace the existing corridor ceiling, and additional builder’s work, related to the future HVAC renovations at Oakwood357 Bartos Drive, Oakville, ON L6K 3E5, in accordance with the Drawings and Specifications provided.

1.2 DESCRIPTION OF WORK

1. Vendor shall furnish all necessary labour, materials, services and equipment to remove the existing asbestos-containing ceiling, and replace with new, fire-rated Gypsum Wall Board (GWB) ceiling.

2. The Contractor shall provide galvanized threaded rods for unistrut pipe hangers, wall penetrations and pipe sleeves for future HVAC renovations, as identified in the Drawings and Specifications.

3. The Contractor shall temporarily remove and reinstall existing power, communications, fire alarm and security devices in the corridors to accommodate the ACM removal and reinstatement of the fire-rated ceiling assembly.

4. Vendor shall furnish necessary labour, materials, services and equipment to remove all waste and debris generated in execution of the Work identified under the terms of this Contract. The Contractor must provide their own waste bin(s), and under no circumstances is the Contractor permitted to use the waste bin(s) used by the HDSB for regular school operations.

1.3 HAZARDOUS SUBSTANCES

1. The school has been identified as containing Asbestos Containing Materials (ACM). A copy of the Designated Substances and Hazardous Materials Survey (DSS) for the school has been included with the Contract Documents. A complete copy of the Asbestos Survey and Register is also available at the school upon request at the main office.

2. The HDSB has retained the services of the environmental consultant Arcadis Canada to provide professional services related to the removal of hazardous materials at the school. A list of pre-qualified asbestos abatement contractors has been included in Appendix C. Prospective asbestos abatement companies not identified therein, shall be approved by Arcadis Canada, prior to performing any Work.

3. The Contractor shall carefully examine existing conditions for suspected ACM and hazardous substances, on which completion of Work is dependent. Upon discovery or disturbance of unforeseen suspect hazardous materials affecting the Work, the Contractor shall cease any operations that may disturb said materials and notify the Owner immediately.
1.4 PRE-QUALIFIED SUBCONTRACTORS

1. At the discretion of the Owner, subcontracted forces shall be pre-qualified by, and in good standing with, the HDSB, and identified on the HDSB’s Vendor of Record (VOR). Subcontractors and trades retained to provide Work or services not specifically identified by the HDSB, shall be at the discretion of the prime contractor.

2. A list of pre-qualified contractors in the disciplines identified, and required to complete the Scope of Work, will be provided by the Owner, where applicable.

3. Mechanical contractors with internal forces qualified and licensed in accordance with O.Reg.570/05 as an electrical contractor in the Province of Ontario, may undertake the electrical scope of work identified in the execution of this Contract. Bidders using internal forces to complete the electrical scope of work shall indicate on the Quotation Form "Own Forces" and must provide their ECRA/ESA license number where required to name an Electrical Sub-contractor.

1.5 Cash and Contingency allowances

1. Include with your bid, a contingency allowance in the sum of $50,000.00 CAD, exclusive of HST.

2. PRODUCTS

SECTION NOT USED

3. EXECUTION

3.1 Project timeline

1. It is the intent of the Board to have the entirety of the Work completed not later than August 31, 2019.

3.2 access to site

1. For the purposes of this Contract, “Regular Hours” are considered to be between 8:00 A.M. and 4:00 P.M., Monday to Friday.

2. Typical access to the site(s) during the execution of Work shall be during Regular Hours, however the HDSB will provide access to the site(s) outside of Regular Hours, if such access is required to maintain the project timeline. The HDSB will provide contact information for the Board’s Security Contractor to the successful Bidder for site access outside of Regular Hours, or if HDSB personnel will not be available to unlock or secure the site.

3. The Contractor will be responsible to coordinate with the Board’s Security Contractor to arrange for access to the school, and to have the school secured at the end of each day, in accordance with the schedule of the Contractor.

3.3 Coring Drilling and Cutting
1. Use of power drilling equipment on plaster walls shall be performed in accordance with the *Guideline Silica on Construction Projects* published by the Occupational Health and Safety Branch of the Ministry of Labour.

2. Use polyethylene drop sheets under all locations where core holes are drilled through plaster walls. Place an adequately-powered HEPA-filtered dust collection device directly at the source of dust generation.

3. Workers shall wear appropriate personal protective equipment including half-face HEPA-filtered P-100 respirator.

4. Dust is not to be allowed to migrate out of the immediate work area.

5. All work areas are to be completely cleaned after drilling activity.

### 3.4 Inspection of Work

1. Owner, or Owner’s Representative, shall be permitted to inspect Work prior to being concealed upon request.

2. Authorities having jurisdiction, prior to concealment, shall approve Work.

### 3.5 Permits

1. The HDSB has obtained the Building Permit from the Town of Oakville for this project. The Contractor shall obtain any additional permits and pay fees and comply with Provincial, Municipal and other legal regulations and bylaws applicable to work, as required.


### 3.6 Sequence of Work

1. Before interrupting major services, notify Owner and arrange acceptable schedule for interruptions.

2. Before interrupting services, complete preparatory work as far as possible and have materials on site and prefabricated (where practical) and work continuously to keep length of interruption to minimum.

3. Include for cost of work that may be required outside of Regular Hours, to minimize period of service interruption when connecting into existing systems.

**END OF SECTION**
### SPECIFICATIONS

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<td>07270 Firestopping and Smoke Seals</td>
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<td>15010 Basic Mechanical Requirements</td>
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<td>1-10</td>
<td>15050 Basic Mechanical Material and Methods</td>
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<td>1-12</td>
<td>15060 Pipes, Hangers and Supports</td>
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<td>E-3 Part Floor Plan North East</td>
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<td>E-4 Part Floor Plan South</td>
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<tr>
<td></td>
<td>E-5 First Floor Conduit Support Plan</td>
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End of Section
1. **Definitions**

1. The following Section of this Specification are of the abbreviated type and include incomplete sentences. Definite and indefinite articles have often been omitted and sentences are written in the form of direct instructions to the Contractor without using the phrase `the Contractor shall.' Standard specifications and other quality references inserted govern materials and workmanship without using phrases `conform with,' `conformity therewith,' etc. Omitted words and phrases to be supplied in the same manner as they are when a note appears on the Drawings.

2. The Specifications are separated into Sections for reference convenience only. Such separation must in no instance make Owner or his Consultants arbiter to establish subcontract limits between Contractor and Subcontractor.

3. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on Drawings and/or in Specifications, including all labour, materials, equipment, tools, services, and incidental necessary and required to complete the work. Responsibility for breakdown into and extension of subcontracts, including co-ordination of same, rests entirely with the Contractor.

4. Standard Specifications referred to are editions in force at Tender Closing Date.

2. **Terminology**

1. Consultants are the team of Architects, Engineers and other experts commissioned by the Owner, directly or indirectly, to execute design, contract documents and supervision for the project, including any of their agents or employees.

2. Prime Consultant is the Architect.

3. Contractor is the Firm or Corporation who, having signed the Agreement, has the sole legal responsibility to carry out the work shown or described in the Contract Documents for the Owner, whether contractually assigned to a Subcontractor or supplier, or not.

3. **Minimum Standards**

1. Unless otherwise specified, work and material to conform or exceed the minimum standards set out in the editions of the Canadian Government Specification Board, Canadian Standards Associations, the Ontario Building Code, Underwriters' Laboratories of Canada, the Canadian Electrical Code, the Local Building Code in force, whichever is applicable.

2. Copies of Standard Specifications referred to in this Specification to be kept on the site.

3. The use of the name (or its abbreviation) of any of the following bodies, accompanied by the reference number of a specification of that body to mean that the entire specification of the body to apply as noted:

   AISC: American Institute of Steel Construction;
4. Cooperation

1. Each trade to cooperate with the trades of adjacent or affected work. Supply in good time requirements effecting adjacent and underlying work in writing and items to be set or built in. Similarly, heed requirements and build-in items provided by other trades.

2. Take necessary precautions to protect work of other trades from contamination, marring or other damage due to application or installation processes, methods and activities.

3. General Contractor and each trade to cooperate with Contractors which may be assigned or selected by the Owner to perform work under Cash Allowances. Owner reserves the right to assign nonunionized labour to perform work under Cash Allowances, at Owners discretion.

5. Coordination

1. Coordinate the work of all trades in such a manner that each trade co-operates with the trade of adjacent work.

2. Organize weekly job site meetings and send out notices stating time and place to Consultants, subcontractors, Suppliers and all others whose presence is required at the meetings.

3. Take note of all persons attending these meetings and submit to Consultants and Owner, Minutes of these Meetings showing any major decisions made and instructions or information required.

4. Coordinate the Work in this Contract with the work of others awarded work under Cash Allowances.


1. Ensure that all necessary job dimensions are taken and all trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.

2. Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by
requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.

3. Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.

4. Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.

5. All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.

6. Advise Consultant of discrepancies and if there are omissions on drawings, particularly reflected ceiling plans and jointing patterns for paving, ceramic tile, or carpet tile layouts, which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.

7. Ensure that each Subcontractor communicates requirements for site conditions and surfaces necessary for the execution of the Subcontractor’s work, and that he provides setting drawings, templates and all other information necessary for the location and installation of material, holes, sleeves, insets, anchors, accessories, fastenings, connections and access panels. Inform other Subcontractors whose work is affected by these requirements and preparatory work.

8. Prepare interference drawings to properly co-ordinate the work where necessitated. Refer to Section 01340.

7. Use of Premises Before Substantial Performance

1. The Owner shall have the right to enter and occupy the building, in whole or in part, for the purpose of placing fittings and equipment, or for other use, before completion of the Contract if, in the opinion of the Consultant, such entry and occupancy does not prevent or interfere with the Contractor in the performance of the Contract. Such entry shall in no way be considered as an acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of the Agreement are fulfilled.

8. Layout of Work

1. Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.

2. Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.
9. By-Laws and Regulations

1. Nothing contained in the Drawings and Specifications are to be so construed as to be knowingly in conflict with any law, by-law or regulation of municipal, provincial or other authorities having jurisdiction.

2. Perform work in conformity with such laws, by-laws and regulations and make any necessary changes or deviations from the Drawings and Specifications subsequently required as directed and at no cost to the Owner unless notification is given in writing before Tender Closing Date.

3. Furnish inspection certificates and/or permits as may be applicable as evidence, that installed work conforms with laws, by-laws, and regulations of authorities having jurisdiction.

10. Protection

1. Take necessary precautions and provide and install required coverings to protect material, work and finishes from contamination, damage, the elements, water and frost.

2. Make good any damage or replace damaged materials, as directed. Repairs to be made by the trade having originally installed or fabricated the damaged material, finish or item. Protect electrical equipment from water and the elements.

3. Protect adjacent private and public property from damage and contamination.

4. Protect curbs and sidewalks from damage from trucking by means of boards and the like. Repair, or pay or repair of damage to existing roads and sidewalks.

5. Mark glass after glazing in an acceptable manner, and leave in place until final clean-up.

6. Protect floor finishes from construction traffic and transport of construction materials and equipment by means of 6 mm plywood panels.

11. Delivery, Handling and Storage of Materials

1. Schedule material delivery so as to keep storage at site to the absolute minimum, but without causing delays due to late delivery.

2. Store materials which will be damaged by weather in suitable dry accommodation. Provide heat, as required, to maintain temperatures recommended by material manufacturer.

3. Store highly combustible or volatile materials separately from other materials, and under no circumstances, within the building. Protect against open flame and other fire hazards. Limit volume of supply on the site to minimum required for one day’s operations.

4. Handle and store material so as to prevent damage to material, structure and finishes. Avoid undue loading stresses in materials or overloading of floors.
5. Do not store material and equipment detrimental to finished surfaces within areas of the building where finishing has commenced or has been completed. All material storage within the building is subject to relocation, as directed.

6. Deliver package material in original, and Storage of unopened and undamaged containers with manufacturer's labels and seals intact.

12. Debris

1. Assign clean-up duties to a crew with own Foremen which will be of sufficient size to prevent accumulation of debris and dirt in any part of the structure or on the site.

2. Remove construction debris on a daily basis and legally dispose of same.

3. Under no circumstances, should debris, rubbish or trash be burned or buried on the site.

13. Cutting, Fitting and Patching

1. Required cutting to be done by General Contractor. Patching and painting of work to be executed by the General Contractor.

2. All sub-trades are to notify the General Contractors bidding as to the extent of the cutting, patching, and painting of their respective trades.

3. Drilling, cutting, fitting and patching necessary due to failure to deliver items to be built-in time, or installation in wrong location to be executed, as directed, at no cost to the Owner.

4. Give written notification prior to commencement of drilling and cutting of load bearing structural members and finished surfaces.

5. Cut holes with smooth, true, clean edges, after they are approved by applicable trade. Size holes and openings for hot water and steam pipes, so as to allow for expansion and contraction of such pipes.

14. Fastenings

1. Supply all fastenings, anchors and accessories required for fabrication and erection or work.

2. Metal fastenings to be of the same material as the metal component they are anchoring, or of a metal which will not set up an electrolysis action which would cause damage to the fastening or metal component under moist conditions.

3. Exposed metal fastenings and accessories to be of the same texture, color, and finish as base metal on which they occur. Keep to a minimum; evenly space and lay out.

4. Fastenings to be permanent, of such a type and size and installed in such a manner to provide positive anchorage of the unit to be secured. Wood plugs are not acceptable. Install anchors at required spacing to provide required load bearing or shear capacity.
5. Power actuated fastenings not to be used without prior written approval for specific use.

15. **Surplus Materials**

1. Surplus materials specifically so specified, to remain property of the Owner and be neatly stockpiled or stored, as directed.

2. All other surplus materials to become property of the Contractor; to be removed from the site and legally disposed of.

16. **Documents Required and General Duties**

1. **At Commencement of Contract**
   
   .1 Supply Public Liability and Property Damage Insurance Certificates.
   .2 Supply Certificates of good standing from Workers' Compensation Board for the General Contractor and all Subcontractors.
   .3 Supply Contract Sum Breakdown of all sub-trades or parts of work and general expense items.
   .4 Supply Construction Schedule.
   .5 Supply Schedule of Shop Drawing Submissions.
   .6 **The Owner has paid the cost of the Building Permit. Mechanical Subcontractor will pay the cost of other Fees related to the Work Specified under Division 15. Electrical Subcontractor will pay the cost of all permits and fees related to the Work Specified under Division 16.**
   .7 **The General Contractor is to pay all other fees and refundable deposits if applicable.**

2. **During Construction**

   .1 Adjust Allowances, as required.
   .2 Organize Job Meetings.
   .3 Supply Monthly Progress Reports and Construction Schedule.
   .4 Confirm that payments are being made to subcontractors and suppliers by submission of receipts with the second and subsequent Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.

3. **Upon Completion**

   .1 Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:
      .1 All deficiencies to have been completed in a satisfactory manner.
      .2 All final clean-up to have been executed.
      .3 Finishing Hardware, Inspection and Verification.
      .4 Organize a Final Inspection tour at which to be present:
         - the Owner's authorized representative;
         - the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any;
         - the Contractor and his superintendent.
5. Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.

6. A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.

7. Certificates of good standing from the Workers' Compensation board, for the General Contractor and all Subcontractors.

8. Certificate of Inspection from Mechanical and Electrical Engineers.

9. Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.

10. Statement of Completion from General Contractor.

11. Final adjustment of all Allowances.

12. H.E.P.C. Inspection Certificate and all other Inspection Certificates required by Provincial, Municipal and other authorities having jurisdiction.

13. Balancing Reports.


15. Two hard copies of Operation and Maintenance Manuals. A digital copy (pdf file) of all closeout documents to be provided on a CD or USB memory stick format.

17. Progress Reports

1. Submit to the Architect, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims.

2. Keep permanent written daily records on the site on the progress of work. Record to be open to inspection at reasonable times and copies to be furnished upon request. Records to show notes of commencement and completion of different trades and parts of work; daily high and low temperatures and other weather particulars; number of men engaged on the site (including sub-trades) broken down in groups for each type of construction work, and particulars about excavation and shoring; erection and removal of form work; pouring and curing of concrete; floor finishing; placing and compaction of backfill, masonry work; roofing;

3. Daily progress to give particulars on commencement and completion of each trade or part of work; form work erections and removal; concrete pouring and curing; floor finishing; masonry work; roofing; waterproofing; finishing trades, tests and inspection and the like.

End of Section
1. Project Meetings for Coordination

1. In consultation with the Consultant during the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.

2. Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.

3. Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.

4. Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: ________".

5. Within three days after each meeting, distribute two copies of the minutes to each invited person.

2. Pre-construction Meeting

1. Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

2. Include in the agenda the following:

   .1 Appointment of official representative of participants in the Work.
   .2 Scheduling of Work. Schedule to include a detailed breakdown of mechanical and electrical works.
   .3 Interference with ongoing business.
   .4 Work by other Contractors.
   .5 Schedule of submission of shop drawings and samples.
   .6 Requirements for temporary facilities, site sign, offices, storage sheds, utilities.
   .7 Delivery schedule of specified equipment.
   .8 Site security.
   .9 Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
   .10 Record drawings.
   .11 Maintenance manuals.
   .12 Take-over procedures, acceptance, warranties.
   .13 Monthly progress claims, administrative procedures, photographs, holdbacks.
   .14 Appointments of inspection and testing agencies or firms.
   .15 Insurance, transcript of policies.
   .16 Schedule for progress meetings.
3. **Project Meetings for Progress of Work**

1. Conduct progress meetings in accordance with the schedule and/or decisions made at Pre-construction meeting.

2. Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.

3. Include in the agenda the following:
   
   .1 Review, approval of minutes of previous meeting.
   .2 Review of Work progress since previous meeting.
   .3 Field observations, problems, conflicts.
   .4 Problems which impede construction schedule.
   .5 Review of off-site fabrication delivery schedules.
   .6 Corrective measures and procedures to regain projected schedule.
   .7 Revisions to construction schedule.
   .8 Progress during succeeding work period.
   .9 Review submittal schedules: expedite as required.
   .10 Maintenance of quality standards.
   .11 Pending changes and substitutions.
   .12 Review proposed changes for effect on construction schedule and on completion date.
   .13 Other business.

4. **Progress Records**

1. Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:

   .1 Daily weather conditions, including maximum and minimum temperatures.
   .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
   .3 Conditions encountered during excavation.
   .4 Dates of erection and removal of formwork, in each area of the project.
   .5 Dates of pouring the concrete in each area of the project, with quantity and particulars of the concrete.
   .6 Work force on project daily per trade.
   .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

End of Section
1. General

1. Submit to Architect, for review, shop drawings, product data and samples specified.

2. Until submission is reviewed, work involving relevant product must not proceed.

2. Shop Drawings

1. Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.

2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

3. Maximum sheet size 24” x 36” as PDF.

3. Project Data

1. Certain specification Sections specify that manufacturer’s standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

2. Above will only be accepted if they conform to following:
   .1 Delete information which is not applicable to project.
   .2 Supplement standard information to provide additional information applicable to project.
   .3 Show dimensions and clearances required.
   .4 Show performance characteristics and capacities.
   .5 Show wiring diagrams (when requested) and controls.

4. Coordination of Submissions

1. Review shop drawings, product data and samples prior to submission.

2. Verify:
   .1 Field measurements.
   .2 Field construction criteria.
   .3 Catalogue numbers and similar data.

3. Coordinate each submission with requirement of work and Contract documents. Individual shop drawings will not be reviewed until all related drawings are available.

4. Contractor’s responsibility for errors and omissions in submission is not relieved by Architect’s review of submittals.

5. Contractor’s responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect’s review of submission, unless Architect gives written acceptance of specified deviations.

7. After Architect's review, distribute copies.

5. Submission Requirements

1. Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.

2. Submit a digital copy (PDF) of shop drawings, product data to Architect for review.

3. Accompany submissions with transmittal letter, in duplicate, containing:
   .1 Date.
   .2 Project title and number.
   .3 Contractor's name and address.
   .4 Number of each shop drawing, product data and sample submitted.
   .5 Other pertinent data.

4. Submissions must include:
   .1 Date and revision dates.
   .2 Project title and number.
   .3 Name of:
      .1 Contractor.
      .2 Subcontractor.
      .3 Supplier.
      .4 Manufacturer.
      .5 Separate detailer when pertinent.

5. Identification of product or material.
   .1 Relation to adjacent structure or materials.
   .2 Field dimensions, clearly identified as such.
   .3 Specification Section number.
   .4 Applicable standards, such as CSA or CGSB numbers.
   .5 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract documents.

6. Interference Drawings
   .1 Prepare interference drawings for all work in confined space ie: ceiling space.

End of Section
1. **Construction Safety Measures**

1. Observe and enforce construction safety measures required by the National Building Code; the O.B.C.; The Provincial Government; Workers’ Compensation Board; and, Municipal authorities.

2. In particular, the Occupational Health and Safety Act (Ont. Re. 213/91), the Occupational Health and Safety Act, the regulations of the Ontario Ministry of Labour and Ontario Hydro Safety requirements shall be strictly enforced.

3. Contractor shall ensure that copies of all applicable construction safety regulations, codes and standards are available on the job-site throughout the period of construction. All workers are to be informed that these documents are available for reference at any time.

4. The Contractor shall ensure that all supervisory personnel on the job-site are fully aware of the contents of the Occupational Health and Safety Act (Ontario Regulation 213/91 - Construction Projects) the Workers’ Compensation Act and, Bill 208 (Chapter 7, Standards of Ontario) “An Act to Amend the Occupational Health & Safety Act and the Workers’ Compensation Act”, and, that they comply with all requirements and procedures prescribed therein. These documents include, but are not limited to, the following construction safety requirements:
   
   .1 Contractor to register with the Director of the Occupational Health and Safety Division before or within 30 days of the commencement of the project, (O.Reg. 213/91, sec 5).
   
   .2 File a notice of project with a Director before beginning work on the project, (O.Reg 313/91, sec 6).
   
   .3 Notification prior to trenching deeper than 1.2m, (O.Reg. 213/91, sec 7).
   
   .4 Accident Notices and Reports, (O.Reg. 213/91, sec 8 through sec 12).
   
   .5 General Safety Requirements, (O.Reg. 213/91, sec 13 through sec 19).
   
   .6 General Construction Requirements, e.g. protective clothing, hygiene practices, housekeeping, temporary heat, fire safety, access to the job-site, machine and equipment guarding and coverings, scaffolds and platforms, electrical hazards, roofing, et al, (O.Reg. 213/91, sec 20 through sec 221).
   
   .7 Establish a Joint Health and Safety Committee where more than 19 workers are employed for more than 3 months, (Bill 208, S.8(2) to S.8(14).
   
   .8 Establish a Worker Trades Committee for all projects employing more than 49 workers for more than 3 months, (Bill 208, S-8a(1) to S.8b(4).
   
   .9 Ensure that all activities arising out of (.07) and (.08) above are recorded and that minutes are available to an inspector of the Ontario Ministry of Labour.

5. The Contractor shall be considered as the "Constructor" in consideration of the rights and responsibilities for all construction safety requirements, procedures, facilities and inspection of all work performed by the Contractor, Subcontractors/Sub-trades and other Contractors engaged on this project.
6. In the event of a conflict between any of the provisions of the above authorities the most stringent provisions are to be applied.

2. **Material Safety Data Sheet**

   1. Material safety Data Sheets (MSDS) must be available at the job-site for any product listed on the Hazardous Ingredients List prior to being used, installed or applied inside of the building.

   2. A Material Safety Data Sheet is to be submitted to the Architect for any product which is known to create, or suspected of creating, a health hazard or discomfort during construction or upon commissioning of the project including, but not limited to, the following:
      .1 adhesives
      .2 solvents
      .3 sealants, (caulking, vapour seals, etc.)
      .4 sprayed-on fireproofing
      .5 resilient flooring
      .6 carpet, paint, varnish or other coatings
      .7 exposed membrane waterproofing
      .8 special coatings, (terrazo sealants, chafing coatings, etc.)
      .9 solder, brazing and welding and other filler metal
      .10 other products whose particles or vapours may become air borne after installation.
      .11 any other product as directed by the Consultant.


3. **Fire Safety Requirements**

   1. Comply with requirements for Building Construction, the Ontario Building Code, the Ontario Fire Code, the requirements of Local Fire Authorities and of the requirements of the Office of the Fire Marshal.

4. **Overloading**

   1. Ensure no part of Work is subjected to a load which will endanger its safety or will cause permanent deformation.

5. **Falsework**

   1. Design and construct falsework in accordance with CSA S269.1-1975.

6. **Scaffolding**

   1. Design and construct scaffolding in accordance with CSA S269.2-M1980.
2. Scaffolding to be designed by a Professional Engineer when required under the Occupational Health and Safety Act.

7. Materials Specifically Excluded

1. Asbestos and/or asbestos-containing products are not permitted. Submit Material Safety Data Sheets for any product suspected of containing asbestos if so requested by Consultant. Examples of some materials requiring close scrutiny and/or confirmation include:
   .1 Transite drainage pipe - whether buried or above grade - not permitted.
   .2 Composite floor tile containing asbestos - not permitted.
   .3 Lay-in ceiling tiles containing asbestos - not permitted.
   .4 Insulation and/or jacketing for pipes, ducts, motors, pumps, etc. - not permitted if any asbestos is present.

2. Solder for all piping is to be lead-free.
   .1 "Lead Free" shall mean solder which contains less than 0.030% of lead when dissolved in fluoroboric and nitric acids and tested by inductively coupled argon plasma atomic emission spectroscopy. "Steelbond 281" and "Silverbrite" are acceptable solder products.
   .2 The mechanical contractor shall provide an affidavit signed by the Principal of the company, on company letterhead, that all of the solder used on the project was either one of the two acceptable products or that the solder used (identified by brand name) meets or exceeds the testing criteria.
   .3 The Owner shall undertake random testing of the soldered joints. Should testing prove that the solder used was not as specified, the Owner shall take action against the contractor to the full extent of the law.

3. All paint and finish coatings are to be lead and mercury-free. Submit Material Safety Data Sheets confirming that these products are free of all lead and/or mercury compounds.

End of Section
PART 1 - GENERAL

1.1 Related Work

1. These specifications apply to all 16 divisions of the project specification. It is the responsibility of the contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.

2. It is recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the owner, notify the Architect of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Architect.

3. Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Architect. Suitability of all products used is the responsibility of the contractor.

1.2 Compliance Specifications

1. The contractor must comply with all applicable health, safety and environmental regulations.

1.3 Beyond Compliance Specifications

1. These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner’s intention to develop a specification which maximizes environmentally “friendly” materials and methods wherever possible within current technical and budget limitations.

2. Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.

3. The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.

4. These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.

5. These provisions apply to both indoor and outdoor applications equally.
1.4 Exceptions

1. These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Architect.

PART 2 - MATERIALS

2.1 Products or Substances to be Avoided or Limited in Use

1. No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Material Safety Data Sheets, therefore MSDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related MSDS and product application and performance sheets, clearly showing a need for the exception.

2.2 Volatile Organic Compounds

1. No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.

   Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.

2. Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents, therefore the fact that a product is waterborne does not automatically make it acceptable.

2.3 Chlorinated Substances

1. Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

2.4 Plasticizers

1. Plasticisers which offgass (low molecular weight) should be avoided.
2.5 **Man Made Mineral Fibres**

1. Products containing mineral fibres which can be emitted or abraded should be avoided.

   Examples: duct liner, mineral fibre ceiling tiles, etc.

2.6 **Radiation**

1. Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

2.7 **Biocides**

1. Products containing biocides (pesticides, miticides, mildewicides, fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portercept may be acceptable substitutes. Biocide formulas which break down, emit powders of offgass should be avoided.

2.8 **Heavy Metals**

1. Heavy metals such as lead, cadmium, mercury etc. should be avoided.

2.9 **Aluminum**

1. Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

2.10 **Ozone Depleting Substances**

1. Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

2.11 **Greenhouse Gasses**

1. Products which contain, use or generate Greenhouse gasses such as CO2 should be avoided if suitable substitutes are available.

2.12 **Bituminous (tar) Products**

1. Products containing tar compounds should not be used if suitable substitutes are available.

2.13 **Chemical Compounds**

1. Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, Formaldehyde.
2.14 Adhesives

1. Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives.

2.15 Composite Products

1. Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

2.16 Cleaners and Solvents

1. Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

End of Section
1.1 Fires

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

1.2 Disposal of Wastes

1. Do not bury rubbish and waste materials on site.

2. Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 Drainage

1. Provide temporary drainage and pumping, as necessary to keep excavations and site free from water.

2. Do not pump water containing suspended materials into waterways, sewer or drainage systems.

3. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 Site Clearing and Plant Protection

1. Protect trees and plants on site and adjacent properties, which are to be retained.

2. Wrap in burlap trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

3. Protect roots of trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.5 Pollution Control

1. Install and maintain temporary erosion and pollution control features as requested by local Municipal and Regional Authorities.

2. Install, maintain, restore, replace sediment control fence as required by Municipal and Regional authorities. The fence shall be in accordance with Municipal standards.

3. Install, maintain, restore, replace roadside catchbasin sediment protection at all street catchbasin in accordance with Municipal standards.

4. Install, maintain, restore, replace catchbasin sediment barrier immediately after installation of catch basins on the property in accordance with Municipal Standards.
5. Install and maintain a mud mat at the construction access made consisting of 30m x 5m x 0.45m clear stone.

6. Control emissions from equipment and plant to local authorities’ emission requirements.

7. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

End of Section
1. General

1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

2. Store volatile wastes in covered metal containers, and remove from premises daily.

3. Prevent accumulation of wastes which create hazardous conditions.

4. Provide adequate ventilation during use of volatile or noxious substances.

2. Materials

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

2. Provide on-site dump containers for collection of waste materials, and rubbish.

3. Cleaning During Construction

1. Maintain project grounds, and public properties free from accumulations of waste materials and rubbish.

2. Remove waste materials, and rubbish from site.

3. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

4. Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.

4. Final Cleaning

1. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.

2. Employ experienced workers, or professional cleaners, for final cleaning.

3. In preparation for Substantial Performance or Fitness for Occupancy status, whichever occurs first, conduct final inspection of interior and exterior surfaces exposed to view, and of concealed spaces.

4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.

5. Clean and polish glass and mirrors.
6. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.

7. Broom-clean paved surfaces; rake clean other surfaces of grounds.

8. Clean exposed ductwork and structure.

9. Replace filters.

10. Clean bulbs and lamps and replace those burned out.

11. Clean diffusers and grilles.

12. Clean sinks, faucets, and water closets and controls.

13. Maintain cleaning until project, or portion thereof, is occupied by Owner.

   End of Section
1. Requirements Included

1. Record documents, samples, and specifications.
2. Equipment and systems.
3. Product data, materials and finishes, and related information.

2. Quality Assurance

1. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

3. Format

1. Organize data in the form of an instructional manual.
2. Binders: commercial quality, 8½” x 11” maximum 2½” ring size.
3. When multiple binders are used, correlate data into related consistent groupings.
4. Cover: Identify each binder with type or printed title “Project Record Documents”, list title of Project, identify subject matter of contents.
5. Arrange content under Section numbers and sequence of Table of Contents.
6. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
7. Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

4. Contents, Each Volume

1. Table of Contents: Provide title of project; names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
2. For each Product or System: list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product Data: mark sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
4. Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
5. Typed Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
5. Submission

1. Submit one copy of completed volumes in final form 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

2. Copy will be returned after inspection, with Consultant comments.

3. Revise content of documents as required prior to final submittal.

4. Submit two copies of revised volumes of data in final form within ten days after final inspection.

5. For contract drawings (architectural, landscaping, structural, mechanical, electrical), transfer neatly as-built notations onto second set and submit both sets.


6. Record Documents and Samples

1. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
   .1 Contract Drawings.
   .2 Specifications.
   .3 Addenda
   .4 Change Orders and other modifications to the Contract.
   .5 Reviewed shop drawings, product data and samples.
   .6 Field test records.
   .7 Inspection certificates.
   .8 Manufacturer's certificates.

2. Store Record Documents and Samples in Field Office apart from documents used for construction. Provide files, racks, and secure storage.

3. Label and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document “Project Record” in neat, large, printed letters.

4. Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.

5. Keep Record Documents and samples available for inspection by Consultant.

7. Recording As-Built Conditions

1. Consultant will provide two (2) complete sets of white prints of project drawings and two (2) complete sets of specifications for the purpose of recording as-built conditions. Mark
and record one set on an on-going basis as construction proceeds. **Near the end of the construction period transfer all marks neatly to second set for submission as project record documents.**

2. Refer to drawings/specifications for additional mechanical and electrical requirements.

3. Record information concurrently with construction progress. Do not conceal work until required information is recorded.

4. Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
   .1 Measure depths of elements of foundation in relation to finish first floor datum.
   .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
   .4 Field changes of dimension and detail.
   .5 Changes made by change orders.
   .6 Details not on original Contract Drawings.
   .7 References to related shop drawings and modifications.

5. Specifications: legibly mark each item to record actual construction, including:
   .1 Manufacturer, trade name, and catalog number of each project actually installed, particularly optional items and substitute items.
   .2 Changes made by Addenda and Change Orders.

6. Other Documents: maintain manufacturer’s certifications, inspection certifications, field test records, required by individual specifications sections.

7. After the consultant has found the Redlined As-Built drawings to be acceptable, prepare digital pdf file of redlined Asbuilts Drawings to be included on CD or USB with other closeout documents.

**9. Equipment and Systems**

1. Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

2. Panelboard Circuit Directories: provide electrical service characteristics, controls, and communications.

3. Include installed colour coded wiring diagrams.

4. Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instruction. Include summer, winter, and any special operating instructions.
5. Maintain Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair and reassemble instructions; and alignment, adjusting, balancing, and checking instructions.

6. Provide servicing and lubrication schedule, and list of lubricants required.

7. Include manufacturer’s printed operation and maintenance instructions.

8. Include sequence of operation by controls manufacturer.

9. Provide original manufacturer’s parts lists, illustrations, assembly drawings, and diagrams required for maintenance.

10. Provide installed control diagrams by controls manufacturer.

11. Provide Contractor’s co-ordination drawings, with installed colour coded piping diagrams.

12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

13. Provide list of original manufacturer’s spare parts, current prices, and recommended quantities to be maintained in storage.

14. Include test balancing reports as specified in mechanical specifications.

15. Additional Requirements: As specified in individual specification sections.

10. Materials and Finishes


2. Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

3. Moisture-protection and Weather-exposed Products: include manufacturer’s recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommend schedule for cleaning and maintenance.

4. Additional Requirements: as specified in individual specifications sections.

11. Guarantees, Warranties and Bonds

1. Separate each warranty or bond with index tab sheets keyed to the List of Contents listing.

2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section
01721 whenever standard preprinted trade or manufacturer’s Guarantee/Warranty forms are not available.

3. Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

4. Except for items put into use with Owner’s permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

5. Verify that documents are in proper form, contain full information, and are notarized.

6. Co-execute submittals when required.

7. Retain warranties and bonds until time specified for submittal.

End of Section
PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Not applicable

1.2 Existing Conditions

1. Take over structures to be demolished based on their conditions (on date that tender is accepted).

1.3 Demolition Drawings

1. Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures.

1.4 Protection

1. Prevent movement, settlement or damage of adjacent grades. Provide bracing, shoring as required.

2. Prevent debris from blocking surface drainage inlets which must remain in operation.

3. Protect existing items designated to remain and materials designated for salvage. In the event of damage to such items, immediately replace or make repairs to approval of Owner and at not cost to Owner.

PART 2 - PRODUCTS

1. Not applicable.

PART 3 - EXECUTION

3.1 Work

1. Dispose of demolished materials except where noted otherwise.

3.2 Safety Code


2. Should material resembling spray or trowel-applied asbestos be encountered, notify Architect. Any asbestos encountered will be removed by the Owner’s Contractor.
3.3 Preparation

1. Disconnect electrical and telephone service lines entering areas to be demolished as per rules and regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other areas during period of demolition.

2. Inspect site and rectify with Architect items designated for removal and items to remain.

3. Disconnect and cap mechanical services in accordance with requirements of local authority having jurisdiction.

4. Natural gas supply lines to be removed by gas company or by qualified tradesman in accordance with gas company instructions.

3.4 Demolition & Field Work

1. Demolish areas as indicated on the drawings.

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

3. At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times).


5. Demolish masonry and concrete walls in small sections. Carefully remove and lower structural framing and other heavy or large objects.

6. Burning materials on site is not permitted.

7. Remove contaminated or dangerous materials from site and dispose of in safe manner.

8. Employ rodent and vermin exterminators to comply with health regulations.

3.5 Salvage

1. Carefully dismantle items containing materials for salvage and stock pile salvaged materials at locations as directed by Architect.

3.6 Restoration

1. Upon completion of work, remove debris, trim services and leave work site clean.

2. Reinstall areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.
3.7 Scheduling

1. Demolition of areas adjacent to occupied spaces may not occur during occupancy of these spaces. Contractor to schedule the demolition of these areas to occur after school hours or weekends.

End of Section
PART 1 - GENERAL

1.1 Related Work

1. Gypsum Board: Section 09250

2. Firestopping and Smoke Seals for Mechanical and Electrical Work: refer to drawings

1.2 Reference

1. ASTM E814 - Test Method of fire tests of through-penetration firestops, factory mutual.


4. ULC - List of Equipment and Materials.

1.3 System Description

1. Firestopping Materials: CAN4-S115M ASTM E814 to achieve a fire protection rating as noted on Drawings.

2. It is the intent of this Section that in conjunction with Divisions 15 and 16 a competent, single source be responsible for the firestopping and smoke seals of the entire project.

1.4 Submittals

1. Submit a product data to requirements of Section 01340.

2. Submit manufacturer’s product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer’s printed instructions for installation, ULC design references.

3. Submit proposed type of fireproofing system for each location for approval by Architect. Fireproofing System must be appropriate to achieve expected appearance and finish.

1.5 Quality Assurance

1. Manufacturer: Company specializing in manufacturing products of this Section with minimum five years documented experience.

2. Applicator: Approved, licensed and supervised by the manufacturer of firestopping materials. Company with minimum five years documented experience.

3. Product: Manufactured under ULC Follow-up Program. Each container or package shall bear ULC label.
1.6 Regulatory Requirements

1. Conform to applicable code for fire protection ratings.

2. Provide certificate of compliance for authority having jurisdiction indicating approval.

1.7 Delivery, Storage & Handling

1. Deliver and store materials in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer’s labels and seals intact.

1.8 Project & Site Conditions

1. Application temperature and ventilation as per Manufacturer’s instructions.

1.9 Sequencing & Scheduling

1. Sequence work to permit installation of firestopping and smoke seal materials to be installed after adjacent work is complete and before closure of spaces.

PART 2 - PRODUCTS

2.1 Materials

1. A/D Fire-barrier Firestop Systems, by A/D Fire Protection Systems Inc., capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.


3. Retainers: Clips to support mineral wool.


8. Damming Material: In accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
PART 3 - EXECUTION

3.1 Examination

1. Examine surfaces to receive work of this Section and report any defects which may affect the Work of this Section.

2. Verify that openings are ready to receive the Work of this Section.

3. Confirm compatibility of surfaces to receive firestopping and smoke seal materials.

4. Beginning of installation means acceptance of existing surfaces and substrate.

3.2 Preparation

1. Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

2. Prepare surfaces in contact with firestopping materials and smoke seals to manufacturer’s instruction.

3.3 Application

1. Install firestopping and smoke seal material and components in accordance with ULC listing and manufacturer’s instructions.

2. Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

3. Apply in sufficient thickness to achieve rating to uniform density and texture.

4. Provide temporary forming if required.

5. Tool or trowel exposed surfaces to a neat finish where required.

6. Remove excess material promptly as work progresses and upon completion.

7. Protect installed material until cured or set.

3.4 Cleaning

1. Clean adjacent surfaces of firestopping and smoke seal materials.

3.5 Field Quality Control

1. Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.
3.6 Scheduling

1. Firestop and smoke seal at:

   .1 Penetrations through fire-separations: masonry, concrete, and gypsum board partitions and walls.
   .2 Edge of floor slabs at curtain wall and precast concrete panels.
   .3 Top of fire-separations: masonry and gypsum board partitions.
   .4 Intersection of fire-separations: masonry and gypsum board partitions.
   .5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
   .6 Penetrations through fire-separations: floor slabs, ceilings and roofs.
   .7 Openings and sleeves installed for future use through fire separations.

End of Section
PART 1 - GENERAL

1.1 Related Work Specified Elsewhere

1. Not applicable.

1.2 Environmental Conditions

1. Sealant and substrata materials to be minimum 5 deg. C.

2. Should it become necessary to apply sealants below 5 deg. C, consult sealant manufacturer and follow their recommendations.

1.3 Warranty

1. Contractor hereby warrants that caulking work will not leak, crack, crumble, melt, shrink, run lose adhesion or stain adjacent surfaces in accordance with General Conditions, but for two (2) years total.

PART 2 - PRODUCTS

2.1 Materials

1. Primers: type recommended by sealant manufacturer.

2. Joint Fillers:

   .1 General: compatible with primers and sealants, outsized 30 to 50%.
   .2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
   .3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.
   .4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.
   .5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.
   .6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B.
   .7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.
   .8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.
   .9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.

3. Color of Sealants: to be selected by Consultant. Allow for a total of three (3) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.
4. Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

5. Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

**PART 3 - EXECUTION**

**3.1 New Work**

1. Caulk where specified and everywhere required.

2. Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.

3. Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

4. Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.

5. Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer’s instructions.

6. Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of ¼", maximum width 1”.

7. Install joint filler to achieve correct joint depth.

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

9. Apply bond breaker tape where required to manufacturer’s instructions.

10. Prime sides of joints to sealant manufacturer’s instructions immediately prior to caulking.

**3.2 Application**

1. Apply sealants, primers, joint fillers, bond breakers, to manufacturer’s instructions. Apply sealant, using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

2. Form surface of sealant with full bead, smooth, and free from ridges, wrinkles, sags, air pockets, and embedded impurities. Neatly tool surface to a slight concave joint.

3. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.
4. In precast concrete panel facing, vent space behind panels by inserting vent tubing at bottom of each vertical caulked joint and at every second intersection of horizontal and vertical joints. Position tube to drain to exterior.

5. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

6. Use sealants specified in the following locations:

   **Type A:** Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.

   **Type B:** Joints between splash backs and walls.

   **Type C:** Joints between interior metal doorframes and partitions.

   **Type D:** Joints in horizontal surfaces between concrete slabs, pavers and precast concrete panels.

End of Section
PART 1 - GENERAL

1.1 Related Work

1. Gypsum Board: Section 09250

1.2 Reference Standards

1. Do work to CSA A82.31-1977, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Materials

1. Metal Studs: non-load bearing channel stud framing to ASTM C645-09a, roll formed from 0.59 mm thickness electro-galvanized steel sheet for screw attachment of gypsum lath and metal lath, and with service access holes.

2. Structural Metal Studs: CSA-S13-01 and hot-dipped galvanized to ASTM A525M-87, minimum 1.22 (18ga.) use thicker materials where required to suit structural requirements. Framing shall be designed by a licensed professional engineer registered in the province of Ontario. Follow fabrication standards ASTM C955.

3. Floor and ceiling tracks: to ASTM C645-09a in width to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.

4. Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.

5. Furring channels (channels, hangers, tie wire, insert, anchor): CGSB 7.1-98-CAN/CGSB.


PART 3 - EXECUTION

3.1 Stud Partitions

1. Align partition tracks at floor and underside of structure above and secure at 24” o.c. maximum. All partitions to extend to underside of structure above.

2. Place studs vertically at 16” o.c. and not more than 2” from abutting walls and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs, as required, to provide rigid installation to manufacturer’s instructions.

3. Erect metal studding to tolerance 1:1000.

4. Attach studs to bottom track using screws.
5. Coordinate simultaneous erection of studs with installation of service lines. When erecting studs, ensure web openings are aligned.

6. Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 84" high and a minimum of four (4) anchors per jambs for jambs over 84" high.

7. Provide two (2) studs at each side of openings wider than stud centre specified.

8. Install, cut to length, piece of runner horizontally over door frames.

9. Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.

10. Install steel stud or furring channel between studs for attaching electrical and other boxes.

11. Extend all partitions to underside of structure above for sound and fire separation.

12. Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

### 3.2 Ceiling Furring

1. Install runners level to tolerance of 1/8" over 11'-8". Provide runners at interruptions of continuity and change in direction.

2. Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.

3. Furring for bulkheads within or at termination or ceilings.

4. Install furring channels at 16" o.c. maximum.

### 3.3 Wall Furring

1. Install steel furring, as indicated.

2. Frame opening and around built-in equipment on four (4) sides with channels.

3. Box-in beads, columns, pipes, and around exposed services.

### 3.4 Fire-rated Assemblies

1. Where required, install Metal Stud System and Furring in accordance with appropriate UL Code Design and with supplement to the National Building Code of Canada 1985. This includes horizontal and vertical assemblies.

End of Section
PART 1 - GENERAL

1.1 Related Work

1. Metal Stud System: Section 09111

2. Access Doors: refer to related mechanical and electrical

1.2 Reference Standards

1. Do work to CSA A82.31-1977, except where specified otherwise.

PART 2 - PRODUCTS

2.1 Gypsum Board

1. Gypsum Board: to ASTM C36; tapered edges, thickness as noted on Drawings.

2. Fire Rated Gypsum Board: to ASTM C36, Type X; tapered edges, ULC labeled, thickness as noted on Drawings.

3. Impact Resistant Gypsum Sheathing Board: to ASTM C1177/C1177M; silicone treated gypsum core, glass fiber mesh facers both sides; eg. DensGlass Gold by G-P Gypsum Corporation or equivalent by CGC Inc.

4. Cement Board: to ASTM C1325; polymer modified concrete core, dual layer of alkali-resistant fibre mesh reinforced faces and edges, tapered rolled edges; thicknesses as indicated on Drawings.

2.2 Fastenings and Adhesives

1. Screws: to CSA A82.31-1977.

2. Adhesive: to CGSB 71 GP 25M.

3. Laminating Compound: to CSA A82.31-1077.

4. Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.

5. Tie Wire: #16 ga. galvanized soft annealed steel wire.

2.3 Accessories

1. Casing Beads and Corner Beads: 0.5 mm base thickness commercial sheet steel with G90 zinc finish to ASTM A 525-78 A.

2. Joint compound: to CSA A82.31-1977, asbestos-free.

2.4 Insulation Blanket

1. 38 mm thick mineral wool batts ULC labelled, if indicated on drawings.

PART 3 - EXECUTION

3.1 Gypsum Board Application

1. Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

2. Install metal studs plumb and true to sizes and locations indicated on drawings.

3. Apply single and double layers gypsum board to metal furring or framing, using screw fasteners and laminating adhesive. Maximum spacing of screw 12” oc.

4. Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.

5. Apply Type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.

3.2 Insulation and Blanket Application

1. Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.

3.3 Accessories

1. Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces, where practical. Make joints tight, accurately aligned and rigidly secure. Mitre and fit corners accurately, free from rough edges.

2. Install casing beads around perimeter of suspended ceilings.

3. Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

3.4 Access Doors

1. Install access doors to electrical and mechanical fixtures specified in respective Sections.

2. Rigidly secure frames to furring or framing systems.
3.5 Taping and Filling and Sound Seal

1. Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.

2. Above partitions fill flutes of steel deck with rock wool and cover with non-sagging sealant on at least one side of the partition.

3. Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

4. Finish corner beads, control joints and trim as required with two (2) coats of joint compound and one (1) coat of taping compound, feathered out onto panel faces.

5. Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

6. Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

7. Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

End of Section
1. **General**

1. This project involves work in an existing school building.

2. The contract drawings represent the overall intent of the design and provides a general arrangement of equipment and accessories. Contractor shall include all other materials, tools, items and labour to carry out such work, considering the complexity of the existing site conditions and account for aspects of the practicality of implementing the design intent.

3. All Mechanical equipment, ductwork, piping, controls and associated systems shall be configured and installed to meet the specific requirements included on the drawings and in the specifications and shall be fully functional prior to achieving substantial completion.

1. **Scope of work**

.1 This section is intended to provide basic identification of the work, for the Contractor to determine upfront, the nature of the work involved in this Contract. In no way shall this article be interpreted as being a full representation of the work of this Contract.

.2 It is the Contractor's sole responsibility to gain an in-depth understanding of the design intent and also examine all of the Commercial Documents, Specifications and Drawings issued.

.3 The work generally involves the following:

.1 Mechanical building systems for the subject building including provision of:
  .1 Total replacement of the existing cabinet heaters, convectors, wall fin radiators, wall fin enclosures, controls and accessories as generally shown on the drawings and as specified herein.
  .2 Provision of heating and cooling system comprising of unit ventilators, split A/C units, unit heaters, cabinet heaters, convectors, wall fin radiators, wall fin enclosures, all associated venting, ducting and piping, controls and accessories.
  .3 Modification of existing controls and the Building Automation System (BAS) as shown on the Drawings and as specified herein including all equipment, BAS graphics, devices programming, wiring, conduits, transformers, relays etc.
  .4 Integration of the proposed hydronic heating equipment and auxiliary equipment into the existing BAS.
  .5 Start-up, performance testing and balancing of all mechanical and related systems.
  .6 All associated electrical power and control wiring.
  .7 Provision of concrete pads and/or structural steel frames for floor mounted equipment.
  .8 Provision of wall mounting hardware for convectors, wall fin radiators and cabinet heaters.
  .9 Cutting, patching and painting of wall/floor as required for installation of recessed/wall mounted heating equipment.
  .10 Labeling of all equipment and piping.
.11 Commissioning of mechanical systems as specified,
.12 Cutting, patching and painting as required.

2. Roof work
   .1 As applicable.

3. Scheduling of the work
   .1 Co-ordinate all mechanical work with the school board and with the work of other trades, and schedule and complete the work as required coinciding with the completion date established for the Project.

4. Codes, Regulations and Standards
   .1 Comply with Municipal or Provincial Codes, Rules and Regulations and/or Authorities having jurisdiction, including OBC, CSA, ASHRAE, AHRI, ARI, NFPA & TSSA.
   .2 Revisions issue: latest version as amended to date.

5. Permits, Certificates, Equipment Registration and Fees
   .1 Make application and pay all required fees for permits, registration, inspections, etc. for all equipment and systems installed including those required by TSSA, local utility companies and municipalities.
   .2 Upon substantial completion of work, supply and turn over to the Consultant all required inspection certificates from governing authorities to certify that the work as installed conforms to the rules and regulations of the governing authorities.
   .3 Permits
     .1 Obtain permits required for the installation of mechanical trades work including:
       .1 Building permit,
       .2 Electrical inspection
       .3 TSSA’s inspection
     .2 Arrange for inspections and tests and pay all fees and costs for the permits, inspections and tests. Obtain permits immediately after notification of award of Contract.
     .3 Obtain copies of Drawings from the Consultant for submission with application for permits.
   .4 Material approvals
     .1 Obtain special inspection and approvals by CSA and/or local authorities, for materials and equipment where required or as specified.
     .2 Obtain such approval for the particular installation with the co-operation of the material supplier.

6. Working Drawings and Documents
   .1 Design Drawing Intent
.1 The design Drawings are schematic in arrangement, and describe the general design intent but do not show the exact details for the installation. They are not fabrication or installation Drawings.

.2 The design is based on a set of products listed in the schedule of manufacturers. All corresponding performance parameters, dimensions, noise data, operating weights and electrical data are used in the preparation of the tender set. Bidders choosing to propose alternate products that are not listed in the table, may substitute exact details of the potential substitutions for review and acceptance by the Board/Engineer prior to closing of the tender. Alternate, unlisted products that are proposed after award of contract will not be considered for acceptance.

.3

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment Description</th>
<th>Manufacturers</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Basis of Design</td>
</tr>
<tr>
<td>1</td>
<td>Wall Fin Radiators/convectors/cabinet heaters</td>
<td>Sigma</td>
</tr>
<tr>
<td>2</td>
<td>Unit Ventilators</td>
<td>Change Air</td>
</tr>
<tr>
<td>3</td>
<td>Split A/C Units</td>
<td>Mitsubishi Electric</td>
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<tr>
<td>4</td>
<td>Valves &amp; accessories</td>
<td>Crane</td>
</tr>
<tr>
<td>5</td>
<td>Controls &amp; BAS</td>
<td>Match existing System.</td>
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</tbody>
</table>

.4 The overall scope of work is suitably outlined on the Drawings with regard to sizes, locations, general arrangements and installation details, and has been generally coordinated for routing of services. The routing of piping, ductwork and equipment arrangement are shown more or less in diagrammatic form except where in certain cases the Drawings may include details giving the exact locations and arrangements required.

.5 The location of equipment, and the associated arrangement of piping, ductwork, and other material describes the general requirements of the work. Final location is dependent on the actual equipment supplied and coordination of existing services on site. The Consultant reserves the right to make reasonable adjustment of up to 1 m to the location of equipment, floor drains, routing of major piping and ductwork, at no additional cost to the Owner.

.6 In order to provide clarity to the arrangement of the work, not all details including valves, thermometers, pressure gauges, etc. are shown on the plan Drawings. Refer to schematic Drawings, standard details and the specification for these requirements. In the absence of specific details, the Contractor is expected to follow generally accepted good installation practices. Alternatively, the Contractor shall submit a written request for Information (RFI) to the Owner/Consultant prior
to submission of the bids and obtain a ruling prior to bidding or proceeding with the work.

.7 Where specific installation dimensions for location of equipment and access space requirements are indicated on the Drawings, install to these requirements. For all other installation details, it is expected that good, industry specific installation practices will be adhered to.

.8 Where Standard Details are provided, the details show the general installation requirements, and are applicable to each occurrence in the work, unless otherwise specified or shown.

.9 Do not proceed with work where an obvious ambiguity is noted between tender documents. Notify the Engineer and obtain proper direction prior to submission of the bids and obtain a ruling prior to bidding or proceeding with the work.

.2 Coordination and Cooperation with Other Trades

.1 Review design drawings of all other related disciplines including architectural, electrical, structural and site services. Coordinate scope of work between all trades and allow for adequate costs for all related work. Coordinate work with all trades to ensure a proper and complete installation of fully functioning system that can be properly maintained in future.

.2 Notify all trades concerned of the requirements for openings, sleeves, insets and other hardware necessary for the installation and where work is to be integrated with the work of other trades or is to be installed in close proximity with the work of the trades, carefully coordinate the work prior to installation.

7. Coordination and Examination

.1 Examination

.1 Carefully examine work and Drawings of all related trades and thoroughly plan the work in advance so as to avoid interferences.

.2 Report defects which would adversely affect the work. Do not commence installation until such defects have been corrected.

.2 Coordination

.1 Coordinate work of Division 15 such that items will properly interface with work of other Divisions. Prepare installation and interference Drawings of all critical locations and submit to the Consultant for review.

.2 Architectural Drawings, or in their absence, Mechanical Drawings govern all locations.

8. Submittals

.1 Shop Drawings

.1 Shop drawings shall be submitted electronically. All shop drawings shall clearly identify and cross reference the proposed equipment (i.e. Equipment name,
Specification section references, equipment tags from drawings and valve references, as applicable).

.2 Conform to general conditions of contract and the following.

.3 Shop drawings for alternate products that are not specifically proposed and accepted during the tendering period will be rejected. Any delays that result due to such submissions shall be solely attributed to the Contractor and the Contractor shall make necessary amends to complete the project in the stipulated time.

.4 Shop drawings for alternate products that are specifically proposed and accepted during the tendering period will be reviewed by the Engineer, provided a detailed layout is also submitted by the contractor along with the shop drawings. The layout shall clearly demonstrate how the physical differences of the alternate products can be accommodated in the available spaces and shall include all details for integration such as electrical and mechanical connections. Any delays that result due to lack of proper submissions and preparation of detailed layouts shall be solely attributed to the Contractor and the Contractor shall make necessary amends to complete the project in the stipulated time.

.5 Shop Drawings showing more than one size or model will not be considered unless properly marked up.

.6 For electrically driven, and fuel fired appliances, provide the following information:
   .1 Electrical characteristics including voltage, phase, frequency and power rating.
   .2 For motors, NEMA, Class and efficiency ratings
   .3 Fuel input ratings, including flow rates and pressures
   .4 Equipment performance ratings, including flow rates, pressures, efficiencies, part load values and/or efficiencies (IPLV’s), plotted flow characteristics (pump and fan curves) with operating points clearly plotted.

.7 For other equipment include the following information:
   .1 Equipment performance ratings, including flow rates, pressures drops.
   .2 Electrical control power requirements

.8 For all equipment, include the following:
   .1 Equipment dimensions and weights.
   .2 Itemized product description with optional items clearly marked as being included.

.9 Provide wiring Shop Drawings:
   .1 Wiring diagrams and schematics for all equipment which has electrical controls or devices furnished with the equipment.
   .2 Wiring diagrams alone are not sufficient; schematic and interconnecting. Detailed drawings and sequence of operation of all equipment are required for review.
   .3 Clearly indicate the materials and/or equipment being supplied:
.1 Details of construction, finish, accurate dimensions, capacities and performance.
.2 Certify Drawings correct for construction by the manufacturer, before submission.
.3 Identify Equipment Shop Drawings with designations as shown on the Drawings or in the Specifications.
.4 If not complied with, Shop Drawings will not be reviewed and will be returned to the Contractor.
.4 Coordinate equipment which attaches to and/or where external wiring provided connects to other equipment.
.5 Coordination is required for all scenarios: whether such equipment is supplied under this or other contracts or subcontracts, for which relevant information will be provided by Owner/Consultant.

9. “As-Built” Record Drawings

.1 Reference

.1 Maintain an accurate dimensional record of all piping and all deviations and changes in aboveground services and equipment.

.2 On completion of the project, provide an electronic copy of the as-built Drawings in AutoCad format. Include CD’s and hard copies of the as-built Drawings in each O&M manual.

10. Installation and Start-up Instructions

.2 Reference

.1 Conform to Section 01700 “Material and Equipment”.

.2 Submit copies of installation instructions and copies of start-up instructions for any item of equipment when requested by the Consultant.

11. Operating and Maintenance Instruction Manuals

.3 Reference

.1 In addition, include the following in the manuals:

.1 Non-dimensional layout showing location of all electrical devices on mechanical equipment.

.2 Operating instructions, including start-up and shut-down procedure.

.3 Lubricating instructions and recommended cycle of lubrication for each item of equipment, including various types of lubricants.

.4 List of spare parts.

.2 All the above applies to component parts of equipment whether they are manufactured by the supplier of the equipment or are supplied as a component part of an item of equipment.

12. Cleaning, Testing and Approval Records

.1 Records
13. Dimensions and Quantities

.1 Dimensions

.1 Dimensions shown on Drawings are approximate.

.2 Verify dimensions by reference to Shop Drawings and field measurement.

.2 Quantities

.1 Quantities or lengths indicated in any of the Contract Documents are approximate only and shall not be held to gauge or limit the work.

2. Products

1. Materials and Equipment

.1 Materials

.1 Use new materials and equipment, free from defects impairing strength and durability, as specified or specified equivalent.

.2 Of Canadian manufacture wherever possible.

.3 Labelled or listed as required Code and/or inspection authorities (CSA/ETL).

.4 Design of mechanical systems has been based on the first listed supplier and model number/size stated on the Equipment Schedules on the Drawings. Bear all costs due to physical or performance differences between stated equipment and proposed equipment. These differences include but are not limited to size, layout, arrangement, connection size, location and/or quantity of connections, or performance differences such as noise, power requirements, flow, throw, etc.

.2 Equipment/Structure Coordination

.1 Locations and dimensions of curbs and roof and floor opening framing, where indicated on the Drawings, are based on an arrangement to suit the above named supplier.

.2 Be responsible to verify the actual size requirements of the openings, and notify the Consultant immediately in case the dimension of the unit supplied and the connecting ductwork/piping, etc. are at variance with the dimensions given on the Drawings.

.3 Bear all costs for modification of curbs and floor/roof openings resulting from failure to notify the Consultant prior to the fabrication or construction of opening framing and curb.

2. Standard Specifications

.1 Product Quality
.1 Ensure that the chemical and physical properties, design, performance characteristics and methods of construction of all Products provided comply with the latest issue of applicable Standard Specifications issued by Authorities having jurisdiction.

.2 Do not apply such Standard Specifications to decrease the quality of workmanship, products and services required by the Contract Documents.

3. Manufacturer’s Nameplates
   .1 Metal Nameplates
      .1 Provided with raised or recessed lettering, on each piece of equipment.
      .2 Mechanically fasten nameplate on a metal stand-off bracket arranged to clear insulation.
      .3 Mount on same stand-off Underwriters Laboratories and/or CSA registration plates.
   .2 Nameplate Data
      .1 Indicate:
         .1 Size
         .2 Capacity
         .3 Equipment model
         .4 Manufacturer’s name
         .5 Serial number
         .6 Voltage
         .7 Frequency
         .8 Phases

3. **Execution**

1. General
   .1 Execute work in accordance with requirements specified in the various Sections of Division 15.
   .2 Coordinate all installation details and service requirements of equipment and accessories with other trades to eliminate conflicts prior to installation.
   .3 Mechanical equipment and accessories shall be installed in a manner that provides adequate access to equipment and also assists in reducing the effort for maintenance. Equipment shall only be installed at heights or in spaces that can be easily reached by a standard height ladder (i.e. not exceeding 3 metres). In case space constraints on site require installation of equipment in other locations or heights, contractor shall bring this to the Engineer’s attention and direction, prior to commencing work or ordering related materials/equipment.
   .4 Lay out work of each trade so that it does not interfere with work under other Divisions of Specifications.
.5 Make good any damage to Owner’s property or other trade’s work caused by improperly locating or carrying out of work.

.6 Supply anchor bolts and templates for installation by other Divisions.

.7 Location of pipes, ductwork, raceways and equipment may be altered without extra cost provided alteration is made before installation.

.8 Install all power and control wiring in approved conduits.

2. Spare Parts

.1 Furnish spare parts

.1 One set of V-belts for each drive.

.2 One set of bearings for each type for all directly driven equipment.

.3 One filter cartridge or set of filter media for each filter or filter bank installed.

3. Protection

.1 Protect work and materials before, during and after erection from weather and other hazards and keep in a clean and orderly manner.

.2 Protect pipe ends, valves and parts of equipment left unconnected to prevent damage or intrusion of foreign matter. Provide pipe caps for threaded male connections and plugs for threaded female connections.

.3 Protect finished floor slabs from scuffing, cracking, chipping, staining, cutting and other damage resulting from work of this Contract.

   .1 Place 19 mm thick plywood under laid with 25 mm thick polystyrene insulation board adhered to same, over floor areas when working from, or over, such surfaces.

   .2 Provide such protection below hoist rigs, ladders, pallets of material, and in other circumstances where the flooring is exposed to potential damage. Work damaged due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Owner, at no increase in Contract Price.

4. Painting

.1 Reference

   .1 With the exception of prime painting of miscellaneous steel or any other specific requirements as specified under the respective Sections of Division 15, all equipment shall be factory painted.

   .2 Factory applied finish painting:

      .1 Factory prime and final coats applied to pumps, air moving units, uninsulated pressure vessels, unit heaters, convectors, grilles, diffusers and bare metal equipment items, in exposed to view applications such as boiler rooms, mechanical rooms and fan rooms.
.2 Use heat resistant paint where conditions require (i.e. equipment/accessories installed in the vicinity of heaters or boilers). Protect factory finished equipment during construction, and clean at completion of work.

.3 Factory applied prime painting:
   .1 Factory prime paint other equipment fabricated from iron or steel including access doors, dampers, metal radiation enclosures, and fire hose cabinets.
   .2 In occupied areas of the building, touch up any damage to prime coat resulting from shipping or installation and leave ready for final painting under Division 9.

.4 Field painting:
   .1 Mechanical rooms, boiler rooms, fan rooms, crawl spaces, pipe tunnels and penthouses: paint exposed galvanized metal surfaces with one coat of zinc dust galvanized primer and one coat of 100% alkyd base enamel.
   .2 Clean rust and oil from exposed iron and steel work provided under this Division, whether or not it has been factory prime painted. Paint this equipment with one coat of chrome oxide phenolic base primer and one coat of 100% alkyd base enamel in an approved colour.

END OF SECTION
1. **General**

1. Related work

   .1 Other Divisions

      .1 Refer to other divisions of the Specifications and to the Drawings for work related to the mechanical work to avoid interferences with work of other trades (and other contractors) and to ensure proper completion of the work as a whole.

2. General Construction Requirements

   .1 Applicable Codes and Standards

      .1 Ontario Building Code-2012

      .2 Occupational Health and Safety Act and Regulations for Construction Projects, Ontario Regulation 691.

      .3 Owners Health and Safety Requirements

   .2 Measurements and Deviations

      .1 Where any parts of the mechanical work are specifically located by dimensions on the Drawings, check and verify these dimensions on site prior to installation.

      .2 Before installing piping, review existing conditions and architectural, structural and electrical Drawings with mechanical Drawings

         .1 Where interference may occur and departures from arrangements as shown are required, consult with other trades involved, come to agreement as to changed locations or elevations and obtain approval of the Consultant for proposed changes before proceeding with the work.

      .3 Examine work of other trades or contractors, prior to commencement of mechanical installations.

         .1 Report in writing, to the Consultant, any discrepancies which will affect mechanical installations.

         .2 Failure to do so shall be considered acceptance of the conditions.

   .4 Where site conditions require minor deviations from indicated arrangements or locations, make such changes on approval of the Consultant without additional cost to the Owner.

   .5 Should any discrepancies occur during installation of mechanical work which will necessitate major revisions to the mechanical trades work or the work of other trades or contractors, notify the Consultant immediately and obtain written authorization before proceeding with the work.

   .3 Building Attachments:

      .1 Obtain prior written Consultant’s approval before drilling, cutting or welding of the building steel or building structure for erection of materials or equipment.
.4 Overloading

.1 During installation of mechanical work, do not load any part of the building structure with a load greater than it is capable of bearing.

.1 Should any accident occur or damage result through the violation of this requirement, the contractor shall be held solely responsible.

.2 Design temporary supports used during installation as being equivalent to permanent supports.

.3 Remove temporary supports at completion of work.

.5 Cutting and Patching

.1 Do not cut, remove or burn structural parts or sections of the building, whether they are steel, concrete or masonry without the written authorization of the Consultant.

.2 Should cutting, repairing, and patching of previously finished work of other trades be required to allow installation of mechanical work, pay all costs for the trade concerned to perform the work.

2. Products

1. Building Attachments

.1 Welding Studs

.1 Maximum size: 10 mm (3/8") for attaching miscellaneous materials and equipment to building steel.

.2 If the weight of materials or equipment require bolts or studs larger than 10mm (3/8") diameter, use steel clips or brackets, secured to building steel by (welding or) bolting as approved by the Consultant.

.3 Acceptable Manufacturers:
   .2 Graham
   .3 Omark
   .4 Nelson
   .5 Or approved equivalent

.2 Self drilling expansion type concrete inserts:

.1 To secure miscellaneous equipment and materials to masonry or concrete construction already in place.

.2 Of sufficient number and size to prevent concrete from breaking away.

.3 The use of powder or power actuated fasteners will not be allowed unless prior written approval is obtained from the Consultant.

.4 Acceptable Manufacturers:
   .1 ITW "Redhead"
   .2 Star "SSS"
.3 USM "Parabolt"
.4 Or approved equivalent

.3 Supports for any suspended items:
.1 Do not fasten/attach to or extend through steel pan type roofs or through concrete slab roofs.

.4 Beam clamps:
.1 2-bolt design and of such type that the rod load is transmitted only concentrically to the beam web centreline.
.2 The use of "C" and "I" beam side clamps, etc., will not be allowed without written consent of the Consultant.

.3 Acceptable Manufacturers:
.1 Grinnell
.2 Myatt
.3 Carpenter & Paterson
.4 Or approved equivalent

.5 Truss or steel joist roof or floor framing:
.1 Locate hangers at or within 150mm (6") of the joist top or bottom chord panel points
.2 Otherwise provide additional structural steel as required where hanger spacing does not coincide with joist spacing.
.3 Transmit hanger load only concentrically to the supporting truss or joist.

.6 Secondary structural steel members between trusses and/or joists:
.1 Locate at or within 150mm (6") of top or bottom chord panel points.
.2 Where the secondary structural steel member cannot be located at or near a truss or joist panel point, provide additional diagonal structural steel web member/members designed for the applicable load to the nearest panel point in the opposite chord member.
.1 The above condition may be waived if the load to be suspended between panel points is not in excess of 45kg (100 LB).
.3 Diagonal hangers which will induce lateral stresses in the chord members of the joist will not be permitted.

2. Drives and Accessories

.1 Drives
.1 V-belt drives selection: 150 percent of the motor size rating.
.2 Sheaves: cast iron construction with machined grooves.
.1 Sheaves 75mm (3") size and larger diameter: taper lock bushings.
.2 Multi-belt drives: matched sets.
.3 Statically and dynamically balance all sheaves as an operating unit.

.3 Adjustable sheaves:
.1 Motors less than 1.1Kw (1.5 HP) rating: adjustable pitch motor sheave with diameter range selected to obtain specified RPM of the driven equipment at approximately the mid-point setting of the sheave.

.4 Fixed Sheaves:
.1 Motors of 1.1Kw (1.5 HP) and greater: solid type.
.2 Should such sheaves not provide design requirements under operating conditions, supply and install a new drive sheave of proper size at no increase in Contract Price.

.2 Drive Couplings

.1 Acceptable Manufacturers:
.1 Falk
.2 Fast
.3 Thomas
.4 Or approved equivalent

.3 Lubricating Devices

.1 Equipment to have oil reservoirs with level indicators, or pressure grease fittings.
.2 Inaccessible fittings: provide extended tubes to an accessible location.
.3 Grease fittings: Zerk, Alemite or approved equivalent.
.1 All fittings shall be of one type.

.4 Drive Guards

.1 To OSHA requirements.
.2 Build guards of all welded construction on exposed rotating parts or elements and on all drives including the following:
.1 V-belt drives
.2 Flexible couplings
.3 Gear drives
.3 Construction (except fan drives):
.1 Total enclosure type fabricated of minimum 1.3mm (18 ga.) black sheet steel.
.2 Hinged side to allow access for lubrication, inspection or removal of the drive parts.
.3 Maximum clearance of openings in guards to rotating parts: not to exceed 13mm (1/2”).
.4 Make provision for slide rail adjustment.
.4 Construction for fan drives:
.1 V-belt drives: total enclosure type as specified above.
.2 Enclosure sides: 13mm (1/2") mesh, 2.7mm (0.105") wire screening.
.3 Tachometer holes at shaft centres, reinforced as required to maintain rigidity of guard.

.5 Flexible drive coupling guards:
   .1 Location: between motor and driven equipment
   .2 Minimum 1.3mm (18 ga.) black sheet steel, securely fastened to the equipment base plate and readily removable.
   .3 Leave a clearance of approx. 13mm to 25mm (1/2” to 1”) between the guard and the coupling.
   .4 Extend the guard to within 13mm (1/2”) of both motor and driven equipment housing.

.6 Rework any substandard guards supplied with mechanical equipment to conform to the above requirements.

3. Sealants, Concrete and Grouts

   .1 Pipe Sleeve Seals

   .1 Acceptable Manufacturers:
      .1 Thunderline "Link-Seal" Series LS
      .2 Century-Line
      .3 Metraflex
      .4 Or approved equivalent

   .2 Concrete

      .1 Strength: Unless otherwise noted, 25 MPa concrete: to CSA-A23.1/A23.2

   .3 Concrete Grouts

      .1 Acceptable Manufacturers:
         .1 Sternson "M-Bed Standard"
         .2 Sika "Sikagrou 212"
         .3 Master Builders "Construction Grout"
         .4 Meadows "CG-86"
         .5 Euclid "Euco NS Grout"
         .6 CPD "Non-Shrink Grout"
         .7 Or approved equivalent

   .4 Bonding Agents

      .1 Acceptable Manufacturers:
         .1 Sika "Sikadur 32" Hi-Mod
         .2 Or approved equivalent

   .5 Caulking Compounds

      .1 Acceptable Manufacturers:
         .1 Denso-Plast
         .2 Or approved equivalent

   .6 Firestopping
1. ULC listed fire stopping assembly

2. Rating to suit wall and floor penetrations

3. Acceptable Manufacturers:
   .1 Hilti
   .2 Fire Stop Systems
   .3 Dow Corning
   .4 3M
   .5 Tremco
   .6 A/D Fire Protection System
   .7 Johns Manville
   .8 Or approved equivalent

4. Miscellaneous

   1. Access Doors

      1. Size:
         .1 Minimum size: 300mm x 300mm (12" x 12") size, unless otherwise specified on the Drawings or in other divisions of the Specifications, or as required to replace or repair said equipment.
         .2 Provide 600 x 600 size access doors where personnel entry is required.
         .3 Where access doors are required to be located in fire rated walls, floors and ceilings, provide ULC listed and labelled units having a minimum rating in hours per OBC for the structure being penetrated.

      2. Material:
         .1 Fabricated of 2.5mm (12 ga) bonderized steel.
         .2 Fabricated of 2.5mm (12 ga) stainless steel in areas finished with tile or marble surfaces.
         .3 Flush mounted, concealed hinges and screwdriver lock.
         .4 Plast lock and anchor straps.
         .5 Doors to be of a type and fire rating to suit the particular type of wall or ceiling construction in which they are to be installed.

      3. Acceptable Manufacturers:
         .1 E.H. Price
         .2 Titus
         .3 Controlled Air
         .4 Williams (S.M.S.)
         .5 Acudor
         .6 Or approved equivalent

   2. Isolating Unions

      4. Acceptable Manufacturers:
         .1 Epcoscor
         .2 Marpac "Petro"
         .3 Corrosion Service
         .4 Or approved equivalent
3. **Execution**

1. **Equipment**

   1. **General**

      1. Install equipment in a compact, neat and workmanlike manner.

      1.1 Align, level and adjust for satisfactory operation.

      1.2 Install in such a manner that connecting and disconnecting of piping and accessories can be made readily and that all parts are easily accessible for inspection, operation, maintenance and repair.

      2. Install and start up items of equipment in accordance with the manufacturer's printed installation and operating instructions.

   2. **Noise and Vibration**

      1. Noise and vibration levels of equipment and systems shall be within design intent.

      2. If noise or vibration levels created by any mechanical equipment and systems and transmitted to occupied portions of building or other mechanical work are over the limits, make all necessary changes and additions as approved by the Consultant without additional cost.

   3. **Lubrication**

      1. Lubricate all equipment prior to start up in accordance with the manufacturer's printed instructions.

      2. Supply all lubrication including sufficient quantity for drainage and refilling of oil sumps, etc., when required by manufacturer's instructions.

   4. **Equipment Bases and Pads**

      1. Construct bases and pads for all mechanical equipment. Pads shall be constructed of concrete c/w reinforcement and dowels. Refer to structural drawings and specifications for details.

      1. Layout coordination:

      1.1 Verify size of bases shown on Drawings with actual requirements and advise the Consultant and the respective trades if change in size or shape of pad is required.

      2. **Anchor bolts:**

      1. Supply anchor bolts required for mechanical equipment unless indicated otherwise on the Drawings.
.2 Sleeve anchor bolts.
.3 Supply anchor bolts and sleeves to trade constructing bases in sufficient time for setting in formwork prior to placing concrete and provide anchor bolt location drawing or template for locating anchor bolts.
   .1 Check anchor bolt locations for proper position before concrete is poured.

.5 Setting and Alignment of Equipment

.1 Rotating equipment (fans, pumps, etc):
   .1 Use millwrights to set and align to lines established with an engineer’s level.
   .2 Shim equipment using standard brass or bronze shim stock of suitable thickness to provide proper level and alignment.
   .3 Place 25mm (1”) minimum thick grout between equipment base and concrete pad or foundation.
   .4 Have the Consultant approve equipment settings for equipment mounted on concrete pads or foundations prior to grouting.
   .5 Re-check alignment prior to start-up of equipment.

.6 Ceiling or Wall Mounting

.1 Where ceiling or wall mounting is indicated or required, provide a suspended platform, bracket or shelf.

.2 Materials: standard steel members and steel plates of welded construction throughout.

.3 Attach to building steel with rod hangers and beam clamps, or attach to precast structure as the case may be.

.4 Place additional structural steel as required between building steel where beam spacing does not meet requirements.

.5 Do not use inserts unless specifically shown on the Drawings or approved by the Consultant for any particular item of equipment.

.6 Attach brackets or shelves to vertical member or sections of the building structure as hereinbefore specified.

.7 Suspended Equipment Support: Provide double locknuts on suspended equipment supports as follows:

.1 Upper attachment
   .1 Beam clamp: provide a double nut on end of beam clamp tie rod.
   .2 Supplemental steel: double nut all mechanical fasteners fixing supplemental steel to building structural steel.

.2 Middle attachment
   .1 Upper load bearing point, to beam clamp: not applicable.
   .2 Upper load bearing point, to supplemental steel: double nut on top of load bearing point, single locknut on underside of bearing point
   .3 Lower load bearing point, all: double nut on underside of bearing point, single locknut on top of bearing point.
.3 Lower attachment
   .1 Trapeze hanger or equipment fastening: refer to middle attachment requirements above.

.4 Apply Loctite 242 to the second nut (and matchmark both nuts).

2. Miscellaneous Steel
   .1 General
      .1 Hang or support equipment, piping, ductwork etc., with miscellaneous structural supports, platforms, braces as may be required unless Drawings or other Sections of the Specifications state otherwise.

   .2 Materials and Fabrication
      .1 Conform to:
         .1 CAN/CSA-S16.1-M Limit Status Design of Steel Structures.
         .2 CSA-G40.20/G40.21 grade 300W for General requirement for rolled or welded Structural Quality Steel CSA W47.1 - for qualification of welders.
         .3 CSA W48.1-M - for electrodes (only coated rods allowed).
         .4 CSA W59-M - Welded Steel Construction (Metal Arc Welding).
         .5 CSA W117.2 - for safety in welding.

      .2 Construction:
         .1 Welded construction wherever practicable.
         .2 Chip welds to remove slag, and grind smooth.
         .3 Bolted joints allowed for field assembly using high strength steel bolts.

   .3 Painting and Cleaning
      .1 Clean steel to Steel Structures Painting Council SSPC-SP6, Commercial Blast Cleaning.

      .2 Apply one coat of oil alkyd primer conforming to CISC/CPMA 2.75 to all miscellaneous steel.

      .3 In the field, touch up all bolt heads and nuts, previously unpainted connections and surfaces damaged during erection with primer as hereinbefore specified.

      .4 Apply two coats of primer to all surfaces which will be inaccessible after erection.

      .5 Thoroughly remove all foreign matter from steelwork on completion of installation.

3. Concrete Inserts
   .1 General
      .1 Install inserts required for attachment of hangers, either for suspension of piping or equipment.
.2 For masonry or poured concrete construction use expansion type units. Insert into the concrete after concrete has cured. Do not use anchors or inserts installed by explosive means.

4. Flashings

.1 Coordination

.1 Coordinate with general trades and roofing supplier.

.2 Provide flashing and counter-flashing for all mechanical and related electrical penetrations through roof. Costs resulting from failure to comply with this requirement are the sole responsibility of the contractor.

.3 Acceptable Manufacturer: Thaler Metal or approved equal.

.1 Flexible steel conduit: Thaler model MEF-2x

.2 Rigid conduit: MEF-AE1

.3 Gas Piping: MEF-9

.4 Or approved equivalent.

5. Fire Stopping

.1 Submittals

.1 Submit shop Drawings, including the following information:

.1 ULC/CUL listing number

.2 Installation Drawings for each type of penetration

.3 Installation materials

.2 General

.1 Seal piping, ductwork, conduits and miscellaneous support steel penetrating fire separations.

.2 Install fire stopping in accordance with manufacturer’s instructions and ULC listing requirements.

.3 Provide a written report on completion of fire stopping, by area or floor if necessary, indicating the work is completed and ready for inspection. Do not cover over fire stopping, including installation of walls and ceilings, until work is inspected.

6. Access Doors

.1 General

.1 Access doors in ductwork are specified in Section 15820 “Ductwork Accessories”.

.2 Supply access doors for installation by other trades in walls or ceilings where accessibility is required for the operation and/or maintenance of:

.1 Concealed valves
.2 Traps
.3 Cleanouts
.4 Dampers
.5 Fan Coil Units
.6 Controls equipment

7. Performance and Balancing

.1 Refer to section 15990 Start-up and Performance Testing.

8. Adjustment and Operation of Systems

.1 General

.1 When the work is complete:
  .1 Adjust equipment items of the various systems for proper operation within the framework of design intent, and the operating characteristics as published by the equipment manufacturer.
  .2 Complete additional instructions are specified under the respective Sections of Division 15.

.2 The Consultant reserves the right to require the services of an authorized representative of the manufacturer in the event that any item of equipment is not adjusted properly.
  .1 Arrange for such services and pay all costs thereof.
  .2 After completion of adjustments, place systems in full operating condition and advise the Consultant that the work is ready for acceptance.

9. Acceptance

.1 General

.1 After all equipment has been installed and adjusted and all systems balanced:
  .3 Conduct performance tests in the presence of the Consultant and the Owner.
  .4 Arrange the time for these tests at the convenience of the Consultant and the Owner.
  .5 Conduct tests under climatic circumstances to ensure complete and comprehensive tests and of such a manner and duration as the Consultant may deem necessary.

.2 During these tests:
  .1 Demonstrate the correct performance of all equipment items and of the systems they comprise.
  .2 Should any system or any equipment item fail to function as required, make such changes, adjustments or replacements necessary to meet performance requirements.
  .3 Repeat tests until requirements have been fully satisfied and all systems accepted by the Consultant.

10. Coordination with Testing and Balancing work

.1 General
.1 Review with the Mechanical Contractor before fabrication:
   .1 Location of balancing devices
   .2 Test connections
   .3 Access openings

.2 Report conditions which could affect optimum system performance.

.3 Inspection:
   .1 Assure that all testing, balancing and metering devices are installed properly and in pre-selected locations.
   .2 Report any errors to the Consultant.
   .3 The Mechanical Contractor shall obtain the approval of the Testing and Balancing Firm before relocating these devices due to field conditions.

.2 TAB Contractor Coordination

   .1 Cooperate with the Mechanical Contractor giving adequate prior notification of request for services of tradesmen.

   .2 Coordinate efforts so that items requiring replacement and/or delivery time (sheaves, motors, etc.) are tested as early as possible.

.3 Mechanical Contractor Coordination

   .1 Cooperate with the Testing and Balancing Firm.

   .2 Provide the following assistance and/or services:
      .1 Schedule sufficient time so that the initial testing and balancing can be completed before occupancy begins and coordinate with the trades involved.
      .2 Keep the Testing and Balancing Company informed of any major changes made during construction and provide same with a set of project Drawings and reviewed Shop Drawings.
      .3 Provide balancing devices, test connections access openings, balancing probe inlets and plugs.
      .4 Clean and pre-run all equipment, filters, etc. and place all heating, ventilating and air conditioning systems into full operation and continue same during each working day of testing and balancing.
      .5 Provide immediate labour from pertinent mechanical trades and tools, equipment and materials to make equipment and system alterations and adjustments, as required including control adjustments.
      .6 Make available all equipment data (Shop Drawing performance data and operating instructions) to the Testing and Balancing Firm.

   .3 As part of the coordination effort, the Mechanical Contractor shall be fully responsible for systems constructed, installed and adjusted to Provide optimum performance as required by design intent. Any re-adjusting required as the result of spot checks by the Consultant shall be done at no increase in Contract Price.

   .4 Nothing contained in this Section voids the responsibility of the Mechanical Contractor (Subcontractor) for systems constructed, installed and adjusted to achieve the design intent.

   END OF SECTION
1. **General**

1. Submittals

1.1 Shop Drawings

1.1 Submit Shop Drawings in accordance with 15010 “Basic Mechanical Requirements”.

1.2 Submit layout Drawings showing each type and placement of manufactured, pre-fabricated roof piping support system. Submit details for fixing roofing pad to roof.

2. **Products**

1. Materials

1.1 Acceptable Manufacturers

1.1 Hangers:

1.1.1 Anvil
1.1.2 Myatt
1.1.3 Carpenter & Paterson
1.1.4 Hunt
1.1.5 B-Line
1.1.6 Or approved equivalent

1.2 Insulation shields:

1.2.1 Anvil
1.2.2 Myatt
1.2.3 Pipe Shields Inc.
1.2.4 Or approved equivalent

1.2 Lower Attachment

1.2.1 Clevis hanger – steel pipe

1.2.1.1 Standard weight black steel clevis hangers with level adjustment and locknut
1.2.1.2 Anvil figures 260 and 300.
1.2.1.3 For figure 260, provide clevis bolt spacer on insulated piping.
1.2.1.4 Or approved equivalent

1.2.2 Clevis hanger – copper pipe

1.2.2.1 Light weight black steel clevis hangers with copper coloured finish and plastic insert to suit local authority requirements, with level adjustment and locknut.
1.2.2.2 Anvil figure CT-65.
1.2.2.3 Or approved equivalent

1.2.3 Roller hanger

1.2.3.1 Adjustable roller type hangers with locknuts.
1.2.3.2 Rollers of sufficient width to clear the outside diameter of the insulation on the piping.
.3 Support rollers at both ends, either by a yoke, swivel type hanger or by two adjustable rods with locknuts (double locknuts).
.4 Anvil figure 177 or 171 as applicable.
.5 Or approved equivalent

.3 Insulation Protection

.1 Insulation saddles, for welding to pipe:
  .1 Anvil figure 160-165 as applicable.
  .2 Or approved equivalent

.2 Insulation shields:
  .1 Either shop fabricated, or manufactured plates of the size required to properly fit the outside diameter of the pipe insulation.
  .2 Anvil figure 167, modified with holes at each end to suit 12 mm wide stainless steel band clamps.
  .3 Shop fabricate bearing plates conforming to the following table for various pipe sizes:

<table>
<thead>
<tr>
<th>Pipe Size (NPS)</th>
<th>Length of Plate mm</th>
<th>Thickness of Plate mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ to 2</td>
<td>300</td>
<td>1.2</td>
</tr>
<tr>
<td>3 to 4</td>
<td>300</td>
<td>1.52</td>
</tr>
</tbody>
</table>

.4 Form the bearing plates to the O.D. of the adjoining pipe insulation and extend the plate up to the horizontal centre line of the pipe.

.4 Middle Attachment

.1 Machine threaded rods
  .1 Black steel finish in concealed areas.
  .2 Galvanized finish in mechanical rooms and exposed areas.

.5 Upper Attachments

.1 Beam clamps:
  .1 Malleable iron C-Clamp with retaining clip, FM approved: Anvil figure 87, NPS ½ to NPS 2; maximum load: 180 kg.
  .2 Malleable beam clamp FM approved: Anvil figure 218, NPS 2½ to NPS 8; maximum load: 540 kg.
  .3 For pipes NPS 10 and larger, provide supplementary steel members supported from structural steel.
  .4 Do not use top beam clamps.

.2 Concrete inserts (new construction):
  .1 Single hanger: Malleable iron body and nut, universal nut style: Anvil figure 282, to NPS 8.
  .2 Continuous hanger: cold formed hot dipped galvanized strip steel with end caps: Power-Strut PS 449.

.3 Concrete clevis plates (existing concrete):
  .1 Carbon steel plate, with clevis attachment.
.2 Anvil figure 49.
.3 Do not use explosive driven anchors.
.4 Or approved equivalent

.6 Rooftop Pipe Supports

.1 Prefabricated pipe support system:
  .1 Bases: injection moulded plastic, structurally reinforced.
  .2 Framing: fabricated steel to ASTM A570 Grade 33 (stainless steel Type 304 to ASTM A 167), roll formed 2.7 mm (12 ga) thick tubular sections. Tubing perforated with nominal 14 mm diameter holes on nominal 50 mm centres on 3 sides.
  .3 Hangers: as specified above.
  .4 Clamps, bolts, nuts and washers to suit installation, same material as framing members.
  .5 Roof pads to suit roof construction.

.2 Acceptable Manufacturers:
  .1 Portable Pipe Hangers
  .2 Unistrut
  .3 Or approved equivalent

.7 Riser Clamps

.1 Black steel double clamp: Anvil figure 261, supported at floors; Anvil figure 240, supported by hanger rods.

.2 Or approved equivalent

.8 Pipe Guides

.1 Outer hinged housing with sliding spider clamp.
  .1 Carbon steel, black steel finish.
  .2 Anvil figure 256.
  .3 Or approved equivalent

3. **Execution**

1. Installation

   .1 General

   .1 Support or suspend piping with necessary hangers, structural supports and/or brackets, to prevent sagging, warping and vibration and to allow for movement due to expansion and contraction. Provide adequate number of expansion compensators of suitable materials as required to allow movement of pipe work.

   .2 Place hangers and supports close to fittings, elbows, valves and/or other heavy parts.

   .3 Do not allow loads of any nature to be transmitted through the piping connections to equipment not specifically designed for such loads.
.1 Where flexible connections are not called for at connections to equipment, support the pipe by stands attached to both pipe and supporting structure so that force in any direction is not transmitted to the equipment.

.4 Place suitably dampened spring hangers at the first three supports from the equipment connection on piping subject to excessive movement or shock from any source, thermal expansion and contraction.

.1 Where it is evident that no undue loads will be transmitted to the equipment by the system concerned, i.e. small bore connections to comparatively large equipment, cold service piping not subject to shock, etc., then spring hangers may be omitted and standard hangers used.

.5 Do not hang pipe from another pipe unless specifically shown on the Drawings.

.2 Hanger Selection

.1 Select lower attachment and insulation protection based on the following, unless otherwise shown on Drawings:

<table>
<thead>
<tr>
<th>Pipe Size NPS</th>
<th>Operating Temperature</th>
<th>Insulated</th>
<th>Non-insulated</th>
<th>Insulated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 21°C</td>
<td>Between 21°C and 43°C</td>
<td>Greater than 43°C</td>
<td></td>
</tr>
<tr>
<td>2 and less, steel</td>
<td>Clevis and Shield</td>
<td>Clevis only</td>
<td>Clevis</td>
<td></td>
</tr>
<tr>
<td>2½ to 8, steel</td>
<td>Clevis and Shield</td>
<td>Clevis only</td>
<td>Roller and Saddle</td>
<td></td>
</tr>
<tr>
<td>½ to 4, copper</td>
<td>Clevis and Shield</td>
<td>Clevis</td>
<td>Clevis and Shield</td>
<td></td>
</tr>
</tbody>
</table>

.2 Install temporary spacers between the insulation Shield and the pipe equal to the thickness of insulation specified. Refer to Section 15080 “Mechanical Thermal Insulation”.

.3 Saddles and Roller Supports

.1 Place saddles at roller supports for piping carrying liquids at 43°C (110°F) or higher.

.2 Weld saddles to black or galvanized steel piping.

.3 Refinish galvanized surfaces destroyed by the welding with a zinc rich paint such as W.R. Meadows "Galvafront", Kerry Industries "ZRC" or Niagara Paint Inc. "PL052898" or Approved Equivalent.

.4 Insulation Shields

.1 Place insulation shields at pipe supports for pipes carrying liquids at 21°C (70°F) or less.

.2 Field or factory punch a hole at each end of the shield to allow a 12 mm stainless steel band clamp to pass through opening.

.3 Secure shields with 2@ 12 mm stainless steel band clamps per shield.

.5 Hanger Spacing - General
.1 Horizontal runs of plumbing and drainage piping: to hanger spacing requirements of the Ontario Building Code.

.2 Place additional hangers in locations where there are concentrated loads such as valves, specialties, etc.

.6 Hanger Spacing - Black Steel and Galvanized Pipe

.1 For horizontal runs of black or galvanized steel pipe, other than for plumbing service:

.2 Maximum distances between supports and with minimum diameter rods as follows:

<table>
<thead>
<tr>
<th>Pipe Size NPS</th>
<th>Rod Size mm</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Water Service</td>
</tr>
<tr>
<td>½ Thru 1</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>1¼</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>1½</td>
<td>10</td>
<td>2.7</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>3.0</td>
</tr>
<tr>
<td>2½</td>
<td>12</td>
<td>3.3</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>3.6</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>4.2</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>5.0</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>5.0</td>
</tr>
</tbody>
</table>

.7 Hanger Spacing - Copper Tubing

.1 For horizontal runs of copper tubing for services other than plumbing:

.2 Maximum distances between supports and with minimum diameter rods as follows:

<table>
<thead>
<tr>
<th>Pipe Size NPS</th>
<th>Rod Size mm</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Water Service</td>
</tr>
<tr>
<td>Thru ¾</td>
<td>10</td>
<td>1.5</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>1.8</td>
</tr>
<tr>
<td>1¼</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>1½</td>
<td>10</td>
<td>2.4</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>2.4</td>
</tr>
<tr>
<td>2½</td>
<td>12</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>3.0</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>3.6</td>
</tr>
</tbody>
</table>

.8 Hanger Spacing - PVC or CPVC

.1 For horizontal runs of PVC or CPVC for services other than plumbing.
.2 Maximum distances between supports and with minimum rods sizes for uninsulated pipe as follows.

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Rod Size NPS</th>
<th>PVC 40</th>
<th>CPVC 40</th>
<th>PVC 80</th>
<th>CPVC 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>6</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>¾</td>
<td>6</td>
<td>1.2</td>
<td>1.5</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>1.2</td>
<td>1.5</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>1¼</td>
<td>6</td>
<td>1.5</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>1½</td>
<td>6</td>
<td>1.5</td>
<td>1.8</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>1.8</td>
<td>2.0</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>2½</td>
<td>6</td>
<td>1.8</td>
<td>2.0</td>
<td>2.0</td>
<td>2.4</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>2.0</td>
<td>2.4</td>
<td>2.4</td>
<td>2.7</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>2.4</td>
<td>2.4</td>
<td>2.7</td>
<td>3.0</td>
</tr>
</tbody>
</table>

.3 For insulated pipe, reduce spacing by 30%.

.4 Do not restrain axial movement.

.5 Spacing based on fluids with specific gravity of 1.0 and 26°C 80°F. For other conditions, use other published data approved by the Consultant.

.9 Anchors and Guides

.1 Provide anchors as required to maintain permanent location of pipe lines.
.1.1 Construct anchors for steel or galvanized pipe of approved steel straps and/or rods.
.1.2 For anchoring copper lines, use copper plated anchors, or use insulation bands between tubing and clamps if steel straps or rods are used.

.2 Provide minimum two (2) pipe guides on each side of an expansion joint and expansion compensator.
.2.1 1200 mm between each guide.
.2.2 Not more than 900 mm between last guide and start of expansion joint or expansion compensator.

.3 For special expansion joint/compensator or for special applications, where more than two guides on each side are required, follow manufacturer recommendations for location of guides.

.10 Inserts

.1 In new construction, set inserts onto formwork prior to pouring of concrete.
.1.1 Provide a 200 mm length of rebar and wire through insert.

.2 Mechanical rooms and other areas of multiple pipe runs.
.1.1 Provide continuous type insert channels at 1800 mm intervals alone route of piping.
.2.1 Provide a 200 mm length of rebar and wire through insert.
.11 Upper Attachments - Structural Steel

.1 For pipe size NPS 10 and larger supported from structural steel:
   .1 Provide supplementary structural steel and weld or bolt to structural steel.
   .2 Submit plan Drawings and details to the structural engineer for review.

END OF SECTION
ASBESTOS ABATEMENT SPECIFICATIONS
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Final Clearance Test Checklist  
Typical Decontamination Enclosures  
Electrician’s Submittal Form
1.0  PART 1 – GENERAL

1.1  GENERAL

.1 The requirements as set out in these specifications may, at times, exceed the procedures
detailed in the various applicable regulations. All work shall be done in compliance with
the specifications AND the regulations. Should there be any discrepancy or conflict
between the documents, the most stringent shall apply.

1.2  OUTLINE OF WORK

.1 The intent of the work is to remove select asbestos-containing materials to the extent
practicable, in designated areas in the facility prior to renovations.

.2 Replacement of removed materials is not part of this contract unless otherwise noted.

.3 Coordinate all work with the General Contractor and sub trades as required.

.4 Refer to Architectural Drawings for locations and details.

.5 All mechanical, electrical, communication and fire alarm systems isolations and
disconnects associated with asbestos removal operations will be performed by the General
Contractor’s sub trades prior to commencement of remedial work.

.6 Removal of fluorescent light tubes in light fixtures affected by asbestos removal operations
will be performed by the General Contractor’s sub trades prior to commencement of
remedial work.

.7 Hookups of GFI panels will be performed by the General Contractor’s electrical sub trade.

.8 Each HEPA fan-filtered negative pressure unit shall be integrity tested at the work site prior
to commencement of asbestos removal operations.

.9 Provide all supervision, labour, equipment, tools, materials, waste management, haulage
and disposal, and other services, as required, for undertaking and completing all of the
work, as detailed below.

.10 Work Area 1 – Corridors 1, 2, and 3

.1 Prepare the areas as indicated above and on the attached floor plan for a Type 3
asbestos removal operation.

.2 Supply and install scaffolding, in accordance with all applicable regulations, in
order to provide sufficient and safe access to the work areas.

.3 Carefully detach all conduits, wire moldings, etc., attached to asbestos-containing
texture coat ceiling finishes, remove all dust and debris and protect using
polyethylene sheeting and tape. During ceiling demolition operations, provide
temporary support to any systems attached to ceilings.
.4 Remove and dispose as asbestos waste, entire solid ceiling assemblies including, but not limited to, light fixtures, ceiling grilles, other attachments not being retained, asbestos-containing texture coat ceiling finishes, substrate plaster, underlying materials, lath, ceiling support systems and asbestos-containing thermal insulation that may be present on rainwater piping inside ceiling cavities.

.1 Light fixtures and ceiling support systems may be disposed as clean demolition waste provided they are thoroughly cleaned of all texture coat and plaster dust and debris.

.11 Texture coat ceiling finish contains 2% chrysotile asbestos.

.12 All waste is to be removed from the site and disposed. Asbestos waste disposal bins are not to be left on school property unless fully enclosed with an integral metal roof system and locked. Disposal bins must be removed immediately on completion of work.

.13 Schedule

.1 Mobilization July 2, 2019

.2 Complete Work and Demobilize July 23, 2019

.14 The milestone dates identified above are fundamental conditions of the Contract and failure to achieve these dates will be considered a breach of the Contract. The Asbestos Contractor must schedule adequate manpower to achieve completion by the milestone dates.

1.3 GENERAL REQUIREMENTS

.1 The location and availability of utilities including water, sewer and electrical power is to be determined on site. The Asbestos Contractor shall co-operate with all others on site. Should there be any disagreement, or should Contractors be unable to reach a satisfactory working arrangement, the Asbestos Consultant shall determine the manner for proceeding. The Asbestos Contractor shall not be entitled to any additional payment.

.2 The Asbestos Contractor is responsible for making all arrangements, and for paying for the disposal of all waste materials in accordance to all applicable government laws and regulations including local, provincial and federal.

.3 The Asbestos Contractor is advised that extended hours of work may be required to meet the schedules as detailed in the Scope of Work and shall allow for the cost thereof including shift premiums and overtime. The Asbestos Consultant shall be advised in writing at least four days in advance of the proposed working hours.

.4 The Asbestos Contractor shall furnish and post on site the name and current phone number of an authorized representative(s) who can be contacted on a 24-hour basis in case of an emergency.

.5 All precautions will be taken to prevent the spread of contaminated material and to protect all parties including Asbestos Contractor’s personnel, Owner’s employees and the public...
from asbestos dust exposure during the course of the work. The documents outline the minimum levels of precaution to be taken.

.6 All work shall be done in compliance with the specifications and the Ontario Regulation 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations – made under the Occupational Health and Safety Act. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

.7 Contract conditions include, but are not limited to, complying with all Regulations, taking all precautions necessary to control the release of asbestos fibres within the work areas, preventing the release of asbestos fibres outside the work areas, and providing appropriate protection from exposure to asbestos fibres for all parties. Failure to meet any of these conditions will be considered a fundamental breach of the Contract.

.8 The Asbestos Consultant will visit the site at his/her discretion to familiarize himself/herself with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents.

.9 The Asbestos Consultant shall have the authority to immediately stop the Work through a written instruction if, in his opinion, the Work does not conform to the requirements of the Contract Documents, or if continuance of the Work could subject the Owner, his employees or the public to a hazardous condition. The Work shall not recommence until such time as the deficiency or hazardous situation has been corrected and a written notice to proceed has been issued by the Asbestos Consultant.

.10 If the Asbestos Contractor fails to comply with requirements dealing with the control of asbestos fibres and the health and safety of Asbestos Contractor employees, Asbestos Consultant and Owner personnel or the Public, the Owner, or the Owner’s representative, may verbally instruct the Asbestos Contractor to cease work immediately with written confirmation to follow within two working days. If the Asbestos Consultant gives a written statement to the Owner and the Asbestos Contractor that sufficient cause exists, the Owner may notify the Asbestos Contractor in writing that he is in default of his contractual obligations.

.11 Any employee shall be replaced, at the written request of the Asbestos Consultant, if working, or causing others to work, in violation of O.Reg. 278/05.

.12 The Asbestos Contractor’s insurance coverage limits, per occurrence, shall equal or exceed the following and shall name the Owner, the Architect and Arcadis Canada Inc. as additional insureds:

.1 General Liability $5 million;
.2 Automotive Liability $2 million;
.3 Pollution Liability $5 million including asbestos operations.

.13 The supervisor must have proven experience and proficiency in the type of Work being undertaken under this Contract.

.14 The supervisor shall be replaced, at the written request of the Asbestos Consultant, if found to be incompetent or inattentive to the needs of the project.
.15 Where standards of performance are specified or implied and the Work does not comply with the performance specified or implied, such deficiencies shall be corrected as directed by the Asbestos Consultant. Any subsequent testing shall be done at the Asbestos Contractor’s expense.

1.4 DEFINITIONS

.1 HEPA Vacuum:

.1 High Efficiency Particulate Aerosol (HEPA) filtered vacuum equipment acceptable to Health and Welfare Canada and meeting U.S. Military Standard 282. This vacuum equipment shall have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 micrometer or larger.

.2 Polyethylene sheeting sealed with tape:

.1 Polyethylene sheeting of thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.

.3 Inspector:

.1 Representative of ARCADIS CANADA INC. (ARCADIS) designated by the owner to provide inspection and air monitoring of the Contractor’s work.

.4 Authorized Visitor:

.1 Representative of the building owner, ARCADIS, and/or persons representing regulatory agencies.

.5 Amended Water:

.1 Water with a non-ionic surfactant added to reduce water tension to allow thorough wetting of asbestos fibres.

.6 Airlock:

.1 A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area typically consisting of two curtained doorways at least 1.5 m apart.

.7 Curtained Doorways:

.1 An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway.
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.2 All free edges of polyethylene shall be reinforced with duct tape and the bottom edge shall be weighted to ensure proper closing. Each polyethylene sheet shall overlap openings an additional 1/3 of the doorway width.

.8 Operating Area:
.1 Area where no removal or repair Work is underway.

.9 Clean Area:
.1 Either an operating area or an area in which removal Work has already been completed.

.10 Work Area:
.1 Where the actual removal of asbestos-containing materials take place.

.11 Negative Pressure:
.1 A system which extracts air from the work area and discharges this air directly outside the building, sufficient to maintain a minimum pressure differential of 0.5 mm (0.02 inch) of water column relative to adjacent areas outside of work areas. This air extraction system is to be equipped with a High Efficiency Particulate Aerosol filtering system before discharge.

.12 Confined Space:
.1 A fully or partially enclosed space,
.1 that is not both designed and constructed for continuous human occupancy, and
.2 in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

1.5 REGULATORY AGENCIES

.1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirement shall apply. These include, but are not limited to, the following:


.2 Ontario Ministry of the Environment Regulation 347 (previously 309) under the Environmental Protection Act (as amended by O.Reg. 175/83; O.Reg. 574/84; O.Reg. 322/85), June 17, 1985.
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.3 Government of Canada Regulations Respecting the Handling, Offering for Transport and Transporting of Dangerous Goods. (Extract from the Canada Gazette Part II, dated February 6, 1985.)


.5 Office of the Fire Commissioner of Canada.

.6 Ontario Electrical Safety Code.

.7 Regulation 647 RRO ’70 of the Plumbing Code.

.2 Patents:

.1 It shall be the Contractor’s responsibility to ensure that all applicable patent laws are complied with.

1.6 FIRE SAFETY PLAN

.1 Prior to initiating any work on the site, the Contractor shall prepare and submit in writing to the Engineer a Fire Safety Plan. The Plan shall be in accordance to the requirements set forth in Section 2.14, Construction and Demolition Sites, of the National Fire Code and shall include:

.1 the designation and organization of site personnel to carry out fire safety duties, including fire water services if applicable;

.2 the emergency procedures to be used in the case of fire, including:

.1 sounding the fire alarm;

.2 notifying the fire department;

.3 instructing site personnel on procedures to be followed when the alarm sounds; and

.4 fire fighting procedures;

.3 the control of fire hazards in and around the building;

.4 maintenance of fire fighting facilities; and

.5 special requirements as may be identified by the building owner.

.2 Implementation of the Fire Safety Plan shall be the sole responsibility of the Contractor, and the above shall, in no way, limit the Contractor’s statutory and regulatory obligations. During the work, the Fire Safety Plan shall be prominently displayed at the site and its requirements included in site safety training and awareness programs.
1.7 Submittals

1.7.1 Submittals Before Commencing Work

.1 The following documentation shall be submitted to the Inspector with a dated covering letter listing attachments a minimum 48 hours prior to commencement of the Work:

.1 Permits and Notifications:

.1 All necessary permits for transporting and disposal of asbestos waste. Submit proof satisfactory to Inspector that suitable arrangements have been made to receive and properly dispose of asbestos waste. Copies of all Notifications required by Section 1.11.

.2 Material Safety Data Sheets:

.1 Material Safety Data Sheets, or equivalent, for any sealant, surfactant or other material proposed for use. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

.3 Supervisory Personnel:

.1 Names of supervisory personnel who will be responsible for work area(s). One of these supervisors must remain on site at all times asbestos removal or cleanup is occurring. Submit proof that supervisory personnel have over 2000 hours experience on asbestos abatement projects, have performed supervisory functions on at least two other asbestos projects and have achieved the level of training as set out by the Regulation.

.4 Schedule:

.1 Provide a bar chart indicating planned progress for critical activities as required under Scope of Work as well as additional information listed below a minimum of 48 hours prior to commencement of any preparatory work indicating:

.1 shifts to be worked;
.2 proposed workforce;
.3 starting date;
.4 estimated date of commencement of asbestos removal;
.5 estimated date of completion of asbestos removal;
.6 estimated completion date.
.5 **Insurance:**

.1 Provide a Certificate signed by the insurance agency naming the Owner, the Architect and Arcadis Canada Inc. as co-insureds.

2. The Asbestos Contractor’s insurance coverage limits, per occurrence, shall equal or exceed the following:

   .1 General Liability $5 million;
   .2 Automotive Liability $2 million;
   .3 Pollution Liability $5 million including asbestos operations.

.3 The Asbestos Contractor must provide thirty (30) days notice of cancellation or amendment of coverage.

.6 **Fire Safety Plan:**

.1 In accordance to Article 1.6 above.

.7 **Confined Space:**

.1 If a work area, or part thereof, is a confined space, the contractor shall submit:

   .1 a co-ordination document (see Section 1.13.1.1);
   .2 a written program (see Section 1.13.1.2);
   .3 a written plan (see Section 1.13.1.4).

.8 **Asbestos Training:**

.1 A letter certifying that:

   (a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

   (b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O.Reg. 278/05, s. 20(1).

1.7.2 **Submittals Before Commencing Asbestos Removal**

.1 Results of HEPA fan-filtered negative pressure unit integrity tests.

.2 Proposed Work Area emergency exit procedures.

.3 Proposed locations of decontamination facilities and negative pressure units and exhaust routing.
.4 Evidence (letter or other suitable documentation) of proper construction, inspection and installation of GFI panel by licensed electrician in compliance to all regulatory requirements and codes.

1.7.3 Submittals Upon Completion of Work

.1 Asbestos waste haulage and disposal documentations including Bills of Lading, waste transfer documents and dump receipts.

.2 All documentation as specified in the contract General Conditions including, but not limited to, Workplace Safety and Insurance Board Certificate, Statutory Declarations and Proof of Publication of Substantial Performance.

1.8 Existing Conditions

.1 Texture coat ceiling finish contains 2% chrysotile asbestos.

.2 Mercury is present in florescent light tubes.

.3 Masonry applications may contain silica. Paint applications may contain lead and mercury. Appropriate dust control procedures and respiratory protective equipment are to be used if disturbing these materials.

1.9 Restrictions

.1 Do not allow smoking, eating or drinking in the work area.

.2 Do not allow entry to work area by unauthorized persons.

.3 Compressed air shall not be used in the work area.

.4 Open flames will not be permitted in the work area (including but not limited to torches and propane-fired heaters).

1.10 Worker Protection

.1 Instructions:

.1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.

.2 Respiratory Protection:

.1 Provide workers with personally issued and marked respiratory equipment acceptable to the Occupational Health and Safety Division of the Ontario Ministry of Labour, suitable for the asbestos exposure in the work area.
.2 Ensure that suitable respiratory protective equipment is worn by every worker who enters the work area. A respirator provided by an employer and used by a worker:

.1 shall be in accordance to O.Reg. 278/05, Section 13, respirators.

.2 shall be fitted so that there is an effective seal between the respirator and the worker’s face;

.3 shall be assigned to a worker for the worker’s exclusive use;

.4 shall be used and maintained in accordance with the procedures specified by the equipment manufacturer;

.5 shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary;

.6 shall have damaged or deteriorated parts replaced prior to being used by a worker; and

.7 when not in use, shall be stored in a convenient, clean and sanitary location.

.3 Protective Clothing:

.1 Provide workers with protective clothing which shall:

.1 be worn by every worker who enters the work area,

.2 be made of a material which does not readily retain nor permit penetration of asbestos fibres,

.3 consist of full body covering including head covering with snug fitting cuffs at the wrists, ankles and neck,

.4 include suitable footwear, and

.5 be repaired or replaced if torn.

1.11 Notifications

.1 Notify, in writing, the local Fire Department of the extent of the work, including a copy of the Fire Safety Plan detailed in Article 1.6 above.

.2 Notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the work place of the operation. O.Reg. 278/05, Section 11.

.1 The written notice required by subsection (1) shall set out:

.1 the name and address of the person giving the notice;
.2 the name and address of the owner of the place where the work will be carried out;

.3 the municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;

.4 a description of the work that will be carried out;

.5 the starting date and expected duration of the work; and

.6 the name and address of the supervisor in charge of the work.

1.12 PROTECTION, REPAIR AND REPLACEMENT OF EQUIPMENT AND MATERIALS

.1 All equipment within and surrounding the work area shall be suitably protected by the Contractor during the work periods.

.2 All equipment damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Owner.

1.13 CONFINED SPACES

.1 If any work area, or part thereof, is a confined space, the contractor shall comply with all requirements respecting confined spaces specified in O. Reg. 213/91, including but not limited to:

.1 preparation of a co-ordination document;

.2 development of a written program;

.3 assessment of hazards;

.4 development and implementation of an adequate written plan;

.5 provision of adequate worker training; and

.6 issuance of entry permits.
.2 The contractor shall perform adequate air tests while a worker is in a confined space to ensure that acceptable atmospheric levels are maintained in the confined space, including during any inspections and during final clearance air monitoring performed by ARCADIS.

.3 The contractor shall provide an attendant for communications and rescue response whenever a worker is to enter a confined space, including during inspections and final clearance air monitoring by ARCADIS.

.4 The contractor shall provide ARCADIS with calibration records for air testing equipment and copies of all records of atmospheric monitoring of confined space.

.5 The co-ordination document (see Section 1.13.1.1) shall refer to the contractor’s responsibilities for air testing, communications and rescue response specified in Sections 1.13.2 and 1.13.3, above.
2.0 PART 2 – PRODUCTS

2.1 MATERIALS

.1 Polyethylene:
  .1 In 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

.2 Tape:
  .1 Reinforced duct tape suitable for sealing polyethylene under both wet conditions using amended water, and dry conditions.

.3 Wetting Agent:
  .1 50% polyoxethylene ester and 50% polyglycol or polyoxyethylene ether, or equivalent approved product, and shall be mixed with water to a concentration to provide adequate penetration and wetting of asbestos-containing material.

.4 Asbestos Waste Receptors:
  .1 0.15 mm (6 mil) minimum thickness appropriately labelled, sealable polyethylene bags and 0.15 mm (6 mil) minimum thickness sealable clear polyethylene bags.

.5 Rip-Proof Polyethylene:
  .1 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

.6 Sealant:
  .1 Slow-drying sealant which remains tacky on surface for a minimum of 8 hours for purpose of trapping residual airborne fibre during settling period. Product must have flame spread and smoke development ratings both less than 50. Product shall leave a clear finish when dry. Acceptable products “Childers Chil-Lock CP-240” or equivalent.

2.2 EQUIPMENT

.1 All equipment brought on site must be thoroughly clean and free of all fibre, asbestos or otherwise, to the satisfaction of the Field Inspector. The Contractor will be fully responsible for the replacement of equipment rejected by the Inspector and for all costs resulting from site contamination due to dirty or faulty equipment.

.2 Airless Sprayer:
  .1 Spray equipment for the application of amended water and sealant such as Graco Hydrospray or equivalent:
ASBESTOS ABATEMENT SPECIFICATIONS
OAKWOOD PUBLIC SCHOOL

.1 Fine atomizing spray nozzle: Nozzle for airless sprayer capable of delivering not less than 4.5 L per minute of fine particle spray of amended water.

.3 Garden Sprayer:

.1 Hand pump-type pressure-can garden sprayer fabricated out of either metal or plastic equipped with a wand at the end of a hose that can deliver a stream or spray of liquid under pressure. Only to be used on small removal and repair projects with the approval of the site inspector.

.4 HEPA Vacuum:

.1 High Efficiency Particulate Aerosol filtered vacuum equipment. Must have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. HEPA filters must have been individually tested and certified by the manufacturer.

.2 All HEPA vacuums brought onto the job site shall be visibly clean, shall be in a good state of repair and shall be maintained in such state through completion of the project.

.5 Glovebag:

.1 Prefabricated, purposely made, 0.20 mm minimum thickness, polyvinyl chloride bag with integral 0.25 mm thick polyvinyl chloride gloves.

.2 Bag equipped with reversible double-pull, double-throw zipper on top to facilitate installation on pipe and progressive movement along pipe, with straps for sealing ends of bag around pipe, and with plastic flap under zipper for strength on pipe and to provide effective seal and with “ziploc” feature. Bags shall be secured using manufacturer’s prescribed securing devices. Approval must be obtained from the Inspector for use of Glovebags. Bag must be acceptable to the Inspector for use.

.3 Bag must have valves to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

.6 Negative Pressure Units:

.1 Exhaust units fitted with High Efficiency Particulate Aerosol (HEPA) filters used to effect a negative pressure differential in the work area as compared to the immediate surrounding or clean area. The filtering system must be capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. The HEPA filters must have been individually tested and certified by the manufacturer and bear a label certifying performance. The unit is to be fitted with instrumentation to indicate pressure differential across the HEPA filter with an audible alarm to sound at a preset low differential pressure.

.2 Construction of HEPA filter/fan cabinet units shall be airtight and all joints shall be caulked. The gasket seal between the filter housing and the retaining frame inside the cabinet shall provide a zero-leakage seal to avoid filter bypassing.
.3 Each negative pressure unit shall be DOP tested at the work site prior to commencement of asbestos removal. The procedure must include the testing of the integrity of the entire cabinet. Written confirmation of the test results are to be provided to the Inspector. Retesting may be requested by the Inspector and performed by the Contractor should the unit be damaged or modified during the work.

.7 Differential Pressure Recorder:

.1 Instrument to monitor and record the differential pressure between the Work Area and Clean Area.

.1 sensitivity: 0.025 mm (0.001 inches) WC increments between +0.25 mm to -2.5 mm (+0.010 to -0.100 inches) WC

.2 accuracy: +/- 1 %

.3 pressure alarms: audible high and low level alarm programmable within operating range

.4 printout: minimum 24 hr period at 15 minute intervals

.8 Ground Fault Panel:

.1 Electrical Panel equipped with ground fault circuit breakers of sufficient capacity to power all electrical equipment and lights in work area. All breakers shall have 5 mA ground fault protection. Panel should be complete with all necessary accessories including ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Ground fault receptacles on extension cords shall not be used without written authorization by the Consultant.

.2 The GFI Panel must be constructed under the direction of a licensed Electrician and inspected by a licensed Electrician on a regular basis. Evidence of such construction and inspection shall be submitted to the Consultant prior to installation of the Panel on site.
3.0 PART 3 – EXECUTION

3.1 MAJOR ASBESTOS WORK (TYPE 3 OPERATIONS)

3.1.1 Plumbing and Drainage

.1 Provide a constant supply of water by means of copper or PVC pipe, fittings and valves to the worker area, equipment decontamination room and the shower facility. High pressure hose with appropriate connections may be used with the approval of the Inspector. A master shut-off valve shall be installed adjacent to, and on the clean side, of the decontamination facility. Any hose and hose connections must have a high pressure rating and be limited to downstream of the master shut-off valve and are not to be left under pressure unattended.

.2 Water will be made available to the Contractor within the building, location to be determined during the pre-tender site visit. The Contractor is responsible for all tie-ins to existing systems, providing hot water including supply and installation of a temporary hot water tank, as necessary, and making good on completion.

.3 The effluent from the shower may be disposed of, through a filter, to the sanitary sewer, location to be determined during the pre-tender site visit. Only shower water may be disposed in this fashion, no asbestos-containing debris, cleaning solutions, encapsulants, sealants, body wastes, etc., may be disposed in the shower. The Contractor is responsible for all tie-ins to the existing systems and making good on completion. Free flowing shower effluent on to the floor or ground is not acceptable.

.4 All Work shall be carried out in accordance to the Ontario Plumbing Code.

3.1.2 Electrical

.1 The Contractor shall become completely familiar with the existing electrical installation during the site visit and pre-tender period.

.2 The Contractor is responsible to provide and install all electrical requirements for the project including but not limited to:

.1 de-energize and lockout all electrical circuits in the work area wherever practicable;

.2 identify all systems that cannot be de-energized, and all low voltage systems such as controls and alarms;

.3 identify any electrical conditions which need special protection or consideration during the work;

.4 disconnect, if practicable, or provide suitable protection for, smoke and heat detectors, if any, and advise the authorities;

.5 protect existing electrical equipment including but not limited to: transformers, circuit breakers, switch gear, panels, bus ducts, fixtures, conduits, etc, within the work area, de-energized or not. Cover with a minimum of two independently sealed layers of poly, at least one of the layers to be of reinforced poly;
6 provide all additional transformers, circuit breakers, switch gear, panels, ground fault protection and temporary lighting required for the project. The ground fault panel is to have sufficient capacity to service the project needs and have two spare circuits to serve as backup. The work area lighting is to provide appropriate levels of illumination for the work, with a minimum of two separate circuits. Bulbs are to be fitted with cages or other suitable protection against breakage and/or direct contact with insulation materials (wood, plastic, etc.).

7 All electrical power within the work area must be ground fault protected. Refer to Section 2.2.8, Ground Fault Panel.

.1 The power cable to the Ground Fault Panel and the panel itself is not protected by interruptor and as such it must be located outside the work area or suitably protected from water and physical damage.

.2 All Work shall be performed by a licensed electrician and comply with the latest edition of the Ontario Electrical Safety Code and any other local codes and requirements which may govern the installation. The Contractor is responsible for, and shall arrange for, all inspections and approvals which may be required by government regulations, Electrical Safety Authority (ESA) or any other authorities having jurisdiction. The Client is to receive copies of all inspection reports.

3.1.3 Fire Prevention / Site Security

.1 Contact and co-operate with Owner’s fire/security monitoring agency to identify impact of project on existing system with the intent of maintaining existing protection. The Owner will assume service costs for the monitoring agency.

.2 Advise local fire department of the nature and extent of the work.

.3 Heat Detectors

.1 Protect and seal heat detectors with 0.04 mm (1.5 mil) polyethylene, sealed with tape. Tape is not to interfere with function of the unit.

.2 System is to be activated and deactivated as arranged with monitoring agency and Owner’s Representative with the intent of leaving the entire system active when the Contractor is not on site.

.3 Provide an emergency name and contact number to the monitoring agency.

3.1.4 Decontamination Facilities

.1 Proposed locations of Decontamination Enclosure Systems are to be determined during the prestart site review. The facility must be of adequate size and construction to suit the requirements of the project. The owner may have restrictions on the location of the facilities. The worker decontamination enclosure system shall be kept separate from the waste and equipment transfer system.

.2 Workers’ Decontamination Enclosure System:
The Worker Decontamination Enclosure System shall comprise of a serial arrangement of three separate compartments including a Clean Change Room, a Shower Room and a Contaminated Change Room with an air lock separating each area. The purpose of this system is to provide a means of entry into the work area and allow decontamination of personnel and small tools on exit.

1. **Clean Change Room:** Build a clean room between the shower room and clean areas outside of enclosures, with one airlock to the shower room. Provide lockers for workers’ street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install a mirror to permit workers to fit respiratory equipment properly; provide sufficient hangers and hooks; provide a bench or chairs. Install a lockable door and lock at the entrance to the clean room and provide a key to the Inspector.

2. **Shower Room:** Build a shower room between the Equipment and Access Room, with two airlocks, one to the clean room and one to the Equipment and Access Room. Provide one shower for every five workers. Only ‘walk through’ shower units are acceptable.

3. Provide a constant supply of hot and cold water. The shower room shall have individual controls inside the room to regulate water flow and temperature.

4. Provide piping and connect to water sources and drains. Provide soap and appropriate containers for disposal of used respirator filters. Note that workers may provide their own towels as these are not contaminated and may be removed from the site for cleaning.

5. **Contaminated Change Room:** Build an Equipment and Access Room between the shower room and the work areas, with one airlock to the shower room. Install storage facilities for workers’ shoes and any protective clothing to be reworn in work areas. Provide for disposal of used coveralls.

6. The Contaminated Change Room shall be large enough to accommodate specified facilities, any other equipment needed, and at least one worker allowing him sufficient space to undress comfortably.

The drum and equipment decontamination enclosure system shall comprise of a serial arrangement of three separate compartments including a Clean Room, a Central Handling Area and a Washing area with an air lock between each area. The purpose of this system is to provide a means to decontaminate and remove waste from the work area. Large equipment is to remain in the work area for the duration.

1. **Clean Room:** Build a clean room between the Central Handling Area and the clean area with a plastic double airlock separating the two areas. The clean room shall be of sufficient size to accommodate at least ten waste receptors and the largest item of equipment used. Install a lockable door
and lock at the entrance to the clean room and provide a key to the Inspector.

.2 Central Handling Area: Build a handling room between the Clean Room and the Washing Area with a plastic double airlock separating the two areas. The handling room shall be of sufficient size to accommodate at least ten waste receptors and the largest item of equipment used.

.3 Washing Area: Build a washroom between the Central Handling Area and the work area with one airlock to the Central Handling Area. Provide water for cleaning which is to be disposed as asbestos waste.

.4 Construction of Decontamination Enclosures:

.1 Build suitable framing for enclosures or use existing rooms, where convenient and permitted, and line with polyethylene sheeting sealed with tape. Use minimum of one layer of clear, rip-proof polyethylene on floors and two layers (one on each side of the framing) of dark 0.15 mm (6 mil) polyethylene on walls and ceiling.

Temporary framing shall be constructed of 50 mm x 100 mm studs at 600 mm centres.

.2 Construct airlocks between rooms.

.3 Clearly mark the exits from the work area.

.4 Post warning signs at all entrances to the work area and on the outside of all walls enclosing each work area. Submit proposed emergency exit procedures for review and approval by the Inspector prior to contamination of the work area.

.5 Separation of Work Areas with Temporary Partitions:

.1 Separate parts of the building not included in the asbestos abatement program from parts of the building used for asbestos abatement by means of an airtight and tamper resistant barrier constructed from floor to ceiling as follows:

.1 Build suitable temporary lumber stud framing constructed of 50 mm x 100 mm Spruce studs at 600 mm centres.

.2 Caulk edges of partition both sides at floor, ceiling, walls and fixtures to form an air tight and watertight seal. Duct tape is a suitable alternative.

.3 Cover framing with two layers of 0.15 mm (6 mil) polyethylene, one on each side of studs. Apply new 12 mm (1/2 inch) gypsum board or 6 mm (1/4 inch) plywood from top to bottom of the barrier on the occupied (clean) side secured with screws and nails.

3.1.5 Work Area Preparation

.1 Remove moveable objects to a designated temporary location in the building unless the Scope of Work specifies this work to be done by others.
Isolate air handling and ventilation systems to prevent contamination and fibre dispersal to other areas of the building during the work phase.

There may be ventilation ducts above the ceiling assembly which must be accessed, visually inspected for openings and sealed prior to contaminating the work area. If, in the opinion of the Inspector, there is a significant amount of asbestos material on the ceiling assembly, access is to be restricted until all other preparations are complete.

The mechanical ventilation system serving the work area shall be disabled and locked out and all openings, diffusers, grills or voids in the work area shall be sealed with rip proof polyethylene and tape independent of wall polyethylene.

Protect all existing electrical equipment to be left in place during the work including fixtures, panels, transformers, switch gear, motors and boxes located within the work area: Cover with a minimum of 2 independently sealed layers of polyethylene sealed with duct tape. At least one of the layers shall be rip proof polyethylene.

Protect all wall hangings, fixtures, equipment, and other items which could not be relocated from the work area with 0.15 mm (6 mil) polyethylene sealed with tape independent of wall or floor polyethylene.

Secure from the inside and seal independently, prior to applying the wall polyethylene, all openings including doors, windows, hatches, etc., leading into the work area from an occupied area or from outside. Polyethylene used to seal windows to public or occupied areas is to be opaque.

Seal all penetrations including pipe, conduit and duct openings, drains, etc., with polyethylene and duct tape independent of floor or wall polyethylene.

There may be penetrations or equipment requiring protection above the ceiling assembly which must be accessed, visually inspected and sealed prior to contaminating the work area. If, in the opinion of the Inspector, there is a significant amount of asbestos material on the ceiling assembly, access is to be restricted until all other preparations are complete.

Protect floors with rip proof polyethylene sheeting sealed with tape except areas requiring floor tile removal. Extend polyethylene at least 300 mm (12 inches) up the walls. Overlap adjoining sheets of polyethylene by at least one foot.

Protect any floor rugs which are to remain in place from damage by using a minimum second layer of rip-proof poly taped and sealed independently.

Water leakage during the removal operation may not be confirmed until the work is complete and can result in contamination of the rug with asbestos fibres carried in the water as well as permanent staining or damage of the material. Should a rug be left in place during the work it must be thoroughly vacuumed with HEPA equipment and steam cleaned at the completion of the project. The Contractor is responsible for cleaning, repair or replacement of floor covering to the satisfaction of the Inspector. The Contractor may elect to provide additional protection.

Protect walls and all other internal surfaces not specifically mentioned earlier with one layer of 0.15 mm (6 mil) clear polyethylene. The polyethylene shall extend to within six inches.
of ceiling height and shall be attached carefully to avoid disturbing asbestos-containing material. Overlap adjoining sheets of polyethylene by at least 300 mm.

.9 Polyethylene sheeting shall be suitably braced and/or restrained so that subsequent application of a negative pressure differential in the work area does not cause excessive billowing or failure of the polyethylene or taped joints. Walls with masonry finish (brick or block) may require 25 mm x 50 mm (1” x 2”) straps as bracing for the wall protection.

.10 Ensure that polyethylene near a heat source is a flame-resistant type.

.11 Spray adhesive is not to be applied directly on to floor or wall finishes.

.12 Install the negative air pressure system, which includes a minimum of 1 backup unit for every 4 units installed. Exhaust air to the outside of the building. Submit proposed locations of negative pressure units and exhaust routing to the Inspector for review and approval.

.1 The exhaust from the unit to the outside of the building is to be airtight and constructed of wire-reinforced flexible or rigid duct. Each end, at the unit and at the outlet, and the penetration through the isolation barrier or enclosure, is to be mechanically secured (duct tape is not considered adequate). The outlet is to be shielded from the weather and have a mesh to prevent introduction of foreign objects. The Contractor is to ensure that the building remains secure from intrusion by others.

.2 Each unit is to be DOP tested at the work site prior to commencing asbestos removal. The procedure is to include the testing of the integrity of the entire cabinet. Retesting is required if the unit is damaged or modified during the work.

.3 Switch the negative air pressure system to the “ON” mode and operate continuously until completion of the work, including final cleanup. Provide continuous monitoring of pressure difference using an automatic instrument. The monitor gauge shall be located outside the work area enclosure. A minimum air pressure of 0.5 mm (0.02 inches) water gauge is to be achieved and maintained within the work enclosure relative to the adjacent uncontaminated areas at all times.

3.1.6 Worker Protection

.1 Instructions:

.1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.

.2 Respiratory Protection: (refer to Section 1.10.2)

.3 Protective Clothing: (refer to Section 1.10.3)

.4 Entering the Work Area:

.1 Remove all street clothing in the Clean Room,

.2 Put on clean disposable coveralls,
.3 Inspect and put on respiratory protection. Note that respirator head straps are to
be under the head covering as the respirator is removed last.

.4 Enter work area through Shower Room and Equipment and Access Room. Put on
work boots and other items left in contamination.

.5 Leaving the Work Area:

.1 Before exiting the work area, remove visible debris from clothing, footwear, hard
hats and the outside of respirators by using a HEPA vacuum or wet wiping.

.2 Proceed to the Equipment and Access Room and remove boots and other items
to be left in contamination, remove disposable coverall and place in container for
disposal. Respirator is not to be disturbed during this operation.

.3 Wearing only the respirator, enter the Shower Room, wet the respirator in the
shower before removing by facing the shower nozzle and remove. If applicable,
remove the filters and dispose in container. If filters are to be reused, seal
openings with provided plugs or duct tape to prevent release of fibre and hand out
respirator to the Clean Room. Proceed to wash thoroughly with soap and
shampoo prior to entering the Clean Room.

.4 Items left in the Equipment and Access Area may be removed by cleaning at
completion of the project, disposed as waste, or sealed in plastic and taken to
another contaminated area.

.1 At no time is more than one airlock in the three room serial arrangement
to be opened during the passage of workers.

.2 Once in the contaminated work area, leaving the area must include full
procedures as listed above.

3.1.7 Pre-contamination Inspection

.1 Asbestos Abatement Work shall not commence until:

.1 The Ministry of Labour, Construction Health and Safety Branch has been notified
through a Notice of Project and a copy of the Notice of Project is posted on the
site.

.2 Arrangements have been made for disposal of waste.

.3 All documentation is in place.

.4 Work areas and decontamination enclosures and parts of the building required to
remain in use are effectively segregated.

.5 Tools, equipment, materials, and waste receptors are on hand.

.6 Warning signs have been posted as specified.
.7 Negative air pressure differential [minimum 0.5 mm (0.02 inches) water gauge] has been established in the work area with monometer in place and operational.

.8 All workers have been made familiar with the use of respirators, procedures for entering and leaving the contaminated area and emergency evacuation routes.

.9 Written **authorization to proceed** has been obtained from the Inspector based on a visual inspection of the site.

.10 A Pre-contamination Inspection Checklist is provided at the end of this document for the Contractor’s reference.

### 3.1.8 Asbestos Remedial Work

.1 **Maintenance of Enclosures:**

.1 Maintain enclosures in tidy condition.

.2 Ensure that barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

.3 Visually inspect enclosures at the beginning and end of each working period and at least once each day on days when there are no shifts. This includes weekends and holidays.

.4 Ensure that a **minimum** air pressure differential of 0.5 mm (0.02 inches) water gauge is maintained within the work enclosure relative to the adjacent uncontaminated areas at all times.

.5 Ensure that the work area is secure during periods of no activity.

.2 **Upper Seals:** (where applicable)

.1 There may be ventilation ducts, penetrations and equipment requiring protection above the ceiling assembly which must be accessed, visually inspected and sealed.

.2 Open Plenum and/or upper wall penetrations: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically access the ceiling along the perimeter of the project site and seal all openings with framing, polyethylene and duct tape. Adjacent areas are not to be occupied during this operation.

.3 Ventilation ducts, openings, etc.: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically access the ceiling as required to access the openings and seal with framing, polyethylene and duct tape. The ventilation systems serving the work area are to be turned off or locked-out during this procedure and remain off until completion of the work.

.4 Equipment requiring protection: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically
access the ceiling as required to access the equipment and seal with polyethylene and duct tape.

.3 Asbestos Encapsulation

.1 Bridging: applied as a continuous flexible membrane or coating over friable material to seal the surface and act as a barrier against physical damage or deterioration. Material is to be water based, without solvents nor utilize hydrocarbons and have a Class A Fire Hazard Classification. Must comply with CGSB 1-GP-205M Type 11. Refer to Scope of Work for finish colour. Standard of acceptance: Ocean No. 666 Latex Fire Resistive Asbestos Encapsulant as distributed by Ocean Coatings Consultants Ltd.

.2 Penetrating: applied to be absorbed into friable material and solidify thus binding fibres together and prevent release. Material is to be water based, without solvents nor utilize hydrocarbons and have a Class A Fire Hazard Classification. Standard of acceptance: Childers CHIL-CASE CP-215 Bridging Encasement/Encapsulant Coating;

.3 Equipment: airless paint sprayer with adequate pressure and nozzle size to suit the material being used. Refer to the encapsulant manufacturer’s recommendations for minimum sizes. Equipment must be able to maintain a consistent fan pattern with the nozzle at 300 mm from the surface when spraying.

.4 The nature of the encapsulant may effect the requirements for respiratory protection in addition to protection provided for asbestos dust. Vapours may be released during application and must be taken into account when selecting appropriate protection. Refer to MSDS sheets.

.5 Application: clean all surfaces of debris and dust, repair damaged areas with compatible materials, apply a light first coat to moisten the surface and immediately follow with a second application ensuring complete and consistent coverage by spraying a minimum of four passes in different directions. Refer to Scope of Work for minimum dry film thickness.

.6 Encapsulated asbestos-containing materials are to be identified in a manner acceptable to the Inspector.

.4 Asbestos Removal (Wet Method)

.1 Thermal insulation: (piping and equipment) Ensure that heat sources to all piping systems, tanks, etc., have been shut off before work commences. Carefully cut open the outer cover of thermal insulation while spraying a mist of amended water on the section being worked on; thoroughly soak the underlying asbestos-containing material with amended water, using airless spray equipment. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Spray applications: (fire proofing and acoustic) Apply amended water to the surface of the material using an airless sprayer. Allow the water to soak through to the non-asbestos surface. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. The thickness and the nature of the asbestos
containing material will dictate the time required to soak and number of passes necessary.

.3 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material into a waste receptor (polyethylene bag).

.1 Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Mist the air periodically with water.

.3 Excess water is to be treated as asbestos waste and is to be placed into a waste receptor (polyethylene bag). Refer to Waste Handling for cleaning and removal of bagged asbestos waste.

.4 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed and wet-sponged to remove all visible material and residues. During this Work the surfaces shall be kept wet.

.5 Asbestos Removal (Dry Method)

.1 Dry removal of asbestos-containing material is to be limited to applications which cannot be wetted due to electrical hazards and may only be undertaken with written instruction for the Inspector.

.2 Ensure that the site is fully isolated from the remaining parts of the building and that adequate negative air pressure is being maintained within the work area prior to initiating any dry removal work.

.3 A person knowledgeable in supplied air systems and responsible for its operation is to inspect the air source and supply network to ensure that it complies with all regulatory requirements. The person is to sign a statement as to his inspection and have the statement posted on the work site.

.4 Provide supplied-air, positive-pressure, full-face respirators to all persons required to enter the dry removal area. All persons required to use supplied air respirators are to be trained and be able to demonstrate their competence to use and maintain the equipment.

.5 Remove the asbestos by hand in small quantities and place directly into a waste receptor (poly bag). Do not allow a build-up of asbestos debris. The bagged asbestos waste is to be wetted with amended water inside the material transfer facility prior to double bagging.

.6 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed (dry) and HEPA vacuumsed to remove all visible material and residues. The entire work area including decontamination facilities, equipment and work area surfaces shall then be cleaned by HEPA vacuumsing.
.1 Wet clean (other than dry removal areas) and HEPA vacuum the entire work area, including all Decontamination Enclosure Systems and equipment used in the process. Prefilters on HEPA fan/filter units shall be replaced and disposed of as contaminated waste.

.1 For floors covered by rugs, remove the top layer of polyethylene at this stage.

.2 HEPA vacuum cleaners shall be emptied of their contents which shall be disposed of as contaminated waste.

.3 All equipment shall also be thoroughly clean including but not limited to HEPA vacuum cleaners, vacuum hoses, sprayers, scaffolding and other equipment. Dismantle scaffolding and clean components.

3.1.9 Waste Handling

.1 Three workers with personal protection equipment for a Type 3 operation, respirators and disposable coveralls, enter the Waste Load-out facility from the clean side, one (A) stays in the Clean Area, the second (B) proceeds to the Central Handling Area, and the third (C) proceeds to the Washing Area. A fourth worker (D) may enter the work area in the usual fashion.

.2 Worker D cleans all bulk debris from the waste receptors (polyethylene bag) containing asbestos waste by wet wiping. The bag is then passed in to worker C in the Washing Area of the Waste Load-out facility. Worker C washes the bag (water must be made available) and passes it to worker B in the Central Handling Area where it is placed into a second waste receptor (clear bag) and wet wiped. Worker B passes the bag to worker A in the Clean Area where it is stored for future disposal or passed outside the facility to another worker for placement into the disposal bin.

.1 At no time is more than one air lock in the three room serial arrangement to be opened for transfer of material. The workers are not to pass from one room to another during the waste handling operation.

.3 On completion, all surfaces in the three material handling areas are to be wet washed and cleaned of all debris. The three workers are then to proceed into the contaminated work area each sealing or closing the airlock behind him.

.4 Contaminated equipment being removed from the work area may be handled similarly to waste but instead of bagging it may be completely washed or vacuumed.

3.1.10 Final Seal and Cleaning

.1 After completion of the asbestos removal and initial cleaning a visual inspection will be performed by the Inspector to confirm that all visible debris has been removed from the work surfaces.

.2 Surfaces shall be accepted as clean when there is no visible residue, dirt, dust, film, stain or discolouration on all surfaces within the work area including but not limited to piping, tanks, ducts, conduits, mechanical and electrical items, wiring, cracks, crevices, joints, etc., resulting either from prior contamination, asbestos removal procedures or from cleaning procedures.
Cleaning and inspection shall be repeated at the Contractor’s cost if the area does not meet the above criteria and is declared unclean.

The application of sealant is not to commence until all visible asbestos fibre has been removed from all surfaces and a written authorization to proceed has been obtained based on a visual inspection of the work area.

Architectural finishes, including ceiling components, various fixtures and other surfaces which may be damaged or stained by the sealant are to be suitably protected with polyethylene and duct tape. Any damage resulting from the Contractor’s work shall be made good to the satisfaction of the Inspector.

Two applications of sealant shall be sprayed to all surfaces in the work area. The spray is to be directed from the top down to ensure that the higher horizontal surfaces are covered. Spraying from the floor only is not acceptable. Apply sealant using an airless high pressure paint sprayer.

The nature of the sealant may effect the requirement for respiratory protection. Vapours that may be released during sealant application must be taken into account when selecting respirators.

In dry removal areas, it may be possible to apply the sealant with a rag or sponge. If this is not practicable, the surfaces are to remain unsealed.

After the second coat of sealant has dried, allow a 12-hour period for dust settling. During this settling period, no entry or activity will be permitted in the work area. After the settling period, remove the polyethylene sheeting from the walls and floor (except in areas with rugs) and dispose of as asbestos waste.

Polyethylene seals on vents, ducts, grilles, louvres, dampers, diffusers, doors, windows, fixed equipment, etc., and on the outside of temporary partition walls shall remain in place.

Perform a second cleaning consisting of HEPA vacuuming of work area surfaces and wet wiping (other than dry removal areas) of surfaces that will not be damaged by application of water including walls and floors from where polyethylene sheeting has been removed.

After the work area is dry and a visual inspection by the Inspector confirms satisfactory completion of the second cleaning operation, clearance air samples shall be taken in the work area by the Inspector. The work area is declared clean by the Inspector when the air monitoring results conform to the pre-established levels.

Cleaning, inspection and air sampling shall be repeated at the Contractor’s expense if the area does not meet visual inspection and air monitoring criteria and is declared unclean.

Final Tear Down and Demobilization

The final tear down is not to commence until a written authorization to proceed has been obtained based on a visual inspection of the work area and the results of the air monitoring.

Dismantle the remainder of the enclosure and dispose of all polyethylene sheeting as asbestos waste.
.3 Vacuum and/or wet wipe all surfaces previously inaccessible due to temporary construction.

.4 Seal the outside of the negative pressure exhaust units with polyethylene and tape before removing from work area.

3.1.12 Re-establishment of Objects and Systems

.1 Re-establish thermal insulation, fireproofing, acoustic applications, ceiling systems, etc., removed during the course of the project in accordance with the standard specification when specified in the Scope of Work.

.2 Reinstall objects, moved to temporary locations in the course of the Work, in their proper positions.

.3 Resecure mounted objects removed in the course of the Work in their former positions.

.4 Re-establish mechanical and electrical systems in proper working order.

.5 Repair or replace objects damaged in the course of the Work.

3.2 GLOVEBAG REMOVAL METHOD

Not Applicable.

3.3 TYPE 2 ENCLOSURE METHOD

Not Applicable.

3.4 TYPE 1 OPERATION

Not Applicable.

3.5 WASTE DISPOSAL

.1 Asbestos-containing wastes shall be disposed of in accordance with procedures established by the Ontario Ministry of the Environment Regulation 347 (as amended) under the Environmental Protection Act and the Government of Canada Transportation of Dangerous Goods Regulations.

.2 All waste is to be removed from the site and disposed. Disposal containers are not to be left on the property unattended unless fully enclosed and locked. Bins must be removed immediately on completion of work.

.3 Both sides of every vehicle used for the transportation of asbestos and every waste container must display in large easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than 10 cm in height and the words:
CONTAINS ASBESTOS FIBRES
Avoid Creating Dust and Spillage
Asbestos May Be Harmful To Your Health
Wear Approved Protective Equipment

.4 Both sides of every waste container must display in large easily legible letters the words ‘ASBESTOS, WHITE, PRODUCT IDENTIFICATION NUMBER 2590’ or ‘ASBESTOS, BLUE, PRODUCT IDENTIFICATION NUMBER 2212’ in accordance with the type of asbestos being transported.

.5 Every vehicle used for the transportation of asbestos waste shall display a Class 9 placard on the front, back and two sides of the vehicle.

.6 The waste must be transported in a fully-enclosed truck, or alternatively, in a waste disposal skip. The driver must be familiar with cleanup and handling procedures and be trained to deal with spills or container breakage.

.7 The truck must be equipped with a shovel and broom, wetting agent, protective clothing, respiratory protective equipment, polyethylene bags of at least 0.15 mm (6 mil) thickness, and bag closures and duct tape.

.8 All waste must be transported with a Bill of Lading directly from the work area to the waste disposal site. The Bill of Lading is to indicate the source and type of asbestos, the Carrier, the amount, the destination (disposal site) and date all in accordance to applicable regulations. A copy of the Bill of Lading and disposal site receipt is to be provided to the Inspector.

3.6 AIR MONITORING

.1 Air tests will be taken at the discretion of the Asbestos Consultant using the Phase Contrast Microscopy (PCM) method from the time asbestos-containing materials may be disturbed until the final visual inspection of the work area(s). PCM will be used for final clearance air monitoring analysis.

Outside Asbestos Removal Work Areas:

.1 The maximum allowable fibre concentration outside the Work Areas during asbestos removal or cleanup shall be 0.05 f/cc. Should readings exceed this value, the work shall stop at the discretion of the inspector and proceed only after the cause of the high fibre counts has been remedied.

.2 All costs associated with the cleaning, monitoring, and disruption caused by excessive fibre levels outside the Work Area and related to the work, are to be borne by the Asbestos Contractor including but not limited to:

.1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,
.2 all activities deemed necessary by the Inspector including area isolation, personnel relocation, additional visual inspections and air monitoring to confirm that the area has been adequately cleaned,

.3 disruption of plant production, office routine, and delays.

.2 Final Clearance Test:

.1 Air samples will be taken in each Type 3 asbestos removal work area using the PCM (NIOSH 7400) method.

.2 Final clearance tests will be performed following aggressive sampling procedures:

.1 Before starting the sampling pumps and during sampling, the exhaust from forced air equipment (1 horsepower) leaf blower) is directed against walls, ceilings, floors, ledges, and other surfaces in the area. The Contractor shall supply the leaf blower.

.2 Prior to commencement of final air clearance testing, the contractor shall install 20 inch fans in the centre of the work area (minimum of one fan per 10,000 cubic foot of work area space). The fans shall be operated on slow speed and pointed toward the ceiling. The fans will run for the duration of the air sampling period and will be shut off when sampling is complete.

.3 Asbestos work areas shall be declared clean only if the laboratory results show concentrations of 0.01 f/cc or less for all samples.

.4 All costs associated with additional cleaning, monitoring, and disruption as the result of failure to pass final clearance due to visual inspection and/or air monitoring are to be borne by the Contractor including but not limited to:

.1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,

.2 further visual inspections and air monitoring to confirm that the area has been adequately cleaned,

.3 disruption of plant production, office routine, and delays.

END OF SECTION
TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT
PRE-CONTAMINATION INSPECTION CHECKLIST

Type 3 Asbestos Abatement Classifications:
- Removing/disturbing of more than 1 m² of friable asbestos-containing materials
- Spray application of sealant to friable asbestos-containing materials
- Removing/cleaning air handling equipment in a building with sprayed fireproofing
- Removing/disturbing kiln, metallurgical furnace or similar structure with refractory materials
- Removing non-friable asbestos materials using power tools not equipped with HEPA filters
- Repair/alter/demolish a building which asbestos was used in the manufacture of products

Before Beginning Asbestos Abatement Work:
- All documentation and pre-work submittals in place
- Bonding (if applicable)
- Insurance documentation (naming ARCADIS and Owner as co-insured)
- Names/Phone numbers of Contractor Representatives for emergencies
- Permits for transport and disposal of asbestos waste
- Material Safety Data Sheets
- Names and statement of experience for supervisory personnel
- Contractor schedule
- Notice of Project (NOP)
- Confirmation of electrical lock-out in work area and of any electrical inspections
- Evidence of proper construction and inspection of GFI panel by a licensed electrician.
- Written Fire Safety Plan.
- Documentation of pre-construction site condition (if required)
- Proof of asbestos abatement training
- Notice of Project (NOP) posted
- Warning signs posted
- Work area and decontamination enclosures segregated from rest of building
- Points of entry secure including neg-air exhaust location(s)
- Independent isolation of all electrical equipment and openings including windows, doors, temporary partitions, etc.
- Adequate protection applied to all equipment and other components within work area
- Mechanical ventilation systems locked out and isolated
- Adequate neg-air units, including back-ups installed, and Integrity-tested on site
- Negative air units exhausting outside of building
- Negative air pressure differential in place (minimum 0.02 inch water gauge)
- Manometer in place, alarm and recorder functioning
- Emergency lighting in place and plugged into electrical outlets
- Work area lighting adequate
- All electrical equipment, including shower sump pump inside work area ground fault protected
- Tools, equipment, materials and waste receptors on hand
- All workers familiar with PPE, decontamination procedures, equipment and evacuation routes
- Airless sprayer functioning, and tested with approved amended water in-line
- Shower functioning and tested for pressure, filtered drainage, separate hot/cold water, or mixed water (40°C to 50°C)
- All shower accessories (soap, shampoo, mirrors etc.) in place
- Upper seals complete (if required)
- HEPA vacuums - Integrity-tested within last 3 months

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: ___________________________ ARCADIS INSPECTOR SIGNATURE: ___________________________
TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT

DAILY PROCEDURES CHECKLIST

- All warning signs posted
- Decontamination and work area enclosures kept in tidy condition
- Shower unit properly drained and clean
- Adequate hot water for shower
- Adequate shower accessories
- All polyethylene barriers and linings sealed and taped
- Minimum negative pressure maintained
- Neg-air primary filters replaced regularly
- Neg-air exhausts to each side secure
- Manometer alarm and tape read-out functioning
- ACM applications wet and promptly bagged into labelled containers
- Decontamination of personnel and equipment executed properly
- Perimeter inspections being carried out
- Adequate labour, supervisors, materials and equipment available on site
- Access to work area secure
- Adequate lighting maintained
- Emergency lighting operational

Waste Disposal
- Proper signage applied to truck/waste skip
- Waste bin secured/locked

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _______________  ARCADIS INSPECTOR SIGNATURE: ____________________
Final Visual Inspection Checklist

Surfaces shall be accepted as clean when there is no visible residue, dirt, dust, film, stain or discoloration on all surfaces within the work area including but not limited to piping, tanks, ducts, conduits, mechanical and electrical items, wiring, cracks, crevices, joints, etc., resulting either from asbestos removal procedures or from cleaning procedures.

Cleaning and inspection shall be repeated at the Contractor's expense if the area does not meet the above criteria and is declared unclean.

- All waste bags removed from area
- All surfaces and equipment clean including neg-air units, scaffolding, ladders, vacuum attachments, etc.
- All tools bagged or decontaminated and removed from area
- Glue and application equipment available and operational
- Remaining non-acm thermal insulation applications protected and clean (if present)

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.
TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT

FINAL CLEARANCE TEST CHECKLIST

Post-Sealant Application Inspection Checklist

☐ Sealant application visually confirmed (surfaces tacky)
☐ Polyethylene from walls and floors (not forming part of seal) removed and disposed
☐ All surfaces and equipment clean
☐ Minimum sealant settling time elapsed

PCM Final Clearance Test

☐ Two air samples taken inside the enclosure of an area of 10 m² (108 ft²) or less
☐ Three air samples taken inside the enclosure of an area of 10 m² (108 ft²) to 500 m² (5382 ft²)
☐ Five air samples taken inside the enclosure of an area of 500 m² (5382 ft²) or more
☐ Forced air used inside enclosure before and during air sampling
☐ Fan (20") in the centre of the enclosure pointed upwards towards the ceiling on low (1 fan for every 20,000 ft³ of room space required.)
☐ Each air sample collected for a volume of at least 2400 L
☐ Final air sample analysis pass pre-determined criteria
☐ Final air sample analysis failed pre-determined criteria
☐ Air sampling results posted following receipt of the results.

TEM Final Clearance Test

☐ Five air samples taken inside of the enclosure
☐ Five air samples taken outside of the enclosure
☐ Forced air used inside enclosure before and during air sampling
☐ Fan (20") in the centre of the enclosure pointed upwards towards the ceiling on low (1 fan for every 20,000 ft³ of room space required.)
☐ Each air sample collected for a volume of at least 2400 L
☐ Final air sample analysis pass pre-determined criteria
☐ Final air sample analysis failed pre-determined criteria
☐ Air sampling results posted following receipt of the results.

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _______________  ARCADIS INSPECTOR SIGNATURE: ___________________________
ASBESTOS ABATEMENT
ELECTRICIAN’S SUBMITTAL FORM

Abatement Contractor

Project Site

I hereby certify the following:

1. All electrical work has been performed by a licensed electrician and complies with the latest edition of the Ontario Electrical Safety Code and any other local codes and requirements.

2. Arrangements have been made for all inspections and approvals which may be required by government regulations, Electrical Safety Authority and any other authorities having jurisdiction.

3. The GFI panel has been properly constructed, inspected and installed by a licensed electrician in compliance to all regulatory requirements and codes.

4. All electrical circuits in the work area have been de-energized and locked out wherever practicable.

5. All systems that cannot be de-energized have been clearly identified.

6. Any electrical conditions which need special protection or consideration have been clearly identified.

Electrical Contractor

Electrician’s Name (print)

Electrician’s Signature

Electrician’s License No.

Date
HALTON DISTRICT SCHOOL BOARD

PRE-RENOVATION DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

OAKWOOD PUBLIC SCHOOL
357 BARTOS DRIVE, OAKVILLE, ONTARIO

June 29, 2018

702170-176
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PRE-RENOVATION DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY – OAKWOOD PUBLIC SCHOOL

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B  Laboratory Reports
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EXECUTIVE SUMMARY

Arcadis Canada Inc. (Arcadis) was retained by the Halton District School Board to conduct a pre-renovation designated substances and hazardous materials survey in designated areas of Oakwood Public School located at 375 Bartos Drive, Oakville, Ontario.

It is our understanding that ceilings in the designated study areas are scheduled for renovation.

Asbestos-containing materials found to be present in the designated study areas included:

- textured acoustic coat applied on ceilings in Corridors 1, 2 and 3; and
- textured plaster applied on the lower half of the walls in Corridors 1, 2 and 3.

It should be noted that the upper half of the walls consisting of smooth plaster in the corridors does not contain asbestos. The lower half of the walls in the corridors that contains asbestos are not expected to be affected by the renovation project and this information is provided for references purposes.

It is our understanding that there may be limited amounts of piping above solid ceilings. However, most of the piping system is at the perimeter of the building that is not within the study area.

Measures and procedures for asbestos abatement work are prescribed in Ontario Regulation 278/05 - Asbestos on Construction Projects and in Buildings and Repair Operations. If any materials which may contain asbestos and which were not tested during the course of the designated substances survey are discovered during any construction activities, the work shall not proceed until such time as the required notifications have been made and an appropriate course of action is determined.

Lead was detected in the light grey paint applied on walls in the corridors.

All applications should be handled according to the measures and procedures outlined in the Ministry of Labour Guideline, Lead on Construction Projects, April 2011. In addition, the EACO Lead Abatement Guidelines, 2014 — Edition 1, Environmental Abatement Council of Ontario, also provides guidance and recommended work practices.

During the course of our site investigation, fluorescent lights were identified in the designated study areas. Mercury should be assumed to be present as a gas in all fluorescent light tubes and in all paint applications, albeit at low levels. The fluorescent light tubes should be recycled for mercury, if the lights are removed.

Materials observed in the designated study areas which should be considered to contain silica included plaster and concrete.

The Ministry of Labour Guideline, Silica on Construction Projects, dated April 2011, provides guidance in controlling exposure to silica dust during construction activities.
Fluorescent lights were observed in the designated study areas during the course of our site investigations. Light ballasts, such as those associated with the type of fluorescent lights (T8s) observed in the designated study areas, are usually an electronic-type which do not contain PCBs, however, this would be confirmed by an electrician at the time of dismantling of the lights.

No equipment potentially containing ozone-depleting substances (ODS) was identified during the course of the site investigation.

Readily-evident mould was not observed in the designated study areas during the course of the site investigation.

No other designated substances (vinyl chloride, acrylonitrile, benzene, isocyanates, arsenic ethylene oxide and coke oven emissions) were observed to be present in the designated study areas in a form that would represent an exposure concern.
1 INTRODUCTION

Arcadis Canada Inc. (Arcadis) was retained by the Halton District School Board to conduct a pre-renovation designated substances and hazardous materials survey in designated areas of Oakwood Public School located at 375 Bartos Drive, Oakville, Ontario.

The information in this report is to be provided to all bidders on a project in accordance with the requirements of the Occupational Health and Safety Act.

The site is a one-storey masonry structure.

It is our understanding that ceilings in the designated study areas are scheduled for renovation.

The designated study areas are shown on the floor plans provided in Appendix A.

The survey was undertaken to report on the presence or suspected presence of readily observable designated substances and hazardous materials.

1.1 Scope of Work

The scope of work for our investigation included:

- review of existing information;
- investigation of readily-accessible areas in the designated study areas for the presence of designated substances and hazardous materials used in building construction materials;
- obtaining representative bulk samples of materials suspected of containing asbestos and paint chip samples;
- laboratory analyses of bulk samples for asbestos content;
- laboratory analyses of paint chip samples for lead content; and
- preparation of a report outlining the findings of the investigation.

Mr. Amit Kaul of Arcadis visited the site on June 14, 2018 to conduct the designated substances and hazardous materials survey at Oakwood Public School.
2 REGULATORY DISCUSSION AND METHODOLOGY

Ontario Occupational Health and Safety Act (OHSA)

The Ontario Occupational Health and Safety Act (OHSA) sets out, in very general terms, the duties of employers and others to protect workers from health and safety hazards on the job. These duties include, but are not limited to:

- taking all reasonable precautions to protect the health and safety of workers [clause 25(2)(h)];
- ensuring that equipment, materials and protective equipment are maintained in good condition [clause 25(1)(b)];
- providing information, instruction and supervision to protect worker health and safety [clause 25(2)(a)]; and
- acquainting a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent [clause 25(2)(d)].

In addition, Section 30 of the OHSA deals with the presence of designated substances on construction projects. Compliance with the OHSA and its regulations requires action to be taken where there is a designated substance hazard on a construction project.

Section 30 of the OHSA requires the owner of a project to determine if designated substances are present on a project and, if so, to inform all potential contractors as part of the bidding process. Contractors who receive this information are to pass it onto other contractors and subcontractors who are bidding for work on the project.

Regulation for Construction Projects, O.Reg. 213/91

The Regulation for Construction Projects, O.Reg. 213/91, applies to all construction projects. The following sections of the regulation would apply to situations where there is the potential for workers to be exposed to designated substances:

Section 14 (5) A competent person shall perform tests and observations necessary for the detection of hazardous conditions on a project.

Section 21 (1) A worker shall wear such protective clothing and use such personal protective equipment or devices as are necessary to protect the worker against the hazards to which the worker may be exposed.

(2) A worker’s employer shall require the worker to comply with subsection (1).
(3) A worker required to wear personal protective clothing or use personal protective equipment or devices shall be adequately instructed and trained in the care and use of the clothing, equipment or device before wearing or using it.

Section 30
Workers who handle or use substances likely to endanger their health shall be provided with washing facilities with clean water, soap and individual towels.

Section 46
(1) A project shall be adequately ventilated by natural or mechanical means,

(a) if a worker may be injured by inhaling a noxious...dust or fume;

(2) If it is not practicable to provide natural or mechanical ventilation in the circumstances described in clause (1)(a), respiratory protective equipment suitable for the hazard shall be provided and be used by the workers.

Section 59
If the dissemination of dust is a hazard to a worker, the dust shall be adequately controlled or each worker who may be exposed to the hazard shall be provided with adequate personal protective equipment.

Regulation for Designated Substances (O.Reg. 490/09)

The Designated Substance Regulation (O.Reg. 490/09) specifies occupational exposure limits (OELs) for designated substances and requires an assessment and a control program to ensure compliance with these OELs.

Although, O.Reg. 490/09 and the OELs do not apply to an employer on a construction project, or to their workers at the project, employers still have a responsibility to protect the health of their workers and to comply with the OHSA and other applicable regulations. Section 25(2)(h) of the OHSA requires that employers take "every precaution reasonable in the circumstances for the protection of a worker".

Other regulatory requirements (and guidelines) which apply to control of exposure to designated substances and hazardous materials are referenced in the sections below.

2.1 Asbestos

Asbestos has been widely used in buildings, both in friable applications (materials which can be crumbled, pulverized or powdered by hand pressure, when dry) such as pipe and tank insulation, sprayed-on fireproofing and acoustic texture material and in non-friable manufactured products such as floor tile, gaskets, cement board and so on. The use of asbestos in friable applications was curtailed around the mid-1970s and, as such, most buildings constructed prior to about 1975 contain some form of friable construction material with an asbestos content. The use of asbestos in certain non-friable materials continued beyond the mid-1970s.

Control of exposure to asbestos is governed in Ontario by Regulation 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations. Disposal of asbestos waste
(friable and non-friable materials) is governed by Ontario Regulation 278/05 and by Ontario Regulation 347, *Waste Management – General*. O.Reg. 278/05 classifies asbestos work operations into three types (Type 1, 2 and 3), as shown in Table C-1 in Appendix C, and specifies procedures to be followed in conducting asbestos abatement work.

### 2.2 Lead

Lead is a heavy metal that can be found in construction materials such as paints, coatings, mortar, concrete, pipes, solder, packings, sheet metal, caulking, glazed ceramic products and cable splices. Lead has been used historically in exterior and interior paints.

The *Surface Coating Materials Regulations* made under the *Hazardous Products Act* (SOR/2005-109) sets a maximum concentration of total lead of 90 mg/kg (0.009 percent or 90 parts per million) for surface coating materials, including paints, effective 21 October 2010. This criterion level applies to the sale and importation of new surface coating materials.

The *National Plumbing Code* allowed lead as an acceptable material for pipes until 1975 and in solder until 1986.

The Ministry of Labour *Guideline, Lead on Construction Projects*, dated April 2011, provides guidance in the measures and procedures that should be followed when handling lead containing materials during construction projects. In the guideline, lead-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of lead, as shown in Appendix C, Table C-2. Any operation that may expose a worker to lead that is not a Type 1, Type 2, or Type 3b operation, is classified as a Type 3a operation.

### 2.3 Mercury

Mercury has been used in electrical equipment such as alkaline batteries, fluorescent light bulbs (lamps), high intensity discharge (HID) lights (mercury vapour, high pressure sodium and metal halide), “silent switches” and in instruments such as thermometers, manometers and barometers, pressure gauges, float and level switches and flow meters. Mercury-containing lamps, the bulk of which are 1.22 m (four foot) fluorescent lamps contain between 7 and 40 mg of mercury each. Mercury compounds have also been used historically as additives in latex paint to protect the paint from mildew and bacteria during production and storage.

The intentional addition of mercury to Canadian-produced consumer paints for interior use was prohibited in 1991. Mercury may have remained in paints after 1991, however, as a result of impurities in the paint ingredients or cross-contamination due to other manufacturing processes. The *Surface Coating Materials Regulations* made under the *Hazardous Products Act* set a maximum total mercury concentration of 10 mg/kg (0.001 percent) for surface coating materials (including paint). This criterion level applies to the sale and importation of new surface coating materials.
Mercury-containing thermostats and silent light switches are mercury tilt switches which are small tubes with electrical contacts at one end of the tube. A mercury tilt switch is usually present when no switch is visible. Mercury switches often have the word “TOP” stamped on the upper end of the switch, which is visible after removing the cover plate. If mercury switches are to be removed, the entire switch should be removed and placed into a suitable container for storage and disposal.

Waste light tubes generated during renovations or building demolition and waste mercury from equipment must either be recycled or disposed of in accordance with the requirements of Ont. Reg. 347 - *Waste Management, General*.

Waste mercury in amounts less than 5 kg (per month) are exempt from the generator registration requirements prescribed by O.Reg. 347 – *Waste Management – General*. Waste mercury from mercury switches or gauges should, however, be properly collected and shipped to a recycling facility or disposed of as a hazardous waste. Removal of mercury-containing equipment (e.g., switches, gauges, controls, etc.) should be carried out in a manner which prevents spillage and exposure to workers.

### 2.4 Silica

Silica exists in several forms of which crystalline silica is of most concern with respect to potential worker exposures. Quartz is the most abundant type of crystalline silica. Some commonly used construction materials containing silica include brick, refractory brick, concrete, concrete block, cement, mortar, rock and stone, sand, fill dirt, topsoil and asphalt containing rock or stone.

The Ministry of Labour *Guideline, Silica on Construction Projects*, dated April 2011, provides guidance in controlling exposure to silica dust during construction activities. In the guideline, silica-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of respirable crystalline silica in the form of cristobalite, tridymite, quartz and tripoli as shown in Appendix C, Table C-3.

### 2.5 Vinyl Chloride

Vinyl chloride vapours may be released from polyvinyl chloride (PVC) products in the event of heating or as a result of decomposition during fire. PVC is used in numerous materials that may be found in building construction, including, for example, piping, conduits, siding, window and door frames, plastics, garden hoses, flooring and wire and cable protection.

### 2.6 Acrylonitrile

Acrylonitrile is used to produce nitrile-butadiene rubber, acrylonitrile-butadiene-styrene (ABS) polymers and styrene-acrylonitrile (SAN) polymers. Products made with ABS resins which may be found in buildings include telephones, bottles, packaging, refrigerator door liners, plastic pipe, building panels and shower stalls. Acrylonitrile can be released into the air by combustion of products containing ABS.
2.7 Other Designated Substances

Isocyanates are a class of chemicals used in the manufacture of certain types of plastics, foams, coatings and other products. Isocyanate-based building construction materials may include rigid foam products such as foam-core panels and spray-on insulation and paints, coatings, sealants and adhesives. Isocyanates may be inhaled if they are present in the air in the form of a vapour, a mist or a dust.

Benzene is a clear, highly flammable liquid used mainly in the manufacture of other chemicals. The commercial use of benzene as a solvent has practically been eliminated, however it continues to be used as a solvent and reactant in laboratories.

Arsenic is a heavy metal used historically in pesticides and herbicides. The primary use in building construction materials was its use in the wood preservative chromated copper arsenate (CCA). CCA was used to pressure treat lumber since the 1940’s. Pressure-treated wood containing CCA is no longer being produced for use in most residential settings.

Ethylene oxide is a colourless gas at room temperature. It has been used primarily for the manufacture of other chemicals, as a fumigant and fungicide and for sterilization of hospital equipment.

Coke oven emissions are airborne contaminants emitted from coke ovens and are not a potential hazard associated with building construction materials.

2.8 Polychlorinated Biphenyls (PCBs)

The management of equipment classified as waste and containing Polychlorinated Biphenyls (PCBs) at concentrations of 50 parts per million (mg/kg) or greater is regulated by Ontario Regulation 362, Waste Management – PCBs. Under this regulation, PCB waste is defined as any waste material containing PCBs in concentrations of 50 mg/kg or greater. Any equipment containing PCBs at or greater than this level, such as transformers, switchgear, light ballasts and capacitors, which is removed from service due to age, failure or as a result of decommissioning, is considered to constitute a PCB waste. Although current federal legislation (effective 1 July 1980) has prohibited the manufacture and sale of new equipment containing PCBs since that time, continued operation of equipment supplied prior to this date and containing PCBs is still permitted. Handling, storage and disposition of such equipment is, however, tightly regulated and must be managed in accordance with provincial and federal government requirements as soon as it is taken out of service or becomes unserviceable.

In most institutional, commercial facilities and in smaller industrial facilities, the primary source of equipment potentially containing PCBs is fluorescent and H.I.D. light ballasts. Small transformers may also be present. In larger industrial facilities, larger transformers and switchgear containing, or potentially containing, PCBs may also be present.

PCBs were also commonly added to industrial paints from the 1940s to the late 1970s. PCBs were added directly to the paint mixture to act as a fungicide, to increase durability and flexibility, to improve resistance to fires and to increase moisture resistance. The use of PCBs in new products was banned in Canada in
the 1970s. PCB amended paints were used in specialty industrial/institutional applications prior to the 1970s including government buildings and equipment such as industrial plants, radar sites, ships as well as non-government rail cars, ships, grain bins, automobiles and appliances.

Removal of in-service equipment containing PCBs, such as fluorescent light ballasts, capacitors and transformers, is subject to the requirements of the federal PCB Regulations (discussed below).

The PCB Regulations, which came into force on 5 September 2008, were made under the Canadian Environmental Protection Act, 1999 (CEPA 1999) with the objective of addressing the risks posed by the use, storage and release to the environment of PCBs, and to accelerate their destruction. The PCB Regulations set different end-of-use deadlines for equipment containing PCBs at various concentration levels.

The Regulations Amending the PCB Regulations and Repealing the Federal Mobile PCB Treatment and Destruction Regulations were published on 23 April 2014, in the Canada Gazette, Part II, and came into force on 1 January 2015. The most notable part of the amendments is the addition of an end-of-use deadline date of 31 December 2025 for specific electrical equipment located at electrical generation, transmission and distribution facilities.

When the PCB materials are classified as waste, jurisdiction falls under the Ontario Ministry of the Environment and Climate Change (MOECC) and O.Reg. 362. All remedial and PCB management work must be carried out under the terms of a Director’s Instruction issued by an MOECC District Office (for quantities of PCB fluid greater than 50 litres). The PCB waste stream, regardless of quantity, must be registered with the MOECC, in accordance with O.Reg. 347, General - Waste Management. O.Reg. 362 applies to any equipment containing greater than 1 kg of PCBs.

### 2.9 Ozone-Depleting Substances (ODS) and Other Halocarbons

Ontario Regulation 463/10 – Ozone Depleting Substances and Other Halocarbons, applies to the use, handling and disposal of Class 1 ozone-depleting substances, including various chlorofluorocarbons (CFCs), halons and other halocarbons, Class 2 ozone-depleting substances, including various hydrochlorofluorocarbons (HCFCs) and halocarbons, and other halocarbons, including fluorocarbons (FCs) and hydrofluorocarbons (CFCs). The most significant requirements for handling of ozone-depleting substances (ODS) and other Halocarbons, which include, for example, refrigerants used in refrigeration equipment and chillers, include the following:

- certification is required for all persons testing, repairing, filling or emptying equipment containing ODS and other halocarbons;
- the discharge of a Class 1 ODS or anything that contains a Class 1 ODS to the natural environment or within a building is prohibited;
- the making, use of, selling of or transferring of a Class 1 ODS is restricted to certain conditions;
• the discharge of a solvent or sterilant that contains a Class 2 ODS is prohibited;

• the making, use of, selling of or transferring of a solvent or sterilant that contains a Class 2 ODS is restricted to certain conditions;

• fire extinguishing equipment that contains a halon may be discharged to fight fires, except fires for firefighting training purposes;

• portable fire extinguishing equipment that contains a halon may be used or stored if the extinguisher was sold for use for the first time before 1 January 1996;

• records of the servicing and repair of equipment containing ODS and other halocarbons must be prepared and maintained by the owner of the equipment; and

• equipment no longer containing ODS and other halocarbons must be posted with a notice completed by a certified person.

Ontario Regulation 347, General – Waste Management, has also been amended to provide for more strict control of CFCs. The requirements under the amended regulation apply primarily to the keeping of records for the receipt or recycling of CFC waste.

2.10 Mould

Moulds are forms of fungi that are found everywhere both indoors and outdoors all year round. Outdoors, moulds live in the soil, on plants and on dead and decaying matter. More than 1000 different kinds of indoor moulds have been found in buildings. Moulds spread and reproduce by making spores, which are all small and light-weight, able to travel through air, capable of resisting dry, adverse environmental conditions, and hence capable of surviving a long time. Moulds need moisture and nutrients to grow and their growth is stimulated by warm, damp and humid conditions.

Control of exposure to mould is required under Section 25(2)(h) of the Ontario Occupational Health and Safety Act, which states that employers shall take every precaution reasonable in the circumstances for the protection of workers. Recommended work practices are outlined in the following documents:


3 RESULTS AND DISCUSSION

3.1 Asbestos

Arcadis reviewed a report entitled *Survey of Asbestos-Containing Materials, Oakwood Public School, 357 Bartos Drive, Oakville, Ontario* dated December 23, 2017. Information and/or bulk sample analysis results obtained from this report was utilized by Arcadis during the course of our investigation and in the preparation of this report.

During the course of our site investigation, representative bulk samples of material were collected by Arcadis staff. The samples were forwarded to EMSL Canada Inc. (EMSL) for asbestos analyses. Results of bulk sample analysis for asbestos content are provided in Table 3.1. Laboratory reports are provided in Appendix B.

Table 3.1. Summary of Results of Analyses of Bulk Samples for Asbestos Content

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Location</th>
<th>Description</th>
<th>Asbestos Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Corridor 3</td>
<td>Acoustic coat on ceiling (acoustic spray)</td>
<td>2% Chrysotile</td>
</tr>
<tr>
<td>3A</td>
<td>Corridor 3</td>
<td>Scratch coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>3B</td>
<td>Corridor 2</td>
<td>Scratch coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>3C</td>
<td>Corridor 1</td>
<td>Scratch coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>3D</td>
<td>Foyer</td>
<td>Scratch coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>3E</td>
<td>Corridor 2</td>
<td>Scratch coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>4A</td>
<td>Corridor 3</td>
<td>Smooth coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>4B</td>
<td>Corridor 2</td>
<td>Smooth coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>4C</td>
<td>Corridor 1</td>
<td>Smooth coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>4D</td>
<td>Foyer</td>
<td>Smooth coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>4E</td>
<td>Corridor 2</td>
<td>Smooth coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>5A</td>
<td>Corridor 3</td>
<td>Textured coat – Plaster on wall</td>
<td>None Detected</td>
</tr>
<tr>
<td>5B</td>
<td>Corridor 2</td>
<td>Textured coat – Plaster on wall</td>
<td>&lt;0.25% Chrysotile (2)</td>
</tr>
<tr>
<td>5C</td>
<td>Corridor 1</td>
<td>Textured coat – Plaster on wall</td>
<td>&lt;0.25% Chrysotile (2)</td>
</tr>
<tr>
<td>5D</td>
<td>Foyer</td>
<td>Textured coat – Plaster on wall</td>
<td>&lt;0.25% Chrysotile (2)</td>
</tr>
<tr>
<td>5E</td>
<td>Corridor 2</td>
<td>Textured coat – Plaster on wall</td>
<td>&lt;0.25% Chrysotile (2)</td>
</tr>
<tr>
<td>18A-PL-6</td>
<td>Room 6</td>
<td>Fine Textured Plaster- (Wall)</td>
<td>0.4% Chrysotile (1,2)</td>
</tr>
<tr>
<td>18B-PL-6</td>
<td>Room 6</td>
<td>Fine Textured Plaster- (Wall)</td>
<td>&lt;0.025% Chrysotile (1,2)</td>
</tr>
<tr>
<td>18C-PL</td>
<td>Gym</td>
<td>Fine Textured Plaster- (Wall)</td>
<td>None Detected</td>
</tr>
<tr>
<td>18D-PL</td>
<td>Boiler Room</td>
<td>Fine Textured Plaster- (Wall)</td>
<td>&lt;0.025% Chrysotile (1,2)</td>
</tr>
</tbody>
</table>
NOTES:

(1) Sample results derived from a report prepared by Arcadis for Halton District School Board entitled Survey of Asbestos-Containing Materials, Oakwood Public School, 357 Bartos Drive, Oakville, Ontario dated December 23, 2017.

(2) “Asbestos-containing material” is defined as material that contains 0.5% or more asbestos by dry weight.

Bulk samples were analyzed by Polarized Light Microscopy (PLM) analysis, except where “TEM” is noted, in which case Transmission Electron Microscopy analysis was also performed.

< = less than.

Chrysotile = Chrysotile asbestos.

Determination of the locations of asbestos-containing material was made based on the results of bulk sample analysis, visual observations and physical characteristics of the applications as well as our knowledge of the uses of asbestos in building materials.

Based on visual observations and results of laboratory analyses of samples collected by Arcadis Canada Inc., the following asbestos-containing materials were found to be present in the designated study areas:

- textured acoustic coat applied on ceilings in Corridors 1, 2 and 3; and
- textured plaster applied on the lower half of the walls in Corridors 1, 2 and 3.

It should be noted that the upper half of the walls consisting of smooth plaster in the corridors does not contain asbestos. The lower half of the walls in the corridors that contains asbestos are not expected to be affected by the renovation project and this information is provided for references purposes.
It is our understanding that there may be limited amounts of piping above solid ceilings. However, most of the piping system is at the perimeter of the building that is not within the study area.

Textured acoustic coat is a friable material. The removal, alteration and/or disturbance of less than 1 m$^2$ of friable asbestos-containing materials is classified as a Type 2 enclosure operation as specified in O.Reg. 278/05. The removal, alteration and/or disturbance of more than 1 m$^2$ of friable asbestos-containing materials is classified as a Type 3 operation.

Plaster is a non- or semi-friable material which can become friable when disturbed. According to the Ministry of Labour “A Guide to the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations”, dated November 2007, wetting does not adequately control the spread of dust and fibres during the breaking, cutting, drilling, abrading, grinding, sanding or vibrating of asbestos containing plaster (as well as stucco and other hard finishes) by means of non-powered hand-held tools. As such, Type 1 procedures cannot be used for work on these materials. The removal, alteration and/or disturbance should therefore be classified as a Type 2 or Type 3 operation depending on the tools used, and the amount of material to be removed.

Asbestos may also be present in materials which were not sampled during the course of the asbestos survey carried out by Arcadis, including, but not limited to, areas outside the designated study areas, components of electrical equipment (e.g. electric wiring insulation, non-metallic sheathed cable, electrical panel partitions, arc chutes, high-grade electrical paper, etc.), etc., and/or in locations that are presently inaccessible (e.g., behind walls and above plaster ceilings). Confirmatory testing of any such materials could be undertaken as the need arises (i.e., at the time of renovations, modifications or demolition) or the materials can be assumed to contain asbestos based on findings in adjacent areas.

If any materials which may contain asbestos and which were not tested during the course of the designated substances and hazardous materials survey are discovered during any construction activities, the work shall not proceed until such time as the required notifications have been made and an appropriate course of action is determined.

### 3.2 Lead

During the course of our site investigation, representative bulk samples were collected by Arcadis staff. The samples were forwarded to EMSL Canada Inc. (EMSL) for lead analyses. Results of bulk sample analysis for lead content are provided in Table 3.2. The laboratory report is provided in Appendix B.

The paint samples were collected from the predominant paint present in the designated study areas.

**Table 3.2. Summary of Results of Analyses of Bulk Samples for Lead Content**

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Sample Location</th>
<th>Sample Description</th>
<th>Lead Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1</td>
<td>Corridor 1</td>
<td>Light Grey on Wall</td>
<td>1700 mg/Kg</td>
</tr>
</tbody>
</table>
NOTE:
< = less than.

mg/Kg = milligrams lead per kilogram paint.
1 mg/Kg = 1 part per million (ppm).

Lead was detected in the light grey paint applied on walls in the corridors.

The Ministry of Labour Guideline – Lead on Construction Projects, dated April 2011, provides guidance in the measures and procedures that should be followed when handling lead containing materials during construction projects. In the guideline, lead-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of lead, as shown in Appendix C, Table C-2. Any operation that may expose a worker to lead that is not a Type 1, Type 2, or Type 3b operation, is classified as a Type 3a operation.

In addition, the EACO Lead Abatement Guidelines, 2014 — Edition 1, Environmental Abatement Council of Ontario, also provides guidance and recommended work practices.

### 3.3 Mercury

During the course of our site investigation, fluorescent lights were identified in the designated study areas. Mercury should be assumed to be present as a gas in all fluorescent light tubes and in all paint applications, albeit at low levels. The fluorescent light tubes should be recycled for mercury, if the lights are removed.

Proper procedures for removing and handling mercury-containing fluorescent light tubes typically involve:

- ensuring that electrical power to light fixtures has been disconnected and locked out;
- taking all necessary precautions to ensure that fluorescent lamp tubes are removed in a manner that prevents breakage; and
- transporting fluorescent lamp tubes to a licensed processing location for separation and recovery of mercury.

The measures and procedures outlined in the MOL Guideline, Lead on Construction Projects for control of potential exposure to lead in paint during construction activities will also serve to control potential exposure to any mercury in paint.

### 3.4 Silica

Materials observed in the designated study areas which should be considered to contain silica included plaster and concrete.
The Ministry of Labour Guideline, *Silica on Construction Projects*, April 2011, provides guidance in controlling exposure to silica dust during construction activities. In the guideline, silica-containing construction operations are classified into three groups - Type 1 (low risk), Type 2 (medium risk) and Type 3 (high risk) based on presumed airborne concentrations of silica, as shown in Appendix C, Table C-3.

Additional precautionary measures should also be implemented for certain types of materials (e.g., plaster and texture coat materials, including non-asbestos applications, concrete block, etc.). For minor disturbances such as drilling, a HEPA-filtered attachment should be used. For removal of more than a minor amount of material, enclosures should be constructed for dust control and separation of the work area from adjacent areas.

### 3.5 Vinyl Chloride

As mentioned in Section 2.5 above, vinyl chloride would only be a potential exposure concern in the event of combustion of PVC products.

### 3.6 Acrylonitrile

As mentioned in Section 2.6 above, acrylonitrile would only be a potential exposure concern in the event of combustion of ABS products.

### 3.7 Other Designated Substances

No other designated substances (benzene, isocyanates, arsenic, ethylene oxide and coke oven emissions) were observed to be present in the designated study areas, and none would be expected to be encountered in any building materials in a form that would represent an exposure concern. Arsenic may be present at low levels in paint applications. The measures and procedures outlined in the MOL Guideline, *Lead on Construction Projects* for control of potential exposure to lead in paint during construction activities will also serve to control potential exposure to any arsenic (or mercury) in paint.

### 3.8 Polychlorinated Biphenyls (PCBs)

Fluorescent lights were observed in the designated study areas during the course of our site investigations. Light ballasts, such as those associated with the type of fluorescent lights (T8s) observed in the designated study areas, are usually an electronic-type which do not contain PCBs, however, this would be confirmed by an electrician at the time of dismantling of the lights.

### 3.9 Ozone-Depleting Substances (ODS) and Other Halocarbons

No equipment potentially containing ozone-depleting substances (ODS) was identified during the course of the site investigation.
3.10 Mould

The investigation for mould included a visual inspection of readily-accessible surfaces throughout the designated study areas to determine if any mould was evident. Readily evident mould was not observed in the designated study areas during the course of the site investigation.
4 USE AND LIMITATIONS OF THIS PRE-RENOVATION DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY REPORT

This report, prepared for Halton District School Board, does not provide certification or warranty, expressed or implied, that the investigation conducted by Arcadis Canada Inc. identified all designated substances (as defined in the Ontario *Occupational Health and Safety Act*) in the designated study areas at the subject facility. The work undertaken by Arcadis Canada Inc. was directed to provide information on the presence of designated substances in building construction materials based on review of existing information, visual investigation of readily accessible areas in the designated study areas of the building and on the results of laboratory analysis of a limited number of bulk samples of material for asbestos content and laboratory analysis of a limited number of paint samples for lead content. The survey did not include for identification of asbestos in process materials, equipment (including electrical equipment and wiring), furniture (e.g., chairs, table tops, etc.), nor material outside of the building (e.g., asphaltic pavement).

The material in this report reflects Arcadis Canada Inc.’s best judgment in light of the information available at the time of the investigation, which was performed on June 14, 2018.

This report is not intended to be used as a scope of work or technical specification for remediation of designated substances or hazardous materials.

This report was prepared by Arcadis Canada Inc. for Halton District School Board. Any use which any other party makes of the report, or reliance on, or decisions to be based on it, is the responsibility of such parties.
LOCATIONS OF ASBESTOS-CONTAINING MATERIALS AND STUDY AREAS

NOTE:
1. INTERIORS OF ALL FIRE DOORS ARE ASSUMED TO CONTAIN ASBESTOS.
Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

<table>
<thead>
<tr>
<th>Client Sample ID</th>
<th>Lab Sample ID</th>
<th>Sample Description</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Fibrous Asbestos</th>
<th>Fibrous Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>551807156-0001</td>
<td>Corridor 3 (Room 17)/Textured ceiling plaster</td>
<td>6/19/2018</td>
<td>Beige</td>
<td>98%</td>
<td>0%</td>
<td>2% Chrysotile</td>
</tr>
<tr>
<td>1B</td>
<td>551807156-0002</td>
<td>Corridor 2 (Room 23)/Textured ceiling plaster</td>
<td>6/19/2018</td>
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<td></td>
<td></td>
<td>Positive Stop (Not Analyzed)</td>
</tr>
<tr>
<td>1C</td>
<td>551807156-0003</td>
<td>Corridor 1 (Room 8)/Textured ceiling plaster</td>
<td>6/19/2018</td>
<td></td>
<td></td>
<td></td>
<td>Positive Stop (Not Analyzed)</td>
</tr>
<tr>
<td>1D</td>
<td>551807156-0004</td>
<td>Foyer/Textured ceiling plaster</td>
<td>6/19/2018</td>
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<td></td>
<td></td>
<td>Positive Stop (Not Analyzed)</td>
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<tr>
<td>1E</td>
<td>551807156-0005</td>
<td>Corridor 2 (Room 10)/Textured ceiling plaster</td>
<td>6/19/2018</td>
<td></td>
<td></td>
<td></td>
<td>Positive Stop (Not Analyzed)</td>
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<tr>
<td>3A</td>
<td>551807156-0006</td>
<td>Corridor 3 (Room 17)/Scratch coat – Plaster on wall</td>
<td>6/19/2018</td>
<td>Gray</td>
<td></td>
<td></td>
<td>None Detected</td>
</tr>
<tr>
<td>3B</td>
<td>551807156-0007</td>
<td>Corridor 2 (Room 23)/Scratch coat – Plaster on wall</td>
<td>6/19/2018</td>
<td>Gray</td>
<td></td>
<td></td>
<td>None Detected</td>
</tr>
</tbody>
</table>
## Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

### Client Sample ID: 3C
#### Sample Description:
Corridor 1 (Room 8)/Scratch coat – Plaster on wall

<table>
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<th>TEST</th>
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<th>Non-Asbestos Fibrous</th>
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<th>Asbestos</th>
<th>Comment</th>
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</thead>
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<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>Gray</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Client Sample ID: 3D
#### Sample Description:
Foyer/Scratch coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>Gray</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Client Sample ID: 3E
#### Sample Description:
Corridor 2 (Room 10)/Scratch coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>Gray</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Client Sample ID: 4A
#### Sample Description:
Corridor 3 (Room 17)/Smooth coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Client Sample ID: 4B
#### Sample Description:
Corridor 2 (Room 23)/Smooth coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Client Sample ID: 4C
#### Sample Description:
Corridor 1 (Room 8)/Smooth coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
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<td>White</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
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### Client Sample ID: 4D
#### Sample Description:
Foyer/Smooth coat – Plaster on wall

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<tr>
<th>TEST</th>
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<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
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<tr>
<td>PLM</td>
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<td>100%</td>
<td>None Detected</td>
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### Client Sample ID: 4E
#### Sample Description:
Corridor 2 (Room 10)/Smooth coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
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<td>White</td>
<td>0%</td>
<td>100%</td>
<td>None Detected</td>
<td></td>
</tr>
</tbody>
</table>
# Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

**Client Sample ID:** 5A  
**Lab Sample ID:** 551807156-0016  
**Sample Description:** Corridor 3 (Room 17)/Textured coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
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<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>None</td>
<td>Detected</td>
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</tbody>
</table>

**Client Sample ID:** 5B  
**Lab Sample ID:** 551807156-0017  
**Sample Description:** Corridor 2 (Room 23)/Textured coat – Plaster on wall

<table>
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<tr>
<th>TEST</th>
<th>Analyzed Date</th>
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<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;1% Chrysotile</td>
<td></td>
</tr>
<tr>
<td>400 PLM Pt Ct</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;0.25% Chrysotile</td>
<td></td>
</tr>
</tbody>
</table>

**Client Sample ID:** 5C  
**Lab Sample ID:** 551807156-0018  
**Sample Description:** Corridor 1 (Room 8)/Textured coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
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<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;1% Chrysotile</td>
<td></td>
</tr>
<tr>
<td>400 PLM Pt Ct</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;0.25% Chrysotile</td>
<td></td>
</tr>
</tbody>
</table>

**Client Sample ID:** 5D  
**Lab Sample ID:** 551807156-0019  
**Sample Description:** Foyer/Textured coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;1% Chrysotile</td>
<td></td>
</tr>
<tr>
<td>400 PLM Pt Ct</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;0.25% Chrysotile</td>
<td></td>
</tr>
</tbody>
</table>

**Client Sample ID:** 5E  
**Lab Sample ID:** 551807156-0020  
**Sample Description:** Corridor 2 (Room 10)/Textured coat – Plaster on wall

<table>
<thead>
<tr>
<th>TEST</th>
<th>Analyzed Date</th>
<th>Color</th>
<th>Non-Asbestos Fibrous</th>
<th>Non-Asbestos Non-Fibrous</th>
<th>Asbestos</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLM</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;1% Chrysotile</td>
<td></td>
</tr>
<tr>
<td>400 PLM Pt Ct</td>
<td>6/19/2018</td>
<td>White/Pink</td>
<td>0%</td>
<td>100%</td>
<td>&lt;0.25% Chrysotile</td>
<td></td>
</tr>
</tbody>
</table>
Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Analyst(s):

Anne Balayboa
PLM (16)
400 PLM Pt Ct (4)

Reviewed and approved by:

Matthew Davis or other approved signatory
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Initial report from: 06/19/2018 15:30
Test Report:EPAMultiTests-7.32.2.D Printed: 6/19/2018 06:15PM
## Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

<table>
<thead>
<tr>
<th>Client Sample Description</th>
<th>Lab ID</th>
<th>Collected</th>
<th>Analyzed</th>
<th>Weight</th>
<th>Lead Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>551807054-0001</td>
<td>6/18/2018</td>
<td></td>
<td>0.2264 g</td>
<td>1700 mg/Kg</td>
</tr>
</tbody>
</table>

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

---

Rowena Fanto, Lead Supervisor or other approved signatory

---

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Canada Inc. Mississauga, ON A2LA Accredited Environmental Testing Cert #2845.08

---

Initial report from 06/22/2018 09:06:04
APPENDIX C

Summary of Asbestos, Lead and Silica Work Classifications
TABLE C-1
SUMMARY OF CLASSIFICATION OF TYPE 1, 2 AND 3 OPERATIONS
(Ont. Reg. 278/05)

**TYPE 1 OPERATIONS**

- removing less than 7.5 m² asbestos-containing ceiling tiles;
- removing non-friable asbestos-containing material other than ceiling tiles, if the material is removed without being broken, cut, drilled, abraded, ground, sanded or vibrated;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the material is wetted and the work is done only using non-powered, hand-held tools; and
- removing less than 1 m² of drywall in which asbestos-containing joint compounds have been used.

**TYPE 2 OPERATIONS**

- removing all or part of a false ceiling to obtain access to a work area, if asbestos-containing material is likely to be lying on the surface of the false ceiling;
- removal of one square metre or less of friable asbestos-containing material;
- enclosing friable asbestos-containing material;
- applying tape or a sealant or other covering to asbestos-containing pipe or boiler insulation;
- removing 7.5 m² or more asbestos-containing ceiling tiles (if removed without being broken, cut, drilled, abraded, ground, sanded or vibrated);
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the material is not wetted and the work is done only using non-powered, hand-held tools;
- removal of one square metre or more of drywall in which asbestos-containing joint compounds have been used;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing material if the work is done using power tools that are attached to dust-collecting devices equipped with HEPA filters;
- cleaning or removing filters used in air-handling equipment in a building that has asbestos-containing sprayed fireproofing.
### TABLE C-1 (Continued)
#### SUMMARY OF CLASSIFICATION OF TYPE 1, 2 AND 3 OPERATIONS
( Ont. Reg. 278/05 )

**TYPE 3 OPERATIONS**

- removal of more than one square metre of friable asbestos-containing material;
- spray application of a sealant to friable asbestos-containing material;
- cleaning or removing air-handling equipment, including rigid ducting but not including filters, in a building that has sprayed asbestos-containing fireproofing;
- repairing or demolishing a kiln, metallurgical furnace or similar structure that is made in part of asbestos-containing refractory materials;
- breaking, cutting, drilling, abrading, grinding, sanding or vibrating non-friable asbestos-containing materials, if the work is done using power tools that are not attached to dust-collecting devices equipped with HEPA filters.
TABLE C-2
SUMMARY OF CLASSIFICATION OF LEAD-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE – LEAD ON CONSTRUCTION PROJECTS, APRIL 2011

<table>
<thead>
<tr>
<th>Type 1 Operations</th>
<th>Type 2 Operations</th>
<th>Type 3 Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 2a</td>
<td>Type 2b</td>
</tr>
<tr>
<td>&lt;0.05 mg/m³</td>
<td>&gt;0.05 to 0.50</td>
<td>&gt;0.50 to 1.25</td>
</tr>
<tr>
<td></td>
<td>mg/m³</td>
<td>mg/m³</td>
</tr>
</tbody>
</table>

Note: The classification of Type 1, 2 and 3 operations is based on presumed airborne concentrations of lead, as shown above.

TYPE 1 OPERATIONS

- application of lead-containing coatings with a brush or roller;
- removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap;
- removal of lead-containing coatings or materials using a power tool that has an effective dust collection system equipped with a HEPA filter;
- installation or removal of lead-containing sheet metal;
- installation or removal of lead-containing packing, babbit or similar material;
- removal of lead-containing coatings or materials using non-powered hand tools, other than manual scraping or sanding;
- soldering.

TYPE 2 OPERATIONS

Type 2a Operations

- welding or high temperature cutting of lead-containing coatings or materials outdoors. This operation is considered a Type 2a operation only if it is short-term, not repeated, and if the material has been stripped prior to welding or high temperature cutting. Otherwise it will be considered a Type 3a operation;
- removal of lead-containing coatings or materials by scraping or sanding using non-powered hand tools;
- manual demolition of lead-painted plaster walls or building components by striking a wall with a sledgehammer or similar tool.

Type 2b Operations

- spray application of lead-containing coatings.
TABLE C-2 (Continued)
SUMMARY OF CLASSIFICATION OF
LEAD-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE – LEAD ON CONSTRUCTION PROJECTS, APRIL 2011

TYPE 3 OPERATIONS

Type 3a Operations
- welding or high temperature cutting of lead-containing coatings or materials indoors or in a confined space;
- burning of a surface containing lead;
- dry removal of lead-containing mortar using an electric or pneumatic cutting device;
- removal of lead-containing coatings or materials using power tools without an effective dust collection system equipped with a HEPA filter;
- removal or repair of a ventilation system used for controlling lead exposure;
- demolition or cleanup of a facility where lead-containing products were manufactured;
- an operation that may expose a worker to lead dust, fume or mist that is not a Type 1, Type 2, or Type 3b operation

Type 3b Operations
- abrasive blasting of lead-containing coatings or materials;
- removal of lead-containing dust using an air mist extraction system.
TABLE C-3
SUMMARY OF CLASSIFICATION OF SILICA-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE, SILICA ON CONSTRUCTION PROJECTS, APRIL 2011

<table>
<thead>
<tr>
<th></th>
<th>Type 1 Operations</th>
<th>Type 2 Operations</th>
<th>Type 3 Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cristobalite and</td>
<td>&gt;0.05 to 0.50 mg/m³</td>
<td>&gt;0.50 to 2.50 mg/m³</td>
<td>&gt;2.5 mg/m³</td>
</tr>
<tr>
<td>Tridymite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartz and Tripoli</td>
<td>&gt;0.10 to 1.0 mg/m³</td>
<td>&gt;1.0 to 5.0 mg/m³</td>
<td>&gt;5.0 mg/m³</td>
</tr>
</tbody>
</table>

Note: The classification of silica-containing construction tasks is based on presumed concentrations of respirable crystalline silica, as shown above.

**TYPE 1 OPERATIONS**

- The drilling of holes in concrete or rock that is not part of a tunnelling operation or road construction.
- Milling of asphalt from concrete highway pavement.
- Charging mixers and hoppers with silica sand (sand consisting of at least 95 per cent silica) or silica flour (finely ground sand consisting of at least 95 per cent silica).
- Any other operation at a project that requires the handling of silica-containing material in a way that may result in a worker being exposed to airborne silica.
- Entry into a dry mortar removal or abrasive blasting area while airborne dust is visible for less than 15 minutes for inspection and/or sampling.
- Working within 25 metres of an area where compressed air is being used to remove silica-containing dust outdoors.

**TYPE 2 OPERATIONS**

- Removal of silica containing refractory materials with a jackhammer.
- The drilling of holes in concrete or rock that is part of a tunnelling or road construction.
- The use of a power tool to cut, grind, or polish concrete, masonry, terrazzo or refractory materials.
- The use of a power tool to remove silica containing materials.
- Tunnelling (operation of the tunnel boring machine, tunnel drilling, tunnel mesh installation).
- Tuckpoint and surface grinding.
- Dry mortar removal with an electric or pneumatic cutting device.
- Dry method dust cleanup from abrasive blasting operations.
- The use of compressed air outdoors for removing silica dust.
- Entry into area where abrasive blasting is being carried out for more than 15 minutes.
TABLE C-3 (Continued)
SUMMARY OF CLASSIFICATION OF SILICA-CONTAINING CONSTRUCTION TASKS
MOL GUIDELINE, SILICA ON CONSTRUCTION PROJECTS, APRIL 2011

**TYPE 3 OPERATIONS**

- Abrasive blasting with an abrasive that contains $\geq 1$ per cent silica.
- Abrasive blasting of a material that contains $\geq 1$ per cent silica.
Arcadis Canada Inc.

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Tel 905 882 5984

Fax 905 882 8962

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