ST. PATRICK ELEMENTARY SCHOOL
School Modernization

Street Address: 5302 48 Street
Taber, AB T1G 1H3

Pre-Bid Meeting: Tuesday, May 16, 2017 10:30 a.m. – 12:00 p.m.

Bid Closing: **Tuesday, May 30, 2017, at 2:00:00 p.m.**

Inquires Contact: Robert Camarta: robert.camarta@gov.ab.ca
(include the Plan No. in the subject line).

Plan Holder List: is available at www.purchasingconnection.ca – accessible from the opportunity notice for this project.

Project ID: B4166A-0001
Building No: B4166A **Plan No:** 016559G

VOLUME 1 OF 2

Alberta Infrastructure

ST. PATRICK ELEMENTARY SCHOOL
School Modernization

Project ID: B4166A-0001
Building No: B4166A **Plan No:** 016559G

Prime Consultant:

Sahuri + Partners Architecture Inc.
Suite 201, 123 Forge Road SE
Calgary, Alberta
T2H 0S9

PREAMBLE

The division and section arrangement of these Specifications is generally based on MasterFormat™, 2004 edition, published jointly by Construction Specifications Canada and the Construction Specifications Institute.

Where it is indicated that a division of MasterFormat™ is "Not Used", or where a division heading is omitted entirely, this does not necessarily mean that work normally specified in that division is not required. It may be specified elsewhere.

End of Table of Contents

CONTRACT DRAWINGS

The following is a list of the contract drawings:

SERIES	NAME/TITLE	DATE	REVISION
ARCHITECTURAL			
A000	COVER PAGE		
A001	PROJECT INFORMATION		
A002	PROJECT INFORMATION		
A003	DOOR SCHEDULE & ELEVATIONS		
A004	WINDOW SCHEDULE & ELEVATIONS		
A005	ROOM FINISH SCHEDULE		
A006	FIRE SEPARATION PLAN		
A010	MAIN FLOOR DEMOLITOIN PLAN		
A011	MAIN FLOOR & MECHANICAL MEZZANINE FLOOR PLANS		
A012	ROOF DEMOLITION PLAN		
A013	ROOF PLAN		
A014	SOLAR PANEL LAYOUT		
A020	MAIN & SECOND FLOOR REFLECTED CEILING PLAN		
A030	MAIN FLOOR & MECHANICAL MEZZANINE FINISH PLANS		
A040	MAIN FLOOR FURNITURE PLAN		
A041	MAIN FLOOR FITMENT PLAN SOUTH WING		
A042	MAIN FLOOR FITMENT PLAN NORTH WING		
A043	INTERIOR SIGNAGE PLAN		
A100	ENLARGED FLOOR PLANS		
A101	ENLARGED FLOOR PLANS		
A102	ENLARGED FLOOR PLANS		
A103	ENLARGED FLOOR PLANS		
A104	ENLARGED FLOOR PLANS		
A110	GYMNASIUM GAME LINE LAYOUT		
A120	STAIR PLANS, SECTIONS & DETAILS		
A130	EXTERIOR ELEVATIONS		
A141	BUILDING SECTIONS		
A142	BUILDING SECTIONS		
A151	WALL SECTIONS		
A152	WALL SECTIONS		
A153	WALL SECTIONS		
A154	WALL SECTIONS		
A160	PLAN DETAILS		
A161	PLAN DETAILS		
A162	PLAN DETAILS		
A163	PLAN DETAILS		

A170	SECTION DETAILS
A171	SECTION DETAILS
A172	SECTION DETAILS
A173	SECTION DETAILS
A174	SECTION DETAILS
A175	SECTION DETAILS
A176	SECTION DETAILS
A177	SECTION DETAILS
A181	INTERIOR ELEVATIONS
A182	INTERIOR ELEVATIONS
A183	INTERIOR ELEVATIONS
A184	INTERIOR ELEVATIONS
A185	INTERIOR ELEVATIONS
A186	INTERIOR ELEVATIONS
A187	INTERIOR ELEVATIONS
A190	MILLWORK
A191	MILLWORK
A192	MILLWORK
A501	SITE DEMOLITION PLAN
A502	SITE PLAN
A503	SITE SURVEY
A504	SITE DETAILS
A505	SITE PHOTOS

MECHANICAL

M001	LEGEND
M100	MAIN SANITARY DRAINAGE PLAN
M110	MAIN FLOOR PLUMBING PLAN
M200	MAIN FLOOR HEAT/COOL PLAN
M300	MAIN FLOOR VENTILATION PLAN
M400	MAIN FLOOR FIRE PROTECTION
M500	SCMEMATICS SHEET 1
M501	SCHEMATICS SHEET 2
M600	ROOF PLAN
M601	ENLARGED PLANS
M700	DETAILS SHEET 1
M701	DETAILS SHEET 2
M702	DETAILS SHEET 3
M900	MECHANICAL SCHEDULES PAGE 1
M901	MECHANICAL SCHEDULES PAGE 2
MD100	MAIN FLOOR MECHANICAL DEMO PLAN

ELECTRICAL

E400	SYMBOL LEGEND AND NOTES
E401	SITE PLAN
E402	DEMOLITION – MAIN FLOOR
E410	CONSTRUCTION LIGHTING – SOUTH MAIN FLOOR AND MEZZANINE
E411	LUMINAIRE AND LIGHTING CONTROL SCHEDULES
E420	CONSTRUCTION – POWER & LOW VOLTAGE SYSTEMS –MAIN FLOOR
E421	CONSTRUCTION – POWER & LOW VOLTAGE SYSTEMS – ROOF & MEZZANINE
E422	CONSTRUCTION – POWER & LOW VOLTAGE SYSTEMS DETAILS
E423	CONSTRUCTION – CABLE TRAY – MAIN FLOOR
E424	SHADOW STUDY
E425	PV INSTALLATION – ROOF AREAS
E426	PV INSTALLATION – SYSTEM LAYOUT
E430	PV INSTALLATION – SINGLE LINE DIAGRAM
E431	SINGLE LINE DIAGRAM
E432	PANEL SCHEDULES SHEET 1
E433	PANEL SCHEDULES SHEET 2
E440	CONSTRUCTION – SECURITY – MAIN FLOOR
E441	CONSTRUCTION – SECURITY – ROOF & MEZZANINE
E450	CONSTRUCTION – FIRE ALARM – MAIN FLOOR & MEZZANINE
E451	FIRE ALARM DETAILS
E452	FIRE ALARM DETAILS

CIVIL

C001	SITE SERVICING PLAN

STRUCTURAL

S100	STRUCTURAL GENERAL NOTES SHEET 1
S101	STRUCTURAL GENERAL NOTES SHEET 2
S102	STRUCTURAL GENERAL NOTES SHEET 3
S103	STRUCTURAL STANDARD DETAILS
S200	FOUNDATION DEMOLITION AND NEW FOUNDATION PLANS
S201	MAIN FLOOR DEMOLITION AND NEW SLAB ON GRADE PLAN
S202	EXISTING ROOF MODIFICATION AND NEW STRUCTURAL FRAMING PLANS
S210	ENLARGED FOUNDATION PLAN
S211	ENLARGED ANCHOR BOLT PLAN
S212	GATHERING SPACE ROOF AND MECHANICAL ROOM FLOOR FRAMING PLAN
S300	ELEVATIONS SHEET 1
S301	ELEVATIONS SHEET 2
S302	ELEVATIONS SHEET 3

S401	SECTIONS AND DETAILS SHEET 1
S402	SECTIONS AND DETAILS SHEET 2
S403	SECTIONS AND DETAILS SHEET 3
S404	SECTIONS AND DETAILS SHEET 4
S405	SECTIONS AND DETAILS SHEET 5
S406	SECTIONS AND DETAILS SHEET 6

END OF LIST OF DRAWING SHEETS

1. SUMMARY

.1 The intent of this bid call is to solicit and receive formal offers to perform the following Work:

Renovations to the St. Patrick Elementary School, located at 5302 48 Street, Taber, Alberta, in accordance with Drawings and Specifications.

.2 Bids shall be prepared and submitted and the bidding process shall be administered in accordance with these bidding requirements.

.3 Refer to Section 01 11 00 - Summary of Work for a summary of the Project, including requirements pertaining to Contract Time.

2. BID SUBMISSION

.1 Electronic or hardcopy bids will be accepted until 2:00:00 p.m. local time on Tuesday, May 30, 2017 (the "Bid Closing Time") as follows:

.1 Electronic bids:

.1 Submit electronic bids via the Infrastructure designated electronic bid submission system. The electronic bid submission system is accessible via COOLNet Alberta: http://coolnetalberta.com/login/

.2 Hard copy bids:

.1 Submit hardcopy bids on the form(s) provided in the Bid Documents using the pre-addressed envelope.

.2 When a pre-addressed envelope is not available, include the following information on a Bidder supplied envelope:

.1 Labeled as a “Bid”.
.2 Name of the Project/Work specified in 1.1.
.3 Address for receipt of bids, as specified in 2.1.
.4 Bidder’s Legal Name

.3 Seal envelope and deliver to:

Tender Administrator
Infrastructure
2nd Floor, (2700)
Infrastructure Building
6950 - 113 Street NW
Edmonton, Alberta T6H 5V7
Fax: 780-422-9686

.3 Oral, telephoned, fax, or e-mail bids will not be accepted nor acknowledged.

.4 In the event that a bidder submits an electronic bid and a hard copy bid, only the electronic bid will be accepted. The hard copy bid will be returned unopened to the bidder.

.2 Visual Appearance of Bid Documents

.1 The hard copy bid documents found in the document package and electronic forms that need to be completed for bid submission on the electronic bid submission system may have different visual appearances. The information required to be submitted however is identical.

.3 Official Bid Closing Time will be determined as follows:

.1 Electronic Bid Submissions: the official time shall be as determined by the electronic bid submission system clock.

.2 Hard Copy Bid Submissions: the official bid closing time shall be as determined by the time recorder clock at the location of submission.

.4 Extension of Bid Closing Time

.1 The Province may extend the Bid Closing Time by addendum.

3. BASIS OF BID

.1 Bids shall be on a stipulated price basis.

4. SUFFICIENCY OF BID

.1 The submission of a bid shall constitute an incontrovertible representation by the Bidder that:

.1 the Bidder has complied with all bidding requirements,

.2 the Bidder is qualified and experienced to perform the Work in accordance with the Bid Documents,

.3 the bid is based upon performing the Work in accordance with the Bid Documents, without exception, and

.4 the price or prices stated in the bid cover all the Bidder's obligations under the Contract and all matters and things necessary for the performance of the Work in accordance with the Bid Documents.

5. BID EVALUATION AND CONTRACT AWARD ALTERNATIVE STIPULATED PRICES

.1 Each alternative will be evaluated separately.

.2 The Province may select any one of the alternatives.

.3 The Province may award a contract based on the lowest valid bid for the selected alternative, notwithstanding that other valid bids, for an alternative not selected, may be lower.

6. BID DOCUMENTS

.1 The Bid Documents are the documents issued or made available to Bidders by the Province for the purpose of preparing a bid. The Bid Documents consist of the following:

.1 Instructions to Bidders.
.2 Pre-Bid Meeting.
.3 Information Documents.
.4 Bid Form and Bid Form Supplements.
.5 Bid Security.
.6 Agreement Form.
.7 Payment Conditions.
.8 Statutory Declaration.
.9 Contract Performance Security.
.10 Security for Payment of Claims.
.11 Definitions.
.12 General Conditions of Contract.
.13 Supplementary Conditions.
.14 Insurance Conditions.
.15 Public Works Act Claims.
.16 Detail Drawings.
.17 Specifications, Divisions 01 to 49 inclusive.

.18 Drawings, as listed in the List of Drawings.
.19 Schedules.
.20 Addenda issued during bid period.

7. BID FORM

.1 Complete Bid Form in its entirety and sign. Any required information that is omitted or illegible, any alterations to the text, or any conditions added on or submitted with the Bid Form, may cause the bid to be declared invalid and rejected.

8. BID FORM SUPPLEMENTS

.1 Prepare and submit each required supplement to the Bid Form (hard copy or electronic) as specified below.

.1 Bid security, as specified in Section 00 43 13.

.2 For hard copy bids submit the Bid Form supplement identified in 8.1 together with the Bid Form in a single envelope.

.3 Bid Form supplements are final and binding on the Bidder upon submission and may not be modified or superseded with another submission, unless the modifying or superseding submission is received before the bid closing time, as specified in the Instructions to Bidders article entitled "Bid Modifications."

.4 Bid Form supplements will be reviewed for compliance with the requirements of the Bid Documents after the public bid opening.

.5 Any of the following irregularities may cause the bid to be declared invalid and rejected:

.1 Any failure to submit a required Bid Form supplement as specified.

.2 Any required information in a Bid Form supplement is omitted, illegible, frivolous, or otherwise improperly submitted.

.3 Any alterations to the text, or any conditions added on or submitted with a Bid Form supplement.

.6 The Province may, after the bid closing time and before contract award, require any Bidder to submit, in a form prescribed by or acceptable to the Province, a detailed cost breakdown of the Bid Price(s), or any other additional supplementary information about any aspect of the Bidder's bid which, in the Province's opinion, is necessary for bid evaluation purposes.

9. BID MODIFICATION – HARD COPY BIDS

.1 A bid, including the Bid Form and Bid Form supplements, submitted in accordance with these bidding requirements may be modified, provided the modification:

.1 is in the form of a fax transmittal received at the fax number specified in 2.1.2.3, before the bid closing time, or

.2 is in the form of a letter received at the address specified in 2.1.2.3 before the bid closing time, and

.3 states the project title, legal name of the Bidder, the nature of the modification, and is signed by an authorized person.

.2 When submitting a modification directing a change in a bid amount, do not reveal the original amount nor the revised amount:

.1 On stipulated price bids, state only the amount to be added to or deducted from the original bid amount.

.2 On unit price bids, state only the amount to be added to or deducted from each original unit price or lump sum in the Schedule of Prices. The Province will adjust extended amounts and the total amount as required by the modification.

.3 When submitting a second or more modifications related to a single bid amount, ensure that there is no ambiguity as to the intended bid price. The written modification shall clearly indicate whether:

.1 the bid amount first submitted is being modified and any previous modifications are to be disregarded, or

.2 a revised bid amount derived from a previous modification is being modified.

.4 Confirm receipt and consideration of all issued addenda.

.5 The Province will assume no responsibility or liability for the content of modifications, or for modifications that are, for any reason, delayed, illegible, unclear as to intent, ambiguous, contrary to these instructions, or otherwise improperly received. The Province may disregard improperly received modifications.

10. BID WITHDRAWAL – HARD COPY BIDS

.1 A bid may be withdrawn at any time before the bid closing time, provided the request is in the form of:

.1 a fax transmittal received and printed out in its entirety at the fax number specified in 2.1.2.3, before the bid closing time, or

.2 a letter received at the address specified in 2.1.2.3 before the bid closing time.

.2 Withdrawn bids may be resubmitted in accordance with these bidding requirements providing the resubmitted bid is received at the office specified in 2.1.2.3, before the bid closing time.

11. BID MODIFICATION AND WITHDRAWAL – ELECTRONIC BIDS

.1 Bids submitted electronically may be modified or withdrawn at any time before the bid closing time using the processes provided by the electronic bid submission system.

.2 Hard copy modifications to bids that have been submitted electronically will not be accepted

12. BID ACCEPTANCE – HARDCOPY AND ELECTRONIC BIDS

.1 A bid may not be withdrawn at or after bid closing time and shall be open to acceptance by the Province until:

.1 some other Bidder has entered into a contract with the Province for performance of the Work, or

.2 35 days after the bid closing time,

whichever occurs first.

.2 The 35 day acceptance period referred to above shall commence at midnight of the date of bid closing and shall terminate at midnight of the 35th day thereafter. If the 35th day falls on a statutory holiday, such day(s) shall be omitted from the computation.

.3 The 35 day acceptance period referred to above may be extended at the Province's request and subject to the Bidder's written agreement to the extension.

.4 The Contract shall be established upon issuance, by the Province to the successful Bidder, of a letter accepting the bid without qualification or, if the letter accepting the bid contains one or more qualifications, upon written acceptance by the Bidder of all such qualifications.

.5 The lowest or any bid will not necessarily be accepted and the Province may reject any and all bids.

13. NOTIFICATION OF INTENT NOT TO SUBMIT A BID

.1 Prospective Bidders who have received Bid Documents from the office specified in 19.1, but do not intend to submit a bid, are requested, as a courtesy to subcontract bidders, to promptly notify the office specified in 19.1.

14. BID OPENING

.1 A public bid opening will commence no later than 90 minutes after the bid closing time, at the address specified in 2.1.2.3. All bidders are invited to attend.

.2 The legal name of each Bidder and the bid price stated on the Bid Form will be read aloud. The reading aloud of a bid price shall not be considered a representation or warranty that the price is correct or that the bid is valid.

.3 In the event that the electronic bid submission system is not available to the Province to view the bids at the time of bid closing; the Province will postpone the bid opening and notify all bidders of the new time for the bid opening.

15. POSTING OF BID RESULTS AND AWARD INFORMATION

.1 Bid results and bid award information will be available on:

.1 Alberta Purchasing Connection

16. IRREGULARITIES

.1 A bid that is informal, incomplete, qualified, non-compliant with the requirements of the Bid Documents, or otherwise irregular in any way, may be declared invalid and rejected.

.2 The Province may accept or waive a minor and inconsequential irregularity.

.3 The determination of what is, or is not, a minor and inconsequential irregularity, the determination of whether to accept, waive, or require correction of an irregularity, and the final determination of the validity of a bid, shall be at the Province's sole discretion.

.4 Discrepancies between words and figures will be resolved in favour of words.

17. SAFETY PREQUALIFICATION

.1 As a precondition to contract award, the Prime contractor must provide a valid standard Certificate of Recognition (COR) or a valid Temporary Letter of Certification (TLC) for a standard COR, or a COR Equivalency Letter (COREL) for out of province Bidders, as issued by the Alberta Construction Safety Association (ACSA) or another certifying partner authorized by the Alberta Ministry of Labour to issue CORs, TLCs or CORELs. Possession of a Certificate of Recognition other than a standard COR, TCL or COREL, such as a Small Employer Certificate of Recognition (SECOR) is not acceptable.

.2 Submit evidence of safety qualifications by the earlier of:

.1 The date that the Province may request in writing, or
.2 Seven days before expiry of the bid acceptance period.

.3 Prospective Bidders who do not possess a standard COR, a TLC for a standard COR, or a COREL and wish to obtain information about obtaining one, are advised to contact:

The Alberta Construction Safety Association
225 Parsons Rd SW
Edmonton, Alberta T6X 0W6

Telephone: 780-453-3311 or 1-800-661-2272
Fax: 780- 455-1120 or 1-877-441-0440
e-mail: edmonton@acsa-safety.org
Internet: www.acsa-safety.org

or another certifying partner authorized by Alberta Ministry of Labour.

18. INDUSTRY PARTICIPATION IN TRAINING APPRENTICES

.1 The Government of Alberta encourages all bidders to consider employing apprentices on public sector construction projects. To find out more about hiring an apprentice and the supports available for their training, visit www.tradesecrets.alberta.ca.

19. AVAILABILITY OF BID DOCUMENTS

.1 Bid Documents are available in hard copy, at no charge, to the following bidders only:

.1 Prime contract bidders.
.2 Mechanical subcontract bidders.
.3 Electrical subcontract bidders.

at the following location only:

Tender Administrator
Infrastructure
2nd Floor, (2700)
Infrastructure Building
6950 – 113 Street NW
Edmonton, Alberta T6H 5V7

Telephone: 780-427-3962
Fax: 780-422-9686
Toll free (within Alberta): 310-0000 followed by above telephone or fax number.

.2 Bid Documents are also made available in electronic form, from COOLNet Alberta at www.coolnetalberta.com.

.3 The Province will assume no responsibility or liability for the completeness of any Bid Documents obtained from a source other than the sources identified above.

.4 In the event of a discrepancy between Bid Documents obtained from the sources identified above and any other versions of the Bid Documents, the Bid Documents obtained from the sources identified herein shall be deemed to be correct.

.5 Promptly notify the Province at the office identified under “Inquiries” upon discovery of any discrepancies.

20. GST EXCLUDED

.1 Bidders shall not include GST in their bid.

21. EXAMINATION OF BID DOCUMENTS AND SITE

.1 Bidder shall, before submitting a bid:

.1 examine and read the Bid Documents thoroughly,

.2 visit site and its surroundings and other locations to become familiar with local and other conditions affecting the Work,

.3 consider the effect of regulatory requirements applicable to the Work,

.4 study and correlate Bidder's observations with the Bid Documents,

.5 immediately notify the Province of all perceived omissions and discovered conflicts, errors and discrepancies in the Bid Documents, and

.6 be satisfied that Bidder understands the Bid Documents and is competent to undertake and complete the Work.

.2 Refer to Section 00 25 13 - Pre-Bid Meeting. This meeting will be the only opportunity for Bidders to review the facility’s safety and security regulations which may impact the bid.

.3 Before submitting a bid, each Bidder shall, at the Bidder's expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the conditions at, under or contiguous to the site, which may affect performance of the Work and which the Bidder deems necessary to determine its bid for performing the Work in accordance with the Bid Documents. Bidders shall obtain the Province's prior approval for access to site for the purpose of carrying out any such activities. Bidders shall restore site to a condition acceptable to the Province upon completion of such activities.

.4 Lands upon which Work is to be performed, rights of way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Bid Documents. Additional lands and access thereto required for performance of the Work shall be provided by Contractor.

.5 A site inspection to obtain a clear understanding of the project requirements is deemed necessary but remains at the Bidder’s discretion.

.1 Site inspections are limited to the following date and time:
Tuesday, May 16, 2017; 10:30 am to 12:00 pm

.2 To arrange for access to and inspection of site, contact:

Name: Joanne Smith
Telephone Number: 403.234.1218
E-mail Address: joanne.smith@sahuri.com

22. BID SECURITY

.1 Provide and submit the bid security specified in Section 00 43 13 - Bid Security.

.2 Bidders who wish to submit bid security other than in the form of a Bid Bond must submit a hard copy bid.

23. CONTRACT PERFORMANCE SECURITY AND SECURITY FOR PAYMENT OF CLAIMS

.1 Provide and include in bid price for security specified in Section 00 61 13 - Contract Performance Security.

.2 Provide and include in bid price for security specified in Section 00 61 90 - Security for Payment of Claims.

24. APPLICABLE LEGISLATION RELATED TO CLAIMS

.1 *The Public Works Act* (Alberta) applies to this Project; the *Builder's Lien Act* (Alberta) does not apply.

.2 Public Works Act claim procedures shall be in accordance with Section 00 73 90.

25. ALLOWANCES

.1 Include in bid price all allowances specified in Section 01 21 13.

26. PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Product options: Comply with requirements of Section 01 62 00.

.2 Substitutions:

.1 Comply with requirements of Section 01 62 00.

.2 Where products are specified by a proprietary specification, and substitutions are permitted, Bidders may base their bids on a named product or manufacturer or on unnamed substitutions, subject to the requirements specified for substitutions in Section 01 62 00.

.3 During the bid period, it is the sole responsibility of each Bidder to determine whether a substitution meets the requirements specified in Section 01 62 00.

.4 The Province will not consider requests for approval of substitutions from Bidders during bid period.

.5 Substitutions will be evaluated and approved or rejected by the Province after contract award.

.3 Product Acceptability:

.1 The Province may, after bid submission and before contract award, require any Bidder to submit proof that a product proposed for use complies with requirements of Bid Documents. Such proof shall be in the form of product data as specified in Section 01 62 00.

.2 Should the Province determine that a proposed product does not meet requirements of Bid Documents, Bidder shall propose a product which, in the Province's opinion, does meet requirements of Bid Documents, otherwise such Bidder's bid may be declared invalid and rejected.

27. AGREEMENT

.1 The successful Bidder will be required to enter into a formal Agreement with the Province for performance of the Work.

28. DIVISION OF WORK

.1 Work specified in the Specifications is divided into Divisions and Sections for reference purposes only. Except as may be otherwise specified in the Bid Documents, division of work among Contractor, Subcontractors, Sub-subcontractors and suppliers is Bidders' responsibility.

29. CONFLICT OF INTEREST

.1 Any business entity or individuals that could create a conflict of interest or a perceived conflict of interest shall not submit a Bid.

.2 If a Bidder considers that a particular relationship or association does not create a real or apparent conflict of interest and will not create a perception of conflict of interest, but is concerned that the Province could arrive at a different conclusion, the Bidder shall:

.1 fully disclose the circumstances to the Province at the earliest possible date, and

.2 request that the Province provide an interpretation before the Bid Closing as to whether the relationship or association creates a conflict of interest or a perception of conflict of interest.

.3 In assessing whether a conflict of interest or a perceived conflict of interest exists; the Province will consider in the exercise of his discretion whether any submissions include:

.1 Individuals who through their current employment or association with the Government of Alberta have had involvement with or knowledge of the Project;

.2 Firms or individuals currently retained by the Province in relation to the Projects;

.3 Any individual that is a member of the Legislative Assembly of Alberta or an associated person as set out in the *Conflicts of Interest* Act; or

.4 Any business entity that consists of or contains current employees of the Government of Alberta.

.4 At the Province’s sole discretion, the Province may disqualify a Bid where a conflict of interest or a perceived conflict of interest exists, or where there is evidence of collusion. The decision of the Province is final and binding.

30. INFORMATION DISCLOSURE

.1 The Bidder acknowledges that:

.1 The *FOIP Act* applies to all information and records relating to, or obtained, generated, created, collected or provided under, Contract and which are in the custody or under the control of the Province. The *FOIP Act* allows any person a right of access to records in the Province custody or control, subject to limited and specific exceptions as set out in the *FOIP Act*; and

.2 The Bidder, if it considers portions of its Bid to be confidential, shall identify those parts of its Bid to the Province considered to be confidential and what harm could reasonably be expected from disclosure. The Owner does not warrant that this identification will preclude disclosure under the *FOIP Act*.

.2 The purpose of collecting Personal Information for this Bid is to enable the Province to ensure the accuracy and reliability of the information, to evaluate the Bid, and for other related purposes of the Province. Authority for this collection is the *Government Organization Act* (Alberta), as amended from time to time and section 33 (c) of the *FOIP Act*.

31. INTERPRETATION AND MODIFICATION OF BID DOCUMENTS

.1 Submit questions about the meaning and intent of the Bid Documents to the Province at the office identified under "Inquiries".

.2 If an inquiry requires an interpretation or modification of the Bid Documents, the response to that inquiry will be issued in the form of a written addendum only, to ensure that all bidders base their bids on the same information.

.3 Addenda may also be issued by the Province to modify the Bid Documents as considered necessary by the Province.

.4 Submit inquiries as early as possible in the bid period. If an inquiry requires an interpretation or modification of the Bid Documents, but is received too close to the bid closing time to permit issuance of an addendum, the Province may be unable to respond to that inquiry. Submit inquiries no later than five (5) Business Days before Bid Closing.

.5 Any replies to inquiries or interpretations or modifications of the Bid Documents made verbally, by e-mail, or by any manner other than in the form of a written addendum, shall not be binding.

.6 The Bidder has the responsibility to notify the Province, in writing, of any ambiguity, divergence, error, or omission, oversight, contradiction, or item subject to more than one interpretation in these Bid Documents, as it is discovered, and to request any instruction, decision, or direction required to prepare the Bid.

.7 Headings are used for convenience only, and they do not affect the meaning or interpretation of the clauses.

.8 Words in singular include the plural and vice versa.

32. CONFIDENTIALITY

.1 Subject to article 30 - Information Disclosure.

.2 The Bidder and their employees, subcontractors, and agents shall:

.1 keep strictly confidential all information concerning the Province or third parties, or any of the business or activities of the Province or third parties acquired as a result of participation in this Bid process; and

.2 only use, copy or disclose such information as necessary for the purpose of submitting a Bid or upon written authorization from the Province.

.3 The Bidder shall maintain security standards, including control of access to data and other information consistent with the highest standards of business practice in the industry.

.4 No press release or other public announcement relating to this Bid shall be issued without the prior written consent of the Province.

.5 If a Bidder becomes aware of any situation whereby a breach of confidentiality may have or has occurred, the Bidder shall notify, as soon as is practicable, the contact listed on the front cover of this Bid package and provide details of the situation. The Bidder shall cooperate with the Province with respect to any directions provided by the Province.

.6 If the Bidder, employees, subcontractors, or agents fail to maintain confidentiality or security of information in addition to any other remedies available in law, the result may be suspension of the Bidder, its officers, directors, partners, employees, agents, and representatives from future Province's opportunities for a period of up to 12 months, as decided in the sole discretion of the Province. Such suspension shall begin when the Bidder is notified by the Province.

33. AGREEMENT ON INTERNAL TRADE AND NEW WEST PARTNERSHIP TRADE AGREEMENT

.1 The provisions of the Agreement on Internal Trade, Part IV, Chapter 5 – Procurement and Annex 502.4, and the New West Partnership Trade Agreement apply to this Bid process.

34. LEGAL JURISDICTION

.1 This Bid process shall be governed and interpreted in accordance with the laws in force in Alberta and the Bidder irrevocably attorns to the exclusive jurisdiction of the Courts in Alberta.

35. LOBBYIST ACT

.1 The Bidder acknowledges that:

.1 the *Lobbyists Act* (Alberta), as amended from time to time, establishes certain obligations and prohibitions with respect to lobbying and contracts for paid advice, as those terms are defined in the *Lobbyists Act*; and

.2 it is responsible for complying with the *Lobbyists Act* (Alberta) during the Bidding process, and if the successful Bidder, during the Contract.

36. LANGUAGE

.1 All Bids, including attachments and other information, must be in English. However, notwithstanding this requirement, if a document is not available in English, a translation should accompany the document or be provided within two Business Days of a request by the Province.

37. ADDENDA

.1 During the bid period, the Province may issue addenda.

.2 Bidders who obtained electronic Bid Documents from an electronic plan room such as COOLNet Alberta are advised that it is their responsibility to check the electronic plan room to obtain any addenda that been issued.

.3 The Province will email, fax or courier addenda to all parties who have been recorded as having obtained hardcopy Bid Documents from Infrastructure, Procurement Services.

.4 Addenda shall become part of the Bid and Contract Documents.

.5 Each Bidder shall ascertain before bid submission that it has received all addenda issued by the Province and shall, by signing the Bid Form, acknowledge that all issued addenda have been examined, read, and considered in their bid.

38. PLAN HOLDERS AND INTERESTED BIDDERS

.1 A list of Plan Holders and Interested Bidders can be found on:

.1 Alberta Purchasing Connection (APC): http://www.purchasingconnection.ca

.2 COOLNet Alberta: http://coolnetalberta.com

39. INQUIRIES

.1 Direct inquiries by email during the bid period to the person identified on the cover page.

END OF SECTION

1. PRE-BID MEETING AND SITE INSPECTION

.1 A site inspection to obtain a clear understanding of the project requirements is strongly encouraged but attendance remains at the Bidders' discretion; however, site access is restricted. This will be Bidders' only opportunity to inspect the site.

.2 A pre-bid meeting and site inspection will be held at the time and place specified on the cover of this Project Manual.

.3 Purpose is to:

.1 provide bidders an opportunity to familiarize themselves with the Work.

.2 provide bidders an opportunity to familiarize themselves with existing conditions, if applicable.

.3 for existing facilities, to review the facility's safety and security regulations.

.4 Province's representative(s) and the User's Representative will be present.

.5 All prime contract and major subcontract Bidders are strongly advised to attend. Others are invited to attend.

.6 No information provided by the Province or any of its representatives at the pre-bid meeting and site inspection shall be binding, unless such information is included in an Addendum.

END OF SECTION

1. RELATED REQUIREMENTS

.1 Site visit and inspection prior to bidding: Section 00 21 13.

.2 Changed site conditions: Section 00 72 00.

2. DEFINITIONS

.1 Information Documents means information of any type and in any form, related to the Project and identified in this Section as such.

.2 Contractor is synonymous with Bidder and Modular Builder.

3. STATUS OF INFORMATION DOCUMENTS

.1 Information Documents, or any part thereof, are not part of the Contract unless specifically incorporated into Contract Documents by means of copying, transcribing or referencing.

4. USE OF AND RELIANCE UPON INFORMATION DOCUMENTS

.1 Information Documents are made available to Bidder by Province for the purpose of providing Bidder with access to information available to Province.

.2 Information Documents shall not be considered a representation or warranty that information contained therein is accurate, complete or appropriate.

.3 Bidder shall interpret and draw its own conclusions about Information Documents and is encouraged to obtain specialist advice with respect thereto. Province assumes no responsibility for such interpretations and conclusions.

.4 Information contained in Information Documents may be time sensitive and dates shall be considered when interpreting Information Documents.

.5 Bidder may rely upon the data contained in Information Documents, or parts thereof, which are specifically incorporated into Contract Documents by means of copying, transcribing or referencing, but shall draw his own conclusions from such data and shall not rely on opinions or interpretations contained therein.

.5 INFORMATION DOCUMENTS AVAILABLE UPON REQUEST

.1 Information Documents available for viewing upon request, in whole or in part, consist of the following:

.1 Survey (in Drawing Package)

.2 Solar Study

.3 Existing Drawings – made available by Alberta Infrastructure

6. INFORMATION DOCUMENTS INCORPORATED INTO CONTRACT DOCUMENTS

.1 Information Documents incorporated into Contract Documents, in whole or in part, consist of the following:

.1 Hazardous Material Assessment titled Hazardous Material Assessment, dated July 07, 2016, prepared by Alberta Safety & Environmental Services and consisting of 131 pages including title page. This document is issued with the Bid Documents.

.2 Geotechnical Evaluation, St. Patrick's Elementary School Modernization, Taber, Alberta, dated December 2016, prepared by Tetra Tech EBA Inc., file number ENG.LGEO03186-01 and consists of 49 pages including title page. This document is issued with the Bid Documents.

.3 Hazardous Material Assessment titled Hazardous Materials Assessment, dated March 20, 2017, prepared by Alberta Safety & Environmental Services, project number AS 4576 and consisting of 130 pages including title page. This document is issued with the Bid Documents.

.4 Development Permit, Dated March 27, 2017, application number DP 17-12, and consisting of 2 pages. This document is issued with the Bid Documents.

.5 Building Permit, Dated March 29, 2017, application number DP 17-12, and consisting of 9 pages. This document is issued with the Bid Documents.

END OF SECTION

ALBERTA SAFETY & ENVIRONMENTAL SERVICES

July 07, 2016

Gary Long
Alberta Infrastructure
John J Bowlen Building, 10th Floor
620 7 Avenue SW
Calgary, Alberta T2P 0Y8

Dear Mr. Long,

Re: Hazardous Materials Assessment
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta
Plan No. 016559A Project ID: B4166A-0001 Contract ID: 030323
Project #: AS 4576

Please find the attached Hazardous Materials Assessment report for the Project ID B4166A-0001 and Plan No. 016559A. The report provides details of the assessment performed by Alberta Safety and Environmental Services Ltd. (ASE Services) for the St. Patrick's Elementary School located at 5302 48 Street, Taber, Alberta, and includes a description of the work, tests, inspections and laboratory results of the bulk sample tests. Included with the report are site photographs, site floor plans and a detailed inventory of hazardous materials identified during the assessment. The report was drafted by Jake Koethler and Andrea Irons, Environmental Safety Consultants and reviewed by Senior Project Manager Silvana Wu.

Please note that the findings presented within this report represent conditions encountered at the time of the assessment.

ASE Services would like to thank Alberta Infrastructure for the opportunity and we look forward to any future projects. If you have any questions or require any additional information, please feel free to contact our project management team at (403) 475-0963.

Sincerely,

Alberta Safety & Environmental Services

Submitted by:

Silvana Wu, B. Sc.
Senior Project Manager

ALBERTA SAFETY & ENVIRONMENTAL SERVICES

Table of Contents

1.0 INTRODUCTION

Alberta Safety & Environmental Services Ltd. (ASE Services) was requested by Gary Long of Alberta Infrastructure to conduct a Hazardous Materials Assessment of the St. Patrick's Elementary School located at 5302 48 Street in Taber, Alberta. The assessment was performed on April 2, 2016 to June 20, 2016 by Jake Koethler, Corbyn Pilling, Kari Ghodes, and Silvana Wu with ASE Services.

The purpose of the assessment was to conduct a room-by-room assessment to sample and/or identify building materials that may contain asbestos, paint which may contain lead, as well as to identify the presence of other potential hazardous materials, such as polychlorinated biphenyls (PCBs), mercury, miscellaneous chemicals, urea formaldehyde foam insulation (UFFI), radioactive material and ozone-depleting substances (ODS), in relation to the Alberta Occupational Health and Safety Act, Regulation and adopted Code, and industry-accepted guidelines. The results of the assessment have been used to complete a detailed inventory so that hazardous materials will be properly identified for appropriate management by the owners of the building prior to renovation or demolition.

2.0 SCOPE OF WORK

The scope of work involved an assessment of the building environment for the presence of building materials that may contain the following:

- Asbestos, including vermiculite insulation;
- Lead based paints and lead sheeting;
- Mercury containing equipment and Fluorescent/mercury light bulbs;
- Ozone depleting substances in equipment (CFCs);
- Polychlorinated biphenyls (PCBs) in light fixture ballasts;
- Urea formaldehyde foam insulation (UFFI);
- Equipment containing radioactive components;
- Visible mould on building materials;
- Biohazards; and
- Miscellaneous chemicals.

The reporting scope of work for the building environment includes:

- Photographs of identified materials;
- Site drawings outlining the location of all identified hazardous materials; and
- Preparation of this report detailing our findings, conclusions and recommendations.

3.0 OBSERVATIONS

At the time of the assessment ASE Services made the following observations:

- The building was occupied and slated for demolition;
- The building was a one (1) storey structure originally constructed in 1962, with additions added in 1965, 1969 and 1972;
- The interior walls of the building were mostly cinderblock and drywall;
- Exterior walls were primarily cinderblock with some drywall;
- The flooring in the building consisted of vinyl floor tiles, vinyl sheet flooring, carpet, ceramic tile and exposed concrete flooring;
- The ceilings were primarily 2' x 4' ceiling tiles and 12" x 12" ceiling tiles, with drywall in some areas;
- The exterior of the building was composed of stucco and brick and mortar;
- The roofing material consisted of concrete, V.P., EPS, fibreboard and wood; and
- Vermiculite was observed in cinderblock walls at the time of the assessment.

4.0 METHODOLOGY

The assessment included a room-by-room inspection of all accessible locations in the interior as well as an inspection of the exterior of the building. Samples of suspected asbestos containing materials and suspected lead-containing paints were collected from the interior and exterior of the building. Observations were made for PCBs, mercury, radioactive materials, miscellaneous chemicals, and ozone-depleting substances in the building. The methodology used for each parameter of the hazardous materials survey is outlined below.

4.1 Asbestos Containing Materials

Small, representative pieces of those materials suspected to contain asbestos were collected and placed in clear, sealable plastic bags. Samples were forwarded to Crisp Analytical Laboratories, L.L.C. in Carrollton, Texas, and iATL International Asbestos Testing Laboratories in Mt. Laurel, New Jersey, for analysis. The samples were analyzed using the EPA 600/R-93/116 analysis method. Vermiculite samples were forwarded to Wes-Har Laboratories in Richmond, British Columbia and analyzed using the EPA/600/R-04/004 analysis method. These are comprehensive methods outlining various techniques for determining the asbestos concentration in bulk building materials.

4.2 Lead-Based Paint

Paint that was suspected to contain lead was collected and placed in clear, sealable plastic bags. All paint samples were forwarded to iATL International Asbestos Testing Laboratories for analysis. The sample was analyzed using the ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry" analysis method, and compared to the 90 parts per million (ppm) criterion limit outlined in the Occupational Health and Safety Bulletin "*Lead at The Work Site*" (2013), published by the Government of Alberta[1].

4.3 Mercury in Thermostats, Pressure-Sensing Devices and Fluorescent Light Tubes

All thermostats and pressure-sensing devices were visually assessed for the presence of a mercury-containing bulb. All fluorescent light tubes are known to contain mercury dust unless otherwise stated by the manufacturer.

4.4 Ozone-Depleting Substances (ODS)

At the time of assessment each room was visually inspected for equipment such as refrigerators, freezers and air conditioning units that may contain Ozone-Depleting Substances (ODS). Ozone-Depleting Substances contain the following chemical compounds:

- Chlorofluorocarbons (CFCs);
- Halons;
- Hydrochlorofluorocarbons (HCFCs);
- Bromochloromethane;
- Carbon Tetrachloride;
- Methyl Bromide; and
- Methyl Chloroform.

Stamp codes on the equipment indicate the type of chemical used in each piece of equipment. If stamp codes are not visible at the time of assessment the equipment is considered to be ODS-containing until proven otherwise. Please note that even equipment that uses ozone friendly chemicals must be removed, handled and disposed of and/or recycled properly as they could emit greenhouse gases.

4.5 Polychlorinated Biphenyls (PCBs) in Fluorescent Light Fixtures

Building materials were visually assessed for the presence, or potential presence, of PCBs. Common building materials that could contain PCBs are fluorescent light ballasts, electrical transformers, and heat transfer equipment. Ballasts are inaccessible if the light fixture is not de-

[1] Alberta Government. Occupational Health and Safety. *Lead at The Work Site*. (November 2013).

energized and the power locked out in accordance with the Alberta Occupational Health and Safety Act. Ballasts that were inaccessible at the time of assessment are considered to be PCB-containing until proven otherwise.

4.6 Urea Formaldehyde Foam Insulation (UFFI)

Visually accessible wall cavities were assessed for the presence of urea formaldehyde form insulation (UFFI). The insulation is most commonly found in basements, crawl spaces, attics and unfinished attics. UFFI may pose a health hazard and emit formaldehyde vapour if it is not well sealed, becomes wet and/or is exposed.

4.7 Radioactive Materials

Ionization chambers in select smoke detectors contain a small amount of radioactive material to sense the presence of airborne particles or smoke. All smoke detectors that were inaccessible at the time of assessment are considered to contain radioactive material until proven otherwise.

4.8 Visible Mould Growth and Water Damage

All building materials were visually assessed for the presence of visible mould growth and water damage by trained ASE Services representatives. All observations regarding affected building materials were documented. Areas where mould was observed a sample was collected for analysis. Mould bulk samples were taken using the tape-lift method where approximately 1 inch of clear Scotch tape was applied to an area of suspected mould growth free of extraneous debris. The tape was then applied to a clean glass slide and was analyzed by ASE Services using Direct Microscopy Examination method to determine spore counts.

4.9 Biohazards

At the time of assessment accessible areas of each room were examined for any evidence of biological hazards such as rodent droppings, avian fecal matter, animal nests and skeletal remains.

4.10 Miscellaneous Chemicals

At the time of assessment each room was inspected for miscellaneous chemicals such as paints, lubricants, oils, gasoline, and household and/or commercial cleaning products that may be impacted by demolition and potentially pose an environmental hazard.

5.0 RESULTS AND DISCUSSION

5.1 Samples Collected for Asbestos Content

A total of 88 samples of bulk material were collected for asbestos analysis. Tables 1, 2, 3 and 4 in ***Appendix III*** summarize the laboratory sample results and provides an indication of the asbestos containing materials present in the building. **Results indicate that 12 samples were positive for asbestos.** Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.2 Paint Samples Collected to Determine Lead Content

A total of 54 bulk samples of paint were collected for lead analysis. Table 5 in ***Appendix III*** summarizes the laboratory sample results and provides an indication of the lead-based paint present in the building. **Results indicate that 32 samples exceeded the criterion limit of 90 parts per million (ppm), or 0.009 percent by weight.**[2] Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for the laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.3 Mercury in Thermostats, Pressure-Sensing Devices and Fluorescent Light Tubes

Mercury and other heavy metals pose a danger to human and environmental health when improperly managed. Common sources of mercury include thermometers, fluorescent light

[2] Government of Alberta. Occupational Health and Safety. *Lead at The Work Site*. (November 2013).

tubes and thermostat bulbs. Mercury thermostats are commonly used in residential and commercial office spaces. ASE Services identified the following at the time of assessment:

- Fluorescent light tubes containing mercury dust were observed throughout the building (see Photograph 45); and
- Approximately nine (9) thermostats with mercury containing bulbs were observed throughout the building at the time of the assessment (see Photographs 46 and 47).

5.4 Ozone-Depleting Substances (ODS)

Ozone-depleting substances (ODS) are human-made chemicals that contain chlorine, fluorine, bromine, carbon and hydrogen that do not readily degrade after being released into the atmosphere.

At the time of assessment, approximately five (5) refrigerators were observed in the building (see Photographs 48 to 50). The stamp codes on the refrigerators were inaccessible at the time of assessment, and are assumed to contain ODS until proven otherwise.

5.5 Polychlorinated Biphenyls (PCBs) in Fluorescent Light Ballasts

Fluorescent light fixtures are identified by opening the casing of the light fixtures to visually identify a code stamp on the ballast. In order to safely open the light casing, the lighting fixture must be fully de-energized and the power locked out in accordance with the Alberta Occupational Health and Safety Code requirements.

At the time of the assessment, power within the building was not locked out, so the ballasts were inaccessible for inspection. All ballasts located throughout the building should be assumed to be PCB containing until proven otherwise.

5.6 Urea Formaldehyde Foam Insulation (UFFI)

At the time of assessment UFFI materials were not identified.

5.7 Radioactive Materials

At the time of assessment, the following equipment was observed suspected to contain radioactive materials:

- No smoke detectors were observed in the building (see Photograph 51); and
- Approximately four (4) suspected self-powered “Exit” signs were observed throughout the building (see Photographs 52 and 53).

5.8 Water Damage and Visible Mould Growth

Water damage was observed on ceilings in various areas throughout the building at the time of the assessment (see Photographs 54 to 63). Ten (10) bulk mould sampes were collected from drywall and ceiling tile surfaces for analysis. Table 6 in ***Appendix III*** summarizes the bulk mould laboratory results. Results of the bulk sample analysis indicate low levels of mould spores, including *Chaetomium and Cladosporium* types were detected on the samples collected from Rooms 110, 121 and 131, and low levels of Mycelial Fragments were detected on the sample collected from Room 101. Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for the laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.9 Biological Hazards

No evidence of rodent or animal activity was identified at the time of the assessment.

5.10 Miscellaneous Chemicals

Miscellaneous chemicals, including cleaning supplies, were observed throughout the building (see Photograph 64). Approximately five (5) ABC dry-chemical fire extinguishers containing hazardous materials were also observed throughout the assessed locations within the building (See Photograph 65).

Lead-acid batteries contain an extremely corrosive acid and a large amount of lead, which is a highly toxic metal that produces a range of adverse health effects, particularly in young children.

Approximately four (4) emergency lighting units that may contain lead-acid batteries were observed throughout the building at the time of the assessment (see Photograph 66).

6.0 CONCLUSIONS

Based on the observations and the sampling results, ASE Services makes the following conclusions:

1. Asbestos was determined to be present within the following materials:
   - Black mastic beneath 9”x9” and 12”x12”, grey with white streaks vinyl floor tiles in the Meter Room (Room 106) and Room 113a;
   - Black caulking around the door frame of the exterior door in the Furnace Room (Room 107);
   - 12”x12” acoustic ceiling tile with a grid pattern throughout the 1965 Wing, including Room 118, Room 119, Nevil’s Office, Nevil’s Office Play Area, Room 115, the Gymnasium, and the 1965 Wing Main Hallway and Entry Vestibule;
   - 12”x12” blue with white streaks vinyl floor tile in Room 120;
   - Brown mastic behind 12”x12” acoustic ceiling tiles with a grid pattern throughout the 1969 Addition, including the Gymnasium, Room 122, Room 121 and Room 120;
   - Silver mastic on ducting in the Furnace Room (Room 124) and on ducting throughout the building;
   - Vermiculite insulation was confirmed to be present in the following locations:
     - The South, exterior walls in Rooms 101, 109 and the entrance vestibule (1962 wing);
     - The South wall in the Furnace Room (1972 addition);
     - The South wall in Room 121 (1969 addition); and
     - The South wall in Rooms 118 and 119.

   Please note the following:
   - Vermiculite insulation is likely present in cinderblock walls throughout the building; however, due to the destructive nature of the sampling, intrusive investigations could not be completed in the majority of the walls. Care should be taken when impacting cinderblock walls.
   - If any visually similar building materials are identified in locations other than those outlined in Section 6.0, they should be considered asbestos containing until proven otherwise.
2. Lead-containing surface coatings were found throughout the building. Lead-containing surface coatings were determined to be present in the following locations (see ***Appendix III*** for locations):
   - Dark grey paint on door frames and doors in Room 113 (1962 wing);
   - Yellow paint on door frames and doors in the Boys Washroom and Girls Washroom (1962 wing);
   - Beige surface coating on washroom stalls in the Boys Washroom (1962 wing);
   - White paint on door frames and doors in the 1962 Entry Vestibule and Room 119 (1965 wing);
   - Mint green paint on cinderblock walls in the 1962 Entry Vestibule, 1965 Entry Vestibule and 1965 Gym;
   - Cream paint on door frames and doors in the 1962 Community Washroom;
   - Dark green paint on shelves throughout the Main Hallways in the 1962 and 1965 wings;
   - Dark blue paint on doors in the 1962 Wing Hallway;
   - Light blue paint on door frames in Room 102 (1962 wing);

- Navy blue paint on doors in the Janitor's Room (1962 wing) and Room 108 (1962 wing);
- Blue paint on door frames/doors in Room 115 (1965 wing) and Room 118 (1965 wing);
- Brown paint on door frames/doors in the Furnace Room (1962 wing), Room 123 (1972 wing) and 1962 Main Vestibule;
- Emerald green paint on door frames/doors in the 1972 Entry Vestibule;
- Pale green paint on cinderblock walls in the 1965 Vestibule, Room 128 (1972 wing), Room 117 (1965 wing), Room 130 (1972 wing), Room 123 (1972 wing), Room 13 (1972 wing), and the 1972 Storage and Furnace Rooms;
- Grey and black surface coating on shoe racks in the 1965 Vestibule;
- Grey paint on the floor in the Gym Storage;
- Pale green/blue paint on cinderblock walls in the Gym Storage (1969 wing);
- Dark blue paint on cinderblock walls in Room 121 (1969 wing);
- Yellow/lime green paint on cinderblock walls in Room 130 (1972 wing);
- Yellow paint on cinderblock walls in the Community Washroom (1962 wing); and
- Tan surface coating on washrooms stalls in the Girls and Boys Washrooms (1962 wing).

Please note: If any visually similar paints are identified in locations other than those outlined in Section 6.0, they should be considered lead-containing until proven otherwise.

3. Fluorescent light tubes containing mercury dust were observed throughout the building at the time of the assessment.
4. Approximately nine (9) thermostats with mercury containing bulbs were observed in locations throughout the building at the time of the assessment (see ***Appendix IV*** for locations).
5. Approximately five (5) refrigerators were observed in locations throughout the building at the time of the assessment. The code stamps on this equipment were inaccessible at the time of assessment; therefore, they are considered to contain ODS until proven otherwise (see ***Appendix IV*** for locations).
6. Light fixtures with ballasts were observed throughout the building at the time of the assessment; however, due to the power not being locked out, ballast were inaccessible for inspection. All ballasts should be considered to be PCB-containing until proven otherwise.
7. UFFI materials were not identified in the building at the time of the assessment.
8. Smoke detectors potentially containing radioactive materials were not observed in the building at the time of the assessment.
9. Approximately four (4) suspected self-powered "Exit" signs with radioactive materials were observed throughout the building at the time of the assessment.
10. Water damaged ceiling tiles and drywall were observed throughout the building at the time of the assessment (see ***Appendix IV*** for locations).
11. Mould growth was confirmed to be present on ceilings in Rooms 101, 110, 121 and 131 (see ***Appendix IV*** for locations).
12. Evidence of rodent or animal activity posing a biological hazard was not identified at the time of the assessment.
13. Miscellaneous chemicals including cleaning supplies, paint, and approximately five (5) ABC dry-chemical fire extinguishers were observed throughout the building (see ***Appendix IV*** for locations).

14. Approximately four (4) emergency lighting units observed in the building. These devices should be assumed to contain lead-acid batteries until proven otherwise (see ***Appendix IV*** for locations).

7.0 RECOMMENDATIONS

Based on the above conclusions ASE Services makes the following recommendations:

1. Prior to demolition all asbestos containing materials must be properly removed and disposed of by a contractor competent in asbestos abatement. All asbestos containing materials must be removed in accordance with the requirements outlined in the *Alberta Asbestos Abatement Manual* (2012). Please refer to the identified asbestos containing materials listed in section 6.0.
2. Lead-containing surface coatings in fair or poor condition (flaking, cracking, peeling, etc.) which are to be impacted during the course of any renovation or demolition activities should be removed and disposed of properly by a contractor competent in lead abatement prior to any such renovation and/or demolition. Lead-containing surface coatings in good condition (adhering to surface), do not need to be removed prior to any mechanical activities, however, if they are to be impacted by hand demolition activities, it should be conducted by a lead abatement contractor.

   Please note: If this building is scheduled for renovation or demolition by mechanical means, lead paint in good condition (adhering to surface) does not need to be removed prior to demolition; however, lead paint in poor condition (flaking) should be removed by a contractor competent in lead paint abatement. Although the new Federal standards for surface coating addresses a tolerance concentration up to 90 ppm of lead, if lead-based coatings remain in good condition, it usually does not pose a hazard. Hazardous conditions occur when the coating or paint deteriorates or is disturbed during renovation or industrial activities (sanding, grinding, cutting and/or welding). Occasionally, the removal of lead-based surface coatings can create a greater hazard than having it remain in its current state[3].
3. Fluorescent light tubes containing mercury dust and thermostats containing a mercury bulb should be manifested and disposed of properly according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta.
4. The stamp codes on the identified refrigerators should be inspected to determine if they contains ODS. All equipment that is confirmed to contain ODS should be removed and properly disposed of prior to demolition activities. ODS-containing equipment should be manifested and disposed of according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta. Please note that even equipment that uses ozone friendly chemicals must be removed, handled and disposed of and/or recycled properly as they could emit greenhouse gases.
5. All ballasts confirmed to contain PCB's that may be impacted during renovation or demolition activities must be removed and properly disposed of prior to such activities. All ballasts should be inspected for the presence of PCB's when the power is locked out of the building, and the ballasts are fully de-energized.
6. The code stamp on the identified smoke detectors should be inspected for the presence of radioactive materials.
7. In all occurrences, the underlying cause of water accumulation must be rectified or fungal growth will likely occur. Emphasis should be placed on ensuring proper repairs of the appropriate portions of the building infrastructure, so that water damage and moisture buildup do not persist.

[3] Work Safe Alberta. CH071 – Chemical Hazards. *Special Cases – Lead Paints and Coatings* (2013).

8. All chemicals must be properly packaged and labelled according to WHMIS regulations. Miscellaneous chemicals must be removed and properly disposed of prior to any demolition activities where these items will be impacted. Emergency lighting units should be inspected for the presence of a lead-acid battery. All emergency lighting units confirmed to contain a lead-acid battery should be properly manifested and disposed of according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta.

Please note: Any additional materials identified which were not previously sampled or visually assessed should be assumed as hazardous unless proven otherwise.

8.0 WARRANTY

This report is intended for the exclusive use of the company, organization, or individual to whom it is addressed. It may not be used or relied upon in any manner whatsoever, or for any purpose whatsoever, by any other person. ASE Services makes no representation of fact or opinion of any nature whatsoever to any person other than the company, organization, or individual to whom this report is addressed. The warranty stated above may not be assigned.

If you have any questions or require any additional information, please feel free to contact our project management team at (403) 475-0963.

Alberta Safety & Environmental Services Ltd.

Reviewed by:

Silvana Wu, B. Sc.
Senior Project Manager

Drafted by: Andrea Irons, B.Sc., Senior Environmental Safety Consultant

Attachments:

- Appendix I: Regulations and Guidelines
- Appendix II: Photographs
- Appendix III: Summary Tables of Results
- Appendix IV: Floor Plans
- Appendix V: Laboratory Reports
    - Crisp Analytical L.L.C. Bulk Asbestos Analysis dated June 2, 2016
    - iATL PLM Bulk Sample Analysis Summary Reports dated June 22 and 23, 2016
    - Wes-Har Bulk Summary Report dated June 23, 2016
    - iATL Lead Paint Sample Anlaysis Summary Reports dated June 23 and 29, 2016
    - ASE Services Bulk Mould Analysis Report dated June 29, 2016

APPENDIX I
REGULATIONS AND GUIDELINES

The Occupational Health and Safety Act applies to provincially-regulated worksites in the province of Alberta. Under the Occupational Health and Safety Act are the Occupational Health and Safety Regulation, and the Occupational Health and Safety Code. The purpose of the Act, Regulation and Code is to ensure that employers do everything reasonable and practicable to ensure the health and safety of the worker. The Act, Regulation and Code are administered through Alberta Human Resources and Employment – Workplace Health and Safety. The Regulations and Code provide a minimum standard that is enforceable by law for employers and workers to meet their regulatory obligations. Outlined below are portions of the Regulation, Code and CSA Standards. A complete listing of the applicable portions of the Act, Regulation, Code and Alberta Asbestos Abatement Manual are not provided.

Section 15(3) of the Occupational Health and Safety Regulation outlines the requirements for employers with respect to safety training regarding worker exposure to harmful substances. Where workers are exposed to a harmful substance including, but not limited to, asbestos and lead containing materials, the employer shall:

(a) establish procedures that minimize the worker's exposure to the harmful substance, and
(b) ensure that a worker who may be exposed to the harmful substance
    (i) is trained in the procedures,
    (ii) applies the training, and
    (iii) is informed of the health hazards associated with exposure to the harmful substance.

Part 4 Chemical Hazards, Biological Hazards and Harmful Substances, and Schedule 1 Chemical Substances, of the Alberta Occupational Health and Safety Code establishes the legislative requirements for asbestos and lead.

To assist employers with meeting their statutory requirements, Alberta Workplace Health and Safety has prepared the following documents:

- *Alberta Asbestos Abatement Manual*, 2012, and
- Safety Bulletin CH071 – *Lead at the Workplace*, 2013.

Asbestos

Asbestos is the common name given to a group of naturally occurring mineral silicates that can be separated into flexible fibres. The name asbestos comes from the Greek word meaning "unquenchable or indestructible." The main properties that make asbestos useful are its incombustibility, strength and flexibility when separated into fibres. It is also effective as a reinforcing or binding agent when combined with cement or plastic.

Many products that at one time contained asbestos are either no longer in use or have been replaced. The uses for asbestos ranged from products in which the fibres were well bound to friable products in which the fibres could easily become airborne. The construction industry was the main user of asbestos products. Sprayed insulation, stucco and joint cements manufactured in Canada and the United States no longer contain asbestos in an unbound form.[4]

The definitions for asbestos can be found in Part 4 of the Occupational Health and Safety Code. Part 4 sets limits for exposure to Chemical Hazards, Biological Hazards and Harmful Substances. Part 4 of the Code (Sections 16 through 27) outlines the General Requirements for employers to ensure worker exposure to a harmful substance is kept as low as reasonably practicable. In summary, the general requirements portion addresses the following:

1. Worker exposure to harmful substances;
2. Worker exposure during shifts greater than 8-hours;
3. Airborne concentration measurements;
4. Potential worker exposure;
5. Worker overexposure;
6. Worker decontamination;
7. Emergency bath, showers, eye wash equipment;

[4] Alberta Queen's Printer. *Alberta Asbestos Abatement Manual*. October 2012.

8. Prohibited activities;
9. Codes of practice; and
10. Storage of harmful substances.

Code of Practice: Section 26 of the Code states that an employer must have a Code of Practice (Management Plan) governing the storage, handling, use and disposal of a substance listed in Schedule 1, Table 1 that is present at a worksite. Asbestos is a substance listed in schedule 1. The Code of Practice must include measures to be used to prevent the uncontrolled release of the substance and the procedures to be followed if there is an uncontrolled release.

Sections 28 through 40 (excluding Section 39) outline the employer's requirements for asbestos at the work site. With respect to managing asbestos containing materials at a worksite the following sections apply:

Section 31: This section states that if it is determined that asbestos fibres may be released into the building then the building is in an unsafe condition and the employer must take all necessary steps to correct the unsafe condition.

Section 32: Prohibitions related to the use of asbestos: This section states that a person must not use materials containing crocidolite asbestos in an existing or new building and that a person must not apply asbestos by spraying.

Section 33: This section states that a person must not use asbestos in an air distribution system in a form in which asbestos fibres could enter the air supply or return air systems.

Section 34: If a building is to be demolished, the employer must ensure that the materials with the potential of releasing fibres are removed prior to demolition.

Section 35: If a building is being altered or renovated, the employer must ensure that materials that may be impacted are encapsulated, enclosed or removed.

With respect to the abatement or handling of asbestos containing materials employers are required to ensure worker exposure is kept to a minimum. In addition to the requirements under the General Provisions portion of the Code, sections 28 through 30, sections 36 through 38 and sections 40 are applicable. Please refer to the Occupational Health and Safety Code for further details or the Alberta Asbestos Abatement Manual.

Alberta Asbestos Abatement Manual

To assist employers with meeting their legislative requirements outlined under the Occupational Health and Safety Act, Regulation and Code, Alberta Workplace Health and Safety have published the Alberta Asbestos Abatement Manual. This manual describes the principles to be followed when selecting the most appropriate techniques for the safe abatement of asbestos containingmaterials. The manual also presents basic information on asbestos and asbestos products, health hazards, requirements for worker protection, safe work procedures, inspection criteria, applicable legislation and competency profiles for those persons involved in abatement activities. Work practices and precautions vary considerably with the type of material being removed, the amount of asbestos it contains, its condition and location. The objective of this manual is to present best practices in asbestos abatement that are to be followed in Alberta.

Occupational Health and Safety officers from Alberta Human Resources and Employment use this manual as a guide when reviewing abatement work practices and employer codes of practice. Practices are assessed against those presented in the manual to determine if they meet the intent of the province's occupational health and safety legislation. Alternate practices are acceptable if they provide workers with a level of safety equal to or greater than those practices presented in this manual.[5] By meeting the requirements of the Alberta Asbestos Abatement Manual the employer will ensure that worker and non-worker (general public) health is protected.

If asbestos is present in the building the Alberta Asbestos Abatement Manual states the following:

[5] Alberta Queen's Printer. *Alberta Asbestos Abatement Manual.* October 2012.

> Asbestos must be inhaled to cause disease. Intact and undisturbed asbestos presents no direct health hazard but does present a potential exposure hazard should fibres be released and inhaled. As a result, there is some risk associated with all asbestos installations.

The health risk is considered minimal for asbestos materials in good condition in an inaccessible location and protected from damage. Where damage can be controlled or prevented, managing the exposure risk is often the most cost-effective control measure. Where damage or disturbance cannot be controlled or where deterioration is due to uncontrolled natural causes, management of the exposure risk is very difficult. The use of air monitoring of occupied areas is not considered an acceptable method to determine whether or not asbestos containing materials must be removed, enclosed, encapsulated or may be left as is (with a management system). Air monitoring alone is insufficient to determine the potential health and exposure risk since asbestos fibres cannot usually be detected above background levels unless the material is disturbed in some way.

Additional criteria are needed to determine the risk of exposure or the need for removal. The Alberta Asbestos Abatement Manual has outlined an assessment exposure algorithm to assist in evaluating the condition of a particular asbestos installation. The following factors should be considered when evaluating the risk of exposure to asbestos:

1. Condition of Material – is the material in a condition to release fibres;
2. Water Damage – has the material been damaged due to water;
3. Exposed Surface Area – how much of the material is exposed;
4. Accessibility – can building occupants access the exposed material;
5. Activity and Movement – amount of activity and air movement in the area;
6. Air Plenum or Direct Air Stream – is the material in a air stream;
7. Friability – can the material be easily crumbled due to hand pressure; and
8. Asbestos Content – type of asbestos and percentage.

Lead-based Paint

Some paints used before 1950 contained as much as fifty percent lead by weight. Lead was often used as a pigment in white and pastel shades. Lead made paint dry faster, last longer and gave the colours a more vibrant look. In the 1950s the amount of lead used in paint decreased as other pigments were substituted. In 1976, federal regulations limited the level of lead in paint to 0.5 percent by weight. In 2009 they were limited the level of lead in paint again to 0.009 percent by weight. Exterior paints could still contain more lead. The yellow markings found on highways still use lead-based paint.[6] By 1991, Canadian paint manufacturers had voluntarily stopped using lead altogether.[7] Currently, paint considered to be lead containing are those with a content of 90 ppm (0.009%) or greater.

Lead-based paint does not pose a danger if it is in good condition, and is not disturbed. However, if the paint is peeling or flaking, a potentially harmful situation exists. Even friction from opening and closing doors or windows with painted frames can produce paint dust. This dust can get onto children's hands and toys, and from there, into their mouths. Paint chips can easily be swallowed by young children. Ledges and trim that are accessible to teething toddlers should also be cause for concern.[8]

The requirements for lead can be found within the Occupational Health and Safety Regulation. Part 4 of the Occupational Health and Safety Code sets limits for exposure to Chemical Hazards, Biological Hazards and Harmful Substances. Part 4 of the Code (Sections 16 through 27) outlines the General Requirements for employers to ensure worker exposure to a harmful substance is kept as low as reasonably practicable. In summary, the general requirements portion addresses the following:

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[6] Alberta Workplace Health and Safety. *Lead in the Workplace (Publication CH071).* 2013.

[7] Canada Mortgage and Housing Corporation. *Lead in Your Home* 1984 Revised and reprinted: 1997, 2003, and 2004.

[8] Ibid.

1. worker exposure to harmful substances;
2. worker exposure during shifts greater than 8-hours;
3. airborne concentration measurements;
4. potential worker exposure;
5. worker overexposure;
6. worker decontamination;
7. emergency bath, showers, eye wash equipment;
8. prohibited activities;
9. codes of practice; and
10. storage of harmful substances.

Sections 41 through 43 outline the employer's requirements for lead at the work site. With respect to the Code it primarily applies to managing worker exposure to lead. Lead-based paint should be removed following very specific guidelines according to industry-accepted practices, as well as the Alberta Occupational Health and Safety Act, Regulations and adopted Code.

Polychlorinated Biphenyls

PCBs are human-produced chemicals. They do not occur naturally. They are made by attaching chlorine molecules to a biphenyl molecule. There are 209 possible PCB compounds. All PCBs are heavy, colourless oils or resinous solids. They are very stable since they do not react with other chemicals. They have a high boiling point and do not conduct electricity. They are not soluble in water.

Polychlorinated biphenyls are no longer manufactured in North America. They are still found in older electrical transformers and capacitors, heat transfer equipment, and electro-magnets. However, when this equipment is serviced, other fluids replace the PCBs. PCBs or PCB-contaminated materials must be disposed of appropriately.

Storage sites are licensed and inspected regularly by provincial government inspectors. The owner or producer of the PCBs, or PCB-contaminated material, is responsible for their proper disposal or storage. The Waste Control Regulation (ALBERTA REGULATION 192/96) under the Environmental Protection and Enhancement Act outlines the requirements for storage of PCB-containing materials not in use and their disposal. Once fluorescent light ballasts are not in service then they must be stored or disposed of in accordance with the Waste Control Regulation.

Mercury

Mercury (Hg) is a very dense metal that expands and retracts evenly with changes in the temperature. Mercury exhibits super conductivity, which is the ability to conduct electrical currents with no resistance, and is the only metal that exists as a liquid at room temperature.

Mercury is released into the air, water and land, and it cycles between them due to its ability to change form with temperature. Mercury gets into the soil through natural breakdown of rocks, the disposal of mercury in landfills, and atmospheric deposition. It enters the water through runoff, atmospheric deposition, and when products containing mercury are poured down the drain. Mercury is released to the atmosphere through coal-fired utility, chlor-alkali plants, and incinerator emissions, as well as evaporation from water and land. Once mercury enters this cycle, it can remain in the environment for years as it accumulates. Mercury cannot be removed, but it can be prevented from ever entering the environment.

Miscellaneous Chemicals

Miscellaneous chemicals may require special handling procedures as outlined under the Occupational Health and Safety Act and Environmental Protection and Enhancement Act. For the purpose of this survey miscellaneous chemicals included materials that had labeling or packaging that falls under the Hazardous Product Act (Workplace Hazardous Materials Information System (WHMIS)) or Transportation of Dangerous Goods Act.

Radioactive Material

Two distinct categories of radiation exist, ionizing and non-ionizing. Within both of these there are a variety of subclasses that exist, such as high frequency with short wavelengths, or low frequency with long wavelengths. Ionizing radiation is provincially and federally regulated in Canada. Provincially the *Radiation Protection Act* (2010) and *Radiation Protection Regulation* pertain to the handling and disposal of radiation equipment, such as x-ray equipment, and radiation from non-manmade sources. Federally *The Nuclear Safety and Control Act* (2015) determines the limits to health and safety to the environment and persons during the development, use, packaging and transport of radioactive materials, particularly in the context of nuclear energy and over the course of the nuclear fuel cycle.

On a smaller scale the *Environmental Protection and Enhancement Act* (2014) pertains to the handling, transport and disposal of hazardous waste, such as radioactive materials. Disposal of radioactive materials should not occur in municipal landfills unless prior approval has been obtained. Items with radioactive substances should be disassembled according to manufacturer instruction with radioactive segments manifested, packaged and labeled prior to disposal with an appropriate facility. Parts that are non-radioactive, such as the product casings or shells, may be disposed of in municipal landfills.

Ozone-depleting Substances

In September of 1993, Alberta enacted the *Ozone-Depleting Substances and Halocarbons Regulation* (AR 181/2000), which governs the use, handling and release of CFCs, HCFCs and halons and other ozone-depleting substances. Provincial regulations require all persons servicing air conditioning or refrigeration equipment to be certified in accordance with the Apprenticeship and Industries Training Act and the associated regulations.

Canada banned chlorinated fluorocarbons as a propellant in aerosol cans in the 1980s, reducing their direct release into the atmosphere. As of January 1, 1996, no CFCs may be produced or imported into Canada.

Hydrochlorofluorocarbons (HCFCs) are chemical compounds related to CFCs and about 95 percent less damaging to the ozone layer. They are mainly used as a refrigerant in domestic air conditioning systems and in manufacturing plastic, insulation and packaging. Because HCFCs do contribute to ozone depletion, Canada is phasing out the production and use of HCFCs between the years 2010-2020. Therefore, HCFCs should only be used as a short-term alternative for replacing CFCs.

Most household refrigerators contain a chlorofluorocarbon refrigerant, sometimes called CFC-12 or R-12. While units manufactured prior to 1993 can contain CFCs or HCFCs, new refrigerators manufactured after 1993 can contain an alternate refrigerant with lower or nonexistent ozone-depleting potential. Alternate refrigerants are continuously being developed. Labels attached to all household units should list the refrigerant being used.

Urea Formaldehyde Foam Insulation (UFFI)

Formaldehyde is a colourless but pungent gas that occurs naturally in human bodies as well as in the environment. Commercially formaldehyde is found in plywood, carpets, fabrics, as a disinfectant and as a preservative. Small amounts of formaldehyde are not toxic, though over exposure can lead to irritation of the eyes, nose and throat, respiratory distress, headaches, dizziness and nausea.

Formaldehyde was added as a curing agent to urea foam to ensure a more complete curing process, creating Urea Formaldehyde Foam Insulation (UFFI). UFFI was a common insulating material for existing homes and buildings to improve insulation and decrease energy costs. It was used most often between 1977 and up until 1980, when its use was banned in Canada. However, during the curing process formaldehyde gas would be off-gassed from the foam causing health complaints and raising concerns of potential health concerns of short term exposure to formaldehyde.

Well-maintained UFFI does not pose a health risk as all off-gassing of UFFI installed between 1977 and 1980 in place today would have occurred primarily during the curing process. However, should UFFI become wet, or become exposed to conditions that would cause deterioration of the material, creating the potential for additional formaldehyde off-gassing.

APPENDIX II

PHOTOGRAPHS

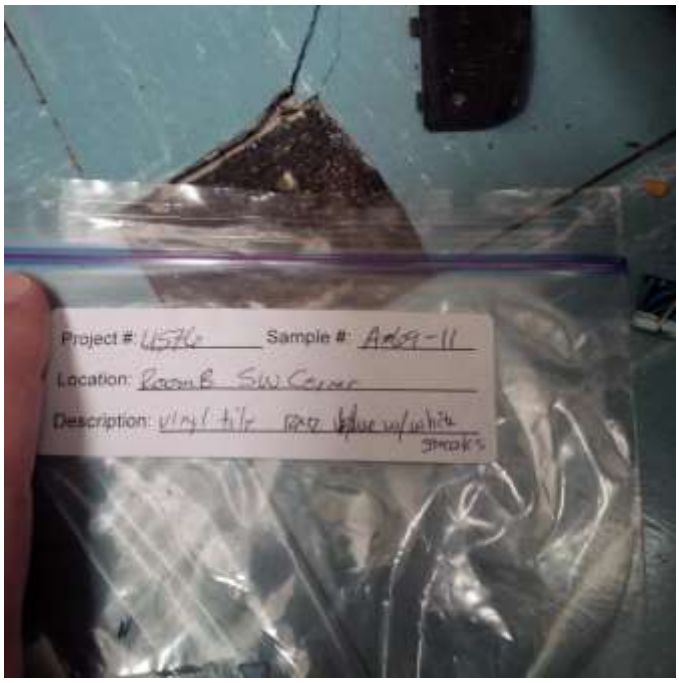
Photograph 1: Sample A62-5, Asbestos containing black mastic (back side of 9”x9”, grey with white streaks floor tile) sampled from the Meter Room.

Photograph 2: Sample A62-6, Asbestos containing black mastic (back side of 12”x12”, grey with white streaks floor tile) sample from Room 113.

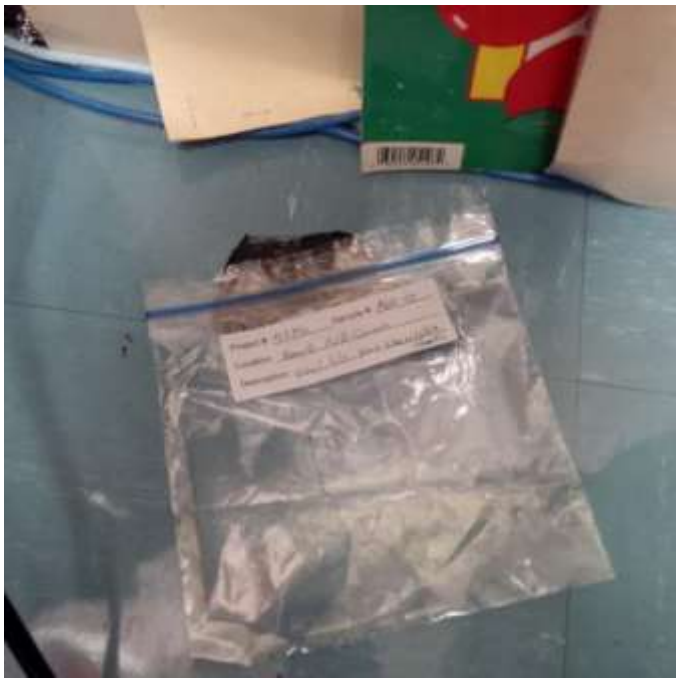
Photograph 3: A62-13, Asbestos containing black caulking sampled from around the Furnace Room door.

Photograph 4: Sample V-1, Asbestos containing vermiculite insulation sampled from the south, exterior cinderblock wall in Room 109.

Photograph 5: Sample A65-4, Asbestos containing 12”x12” acoustic ceiling tile (grid pattern) sampled from the northeast corner of Room 118.

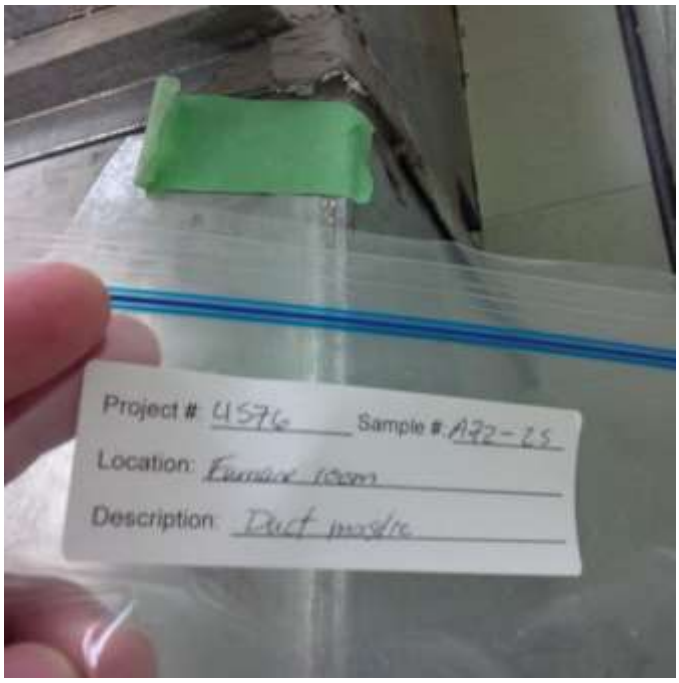


Photograph 6: Sample A69-11, Asbestos containing 12”x12” blue with white streaks vinyl floor tile sampled from the southwest corner of Room 120.

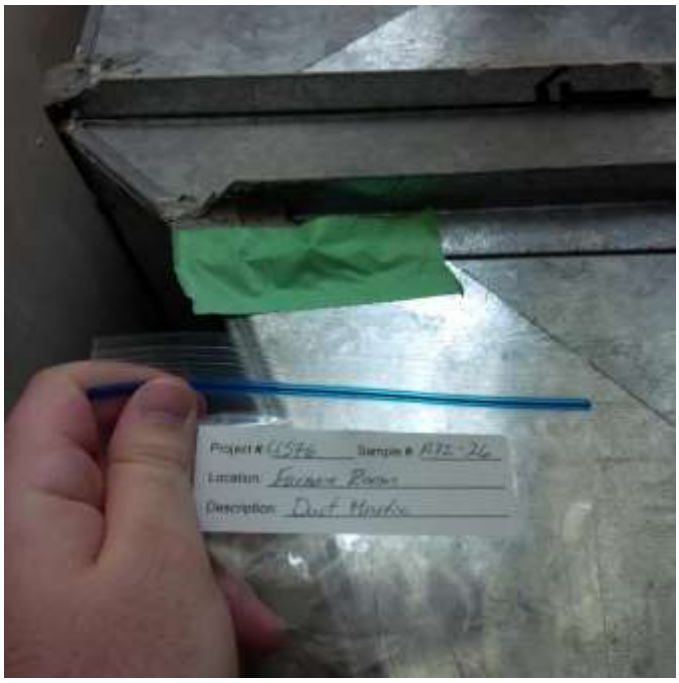


Photograph 7: Sample A69-12, Asbestos containing 12”x12” blue with white streaks vinyl floor tile sampled from the northwest corner of Room 120.

Photograph 8: Sample A69-14, Asbestos containing brown mastic (behind 12”x12” acoustic ceiling tile, grid pattern) sampled from the northeast corner of Room 121.



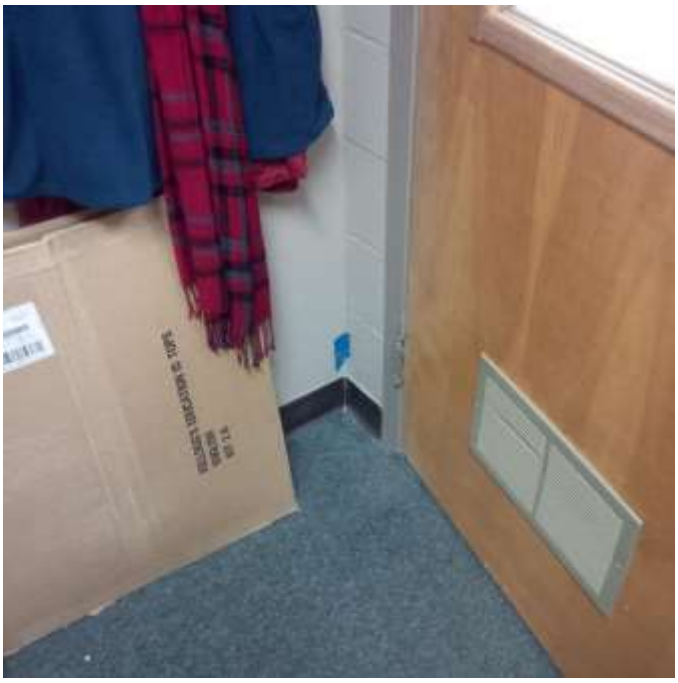
Photograph 9: Sample A72-25, Asbestos containing silver duct mastic sampled from the Furnace Room.



Photograph 10: Sample A72-26, Asbestos containing silver duct mastic sampled from the Furnace Room.

Photograph 11: Sample V-2, Asbestos containing vermiculite insulation sampled from the south wall in the 1972 addition room 124 (Furnace Room)

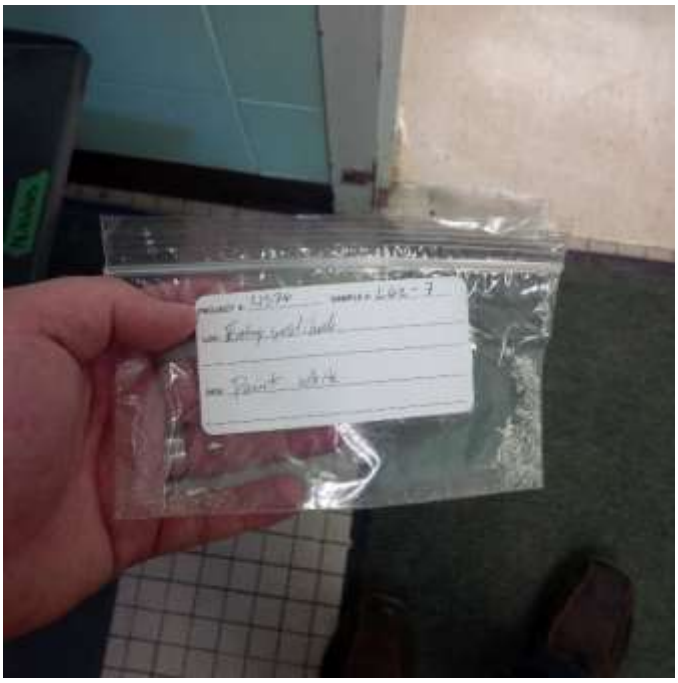
Photograph 12: Sample V-3, Asbestos containing vermiculite insulation sampled from the south wall in Room 121 in the 1969 addition.



Photograph 13: Sample L-2, Lead-based dark grey paint sampled from Room 113 behind the door.

Photograph 14: Sample L-3, Lead-based yellow paint sampled from the door frame in the 1962 boys washroom.

Photograph 15: Sample L-4, Lead-based beige coating sampled from the washroom stall in the 1962 boys washroom.



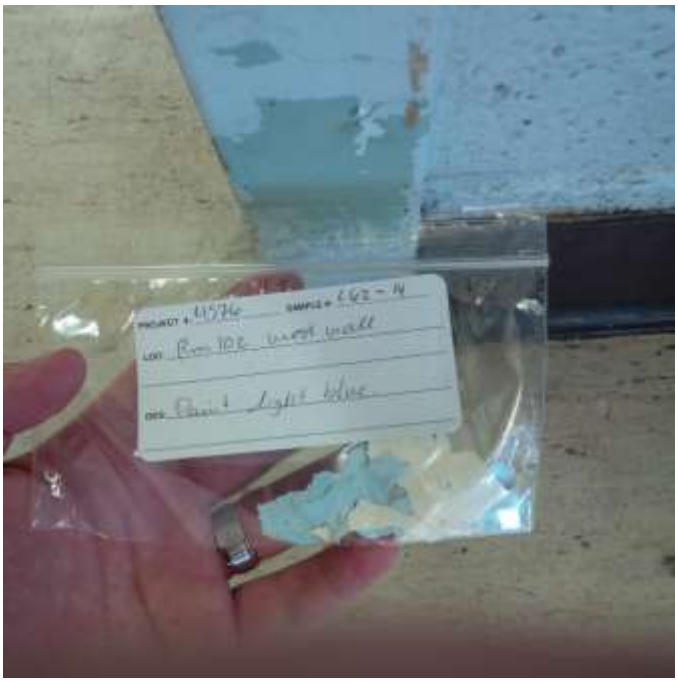
Photograph 16: Sample L-7, Lead-based white paint sampled from the door frame of the entry vestibule in the 1962 addition.

Photograph 17: Sample L-8, Lead-based mint green paint sampled from the wall in the entrance vestibule of the 1962 addition.

Photograph 18: Sample L-10, Lead-based cream paint sampled from the door frame of the community washroom.

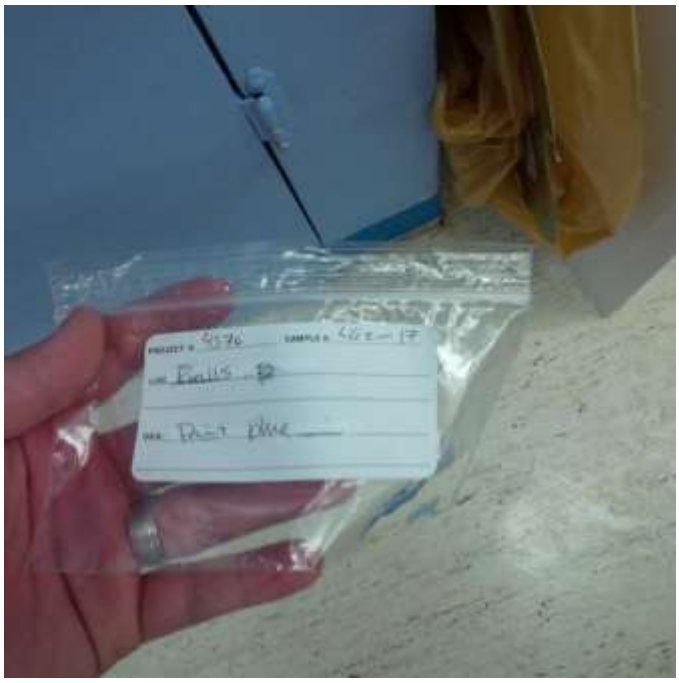
Photograph 19: Sample L-11, Lead-based dark green paint sampled from the main hallway shelf in the 1962 addition.

Photograph 20: Sample L-12, Lead-based dark blue paint sampled from the hallway door to Room 110.

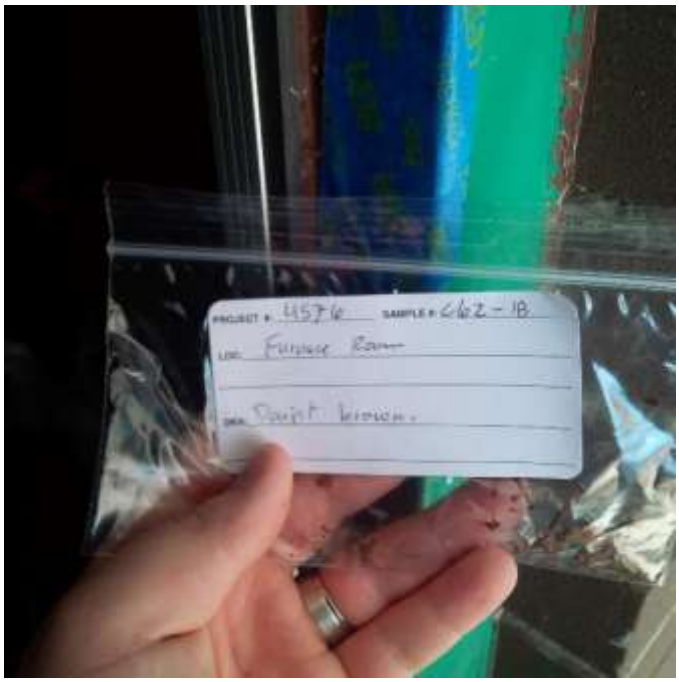


Photograph 21: Sample L-14, Lead-based light blue paint sampled from the door frame of Room 102.

Photograph 22: Sample L-16, Lead-based navy blue paint sampled from the door of the 1962 Janitor's Room.

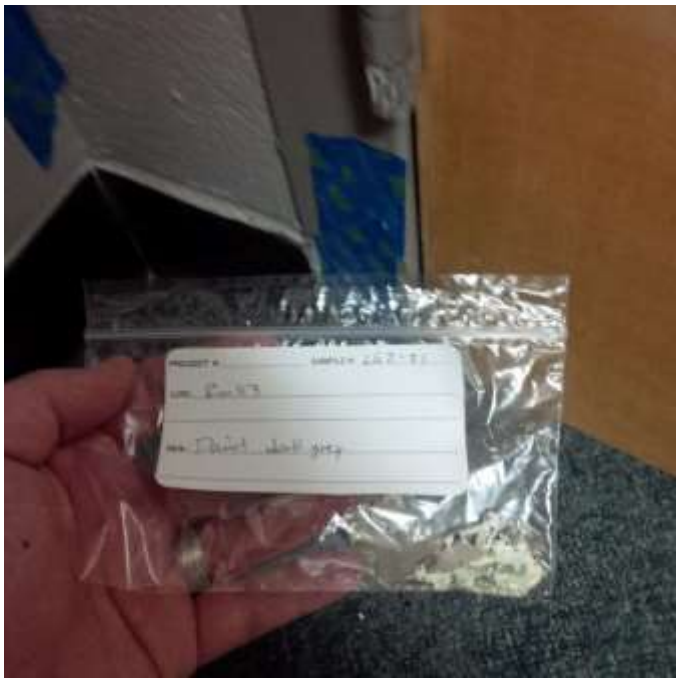


Photograph 23: Sample L-17, Lead-based blue paint sampled from the door of 1962 Room 115.

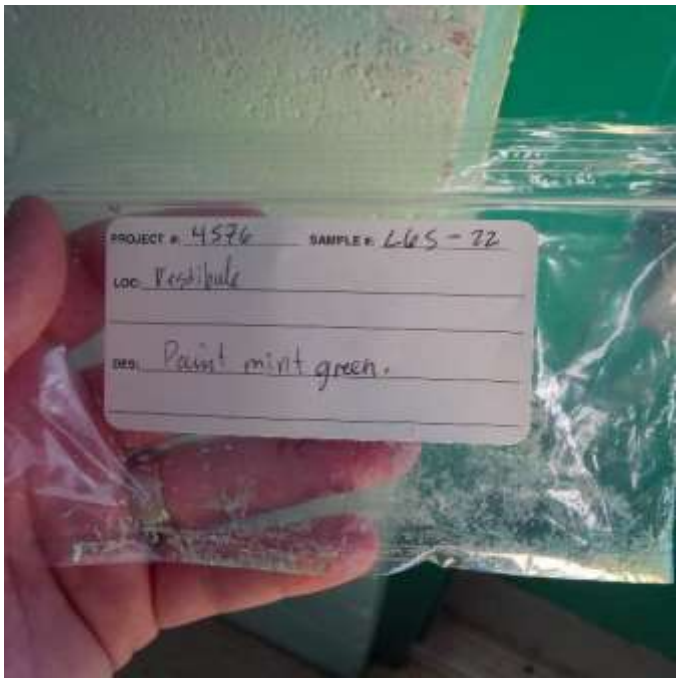


Photograph 24: Sample L-18, Lead-based brown paint sampled from the 1962 Furnace Room door.

Photograph 25: Sample L-19, Lead-based yellow paint sampled from the door frame of the 1962 Girls Washroom.



Photograph 26: Sample L-21, Lead-based dark grey paint sampled from the door frame of Room113.



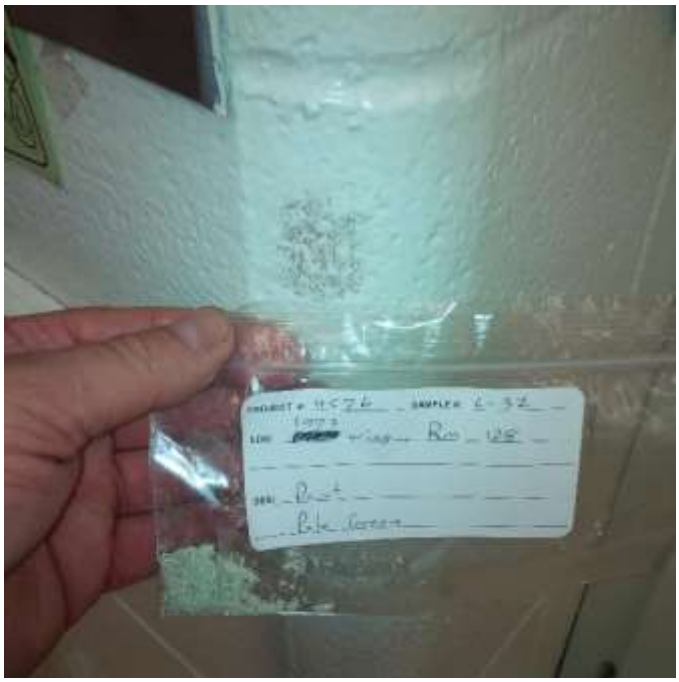
Photograph 27: Sample L-22, Lead-based mint green paint sampled from the 1965 vestibule wall.

Photograph 28: Sample L-23, Lead-based emerald green paint sampled from the 1972 vestibule door.

Photograph 29: Sample L-24, Lead-based brown paint sampled from the door frame of the Furnace Room.

Photograph 30: Sample L-25, Lead-based dark green paint sampled from the main hallway shelf in the 1965 addition.

Photograph 31: Sample L-31, Lead-based pale green paint sampled from the 1965 vestibule wall.



Photograph 32: Sample L-32, Lead-based pale green paint sampled from the wall in Room 128.

Photograph 33: Sample L-34, Lead-based blue paint sampled from the door frame of Room 118.

Photograph 34: Sample L-35, Lead-based white paint sampled from the door frame of Room 119.

Photograph 35: Sample L-36, Lead-based grey and black coating sampled from the 1965 vestibule shoe rack.

Photograph 36: Sample L-37, Lead-based grey paint sampled from the gym storage floor.

Photograph 37: Sample L-38, Lead-based pale green/blue paint sampled from the 1969 gym storage walls.

Photograph 38: Sample L-39, Lead-based light blue paint sampled from the walls in Room 102.

Photograph 39: Sample L-40, Lead-based dark blue paint sampled from the cinderblock wall in Room 121.

Photograph 40: Sample L-44, Lead-based yellow/lime green paint sampled from the cinderblock wall in Room 130.

Photograph 41: Sample L-44, Lead-based brown paint sampled from the door frame in Room 123.

Photograph 42: Sample L-46, Lead-based yellow paint sampled from the cinderblock wall in the community washroom in the 1962 wing.

Photograph 44: Sample L-47, Lead-based tan coating sampled from the girls washroom stall in the 1962 wing.

Photograph 44: Sample L-48, Lead-based navy blue paint sampled from the door in Room 108.

Photograph 45: Fluorescent light tube containing mercury dust observed in Room 108 and throughout the building.

Photograph 46: Thermostat with mercury containing bulb observed in Room 110.

Photograph 47: Thermostat with mercury containing bulb observed in Room 115.

Photograph 48: Refrigerator with assumed ozone-depleting substances observed in Room 117.

Photograph 49: Refrigerator with assumed ozone-depleting substances observed in Room 117.

Photograph 50: Refrigerator with assumed ozone-depleting substances observed in Room 108.

Photograph 51: Smoke detector suspected to contain radioactive materials observed in Room 115.

Photograph 52: Suspected self-powered ‘Exit” sign and emergency lighting unit observed in the gym.

Photograph 53: Suspected self-powered ‘Exit” signs in the gym.

Photograph 54: Sample M-1, Water damage observed on the ceiling tile in Room 101.

Photograph 55: Sample M-2, Water damage observed on the ceiling tile in Room 110.

Photograph 56: Water damage observed on the ceiling drywall in Room 107 where sample M-3 was collected.

Photograph 57: Sample M-4, Water damage observed on the ceiling tile in the 1965 Main Hallway.

Photograph 58: Sample M-5, Water damage observed on the ceiling tile in Room 118.

Photograph 59: Sample M-6, Water damage observed on the ceiling tile in Room 120.

Photograph 60: Sample M-7, Water damage observed on the ceiling tile in Room 121.

Photograph 61: Sample M-8, Water damage observed on the ceiling tile in Room 1969 Main Hallway.

Photograph 62: Sample M-9, Water damage observed on the ceiling tile in Room 129.

Photograph 63: Sample M-10, Water damage observed on the ceiling tile in Room 131.

Photograph 64: Miscellaneous chemicals observed in Room 115.

Photograph 65: ABC dry-chemical fire extinguisher observed in Room 105.

Photograph 66: Emergency lighting unit observed in the 1965 Entry Vestibule.

APPENDIX III

ASBESTOS, LEAD AND MOULD SAMPLE INVENTORY TABLES

Table 1: Summary of Asbestos Sample Analysis dated June 23, 2016 – 1962 Original Structure

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A62-1	Hallway Floor	Sheet Flooring, Off-White with Tan and Brown Streaks – with Tan Mastic, Off-White Mastic, Black Mastic and Grey Cementitious	None Detected	Not Applicable	Not Applicable
A62-2	Hallway Ceiling	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A62-3	Hallway Ceiling	12"x12" Acoustic Ceiling Tile, Large and Small Holes Grid Pattern – with Brown Mastic	None Detected	Not Applicable	Not Applicable
A62-4	Hallway Outside of Girls Washroom	Rubber Baseboard, 3" Brown – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-5 (Layer 1)	Meter Room	9"x9" Vinyl Floor Tile, Grey with White Streaks	None Detected	Not Applicable	Not Applicable
A62-5 (Layer 2)	**Meter Room**	**Black Mastic**	**Chrysotile**	**PC 0.5**	**1**
A62-6 (Layer 1)	Room 113 Server Room	12"x12" Vinyl Floor Tile, Grey with White Streaks	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 2)	Room 113 Server Room	Off-White Mastic	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 3)	Room 113 Server Room	Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 4)	**Rom 113 Server Room**	**Black Mastic**	**Chrysotile**	**PC 1.1**	**2**
A62-7	Furnace Room	Grey Brick Mortar, 2x8 Red	None Detected	Not Applicable	Not Applicable
A62-8	Furnace Room	Grey Brick Mortar, 2x8 Brown	None Detected	Not Applicable	Not Applicable
A62-9	Clerk's Office Entrance	2'x4' Ceiling Tile, Long Horizontal Pinholes/Fissures	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A62-10	Principal's Office, Northeast Corner	2'x4' Ceiling Tile, Long Horizontal Pinholes/Fissures	None Detected	Not Applicable	Not Applicable
A62-11	Furnace Room, Ducting	Expansion Joint Cloth, Tan	None Detected	Not Applicable	Not Applicable
A62-12	Room 102, West Wall	Window Caulking, Black	None Detected	Not Applicable	Not Applicable
A62-13	**Furnace Room Door**	**Black Caulking**	**Chrysotile**	**PC 2.9**	**3**
A62-14	Clerk's Office	Rubber Baseboard, 3" Beige – with Off-White Mastic	None Detected	Not Applicable	Not Applicable
A62-15	Staff Lounge	Rubber Baseboard, 3" Grey – with Tan and Brown Mastics	None Detected	Not Applicable	Not Applicable
A62-16	Room 102, West Wall	Linoleum, Cream with Blue and Red Specks – with Off-Whit Mastic	None Detected	Not Applicable	Not Applicable
A62-17	Staff Lounge	Sheet Flooring, Blue with White and Dark Specks – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-18	Entrance to Principal's Office	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-19	Room 105 Work Room	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-20	Room 101, Northwest Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-21	Room 109, Southeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-22	Room 105 Work Room, South Side	Ceiling Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-23	Room 105 Work Room, Southeast Corner	Ceiling Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
V-1	**1962 Wing, Room 109, South Exterior Cinderblock Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**4**

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.
- DNQ indicates asbestos detected not quantitated**.**

Table 2: Summary of Asbestos Sample Analysis dated June 22, 2016 – 1965 Addition

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A65-1	Main Hallway, Outside Kitchen	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A65-2	Room 115, Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-3	Nevil's Office, Southeast Corner	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-4	**Room 118, Northeast Corner**	**12"x12" Acoustic Ceiling Tile, Grid Pattern**	**Amosite**	**PC 0.25**	**5**
A65-5	Main Hallway, Outside Room 118	Rubber Baseboard, 3" Black – with Brown Mastic	None Detected	Not Applicable	Not Applicable
A65-6	Nevil's Office, South Wall	Rubber Baseboard, 3" Beige – with Tan/Beige Mastic	None Detected	Not Applicable	Not Applicable
A65-7	Room 115, Closet	Rubber Baseboard, 3" Beige with Beige Mastic	None Detected	Not Applicable	Not Applicable
A65-8	Main Hallway, North End	Sheet Flooring, Off-White with Brown Streaks – with Grey Mastic	None Detected	Not Applicable	Not Applicable
A65-9	Main Hallway, Outside Room 115	Sheet Flooring, Off-White with Brown Streaks – with Grey Mastic	None Detected	Not Applicable	Not Applicable
A65-10	Room 115, Closet	Sheet Flooring, Peach with White Streaks – with Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A65-11	Room 115, Closet	Sheet Flooring, Peach with White Streaks – with Tan Mastic, Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A65-12	Room 115, East Wall	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A65-13	Room 115, South Wall	2x8 Brick Mortar, Off-White	None Detected	Not Applicable	Not Applicable
A65-14	Room 115, South Wall	2x8 Brick Mortar, Off-White	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A65-15	Room 115, Southeast Corner	Linoleum, Cream with Blue and Red Specks – with Off-White Mastic	None Detected	Not Applicable	Not Applicable
A65-16	Kitchen Furnace Closet	Expansion Joint Cloth, Black	None Detected	Not Applicable	Not Applicable
A65-17	Kitchen, Northwest Corner	12"x12" Acoustic Ceiling Tile, Wave Pattern	None Detected	Not Applicable	Not Applicable
A65-18	Vestibule, Southeast Corner	12"x12" Acoustic Ceiling Tile, Wave Pattern	None Detected	Not Applicable	Not Applicable
A65-19	Nevil's Office, Northwest Corner	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-20	Room 118, West Walls	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.

Table 3: Summary of Asbestos Sample Analysis dated June 23, 2016 – 1969 and 1972 Additions

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A72-1	Room 131	12"x12" Vinyl Floor Tile, Grey with Black Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-2	Room 128	12"x12" Vinyl Floor Tile, Grey with Black Flecks – with Black Mastic and Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A72-3	Main Hallway, North End	12"x12" Vinyl Floor Tile, Off-White with Tan Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-4	Main Hallway, South End	12"x12" Vinyl Floor Tile, Off-White with Tan Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-5	Room 131	Rubber Baseboard, 3" Black – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A72-6	South Entrance to Library	Rubber Baseboard, 3" Black – with Yellow/Tan Mastic	None Detected	Not Applicable	Not Applicable
A72-7	Storage Closet	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-8	Room 128	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-9	Room 131, Northwest Corner	12"x12" Vinyl Floor Tile, Pink with White Flecks – with White/Black Mastic and Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A69-10	Room 121, Outside Door	12"x12" Vinyl Floor Tile, Pink with White Flecks – with Yellow/Black Mastic	None Detected	Not Applicable	Not Applicable
A69-11 (Layer 1)	**Room 120, Southwest Corner**	**12"x12" Vinyl Floor Tile, Blue with White Streaks**	**Chrysotile**	**PC 1.2**	**6**
A69-11 (Layer 2)	Room 120, Southwest Corner	Black Mastic	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A69-12 (Layer 1)	**Room 120, Northwest Corner**	**12"x12" Vinyl Floor Tile, Blue with White Streaks**	**Chrysotile**	**PC 1.1**	**7**
A69-12 (Layer 2)	Room 120, Northwest Corner	Black Mastic	None Detected	Not Applicable	Not Applicable
A72-13	Room 130, Northwest Corner	12"x12" Acoustic Ceiling Tile, Grid Pattern	None Detected	Not Applicable	Not Applicable
A69-14 (Layer 1)	Room 121, Northeast Corner	12"x12" Acoustic Ceiling Tile, Grid Pattern	None Detected	Not Applicable	Not Applicable
A69-14 (Layer 2)	**Room 121, Northeast Corner**	**Brown Mastic**	**Chrysotile**	**PC 0.5**	**8**
A69-15	Room 121 Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A69-16	Room 120, West Wall	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-17	Room 131, East Wall	Linoleum, Cream with Blue and Red Specks – with Yellow Mastic	None Detected	Not Applicable	Not Applicable
A69-18	Room 120, West Wall	Linoleum, Cream with Blue and Red Specks – with Green Mastic and White Leveling Compound	None Detected	Not Applicable	Not Applicable
A69-19	Main Hallway, Outside Room 121	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A72-20	Main Hallway, Outside Room 130	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A72-21	Boys Bathroom, West Wall	Fiberglass Panel – with Tan Mastic, White Caulking, Grey Cementitious, and White Joint Compound	None Detected	Not Applicable	Not Applicable
A72-22	Boys Bathroom, West Wall	Fiberglass Panel – with Tan Mastic, White Caulking and Grey Cementitious	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A72-23	Room 128, Windows	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A69-24	Room 121, Windows	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A72-25	**Furnace Room**	**Silver Duct Mastic**	**Chrysotile**	**10**	**9**
A72-26	**Furnace Room**	**Silver Duct Mastic**	**Chrysotile**	**10**	**10**
A72-27	Furnace Room	Fire Stopping, Beige	None Detected	Not Applicable	Not Applicable
A72-28	Furnace Room	Fire Stopping, Beige	None Detected	Not Applicable	Not Applicable
A72-29	Storage Closet	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-30	Room 131, Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
V-2	**1972 Addition, Furnace Room, South Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**11**
V-3	**1969 Wing, Room 121, South Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**12**

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.
- DNQ indicates asbestos detected not quantitated**.**

Table 4: Summary of Asbestos Sample Analysis dated June 2 & 22, 2016 – Roof and Exterior of Structure

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
AE-1	1972 Wing, Gym Door	White Caulking	None Detected	Not Applicable	Not Applicable
AE-2	1972 Wing, Gym Door	White Caulking with Black Tar	None Detected	Not Applicable	Not Applicable
AE-3	1965 Wing, West Wall	Grey Mortar – Red Brick	None Detected	Not Applicable	Not Applicable
AE-4	1962 Wing, West wall	Grey Mortar – Brown Brick	None Detected	Not Applicable	Not Applicable
AE-5	1962 Wing, Front Entrance	Grey Mortar – Beige Brick	None Detected	Not Applicable	Not Applicable
AE-6	1972 Wing, East Wall	Grey Mortar – Stone	None Detected	Not Applicable	Not Applicable
AE-7	1972 Wing	Grey Mortar – Brown Textured Brick	None Detected	Not Applicable	Not Applicable
AE-8	1965 Wing, East Wall	Stucco Brown	None Detected	Not Applicable	Not Applicable
A-1	1962, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-2	1965 South, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-3	1969, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-4	1972, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable

Table 5: Summary of Lead Sample Results dated June 23 & 29, 2016

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-1	1962 – Room 113, Drywall behind Door	Light Grey Paint	<69	Good	Not Applicable
L-2	**1962 – Room 113, Door Frame**	**Dark Grey Paint**	**260**	**Good**	**13**
L-3	**1962 – Boys Washroom, Door Frame**	**Yellow Paint**	**2100**	**Good**	**14**
L-4	**1962 – Boys Washroom, Stall**	**Beige Coating**	**420**	**Good**	**15**
L-5	1962 – Room 109, East Wall	Cream Paint	<60	Good	Not Applicable
L-6	1962 – Room 113a Server Room, Door Frame	Cream Paint	<59	Good	Not Applicable
L-7	**1962 – Entry Vestibule, Door Frame**	**White Paint**	**1300**	**Fair**	**16**
L-8	**1962 – Entry Vestibule, Cinderblock Wall**	**Mint Green Paint**	**1400**	**Good**	**17**
L-9	1962 – Entry Vestibule, Door/Frame	Emerald Green Paint	<71	Good	Not Applicable
L-10	**1962 – Main Hallway Community Washroom, Door Frame**	**Cream Paint**	**640**	**Fair**	**18**
L-11	**1962 – Main Hallway, Shelf**	**Dark Green Paint**	**660**	**Fair**	**19**
L-12	**1962 – Hallway/Entrance to Room 110, Door**	**Dark Blue Paint**	**190**	**Good**	**20**
L-13	1962 – Clerks Office, Drywall	Lime Green Paint	<59	Good	Not Applicable
L-14	**1962 – Room 102 Door Frame, Door Frame**	**Light Blue Paint**	**94**	**Fair/Poor**	**21**
L-15	1965 – Nevil's Office, Door Frame	Tan Paint	73	Good	Not Applicable
L-16	**1962 – Janitor's Room, Door**	**Navy Blue Paint**	**1100**	**Good**	**22**

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-17	**1965 – Room 115, Door/Frame**	**Blue Paint**	**110**	**Good**	**23**
L-18	**1962 – Furnace Room, Door Frame**	**Brown Paint**	**38000**	**Poor**	**24**
L-19	**1962 – Girls Washroom, Door Frame**	**Yellow Paint**	**1900**	**Good**	**25**
L-20	1962 – Room 113, Drywall	Light Grey Paint	<77	Good	Not Applicable
L-21	**1962 – Room 113, Door Frame**	**Dark Grey Paint**	**430**	**Good**	**26**
L-22	**1965 – Vestibule, Cinderblock Wall**	**Mint Green Paint**	**1400**	**Good**	**27**
L-23	**1972 – Vestibule, Door/Frame**	**Emerald Green Paint**	**170**	**Good**	**28**
L-24	**1962 – Furnace Room, Door/Frame**	**Brown Paint**	**36000**	**Fair**	**29**
L-25	**1965 – Main Hallway, Shelf**	**Dark Green Paint**	**900**	**Fair**	**30**
L-26	1965 – Main Hallway, Nevil's Office, Drywall	Lime Green Paint	<90	Good	Not Applicable
L-27	1965 – Gym East Wall, Cinderblock	White Paint	<74	Good	Not Applicable
L-28	1965 – Nevil's Office Area, Drywall	Off-White/Cream Paint	<70	Good	Not Applicable
L-29	1965 – Furnace Room, Drywall	Off-White/Cream Paint	<85	Good	Not Applicable
L-30	1965 – Furnace Room Door	Tan Paint	<66	Fair	Not Applicable
L-31	**1965 – Vestibule, Cinderblock Wall**	**Pale Green Paint**	**950**	**Good**	**31**
L-32	**1972 – Room 128, Cinderblock Wall**	**Pale Green Paint**	**660**	**Good**	**32**
L-33	1965 – Room 117 (Kitchen), Drywall	Beige Paint	<59	Good	Not Applicable
L-34	**1965 – Room 118, Door Frame**	**Blue Paint**	**1200**	**Good**	**33**

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-35	**1965 – Room 119, Door Frame**	**White Paint**	**940**	**Good**	**34**
L-36	**1965 – Vestibule, Shoe Rack**	**Grey and Black Coating**	**6700**	**Good**	**35**
L-37	**1969 – Gym Storage, Floor**	**Grey Paint**	**3000**	**Fair**	**36**
L-38	**1969 – Gym Storage, Cinderblock Wall**	**Pale Green/Blue Paint**	**330**	**Good**	**37**
L-39	**1962 – Room 102, Door Frame**	**Light Blue Paint**	**300**	**Good**	**38**
L-40	**1969 – Room 121, Cinderblock Wall**	**Dark Blue Paint**	**95**	**Good**	**39**
L-41	1972 – Room 131, Board	Dark Green Paint	<62	Good	Not Applicable
L-42	1972 – Room 131 Booth, Cinderblock Wall	Bright Green Paint	<70	Good	Not Applicable
L-43	**1972 – Room 130, Cinderblock Wall**	**Yellow/Lime Green Paint**	**350**	**Good**	**40**
L-44	**1972 – Room 123, Door Frame**	**Brown Paint**	**2200**	**Fair**	**41**
L-45	1972 – Room 124 Storage/Furnace	Beige Paint	<81	Good	Not Applicable
L-46	**1962 – Community Washroom, Cinderblock Wall**	**Yellow Paint**	**1100**	**Good**	**42**
L-47	**1962 – Girls Washroom, Stall**	**Tan Coating**	**12000**	**Good**	**43**
L-48	**1962 – Room 108, Door**	**Navy Blue Paint**	**610**	**Fair**	**44**
L-49	1972 – Girls Washroom, 1"x1" Tile	Tan Paint	<63	Good	Not Applicable
L-50	1972 – Boys Washroom, 1"x1" Tile	Tan Paint	55	Good	Not Applicable
L-51	1972 – Girls Washroom, 4"x4" Mottled Tile	Green Paint	<62	Good	Not Applicable

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-52	1972 – Boys Washroom, 4"x4" Mottled Tile	Green Paint	<52	Good	Not Applicable
L-53	1972 – Girls Washroom, 4"x4" Tile	White Paint	70	Good	Not Applicable
L-54	1972 – Boys Washroom, 4"x4" Tile	White Paint	42	Good	Not Applicable

Notes:

- **Bolded text** indicates that lead is present in the sample. Results were compared to the 90 parts per million (ppm) criterion limit outlined in the Occupational Health and Safety Bulletin "*Lead at The Work Site*" (2013), published by the Government of Alberta. Paint samples that are equal to or greater than 90ppm are considered to be lead-containing.
- ppm – parts per million

Table 6: Summary of Bulk Mould Sample Analysis dated June 29, 2016

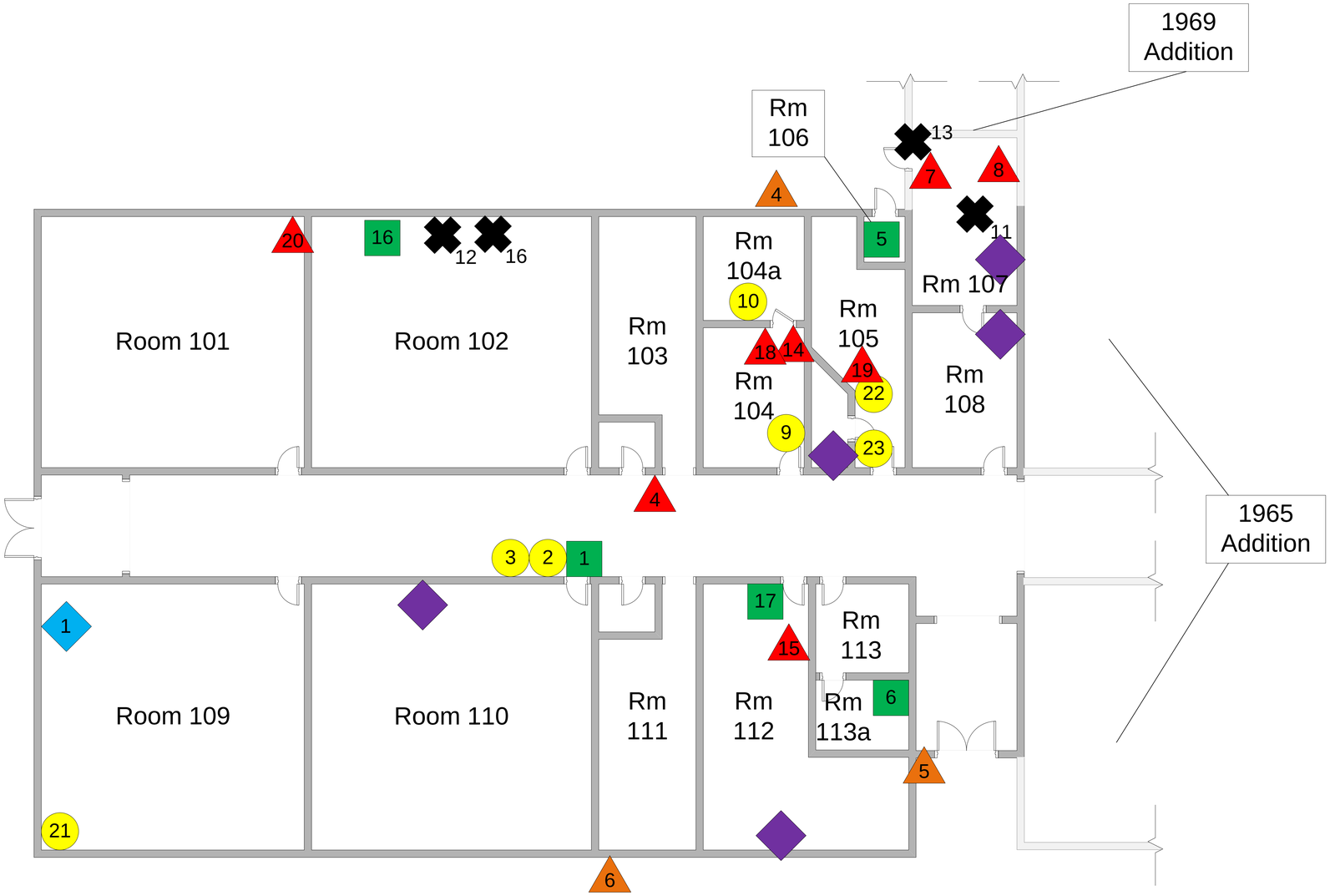
Sample Number	Sample Location	Mould Spore Identification	Relative Amount	Photograph Number
M-1	Room 101, Ceiling Tile	Mycelial Fragments	Low	54
M-2	Room 110, Ceiling Tile	*Cladosporium*	Low	55
M-3	Room 107, Ceiling Drywall	No Fungal Structures Detected	Not Applicable	56
M-4	1965 Main Hallway, Backside of Ceiling Tile	No Fungal Structures Detected	Not Applicable	57
M-5	Room 118, Ceiling Tile	No Fungal Structures Detected	Not Applicable	58
M-6	Room 120, Ceiling Tile	No Fungal Structures Detected	Not Applicable	59
M-7	Room 121, Ceiling Tile	*Chaetomium* *Cladosporium*	Low Low	60
M-8	1969 Main Hallway Adjacent Room 120, Ceiling Tile	No Fungal Structures Detected	Not Applicable	61
M-9	Room 129, Ceiling Tile	No Fungal Structures Detected	Not Applicable	62
M-10	Room 131, Ceiling Tile	*Chaetomium*	Low	63

Notes:

- Relative amount: 'Low' =<10 per mm^2 of tape surface;' Moderate' =10-100 per mm^2; 'High' =>100 per mm^2

APPENDIX IV

FLOOR PLANS



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Asbestos Sample Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

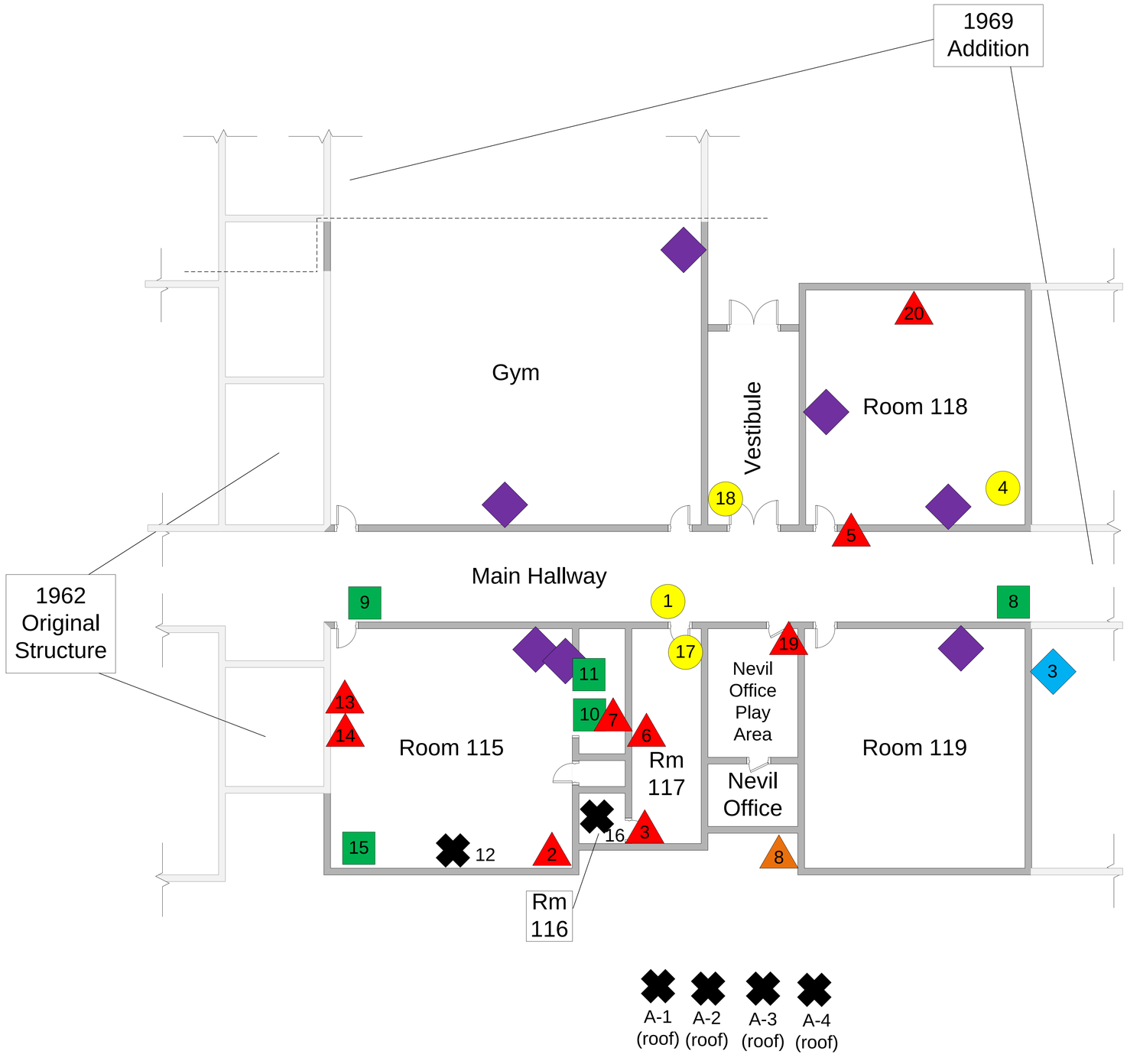
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Asbestos Wall Sample
- Asbestos Ceiling Sample
- Asbestos Flooring Sample
- Miscellaneous Asbestos Sample
- Vermiculite Sample
- No vermiculite found
- Asbestos Exterior Sample

Note:
- Not to Scale



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Asbestos Sample Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

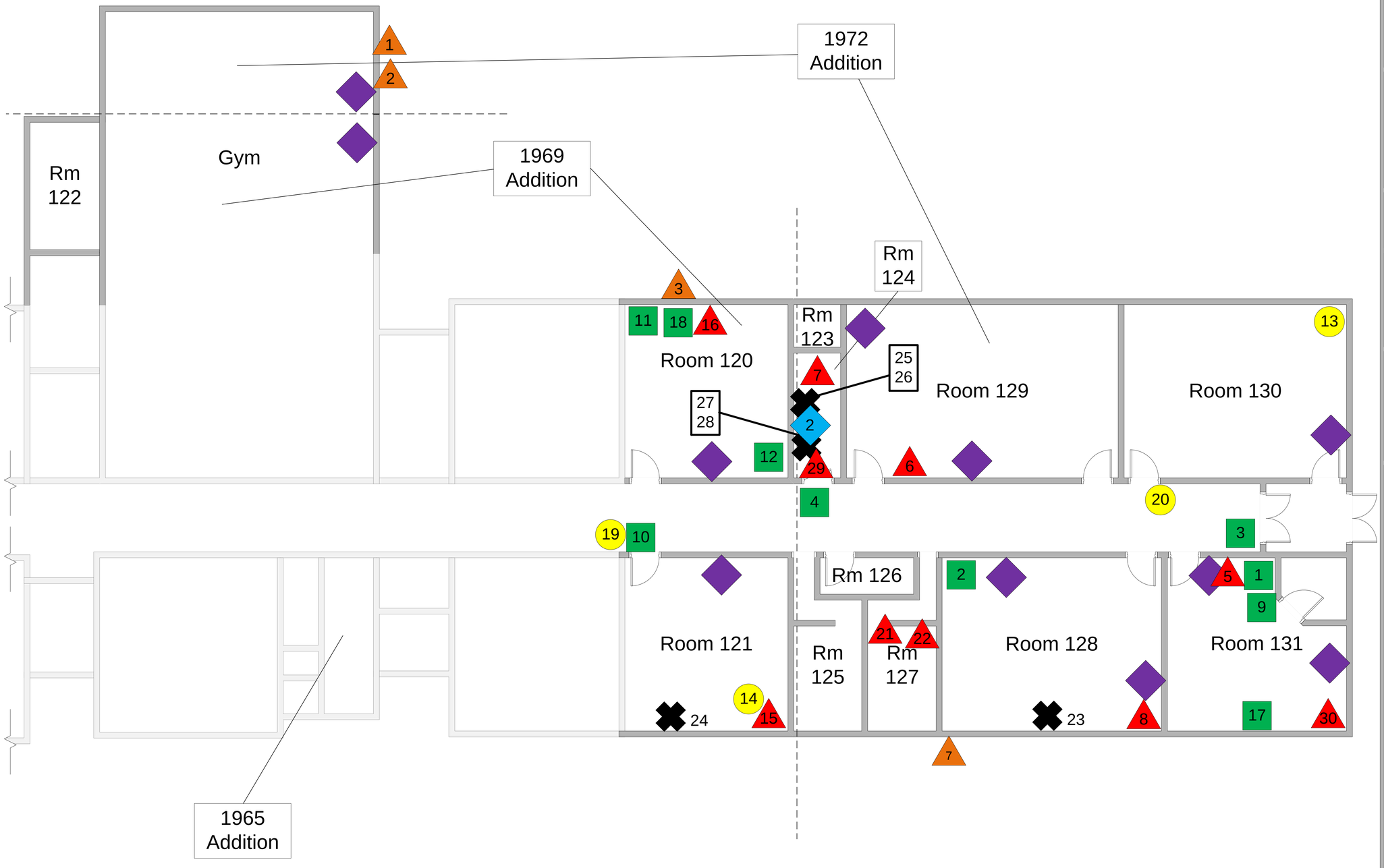
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Asbestos Wall Sample
- Asbestos Ceiling Sample
- Asbestos Flooring Sample
- Miscellaneous Asbestos Sample
- Vermiculite Sample
- No vermiculite found
- Asbestos Exterior Sample

Note:
- Not to Scale



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Asbestos Sample Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

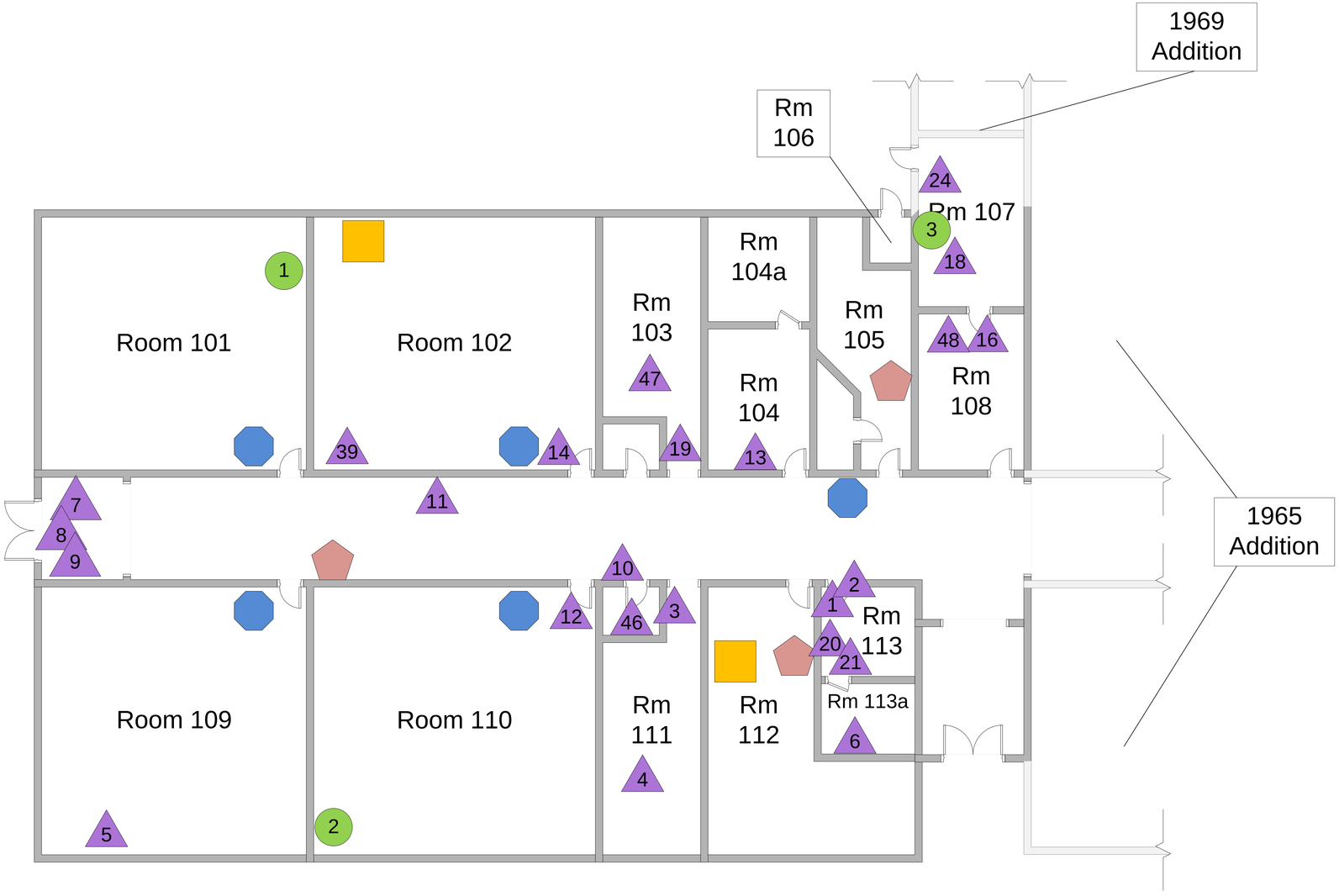
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Asbestos Wall Sample
- Asbestos Ceiling Sample
- Asbestos Flooring Sample
- Miscellaneous Asbestos Sample
- Asbestos Exterior Sample
- Vermiculite Sample
- No vermiculite found

Note:

- Not to Scale



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Mould and Lead Sample Locations and Observations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

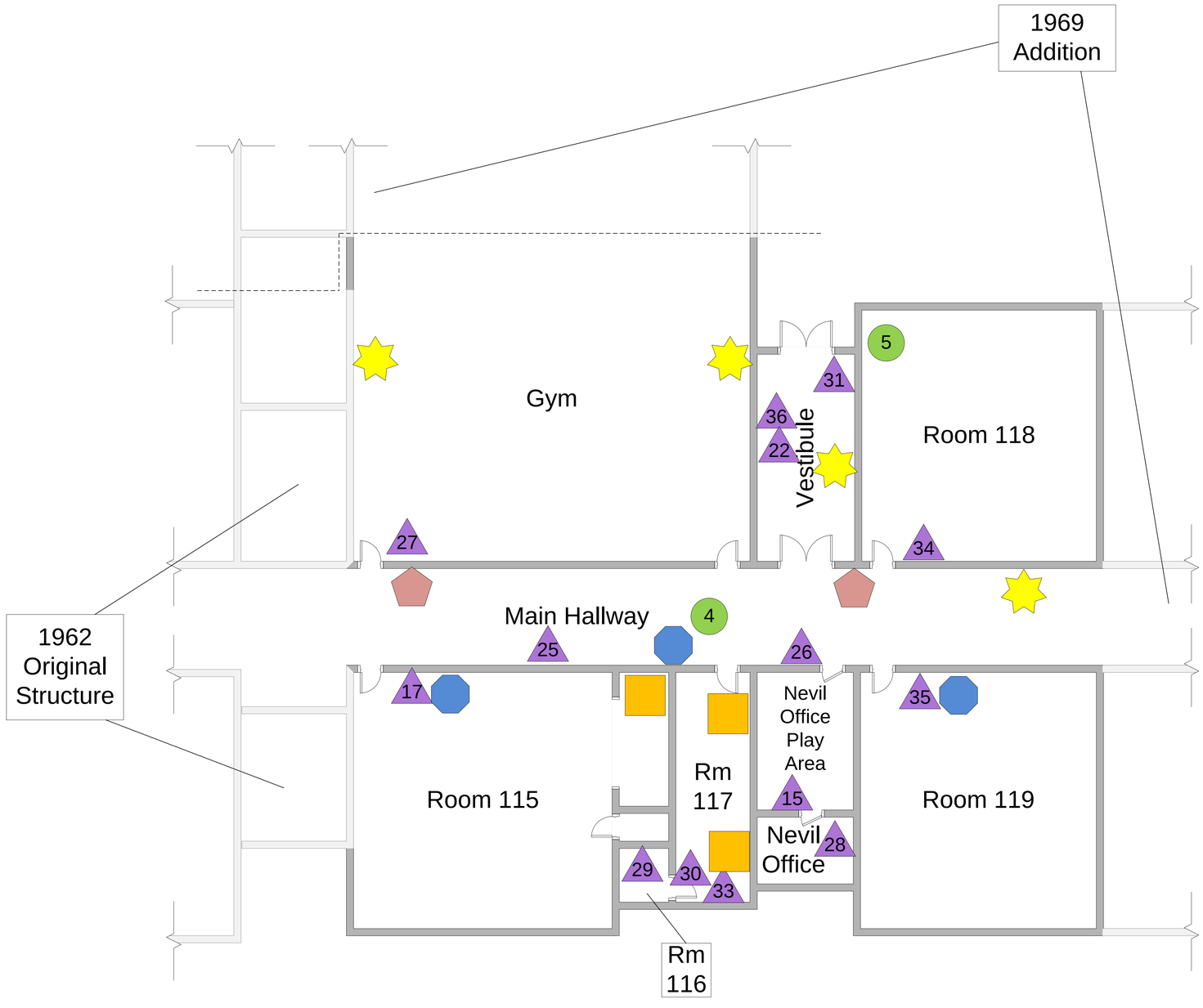
Legend:

- Lead Sample
- Mould Tape Lift
- Mercury Containing Thermostat
- Fire Extinguisher
- Refrigerator

Note:

- Not to Scale

- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballasts and miscellaneous chemicals were observed throughout the building at the time of the assessment.



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Sample Locations -
1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

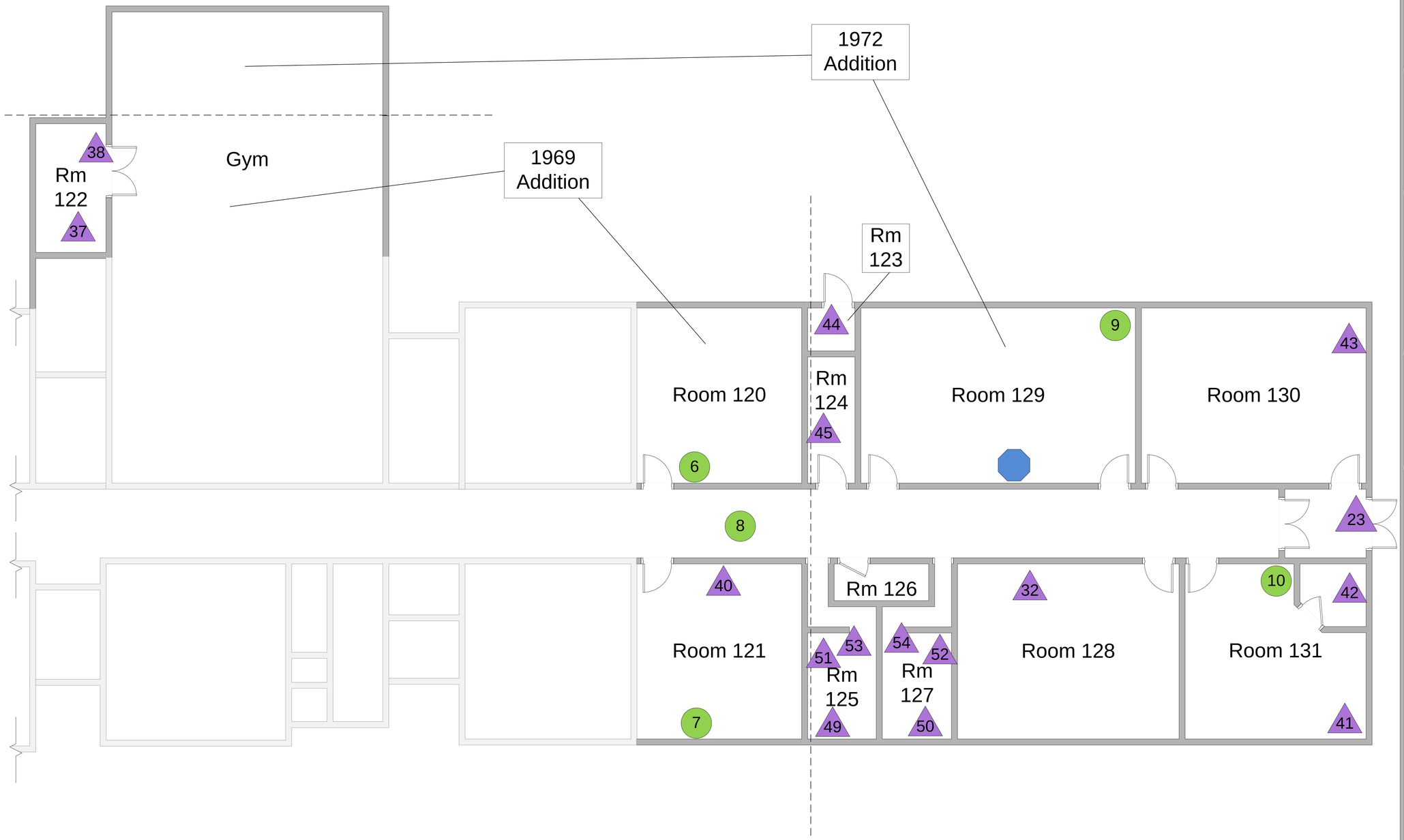
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

N

- Lead Sample
- Mould Tape Lift
- Mercury Containing Thermostat
- Fire Extinguisher
- Refrigerator
- Emergency Lighting Unit

Note:
- Not to Scale
- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballasts and miscellaneous chemicals were observed throughout the building at the time of the assessment.



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Sample Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

N

- Lead Sample
- Mould Tape Lift
- Mercury Containing Thermostat

Note:

- Not to Scale

- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballasts and miscellaneous chemicals were observed throughout the building at the time of the assessment.

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Asbestos Containing Material Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

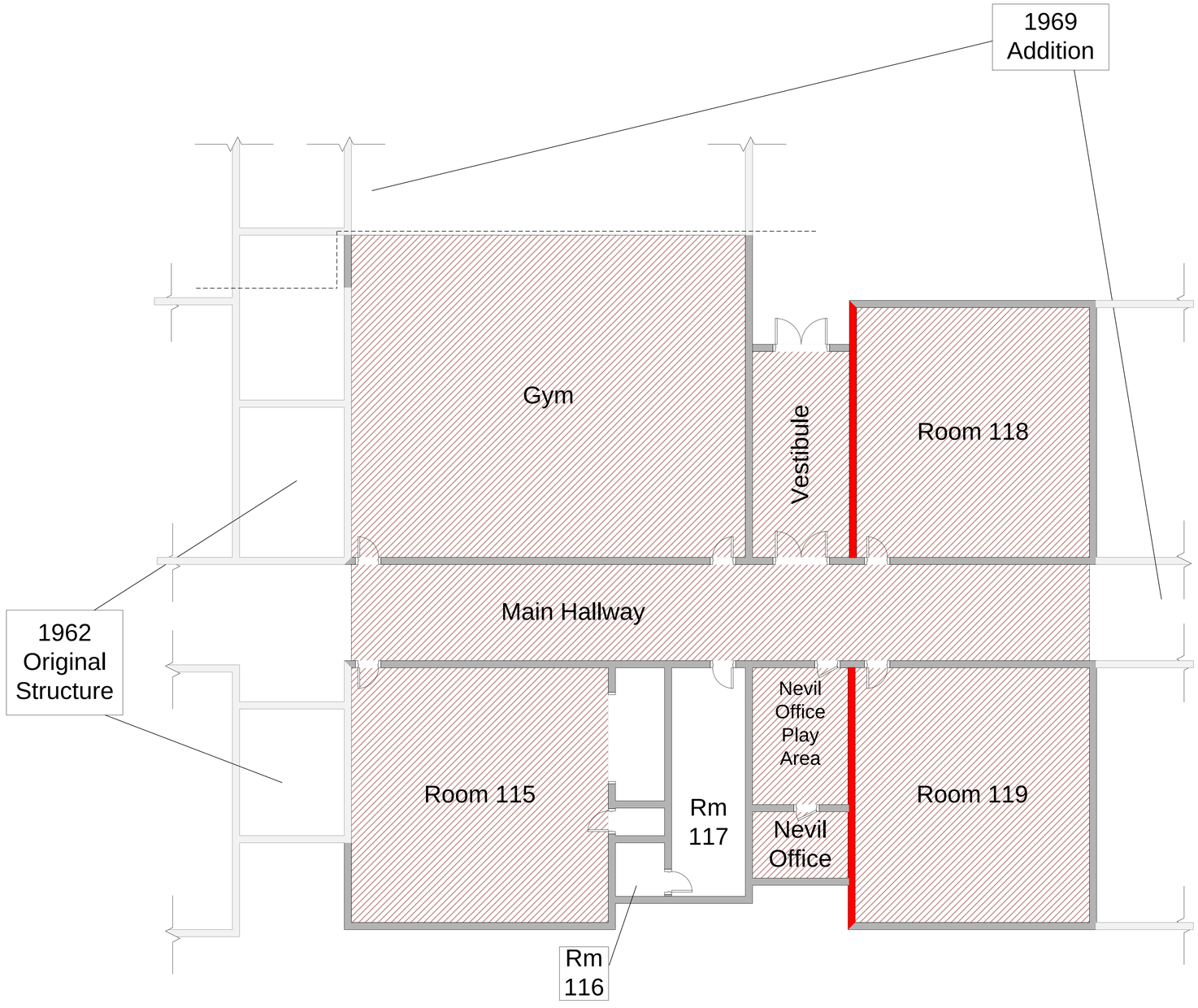
Legend:

N

- Confirmed Asbestos Containing Vermiculite Insulation
- Asbestos Containing Mastic (underneath vinyl floor tile)
- Asbestos Containing Caulking

Note:

- Not to Scale
- **Asbestos containing vermiculite insulation may present in cinderblock walls other than those outlined on this floor plan.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



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Asbestos Containing Material Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

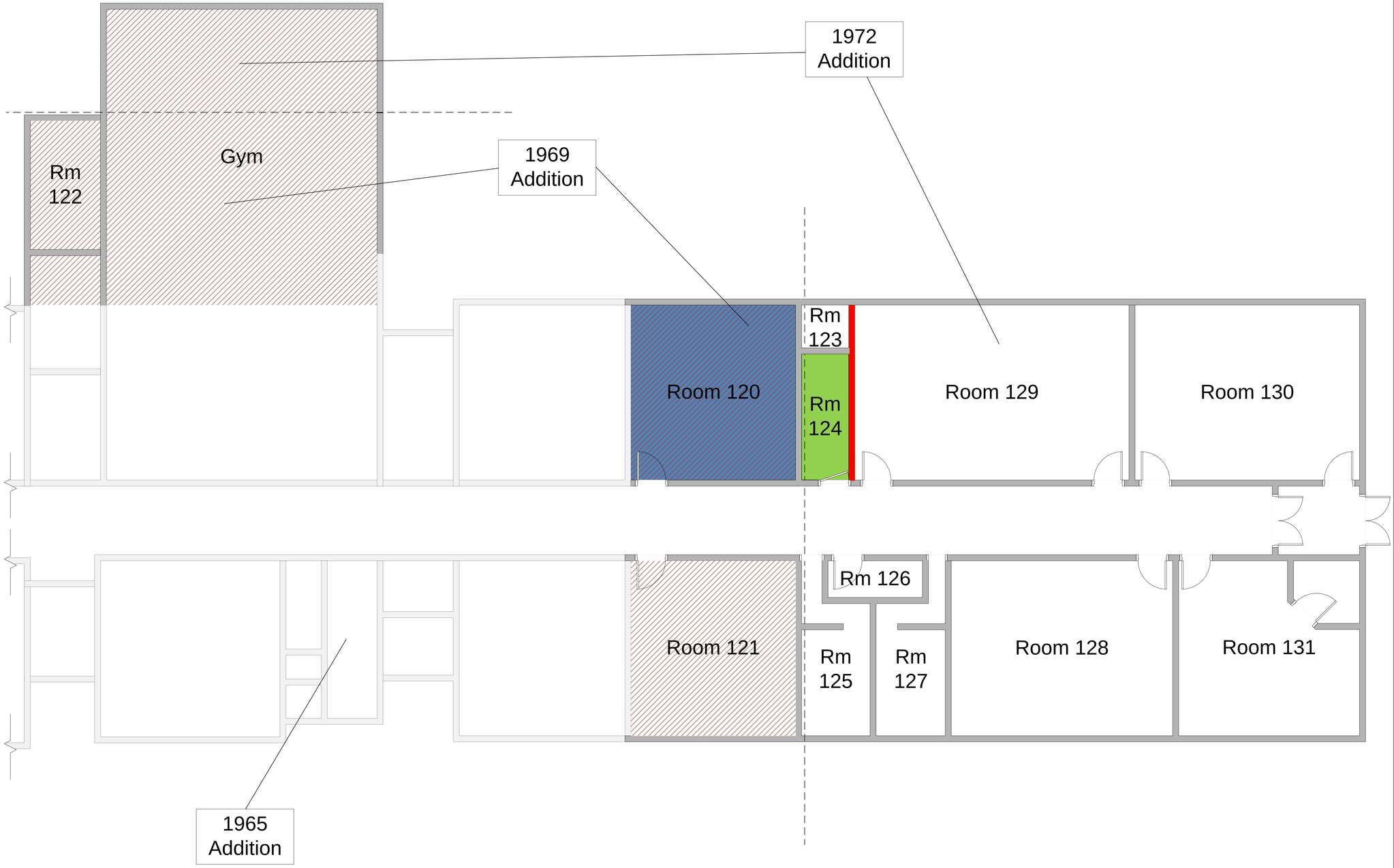
N

Confirmed Asbestos Containing Vermiculite Insulation

Asbestos Containing Acoustic Ceiling Tile

Note:

- Not to Scale
- **Asbestos containing vermiculite insulation may present in cinderblock walls other than those outlined on this floor plan.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



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Asbestos Containing Material Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

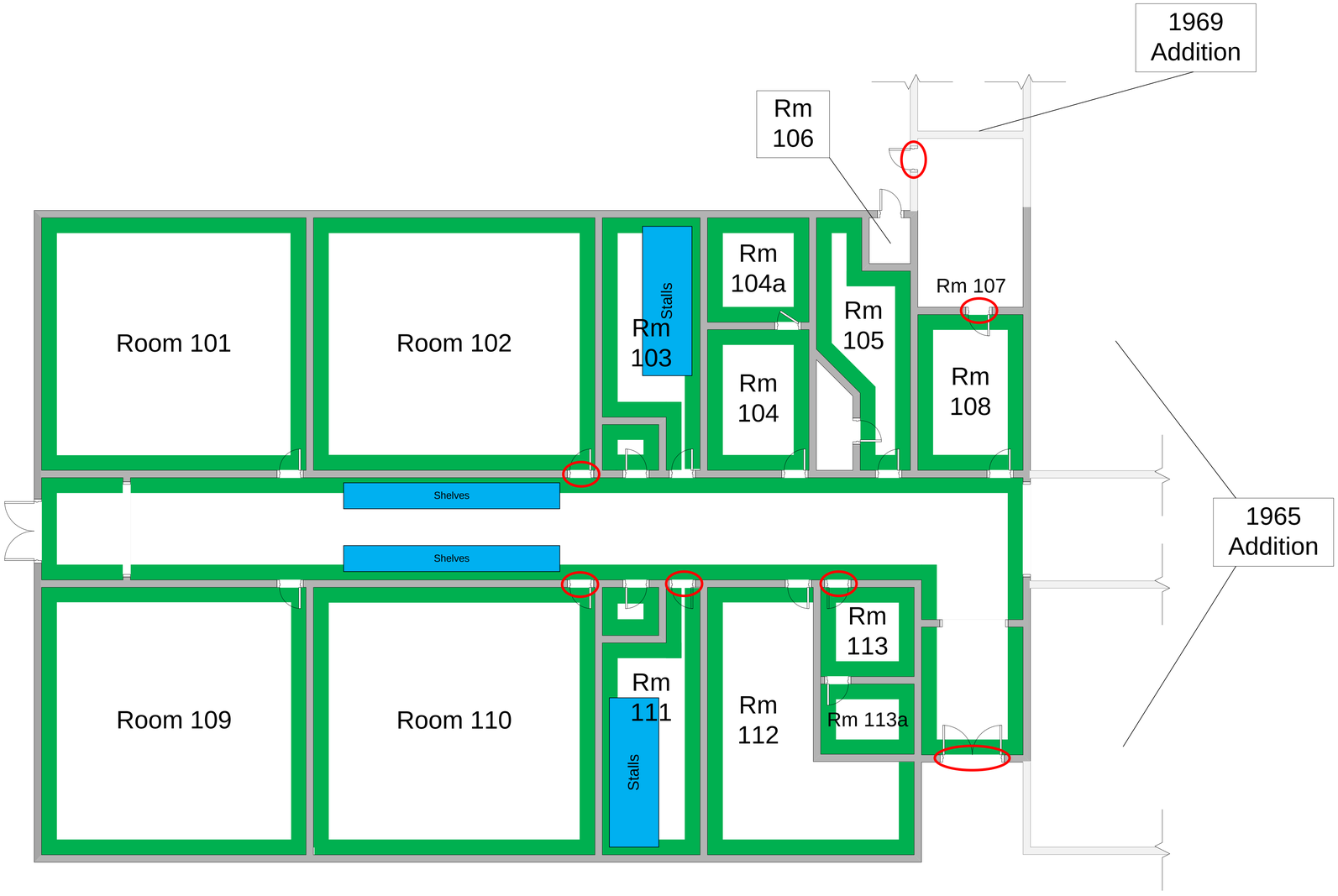
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Confirmed Asbestos Containing Vermiculite Insulation
- Asbestos Containing Vinyl Floor Tile
- Acoustic Ceiling Tile with Asbestos Containing Mastic
- Asbestos Containing Duct Mastic

Note:

- Not to Scale
- **Asbestos containing vermiculite insulation may present in cinderblock walls other than those outlined on this floor plan.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



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Lead-based Paint Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

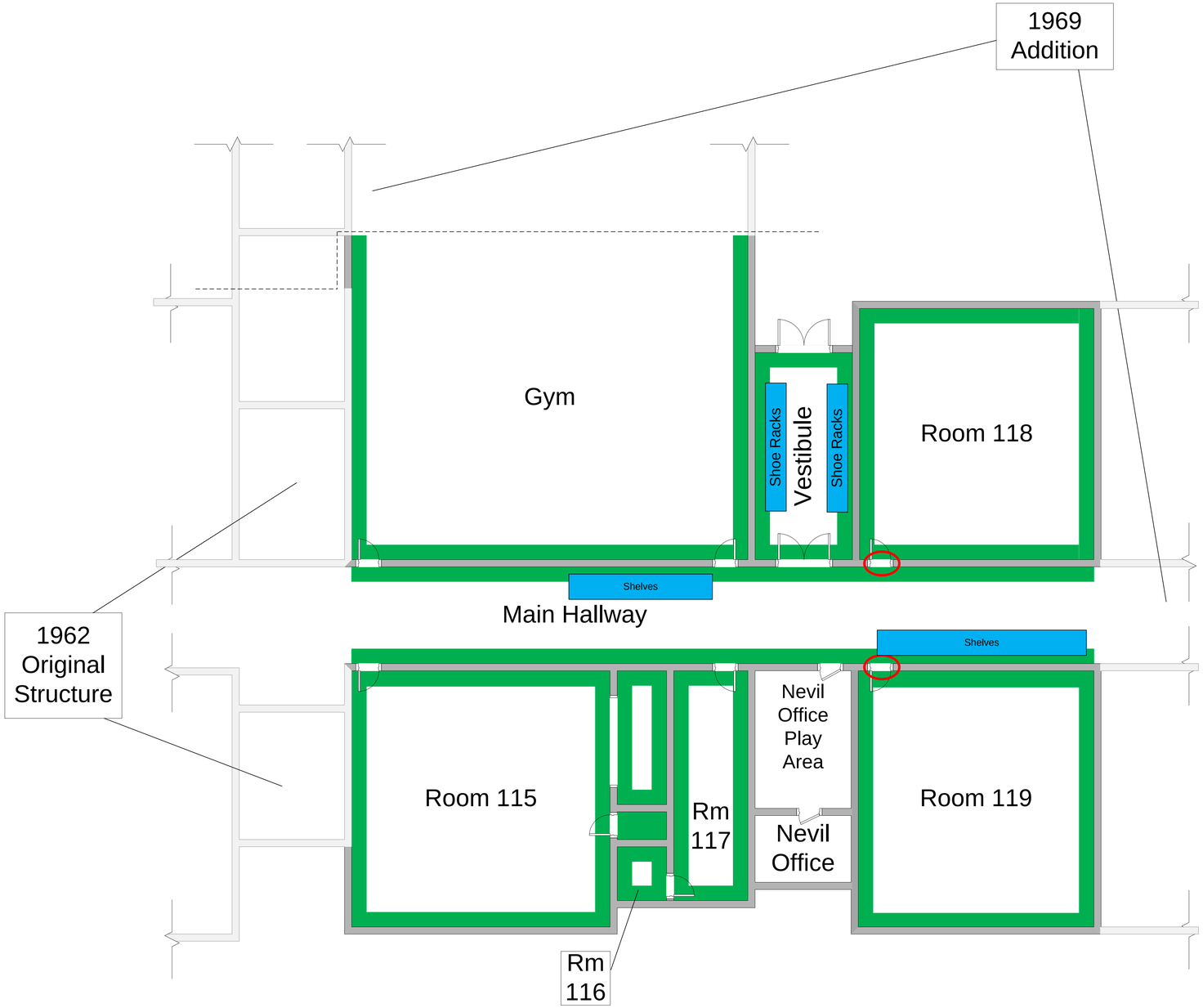
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Lead-based Wall Paint
- Items with Lead-based Paint
- Doors and Door Frames with Lead-Based Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.



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Lead-based Paint Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

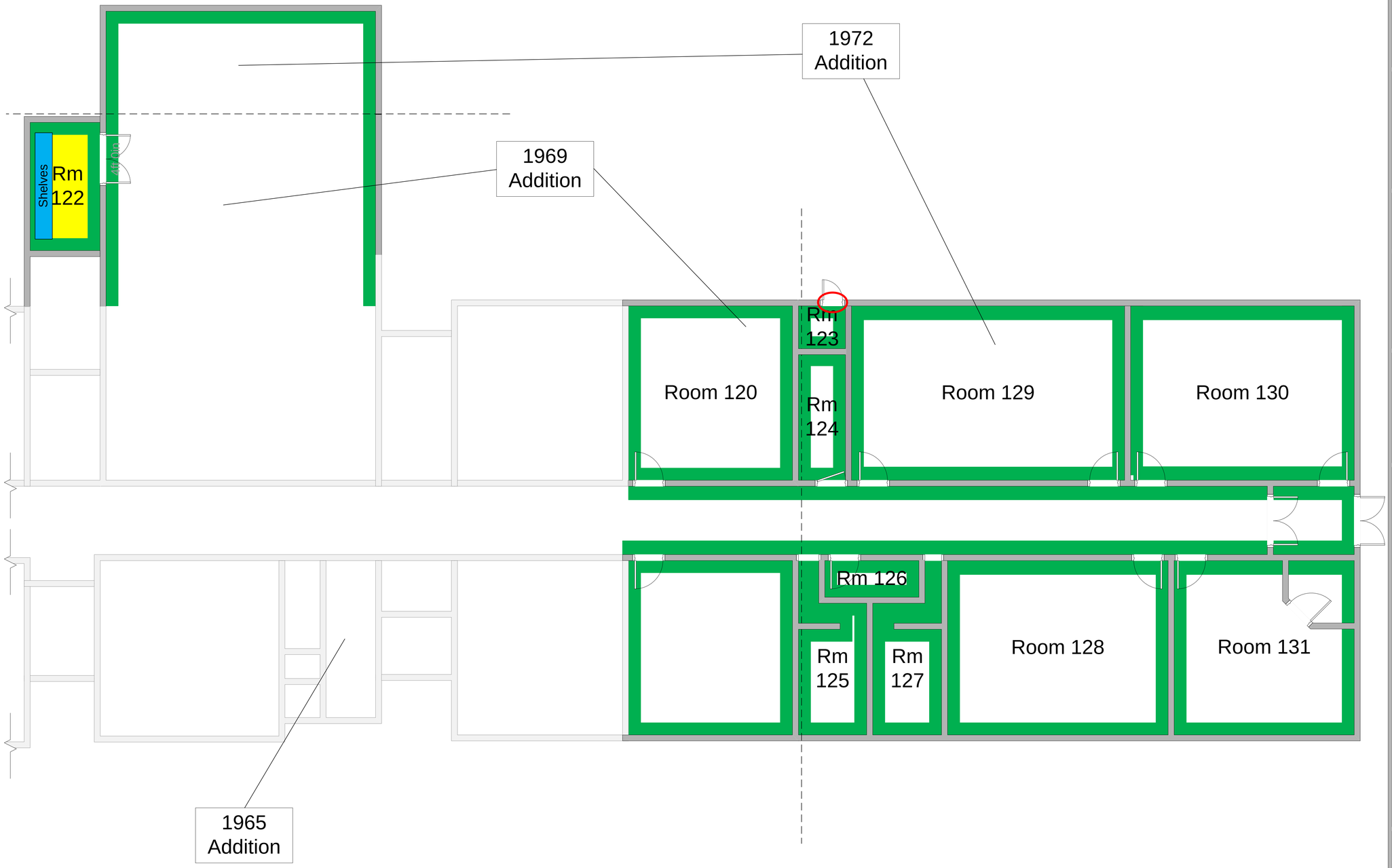
Legend:

N

- Lead-based Wall Paint
- Items with Lead-based Paint
- Doors and Door Frames with Lead-Based Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.



ASE | SERVICES
ALBERTA SAFETY & ENVIRONMENTAL SERVICES

Lead-based Paint Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Lead-based Wall Paint
- Items with Lead-based Paint
- Doors and Door Frames with Lead-Based Paint
- Lead-based Floor Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.

APPENDIX V

LABORATORY REPORTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Attn: Silvana Wu
Customer Project: AS 4576, St Patrick's
Reference #: CAL16053582CB Date: 6/2/2016

Analysis and Method

Summary of polarizing light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of stereomicroscopy. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated of asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may have trace amounts of actinolite-tremolite, where not found be PLM should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may even contain a related asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be delectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Quantification of <1% will actually be reported as <=1% (allowable variance close to 1% is high). Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos and the "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have a college degree in a natural science (geology, biology, or environmental science) or are recognized by a state professional board in one these disciplines .Extensive in-house training programs are used to augment education background of the analyst. The group leader of polarized light has received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: AS 4576, St Patrick's **CA Labs Project #:** CAL16053582CB

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

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Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Silvana Wu
ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Phone # 403-475-0963
Fax # 403-475-0971

Customer Project:
AS 4576, St Patrick's
Turnaround Time:
5 Days

CA Labs Project #:
CAL16053582CB

Date: 6/2/2016
Samples Received: 5/26/16 10:30am
Date Of Sampling: None Given
Purchase Order #: AS 4576

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
A-1		*1-1*	***1962 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	12% ce 10% fg	78% qu,bi
		1-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	
A-2		*2-1*	***1965 South - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	11% ce 11% fg	78% qu,bi
		2-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	
A-3		*3-1*	***1969 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	10% ce 8% fg	82% qu,bi
		3-2	*tan insulation*	*y*	***None Detected***	100% fg	
		3-3	*blue foam*	*y*	***None Detected***		100% qu,or

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Julio Robles
Analyst

QAC
Leslie Crisp, P.G.

Technical Manager
Chad Lytle

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Silvana Wu
ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Phone # 403-475-0963
Fax # 403-475-0971

Customer Project:
AS 4576, St Patrick's
Turnaround Time:
5 Days

CA Labs Project #:
CAL16053582CB

Date: 6/2/2016
Samples Received: 5/26/16 10:30am
Date Of Sampling: None Given
Purchase Order #: AS 4576

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
A-4		*4-1*	***1972 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood/*** *various black tar and black felt layers*	*n*	***None Detected***	10% ce 9% fg	81% qu,bi
		4-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Julio Robles
Analyst

QAC
Leslie Crisp, P.G.

Technical Manager
Chad Lytle

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
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6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959148
Client No.: A62-1
Description: Off-White Floor Tile
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L2)
Client No.: A62-1
Description: Tan Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L3)
Client No.: A62-1
Description: Off-White Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L4)
Client No.: A62-1
Description: Black Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L5)
Client No.: A62-1
Description: Grey Cementitious
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959149
Client No.: A62-2
Description: Off-White Ceiling Tile; 2x4
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
40 Cellulose
30 Fibrous Glass

Percent Non-Fibrous Material:
30

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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ASBESTOS TESTING LABORATORIES

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Mt. Laurel, New Jersey 08054
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959150
Client No.: A62-3
Description: Off-White Ceiling Tile; 12x12
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
95 Cellulose

Percent Non-Fibrous Material:
5

Lab No.: 5959150(L2)
Client No.: A62-3
Description: Brown Mastic
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959151
Client No.: A62-4
Description: Brown Cove Base
Facility:
Location: Hallway Outside Girls Washroom

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959151(L2)
Client No.: A62-4
Description: Tan Mastic
Facility:
Location: Hallway Outside Girls Washroom

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959152
Client No.: A62-5
Description: Grey Floor Tile; 9x9
Facility:
Location: Meter Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959152(L2)
Client No.: A62-5
Description: Black Mastic
Facility:
Location: Meter Room

Percent Asbestos:
PC 0.5 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
99.5

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959153
Client No.: A62-6
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L2)
Client No.: A62-6
Description: Off-White Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L3)
Client No.: A62-6
Description: Tan Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L4)
Client No.: A62-6
Description: Black Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
PC 1.1 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
98.9

Lab No.: 5959154
Client No.: A62-7
Description: Grey Cementitious
Facility:
Location: Furnace Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959155
Client No.: A62-8
Description: Grey Cementitious
Facility:
Location: Furnace Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959156 **Client No.:** A62-9	**Description:** Off-White Ceiling Tile; 2x4 **Facility:**	**Location:** Clerks Office Entrance
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 40 Cellulose 30 Fibrous Glass	Percent Non-Fibrous Material: 30
Lab No.: 5959157 **Client No.:** A62-10	**Description:** Off-White Ceiling Tile; 2x4 **Facility:**	**Location:** Principal's Office NE Corner
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 40 Cellulose 30 Fibrous Glass	Percent Non-Fibrous Material: 30
Lab No.: 5959158 **Client No.:** A62-11	**Description:** Tan Fibrous **Facility:**	**Location:** Furnace Room Ducts
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 90 Cellulose	Percent Non-Fibrous Material: 10
Lab No.: 5959159 **Client No.:** A62-12	**Description:** Black Caulk **Facility:**	**Location:** Rm 102 West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959160 **Client No.:** A62-13	**Description:** Grey Caulk **Facility:**	**Location:** Furnace Room Door
Percent Asbestos: ***PC 2.9*** *Chrysotile*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 97.1
Lab No.: 5959161 **Client No.:** A62-14	**Description:** Off-White Cove Base **Facility:**	**Location:** Clerks Office
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959161(L2)
Client No.: A62-14
Description: Off-White Mastic
Facility:
Location: Clerks Office

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162
Client No.: A62-15
Description: Grey Cove Base
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162(L2)
Client No.: A62-15
Description: Tan Mastic
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162(L3)
Client No.: A62-15
Description: Brown Mastic
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959163
Client No.: A62-16
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Rm 102 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959163(L2)
Client No.: A62-16
Description: Off-White Mastic
Facility:
Location: Rm 102 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959164
Client No.: A62-17
Description: Grey Floor Tile
Facility:
Location: Staff Lounge

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 10 Cellulose
Percent Non-Fibrous Material: 90

Lab No.: 5959164(L2)
Client No.: A62-17
Description: Tan Mastic
Facility:
Location: Staff Lounge

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959165
Client No.: A62-18
Description: White Joint Compound
Facility:
Location: Entrance To Principal's Office

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959166
Client No.: A62-19
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959167
Client No.: A62-20
Description: White Joint Compound
Facility:
Location: Rm 101 North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959168
Client No.: A62-21
Description: White Joint Compound
Facility:
Location: Rm 109 South East Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

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Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959169
Client No.: A62-22
Description: Grey Sheetrock
Facility:
Location: Rm 105 Work Room South Side

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
10 Cellulose

Percent Non-Fibrous Material:
90

Lab No.: 5959169(L2)
Client No.: A62-22
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room South Side

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959170
Client No.: A62-23
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

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iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

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Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

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Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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Report Date: 6/23/2016
Report No.: 512303 - PLM
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Project No.: AS 4576 (1962 Wing)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

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1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

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Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958975
Client No.: A65-1
Description: Tan Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Kitchen

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
15 Mineral Wool

Percent Non-Fibrous Material:
65

Lab No.: 5958976
Client No.: A65-2
Description: White Joint Compound
Facility:
Location: Rm 115 North East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958977
Client No.: A65-3
Description: White Joint Compound
Facility:
Location: Nevil Office South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958978
Client No.: A65-4
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Rm 118 North East Corner

Percent Asbestos:
PC 0.25 *Amosite*

Percent Non-Asbestos Fibrous Material:
60 Cellulose

Percent Non-Fibrous Material:
39.75

Lab No.: 5958979
Client No.: A65-5
Description: Brown Cove Base
Facility:
Location: Main Hallway Outside Rm 118

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958979(L2)
Client No.: A65-5
Description: Brown Mastic
Facility:
Location: Main Hallway Outside Rm 118

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

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208, 2216 27th Ave NE
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Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958980
Client No.: A65-6
Description: Beige Cove Base
Facility:
Location: Nevil Office South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958980(L2)
Client No.: A65-6
Description: Tan/Beige Mastic
Facility:
Location: Nevil Office South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958981
Client No.: A65-7
Description: Beige Cove Base
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958981(L2)
Client No.: A65-7
Description: Beige Mastic
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958982
Client No.: A65-8
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Main Hallway North End

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958982(L2)
Client No.: A65-8
Description: Grey Mastic
Facility:
Location: Main Hallway North End

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958983
Client No.: A65-9
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Main Hallway Outside Rm 115

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958983(L2)
Client No.: A65-9
Description: Grey Mastic
Facility:
Location: Main Hallway Outside Rm 115

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958984
Client No.: A65-10
Description: Tan Vinyl Sheet Flooring
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958984(L2)
Client No.: A65-10
Description: Grey Leveling Compound
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958985
Client No.: A65-11
Description: Tan Vinyl Sheet Flooring
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958985(L2)
Client No.: A65-11
Description: Tan Mastic
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958985(L3)
Client No.: A65-11
Description: Grey Leveling Compound
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958986
Client No.: A65-12
Description: Black Caulk
Facility:
Location: Rm 115 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958987
Client No.: A65-13
Description: Off-White Mortar
Facility:
Location: Rm 115 South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
2 Wollastonite

Percent Non-Fibrous Material:
98

Lab No.: 5958988
Client No.: A65-14
Description: Off-White Mortar
Facility:
Location: Rm 115 South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
2 Wollastonite

Percent Non-Fibrous Material:
98

Lab No.: 5958989
Client No.: A65-15
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 115 South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
5 Fibrous Glass
10 Cellulose

Percent Non-Fibrous Material:
85

Lab No.: 5958989(L2)
Client No.: A65-15
Description: Off-White Mastic
Facility:
Location: Rm 115 South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
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Signature:
Analyst: Alex Wright

Approved By:
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Laboratory Director

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Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958990
Client No.: A65-16
Description: Brown Woven Material
Facility:
Location: Kitchen Furnace Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 50 Cellulose
Percent Non-Fibrous Material: 50

Lab No.: 5958991
Client No.: A65-17
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Kitchen North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 60 Cellulose
Percent Non-Fibrous Material: 40

Lab No.: 5958992
Client No.: A65-18
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Vestibule South East Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 60 Cellulose
Percent Non-Fibrous Material: 40

Lab No.: 5958993
Client No.: A65-19
Description: Grey Sheetrock
Facility:
Location: Nevil Office North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 12 Cellulose
Percent Non-Fibrous Material: 88

Lab No.: 5958993(L2)
Client No.: A65-19
Description: White Joint Compound
Facility:
Location: Nevil Office North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958994
Client No.: A65-20
Description: Grey Sheetrock
Facility:
Location: R 118 West Wall

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 12 Cellulose
Percent Non-Fibrous Material: 88

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
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Laboratory Director

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Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

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iATL Account Representative: Alyssa Peiffer
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Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

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15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958995
Client No.: A72-1
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 131

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958995(L2)
Client No.: A72-1
Description: Black Mastic
Facility:
Location: Rm 131

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996
Client No.: A72-2
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996(L2)
Client No.: A72-2
Description: Black Mastic
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996(L3)
Client No.: A72-2
Description: Grey Leveling Compound
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958997
Client No.: A72-3
Description: Off-White Floor Tile; 12x12
Facility:
Location: North End Main Hallway

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
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Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958997(L2) **Description:** Black Mastic **Location:** North End Main Hallway
Client No.: A72-3 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958998 **Description:** Off-White Floor Tile; 12x12 **Location:** South End Main Hallway
Client No.: A72-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958998(L2) **Description:** Black Mastic **Location:** South End Main Hallway
Client No.: A72-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958999 **Description:** Black Cove Base **Location:** Rm 131
Client No.: A72-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958999(L2) **Description:** Tan Mastic **Location:** Rm 131
Client No.: A72-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959000 **Description:** Black Cove Base **Location:** South Entrance To Library
Client No.: A72-6 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959000(L2) **Description:** Yellow/Tan Mastic **Location:** South Entrance To Library
Client No.: A72-6 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959001 **Description:** White Joint Compound **Location:** Storage Closet
Client No.: A72-7 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959001(L2) **Description:** White Joint Compound **Location:** Storage Closet
Client No.: A72-7 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959002 **Description:** White Joint Compound **Location:** Rm 128
Client No.: A72-8 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959003 **Description:** Lt Pink Floor Tile; 12x12 **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959003(L2) **Description:** White/Black Mastic **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Client: ALB464

Report Date: 6/23/2016
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Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959003(L3) **Description:** Grey Leveling Compound **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959004 **Description:** Lt Pink Floor Tile; 12x12 **Location:** Rm 121 Outside Door
Client No.: A69-10 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959004(L2) **Description:** Yellow/Black Mastic **Location:** Rm 121 Outside Door
Client No.: A69-10 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959005 **Description:** Blue Floor Tile; 12x12 **Location:** Rm 120 South West Corner
Client No.: A69-11 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 1.2 *Chrysotile*	None Detected	98.8

Lab No.: 5959005(L2) **Description:** Black Mastic **Location:** Rm 120 South West Corner
Client No.: A69-11 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959006 **Description:** Blue Floor Tile; 12x12 **Location:** Rm 120 North East Corner
Client No.: A69-12 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 1.1 *Chrysotile*	None Detected	98.9

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959006(L2) **Description:** Black Mastic **Location:** Rm 120 North East Corner
Client No.: A69-12 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959007 **Description:** White Ceiling Tile; 12x12 **Location:** Rm 130 North West Corner
Client No.: A72-13 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	90 Cellulose	10

Lab No.: 5959008 **Description:** White Ceiling Tile; 12x12 **Location:** Rm 121 North East Corner
Client No.: A69-14 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	90 Cellulose	10

Lab No.: 5959008(L2) **Description:** Brown Mastic **Location:** Rm 121 North East Corner
Client No.: A69-14 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 0.5 *Chrysotile*	None Detected	99.5

Lab No.: 5959009 **Description:** White Joint Compound **Location:** Rm 121 North East Corner
Client No.: A69-15 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959010 **Description:** White Joint Compound **Location:** Rm 120 West Wall
Client No.: A69-16 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959011
Client No.: A72-17
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 131 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959011(L2)
Client No.: A72-17
Description: Yellow Mastic
Facility:
Location: Rm 131 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959012
Client No.: A69-18
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959012(L2)
Client No.: A69-18
Description: Green Mastic
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959012(L3)
Client No.: A69-18
Description: White Leveling Compound
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959013
Client No.: A69-19
Description: White Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Rm 121

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
70 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
20

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Date Analyzed: 6/23/2016 4:36:33 AM
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Analyst: Tiffany Lowe

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Project: St. Patrick's Elementary
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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959014
Client No.: A72-20
Description: White Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Rm 130

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
70 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
20

Lab No.: 5959015
Client No.: A72-21
Description: White Panel
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
80 Fibrous Glass

Percent Non-Fibrous Material:
20

Lab No.: 5959015(L2)
Client No.: A72-21
Description: Tan Mastic
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L3)
Client No.: A72-21
Description: White Caulk
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L4)
Client No.: A72-21
Description: Grey Cementitious
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L5)
Client No.: A72-21
Description: White Joint Compound
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959016 **Client No.:** A72-22	**Description:** White Panel **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 80 Fibrous Glass	Percent Non-Fibrous Material: 20
Lab No.: 5959016(L2) **Client No.:** A72-22	**Description:** Tan Mastic **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959016(L3) **Client No.:** A72-22	**Description:** White Caulk **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959016(L4) **Client No.:** A72-22	**Description:** Grey Cementitious **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959017 **Client No.:** A72-23	**Description:** Black Rubber **Facility:**	**Location:** Rm 128 Windows
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 5 Synthetic	Percent Non-Fibrous Material: 95
Lab No.: 5959018 **Client No.:** A69-24	**Description:** Black Rubber **Facility:**	**Location:** Rm 121 Windows
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: Trace Synthetic	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959019 **Description:** Silver Mastic **Location:** Furnace Room
Client No.: A72-25 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
10 *Chrysotile*	None Detected	90

Lab No.: 5959020 **Description:** Silver Mastic **Location:** Furnace Room
Client No.: A72-26 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
10 *Chrysotile*	None Detected	90

Lab No.: 5959021 **Description:** White Non-Fibrous **Location:** Furnace Room
Client No.: A72-27 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959021(L2) **Description:** Pink Fibrous **Location:** Furnace Room
Client No.: A72-27 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	95 Fibrous Glass	5

Lab No.: 5959022 **Description:** White Non-Fibrous **Location:** Furnace Room
Client No.: A72-28 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959022(L2) **Description:** Pink Fibrous **Location:** Furnace Room
Client No.: A72-28 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	95 Fibrous Glass	5

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959023
Client No.: A72-29
Description: White Sheetrock
Facility:
Location: Storage Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
5 Cellulose
3 Fibrous Glass

Percent Non-Fibrous Material:
92

Lab No.: 5959023(L2)
Client No.: A72-29
Description: White Joint Compound
Facility:
Location: Storage Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959024
Client No.: A72-30
Description: White Joint Compound
Facility:
Location: Rm 131 North East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959052 **Description:** White Caulk **Location:** 1972 Wing Gym Door
Client No.: AE-1 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959053 **Description:** White Caulk **Location:** 1972 Wing Gym Door
Client No.: AE-2 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959053(L2) **Description:** Black Tar **Location:** 1972 Wing Gym Door
Client No.: AE-2 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959054 **Description:** Grey Mortar **Location:** 1965 Wing West Wall
Client No.: AE-3 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959055 **Description:** Grey Mortar **Location:** 1962 Wing West Wall
Client No.: AE-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959056 **Description:** Grey Mortar **Location:** 1962 Wing Front Entrance
Client No.: AE-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959057 **Client No.:** AE-6	**Description:** Grey Mortar **Facility:**	**Location:** 1972 Wing East Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959058 **Client No.:** AE-7	**Description:** Grey Mortar **Facility:**	**Location:** 1972 Wing
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959059 **Client No.:** AE-8	**Description:** Grey Stucco **Facility:**	**Location:** 1965 Wing East Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
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Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

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iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

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Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

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Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

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Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

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Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

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Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

Wes-Har Asbestos Analysis & Consulting Ltd.

Bulk Summary Report

For ASE Services Ltd Lethbridge Field Office
Suite 232 , Plaza One, 104
13th St. N, Lethbridge, AB Canada T1H 2R4

Location : St. Patrick's Elementary

Project : AS 4576

15370	AS 4576	Sample Location / Description	Result(s)	TP
1	V-1	Vermiculite Insulation, 1962 Wing Rm. 109 S. Ext. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.
2	V-2	Vermiculite Insulation, 1972 Addition Furnace Room S. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.
3	V-3	Vermiculite Insulation, 1969 Wing Rm. 121 S. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.

Comments

See Detailed Bulk Specific Report for Analytical Method and Associated Detection Limit
TP Means Tested Positive for the Analysis Requested; T - Present
LP - Means Percent : Layer or Phase of Whole SampleACM Means Asbestos Containing Material; T
DNQ - Means Detected Not Quantitated
Samples Submitted Will Be Retained For 30 Days After Receipt And Will Be Disposed Of Thereafter Unless Otherwise Notified In Writing
Sample Submitted By ASE Services Ltd Lethbridge Field Office

June 23, 2016

G. Nawrocki
Reviewed By

Wes-Har Asbestos Analysis & Consulting Ltd.

Detailed Bulk Asbestos in Vermiculite Report

For ASE Services Ltd Lethbridge Field Office
Suite 232 , Plaza One, 104
13th St. N, Lethbridge, AB Canada T1H 2R4

Location : St. Patrick's Elementary

Project : AS 4576

15370	AS 4576	Sample Location / Description	Result(s)	Analyzed	Analyst	ACM
1	V-1	Vermiculite Insulation, 1962 Wing Rm. 109 S. Ext. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.
2	V-2	Vermiculite Insulation, 1972 Addition Furnace Room S. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.
3	V-3	Vermiculite Insulation, 1969 Wing Rm. 121 S. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.

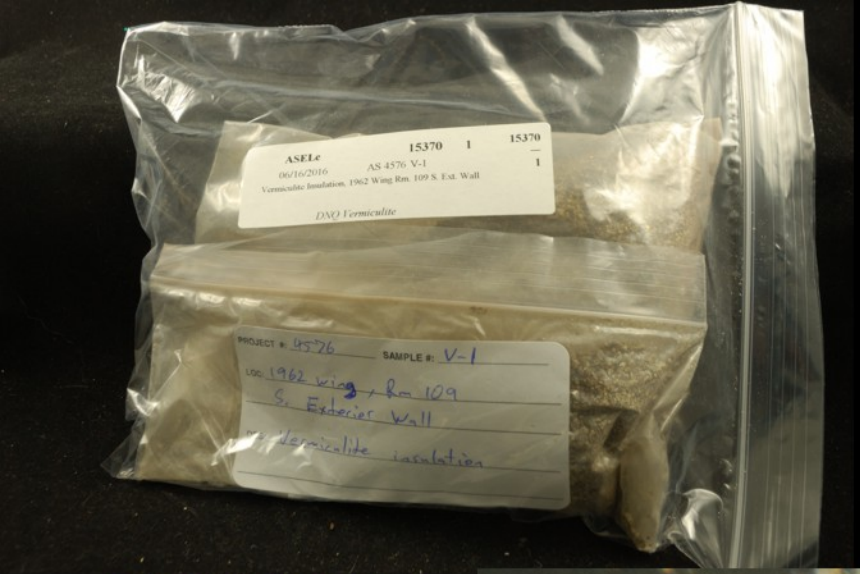
Comments

Fibrous / Mineral Components Analyzed In Accordance With The NIOSH ASBESTOS (bulk) by PLM Method 9002 [15 August 1994]
Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation EPA/600/R-04/004 January 2004
Detection Limit for Asbestiform Amphibole 'Rapid Screening' is less than 0.01 % (by weight) , Dependant on Original Sample Size
ACM Means - Asbestos Containing Material; T - Present
LP Means - Precent : Layer or Phase of Whole Sample.
DNQ Means - Detected Not Quantitated
< Means - Less Than
Samples Submitted Will Be Retained For 30 Days After Receipt And Will Be Disposed Of Thereafter Unless Otherwise Notified In Writing
Sample Submitted By ASE Services Ltd Lethbridge Field Office

June 23, 2016 [Facsimile]

H. McKnight
Analyst

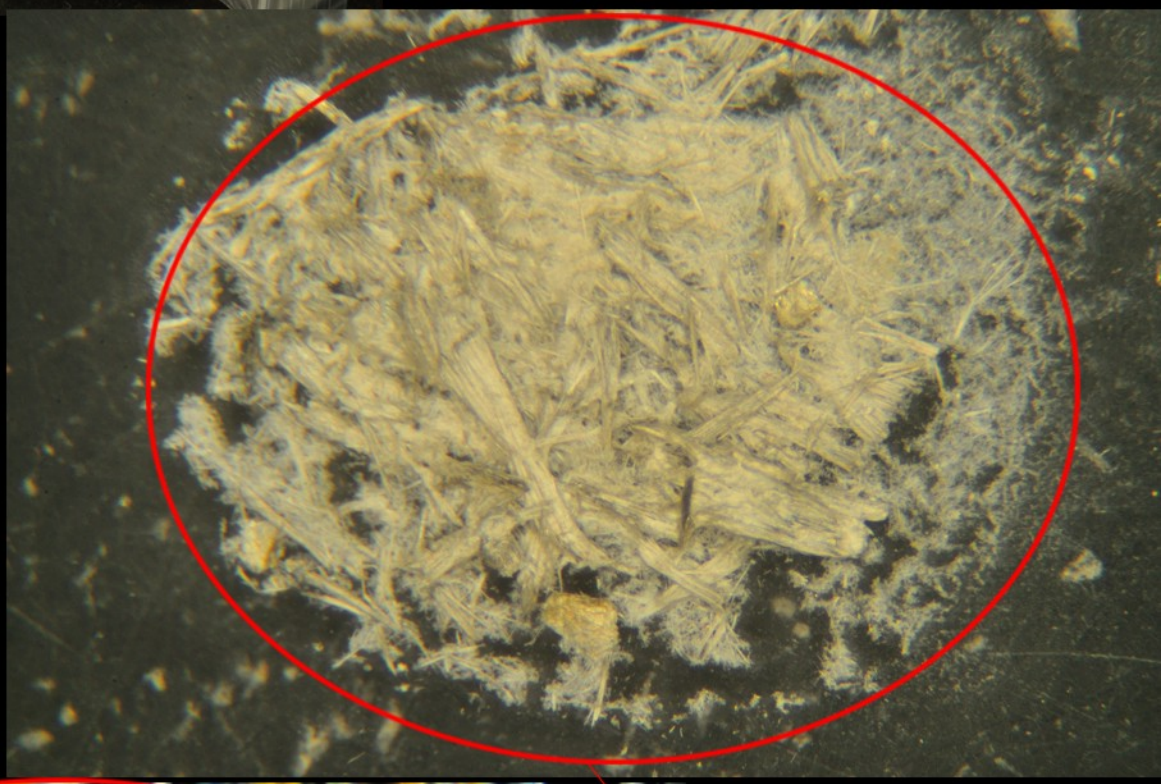
G. Nawrocki
Reviewed By



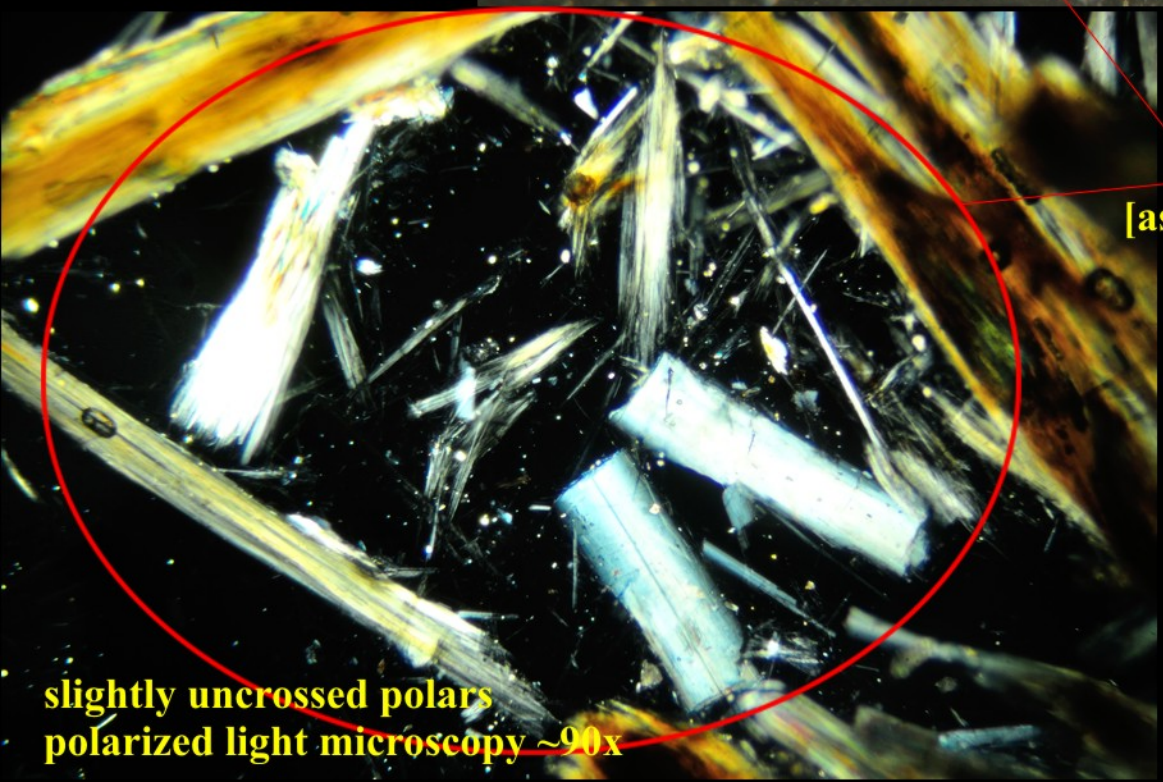
AS 4576 V-1 St. Patrick's Elementary
1962 Wing Rm. 109 S. Ext. Wall
Vermiculite Insulation
15370 . 01

stereo binocular microscopy ~ 25x

submitted sample

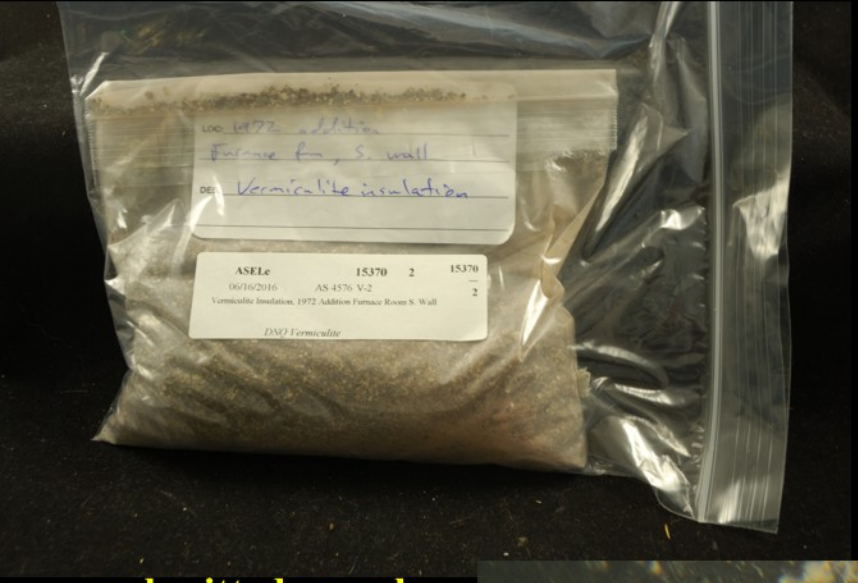


washed & sieved



asbestos fibres
[asbesiform amphibole]

slightly uncrossed polars
polarized light microscopy ~90x

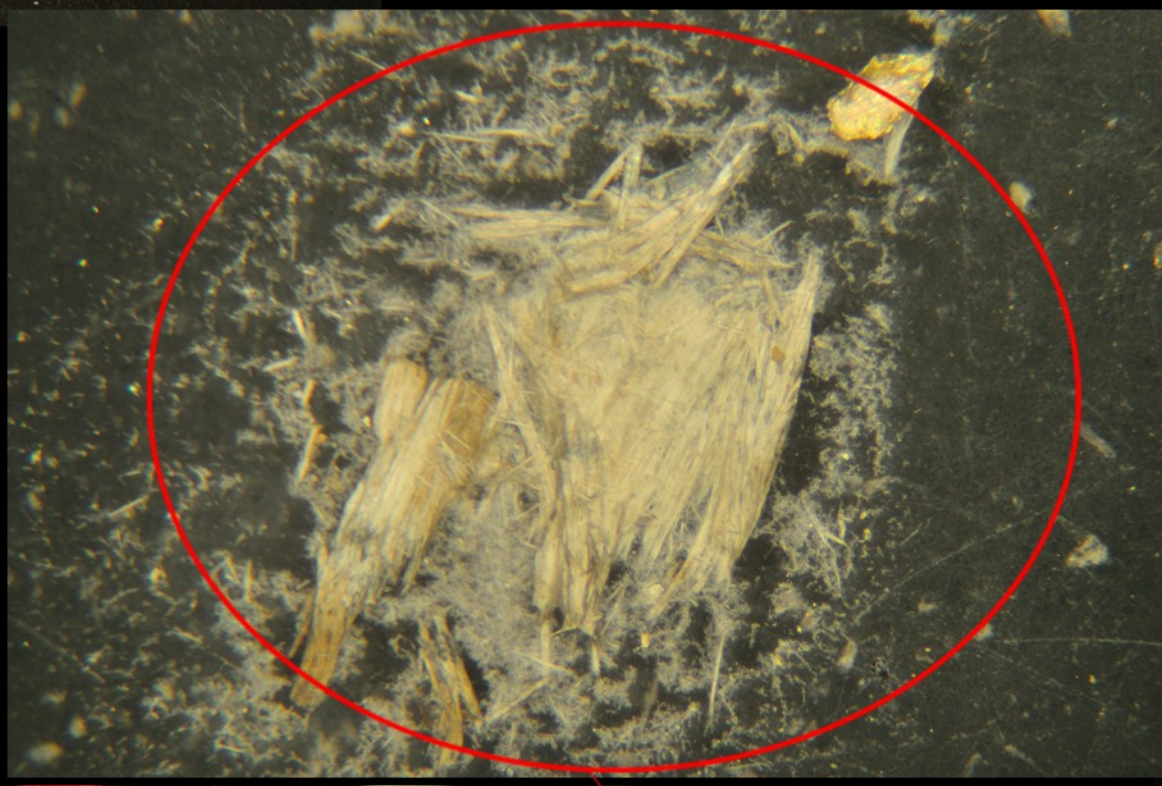


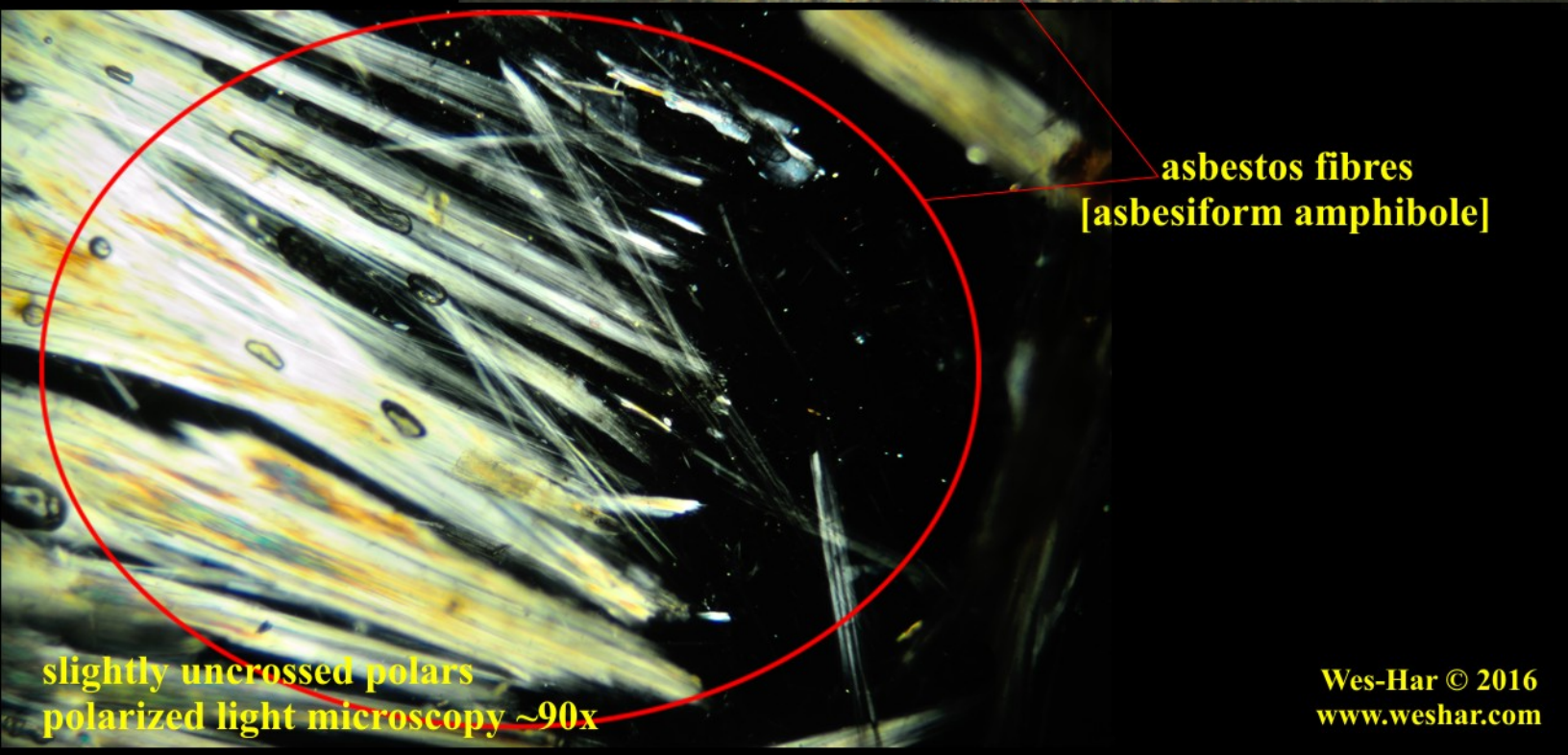
AS 4576 V-2 St. Patrick's Elementary
1972 Addition Furnace Room S. Wall
Vermiculite Insulation
15370 . 02

stereo binocular microscopy ~ 25x

submitted sample

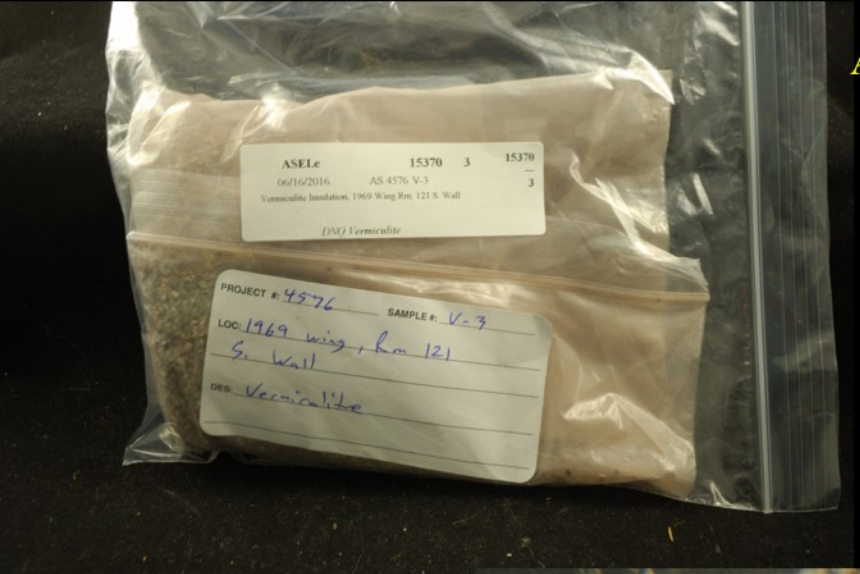
washed & sieved





asbestos fibres
[asbesiform amphibole]

slightly uncrossed polars
polarized light microscopy ~90x

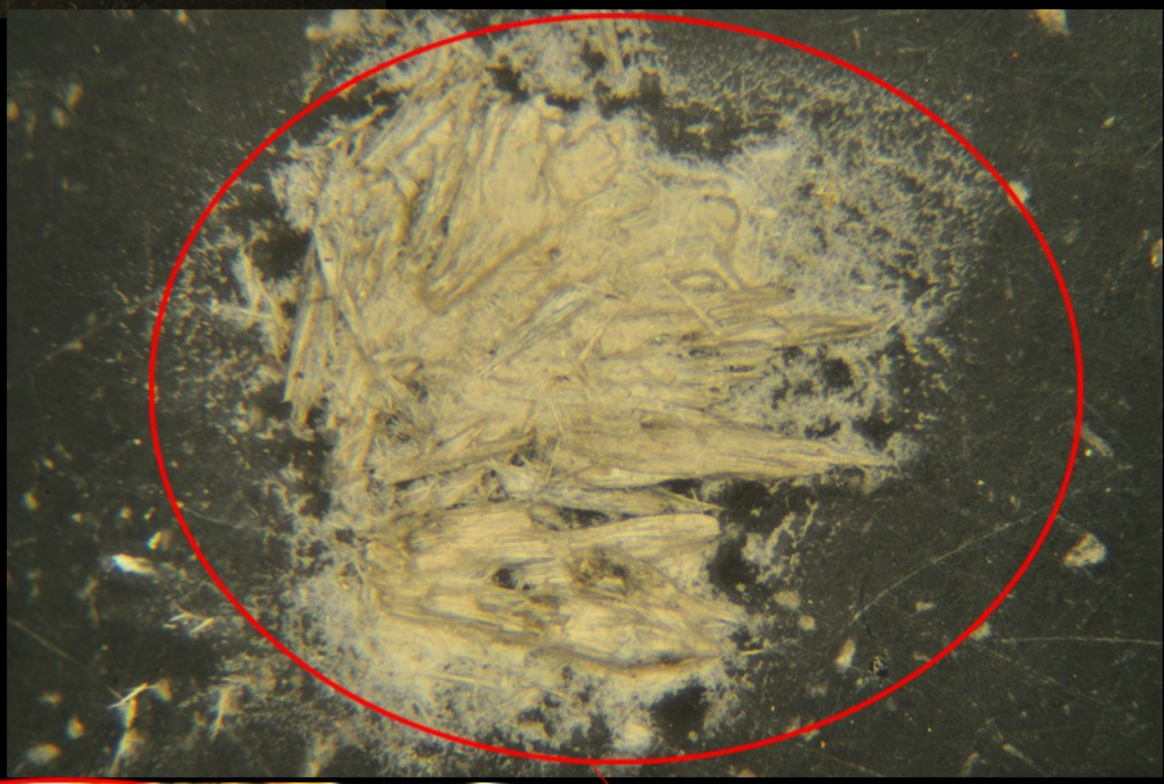


AS 4576 V-3 St. Patrick's Elementary
1969 Wing Rm. 121 S. Wall
Vermiculite Insulation
15370 . 03

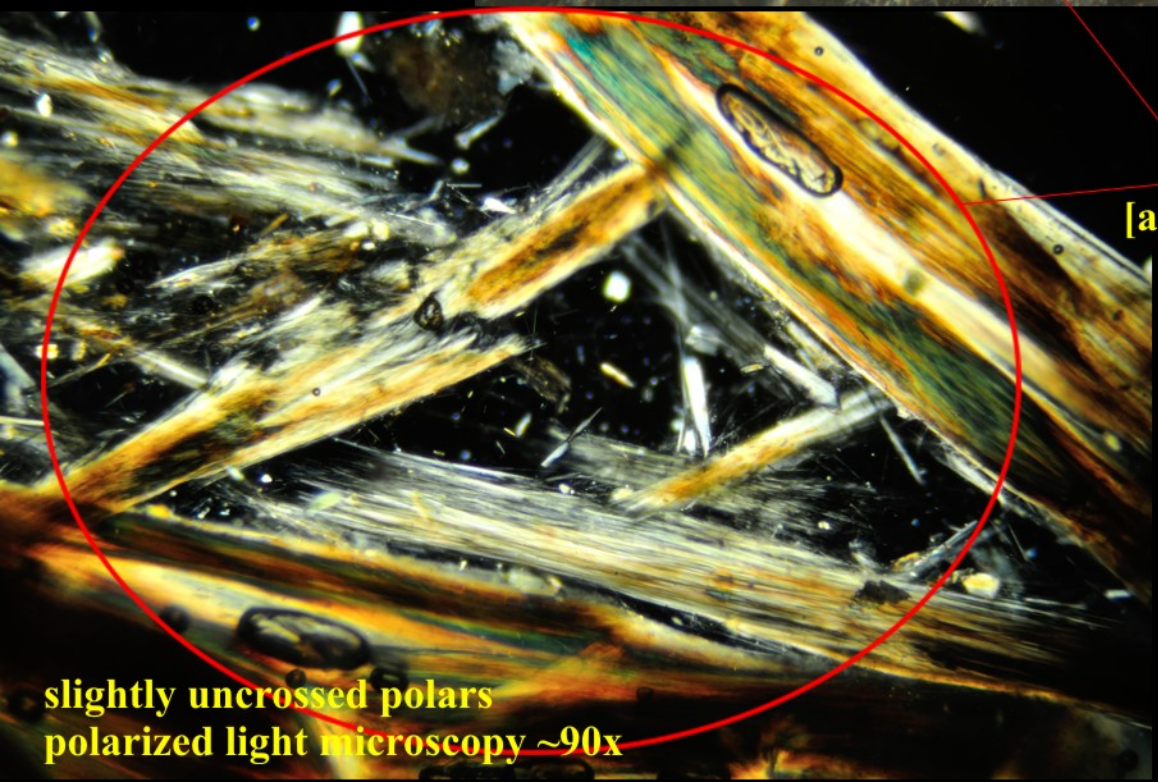
stereo binocular microscopy ~ 25x

submitted sample

washed & sieved



asbestos fibres
[asbesiform amphibole]



slightly uncrossed polars
polarized light microscopy ~90x

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ASBESTOS TESTING LABORATORIES

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Mt. Laurel, New Jersey 08054
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955950 **Description:**Paint Lt Grey **Result (% by Weight):**<0.0069
Client No.:L-1 **Location:**62' Rm 113 Behind Door **Result (ppm):**<69
Comments:***

Lab No.:5955951 **Description:**Paint Dk Grey **Result (% by Weight):**0.026
Client No.:L-2 **Location:**62' Rm 113 Door Frame **Result (ppm):**260
Comments:

Lab No.:5955952 **Description:**Paint Yellow **Result (% by Weight):**0.21
Client No.:L-3 **Location:**62' Boys Washroom **Result (ppm):**2100
Comments:

Lab No.:5955953 **Description:**Coating Beige **Result (% by Weight):**0.042
Client No.:L-4 **Location:**62' Boys Washroom Stall **Result (ppm):**420
Comments:*

Lab No.:5955954 **Description:**Paint Cream **Result (% by Weight):**<0.0060
Client No.:L-5 **Location:**62' Rm 109 East Wall **Result (ppm):**<60
Comments:

Lab No.:5955955 **Description:**Paint Cream **Result (% by Weight):**<0.0059
Client No.:L-6 **Location:**62' Rm 114 Server Rm **Result (ppm):**<59
Comments:

Lab No.:5955956 **Description:**Paint White **Result (% by Weight):**0.13
Client No.:L-7 **Location:**62' Entry Vestibule **Result (ppm):**1300
Comments:

Lab No.:5955957 **Description:**Paint Mint Green **Result (% by Weight):**0.14
Client No.:L-8 **Location:**62' Entry Vestibule **Result (ppm):**1400
Comments:

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955958 **Client No.:**L-9	**Description:**Paint Emerald Green **Location:**62' Entry Vestibule	**Result (% by Weight):**<0.0071 **Result (ppm):**<71 **Comments:**
Lab No.:5955959 **Client No.:**L-10	**Description:**Paint Cream **Location:**62' Main Hallway Com. Washroom	**Result (% by Weight):**0.064 **Result (ppm):**640 **Comments:**
Lab No.:5955960 **Client No.:**L-11	**Description:**Paint Dk Green **Location:**62' Main Hallway Shelf	**Result (% by Weight):**0.066 **Result (ppm):**660 **Comments:**
Lab No.:5955961 **Client No.:**L-12	**Description:**Paint Dk Blue **Location:**62' Hallway Door To Rm 110	**Result (% by Weight):**0.019 **Result (ppm):**190 **Comments:**
Lab No.:5955962 **Client No.:**L-13	**Description:**Paint Lime Green **Location:**62' Clerks Office	**Result (% by Weight):**<0.0059 **Result (ppm):**<59 **Comments:**
Lab No.:5955963 **Client No.:**L-14	**Description:**Paint Lt Blue **Location:**62' Rm 102 Door Frame	**Result (% by Weight):**0.0094 **Result (ppm):**94 **Comments:**
Lab No.:5955964 **Client No.:**L-15	**Description:**Paint Tan **Location:**65' Nevil Office	**Result (% by Weight):**0.0073 **Result (ppm):**73 **Comments:**
Lab No.:5955965 **Client No.:**L-16	**Description:**Paint Navy Blue **Location:**62' Janitors Rm	**Result (% by Weight):**0.11 **Result (ppm):**1100 **Comments:**

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Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955966 **Client No.:**L-17	**Description:**Paint Blue **Location:**62' Rm 115	**Result (% by Weight):**0.011 **Result (ppm):**110 **Comments:**
Lab No.:5955967 **Client No.:**L-18	**Description:**Paint Brown **Location:**62' Furnace Rm Door	**Result (% by Weight):**3.8 **Result (ppm):**38000 **Comments:**
Lab No.:5955968 **Client No.:**L-19	**Description:**Paint Yellow **Location:**62' Girls Bathroom	**Result (% by Weight):**0.19 **Result (ppm):**1900 **Comments:**
Lab No.:5955969 **Client No.:**L-20	**Description:**Paint Lt Grey **Location:**62' Rm 113	**Result (% by Weight):**<0.0077 **Result (ppm):**<77 **Comments:**
Lab No.:5955970 **Client No.:**L-21	**Description:**Paint Dk Grey **Location:**62' Rm 113	**Result (% by Weight):**0.043 **Result (ppm):**430 **Comments:**
Lab No.:5955971 **Client No.:**L-22	**Description:**Paint Mint Green **Location:**65' Vestibule	**Result (% by Weight):**0.14 **Result (ppm):**1400 **Comments:**
Lab No.:5955972 **Client No.:**L-23	**Description:**Paint Emerald Green **Location:**72' Vestibule	**Result (% by Weight):**0.017 **Result (ppm):**170 **Comments:**
Lab No.:5955973 **Client No.:**L-24	**Description:**Paint Brown **Location:**62' Furnace Rm Door	**Result (% by Weight):**3.6 **Result (ppm):**36000 **Comments:***

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Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955974 **Client No.:**L-25	**Description:**Paint Dk Green **Location:**65' Main Hallway Shelf	**Result (% by Weight):**0.090 **Result (ppm):**900 **Comments:**
Lab No.:5955975 **Client No.:**L-26	**Description:**Paint Lime Green **Location:**65' Main Hallway Nevil Office	**Result (% by Weight):**<0.0090 **Result (ppm):**<90 **Comments:**
Lab No.:5955976 **Client No.:**L-27	**Description:**Paint White **Location:**65' Gym East Wall	**Result (% by Weight):**<0.0074 **Result (ppm):**<74 **Comments:**
Lab No.:5955977 **Client No.:**L-28	**Description:**Paint Off-White/Cream **Location:**65' Nevil Office Area	**Result (% by Weight):**<0.0070 **Result (ppm):**<70 **Comments:**
Lab No.:5955978 **Client No.:**L-29	**Description:**Paint Off-White/Cream **Location:**65' Furnace Rm	**Result (% by Weight):**<0.0085 **Result (ppm):**<85 **Comments:**
Lab No.:5955979 **Client No.:**L-30	**Description:**Paint Tan **Location:**65' Furnace Rm Door	**Result (% by Weight):**<0.0066 **Result (ppm):**<66 **Comments:**
Lab No.:5955980 **Client No.:**L-31	**Description:**Paint Pale Green **Location:**65' Vestibule	**Result (% by Weight):**0.095 **Result (ppm):**950 **Comments:**
Lab No.:5955981 **Client No.:**L-32	**Description:**Paint Pale Green **Location:**72' Rm 128	**Result (% by Weight):**0.066 **Result (ppm):**660 **Comments:**

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Date Received: 6/16/2016
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955982 **Client No.:**L-33	**Description:**Paint Beige **Location:**65' Rm 117 (Kitchen)	**Result (% by Weight):**<0.0059 **Result (ppm):**<59 **Comments:**
Lab No.:5955983 **Client No.:**L-34	**Description:**Paint Blue **Location:**65' Rm 118 Door Frame	**Result (% by Weight):**0.12 **Result (ppm):**1200 **Comments:**
Lab No.:5955984 **Client No.:**L-35	**Description:**Paint White **Location:**65' Rm 119 Door Frame	**Result (% by Weight):**0.094 **Result (ppm):**940 **Comments:**
Lab No.:5955985 **Client No.:**L-36	**Description:**Coating Grey And Black **Location:**65' Vestibule Shoe Rack	**Result (% by Weight):**0.67 **Result (ppm):**6700 **Comments:**
Lab No.:5955986 **Client No.:**L-37	**Description:**Paint Grey **Location:**69' Gym Storage Floor	**Result (% by Weight):**0.30 **Result (ppm):**3000 **Comments:**
Lab No.:5955987 **Client No.:**L-38	**Description:**Paint Pale Green/Blue **Location:**69' Gym Storage Walls	**Result (% by Weight):**0.033 **Result (ppm):**330 **Comments:**
Lab No.:5955988 **Client No.:**L-39	**Description:**Paint Lt Blue **Location:**62' Rm 102	**Result (% by Weight):**0.030 **Result (ppm):**300 **Comments:**
Lab No.:5955989 **Client No.:**L-40	**Description:**Paint Dk Blue **Location:**69' Rm 121	**Result (% by Weight):**0.0095 **Result (ppm):**95 **Comments:**

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955990 **Client No.:**L-41	**Description:**Paint Dk Green **Location:**72' Rm 131	**Result (% by Weight):**<0.0062 **Result (ppm):**<62 **Comments:**
Lab No.:5955991 **Client No.:**L-42	**Description:**Paint Bright Green **Location:**72' Rm 131 Booth	**Result (% by Weight):**<0.0070 **Result (ppm):**<70 **Comments:**
Lab No.:5955992 **Client No.:**L-43	**Description:**Paint Yellow/Lime Green **Location:**72' Rm 130	**Result (% by Weight):**0.035 **Result (ppm):**350 **Comments:**
Lab No.:5955993 **Client No.:**L-44	**Description:**Paint Brown **Location:**72' Rm 123 Door Frame	**Result (% by Weight):**0.22 **Result (ppm):**2200 **Comments:***
Lab No.:5955994 **Client No.:**L-45	**Description:**Paint Beige **Location:**72' Rm 124 Storage/Furnace	**Result (% by Weight):**<0.0081 **Result (ppm):**<81 **Comments:**
Lab No.:5955995 **Client No.:**L-46	**Description:**Paint Yellow **Location:**62' Com. Washroom	**Result (% by Weight):**0.11 **Result (ppm):**1100 **Comments:***
Lab No.:5955996 **Client No.:**L-47	**Description:**Coating Tan **Location:**62' Girl's Washroom Stalls	**Result (% by Weight):**1.2 **Result (ppm):**12000 **Comments:***
Lab No.:5955997 **Client No.:**L-48	**Description:**Paint Navy Blue **Location:**62' Rm 108	**Result (% by Weight):**0.061 **Result (ppm):**610 **Comments:**

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Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Appendix to Analytical Report:

Customer Contact:
Analysis: ASTM D3335-85a

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Paint
Exceptions Noted: See Following Pages

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Information Pertinent to this Report:

Analysis by ASTM D3335-85a by AAS

Certification:
- National Lead Laboratory Program (NLLAP): AIHA-LAP, LLC No. 100188
- NYSDOH-ELAP No. 11021

Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation.

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B.

Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies.

LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled).

* Insufficient sample provided to perform QC reanalysis (<200 mg)

** Not enough sample provided to analyze (<50 mg)

*** Matrix / substrate interference possible.

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Telephone: 856-231-9449
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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Disclaimers / Qualifiers:

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* NOTE: Multiple samples received in container. Composite analysis requested per EPA/HUD guidelines not covered by NLLAP/AIHA accreditation.

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/29/2016
Report No.: 513338 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5966550 **Description:**1"x1" Tile, Tan Paint **Result (% by Weight):**<0.0063
Client No.:L-49 **Location:**72' Wing Girl's Washroom **Result (ppm):**<63
Comments:***

Lab No.:5966551 **Description:**1"x1" Tile, Tan Paint **Result (% by Weight):**0.0055
Client No.:L-50 **Location:**72' Wing Boy's Washroom **Result (ppm):**55
Comments:***

Lab No.:5966552 **Description:**4"x4" Mottled Tile, Green Paint **Result (% by Weight):**<0.0062
Client No.:L-51 **Location:**72' Wing Girl's Washroom **Result (ppm):**<62
Comments:***

Lab No.:5966553 **Description:**4"x4" Mottled Tile, Green Paint **Result (% by Weight):**<0.0052
Client No.:L-52 **Location:**72' Wing Boy's Washroom **Result (ppm):**<52
Comments:***

Lab No.:5966554 **Description:**4"x4" Tile, White Paint **Result (% by Weight):**0.0070
Client No.:L-53 **Location:**72' Wing Girl's Washroom **Result (ppm):**70
Comments:***

Lab No.:5966555 **Description:**4"x4" Tile, White Paint **Result (% by Weight):**0.0042
Client No.:L-54 **Location:**72' Wing Boy's Washroom **Result (ppm):**42
Comments:

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/29/2016
Date Analyzed: 6/29/2016 12:00:00 AM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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** Not enough sample provided to analyze (<50 mg)

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ASE | SERVICES
ALBERTA SAFETY & ENVIRONMENTAL SERVICES

BULK MOULD ANALYSIS REPORT

Client: Alberta Infrastructure
Project #: AS 4575
Description: St. Patrick's School

Sample Date: 26-Jun-16
Analysis Date: 29-Jun-16

Sample #	Lab #	Sample Description	Background Debris[1]	Mould Spore Identification	Relative Amount[2]
M-1	L16-7-01	Room 101 Ceiling	Low	Mycelial Fragments	Low
M-2	L16-7-02	Room 110 Ceiling	Low	Cladosporium	Low
M-3	L16-7-03	Room 107 Ceiling	Moderate	No Fungal Structures Detected	
M-4	L16-7-04	1965 Addition Hallway Ceiling	Low	No Fungal Structures Detected	
M-5	L16-7-05	Room 118 Ceiling	Low	No Fungal Structures Detected	
M-6	L16-7-06	Room 120 Ceiling	Low	No Fungal Structures Detected	
M-7	L16-7-07	Room 121 Ceiling	Low	Chaetomium Cladosporium	Low Low
M-8	L16-7-08	1969 Addition Hallway Ceilinig	Low	No Fungal Structures Detected	
M-9	L16-7-09	Room 129 Ceiling	Low	No Fungal Structures Detected	
M-10	L16-7-10	Room 131	Low	Chaetomium	Low

Notes:
1 Background Debris refers to loading of non-fungal fragments.'Low'=0-10%; 'Moderate'=11-30%; 'High'=>30%
2 Relative amount: 'Low' = <10 per mm^2 of tape surface;Moderate' = 10-100 per mm^2; 'High' = >100 per mm^2

Results Reviewed by: Jake Koethler Date: 29-Jun-16

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www.aseservices.ca

Geotechnical Evaluation
St. Patrick's Elementary School Modernization
Taber, Alberta



PRESENTED TO
Alberta Infrastructure

DECEMBER 2016
ISSUED FOR USE
FILE: ENG.LGEO03186-01

Tetra Tech EBA Inc.
442 - 10 Street N.
Lethbridge, AB T1H 2C7 CANADA
Tel 403.329.9009 Fax 403.328.8817

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

APPENDIX SECTIONS

FIGURES

APPENDICES

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Alberta Infrastructure, and their agents. Tetra Tech EBA Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Alberta Infrastructure, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech's General Conditions are provided in Appendix A of this report.

1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation conducted by Tetra Tech EBA Inc. (Tetra Tech) for the proposed St. Patrick's Elementary School Modernization project, located at 5302 - 48 Street in Taber, Alberta

The scope of work for this evaluation was outlined in a services contract, effective on October 5, 2016, signed by the Minister of Infrastructure and Tetra Tech. The objective of this work was to determine the general subsurface conditions in the area of the proposed development and to develop recommendations for the geotechnical aspects of design and construction for the project.

2.0 PROJECT DETAILS AND SCOPE OF WORK

It is understood that the development will comprise design and construction of new structures to replace two old portions of the existing school building. A new mechanical mezzanine is to take the place of the old garage butting the gymnasium and a main floor area is to expand east at the locations of the existing office and two classrooms located on the east of the building. The new mezzanine has a planned area of approximately 22 m² and the new main floor area has a planned area of approximately 135 m². Foundation options under consideration are understood to include shallow footings and/or a deep foundation system, such as helical piles or bored cast-in-place (CIP) concrete piles.

The scope of work for this evaluation comprised the drilling of five (5) boreholes, a laboratory program to assist in classification of the subsurface soils, and this report providing the following foundation design and construction recommendations:

- Design parameters for shallow foundation systems.
- Design parameters for deep pile foundation systems.
- Design and construction of floor systems including slabs-on-grade.
- Site grading.
- Backfill materials and compaction.
- Mitigation of a high groundwater table, where encountered.
- Concrete type used in contact with soils.
- Seismic site response.

3.0 GEOTECHNICAL FIELD AND LABORATORY WORK

The fieldwork for this evaluation was carried out on November 11, 2016 using a truck-mounted drill rig contracted from Chilako Drilling Services Ltd. of Coaldale, Alberta. The rig was equipped with 150 mm diameter solid stem continuous flight augers. Tetra Tech's field representative was Mr. Stuart Smith.

Five (5) boreholes (referenced as 16BH001 through 16BH005) were drilled to depths ranging between 9.6 m and 12.2 m below ground surface. Three boreholes (16BH001, 16BH002, and 16BH003) were located in the proposed new floor area and the other two boreholes (16BH004 and 16BH005) were in the new mechanical mezzanine area.

The approximate borehole locations are shown on Figure 1. From the boreholes, disturbed grab samples were obtained at approximate 600 mm intervals. In addition, Standard Penetration Tests (SPTs) were generally performed at depth intervals of 1.5 m within the boreholes. All soil samples were visually classified in the field and the individual soil strata and the interfaces between them were noted. The borehole logs are presented in Appendix B. An explanation of the terms and symbols used on the borehole logs is also included in Appendix B.

Slotted 25 mm diameter PVC standpipes were installed in the boreholes to monitor groundwater levels. Auger cuttings were backfilled around the standpipes and were sealed at ground surface with bentonite chips.

The ground surface geodetic elevations were surveyed by Mike Spencer Geometrics Ltd. and included on the borehole logs.

Classification tests, including natural moisture content, Atterberg Limits, and soluble sulphate content were performed in a laboratory on soil samples to aid in the determination of engineering properties. The results of the laboratory tests are presented on the borehole logs.

4.0 SITE AND SOIL CONDITIONS

4.1 Site Condition

The proposed additions are located along the east and west sides of the existing school, which is bounded to the north by 56 Avenue, to the south by 53 Avenue, to the east by 48 Street, and to the west by 47 Street. The proposed expansion area of the new main floor is currently a lawn and the proposed mechanical mezzanine is partially covered with gravel fill. Both areas are relatively flat with drainage toward the surrounding areas of the existing school building.

4.2 Soil Stratigraphy

The general subsurface stratigraphy at the borehole locations comprised a surficial layer of topsoil or gravel fill, underlain by clay fill, clay, and clay till deposits. The following sections provide a summary of the stratigraphic units encountered at the specific borehole locations. A more detailed description is provided on the borehole logs provided in Appendix B.

4.2.1 Topsoil

Topsoil was encountered at the proposed entrance area. The topsoil was sandy and silty clay with roots and organics, approximately 100 mm in thickness.

4.2.2 Gravel Fill

Gravel fill was only encountered in 16BH005, approximately 100 mm in thickness. The gravel was described as some sand, subrounded, well graded, sizes to 10 mm, moist, very loose, and brown.

4.2.3 Clay Fill

Clay fill was encountered at the borehole locations, extending to depths of up to 1.2 m below ground surface. The clay fill was generally described as silty, some sand, trace gravel (occasional some gravel), moist, stiff to very stiff, medium plastic, and brown with root hairs and trace organics. Moisture contents of the clay fill ranged between 17% and 24%.

4.2.4 Sand

Sand was encountered underlying the clay fill only at 16BH003, extending to a depth of 6.2 m below ground surface. The sand was generally described as some silt to silty, fine grained, poor to well graded, very moist to saturated, very loose to compact, and dark brown or greyish brown. Moisture contents of the sand ranged between 20% and 25%. Atterberg Limits testing (one test) indicated a Plastic Limit of 14% and a Liquid Limit of 33%, indicative of medium plasticity.

4.2.5 Clay

Clay was encountered underlying the clay fill or sand at the borehole locations, extending to depths ranging between 2.0 m and 7.9 m below ground surface. The clay was generally described as silty, some sand, moist to wet, very soft to firm, low to medium plastic, and brown with occasional sand lenses. Moisture contents of the clay ranged between 18% and 30%. Atterberg Limits testing (two tests) indicated Plastic Limits of 13% and 15%, and Liquid Limits of 25% and 29%; indicative of low plasticity.

4.2.6 Clay Till

Clay till was encountered beneath the clay, extending to borehole termination depths. The clay till was generally described as silty, trace to some sand, trace gravel, moist to very moist, firm to very stiff, medium to high plastic, and brown with coal and oxide specks, and occasional silt and sand pockets. Moisture contents of the clay till ranged between 16% and 24%. Atterberg Limits testing (two tests) indicated Plastic Limits of 12% and 14%, and Liquid Limits of 37% and 51%; indicative of medium to high plasticity.

4.3 Groundwater Conditions

At the time of drilling, seepage and/or sloughing were encountered within the boreholes. The groundwater level at the borehole locations was measured on November 18, 2016. Table A summarizes the groundwater monitoring data.

Table A: Groundwater Monitoring Data – November 18, 2016

Borehole Number	Depth of Standpipe (m)	Borehole Elevation (m)	Depth to Groundwater (m)	Groundwater Elevation (m)
16BH001	9.6	810.54	2.02	808.52
16BH002	9.6	810.53	2.06	808.47
16BH003	6.1	810.54	2.11	808.43
16BH004	9.6	810.51	2.24	808.27
16BH005	9.6	810.14	1.92	808.22

The groundwater is likely to be perched within sandy layers and may fluctuate seasonally and in response to climatic conditions. Further comments regarding groundwater issues are provided in the subsequent sections.

5.0 GEOTECHNICAL RECOMMENDATIONS

The recommendations that follow offer varying options intended to aid in the development of project concepts and specifications. The recommendations are provided on the understanding and condition that Tetra Tech will be retained to review the relevant aspects of the final design (drawings and specifications) and to conduct such field reviews as are necessary to ensure compliance with the geotechnical aspects of the Alberta Building Code (2014), this report, and the final plans and specifications. Tetra Tech accepts no liability for any use of this report in the event that Tetra Tech is not retained to provide these review services.

5.1 General

Specific recommendations that apply to this project are provided for foundation options, including shallow footings and deep foundations (such as bored CIP concrete piles and helical piles). Recommendations are also provided for floor systems including slabs-on-grade and a structural floor system, groundwater issues, and concrete type.

Due to the presence of soft clay and very loose sand soils to be encountered at the potential footing depths. The use of shallow foundations including strip and/or spread footings on such weak soils is subject to risk of excessive settlements. The weak soils should be completely removed prior to the construction of footings, which will increase the foundation cost and complicate construction. A deep foundation system consisting of either bored CIP concrete piles or helical piles is recommended as the preferred foundation type.

Subgrade preparation is recommended for all grade-supported structures including slabs-on-grade, pavements, sidewalks, etc. Subgrade preparation should include removal of any unsuitable materials (if encountered) and conditioning and compaction of the existing clay fill soils. The existing clay fill, clay, and clay till soils (not containing deleterious matter) are adequate for use as general engineered fill, but may require moisture conditioning in order to achieve the required moisture specification. Proof-rolling (where practical) to detect soft areas is also recommended.

All foundation design recommendations presented in this report are based on the assumption that an adequate level of monitoring will be provided during construction and that all construction will be carried out by suitably qualified contractors, experienced in foundation and earthworks construction. An adequate level of monitoring is considered to be:

- For shallow foundations, inspection of bearing surfaces prior to placement of concrete or mudslab and design review during construction.
- For deep foundations, full-time monitoring and design review during construction.
- For earthworks, full-time monitoring and compaction testing.

Suitably qualified persons, independent of the contractor, should carry out all such monitoring. One of the purposes of providing an adequate level of monitoring is to check that recommendations, based on data obtained at discrete borehole locations, are relevant to other areas of the site.

5.2 Limit States Design

The design parameters provided in the following sections may be used to calculate the ultimate foundation capacity in each case. For the Limit States Design (LSD) methodology, in order to calculate the factored load capacity, the appropriate Soil Resistance Factors must be applied to each loading condition as follows:

Factored Capacity = Ultimate Capacity x Soil Resistance Factors

In general, the soil resistance factors in Table B should be incorporated into the foundation design. These factors are considered to be in accordance with the Canadian Foundation Engineering Manual (CFEM) (2006) as well as the Alberta Building Code (2014).

Table B: Soil Resistance Factors

Item	Soil Resistance Factor
Shallow Foundations	
Bearing Resistance	0.5
Passive Resistance	0.5
Horizontal Resistance (Sliding)	0.8
Horizontal Passive Resistance	0.5
Deep Foundations - Piles	
Static Axial Compressive Pile Capacity	0.4
Static Axial Uplift Pile Capacity	0.3
Lateral Pile Capacity	0.5

Under LSD methodology, foundations should be designed on the basis of factored Ultimate Limit State (ULS) parameters. In order to determine the applicable working capacity, Serviceability Limit State (SLS) must also be considered.

5.3 Bored Cast-in-Place Concrete Piles

Bored CIP concrete piles, founded in the stiff clay till, may be designed to resist axial compressive loads on the basis of a combination of shaft and base resistances provided in Table C. For piles constructed in accordance with the recommendations made in this report, the following ultimate values of shaft and base resistances may be used, factored as recommended.

Table C: Geotechnical Parameters for Bored CIP Concrete Piles

Depth (m)	Ultimate Shaft Resistance (kPa)	Ultimate Base Resistance (kPa)
0 to 3.0	-	N/A
3.0 to 6.0	35	N/A
Below 6.0	45	650

It is noted that end-bearing within the stiff clay till will require confirmation, as local sand layers or inclusions may be encountered during pile installation and pose difficulties for belling. Local relatively weak materials (e.g., in 16BH003) may also be encountered below 6.0 m. Where such weak conditions are encountered, lowering design bell elevations to stiffer soils or using straight shaft piles may be considered. The end-bearing value provided for a belled pile option may only be considered if it is confirmed that stiff to very stiff (or better) clay till is encountered. End-bearing belled piles should be established at least 1.5 m below the top of the stiff clay till. Belled piles within the area of 16BH003 for instance, should be installed at a depth of 9.5 m.

Piles should be a minimum of 400 mm in diameter. Shaft resistance should be neglected for the top 2.0 m depth below the finished ground surface and the depths of the shaft within clay fill, if encountered. Base resistance should only be considered in the design of piles where machine cleaning can be verified. End-bearing should not be used for small diameter (less than 760 mm base diameter) piles because of the difficulties associated with ensuring a clean base. End-bearing may only be considered in the design of under-reamed or belled piles if facilities are available for an adequate cleaning of the pile base. General recommendations for the design and construction of bored CIP concrete piles are included in Appendix C.

An overall concreted pile shaft length below final grade of not less than 6.0 m is recommended. A minimum ratio of depth of cover versus the base or bell diameter (D/B) of 2.5 has been assumed to determine the above end-bearing pressure. Should less cover be provided, the bearing pressure would have to be reduced. Minimum bell diameters should be twice the shaft diameter. Piles should be spaced no closer than 2.5 times the base diameter measured centre-to-centre.

Groundwater seepage and/or relatively thick sand and silt pockets will be encountered in the pile bores for the development. Casing should be on hand before drilling starts and used to seal off water and/or prevent sloughing of the hole when encountered. The piling contractor should make his or her own estimate of casing requirements and should consider such factors as construction procedures and bore diameter. Soft, wet clay or wet sand was encountered in most of the upper portion of the boreholes. Casing for the majority of the piles is anticipated.

5.4 Helical Piles

It is understood that helical piles may be considered for the proposed development. It is recommended that helical piles be considered only for statically loaded foundations (i.e., no dynamic load component). Design and construction recommendations for helical piles are provided in this section; however, it is noted that for the final design of this type of pile, consideration should be given to the installation methodology of the specialty contractor, as the design capacity of helical piles is a function of the pile installation methodology.

Tetra Tech recommends using the CFEM (2006) design method for helical piles (CFEM Section 18.2.1.4). Using this methodology, the geotechnical parameters required to calculate the ultimate foundation capacity are provided in Table D.

Table D: Geotechnical Parameters for Helical Piles

Depth (m)	Bulk Unit Weight (kN/m³)	Undrained Shear Strength Cu (kPa)	Friction Angle (Degrees)
0 to 3	18	-	-
3 to 9	18	40	28
Below 9	19	75	27

The total helical pile capacity is presented in the CFEM Equation 18.10 as follows:

$$R = Q_t + Q_f$$

Where:

R = Total ultimate capacity of the pile (kN)

Q_t = Total ultimate multi-helix pile capacity (kN)

Q_f = Ultimate capacity due to pile shaft skin friction (kN) (for pile shafts greater than 100 mm diameter only)

To calculate the multi-helix bearing capacity, the individual bearing method presented in CFEM Equations 18.11 and 18.12 should be used, provided the helical bearing plates are spaced a minimum of three times the diameter of the largest helix. Otherwise, the cylinder shear method should be used, with consideration of overlapping stress zones between helices. This method sums up the bearing capacity of the bottom plate and the cylindrical shear capacity developed between the upper and lower plate(s).

The ultimate bearing capacity of each plate may be determined by taking the least value derived from CFEM Equation 18.11 and the following simplified formula:

$$Q_h = 9*Cu*Ah$$

Where:

Q_h = Individual plate ultimate bearing capacity

Cu = Undrained shear strength

Ah = bearing area of the plate

The factored geotechnical capacity for each pile may be determined as follows, using the soil resistance factors presented in Section 5.2:

Factored Pile Compression Capacity = 0.4R

Factored Pile Uplift Capacity = 0.3R

For helical piles, the helix or helices must be founded in native stiff clay till soils and below the depth of frost penetration. The minimum recommended depth for the upper helix is 9 m below existing grade.

Vertically installed helical piles generally require an enlarged shaft diameter in order to adequately resist lateral loads, where applicable. In addition, shaft buckling must be considered due to the loose sands in the upper 2.0 m.

Should any of these parameters become limiting factors in the design, Tetra Tech should be contacted for more detailed review and analysis.

Construction of helical piles should consider, but not be limited to, the following recommendations:

- As the helical piles are installed, the rate of rotation and advancement should match the pitch of the helix plate. This will help to avoid “churning” of the foundation soils. It is critical that the foundation bearing soil is not excessively disturbed in order to minimize the risk of excessive foundation settlement.

- An estimate of pile capacity may be obtained by correlating capacity to installation torque. This method requires that an appropriate torque factor be selected by the pile designer (in consultation with the piling contractor). Torque factors are selected based on soil type as well as pile shaft size and shape. This method of estimating pile capacity should be used as a quality control check, and is not suitable to replace proper design procedures. Installation torque should be recorded using calibrated equipment, and the piling contractor should provide a calibration certificate (conducted a maximum of 1 year from pile installation) for each piling set up used on site.

- It should be noted that a high torque value can sometimes mislead estimation of bearing capacity. The occurrence of soft zones beneath the final pile depth are not represented in the recorded torque value, but may adversely impact the long-term load carrying capacity of the helical pile. Where the anticipated pile depth is below the depth of known soil type, additional borehole drilling is recommended prior to final design and construction.

- Pile load testing is recommended. The results of the pile load tests can be correlated to the measured installation torque to develop site-specific installation criteria. In addition, a higher geotechnical resistance factor for compressive loading of 0.6 can be used if pile load testing is conducted prior to construction.

- If lateral loading is considered critical to the pile performance, care must be taken during pile installation to identify voids developing around the pile shaft. Due to the nature of the pile installation process, it is common to develop voids that can significantly influence lateral loading on a pile. If voids develop they should be backfilled with granular fill, sand, fillcrete, or grout depending on the size of the voids.

- Full-time pile monitoring by qualified personnel, independent of the piling contractor, is recommended.

5.4.1 Lateral Pile Capacity

Pile resistance to horizontal loading involves soil-structure interaction and is commonly analyzed using software structural analysis or with lateral pile analysis. The nature and level of sophistication of the various analytical techniques varies, as do the required input parameters for the various software applications.

A commercially available software program (LPILE) is one of the more advanced applications and is well recognized as a valid application for lateral pile analysis by the Canadian geotechnical community. LPILE is used to analyze whether or not the laterally loaded piles exceed the ultimate soil resistance, to predict pile head deflections, and to predict the location of the maximum bending moments and shear forces induced by lateral loads. Lateral pile analysis can be performed by Tetra Tech, if requested.

5.4.2 Axial Uplift Pile Capacity

Axial uplift pile capacity is calculated using a similar method as that used for compression loads. The ultimate uplift capacity is the sum of the shaft resistance and the contribution from the expanded base/helix (if applicable). Note that factoring using the Soil Resistance Factors given in Section 5.2 is recommended.

To calculate the ultimate uplift capacity, the ultimate compressive shaft resistance (derived using the parameters of the previous sections) should be reduced by 25%. This is due to the Poisson effect; when a pile is loaded in compression, it experiences a slight increase in diameter. However, the opposite is true when in tension; as the pile is pulled upward, it ‘stretches’ and the diameter becomes slightly smaller. This slight reduction in pile diameter has a reducing effect on shaft friction resistance during uplift loading.

5.5 Shallow Foundations

Shallow foundations should be founded on native, firm to stiff clay soils only. Due to the extensive soft, wet clay conditions, significant problems are anticipated with construction of shallow foundations as well as poor performance and are therefore not recommended.

5.6 Foundation Settlement – Serviceability Limit State

5.6.1 General

In addition to analyzing the ULS resistance of a foundation, the SLS must also be addressed. The SLS is an analysis of the amount of settlement that a foundation element would undergo under unfactored structural loads.

For piles designed on the basis of shaft resistance alone, the ultimate shaft resistance is typically mobilized after a relatively small pile displacement (approximately 5 mm to 10 mm). Full mobilization of the shaft resistance occurs prior to full mobilization of the base resistance (i.e., additional settlement is required to mobilize the base resistance). Due to the small amount of pile settlement, the SLS is typically not of concern for friction piles unless very high settlement tolerances (i.e., less than 10 mm of movement) are required.

Settlement-based criterion from elastic displacement theory is used to assess the SLS design of foundations incorporating base resistance, such as shallow foundations, concrete end-bearing piles, and helical piles.

5.6.2 Cast-in-Place Concrete End-Bearing and Helical Piles

The following expression should be used to estimate the settlement of CIP concrete end-bearing and helical piles under SLS conditions, using unfactored structural loads:

$$S = (K) \times (P / B\ E)$$

Where:

S = Foundation settlement (m)

K = 0.91

P = Unfactored load (live load plus dead load) applied at the base of the pile (kN)

B = Pile base diameter (m)

E = Elastic Modulus of the foundation soil (see Table E)

Table E: Elastic Modulus of the Bearing Soil

Depth Interval (m)	Bearing Stratum	Elastic Modulus (kPa)
Below 6.0 m	Clay Till	24,000

For each loading case, the pile base diameter used in the above expression should be the diameter determined from analysis of factored (ULS) structural loads and factored (ULS) base resistance.

If the calculated settlement is higher than tolerable for the structure, SLS may govern the pile design. Under such conditions, Tetra Tech should be contacted to provide further direction regarding suitable methods of settlement control or to conduct a more rigorous settlement analysis based on the actual structural loads and a preliminary foundation design.

5.7 Floor Slabs-on-Grade

Construction of floor slabs-on-grade for this project must consider the following precautions and construction recommendations. Constructing the slabs-on-grade as follows will reduce the potential for subgrade movements and these procedures are intended to limit total and differential floor slab movements to 35 mm and 20 mm, respectively. Slabs-on-grade should be separated from bearing members to allow some differential movement. If this range of differential movement is unacceptable, the owner should consider a structurally supported floor.

Following removal of any unsuitable soils (e.g., topsoil), a minimum 600 mm subgrade preparation should be conducted. The recommended standard for clay subgrade preparation is a minimum of 98% of Standard Proctor Density (SPD) with a moisture content of 0% to +2% of the optimum moisture content (OMC). The compaction thickness should be less than 150 mm for each lift. Due to the high moisture conditions of the underlying soils, the floor bottom elevations should be designed set as high as possible to reduce soil disturbance during compaction. A static compaction machine is recommended for the same purpose. Depending on the final subgrade design elevations, if weak soils with high moisture conditions are encountered during subgrade preparation, difficulties should be expected for compaction and design compaction quality may not be achieved as expected. In such case, granular backfill should be used with geotextile placed above the weak subgrade. 300 mm of the first lift of the granular backfill may be taken to reduce disturbance on subgrade soils.

Long-term slab performance is dependent on subgrade uniformity. Care must be taken to ensure that the depth of subcut is relatively uniform across the entire floor area. Backfill operations should be conducted such that lift thickness, moisture content, and compaction effort are constant and uniform across the site. It is recommended that subcut and backfill operations be completed prior to construction of foundation elements.

The prepared subgrade beneath slabs-on-grade should be protected at all times from moisture or exposure which may cause softening or desiccation of the subgrade soils. This applies during and after the construction period (and before and after replacement of the required engineered fill). Should the exposed surface become saturated or desiccated, it should be reworked to achieve the above moisture and density standards.

It is recommended that the finished subgrade be observed prior to crushed gravel placement. A levelling course of clean, well-graded crushed gravel, at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade unless a thicker course is required for structural purposes.

Additional recommendations for concrete floor slabs-on-grade are included in Appendix C.

5.8 Backfill Materials

The existing site soils, comprising clay fill, clay, and clay till soils are considered suitable for use as ‘landscape fill’ and as ‘general engineered fill’, as defined in Appendix C. Any soils containing organic or deleterious materials (referenced as unsuitable in this report) should be stockpiled separately and are not suitable for use as general engineered fill.

It is noted that moisture conditioning may be required due to the variable moisture conditions of the subgrade soils encountered during the evaluation; however, the earthwork contractor should make their own estimate of the requirements for moisture conditioning to the recommended standards, and should consider such factors as weather and construction procedures.

Further recommendations regarding backfill materials and compaction are contained in Appendix C.

5.9 Trench Excavations and Backfill

Excavations should be carried out in accordance with the Alberta Occupational Health and Safety Regulations.

For this project, the depth of excavations are anticipated to be relatively shallow (<3.0 m). All excavations which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back not steeper than 1.0H:1.0V for periods up to one month. Where seepage is encountered, or when excavations are deeper than 3.0 m, the cutslope may need to be flatter and dewatering equipment should be on hand. Where excavations are open for longer than one month, the slopes should be cut back flatter than 1.0H:1.0V.

Any seepage, if encountered, should be directed towards a sump for removal from the excavation, where necessary.

Temporary surcharge loads, such as spill piles, should not be allowed within 3.0 m of an unsupported excavation face, while mobile equipment should be kept back at least 1.0 m. All excavations should be checked regularly for signs of sloughing, especially after rainfall periods. Small earth falls from the sideslopes are a potential source of danger to workers and must be guarded against.

Trenches must be backfilled in such a way as to minimize the potential differential settlement and/or frost heave movements. A minimum density of 95% of SPD is recommended for all trenches, with the exception of the top 600 mm, which should be compacted to 98% of SPD.

Cohesive backfill should be uniformly moisture conditioned to ±2% of OMC. The compacted thickness of each lift of backfill should not exceed 150 mm. The upper 1.5 m of service trenches should be cut back at a maximum slope of 1.0H:1.0V to avoid an abrupt transition between backfill and in situ soil.

It should be noted that the ultimate performance of the trench backfill is directly related to the uniformity of the backfill compaction. In order to achieve this uniformity, the lift thickness and compaction criteria must be strictly enforced.

General recommendations for construction excavations are included in Appendix C.

5.10 Site Grading

Drainage of surface water away from buildings should be maintained during construction. The finished grade of the proposed building site should be designed so that surface water is drained away from buildings by the shortest route. All drains should discharge well clear of the building. If there is a roof drain for the building, caution should be taken where downspouts discharge due to the high probability of ice forming in the winter. Downspouts may be discharged onto landscaped areas, provided the water is carried, by means of a concrete splash pad or extendable section so the point of discharge of the water is at least 2 m from the building. Landscaped surfaces adjacent to the walls of the building should be graded to slope away from the building at a gradient of at least 5% within 2 m of the building's perimeter. General landscaped areas should have grades of no less than 2% to minimize ponding.

5.11 Seismic Design

The site classification recommended for seismic site response is Classification D, as noted in Table 4.1.8.4.a of the National Building Code (2010).

5.12 Cement Type

Based on soluble sulphate concentration test results from selected samples taken during the field program and Tetra Tech's experience on local soils, the properties of concrete for foundations in contact with soil shall meet the requirements of the Canadian Standards Association (CSA) A23.1-14, Class S-2 exposure including water/cementing materials (w/cm) ratio of 0.45, air entrainment of 4% to 7% (for 14 mm to 20 mm nominal maximum aggregate size), and a minimum specified 56-day compressive strength of 32 MPa.

For this exposure classification, alternatives include the usage of Type HS (sulphate-resistant) Portland Cement or blends of cement and supplementary cementing materials conforming to Type HSb cements.

5.13 Frost Protection

For protection against frost action, all perimeter footings must be placed a minimum of 1.4 m below final grade for heated structures, or 2.1 m for unheated structures.

Pipes buried with less than 2.1 m of soil cover should be protected with insulation to avoid frost effects that might cause damage to, or breakage of, the pipes.

6.0 RECOMMENDED DESIGN AND CONSTRUCTION GUIDELINES

General design and construction guidelines are provided in Appendix C, under the following supplemental headings:

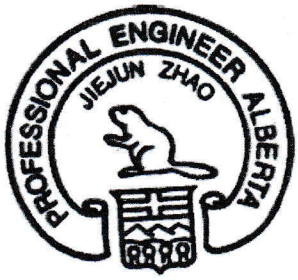
- Bored Cast-in-Place Concrete Piles
- Construction Excavations
- Backfill Materials and Compaction
- Floor Slabs-on-Grade

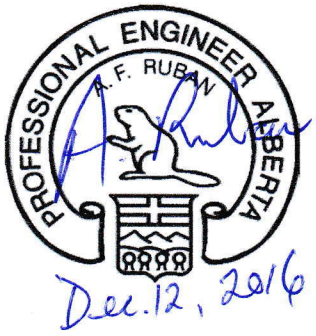
These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the works although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix C, the main text should govern.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Tetra Tech Inc.





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PERMIT TO PRACTICE
TETRA TECH EBA INC.

Signature _____

Date _____

PERMIT NUMBER: P245
The Association of Professional Engineers and Geoscientists of Alberta

FIGURES

LEGEND

BOREHOLE LOCATION

NOTE
GOOGLE EARTH IMAGERY DATED 2011

0 50m

Scale: 1:1,000 @ 8.5"x11"

CLIENT

Alberta Infrsstructure

ST. PATRICK'S ELEMENTARY SCHOOL MODERNIZATION TABER, ALBERTA

BOREHOLE LOCATION PLAN

TETRA TECH

PROJECT NO.	DWN	CKD	REV
LGEO03186-01	LCH	SS	0

OFFICE	DATE
LETHBRIDGE	November 2016

Figure 1

C:\Lethbridge\Drafting\ENG.LGEO\LGEO03186\LGEO03186-01 Figure 1.dwg [FIGURE 1] November 23, 2016 - 11:52:56 am (BY: HUGHES, LEANNE)

APPENDIX A

TETRA TECH'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.1 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of TETRA TECH’s Client. TETRA TECH does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than TETRA TECH’s Client unless otherwise authorized in writing by TETRA TECH. Any unauthorized use of the report is at the sole risk of the user.

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1.2 ALTERNATE REPORT FORMAT

Where TETRA TECH submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed TETRA TECH’s instruments of professional service); only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by TETRA TECH shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of TETRA TECH’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except TETRA TECH. TETRA TECH’s instruments of professional service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

1.3 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.4 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.5 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.6 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of testholes and/or soil/rock exposures. Stratigraphy is known only at the locations of the testhole or exposure. Actual geology and stratigraphy between testholes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

1.7 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.8 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.9 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

1.10 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.11 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

1.12 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

1.13 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.14 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of the report, TETRA TECH may rely on information provided by persons other than the Client. While TETRA TECH endeavours to verify the accuracy of such information when instructed to do so by the Client, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 TO 20%	0 to 4
Loose	20 TO 40%	4 to 10
Compact	40 TO 75%	10 to 30
Dense	75 TO 90%	30 to 50
Very Dense	90 TO 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (KPA)
Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

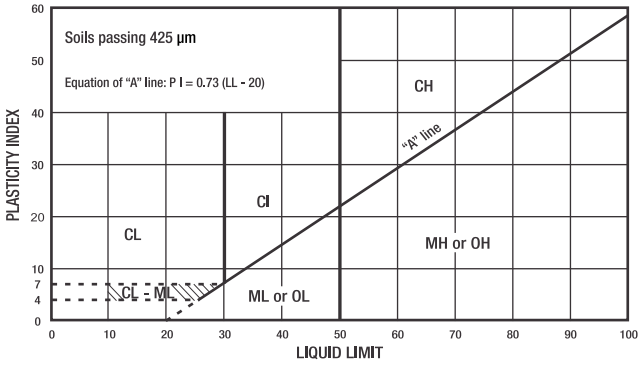
GENERAL DESCRIPTIVE TERMS

Slickensided - having inclined planes of weakness that are slick and glossy in appearance.
Fissured - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated - composed of thin layers of varying colour and texture.
Interbedded - composed of alternate layers of different soil types.
Calcareous - containing appreciable quantities of calcium carbonate.;
Well graded - having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded - predominantly of one grain size, or having a range of sizes with some intermediate size missing.

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines. Less than 5% Pass 75 µm sieve; More than 12% Pass 75 µm sieve; 5% to 12% Pass 75 µm sieve. GW, GP, SW, SP GM, GC, SM, SC Borderline Classification requiring use of dual symbols	$C_U = D_{60} / D_{10}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_U = D_{60}/D_{10}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS Liquid limit <50		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity	For classification of fine-grained soils and fine fraction of coarse-grained soils.		
	SILTS Liquid limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit <30		CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit 30-50		CI	Inorganic clays of medium plasticity, silty clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit >50		CH	Inorganic clays of high plasticity, fat clays			
	ORGANIC SILTS AND CLAYS Liquid limit <50		OL	Organic silts and organic silty clays of low plasticity			
	ORGANIC SILTS AND CLAYS Liquid limit >50		OH	Organic clays of medium to high plasticity			
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils			

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS

FRACTION	SIEVE SIZE PASSING	SIEVE SIZE RETAINED	DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS PERCENTAGE	DESCRIPTOR
GRAVEL			>35 %	"and"
coarse	75 mm	19 mm		
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

OVERSIZE MATERIAL

Rounded or subrounded

COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm

Not rounded

ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

Tt_Modified Unified Soil Classification.cdr

TETRA TECH

BOREHOLE KEYSHEET

Water Level Measurement

 Measured in standpipe, piezometer or well

 Inferred

Sample Types

 A-Casing

 Core

 Disturbed, Bag, Grab

 HQ Core

 Jar

 Jar and Bag

 NQ Core

 No Recovery

 Split Spoon/SPT

 Tube

Backfill Materials

 Asphalt

 Bentonite

 Cement/ Grout

 Drill Cuttings

 Grout

 Gravel

 Sand

 Slough

 Topsoil Backfill

Lithology - Graphical Legend[1]

 Asphalt

 Bedrock

 Cobbles/Boulders

 Clay

 Coal

 Concrete

 Fill

 Gravel

 Limestone

 Mudstone

 Organics

 Peat

 Sand

 Sandstone

 Shale

 Silt

 Siltstone

 Till

 Topsoil

1. The graphical legend is an approximation and for visual representation only. Soil strata may comprise a combination of the basic symbols shown above. Particle sizes are not drawn to scale

TETRA TECH EBA

CLIENT: ALBERTA INFRASTRUCTURE

Borehole No: 16BH001

Project: ST. PATRICK'S SCHOOL MODERNIZATION	Project No: 704-ENG.LGEO03186-01
Location: 5302 - 48 STREET	Ground Elev: 810.54 m
TABER, AB I N: 5515923.23, E: 416877.37	PROJECT ENGINEER: TREVOR CURTIS

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	16BH001	Elevation (m)
0	Solid stem auger	TOPSOIL - clay, sandy, silty, moist, dark brown, roots, organics								810
		CLAY (FILL) - silty, some gravel, moist, stiff, medium plastic, brown, coal and oxide specks, silt and sand pockets, red shale, trace organics		B1		17.3				
1		... trace gravel								
		CLAY - silty, sandy, very moist, to wet, soft, low plastic, dark brown		B2		21.9				
				D1	4					809
2				B3		19.3				
		CLAY (TILL) - silty, some sand, trace gravel, very moist, firm to stiff, medium plastic, brown with greyish brown, coal and oxide specks, silt and sand pockets, trace high plastic clay inclusions		B4		20.7				
3				D2	9	21				
		... moist, stiff, brown with grey mottling, oxide staining		B5		19.3				807
4				B6		19.5				
				D3	12					806
5		... stiff to very stiff		B7		18.2				
				B8		18.4				805
6				D4	15					
				B9		18.5				804
7		... very stiff, dark brown with grey mottling		B10		16.6				
				D5	18					803
8		... stiff, wet sand lenses, trace seepage		B11		18.1				
				B12						802
9				D6	14	18.2				
		End of Borehole @ 9.6 m								801
10		Seepage from 8.2 m, No Sloughing Upon Completion Slotted 25 mm PVC Standpipe Installed to 9.6 m Indicated Water Level Measured on November 18, 2016								
11										800

11/18/2016

11/18/2016

TETRA TECH EBA

Contractor: CHILAKO DRILLING SERVICES LTD.	Completion Depth: 9.6 m
Drilling Rig Type: 150mm SOLID STEM AUGER	Start Date: November 11, 2016
Logged By: SS	Completion Date: November 11, 2016
Reviewed By: JZ	Page 1 of 1

CLIENT: ALBERTA INFRASTRUCTURE

Borehole No: **16BH002**

Project: ST. PATRICK'S SCHOOL MODERNIZATION	Project No: 704-ENG.LGEO03186-01
Location: 5302 - 48 STREET	Ground Elev: 810.53 m
TABER, AB I N: 5515931.35, E: 416877.21	PROJECT ENGINEER: TREVOR CURTIS

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)
0	Solid stem auger	TOPSOIL - clay, sandy, silty, moist, dark brown, roots, organics				
		CLAY (FILL) - silty, some sand, trace to some gravel, moist, stiff, medium plastic, brown, coal specks, coal and oxide specks				
		... trace gravel, trace wood chunks		B1		17.9
1		Clay - silty, sandy, very moist to wet, low plastic, soft, brown		B2		17.8
				D1	1	
2		... wet, seepage		B3		22.9
				B4		21.1
		... 250 mm sand pocket				
3		CLAY (TILL) - silty, some sand, trace gravel, very moist, firm to stiff, medium plastic, brown with grey mottling, coal and oxide specks, sand pockets		D2	8	21.7
				B5		20.5
4				B6		
				D3	8	19.6
5		... trace sand, high plastic		B7		
		... some sand, moist, stiff, medium plastic, high plastic clay inclusions, oxide staining		B8		18.1
6				D4	14	
		... very stiff, dark brown with dark grey mottling		B9		18.2
7				B10		19.1
		... soluble sulphate content < 0.1% @ 7.3 m				
		... stiff to very stiff		D5	16	
8		... very stiff		B11		17.9
				B12		17.9
9				D6	19	18.3
		End of Borehole @ 9.6 m				
10		Seepage from 1.9 m, Sloughing to 3.0 m Upon Completion Slotted 25 mm PVC Standpipe Installed to 9.6 m Indicated Water Level Measured on November 18, 2016				
11						

Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80

SPT (N): 20 40 60 80

Pocket Pen. (kPa): 100 200 300 400

11/18/2016

16BH002

Elevation (m): 810 809 808 807 806 805 804 803 802 801 800

Contractor: CHILAKO DRILLING SERVICES LTD.	Completion Depth: 9.6 m
Drilling Rig Type: 150mm SOLID STEM AUGER	Start Date: November 11, 2016
Logged By: SS	Completion Date: November 11, 2016
Reviewed By: JZ	Page 1 of 1

TETRA TECH EBA

CLIENT: ALBERTA INFRASTRUCTURE

Borehole No: 16BH003

Project: ST. PATRICK'S SCHOOL MODERNIZATION	Project No: 704-ENG.LGEO03186-01
Location: 5302 - 48 STREET	Ground Elev: 810.54 m
TABER, AB I N: 5515936.48, E: 416876.71	PROJECT ENGINEER: TREVOR CURTIS

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	16BH003	Elevation (m)
0	Solid stem auger	TOPSOIL - clay, sandy, silty, moist, dark brown, roots, organics								810
		CLAY (FILL) - silty, some sand, trace gravel, moist, stiff, medium plastic, brown, coal and oxide specks, trace organic staining		B1		24.1				
1		... some gravel for 100 mm								
		... red shale specks		B2		20.5				
		... sandy, low plastic, brown with dark brown mottling								809
		Sand - silty, very moist, fine grained, well graded, very loose, brown		D1	2					
2		... wet, seepage		B3		21.6				
				B4		21.3				808
		...silty, fine grained, wet to saturated, very loose to loose, dark brown								
3		... brown		D2	5	24				
				B5		24.8				807
4				B6						
		... some silt, fine grained, poorly graded, compact, greyish brown		D3	21	27				806
5				B7						
				B8		23.1				805
6										
		CLAY - silty, some sand, very moist to wet, firm to stiff, medium plastic, dark greyish brown, laminated high plastic clay, silt, and sand lenses, high plastic clay lenses to 100 mm		D4	9	22.9				804
7				B9		29.4				
				B10		28.3				
		... trace sand, firm, high plastic		D5	7					803
8		CLAY (TILL) - silty, trace sand, trace gravel, moist to very moist, firm, high plastic, dark grey, silt and sand pockets, medium plastic clay pockets		B11		23.3				
				B12		22.8				802
9										
		... trace to some sand, moist to very moist, stiff, medium to high plastic		D6	12	19.4				801
				B13		21				
10		... some sand, medium plastic								
				B14		19.5				800
				D7	13					
11				B15		18.5				
				B16						799
12										
		End of Borehole @ 12.2 m								798
		Seepage from 1.8 m, Sloughing to 2.4 m Upon Completion								
13		Slotted 25 mm PVC Standpipe Installed to 6.1 m								
		Indicated Water Level Measured on November 18, 2016								797
14										

11/18/2016

11/18/2016

TETRA TECH EBA

Contractor: CHILAKO DRILLING SERVICES LTD.	Completion Depth: 12.2 m
Drilling Rig Type: 150mm SOLID STEM AUGER	Start Date: November 11, 2016
Logged By: SS	Completion Date: November 11, 2016
Reviewed By: JZ	Page 1 of 1

CLIENT: ALBERTA INFRASTRUCTURE

Borehole No: 16BH004

Project: ST. PATRICK'S SCHOOL MODERNIZATION	Project No: 704-ENG.LGEO03186-01
Location: 5302 - 48 STREET	Ground Elev: 810.51 m
TABER, AB I N: 5515906.07, E: 416840.54	PROJECT ENGINEER: TREVOR CURTIS

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	SPT (N) (20 40 60 80) / Pocket Pen. (kPa) (100 200 300 400)	16BH004	Elevation (m)
0	Solid stem auger	CLAY (FILL) - silty, some sand, trace gravel, moist, stiff to very stiff, medium plastic, brown, coal and oxide specks, sand pockets, red shale		B1		18				810
1		... brown with dark brown mottling, organic staining		B2		18.3				
		Clay - silty, sandy, very moist to wet, very sof , low plastic, brown		D1	2					809
2		... wet, brown with dark brown mottling, seepage		B3		23				
		some sand to sandy, very moist to wet, firm, low to medium plastic		B4		23.5				808
3		CLAY (TILL) - silty, trace sand, trace gravel, very moist, stiff, high plastic, brown with grey mottling, coal and oxide specks, silt and sand pockets		D2	12	21.4				
				B5		21.3				807
4				B6		21.9				
				D3	12					806
5		... some sand, moist, very stiff, medium plastic, high plastic clay inclusions		B7		19.1				
				B8		18.2				805
6		... stiff to very stiff, dark brown with grey mottling		D4	16					
		... trace precipitates		B9		17.7				804
7				B10		18.9				
				D5	15					803
8				B11		18.7				
				B12						802
9		... moist to very moist, stiff		D6	12	20.9				
		End of Borehole @ 9.6 m								801
10		Seepage from 1.9 m, No Sloughing Upon Completion Slotted 25 mm PVC Standpipe Installed to 9.6 m Indicated Water Level Measured on November 18, 2016								
										800
11										

11/18/2016

11/18/2016

TETRA TECH EBA

Contractor: CHILAKO DRILLING SERVICES LTD.	Completion Depth: 9.6 m
Drilling Rig Type: 150mm SOLID STEM AUGER	Start Date: November 11, 2016
Logged By: SS	Completion Date: November 11, 2016
Reviewed By: JZ	Page 1 of 1

CLIENT: ALBERTA INFRASTRUCTURE

Borehole No: 16BH005

Project: ST. PATRICK'S SCHOOL MODERNIZATION	Project No: 704-ENG.LGEO03186-01
Location: 5302 - 48 STREET	Ground Elev: 810.14 m
TABER, AB I N: 5515907.28, E: 416833.06	PROJECT ENGINEER: TREVOR CURTIS

Depth (m)	Method	Soil Description	Sample Type	Sample Number	SPT (N)	Moisture Content (%)
0	Solid stem auger	GRAVEL (FILL) - some sand, subrounded, well graded, sizes to 10 mm, moist, very loose, brown				
		CLAY (FILL) - silty, some sand, trace gravel, moist, stiff, medium plastic, brown with dark brown mottling, red shale, sand pockets, trace organic staining		B1		18.1
1		Clay - silty, sandy, very moist, soft, low plastic, brown		B2		21.5
		... wet, trace seepage		D1	6	
		...some sand, firm, medium plastic, brown		B3		20.2
2		... trace sand, moist, stiff to very stiff, high plastic, brown with grey mottling, white precipitates		B4		19.1
		... soluble sulphate content < 0.1% @ 2.4 m				
		CLAY (TILL) - silty, trace to some sand, very moist, firm, medium to high plastic, brown with grey mottling, coal and oxide specks, sand pockets		D2	7	22.9
3				B5		19.6
		... some sand, moist, medium plastic, stiff to very stiff		B6		19
				D3	15	
4				B7		17.6
				B8		18.3
5				D4	15	
				B9		16.8
6				B10		
		... very stiff, dark grey with brown mottling, oxide staining		D5	17	19
7				B11		
		... gypsum crystals		B12		17.4
		... 150 mm high plastic clay pocket				
8				D6	20	16.3
		End of Borehole @ 9.6 m				
9		Seepage from 1.4 m, No Sloughing Upon Completion Slotted 25 mm PVC Standpipe Installed to 9.6 m Indicated Water Level Measured on November 18, 2016				
10						
11						

Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80

SPT (N): 20 40 60 80

Pocket Pen. (kPa): 100 200 300 400

16BH005

Elevation (m): 810 809 808 807 806 805 804 803 802 801 800

11/18/2016

TETRA TECH EBA

Contractor: CHILAKO DRILLING SERVICES LTD.	Completion Depth: 9.6 m
Drilling Rig Type: 150mm SOLID STEM AUGER	Start Date: November 11, 2016
Logged By: SS	Completion Date: November 11, 2016
Reviewed By: JZ	Page 1 of 1

APPENDIX C

RECOMMENDED GENERAL DESIGN AND CONSTRUCTION GUIDELINES

BORED CAST-IN-PLACE CONCRETE PILES

Design and construction of piles should comply with relevant Building Code requirements.

Piles should be installed under full-time inspection of qualified geotechnical personnel. Pile design parameters should be reviewed in light of the findings of the initial bored shafts drilled on a site. Further design review may be necessary if conditions observed during site construction do not conform to design assumptions.

Where fill material or lenses or strata of sand, silt or gravel are present within the designed pile depth, these may be incompetent and/or water bearing and may cause sloughing. Casing should be on hand before drilling starts and be used, if necessary, to seal off water and/or prevent sloughing of the bore.

If piles are to be underreamed (belled), the underreams should be formed entirely in self-supporting soil and entirely within the competent bearing stratum. Where sloughing occurs at design elevation it may be necessary to extend the base of the pile bell to a greater depth. Piles may be constructed with bells having outside diameters up to approximately three times the diameters of their shafts. Piles with shaft diameters of less than 400 mm should not be underreamed due to difficulties associated with ensuring a clean base.

Prior to pouring concrete, bottoms of pile bells or of straight shaft end bearing piles should be mechanically cleaned of all disturbed material.

Pile bores should be visually inspected after completion to ensure that disturbed materials and/or water are not present on the base so that recommended allowable bearing and skin friction parameters may apply.

Other procedures to inspect the pile shafts may be used where shaft diameters of less than 760 mm (30 inch) are constructed, such as, inspection with a light or with the use of a downhole camera.

For safety reasons, where hand cleaning and/or 'down shaft' inspection by personnel are required, the pile shaft must be cased full length prior to personnel entering the shaft.

Reinforcing steel should be on hand and should be placed as soon as the bore has been completed and approved.

Longitudinal reinforcing steel is recommended to counteract the possible tensile stresses induced by frost action and should extend to a minimum depth of 3.5 m. A minimum steel of 0.5 percent of the gross shaft area is recommended or per applicable building code requirements.

Where a limited quantity of water is present on the pile base (<50 mm), it should be removed. Where significant quantities of water are present (>50 mm), and it is impracticable to exclude water from the pile bore, concrete should be placed by tremie techniques or a concrete pump.

A "dry" pile should be poured by "free fall" of concrete only where impact of the concrete against the reinforcing cage, which can cause segregation of the concrete, will not occur. A hopper should be used to direct concrete down the centre of the pile base and to prevent impact of concrete against reinforcing steel.

Concrete used for "dry" uncased piles should be self-compacting and should have a target slump of 125 mm. Where casing is required to prevent sloughing or seepage, the slump should be increased to 150 mm. The casing should be filled with concrete and then the casing should be withdrawn smoothly and continuously. Sufficient concrete should be placed to allow for the additional volume of the casing and reduction in level of the concrete as the casing is withdrawn. Concrete should not be poured on top of previously poured concrete, after the casing is withdrawn. In order to comply with maximum water:cement ratios for the concrete, the use of chemicals (or superplasticizers) to temporarily increase the slump may be required. Concrete for each pile should be poured in one continuous

operation and should be placed immediately after excavation and inspection of piles, to reduce the opportunity for the ingress of free water or deterioration of the exposed soil or rock.

If piles cannot be formed in dry conditions then the concrete should be placed by tremie tube or concrete pump. Concrete placed by tremie should have a slump of not less than 150 mm. A ball or float should be used in the tremie tube to separate the initial charge of concrete from the water in the pile bore. The outlet of the tremie tube should be maintained at all times 1.0 m to 2.0 m below the surface of the concrete. The diameter of the tremie tube should be at least 200 mm. The tube should be water tight and not be made of aluminum. Smaller diameter pipes may be used with a concrete pump. The surface of the concrete should be allowed to rise above the cut off level of the pile, so that when the temporary casing is withdrawn and the surface level of the concrete adjusts to the new volume, the top of the uncontaminated concrete is at or above the cut off level. The concrete should be placed in one continuous smooth operation without any halts or delays. Placing the lower portion of the pile by tremie tube and placing the upper portion of the pile by "free fall" should not be permitted, to ensure that defects in the pile shaft at the top of the tremie concrete do not occur. As the surface of the concrete rises in the pile bore the water in the pile bore will be displaced upwards and out of the top of the pile casing.

When concreting piles by tremie techniques, allowance should be made for the removal of contaminated or otherwise defective concrete at the tops of the piles.

An accurate record of the volume of concrete placed should be maintained as a check that a continuous pile had been formed.

Concrete should not be placed if its temperature is less than 5°C or exceeds 30°C, or if it is more than two hours old.

Where tension, horizontal or bending moment loading on the pile is foreseen, steel reinforcing should be extended and tied into the grade beam or pile cap. The steel should be designed to transfer loads to the required depth in the pile and to resist resultant bending moments and shear forces.

Void formers should be placed beneath all grade beams to reduce the risk of damage due to frost effects or soil moisture changes.

Where the drilling operation might affect the concrete in an adjacent pile (i.e., where pile spacing is less than approximately three diameters) drilling should not be carried out before the previously poured pile concrete has set for at least 24 hours.

Where a group of four or more piles are used the allowable working load on the piles may need to be modified to allow for group effects.

Piles should be spaced no closer than 2.5 times the pile shaft diameter, measured centre-to-centre. Strict control of pile location and verticality should be exercised to provide accurate locations and spacings of piles. In general, piles should be constructed within a tolerance of 75 mm plan distance in any direction and within a verticality of 1%.

A detailed record should be kept of pile construction; the following information should be included, pile number, shaft/base diameter, date and time bored, date and time concreted, elevation of piling platform, depths (from piling platform level) to pile base and to concrete cut off level, length of casing used, details of reinforcement, details of any obstructions, details of any groundwater inflows, brief description of soils encountered in the bore and details of any unusual occurrences during construction.

If a large number of piles are to be installed, it may be possible to optimize the design on the basis of pile load tests or conducting high strain dynamic pile testing.

CONSTRUCTION EXCAVATIONS

Construction should be in accordance with good practice and comply with the requirements of the responsible regulatory agencies.

All excavations greater than 1.5 m deep should be sloped or shored for worker protection.

Shallow excavations up to about 3 m depth may use temporary sideslopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3 m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to Tetra Tech EBA for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. Tetra Tech EBA can provide further information on monitoring and testing procedures if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down, at 45 degrees from the horizontal from the base of foundations of adjacent structures intersects the extent of the proposed excavation, these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

BACKFILL MATERIALS AND COMPACTION (GENERAL)

1.0 DEFINITIONS

"Landscape fill" is typically used in areas such as berms and grassed areas where settlement of the fill and noticeable surface subsidence can be tolerated. "Landscape fill" may comprise soils without regard to engineering quality.

"General engineered fill" is typically used in areas where a moderate potential for subgrade movement is tolerable, such as asphalt (i.e., flexible) pavement areas. "General engineered fill" should comprise clean, granular or clay soils.

"Select engineered fill" is typically used below slabs-on-grade or where high volumetric stability is desired, such as within the footprint of a building. "Select engineered fill" should comprise clean, well-graded granular soils or inorganic low to medium plastic clay soils.

"Structural engineered fill" is used for supporting structural loads in conjunction with shallow foundations. "Structural engineered fill" should comprise clean, well-graded granular soils.

"Lean-mix concrete" is typically used to protect a subgrade from weather effects including excessive drying or wetting. "Lean-mix concrete" can also be used to provide a stable working platform over weak subgrades. "Lean-mix concrete" should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

2.0 GENERAL BACKFILL AND COMPACTION RECOMMENDATIONS

Exterior backfill adjacent to abutment walls, basement walls, grade beams, pile caps and above footings, and below highway, street, or parking lot pavement sections should comprise "general engineered fill" materials as defined above.

Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive "general engineered fill". Such backfill should provide a relatively impervious surficial zone to reduce seepage into the subsoil against the structure.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only hand-held compaction equipment should be used in the compaction of fill within 1 m of retaining walls or basement walls. If compacted fill is to be placed on both sides of the wall, they should be filled together so that the level on either side is within 0.5 m of each other.

All lumps of materials should be broken down during placement. Backfill materials should not be placed in a frozen state, or placed on a frozen subgrade.

Where the maximum-sized particles in any backfill material exceed 50% of the minimum dimension of the cross-section to be backfilled (e.g., lift thickness), such particles should be removed and placed at other more suitable locations on site or screened off prior to delivery to site.

Excavation and construction operations expose materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration of performance. Unless otherwise specifically indicated in this report, the walls and floors of excavations, and stockpiles, must be protected from the elements, particularly moisture, desiccation, frost, and construction activities. Should desiccation occur, bonding should be provided between backfill lifts. For fine-grained materials the previous lift should be scarified to the base of the desiccated layer, moisture-conditioned, and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and recompaction.

3.0 COMPACTION AND MOISTURE CONDITIONING

“Landscape fill” material should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90% of SPD unless a higher percentage is specified by the jurisdiction.

“General engineered fill” and “select engineered fill” materials should be placed in layers of 150 mm compacted thickness and should be compacted to not less than 98% of SPD. Note that the contract may specify higher compaction levels within 300 mm of the design elevation. Cohesive materials placed as “general engineered fill” or “select engineered fill” should be compacted at 0 to 2% above the optimum moisture content. Note that there are some silty soils which can become quite unstable when compacted above optimum moisture content. Granular materials placed as “general engineered fill” or “select engineered fill” should be compacted at slightly below (0 to 2%) the optimum moisture content.

“Structural engineered fill” material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100% of SPD at slightly below (0 to 2%) the optimum moisture content.

4.0 “GENERAL ENGINEERED FILL”

Low to medium plastic clay is considered acceptable for use as “general engineered fill,” assuming this material is inorganic and free of deleterious materials.

Materials meeting the specifications for “select engineered fill” or “structural engineered fill” as described below would also be acceptable for use as “general engineered fill.”

5.0 “SELECT ENGINEERED FILL”

Low to medium plastic clay with the following range of plasticity properties is generally considered suitable for use as “select engineered fill”:

Liquid Limit	= 20 to 40%
Plastic Limit	= 10 to 20%
Plasticity Index	= 10 to 30%

Test results should be considered on a case-by-case basis.

“Pit-run gravel” and “fill sand” are generally considered acceptable for use as “select engineered fill.” See exact project or jurisdiction for specifications.

The “pit-run gravel” should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No material oversize of the specified maximum sieve size should be tolerated. This material would typically have a fines content of less than 10%.

The materials above are also suitable for use as “general engineered fill.”

6.0 "STRUCTURAL ENGINEERED FILL"

Crushed gravel used as "structural engineered fill" should be hard, clean, well graded, crushed aggregate, free of organics, coal, clay lumps, coatings of clay, silt, and other deleterious materials. The aggregates should conform to the requirement when tested in accordance with ASTM C136 and C117. See exact project or jurisdiction for specifications. This material would typically have a fines content of less than 10%.

In addition to the above, further specification criteria identified below should be met:

"Structural Engineered Fill" – Additional Material Properties

Material Type	Percentage of Material Retained on 5 mm Sieve having Two or More Fractured Faces	Plasticity Index (<400 μm)	L.A. Abrasion Loss (percent Mass)
Various sized Crushed Gravels	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications

Materials that meet the grading limits and material property criteria are also suitable for use as "select engineered fill."

7.0 DRAINAGE MATERIALS

"Coarse gravel" for drainage or weeping tile bedding should be free draining. Free-draining gravel or crushed rock generally containing no more than 5% fine-grained soil (particles passing No. 200 sieve) based on the fraction passing the 3/4-inch sieve or material with sand equivalent of at least 30.

"Coarse sand" for drainage should conform to the following grading limits:

"Coarse Sand" Drainage Material – Percent Passing by Weight

Sieve Size	Coarse Sand*
10 mm	100
5 mm	95 – 100
2.5 mm	80 – 100
1.25 mm	50 – 90
630 μm	25 – 65
315 μm	10 – 35
160 μm	2 – 10
80 μm	0 – 3

* From CSA A23.1-09, Table 10, "Grading Limits for Fine Aggregate", Class FA1

Note that the "coarse sand" above is also suitable for use as pipe bedding material. See exact project or jurisdiction for specifications.

8.0 BEDDING MATERIALS

The "Coarse Sand "gradation presented above in Section 7.0 is suitable for use as pipe bedding and as backfill within the pipe embedment zone, however see exact project or jurisdiction for specifications.

FLOOR SLABS-ON-GRADE

All soft, loose or organic material should be removed from beneath slab areas. If any local 'hard spots' such as old basement walls or abandoned pile foundation are revealed beneath the slab area, these should be over-excavated and removed to not less than 0.9 m below underside of slab level. The exposed soil should be proof-rolled and the final grade restored by engineered fill placement. If proof-rolling reveals any soft or loose spots, these should be excavated and the desired grade restored by engineered fill placement. The subgrade should be compacted to a depth of not less than 0.3 m to a density of not less than 98 percent Standard Proctor Maximum Dry Density (ASTM Test Method D698).

If, for economic reasons, it is considered desirable to leave low quality material in-place, such as existing fills, beneath a slab-on-grade, special ground treatment procedures may be considered, Tetra Tech EBA could provide additional advice on this aspect if required.

A levelling course of well graded granular fill (with maximum size of 20 mm), at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade. The type of granular fill should be selected based on the design floor loadings. Alternatively a minimum thickness of 150 mm of 80 mm pit-run gravel overlain by a minimum thickness of 50 mm of 20 mm crushed gravel may be used. Coarse gravel particles larger than 25 mm diameter should be avoided directly beneath the slab-on-grade to limit potential stress concentrations within the slab. All levelling courses directly under floor slabs should be compacted to 100 percent of Standard Proctor Maximum Dry Density (ASTM Test Method D698).

Engineered fill, pit-run gravel and crushed gravel are defined under the heading 'Backfill Materials and Compaction' elsewhere in this Appendix.

The excavated subgrade beneath slabs-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of free water. This applies before, during, and after the construction period.

ALBERTA SAFETY & ENVIRONMENTAL SERVICES

March 20, 2017

Gary Long
Alberta Infrastructure
John J Bowlen Building, 10th Floor
620 7 Avenue SW
Calgary, Alberta T2P 0Y8

Dear Mr. Long,

Re: Hazardous Materials Assessment
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta
Plan No. 016559A Project ID: B4166A-0001 Contract ID: 030323
Project #: AS 4576

Please find the attached Hazardous Materials Assessment report for the Project ID B4166A-0001 and Plan No. 016559A. The report provides details of the assessment performed by Alberta Safety and Environmental Services Ltd. (ASE Services) for the St. Patrick's Elementary School located at 5302 48 Street, Taber, Alberta, and includes a description of the work, tests, inspections and laboratory results of the bulk sample tests. Included with the report are site photographs, site floor plans and a detailed inventory of hazardous materials identified during the assessment. The report was drafted by Jake Koethler and Andrea Irons, Environmental Safety Consultants and reviewed by Senior Project Manager Silvana Wu.

Please note that the findings presented within this report represent conditions encountered at the time of the assessment.

ASE Services would like to thank Alberta Infrastructure for the opportunity and we look forward to any future projects. If you have any questions or require any additional information, please feel free to contact our project management team at (403) 475-0963.

Sincerely,

Alberta Safety & Environmental Services

Submitted by:

Silvana Wu, B. Sc.
Senior Project Manager

ALBERTA SAFETY & ENVIRONMENTAL SERVICES

Table of Contents

1.0 INTRODUCTION

Alberta Safety & Environmental Services Ltd. (ASE Services) was requested by Gary Long of Alberta Infrastructure to conduct a Hazardous Materials Assessment of the St. Patrick's Elementary School located at 5302 48 Street in Taber, Alberta. The assessment was performed on April 2, 2016 to June 20, 2016 by Jake Koethler, Corbyn Pilling, Kari Ghodes, and Silvana Wu with ASE Services.

The purpose of the assessment was to conduct a room-by-room assessment to sample and/or identify building materials that may contain asbestos, paint which may contain lead, as well as to identify the presence of other potential hazardous materials, such as polychlorinated biphenyls (PCBs), mercury, miscellaneous chemicals, urea formaldehyde foam insulation (UFFI), radioactive material and ozone-depleting substances (ODS), in relation to the Alberta Occupational Health and Safety Act, Regulation and adopted Code, and industry-accepted guidelines. The results of the assessment have been used to complete a detailed inventory so that hazardous materials will be properly identified for appropriate management by the owners of the building prior to renovation or demolition.

2.0 SCOPE OF WORK

The scope of work involved an assessment of the building environment for the presence of building materials that may contain the following:

- Asbestos, including vermiculite insulation;
- Lead based paints and lead sheeting;
- Mercury containing equipment and Fluorescent/mercury light bulbs;
- Ozone depleting substances in equipment (CFCs);
- Polychlorinated biphenyls (PCBs) in light fixture ballasts;
- Urea formaldehyde foam insulation (UFFI);
- Equipment containing radioactive components;
- Visible mould on building materials;
- Biohazards; and
- Miscellaneous chemicals.

The reporting scope of work for the building environment includes:

- Photographs of identified materials;
- Site drawings outlining the location of all identified hazardous materials; and
- Preparation of this report detailing our findings, conclusions and recommendations.

3.0 OBSERVATIONS

At the time of the assessment ASE Services made the following observations:

- The building was occupied and slated for renovation;
- The building was a one (1) storey structure originally constructed in 1962, with additions added in 1965, 1969 and 1972;
- The interior walls of the building were mostly cinderblock and drywall;
- Exterior walls were primarily cinderblock with some drywall;
- The flooring in the building consisted of vinyl floor tiles, vinyl sheet flooring, carpet, ceramic tile and exposed concrete flooring;
- The ceilings were primarily 2' x 4' ceiling tiles and 12" x 12" ceiling tiles, with drywall in some areas;
- The exterior of the building was composed of stucco and brick and mortar;
- The roofing material consisted of concrete, V.P., EPS, fibreboard and wood; and
- Vermiculite was observed in cinderblock walls at the time of the assessment.

4.0 METHODOLOGY

The assessment included a room-by-room inspection of all accessible locations in the interior as well as an inspection of the exterior of the building. Samples of suspected asbestos containing materials and suspected lead-containing paints were collected from the interior and exterior of the building. Observations were made for PCBs, mercury, radioactive materials, miscellaneous chemicals, and ozone-depleting substances in the building. The methodology used for each parameter of the hazardous materials survey is outlined below.

4.1 Asbestos Containing Materials

Small, representative pieces of those materials suspected to contain asbestos were collected and placed in clear, sealable plastic bags. Samples were forwarded to Crisp Analytical Laboratories, L.L.C. in Carrollton, Texas, and iATL International Asbestos Testing Laboratories in Mt. Laurel, New Jersey, for analysis. The samples were analyzed using the EPA 600/R-93/116 analysis method. Vermiculite samples were forwarded to Wes-Har Laboratories in Richmond, British Columbia and analyzed using the EPA/600/R-04/004 analysis method. These are comprehensive methods outlining various techniques for determining the asbestos concentration in bulk building materials.

4.2 Lead-Based Paint

Paint that was suspected to contain lead was collected and placed in clear, sealable plastic bags. All paint samples were forwarded to iATL International Asbestos Testing Laboratories for analysis. The sample was analyzed using the ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry" analysis method, and compared to the 90 parts per million (ppm) criterion limit outlined in the Occupational Health and Safety Bulletin "*Lead at The Work Site*" (2013), published by the Government of Alberta[1].

4.3 Mercury in Thermostats, Pressure-Sensing Devices and Fluorescent Light Tubes

All thermostats and pressure-sensing devices were visually assessed for the presence of a mercury-containing bulb. All fluorescent light tubes are known to contain mercury dust unless otherwise stated by the manufacturer.

4.4 Ozone-Depleting Substances (ODS)

At the time of assessment each room was visually inspected for equipment such as refrigerators, freezers and air conditioning units that may contain Ozone-Depleting Substances (ODS). Ozone-Depleting Substances contain the following chemical compounds:

- Chlorofluorocarbons (CFCs);
- Halons;
- Hydrochlorofluorocarbons (HCFCs);
- Bromochloromethane;
- Carbon Tetrachloride;
- Methyl Bromide; and
- Methyl Chloroform.

Stamp codes on the equipment indicate the type of chemical used in each piece of equipment. If stamp codes are not visible at the time of assessment the equipment is considered to be ODS-containing until proven otherwise. Please note that even equipment that uses ozone friendly chemicals must be removed, handled and disposed of and/or recycled properly as they could emit greenhouse gases.

4.5 Polychlorinated Biphenyls (PCBs) in Fluorescent Light Fixtures

Building materials were visually assessed for the presence, or potential presence, of PCBs. Common building materials that could contain PCBs are fluorescent light ballasts, electrical transformers, and heat transfer equipment. Ballasts are inaccessible if the light fixture is not de-

[1] Alberta Government. Occupational Health and Safety. *Lead at The Work Site*. (November 2013).

energized and the power locked out in accordance with the Alberta Occupational Health and Safety Act. Ballasts that were inaccessible at the time of assessment are considered to be PCB-containing until proven otherwise.

4.6 Urea Formaldehyde Foam Insulation (UFFI)

Visually accessible wall cavities were assessed for the presence of urea formaldehyde form insulation (UFFI). The insulation is most commonly found in basements, crawl spaces, attics and unfinished attics. UFFI may pose a health hazard and emit formaldehyde vapour if it is not well sealed, becomes wet and/or is exposed.

4.7 Radioactive Materials

Ionization chambers in select smoke detectors contain a small amount of radioactive material to sense the presence of airborne particles or smoke. All smoke detectors that were inaccessible at the time of assessment are considered to contain radioactive material until proven otherwise.

4.8 Visible Mould Growth and Water Damage

All building materials were visually assessed for the presence of visible mould growth and water damage by trained ASE Services representatives. All observations regarding affected building materials were documented. Areas where mould was observed a sample was collected for analysis. Mould bulk samples were taken using the tape-lift method where approximately 1 inch of clear Scotch tape was applied to an area of suspected mould growth free of extraneous debris. The tape was then applied to a clean glass slide and was analyzed by ASE Services using Direct Microscopy Examination method to determine spore counts.

4.9 Biohazards

At the time of assessment accessible areas of each room were examined for any evidence of biological hazards such as rodent droppings, avian fecal matter, animal nests and skeletal remains.

4.10 Miscellaneous Chemicals

At the time of assessment each room was inspected for miscellaneous chemicals such as paints, lubricants, oils, gasoline, and household and/or commercial cleaning products that may be impacted by demolition and potentially pose an environmental hazard.

5.0 RESULTS AND DISCUSSION

5.1 Samples Collected for Asbestos Content

A total of 88 samples of bulk material were collected for asbestos analysis. Tables 1, 2, 3 and 4 in ***Appendix III*** summarize the laboratory sample results and provides an indication of the asbestos containing materials present in the building. **Results indicate that 12 samples were positive for asbestos.** Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.2 Paint Samples Collected to Determine Lead Content

A total of 54 bulk samples of paint were collected for lead analysis. Table 5 in ***Appendix III*** summarizes the laboratory sample results and provides an indication of the lead-based paint present in the building. **Results indicate that 32 samples exceeded the criterion limit of 90 parts per million (ppm), or 0.009 percent by weight.**[2] Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for the laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.3 Mercury in Thermostats, Pressure-Sensing Devices and Fluorescent Light Tubes

Mercury and other heavy metals pose a danger to human and environmental health when improperly managed. Common sources of mercury include thermometers, fluorescent light

[2] Government of Alberta. Occupational Health and Safety. *Lead at The Work Site*. (November 2013).

tubes and thermostat bulbs. Mercury thermostats are commonly used in residential and commercial office spaces. ASE Services identified the following at the time of assessment:

- Fluorescent light tubes containing mercury dust were observed throughout the building (see Photograph 45); and
- Approximately nine (9) thermostats with mercury containing bulbs were observed throughout the building at the time of the assessment (see Photographs 46 and 47).

5.4 Ozone-Depleting Substances (ODS)

Ozone-depleting substances (ODS) are human-made chemicals that contain chlorine, fluorine, bromine, carbon and hydrogen that do not readily degrade after being released into the atmosphere.

At the time of assessment, approximately five (5) refrigerators were observed in the building (see Photographs 48 to 50). The stamp codes on the refrigerators were inaccessible at the time of assessment, and are assumed to contain ODS until proven otherwise.

5.5 Polychlorinated Biphenyls (PCBs) in Fluorescent Light Ballasts

Fluorescent light fixtures are identified by opening the casing of the light fixtures to visually identify a code stamp on the ballast. In order to safely open the light casing, the lighting fixture must be fully de-energized and the power locked out in accordance with the Alberta Occupational Health and Safety Code requirements.

At the time of the assessment, power within the building was not locked out, so the ballasts were inaccessible for inspection. All ballasts located throughout the building should be assumed to be PCB containing until proven otherwise.

5.6 Urea Formaldehyde Foam Insulation (UFFI)

At the time of assessment UFFI materials were not identified.

5.7 Radioactive Materials

At the time of assessment, the following equipment was observed suspected to contain radioactive materials:

- No smoke detectors were observed in the building (see Photograph 51); and
- Approximately four (4) suspected self-powered “Exit” signs were observed throughout the building (see Photographs 52 and 53).

5.8 Water Damage and Visible Mould Growth

Water damage was observed on ceilings in various areas throughout the building at the time of the assessment (see Photographs 54 to 63). Ten (10) bulk mould sampes were collected from drywall and ceiling tile surfaces for analysis. Table 6 in ***Appendix III*** summarizes the bulk mould laboratory results. Results of the bulk sample analysis indicate low levels of mould spores, including *Chaetomium and Cladosporium* types were detected on the samples collected from Rooms 110, 121 and 131, and low levels of Mycelial Fragments were detected on the sample collected from Room 101. Please refer to ***Appendix II*** for photographs, ***Appendix IV*** for sample locations, ***Appendix V*** for the laboratory reports, and ***Appendix III*** for bulk sample inventory tables.

5.9 Biological Hazards

No evidence of rodent or animal activity was identified at the time of the assessment.

5.10 Miscellaneous Chemicals

Miscellaneous chemicals, including cleaning supplies, were observed throughout the building (see Photograph 64). Approximately five (5) ABC dry-chemical fire extinguishers containing hazardous materials were also observed throughout the assessed locations within the building (See Photograph 65).

Lead-acid batteries contain an extremely corrosive acid and a large amount of lead, which is a highly toxic metal that produces a range of adverse health effects, particularly in young children.

Approximately four (4) emergency lighting units that may contain lead-acid batteries were observed throughout the building at the time of the assessment (see Photograph 66).

6.0 CONCLUSIONS

Based on the observations and the sampling results, ASE Services makes the following conclusions:

1. Asbestos was determined to be present within the following materials:
   - Black mastic beneath 9”x9” and 12”x12”, grey with white streaks vinyl floor tiles in the Meter Room (Room 106) and Room 113a (1962 wing);
   - Black caulking around the door frame of the exterior door in the Furnace Room (Room 107);
   - 12”x12” acoustic ceiling tile with a grid pattern throughout the 1965 Wing, including Room 118, Room 119, Nevil’s Office, Nevil’s Office Play Area, Room 115, the Gymnasium, and the 1965 Wing Main Hallway and Entry Vestibule;
   - 12”x12” blue with white streaks vinyl floor tile in Room 120 (1969 Addition);
   - Brown mastic behind 12”x12” acoustic ceiling tiles with a grid pattern throughout the 1969 Addition, including the Gymnasium, Room 122, Room 121 and Room 120;
   - Silver mastic on ducting in the Furnace Room (Room 124) and on ducting throughout the building;
   - Vermiculite insulation was confirmed to be present in the following locations:
     - The South, exterior walls in Rooms 101, 109 and the entrance vestibule (1962 wing);
     - The North walls in Rooms 118 and 119 (1965 addition); and
     - The North walls in Rooms 120 & 121 (1969 addition);

   Please note the following:
   - A destructive inspection of cinder block walls for the presence of vermiculite was conducted in a total of twenty-six (26) locations through-out the building. Vermiculite insulation was confirmed to be present in three (3) of those locations. ASE Services considers this inspection to be representative of the cinderblock walls in the structure, however it is possible that vermiculite may have gone undetected in isolated areas. Care should be taken when impacting cinderblock walls.
   - If any visually similar building materials are identified in locations other than those outlined in Section 6.0, they should be considered asbestos containing until proven otherwise.
2. Lead-containing surface coatings were found throughout the building. Lead-containing surface coatings were determined to be present in the following locations (see ***Appendix III*** for locations):
   - Dark grey paint on door frames and doors in Room 113 (1962 wing);
   - Yellow paint on door frames and doors in the Boys Washroom and Girls Washroom (1962 wing);
   - Beige surface coating on washroom stalls in the Boys Washroom (1962 wing);
   - White paint on door frames and doors in the 1962 Entry Vestibule and Room 119 (1965 wing);
   - Mint green paint on cinderblock walls in the 1962 Entry Vestibule, 1965 Entry Vestibule and 1965 Gym;
   - Cream paint on door frames and doors in the 1962 Community Washroom;
   - Dark green paint on shelves throughout the Main Hallways in the 1962 and 1965 wings;
   - Dark blue paint on doors in the 1962 Wing Hallway;

- Light blue paint on door frames in Room 102 (1962 wing);
- Navy blue paint on doors in the Janitor's Room (1962 wing) and Room 108 (1962 wing);
- Blue paint on door frames/doors in Room 115 (1965 wing) and Room 118 (1965 wing);
- Brown paint on door frames/doors in the Furnace Room (1962 wing), Room 123 (1972 wing) and 1962 Main Vestibule;
- Emerald green paint on door frames/doors in the 1972 Entry Vestibule;
- Pale green paint on cinderblock walls in the 1965 Vestibule, Room 128 (1972 wing), Room 117 (1965 wing), Room 130 (1972 wing), Room 123 (1972 wing), Room 13 (1972 wing), and the 1972 Storage and Furnace Rooms;
- Grey and black surface coating on shoe racks in the 1965 Vestibule;
- Grey paint on the floor in the Gym Storage;
- Pale green/blue paint on cinderblock walls in the Gym Storage (1969 wing);
- Dark blue paint on cinderblock walls in Room 121 (1969 wing);
- Yellow/lime green paint on cinderblock walls in Room 130 (1972 wing);
- Yellow paint on cinderblock walls in the Community Washroom (1962 wing); and
- Tan surface coating on washrooms stalls in the Girls and Boys Washrooms (1962 wing).

Please note: If any visually similar paints are identified in locations other than those outlined in Section 6.0, they should be considered lead-containing until proven otherwise.

3. Fluorescent light tubes containing mercury dust were observed throughout the building at the time of the assessment.
4. Approximately nine (9) thermostats with mercury containing bulbs were observed in locations throughout the building at the time of the assessment (see ***Appendix IV*** for locations).
5. Approximately five (5) refrigerators were observed in locations throughout the building at the time of the assessment. The code stamps on this equipment were inaccessible at the time of assessment; therefore, they are considered to contain ODS until proven otherwise (see ***Appendix IV*** for locations).
6. Light fixtures with ballasts were observed throughout the building at the time of the assessment; however, due to the power not being locked out, ballast were inaccessible for inspection. All ballasts should be considered to be PCB-containing until proven otherwise.
7. UFFI materials were not identified in the building at the time of the assessment.
8. Smoke detectors potentially containing radioactive materials were not observed in the building at the time of the assessment.
9. Approximately four (4) suspected self-powered "Exit" signs with radioactive materials were observed throughout the building at the time of the assessment.
10. Water damaged ceiling tiles and drywall were observed throughout the building at the time of the assessment (see ***Appendix IV*** for locations).
11. Mould growth was confirmed to be present on ceilings in Rooms 101, 110, 121 and 131 (see ***Appendix IV*** for locations).
12. Evidence of rodent or animal activity posing a biological hazard was not identified at the time of the assessment.

13. Miscellaneous chemicals including cleaning supplies, paint, and approximately five (5) ABC dry-chemical fire extinguishers were observed throughout the building (see ***Appendix IV*** for locations).
14. Approximately four (4) emergency lighting units observed in the building. These devices should be assumed to contain lead-acid batteries until proven otherwise (see ***Appendix IV*** for locations).

7.0 RECOMMENDATIONS

Based on the above conclusions ASE Services makes the following recommendations:

1. Prior to demolition all asbestos containing materials must be properly removed and disposed of by a contractor competent in asbestos abatement. All asbestos containing materials must be removed in accordance with the requirements outlined in the *Alberta Asbestos Abatement Manual* (2012). Please refer to the identified asbestos containing materials listed in section 6.0.
2. Lead-containing surface coatings in fair or poor condition (flaking, cracking, peeling, etc.) which are to be impacted during the course of any renovation or demolition activities should be removed and disposed of properly by a contractor competent in lead abatement prior to any such renovation and/or demolition. Lead-containing surface coatings in good condition (adhering to surface), do not need to be removed prior to any mechanical activities, however, if they are to be impacted by hand demolition activities, it should be conducted by a lead abatement contractor.

   Please note: If this building is scheduled for renovation or demolition by mechanical means, lead paint in good condition (adhering to surface) does not need to be removed prior to demolition; however, lead paint in poor condition (flaking) should be removed by a contractor competent in lead paint abatement. Although the new Federal standards for surface coating addresses a tolerance concentration up to 90 ppm of lead, if lead-based coatings remain in good condition, it usually does not pose a hazard. Hazardous conditions occur when the coating or paint deteriorates or is disturbed during renovation or industrial activities (sanding, grinding, cutting and/or welding). Occasionally, the removal of lead-based surface coatings can create a greater hazard than having it remain in its current state[3].
3. Fluorescent light tubes containing mercury dust and thermostats containing a mercury bulb should be manifested and disposed of properly according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta.
4. The stamp codes on the identified refrigerators should be inspected to determine if they contains ODS. All equipment that is confirmed to contain ODS should be removed and properly disposed of prior to demolition activities. ODS-containing equipment should be manifested and disposed of according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta. Please note that even equipment that uses ozone friendly chemicals must be removed, handled and disposed of and/or recycled properly as they could emit greenhouse gases.
5. All ballasts confirmed to contain PCB's that may be impacted during renovation or demolition activities must be removed and properly disposed of prior to such activities. All ballasts should be inspected for the presence of PCB's when the power is locked out of the building, and the ballasts are fully de-energized.
6. The code stamp on the identified smoke detectors should be inspected for the presence of radioactive materials.
7. In all occurrences, the underlying cause of water accumulation must be rectified or fungal growth will likely occur. Emphasis should be placed on ensuring proper repairs of

[3] Work Safe Alberta. CH071 – Chemical Hazards. *Special Cases – Lead Paints and Coatings* (2013).

the appropriate portions of the building infrastructure, so that water damage and moisture buildup do not persist.

8. All chemicals must be properly packaged and labelled according to WHMIS regulations. Miscellaneous chemicals must be removed and properly disposed of prior to any demolition activities where these items will be impacted. Emergency lighting units should be inspected for the presence of a lead-acid battery. All emergency lighting units confirmed to contain a lead-acid battery should be properly manifested and disposed of according to the Waste Control Regulation under the Environmental Protection and Enhancement Act of the province of Alberta.

Please note: Any additional materials identified which were not previously sampled or visually assessed should be assumed as hazardous unless proven otherwise.

8.0 WARRANTY

This report is intended for the exclusive use of the company, organization, or individual to whom it is addressed. It may not be used or relied upon in any manner whatsoever, or for any purpose whatsoever, by any other person. ASE Services makes no representation of fact or opinion of any nature whatsoever to any person other than the company, organization, or individual to whom this report is addressed. The warranty stated above may not be assigned.

If you have any questions or require any additional information, please feel free to contact our project management team at (403) 475-0963.

Alberta Safety & Environmental Services Ltd.

Reviewed by:

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Drafted by: Andrea Irons, B.Sc., Senior Environmental Safety Consultant

Attachments:

- Appendix I: Regulations and Guidelines
- Appendix II: Photographs
- Appendix III: Summary Tables of Results
- Appendix IV: Floor Plans
- Appendix V: Laboratory Reports
    - Crisp Analytical L.L.C. Bulk Asbestos Analysis dated June 2, 2016
    - iATL PLM Bulk Sample Analysis Summary Reports dated June 22 and 23, 2016
    - Wes-Har Bulk Summary Report dated June 23, 2016
    - iATL Lead Paint Sample Anlaysis Summary Reports dated June 23 and 29, 2016
    - ASE Services Bulk Mould Analysis Report dated June 29, 2016

APPENDIX I
REGULATIONS AND GUIDELINES

The Occupational Health and Safety Act applies to provincially-regulated worksites in the province of Alberta. Under the Occupational Health and Safety Act are the Occupational Health and Safety Regulation, and the Occupational Health and Safety Code. The purpose of the Act, Regulation and Code is to ensure that employers do everything reasonable and practicable to ensure the health and safety of the worker. The Act, Regulation and Code are administered through Alberta Human Resources and Employment – Workplace Health and Safety. The Regulations and Code provide a minimum standard that is enforceable by law for employers and workers to meet their regulatory obligations. Outlined below are portions of the Regulation, Code and CSA Standards. A complete listing of the applicable portions of the Act, Regulation, Code and Alberta Asbestos Abatement Manual are not provided.

Section 15(3) of the Occupational Health and Safety Regulation outlines the requirements for employers with respect to safety training regarding worker exposure to harmful substances. Where workers are exposed to a harmful substance including, but not limited to, asbestos and lead containing materials, the employer shall:

(a) establish procedures that minimize the worker's exposure to the harmful substance, and
(b) ensure that a worker who may be exposed to the harmful substance
    (i) is trained in the procedures,
    (ii) applies the training, and
    (iii) is informed of the health hazards associated with exposure to the harmful substance.

Part 4 Chemical Hazards, Biological Hazards and Harmful Substances, and Schedule 1 Chemical Substances, of the Alberta Occupational Health and Safety Code establishes the legislative requirements for asbestos and lead.

To assist employers with meeting their statutory requirements, Alberta Workplace Health and Safety has prepared the following documents:

- *Alberta Asbestos Abatement Manual*, 2012, and
- Safety Bulletin CH071 – *Lead at the Workplace*, 2013.

Asbestos

Asbestos is the common name given to a group of naturally occurring mineral silicates that can be separated into flexible fibres. The name asbestos comes from the Greek word meaning "unquenchable or indestructible." The main properties that make asbestos useful are its incombustibility, strength and flexibility when separated into fibres. It is also effective as a reinforcing or binding agent when combined with cement or plastic.

Many products that at one time contained asbestos are either no longer in use or have been replaced. The uses for asbestos ranged from products in which the fibres were well bound to friable products in which the fibres could easily become airborne. The construction industry was the main user of asbestos products. Sprayed insulation, stucco and joint cements manufactured in Canada and the United States no longer contain asbestos in an unbound form.[4]

The definitions for asbestos can be found in Part 4 of the Occupational Health and Safety Code. Part 4 sets limits for exposure to Chemical Hazards, Biological Hazards and Harmful Substances. Part 4 of the Code (Sections 16 through 27) outlines the General Requirements for employers to ensure worker exposure to a harmful substance is kept as low as reasonably practicable. In summary, the general requirements portion addresses the following:

1. Worker exposure to harmful substances;
2. Worker exposure during shifts greater than 8-hours;
3. Airborne concentration measurements;
4. Potential worker exposure;
5. Worker overexposure;
6. Worker decontamination;
7. Emergency bath, showers, eye wash equipment;

[4] Alberta Queen's Printer. *Alberta Asbestos Abatement Manual*. October 2012.

8. Prohibited activities;
9. Codes of practice; and
10. Storage of harmful substances.

Code of Practice: Section 26 of the Code states that an employer must have a Code of Practice (Management Plan) governing the storage, handling, use and disposal of a substance listed in Schedule 1, Table 1 that is present at a worksite. Asbestos is a substance listed in schedule 1. The Code of Practice must include measures to be used to prevent the uncontrolled release of the substance and the procedures to be followed if there is an uncontrolled release.

Sections 28 through 40 (excluding Section 39) outline the employer's requirements for asbestos at the work site. With respect to managing asbestos containing materials at a worksite the following sections apply:

Section 31: This section states that if it is determined that asbestos fibres may be released into the building then the building is in an unsafe condition and the employer must take all necessary steps to correct the unsafe condition.

Section 32: Prohibitions related to the use of asbestos: This section states that a person must not use materials containing crocidolite asbestos in an existing or new building and that a person must not apply asbestos by spraying.

Section 33: This section states that a person must not use asbestos in an air distribution system in a form in which asbestos fibres could enter the air supply or return air systems.

Section 34: If a building is to be demolished, the employer must ensure that the materials with the potential of releasing fibres are removed prior to demolition.

Section 35: If a building is being altered or renovated, the employer must ensure that materials that may be impacted are encapsulated, enclosed or removed.

With respect to the abatement or handling of asbestos containing materials employers are required to ensure worker exposure is kept to a minimum. In addition to the requirements under the General Provisions portion of the Code, sections 28 through 30, sections 36 through 38 and sections 40 are applicable. Please refer to the Occupational Health and Safety Code for further details or the Alberta Asbestos Abatement Manual.

Alberta Asbestos Abatement Manual

To assist employers with meeting their legislative requirements outlined under the Occupational Health and Safety Act, Regulation and Code, Alberta Workplace Health and Safety have published the Alberta Asbestos Abatement Manual. This manual describes the principles to be followed when selecting the most appropriate techniques for the safe abatement of asbestos containingmaterials. The manual also presents basic information on asbestos and asbestos products, health hazards, requirements for worker protection, safe work procedures, inspection criteria, applicable legislation and competency profiles for those persons involved in abatement activities. Work practices and precautions vary considerably with the type of material being removed, the amount of asbestos it contains, its condition and location. The objective of this manual is to present best practices in asbestos abatement that are to be followed in Alberta.

Occupational Health and Safety officers from Alberta Human Resources and Employment use this manual as a guide when reviewing abatement work practices and employer codes of practice. Practices are assessed against those presented in the manual to determine if they meet the intent of the province's occupational health and safety legislation. Alternate practices are acceptable if they provide workers with a level of safety equal to or greater than those practices presented in this manual.[5] By meeting the requirements of the Alberta Asbestos Abatement Manual the employer will ensure that worker and non-worker (general public) health is protected.

If asbestos is present in the building the Alberta Asbestos Abatement Manual states the following:

[5] Alberta Queen's Printer. *Alberta Asbestos Abatement Manual.* October 2012.

> Asbestos must be inhaled to cause disease. Intact and undisturbed asbestos presents no direct health hazard but does present a potential exposure hazard should fibres be released and inhaled. As a result, there is some risk associated with all asbestos installations.

The health risk is considered minimal for asbestos materials in good condition in an inaccessible location and protected from damage. Where damage can be controlled or prevented, managing the exposure risk is often the most cost-effective control measure. Where damage or disturbance cannot be controlled or where deterioration is due to uncontrolled natural causes, management of the exposure risk is very difficult. The use of air monitoring of occupied areas is not considered an acceptable method to determine whether or not asbestos containing materials must be removed, enclosed, encapsulated or may be left as is (with a management system). Air monitoring alone is insufficient to determine the potential health and exposure risk since asbestos fibres cannot usually be detected above background levels unless the material is disturbed in some way.

Additional criteria are needed to determine the risk of exposure or the need for removal. The Alberta Asbestos Abatement Manual has outlined an assessment exposure algorithm to assist in evaluating the condition of a particular asbestos installation. The following factors should be considered when evaluating the risk of exposure to asbestos:

1. Condition of Material – is the material in a condition to release fibres;
2. Water Damage – has the material been damaged due to water;
3. Exposed Surface Area – how much of the material is exposed;
4. Accessibility – can building occupants access the exposed material;
5. Activity and Movement – amount of activity and air movement in the area;
6. Air Plenum or Direct Air Stream – is the material in a air stream;
7. Friability – can the material be easily crumbled due to hand pressure; and
8. Asbestos Content – type of asbestos and percentage.

Lead-based Paint

Some paints used before 1950 contained as much as fifty percent lead by weight. Lead was often used as a pigment in white and pastel shades. Lead made paint dry faster, last longer and gave the colours a more vibrant look. In the 1950s the amount of lead used in paint decreased as other pigments were substituted. In 1976, federal regulations limited the level of lead in paint to 0.5 percent by weight. In 2009 they were limited the level of lead in paint again to 0.009 percent by weight. Exterior paints could still contain more lead. The yellow markings found on highways still use lead-based paint.[6] By 1991, Canadian paint manufacturers had voluntarily stopped using lead altogether.[7] Currently, paint considered to be lead containing are those with a content of 90 ppm (0.009%) or greater.

Lead-based paint does not pose a danger if it is in good condition, and is not disturbed. However, if the paint is peeling or flaking, a potentially harmful situation exists. Even friction from opening and closing doors or windows with painted frames can produce paint dust. This dust can get onto children's hands and toys, and from there, into their mouths. Paint chips can easily be swallowed by young children. Ledges and trim that are accessible to teething toddlers should also be cause for concern.[8]

The requirements for lead can be found within the Occupational Health and Safety Regulation. Part 4 of the Occupational Health and Safety Code sets limits for exposure to Chemical Hazards, Biological Hazards and Harmful Substances. Part 4 of the Code (Sections 16 through 27) outlines the General Requirements for employers to ensure worker exposure to a harmful substance is kept as low as reasonably practicable. In summary, the general requirements portion addresses the following:

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[6] Alberta Workplace Health and Safety. *Lead in the Workplace (Publication CH071).* 2013.

[7] Canada Mortgage and Housing Corporation. *Lead in Your Home* 1984 Revised and reprinted: 1997, 2003, and 2004.

[8] Ibid.

1. worker exposure to harmful substances;
2. worker exposure during shifts greater than 8-hours;
3. airborne concentration measurements;
4. potential worker exposure;
5. worker overexposure;
6. worker decontamination;
7. emergency bath, showers, eye wash equipment;
8. prohibited activities;
9. codes of practice; and
10. storage of harmful substances.

Sections 41 through 43 outline the employer's requirements for lead at the work site. With respect to the Code it primarily applies to managing worker exposure to lead. Lead-based paint should be removed following very specific guidelines according to industry-accepted practices, as well as the Alberta Occupational Health and Safety Act, Regulations and adopted Code.

Polychlorinated Biphenyls

PCBs are human-produced chemicals. They do not occur naturally. They are made by attaching chlorine molecules to a biphenyl molecule. There are 209 possible PCB compounds. All PCBs are heavy, colourless oils or resinous solids. They are very stable since they do not react with other chemicals. They have a high boiling point and do not conduct electricity. They are not soluble in water.

Polychlorinated biphenyls are no longer manufactured in North America. They are still found in older electrical transformers and capacitors, heat transfer equipment, and electro-magnets. However, when this equipment is serviced, other fluids replace the PCBs. PCBs or PCB-contaminated materials must be disposed of appropriately.

Storage sites are licensed and inspected regularly by provincial government inspectors. The owner or producer of the PCBs, or PCB-contaminated material, is responsible for their proper disposal or storage. The Waste Control Regulation (ALBERTA REGULATION 192/96) under the Environmental Protection and Enhancement Act outlines the requirements for storage of PCB-containing materials not in use and their disposal. Once fluorescent light ballasts are not in service then they must be stored or disposed of in accordance with the Waste Control Regulation.

Mercury

Mercury (Hg) is a very dense metal that expands and retracts evenly with changes in the temperature. Mercury exhibits super conductivity, which is the ability to conduct electrical currents with no resistance, and is the only metal that exists as a liquid at room temperature.

Mercury is released into the air, water and land, and it cycles between them due to its ability to change form with temperature. Mercury gets into the soil through natural breakdown of rocks, the disposal of mercury in landfills, and atmospheric deposition. It enters the water through runoff, atmospheric deposition, and when products containing mercury are poured down the drain. Mercury is released to the atmosphere through coal-fired utility, chlor-alkali plants, and incinerator emissions, as well as evaporation from water and land. Once mercury enters this cycle, it can remain in the environment for years as it accumulates. Mercury cannot be removed, but it can be prevented from ever entering the environment.

Miscellaneous Chemicals

Miscellaneous chemicals may require special handling procedures as outlined under the Occupational Health and Safety Act and Environmental Protection and Enhancement Act. For the purpose of this survey miscellaneous chemicals included materials that had labeling or packaging that falls under the Hazardous Product Act (Workplace Hazardous Materials Information System (WHMIS)) or Transportation of Dangerous Goods Act.

Radioactive Material

Two distinct categories of radiation exist, ionizing and non-ionizing. Within both of these there are a variety of subclasses that exist, such as high frequency with short wavelengths, or low frequency with long wavelengths. Ionizing radiation is provincially and federally regulated in Canada. Provincially the *Radiation Protection Act* (2010) and *Radiation Protection Regulation* pertain to the handling and disposal of radiation equipment, such as x-ray equipment, and radiation from non-manmade sources. Federally *The Nuclear Safety and Control Act* (2015) determines the limits to health and safety to the environment and persons during the development, use, packaging and transport of radioactive materials, particularly in the context of nuclear energy and over the course of the nuclear fuel cycle.

On a smaller scale the *Environmental Protection and Enhancement Act* (2014) pertains to the handling, transport and disposal of hazardous waste, such as radioactive materials. Disposal of radioactive materials should not occur in municipal landfills unless prior approval has been obtained. Items with radioactive substances should be disassembled according to manufacturer instruction with radioactive segments manifested, packaged and labeled prior to disposal with an appropriate facility. Parts that are non-radioactive, such as the product casings or shells, may be disposed of in municipal landfills.

Ozone-depleting Substances

In September of 1993, Alberta enacted the *Ozone-Depleting Substances and Halocarbons Regulation* (AR 181/2000), which governs the use, handling and release of CFCs, HCFCs and halons and other ozone-depleting substances. Provincial regulations require all persons servicing air conditioning or refrigeration equipment to be certified in accordance with the Apprenticeship and Industries Training Act and the associated regulations.

Canada banned chlorinated fluorocarbons as a propellant in aerosol cans in the 1980s, reducing their direct release into the atmosphere. As of January 1, 1996, no CFCs may be produced or imported into Canada.

Hydrochlorofluorocarbons (HCFCs) are chemical compounds related to CFCs and about 95 percent less damaging to the ozone layer. They are mainly used as a refrigerant in domestic air conditioning systems and in manufacturing plastic, insulation and packaging. Because HCFCs do contribute to ozone depletion, Canada is phasing out the production and use of HCFCs between the years 2010-2020. Therefore, HCFCs should only be used as a short-term alternative for replacing CFCs.

Most household refrigerators contain a chlorofluorocarbon refrigerant, sometimes called CFC-12 or R-12. While units manufactured prior to 1993 can contain CFCs or HCFCs, new refrigerators manufactured after 1993 can contain an alternate refrigerant with lower or nonexistent ozone-depleting potential. Alternate refrigerants are continuously being developed. Labels attached to all household units should list the refrigerant being used.

Urea Formaldehyde Foam Insulation (UFFI)

Formaldehyde is a colourless but pungent gas that occurs naturally in human bodies as well as in the environment. Commercially formaldehyde is found in plywood, carpets, fabrics, as a disinfectant and as a preservative. Small amounts of formaldehyde are not toxic, though over exposure can lead to irritation of the eyes, nose and throat, respiratory distress, headaches, dizziness and nausea.

Formaldehyde was added as a curing agent to urea foam to ensure a more complete curing process, creating Urea Formaldehyde Foam Insulation (UFFI). UFFI was a common insulating material for existing homes and buildings to improve insulation and decrease energy costs. It was used most often between 1977 and up until 1980, when its use was banned in Canada. However, during the curing process formaldehyde gas would be off-gassed from the foam causing health complaints and raising concerns of potential health concerns of short term exposure to formaldehyde.

Well-maintained UFFI does not pose a health risk as all off-gassing of UFFI installed between 1977 and 1980 in place today would have occurred primarily during the curing process. However, should UFFI become wet, or become exposed to conditions that would cause deterioration of the material, creating the potential for additional formaldehyde off-gassing.

APPENDIX II

PHOTOGRAPHS

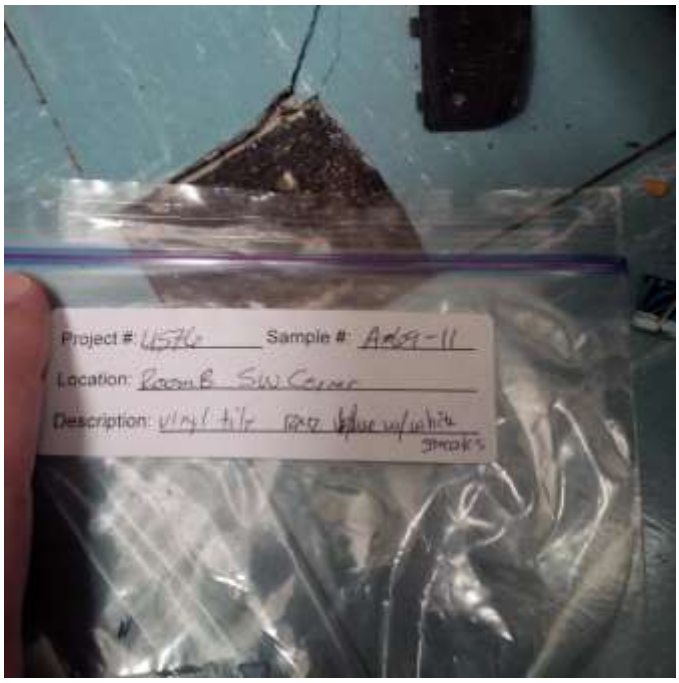
Photograph 1: Sample A62-5, Asbestos containing black mastic (back side of 9”x9”, grey with white streaks floor tile) sampled from the Meter Room.

Photograph 2: Sample A62-6, Asbestos containing black mastic (back side of 12”x12”, grey with white streaks floor tile) sample from Room 113.

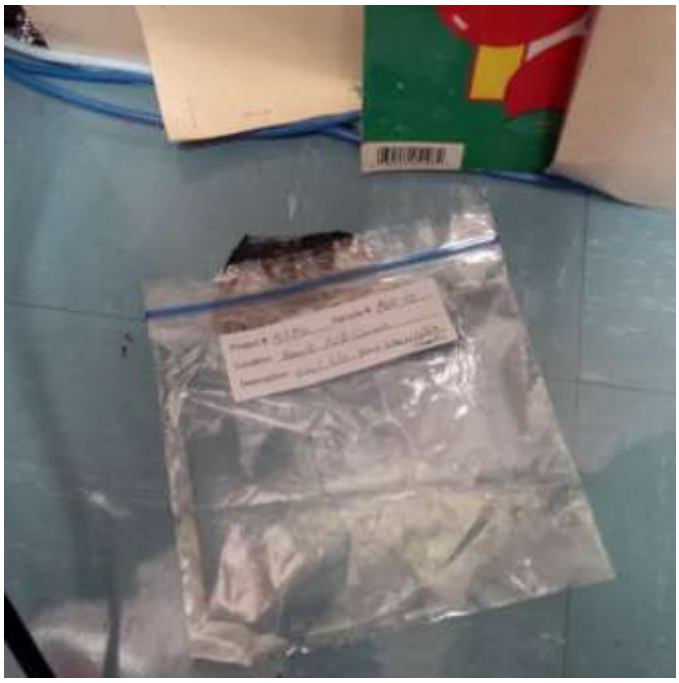
Photograph 3: A62-13, Asbestos containing black caulking sampled from around the Furnace Room door.

Photograph 4: Sample V-1, Asbestos containing vermiculite insulation sampled from the south, exterior cinderblock wall in Room 109.

Photograph 5: Sample A65-4, Asbestos containing 12”x12” acoustic ceiling tile (grid pattern) sampled from the northeast corner of Room 118.

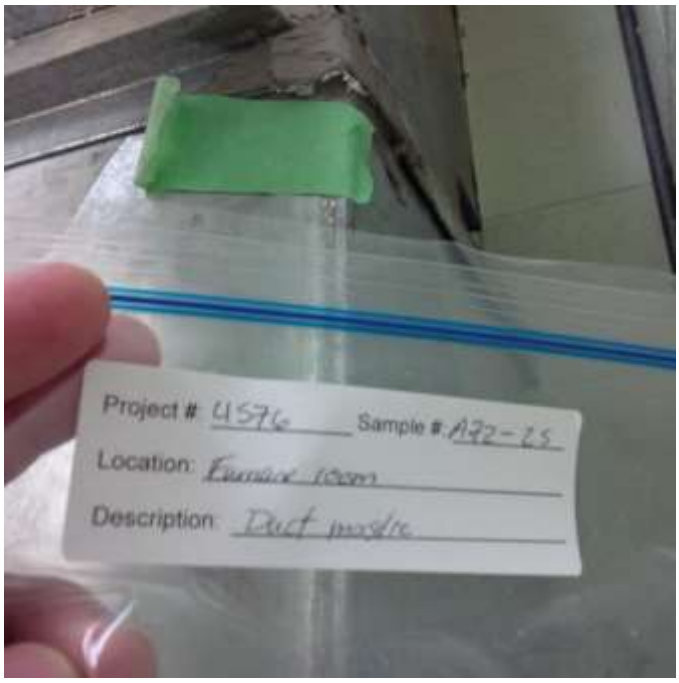


Photograph 6: Sample A69-11, Asbestos containing 12”x12” blue with white streaks vinyl floor tile sampled from the southwest corner of Room 120.

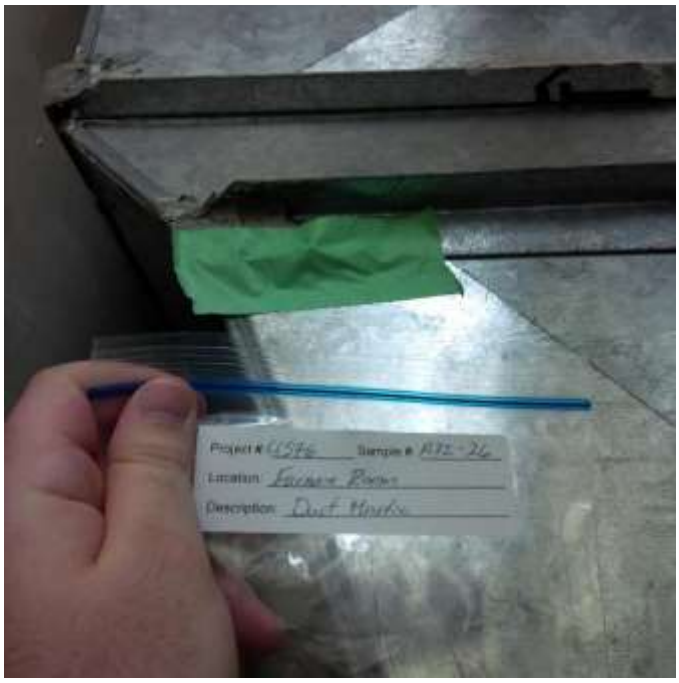


Photograph 7: Sample A69-12, Asbestos containing 12”x12” blue with white streaks vinyl floor tile sampled from the northwest corner of Room 120.

Photograph 8: Sample A69-14, Asbestos containing brown mastic (behind 12”x12” acoustic ceiling tile, grid pattern) sampled from the northeast corner of Room 121.



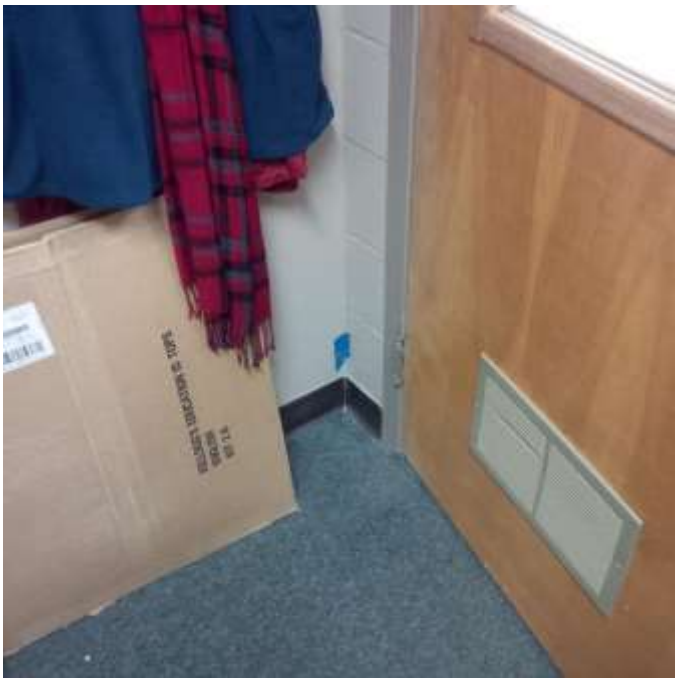
Photograph 9: Sample A72-25, Asbestos containing silver duct mastic sampled from the Furnace Room.



Photograph 10: Sample A72-26, Asbestos containing silver duct mastic sampled from the Furnace Room.

Photograph 11: Sample V-2, Asbestos containing vermiculite insulation sampled from the south wall in the 1972 addition room 124 (Furnace Room)

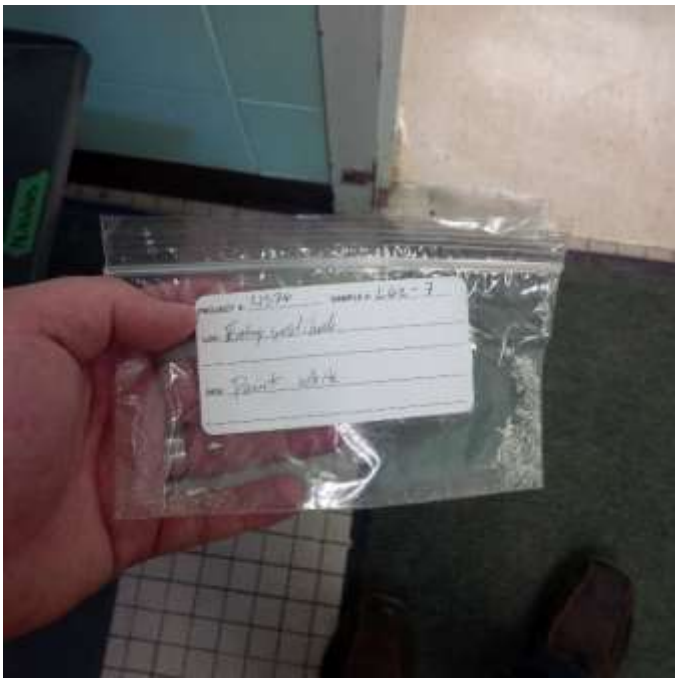
Photograph 12: Sample V-3, Asbestos containing vermiculite insulation sampled from the south wall in Room 121 in the 1969 addition.



Photograph 13: Sample L-2, Lead-based dark grey paint sampled from Room 113 behind the door.

Photograph 14: Sample L-3, Lead-based yellow paint sampled from the door frame in the 1962 boys washroom.

Photograph 15: Sample L-4, Lead-based beige coating sampled from the washroom stall in the 1962 boys washroom.



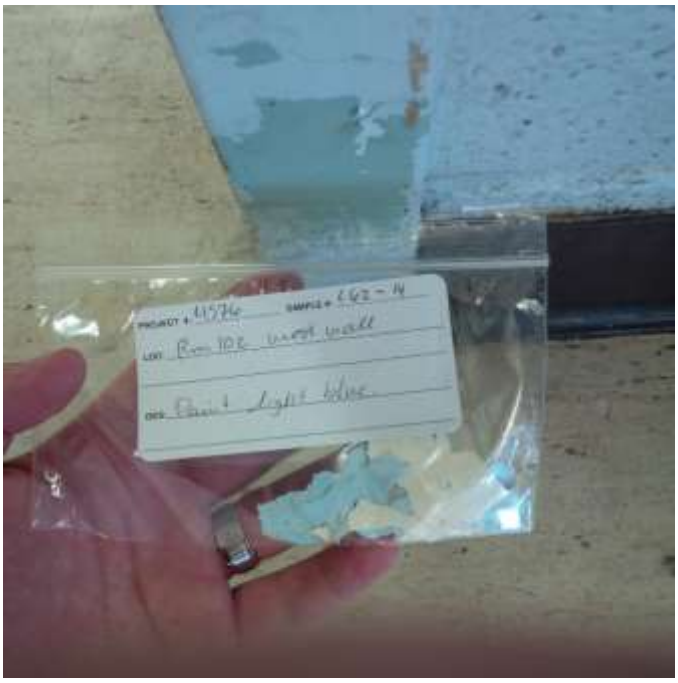
Photograph 16: Sample L-7, Lead-based white paint sampled from the door frame of the entry vestibule in the 1962 addition.

Photograph 17: Sample L-8, Lead-based mint green paint sampled from the wall in the entrance vestibule of the 1962 addition.

Photograph 18: Sample L-10, Lead-based cream paint sampled from the door frame of the community washroom.

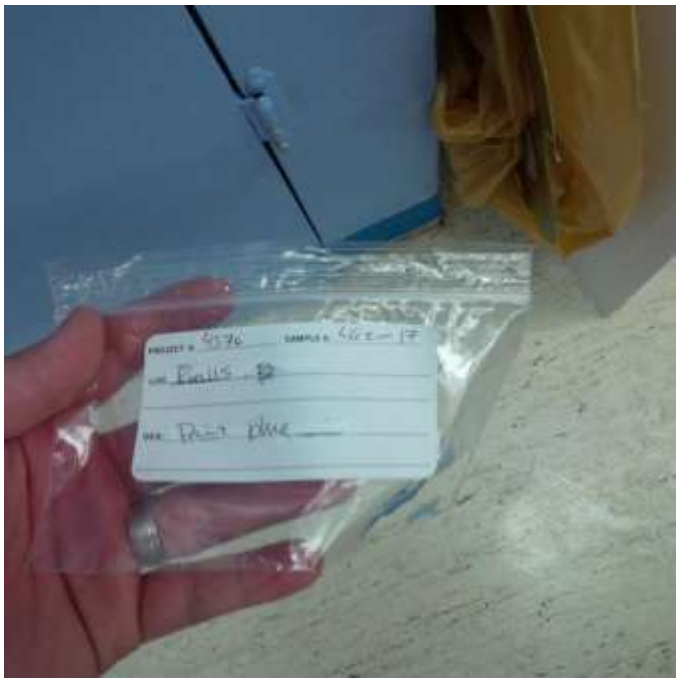
Photograph 19: Sample L-11, Lead-based dark green paint sampled from the main hallway shelf in the 1962 addition.

Photograph 20: Sample L-12, Lead-based dark blue paint sampled from the hallway door to Room 110.

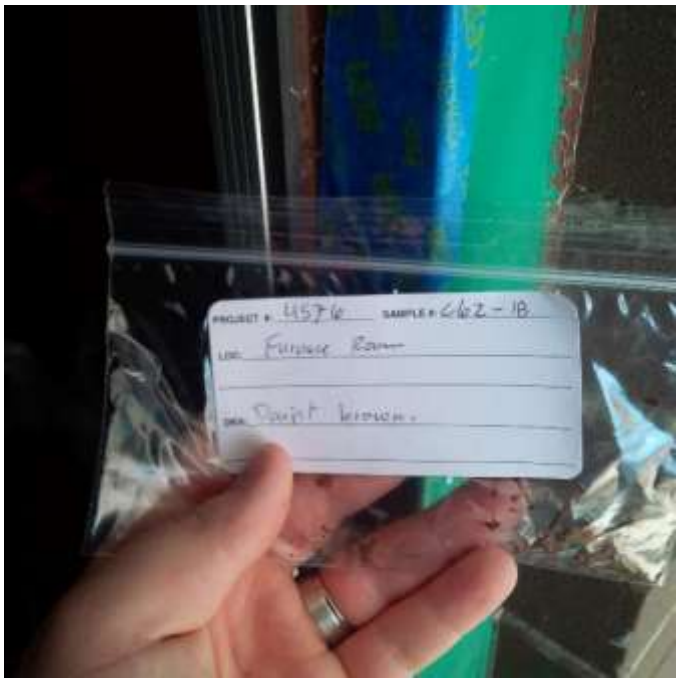


Photograph 21: Sample L-14, Lead-based light blue paint sampled from the door frame of Room 102.

Photograph 22: Sample L-16, Lead-based navy blue paint sampled from the door of the 1962 Janitor's Room.

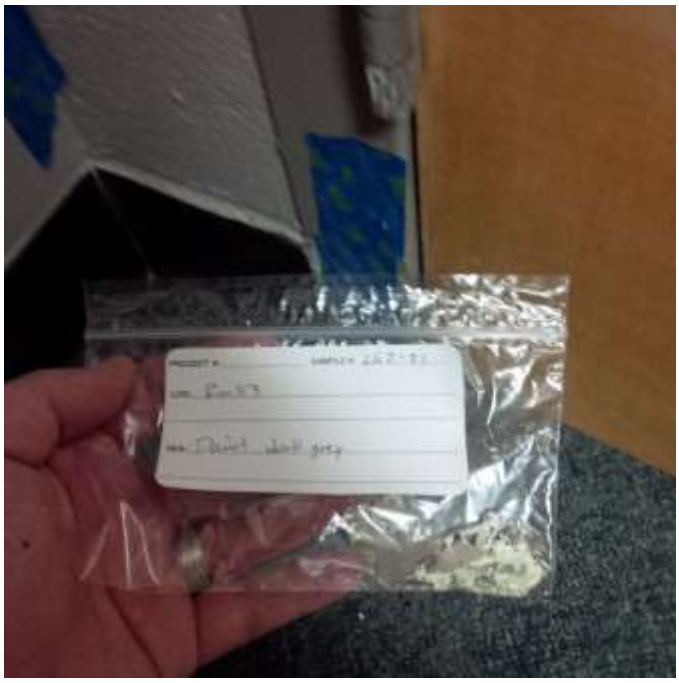


Photograph 23: Sample L-17, Lead-based blue paint sampled from the door of 1962 Room 115.

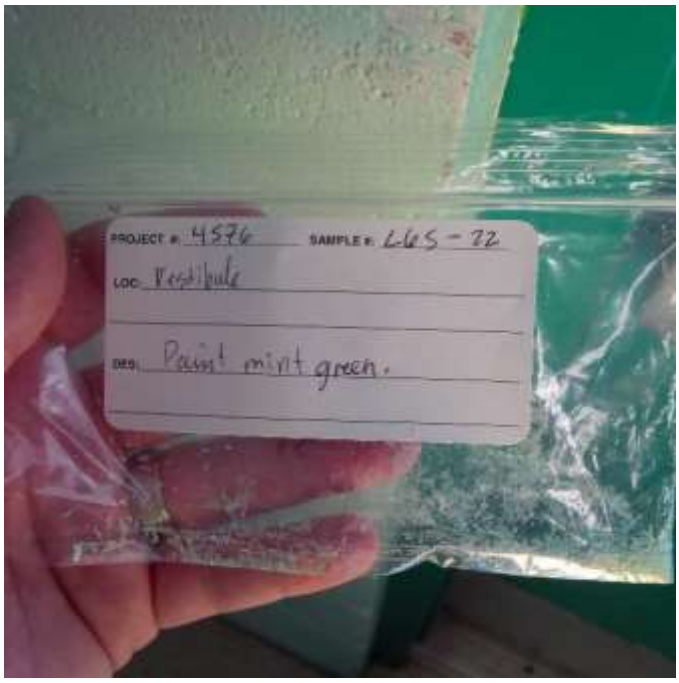


Photograph 24: Sample L-18, Lead-based brown paint sampled from the 1962 Furnace Room door.

Photograph 25: Sample L-19, Lead-based yellow paint sampled from the door frame of the 1962 Girls Washroom.



Photograph 26: Sample L-21, Lead-based dark grey paint sampled from the door frame of Room113.



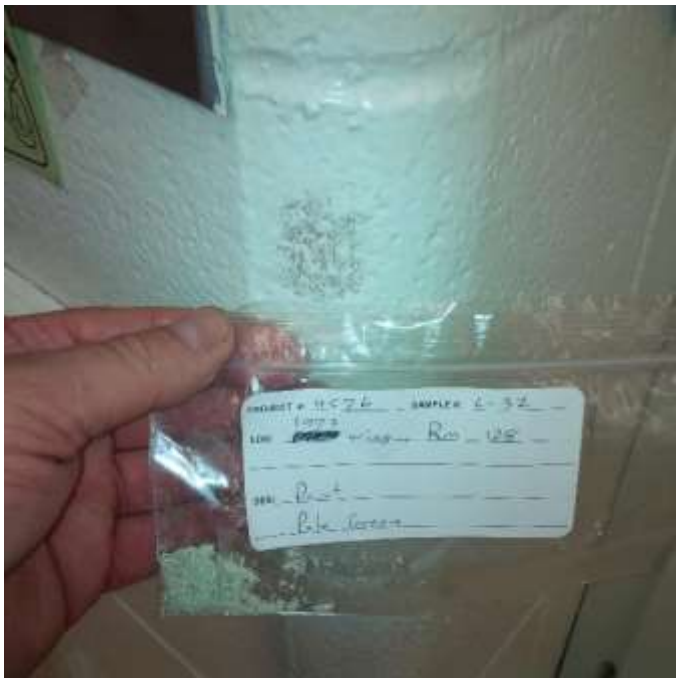
Photograph 27: Sample L-22, Lead-based mint green paint sampled from the 1965 vestibule wall.

Photograph 28: Sample L-23, Lead-based emerald green paint sampled from the 1972 vestibule door.

Photograph 29: Sample L-24, Lead-based brown paint sampled from the door frame of the Furnace Room.

Photograph 30: Sample L-25, Lead-based dark green paint sampled from the main hallway shelf in the 1965 addition.

Photograph 31: Sample L-31, Lead-based pale green paint sampled from the 1965 vestibule wall.



Photograph 32: Sample L-32, Lead-based pale green paint sampled from the wall in Room 128.

Photograph 33: Sample L-34, Lead-based blue paint sampled from the door frame of Room 118.

Photograph 34: Sample L-35, Lead-based white paint sampled from the door frame of Room 119.

Photograph 35: Sample L-36, Lead-based grey and black coating sampled from the 1965 vestibule shoe rack.

Photograph 36: Sample L-37, Lead-based grey paint sampled from the gym storage floor.

Photograph 37: Sample L-38, Lead-based pale green/blue paint sampled from the 1969 gym storage walls.

Photograph 38: Sample L-39, Lead-based light blue paint sampled from the walls in Room 102.

Photograph 39: Sample L-40, Lead-based dark blue paint sampled from the cinderblock wall in Room 121.

Photograph 40: Sample L-44, Lead-based yellow/lime green paint sampled from the cinderblock wall in Room 130.

Photograph 41: Sample L-44, Lead-based brown paint sampled from the door frame in Room 123.

Photograph 42: Sample L-46, Lead-based yellow paint sampled from the cinderblock wall in the community washroom in the 1962 wing.

Photograph 44: Sample L-47, Lead-based tan coating sampled from the girls washroom stall in the 1962 wing.

Photograph 44: Sample L-48, Lead-based navy blue paint sampled from the door in Room 108.

Photograph 45: Fluorescent light tube containing mercury dust observed in Room 108 and throughout the building.

Photograph 46: Thermostat with mercury containing bulb observed in Room 110.

Photograph 47: Thermostat with mercury containing bulb observed in Room 115.

Photograph 48: Refrigerator with assumed ozone-depleting substances observed in Room 117.

Photograph 49: Refrigerator with assumed ozone-depleting substances observed in Room 117.

Photograph 50: Refrigerator with assumed ozone-depleting substances observed in Room 108.

Photograph 51: Smoke detector suspected to contain radioactive materials observed in Room 115.

Photograph 52: Suspected self-powered ‘Exit” sign and emergency lighting unit observed in the gym.

Photograph 53: Suspected self-powered ‘Exit” signs in the gym.

Photograph 54: Sample M-1, Water damage observed on the ceiling tile in Room 101.

Photograph 55: Sample M-2, Water damage observed on the ceiling tile in Room 110.

Photograph 56: Water damage observed on the ceiling drywall in Room 107 where sample M-3 was collected.

Photograph 57: Sample M-4, Water damage observed on the ceiling tile in the 1965 Main Hallway.

Photograph 58: Sample M-5, Water damage observed on the ceiling tile in Room 118.

Photograph 59: Sample M-6, Water damage observed on the ceiling tile in Room 120.

Photograph 60: Sample M-7, Water damage observed on the ceiling tile in Room 121.

Photograph 61: Sample M-8, Water damage observed on the ceiling tile in Room 1969 Main Hallway.

Photograph 62: Sample M-9, Water damage observed on the ceiling tile in Room 129.

Photograph 63: Sample M-10, Water damage observed on the ceiling tile in Room 131.

Photograph 64: Miscellaneous chemicals observed in Room 115.

Photograph 65: ABC dry-chemical fire extinguisher observed in Room 105.

Photograph 66: Emergency lighting unit observed in the 1965 Entry Vestibule.

APPENDIX III

ASBESTOS, LEAD AND MOULD SAMPLE INVENTORY TABLES

Table 1: Summary of Asbestos Sample Analysis dated June 23, 2016 – 1962 Original Structure

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A62-1	Hallway Floor	Sheet Flooring, Off-White with Tan and Brown Streaks – with Tan Mastic, Off-White Mastic, Black Mastic and Grey Cementitious	None Detected	Not Applicable	Not Applicable
A62-2	Hallway Ceiling	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A62-3	Hallway Ceiling	12"x12" Acoustic Ceiling Tile, Large and Small Holes Grid Pattern – with Brown Mastic	None Detected	Not Applicable	Not Applicable
A62-4	Hallway Outside of Girls Washroom	Rubber Baseboard, 3" Brown – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-5 (Layer 1)	Meter Room	9"x9" Vinyl Floor Tile, Grey with White Streaks	None Detected	Not Applicable	Not Applicable
A62-5 (Layer 2)	**Meter Room**	**Black Mastic**	**Chrysotile**	**PC 0.5**	**1**
A62-6 (Layer 1)	Room 113 Server Room	12"x12" Vinyl Floor Tile, Grey with White Streaks	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 2)	Room 113 Server Room	Off-White Mastic	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 3)	Room 113 Server Room	Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-6 (Layer 4)	**Rom 113 Server Room**	**Black Mastic**	**Chrysotile**	**PC 1.1**	**2**
A62-7	Furnace Room	Grey Brick Mortar, 2x8 Red	None Detected	Not Applicable	Not Applicable
A62-8	Furnace Room	Grey Brick Mortar, 2x8 Brown	None Detected	Not Applicable	Not Applicable
A62-9	Clerk's Office Entrance	2'x4' Ceiling Tile, Long Horizontal Pinholes/Fissures	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A62-10	Principal's Office, Northeast Corner	2'x4' Ceiling Tile, Long Horizontal Pinholes/Fissures	None Detected	Not Applicable	Not Applicable
A62-11	Furnace Room, Ducting	Expansion Joint Cloth, Tan	None Detected	Not Applicable	Not Applicable
A62-12	Room 102, West Wall	Window Caulking, Black	None Detected	Not Applicable	Not Applicable
A62-13	**Furnace Room Door**	**Black Caulking**	**Chrysotile**	**PC 2.9**	**3**
A62-14	Clerk's Office	Rubber Baseboard, 3" Beige – with Off-White Mastic	None Detected	Not Applicable	Not Applicable
A62-15	Staff Lounge	Rubber Baseboard, 3" Grey – with Tan and Brown Mastics	None Detected	Not Applicable	Not Applicable
A62-16	Room 102, West Wall	Linoleum, Cream with Blue and Red Specks – with Off-Whit Mastic	None Detected	Not Applicable	Not Applicable
A62-17	Staff Lounge	Sheet Flooring, Blue with White and Dark Specks – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A62-18	Entrance to Principal's Office	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-19	Room 105 Work Room	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-20	Room 101, Northwest Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-21	Room 109, Southeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-22	Room 105 Work Room, South Side	Ceiling Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A62-23	Room 105 Work Room, Southeast Corner	Ceiling Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
V-1	**1962 Wing, Room 109, South Exterior Cinderblock Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**4**

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.
- DNQ indicates asbestos detected not quantitated**.**

Table 2: Summary of Asbestos Sample Analysis dated June 22, 2016 – 1965 Addition

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A65-1	Main Hallway, Outside Kitchen	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A65-2	Room 115, Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-3	Nevil's Office, Southeast Corner	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-4	**Room 118, Northeast Corner**	**12"x12" Acoustic Ceiling Tile, Grid Pattern**	**Amosite**	**PC 0.25**	**5**
A65-5	Main Hallway, Outside Room 118	Rubber Baseboard, 3" Black – with Brown Mastic	None Detected	Not Applicable	Not Applicable
A65-6	Nevil's Office, South Wall	Rubber Baseboard, 3" Beige – with Tan/Beige Mastic	None Detected	Not Applicable	Not Applicable
A65-7	Room 115, Closet	Rubber Baseboard, 3" Beige with Beige Mastic	None Detected	Not Applicable	Not Applicable
A65-8	Main Hallway, North End	Sheet Flooring, Off-White with Brown Streaks – with Grey Mastic	None Detected	Not Applicable	Not Applicable
A65-9	Main Hallway, Outside Room 115	Sheet Flooring, Off-White with Brown Streaks – with Grey Mastic	None Detected	Not Applicable	Not Applicable
A65-10	Room 115, Closet	Sheet Flooring, Peach with White Streaks – with Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A65-11	Room 115, Closet	Sheet Flooring, Peach with White Streaks – with Tan Mastic, Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A65-12	Room 115, East Wall	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A65-13	Room 115, South Wall	2x8 Brick Mortar, Off-White	None Detected	Not Applicable	Not Applicable
A65-14	Room 115, South Wall	2x8 Brick Mortar, Off-White	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A65-15	Room 115, Southeast Corner	Linoleum, Cream with Blue and Red Specks – with Off-White Mastic	None Detected	Not Applicable	Not Applicable
A65-16	Kitchen Furnace Closet	Expansion Joint Cloth, Black	None Detected	Not Applicable	Not Applicable
A65-17	Kitchen, Northwest Corner	12"x12" Acoustic Ceiling Tile, Wave Pattern	None Detected	Not Applicable	Not Applicable
A65-18	Vestibule, Southeast Corner	12"x12" Acoustic Ceiling Tile, Wave Pattern	None Detected	Not Applicable	Not Applicable
A65-19	Nevil's Office, Northwest Corner	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A65-20	Room 118, West Walls	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.

Table 3: Summary of Asbestos Sample Analysis dated June 23, 2016 – 1969 and 1972 Additions

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A72-1	Room 131	12"x12" Vinyl Floor Tile, Grey with Black Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-2	Room 128	12"x12" Vinyl Floor Tile, Grey with Black Flecks – with Black Mastic and Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A72-3	Main Hallway, North End	12"x12" Vinyl Floor Tile, Off-White with Tan Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-4	Main Hallway, South End	12"x12" Vinyl Floor Tile, Off-White with Tan Flecks – with Black Mastic	None Detected	Not Applicable	Not Applicable
A72-5	Room 131	Rubber Baseboard, 3" Black – with Tan Mastic	None Detected	Not Applicable	Not Applicable
A72-6	South Entrance to Library	Rubber Baseboard, 3" Black – with Yellow/Tan Mastic	None Detected	Not Applicable	Not Applicable
A72-7	Storage Closet	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-8	Room 128	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-9	Room 131, Northwest Corner	12"x12" Vinyl Floor Tile, Pink with White Flecks – with White/Black Mastic and Grey Leveling Compound	None Detected	Not Applicable	Not Applicable
A69-10	Room 121, Outside Door	12"x12" Vinyl Floor Tile, Pink with White Flecks – with Yellow/Black Mastic	None Detected	Not Applicable	Not Applicable
A69-11 (Layer 1)	**Room 120, Southwest Corner**	**12"x12" Vinyl Floor Tile, Blue with White Streaks**	**Chrysotile**	**PC 1.2**	**6**
A69-11 (Layer 2)	Room 120, Southwest Corner	Black Mastic	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A69-12 (Layer 1)	**Room 120, Northwest Corner**	**12"x12" Vinyl Floor Tile, Blue with White Streaks**	**Chrysotile**	**PC 1.1**	**7**
A69-12 (Layer 2)	Room 120, Northwest Corner	Black Mastic	None Detected	Not Applicable	Not Applicable
A72-13	Room 130, Northwest Corner	12"x12" Acoustic Ceiling Tile, Grid Pattern	None Detected	Not Applicable	Not Applicable
A69-14 (Layer 1)	Room 121, Northeast Corner	12"x12" Acoustic Ceiling Tile, Grid Pattern	None Detected	Not Applicable	Not Applicable
A69-14 (Layer 2)	**Room 121, Northeast Corner**	**Brown Mastic**	**Chrysotile**	**PC 0.5**	**8**
A69-15	Room 121 Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A69-16	Room 120, West Wall	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-17	Room 131, East Wall	Linoleum, Cream with Blue and Red Specks – with Yellow Mastic	None Detected	Not Applicable	Not Applicable
A69-18	Room 120, West Wall	Linoleum, Cream with Blue and Red Specks – with Green Mastic and White Leveling Compound	None Detected	Not Applicable	Not Applicable
A69-19	Main Hallway, Outside Room 121	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A72-20	Main Hallway, Outside Room 130	2'x4' Ceiling Tile, Pinholes and Fissures	None Detected	Not Applicable	Not Applicable
A72-21	Boys Bathroom, West Wall	Fiberglass Panel – with Tan Mastic, White Caulking, Grey Cementitious, and White Joint Compound	None Detected	Not Applicable	Not Applicable
A72-22	Boys Bathroom, West Wall	Fiberglass Panel – with Tan Mastic, White Caulking and Grey Cementitious	None Detected	Not Applicable	Not Applicable

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
A72-23	Room 128, Windows	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A69-24	Room 121, Windows	Black Window Caulking	None Detected	Not Applicable	Not Applicable
A72-25	**Furnace Room**	**Silver Duct Mastic**	**Chrysotile**	**10**	**9**
A72-26	**Furnace Room**	**Silver Duct Mastic**	**Chrysotile**	**10**	**10**
A72-27	Furnace Room	Fire Stopping, Beige	None Detected	Not Applicable	Not Applicable
A72-28	Furnace Room	Fire Stopping, Beige	None Detected	Not Applicable	Not Applicable
A72-29	Storage Closet	Interior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
A72-30	Room 131, Northeast Corner	Exterior Drywall Joint Compound	None Detected	Not Applicable	Not Applicable
V-2	**1972 Addition, Furnace Room, South Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**11**
V-3	**1969 Wing, Room 121, South Wall**	**Vermiculite Insulation**	**Asbestiform Amphibole**	**DNQ**	**12**

Notes:

- **Bolded text** indicates that asbestos is present in the sample.
- PC indicates Stratified Point Count Method performed.
- DNQ indicates asbestos detected not quantitated**.**

Table 4: Summary of Asbestos Sample Analysis dated June 2 & 22, 2016 – Roof and Exterior of Structure

Sample Number	Sample Location	Sample Description	Asbestos Type	Asbestos Percent (%)	Photograph Number
AE-1	1972 Wing, Gym Door	White Caulking	None Detected	Not Applicable	Not Applicable
AE-2	1972 Wing, Gym Door	White Caulking with Black Tar	None Detected	Not Applicable	Not Applicable
AE-3	1965 Wing, West Wall	Grey Mortar – Red Brick	None Detected	Not Applicable	Not Applicable
AE-4	1962 Wing, West wall	Grey Mortar – Brown Brick	None Detected	Not Applicable	Not Applicable
AE-5	1962 Wing, Front Entrance	Grey Mortar – Beige Brick	None Detected	Not Applicable	Not Applicable
AE-6	1972 Wing, East Wall	Grey Mortar – Stone	None Detected	Not Applicable	Not Applicable
AE-7	1972 Wing	Grey Mortar – Brown Textured Brick	None Detected	Not Applicable	Not Applicable
AE-8	1965 Wing, East Wall	Stucco Brown	None Detected	Not Applicable	Not Applicable
A-1	1962, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-2	1965 South, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-3	1969, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable
A-4	1972, Roof	Concrete, V.P., EPS, Fiberboard, Wood	None Detected	Not Applicable	Not Applicable

Table 5: Summary of Lead Sample Results dated June 23 & 29, 2016

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-1	1962 – Room 113, Drywall behind Door	Light Grey Paint	<69	Good	Not Applicable
L-2	**1962 – Room 113, Door Frame**	**Dark Grey Paint**	**260**	**Good**	**13**
L-3	**1962 – Boys Washroom, Door Frame**	**Yellow Paint**	**2100**	**Good**	**14**
L-4	**1962 – Boys Washroom, Stall**	**Beige Coating**	**420**	**Good**	**15**
L-5	1962 – Room 109, East Wall	Cream Paint	<60	Good	Not Applicable
L-6	1962 – Room 113a Server Room, Door Frame	Cream Paint	<59	Good	Not Applicable
L-7	**1962 – Entry Vestibule, Door Frame**	**White Paint**	**1300**	**Fair**	**16**
L-8	**1962 – Entry Vestibule, Cinderblock Wall**	**Mint Green Paint**	**1400**	**Good**	**17**
L-9	1962 – Entry Vestibule, Door/Frame	Emerald Green Paint	<71	Good	Not Applicable
L-10	**1962 – Main Hallway Community Washroom, Door Frame**	**Cream Paint**	**640**	**Fair**	**18**
L-11	**1962 – Main Hallway, Shelf**	**Dark Green Paint**	**660**	**Fair**	**19**
L-12	**1962 – Hallway/Entrance to Room 110, Door**	**Dark Blue Paint**	**190**	**Good**	**20**
L-13	1962 – Clerks Office, Drywall	Lime Green Paint	<59	Good	Not Applicable
L-14	**1962 – Room 102 Door Frame, Door Frame**	**Light Blue Paint**	**94**	**Fair/Poor**	**21**
L-15	1965 – Nevil's Office, Door Frame	Tan Paint	73	Good	Not Applicable
L-16	**1962 – Janitor's Room, Door**	**Navy Blue Paint**	**1100**	**Good**	**22**

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-17	**1965 – Room 115, Door/Frame**	**Blue Paint**	**110**	**Good**	**23**
L-18	**1962 – Furnace Room, Door Frame**	**Brown Paint**	**38000**	**Poor**	**24**
L-19	**1962 – Girls Washroom, Door Frame**	**Yellow Paint**	**1900**	**Good**	**25**
L-20	1962 – Room 113, Drywall	Light Grey Paint	<77	Good	Not Applicable
L-21	**1962 – Room 113, Door Frame**	**Dark Grey Paint**	**430**	**Good**	**26**
L-22	**1965 – Vestibule, Cinderblock Wall**	**Mint Green Paint**	**1400**	**Good**	**27**
L-23	**1972 – Vestibule, Door/Frame**	**Emerald Green Paint**	**170**	**Good**	**28**
L-24	**1962 – Furnace Room, Door/Frame**	**Brown Paint**	**36000**	**Fair**	**29**
L-25	**1965 – Main Hallway, Shelf**	**Dark Green Paint**	**900**	**Fair**	**30**
L-26	1965 – Main Hallway, Nevil's Office, Drywall	Lime Green Paint	<90	Good	Not Applicable
L-27	1965 – Gym East Wall, Cinderblock	White Paint	<74	Good	Not Applicable
L-28	1965 – Nevil's Office Area, Drywall	Off-White/Cream Paint	<70	Good	Not Applicable
L-29	1965 – Furnace Room, Drywall	Off-White/Cream Paint	<85	Good	Not Applicable
L-30	1965 – Furnace Room Door	Tan Paint	<66	Fair	Not Applicable
L-31	**1965 – Vestibule, Cinderblock Wall**	**Pale Green Paint**	**950**	**Good**	**31**
L-32	**1972 – Room 128, Cinderblock Wall**	**Pale Green Paint**	**660**	**Good**	**32**
L-33	1965 – Room 117 (Kitchen), Drywall	Beige Paint	<59	Good	Not Applicable
L-34	**1965 – Room 118, Door Frame**	**Blue Paint**	**1200**	**Good**	**33**

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-35	**1965 – Room 119, Door Frame**	**White Paint**	**940**	**Good**	**34**
L-36	**1965 – Vestibule, Shoe Rack**	**Grey and Black Coating**	**6700**	**Good**	**35**
L-37	**1969 – Gym Storage, Floor**	**Grey Paint**	**3000**	**Fair**	**36**
L-38	**1969 – Gym Storage, Cinderblock Wall**	**Pale Green/Blue Paint**	**330**	**Good**	**37**
L-39	**1962 – Room 102, Door Frame**	**Light Blue Paint**	**300**	**Good**	**38**
L-40	**1969 – Room 121, Cinderblock Wall**	**Dark Blue Paint**	**95**	**Good**	**39**
L-41	1972 – Room 131, Board	Dark Green Paint	<62	Good	Not Applicable
L-42	1972 – Room 131 Booth, Cinderblock Wall	Bright Green Paint	<70	Good	Not Applicable
L-43	**1972 – Room 130, Cinderblock Wall**	**Yellow/Lime Green Paint**	**350**	**Good**	**40**
L-44	**1972 – Room 123, Door Frame**	**Brown Paint**	**2200**	**Fair**	**41**
L-45	1972 – Room 124 Storage/Furnace	Beige Paint	<81	Good	Not Applicable
L-46	**1962 – Community Washroom, Cinderblock Wall**	**Yellow Paint**	**1100**	**Good**	**42**
L-47	**1962 – Girls Washroom, Stall**	**Tan Coating**	**12000**	**Good**	**43**
L-48	**1962 – Room 108, Door**	**Navy Blue Paint**	**610**	**Fair**	**44**
L-49	1972 – Girls Washroom, 1"x1" Tile	Tan Paint	<63	Good	Not Applicable
L-50	1972 – Boys Washroom, 1"x1" Tile	Tan Paint	55	Good	Not Applicable
L-51	1972 – Girls Washroom, 4"x4" Mottled Tile	Green Paint	<62	Good	Not Applicable

Sample Number	Sample Location	Sample Description	Lead Content (ppm)	Condition	Photograph Number
L-52	1972 – Boys Washroom, 4"x4" Mottled Tile	Green Paint	<52	Good	Not Applicable
L-53	1972 – Girls Washroom, 4"x4" Tile	White Paint	70	Good	Not Applicable
L-54	1972 – Boys Washroom, 4"x4" Tile	White Paint	42	Good	Not Applicable

Notes:

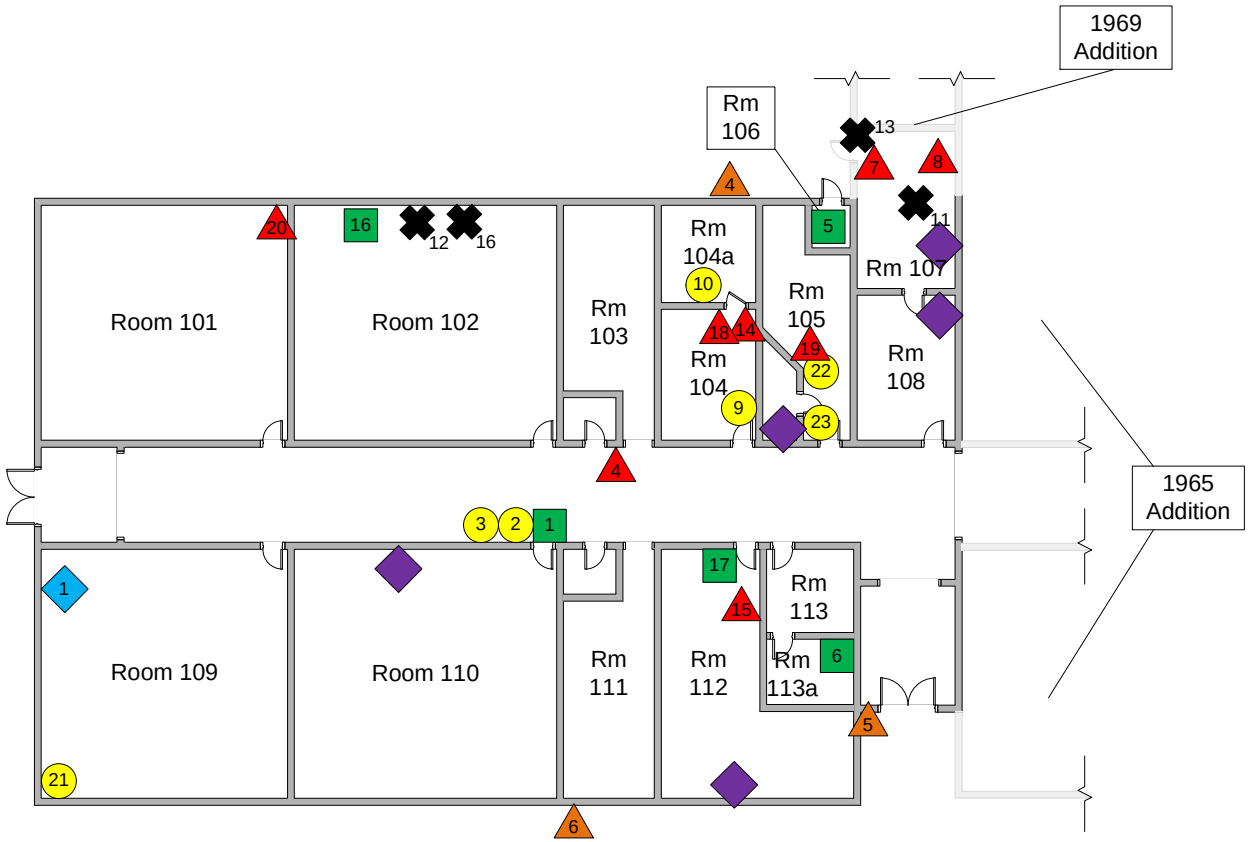
- **Bolded text** indicates that lead is present in the sample. Results were compared to the 90 parts per million (ppm) criterion limit outlined in the Occupational Health and Safety Bulletin "*Lead at The Work Site*" (2013), published by the Government of Alberta. Paint samples that are equal to or greater than 90ppm are considered to be lead-containing.
- ppm – parts per million

Table 6: Summary of Bulk Mould Sample Analysis dated June 29, 2016

Sample Number	Sample Location	Mould Spore Identification	Relative Amount	Photograph Number
M-1	Room 101, Ceiling Tile	Mycelial Fragments	Low	54
M-2	Room 110, Ceiling Tile	*Cladosporium*	Low	55
M-3	Room 107, Ceiling Drywall	No Fungal Structures Detected	Not Applicable	56
M-4	1965 Main Hallway, Backside of Ceiling Tile	No Fungal Structures Detected	Not Applicable	57
M-5	Room 118, Ceiling Tile	No Fungal Structures Detected	Not Applicable	58
M-6	Room 120, Ceiling Tile	No Fungal Structures Detected	Not Applicable	59
M-7	Room 121, Ceiling Tile	*Chaetomium* *Cladosporium*	Low Low	60
M-8	1969 Main Hallway Adjacent Room 120, Ceiling Tile	No Fungal Structures Detected	Not Applicable	61
M-9	Room 129, Ceiling Tile	No Fungal Structures Detected	Not Applicable	62
M-10	Room 131, Ceiling Tile	*Chaetomium*	Low	63

Notes:

- Relative amount: 'Low' =<10 per mm^2 of tape surface;' Moderate' =10-100 per mm^2; 'High' =>100 per mm^2



ASE SERVICES

Asbestos Sample Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

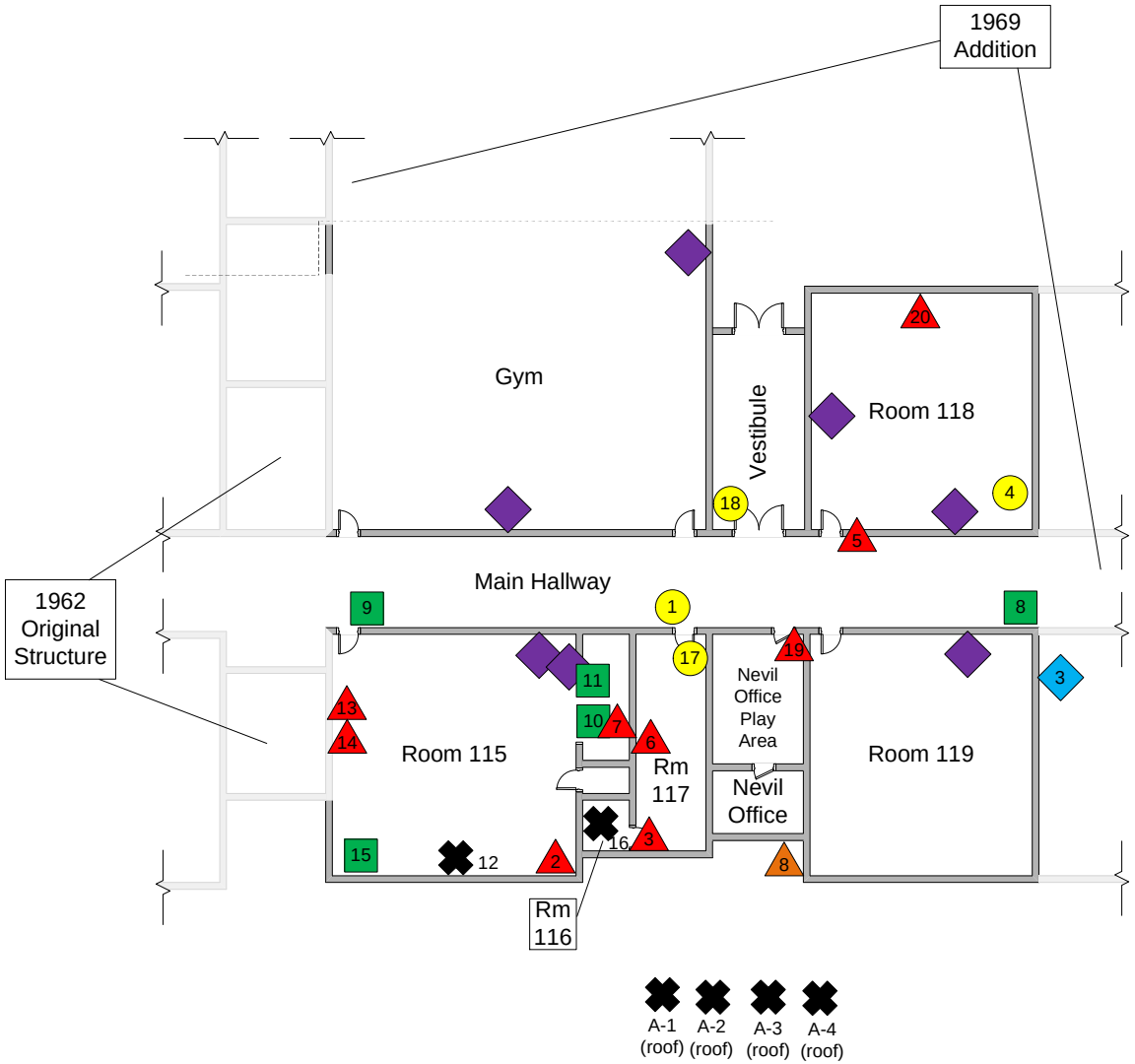
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Asbestos Wall Sample
- Asbestos Ceiling Sample
- Asbestos Flooring Sample
- Miscellaneous Asbestos Sample
- Vermiculite Sample
- No vermiculite found
- Asbestos Exterior Sample

Note:
- Not to Scale



ASE SERVICES

Asbestos Sample Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

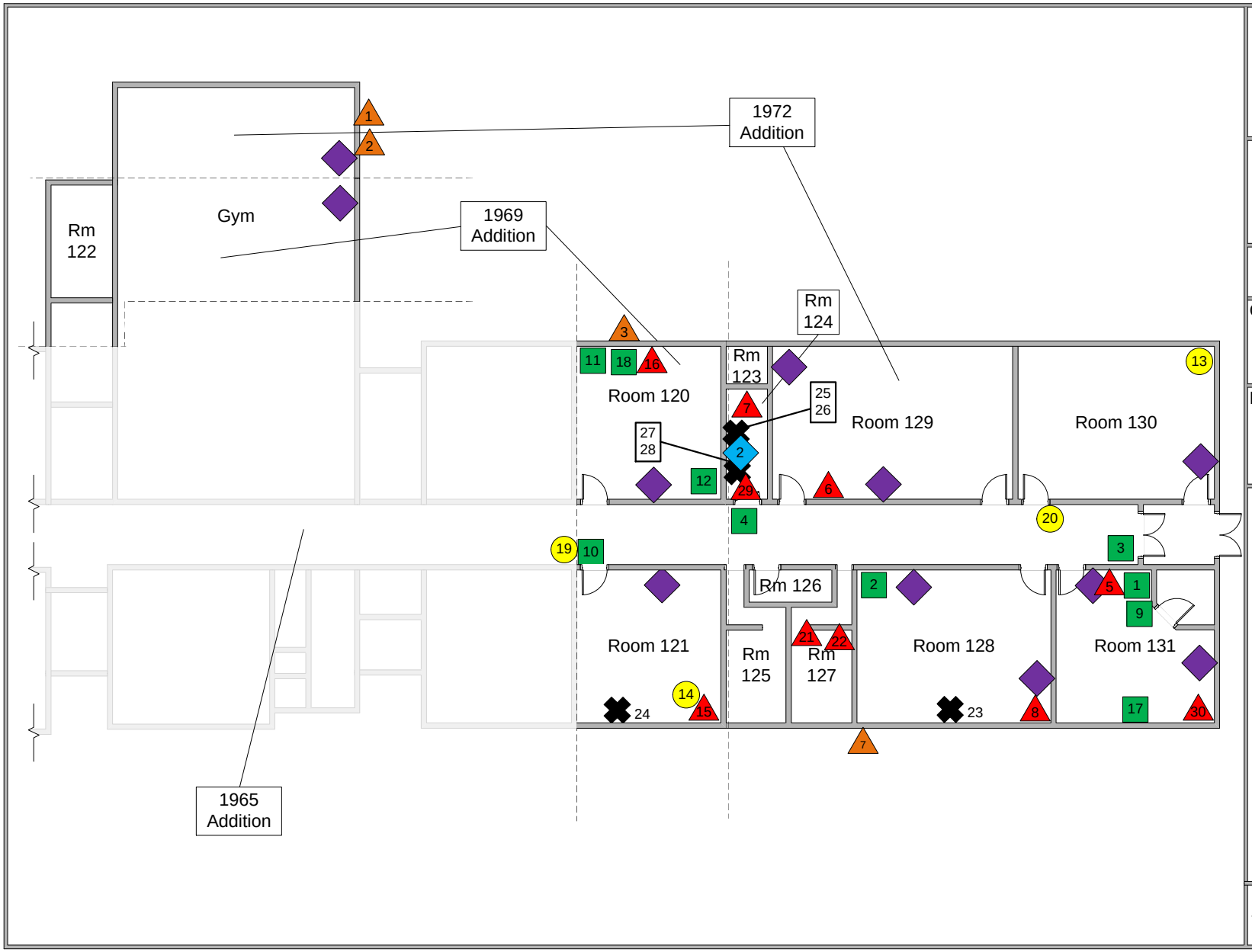
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Asbestos Wall Sample
- Asbestos Ceiling Sample
- Asbestos Flooring Sample
- Miscellaneous Asbestos Sample
- Vermiculite Sample
- No vermiculite found
- Asbestos Exterior Sample

Note:
- Not to Scale


1972 Addition
1969 Addition
1965 Addition
Gym
Rm 122
Rm 123
Rm 124
Rm 125
Rm 126
Rm 127
Room 120
Room 121
Room 128
Room 129
Room 130
Room 131
1
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3
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ASE SERVICES
Asbestos Sample Locations - 1969 & 1972 Additions
Project #AS 4576
Client:
Alberta Infrastructure
Project Location:
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta
Legend:
N
Asbestos Wall Sample
Asbestos Ceiling Sample
Asbestos Flooring Sample
Miscellaneous Asbestos Sample
Asbestos Exterior Sample
Vermiculite Sample
No vermiculite found
Note:
- Not to Scale

Mould and Lead Sample Locations and Observations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

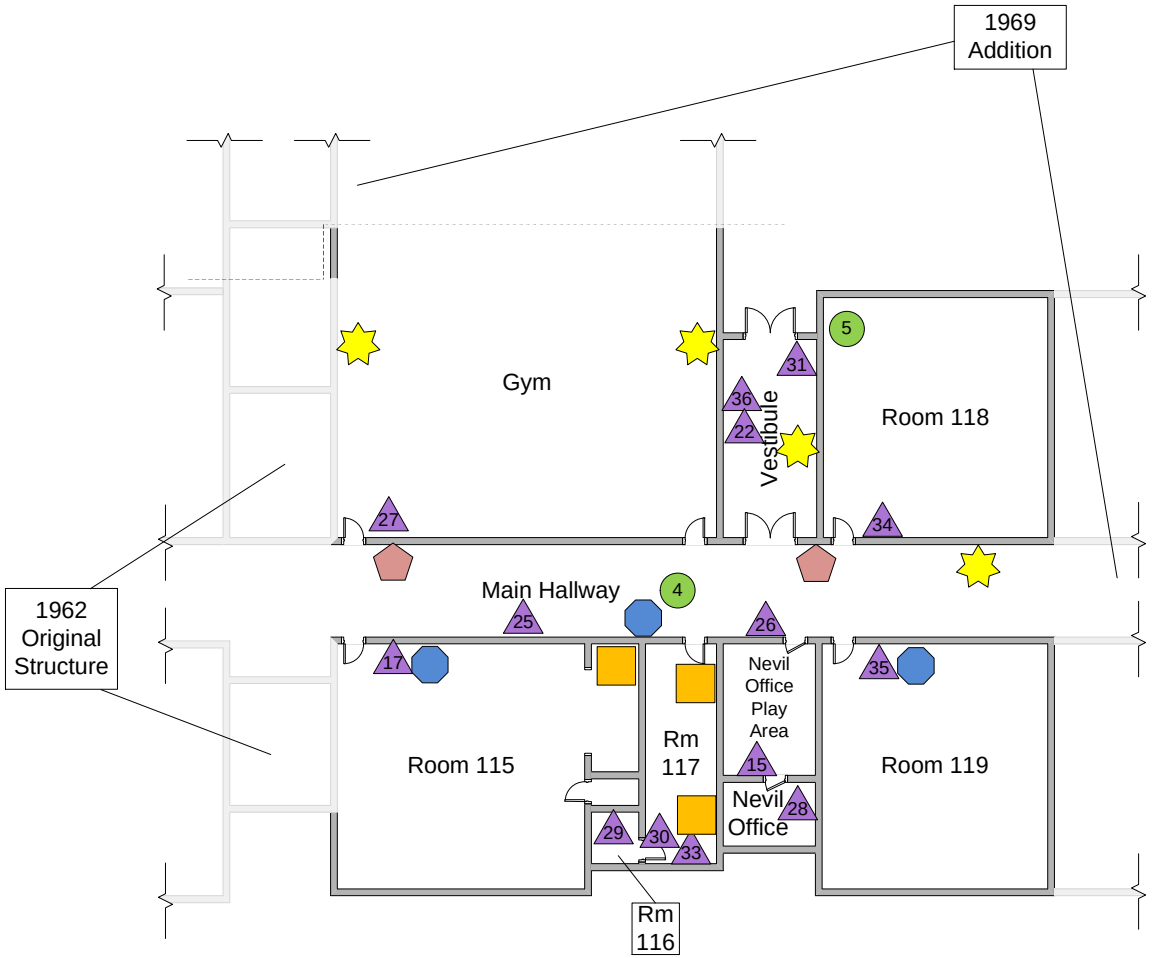
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Lead Sample
- Mould Tape Lift
- Mercury Containing Thermostat
- Fire Extinguisher
- Refrigerator

- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballast and miscellaneous chemicals were observed throughout the building at the time of the assessment.



ASE SERVICES

Sample Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

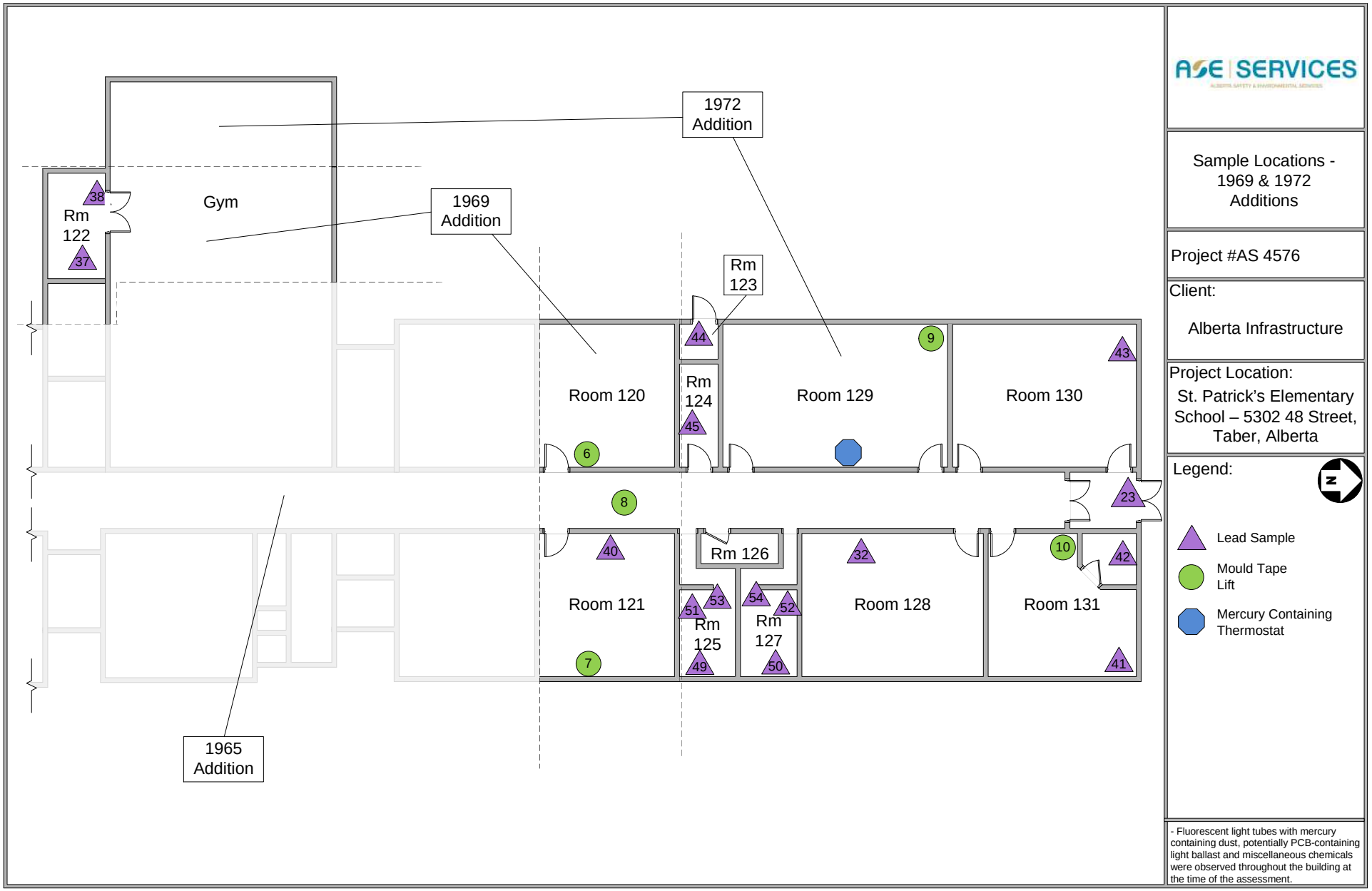
Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Lead Sample
- Mould Tape Lift
- Mercury Containing Thermostat
- Fire Extinguisher
- Refrigerator
- Emergency Lighting Unit

- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballast and miscellaneous chemicals were observed throughout the building at the time of the assessment.



ASE SERVICES

Sample Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

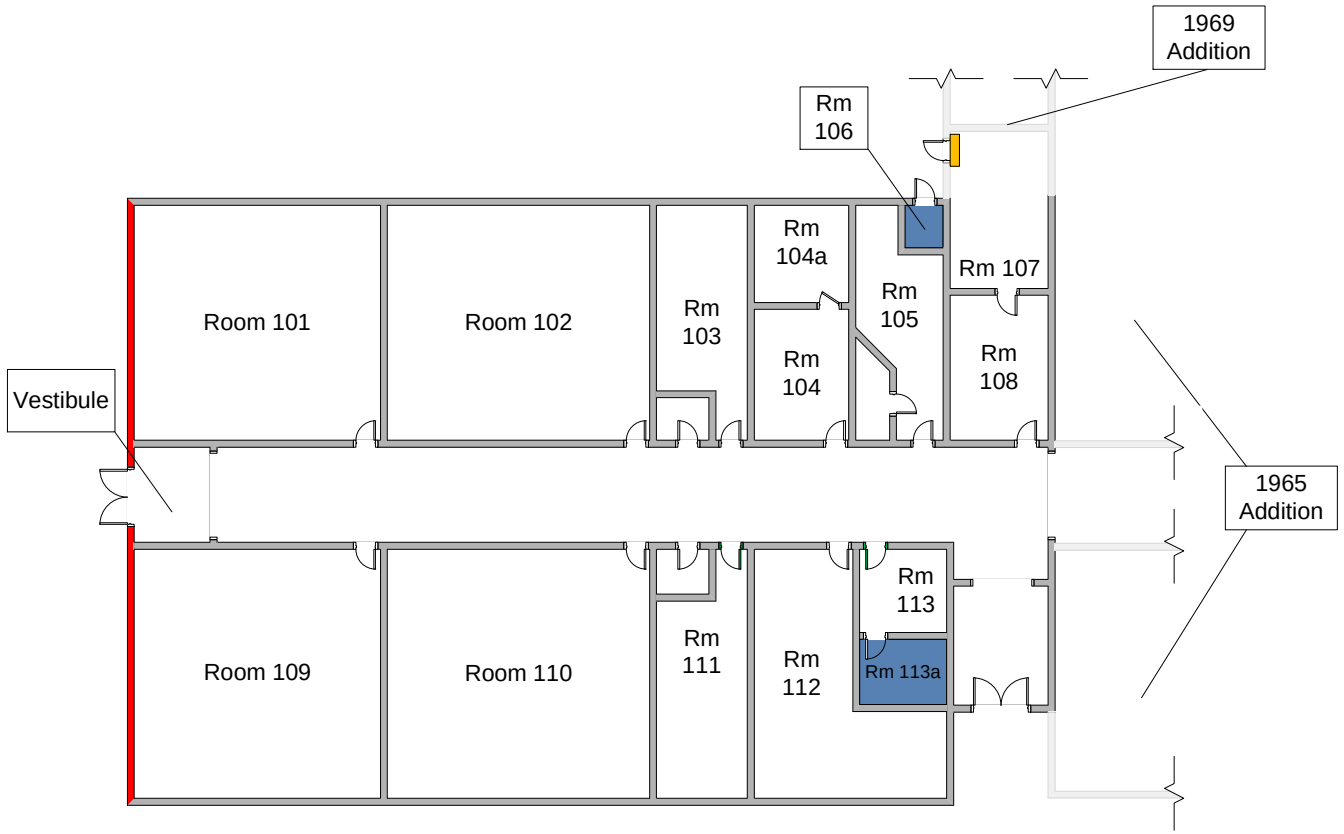
N

Lead Sample

Mould Tape Lift

Mercury Containing Thermostat

- Fluorescent light tubes with mercury containing dust, potentially PCB-containing light ballast and miscellaneous chemicals were observed throughout the building at the time of the assessment.



ASE SERVICES

Asbestos Containing Material Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

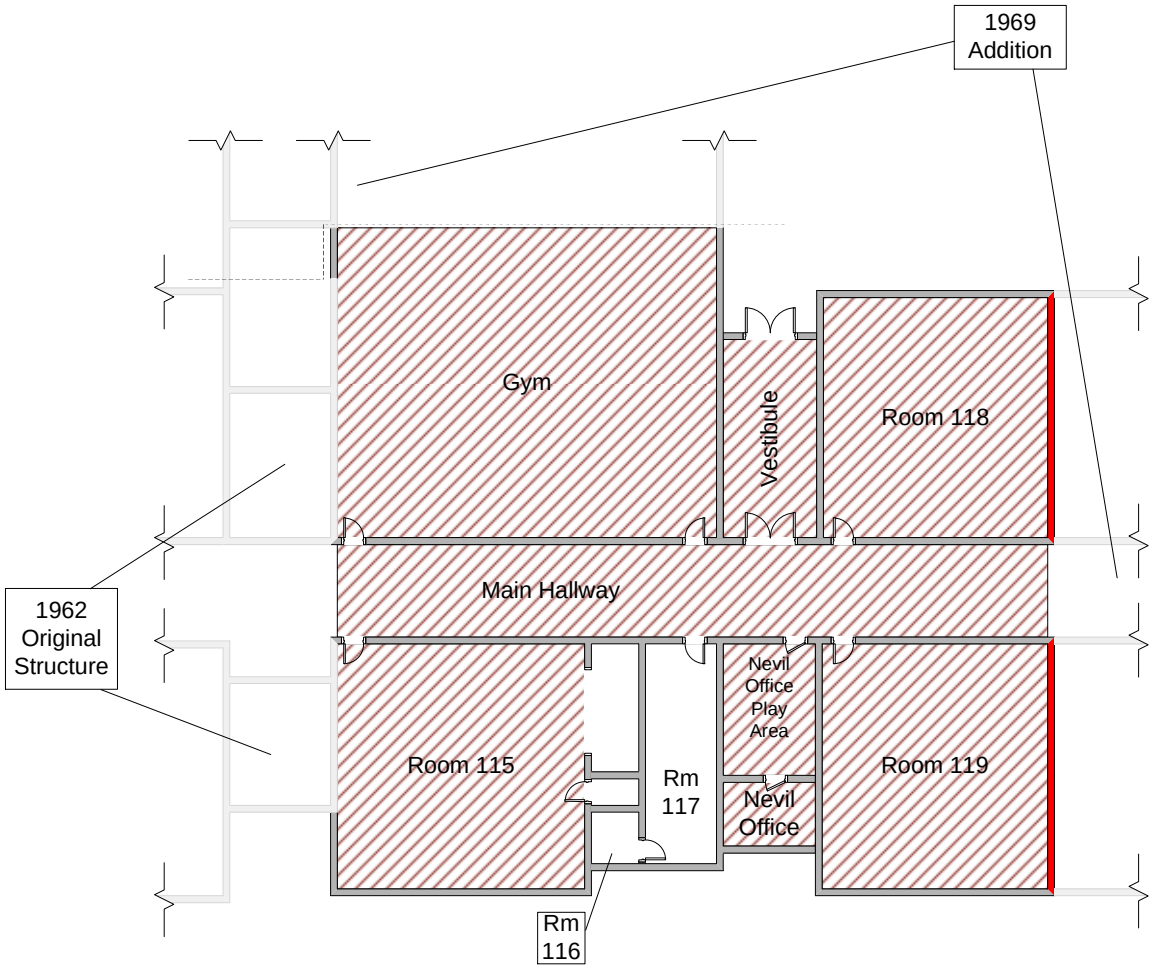
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Confirmed Asbestos Containing Vermiculite Insulation
- Asbestos Containing Mastic (underneath vinyl floor tile)
- Asbestos Containing Caulking

Note:

- Not to Scale
- **Although intrusive inspections were performed, asbestos-containing vermiculite may present in cinderblock walls other than those indicated.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



ASE SERVICES

Asbestos Containing Material Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

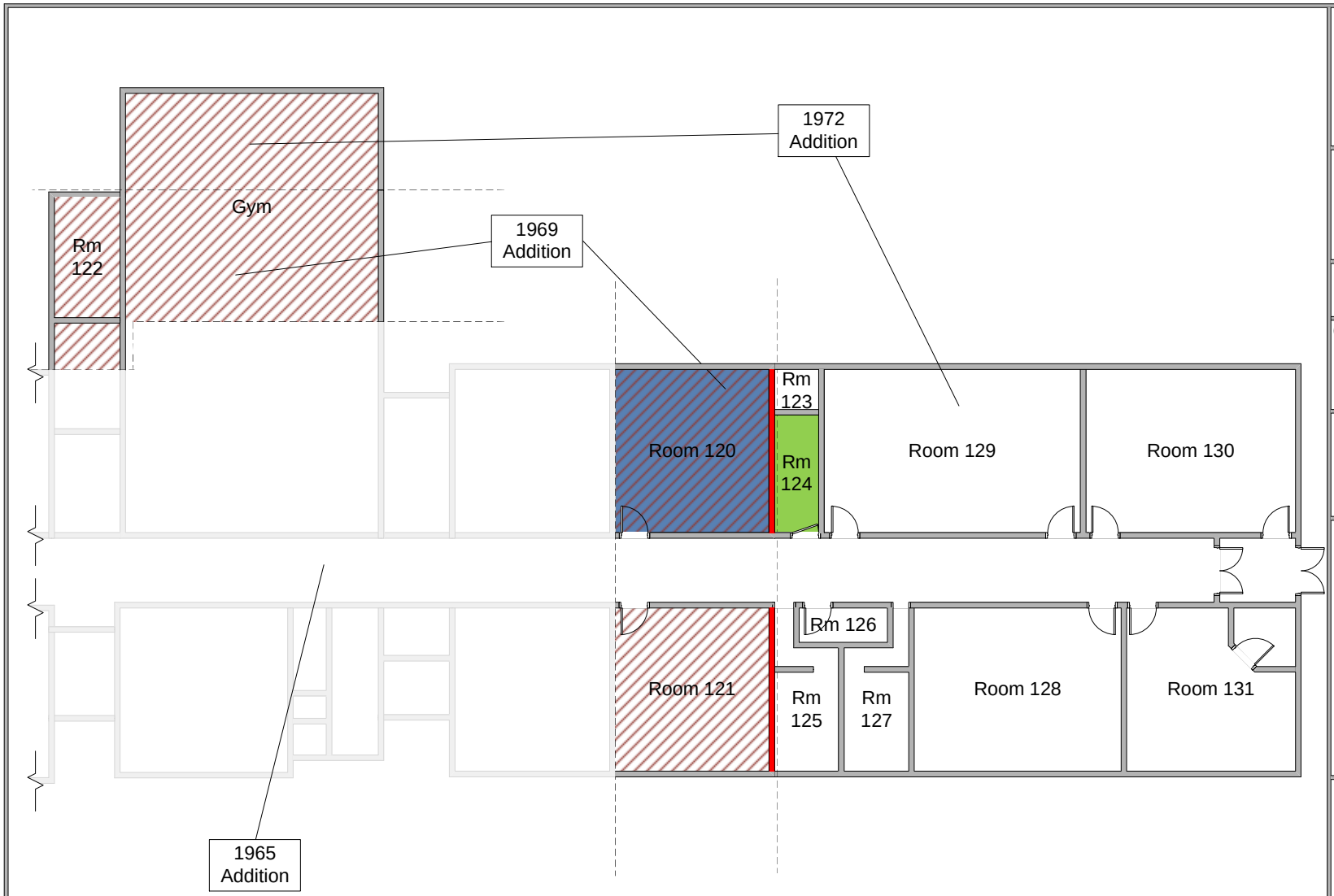
N

Confirmed Asbestos Containing Vermiculite Insulation

Asbestos Containing Acoustic Ceiling Tile

Note:

- Not to Scale
- **Although intrusive inspections were performed, asbestos-containing vermiculite may present in cinderblock walls other than those indicated.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



ASE SERVICES

Asbestos Containing Material Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

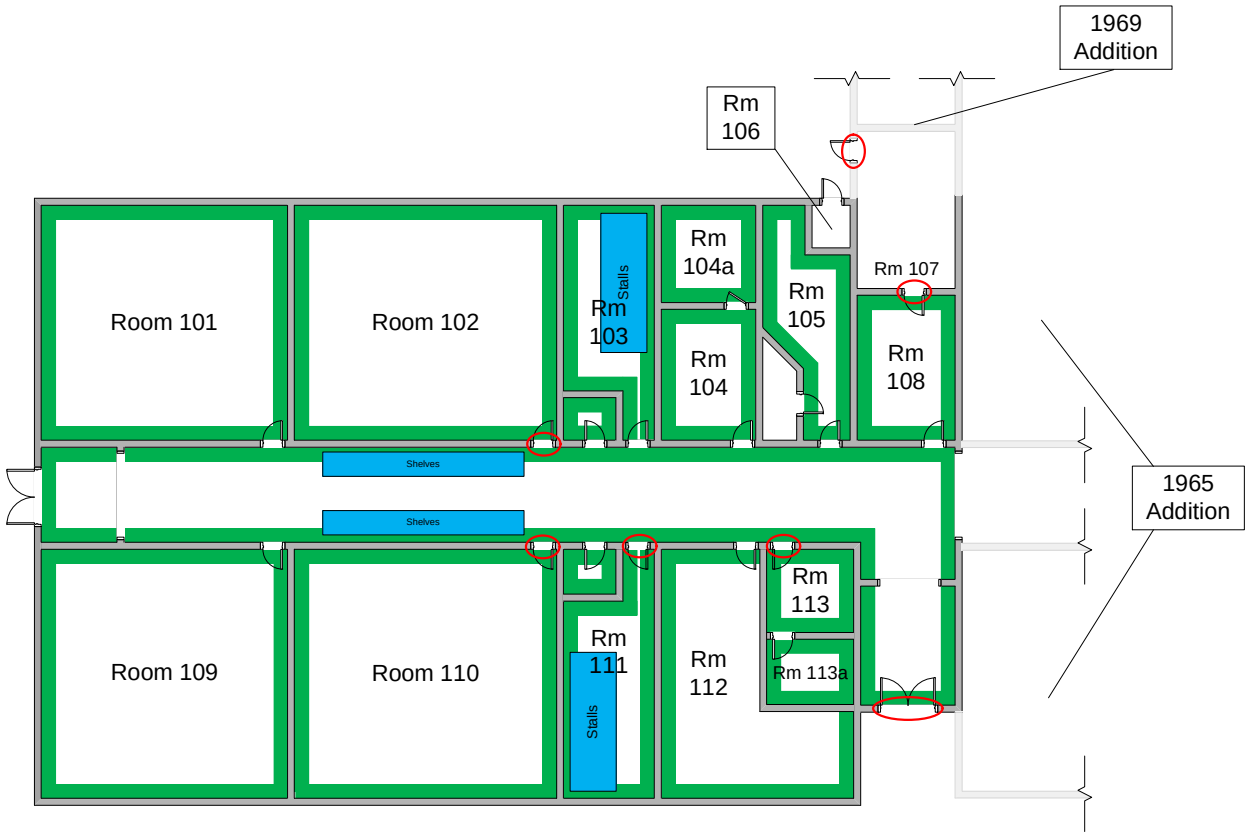
St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Confirmed Asbestos Containing Vermiculite Insulation
- Asbestos Containing Vinyl Floor Tile
- Acoustic Ceiling Tile with Asbestos Containing Mastic
- Asbestos Containing Duct Mastic

Note:

- Not to Scale
- **Although intrusive inspections were performed, asbestos-containing vermiculite may present in cinderblock walls other than those indicated.**
- If visually similar building materials are identified in locations other than those outlined in this floorplan, they should be considered asbestos containing until proven otherwise.
- Slab floor ducts may have asbestos containing mastic underneath them.



ASE SERVICES

Lead-based Paint Locations - 1962 Original Structure

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

N

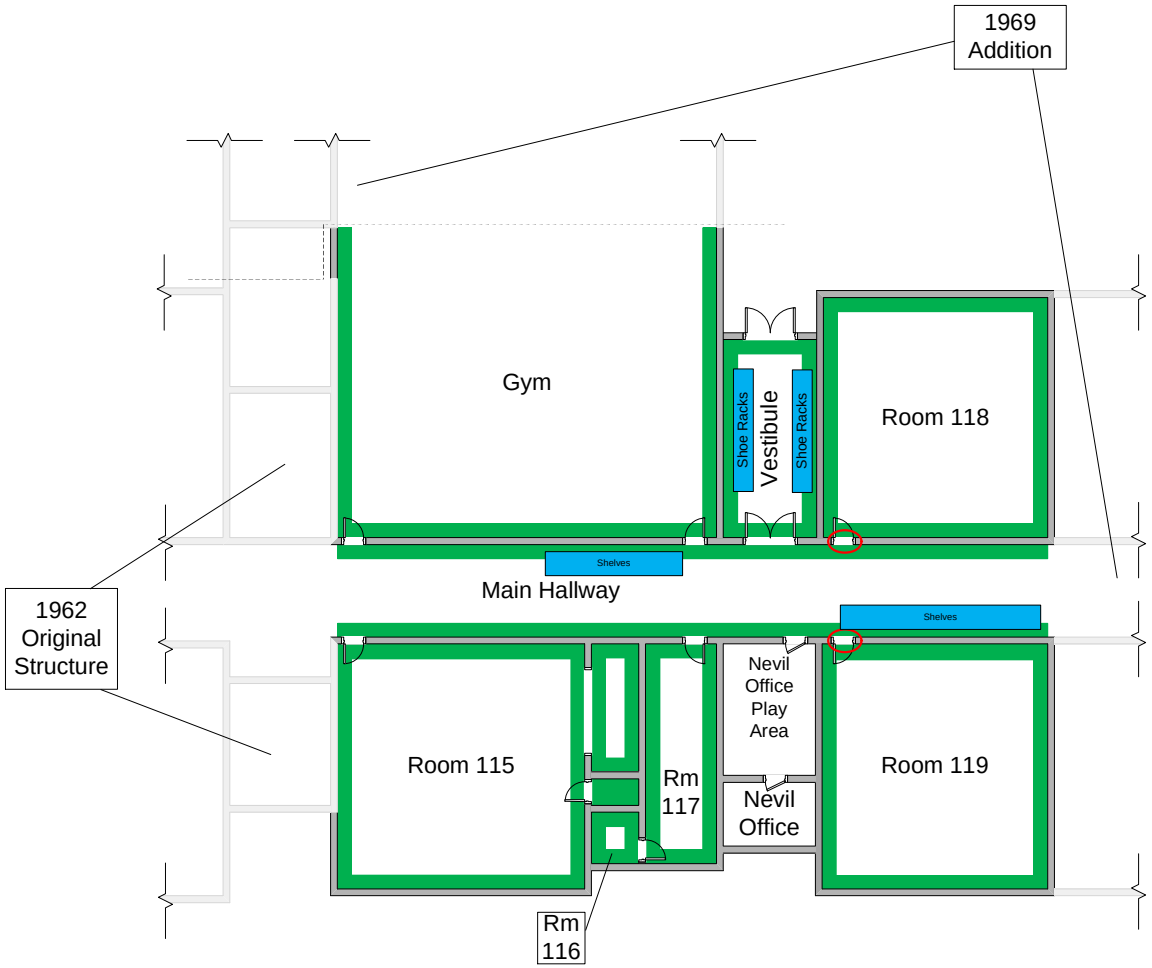
Lead-based Wall Paint

Items with Lead-based Paint

Doors and Door Frames with Lead-Based Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.



ASE SERVICES

Lead-based Paint Locations - 1965 Addition

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

N

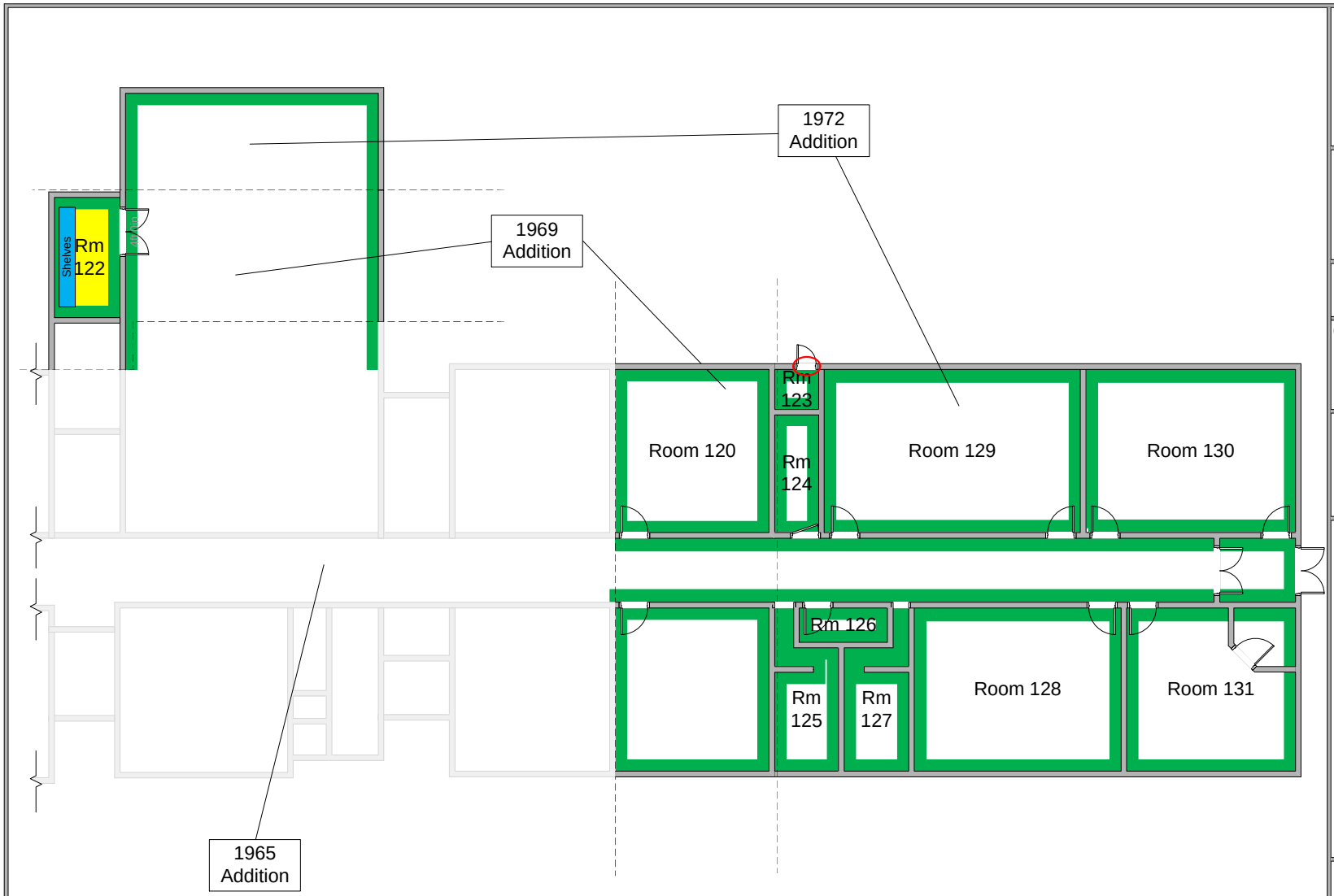
Lead-based Wall Paint

Items with Lead-based Paint

Doors and Door Frames with Lead-Based Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.



ASE SERVICES

Lead-based Paint Locations - 1969 & 1972 Additions

Project #AS 4576

Client:

Alberta Infrastructure

Project Location:

St. Patrick's Elementary School – 5302 48 Street, Taber, Alberta

Legend:

- Lead-based Wall Paint
- Items with Lead-based Paint
- Doors and Door Frames with Lead-Based Paint
- Lead-based Floor Paint

Note:

- Not to Scale
- If visually similar paints are identified in locations other than those outlined in this floorplan, they should be considered lead-based until proven otherwise.

APPENDIX V

LABORATORY REPORTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Attn: Silvana Wu
Customer Project: AS 4576, St Patrick's
Reference #: CAL16053582CB Date: 6/2/2016

Analysis and Method

Summary of polarizing light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of stereomicroscopy. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated of asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may have trace amounts of actinolite-tremolite, where not found be PLM should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may even contain a related asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be delectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Quantification of <1% will actually be reported as <=1% (allowable variance close to 1% is high). Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos and the "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have a college degree in a natural science (geology, biology, or environmental science) or are recognized by a state professional board in one these disciplines .Extensive in-house training programs are used to augment education background of the analyst. The group leader of polarized light has received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: AS 4576, St Patrick's **CA Labs Project #:** CAL16053582CB

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Silvana Wu
ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Phone # 403-475-0963
Fax # 403-475-0971

Customer Project:
AS 4576, St Patrick's
Turnaround Time:
5 Days

CA Labs Project #:
CAL16053582CB

Date: 6/2/2016
Samples Received: 5/26/16 10:30am
Date Of Sampling: None Given
Purchase Order #: AS 4576

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
A-1		*1-1*	***1962 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	12% ce 10% fg	78% qu,bi
		1-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	
A-2		*2-1*	***1965 South - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	11% ce 11% fg	78% qu,bi
		2-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	
A-3		*3-1*	***1969 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood**/ various black tar and black felt layers*	*n*	***None Detected***	10% ce 8% fg	82% qu,bi
		3-2	*tan insulation*	*y*	***None Detected***	100% fg	
		3-3	*blue foam*	*y*	***None Detected***		100% qu,or

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Julio Robles
Analyst

QAC
Leslie Crisp, P.G.

Technical Manager
Chad Lytle

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Silvana Wu
ASE Services
2216 27th Ave. NE, Ste. 208
Calgary, AB T2E 7A7

Phone # 403-475-0963
Fax # 403-475-0971

Customer Project:
AS 4576, St Patrick's
Turnaround Time:
5 Days

CA Labs Project #:
CAL16053582CB

Date: 6/2/2016
Samples Received: 5/26/16 10:30am
Date Of Sampling: None Given
Purchase Order #: AS 4576

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
A-4		*4-1*	***1972 - Roof/ Concrete, V.P. EPS, Fiberboard, Wood/*** *various black tar and black felt layers*	*n*	***None Detected***	10% ce 9% fg	81% qu,bi
		4-2	*brown fibrous paneling*	*y*	***None Detected***	100% ce	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TCEQ# T104704513-15-3 TDH 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Julio Robles
Analyst

QAC
Leslie Crisp, P.G.

Technical Manager
Chad Lytle

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959148
Client No.: A62-1
Description: Off-White Floor Tile
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L2)
Client No.: A62-1
Description: Tan Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L3)
Client No.: A62-1
Description: Off-White Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L4)
Client No.: A62-1
Description: Black Mastic
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959148(L5)
Client No.: A62-1
Description: Grey Cementitious
Facility:
Location: Hallway Floor

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959149
Client No.: A62-2
Description: Off-White Ceiling Tile; 2x4
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
40 Cellulose
30 Fibrous Glass

Percent Non-Fibrous Material:
30

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959150
Client No.: A62-3
Description: Off-White Ceiling Tile; 12x12
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
95 Cellulose

Percent Non-Fibrous Material:
5

Lab No.: 5959150(L2)
Client No.: A62-3
Description: Brown Mastic
Facility:
Location: Hallway Ceiling

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959151
Client No.: A62-4
Description: Brown Cove Base
Facility:
Location: Hallway Outside Girls Washroom

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959151(L2)
Client No.: A62-4
Description: Tan Mastic
Facility:
Location: Hallway Outside Girls Washroom

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959152
Client No.: A62-5
Description: Grey Floor Tile; 9x9
Facility:
Location: Meter Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959152(L2)
Client No.: A62-5
Description: Black Mastic
Facility:
Location: Meter Room

Percent Asbestos:
PC 0.5 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
99.5

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959153
Client No.: A62-6
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L2)
Client No.: A62-6
Description: Off-White Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L3)
Client No.: A62-6
Description: Tan Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959153(L4)
Client No.: A62-6
Description: Black Mastic
Facility:
Location: Rm 113 Server Room

Percent Asbestos:
PC 1.1 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
98.9

Lab No.: 5959154
Client No.: A62-7
Description: Grey Cementitious
Facility:
Location: Furnace Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959155
Client No.: A62-8
Description: Grey Cementitious
Facility:
Location: Furnace Room

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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9000 Commerce Parkway Suite B
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Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959156 **Client No.:** A62-9	**Description:** Off-White Ceiling Tile; 2x4 **Facility:**	**Location:** Clerks Office Entrance
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 40 Cellulose 30 Fibrous Glass	Percent Non-Fibrous Material: 30
Lab No.: 5959157 **Client No.:** A62-10	**Description:** Off-White Ceiling Tile; 2x4 **Facility:**	**Location:** Principal's Office NE Corner
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 40 Cellulose 30 Fibrous Glass	Percent Non-Fibrous Material: 30
Lab No.: 5959158 **Client No.:** A62-11	**Description:** Tan Fibrous **Facility:**	**Location:** Furnace Room Ducts
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 90 Cellulose	Percent Non-Fibrous Material: 10
Lab No.: 5959159 **Client No.:** A62-12	**Description:** Black Caulk **Facility:**	**Location:** Rm 102 West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959160 **Client No.:** A62-13	**Description:** Grey Caulk **Facility:**	**Location:** Furnace Room Door
Percent Asbestos: ***PC 2.9*** *Chrysotile*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 97.1
Lab No.: 5959161 **Client No.:** A62-14	**Description:** Off-White Cove Base **Facility:**	**Location:** Clerks Office
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959161(L2)
Client No.: A62-14
Description: Off-White Mastic
Facility:
Location: Clerks Office

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162
Client No.: A62-15
Description: Grey Cove Base
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162(L2)
Client No.: A62-15
Description: Tan Mastic
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959162(L3)
Client No.: A62-15
Description: Brown Mastic
Facility:
Location: Staff Lounge

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959163
Client No.: A62-16
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Rm 102 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959163(L2)
Client No.: A62-16
Description: Off-White Mastic
Facility:
Location: Rm 102 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959164
Client No.: A62-17
Description: Grey Floor Tile
Facility:
Location: Staff Lounge

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 10 Cellulose
Percent Non-Fibrous Material: 90

Lab No.: 5959164(L2)
Client No.: A62-17
Description: Tan Mastic
Facility:
Location: Staff Lounge

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959165
Client No.: A62-18
Description: White Joint Compound
Facility:
Location: Entrance To Principal's Office

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959166
Client No.: A62-19
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959167
Client No.: A62-20
Description: White Joint Compound
Facility:
Location: Rm 101 North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5959168
Client No.: A62-21
Description: White Joint Compound
Facility:
Location: Rm 109 South East Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
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Laboratory Director

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959169
Client No.: A62-22
Description: Grey Sheetrock
Facility:
Location: Rm 105 Work Room South Side

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
10 Cellulose

Percent Non-Fibrous Material:
90

Lab No.: 5959169(L2)
Client No.: A62-22
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room South Side

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959170
Client No.: A62-23
Description: White Joint Compound
Facility:
Location: Rm 105 Work Room South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 12:55:32 PM
Signature:
Analyst: Shane Cone

Approved By:
Frank E. Ehrenfeld, III
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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512303 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1962 Wing)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958975
Client No.: A65-1
Description: Tan Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Kitchen

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
15 Mineral Wool

Percent Non-Fibrous Material:
65

Lab No.: 5958976
Client No.: A65-2
Description: White Joint Compound
Facility:
Location: Rm 115 North East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958977
Client No.: A65-3
Description: White Joint Compound
Facility:
Location: Nevil Office South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958978
Client No.: A65-4
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Rm 118 North East Corner

Percent Asbestos:
PC 0.25 *Amosite*

Percent Non-Asbestos Fibrous Material:
60 Cellulose

Percent Non-Fibrous Material:
39.75

Lab No.: 5958979
Client No.: A65-5
Description: Brown Cove Base
Facility:
Location: Main Hallway Outside Rm 118

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958979(L2)
Client No.: A65-5
Description: Brown Mastic
Facility:
Location: Main Hallway Outside Rm 118

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

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Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958980
Client No.: A65-6
Description: Beige Cove Base
Facility:
Location: Nevil Office South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958980(L2)
Client No.: A65-6
Description: Tan/Beige Mastic
Facility:
Location: Nevil Office South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958981
Client No.: A65-7
Description: Beige Cove Base
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958981(L2)
Client No.: A65-7
Description: Beige Mastic
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958982
Client No.: A65-8
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Main Hallway North End

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958982(L2)
Client No.: A65-8
Description: Grey Mastic
Facility:
Location: Main Hallway North End

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
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Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958983
Client No.: A65-9
Description: Off-White Vinyl Sheet Flooring
Facility:
Location: Main Hallway Outside Rm 115

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958983(L2)
Client No.: A65-9
Description: Grey Mastic
Facility:
Location: Main Hallway Outside Rm 115

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958984
Client No.: A65-10
Description: Tan Vinyl Sheet Flooring
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958984(L2)
Client No.: A65-10
Description: Grey Leveling Compound
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958985
Client No.: A65-11
Description: Tan Vinyl Sheet Flooring
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958985(L2)
Client No.: A65-11
Description: Tan Mastic
Facility:
Location: Rm 115 Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958985(L3)
Client No.: A65-11
Description: Grey Leveling Compound
Facility:
Location: Rm 115 Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958986
Client No.: A65-12
Description: Black Caulk
Facility:
Location: Rm 115 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958987
Client No.: A65-13
Description: Off-White Mortar
Facility:
Location: Rm 115 South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
2 Wollastonite

Percent Non-Fibrous Material:
98

Lab No.: 5958988
Client No.: A65-14
Description: Off-White Mortar
Facility:
Location: Rm 115 South Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
2 Wollastonite

Percent Non-Fibrous Material:
98

Lab No.: 5958989
Client No.: A65-15
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 115 South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
5 Fibrous Glass
10 Cellulose

Percent Non-Fibrous Material:
85

Lab No.: 5958989(L2)
Client No.: A65-15
Description: Off-White Mastic
Facility:
Location: Rm 115 South East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512306 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1965 Wing)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958990
Client No.: A65-16
Description: Brown Woven Material
Facility:
Location: Kitchen Furnace Closet

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 50 Cellulose
Percent Non-Fibrous Material: 50

Lab No.: 5958991
Client No.: A65-17
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Kitchen North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 60 Cellulose
Percent Non-Fibrous Material: 40

Lab No.: 5958992
Client No.: A65-18
Description: Tan Ceiling Tile; 12x12
Facility:
Location: Vestibule South East Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 60 Cellulose
Percent Non-Fibrous Material: 40

Lab No.: 5958993
Client No.: A65-19
Description: Grey Sheetrock
Facility:
Location: Nevil Office North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 12 Cellulose
Percent Non-Fibrous Material: 88

Lab No.: 5958993(L2)
Client No.: A65-19
Description: White Joint Compound
Facility:
Location: Nevil Office North West Corner

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 5958994
Client No.: A65-20
Description: Grey Sheetrock
Facility:
Location: R 118 West Wall

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 12 Cellulose
Percent Non-Fibrous Material: 88

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

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Project No.: AS 4576 (1965 Wing)

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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Project No.: AS 4576 (1965 Wing)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958995
Client No.: A72-1
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 131

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958995(L2)
Client No.: A72-1
Description: Black Mastic
Facility:
Location: Rm 131

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996
Client No.: A72-2
Description: Grey Floor Tile; 12x12
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996(L2)
Client No.: A72-2
Description: Black Mastic
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958996(L3)
Client No.: A72-2
Description: Grey Leveling Compound
Facility:
Location: Rm 128

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5958997
Client No.: A72-3
Description: Off-White Floor Tile; 12x12
Facility:
Location: North End Main Hallway

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5958997(L2) **Description:** Black Mastic **Location:** North End Main Hallway
Client No.: A72-3 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958998 **Description:** Off-White Floor Tile; 12x12 **Location:** South End Main Hallway
Client No.: A72-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958998(L2) **Description:** Black Mastic **Location:** South End Main Hallway
Client No.: A72-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958999 **Description:** Black Cove Base **Location:** Rm 131
Client No.: A72-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5958999(L2) **Description:** Tan Mastic **Location:** Rm 131
Client No.: A72-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959000 **Description:** Black Cove Base **Location:** South Entrance To Library
Client No.: A72-6 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959000(L2) **Description:** Yellow/Tan Mastic **Location:** South Entrance To Library
Client No.: A72-6 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959001 **Description:** White Joint Compound **Location:** Storage Closet
Client No.: A72-7 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959001(L2) **Description:** White Joint Compound **Location:** Storage Closet
Client No.: A72-7 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959002 **Description:** White Joint Compound **Location:** Rm 128
Client No.: A72-8 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959003 **Description:** Lt Pink Floor Tile; 12x12 **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959003(L2) **Description:** White/Black Mastic **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
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Signature: Tiffany Lowe
Analyst: Tiffany Lowe

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959003(L3) **Description:** Grey Leveling Compound **Location:** Rm 131 North West Corner
Client No.: A72-9 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959004 **Description:** Lt Pink Floor Tile; 12x12 **Location:** Rm 121 Outside Door
Client No.: A69-10 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959004(L2) **Description:** Yellow/Black Mastic **Location:** Rm 121 Outside Door
Client No.: A69-10 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959005 **Description:** Blue Floor Tile; 12x12 **Location:** Rm 120 South West Corner
Client No.: A69-11 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 1.2 *Chrysotile*	None Detected	98.8

Lab No.: 5959005(L2) **Description:** Black Mastic **Location:** Rm 120 South West Corner
Client No.: A69-11 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959006 **Description:** Blue Floor Tile; 12x12 **Location:** Rm 120 North East Corner
Client No.: A69-12 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 1.1 *Chrysotile*	None Detected	98.9

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Report Date: 6/23/2016
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Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959006(L2) **Description:** Black Mastic **Location:** Rm 120 North East Corner
Client No.: A69-12 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959007 **Description:** White Ceiling Tile; 12x12 **Location:** Rm 130 North West Corner
Client No.: A72-13 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	90 Cellulose	10

Lab No.: 5959008 **Description:** White Ceiling Tile; 12x12 **Location:** Rm 121 North East Corner
Client No.: A69-14 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	90 Cellulose	10

Lab No.: 5959008(L2) **Description:** Brown Mastic **Location:** Rm 121 North East Corner
Client No.: A69-14 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
PC 0.5 *Chrysotile*	None Detected	99.5

Lab No.: 5959009 **Description:** White Joint Compound **Location:** Rm 121 North East Corner
Client No.: A69-15 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959010 **Description:** White Joint Compound **Location:** Rm 120 West Wall
Client No.: A69-16 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959011
Client No.: A72-17
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 131 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959011(L2)
Client No.: A72-17
Description: Yellow Mastic
Facility:
Location: Rm 131 East Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959012
Client No.: A69-18
Description: White Vinyl Sheet Flooring
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
20 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
70

Lab No.: 5959012(L2)
Client No.: A69-18
Description: Green Mastic
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959012(L3)
Client No.: A69-18
Description: White Leveling Compound
Facility:
Location: Rm 120 West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959013
Client No.: A69-19
Description: White Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Rm 121

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
70 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
20

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

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Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

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Report Date: 6/23/2016
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Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959014
Client No.: A72-20
Description: White Ceiling Tile; 2x4
Facility:
Location: Main Hallway Outside Rm 130

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
70 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
20

Lab No.: 5959015
Client No.: A72-21
Description: White Panel
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
80 Fibrous Glass

Percent Non-Fibrous Material:
20

Lab No.: 5959015(L2)
Client No.: A72-21
Description: Tan Mastic
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L3)
Client No.: A72-21
Description: White Caulk
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L4)
Client No.: A72-21
Description: Grey Cementitious
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959015(L5)
Client No.: A72-21
Description: White Joint Compound
Facility:
Location: Boys Bathroom West Wall

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959016 **Client No.:** A72-22	**Description:** White Panel **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 80 Fibrous Glass	Percent Non-Fibrous Material: 20
Lab No.: 5959016(L2) **Client No.:** A72-22	**Description:** Tan Mastic **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959016(L3) **Client No.:** A72-22	**Description:** White Caulk **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959016(L4) **Client No.:** A72-22	**Description:** Grey Cementitious **Facility:**	**Location:** Boys Bathroom West Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959017 **Client No.:** A72-23	**Description:** Black Rubber **Facility:**	**Location:** Rm 128 Windows
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: 5 Synthetic	Percent Non-Fibrous Material: 95
Lab No.: 5959018 **Client No.:** A69-24	**Description:** Black Rubber **Facility:**	**Location:** Rm 121 Windows
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: Trace Synthetic	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959019 **Description:** Silver Mastic **Location:** Furnace Room
Client No.: A72-25 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
10 *Chrysotile*	None Detected	90

Lab No.: 5959020 **Description:** Silver Mastic **Location:** Furnace Room
Client No.: A72-26 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
10 *Chrysotile*	None Detected	90

Lab No.: 5959021 **Description:** White Non-Fibrous **Location:** Furnace Room
Client No.: A72-27 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959021(L2) **Description:** Pink Fibrous **Location:** Furnace Room
Client No.: A72-27 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	95 Fibrous Glass	5

Lab No.: 5959022 **Description:** White Non-Fibrous **Location:** Furnace Room
Client No.: A72-28 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959022(L2) **Description:** Pink Fibrous **Location:** Furnace Room
Client No.: A72-28 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	95 Fibrous Glass	5

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959023
Client No.: A72-29
Description: White Sheetrock
Facility:
Location: Storage Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
5 Cellulose
3 Fibrous Glass

Percent Non-Fibrous Material:
92

Lab No.: 5959023(L2)
Client No.: A72-29
Description: White Joint Compound
Facility:
Location: Storage Closet

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 5959024
Client No.: A72-30
Description: White Joint Compound
Facility:
Location: Rm 131 North East Corner

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:36:33 AM
Signature: Tiffany Lowe
Analyst: Tiffany Lowe

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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ASBESTOS TESTING LABORATORIES

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Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512307 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576 (1969 & 1972 Wings)

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

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ASBESTOS TESTING LABORATORIES

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Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959052 **Description:** White Caulk **Location:** 1972 Wing Gym Door
Client No.: AE-1 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959053 **Description:** White Caulk **Location:** 1972 Wing Gym Door
Client No.: AE-2 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959053(L2) **Description:** Black Tar **Location:** 1972 Wing Gym Door
Client No.: AE-2 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959054 **Description:** Grey Mortar **Location:** 1965 Wing West Wall
Client No.: AE-3 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959055 **Description:** Grey Mortar **Location:** 1962 Wing West Wall
Client No.: AE-4 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Lab No.: 5959056 **Description:** Grey Mortar **Location:** 1962 Wing Front Entrance
Client No.: AE-5 **Facility:**

Percent Asbestos:	Percent Non-Asbestos Fibrous Material:	Percent Non-Fibrous Material:
None Detected	None Detected	100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5959057 **Client No.:** AE-6	**Description:** Grey Mortar **Facility:**	**Location:** 1972 Wing East Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959058 **Client No.:** AE-7	**Description:** Grey Mortar **Facility:**	**Location:** 1972 Wing
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100
Lab No.: 5959059 **Client No.:** AE-8	**Description:** Grey Stucco **Facility:**	**Location:** 1965 Wing East Wall
Percent Asbestos: *None Detected*	Percent Non-Asbestos Fibrous Material: None Detected	Percent Non-Fibrous Material: 100

Analytical Method -**US EPA 600, R93-116**. Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/22/2016 12:00:00 AM
Signature:
Analyst: Alex Wright

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
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Client: Alberta Safety & Environmental Services
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Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

Appendix to Analytical Report

Customer Contact:
Analysis: US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NY-DOH No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/22/2016
Report No.: 512304 - PLM
Project: St. Patrick's Elementary
Project No.: AS 4576

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

Wes-Har Asbestos Analysis & Consulting Ltd.

Bulk Summary Report

For ASE Services Ltd Lethbridge Field Office
Suite 232 , Plaza One, 104
13th St. N, Lethbridge, AB Canada T1H 2R4

Location : St. Patrick's Elementary

Project : AS 4576

15370	AS 4576	Sample Location / Description	Result(s)	TP
1	V-1	Vermiculite Insulation, 1962 Wing Rm. 109 S. Ext. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.
2	V-2	Vermiculite Insulation, 1972 Addition Furnace Room S. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.
3	V-3	Vermiculite Insulation, 1969 Wing Rm. 121 S. Wall	DNQ Asbestiform Amphibole See Detailed Vermiculite Report	.T.

Comments

See Detailed Bulk Specific Report for Analytical Method and Associated Detection Limit
TP Means Tested Positive for the Analysis Requested; T - Present
LP - Means Percent : Layer or Phase of Whole SampleACM Means Asbestos Containing Material; T
DNQ - Means Detected Not Quantitated
Samples Submitted Will Be Retained For 30 Days After Receipt And Will Be Disposed Of Thereafter Unless Otherwise Notified In Writing
Sample Submitted By ASE Services Ltd Lethbridge Field Office

June 23, 2016

G. Nawrocki
Reviewed By

Wes-Har Asbestos Analysis & Consulting Ltd.

Detailed Bulk Asbestos in Vermiculite Report

For ASE Services Ltd Lethbridge Field Office
Suite 232 , Plaza One, 104
13th St. N, Lethbridge, AB Canada T1H 2R4

Location : St. Patrick's Elementary

Project : AS 4576

15370	AS 4576	Sample Location / Description	Result(s)	Analyzed	Analyst	ACM
1	V-1	Vermiculite Insulation, 1962 Wing Rm. 109 S. Ext. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.
2	V-2	Vermiculite Insulation, 1972 Addition Furnace Room S. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.
3	V-3	Vermiculite Insulation, 1969 Wing Rm. 121 S. Wall	DNQ Asbestiform Amphibole DNQ Quartz DNQ Vermiculite DNQ Non-fibrous	Jun 23 2016	HM	.T.

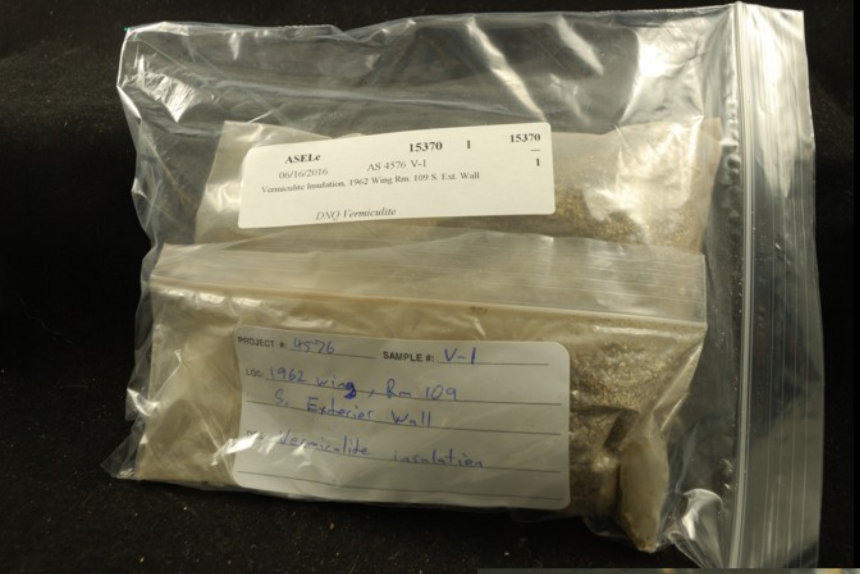
Comments

Fibrous / Mineral Components Analyzed In Accordance With The NIOSH ASBESTOS (bulk) by PLM Method 9002 [15 August 1994]
Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation EPA/600/R-04/004 January 2004
Detection Limit for Asbestiform Amphibole 'Rapid Screening' is less than 0.01 % (by weight) , Dependant on Original Sample Size
ACM Means - Asbestos Containing Material; T - Present
LP Means - Precent : Layer or Phase of Whole Sample.
DNQ Means - Detected Not Quantitated
< Means - Less Than
Samples Submitted Will Be Retained For 30 Days After Receipt And Will Be Disposed Of Thereafter Unless Otherwise Notified In Writing
Sample Submitted By ASE Services Ltd Lethbridge Field Office

June 23, 2016 [Facsimile]

H. McKnight
Analyst

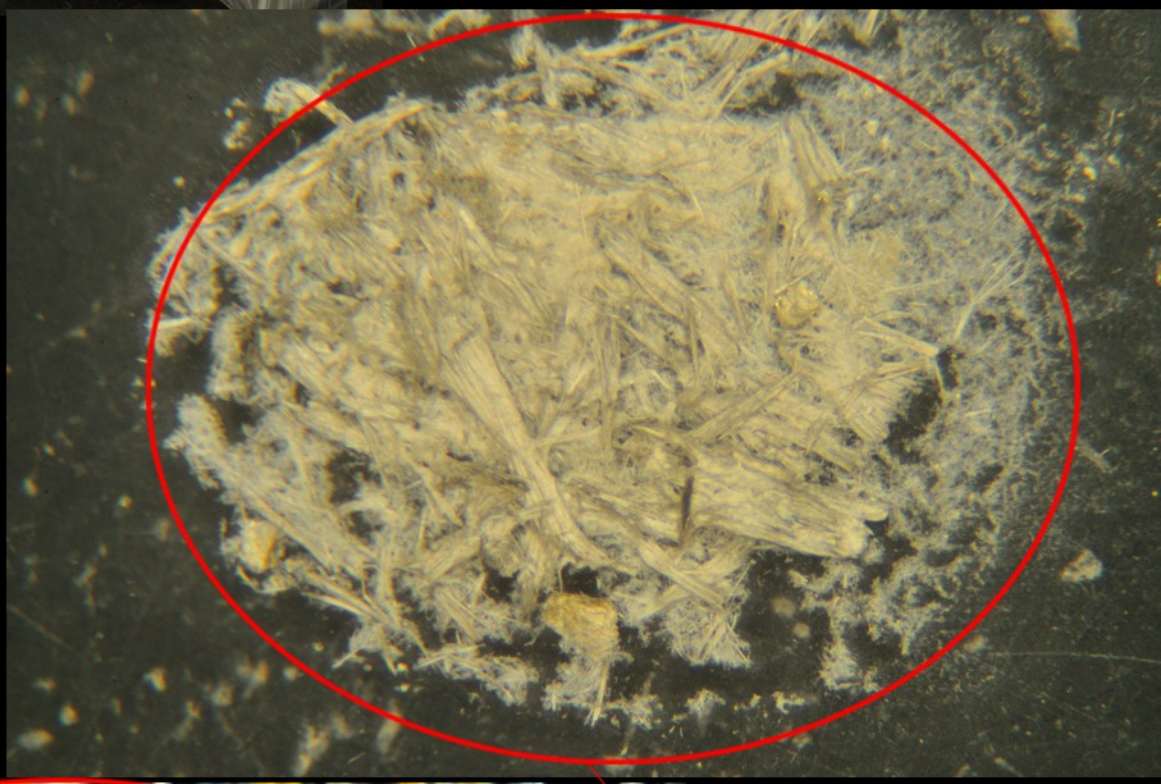
G. Nawrocki
Reviewed By



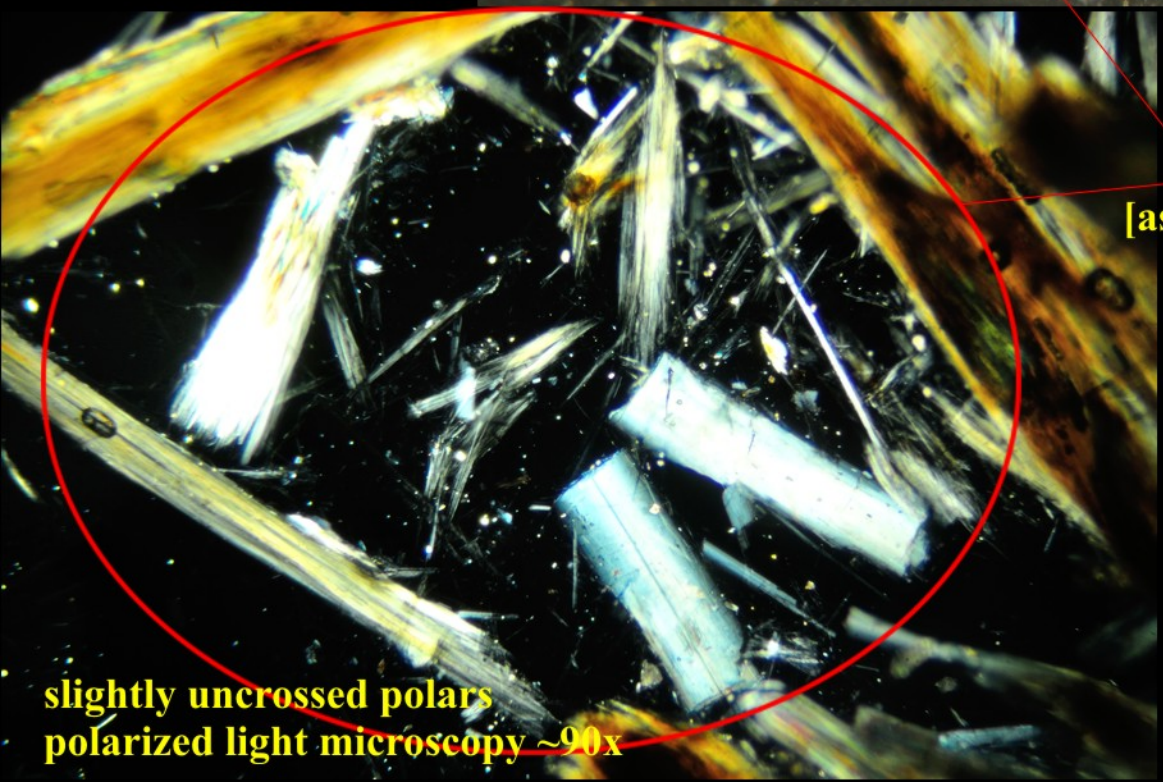
AS 4576 V-1 St. Patrick's Elementary
1962 Wing Rm. 109 S. Ext. Wall
Vermiculite Insulation
15370 . 01

stereo binocular microscopy ~ 25x

submitted sample

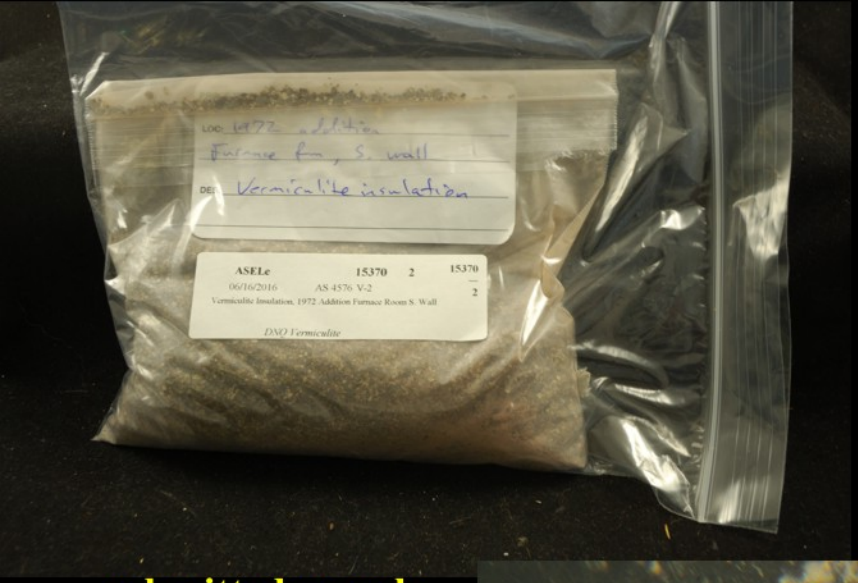


washed & sieved



asbestos fibres
[asbesiform amphibole]

slightly uncrossed polars
polarized light microscopy ~90x

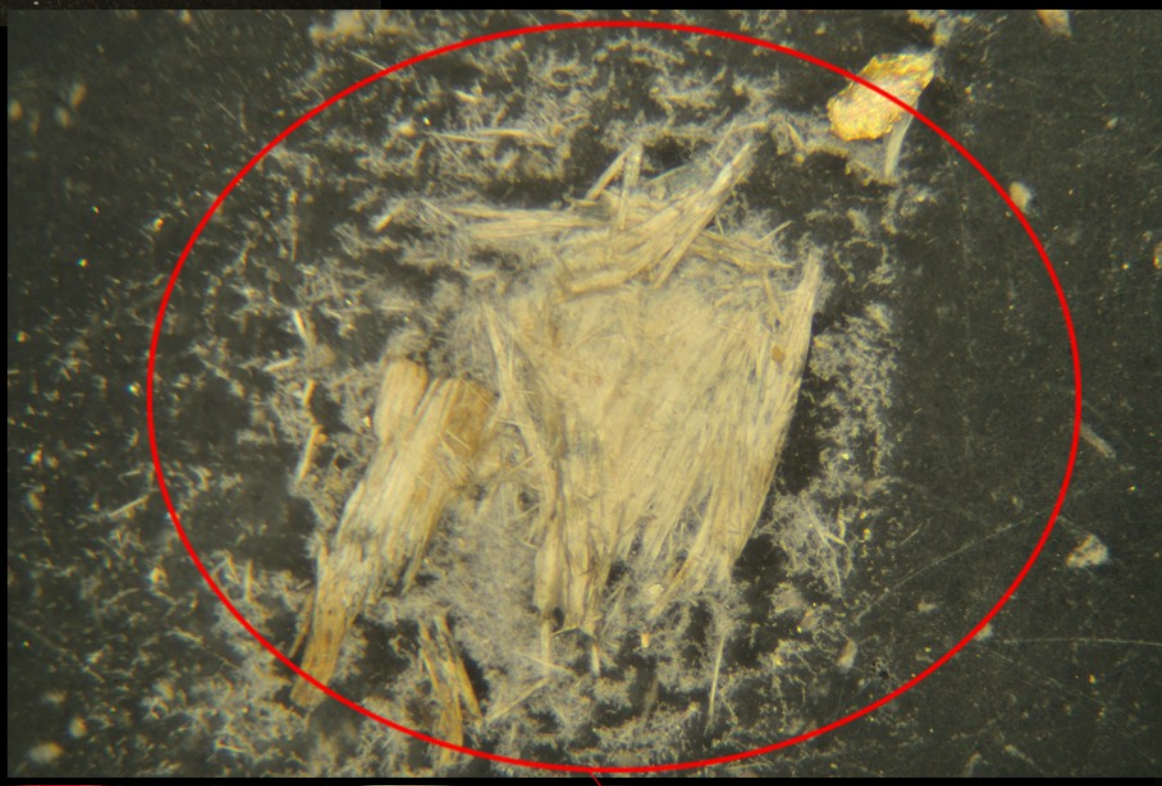


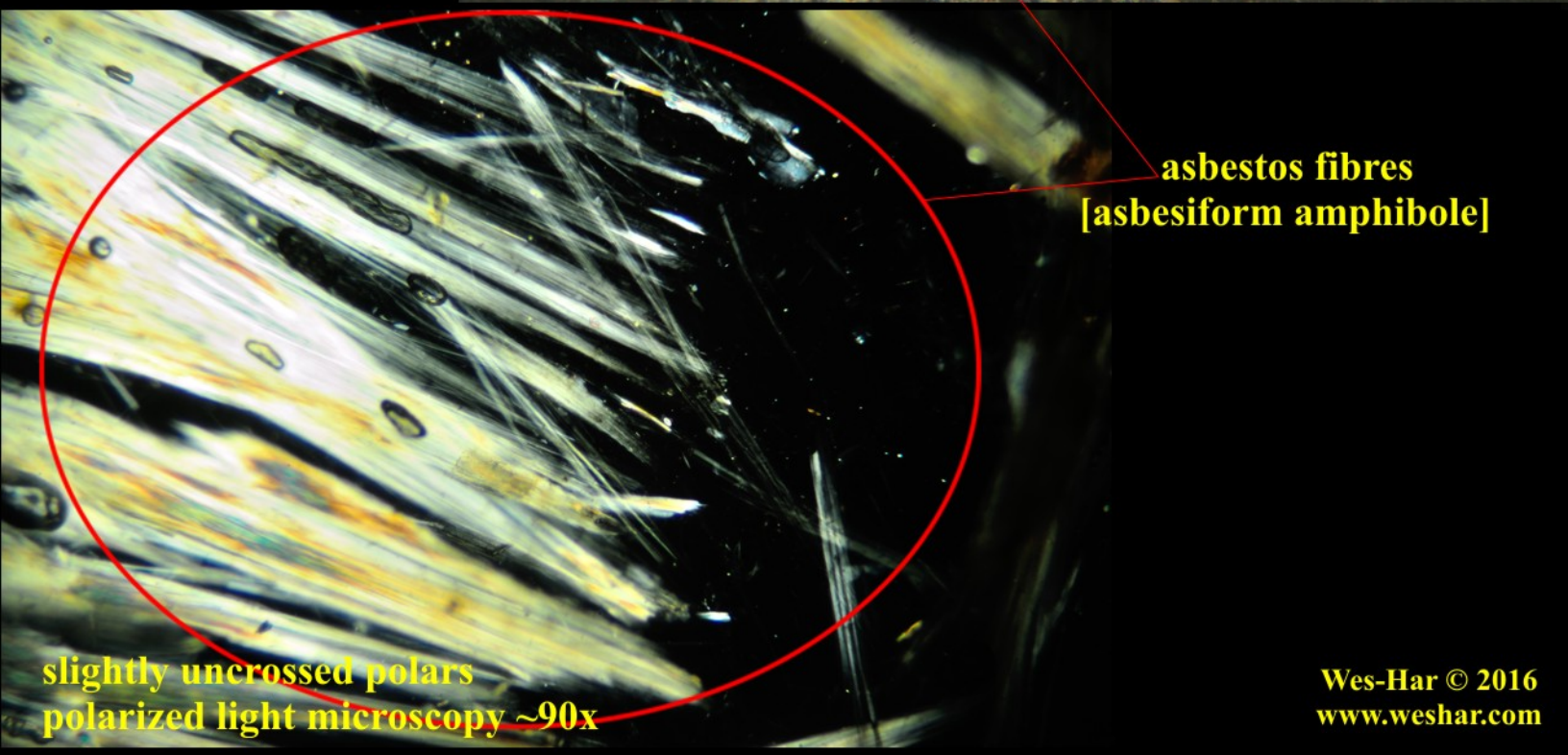
AS 4576 V-2 St. Patrick's Elementary
1972 Addition Furnace Room S. Wall
Vermiculite Insulation
15370 . 02

stereo binocular microscopy ~ 25x

submitted sample

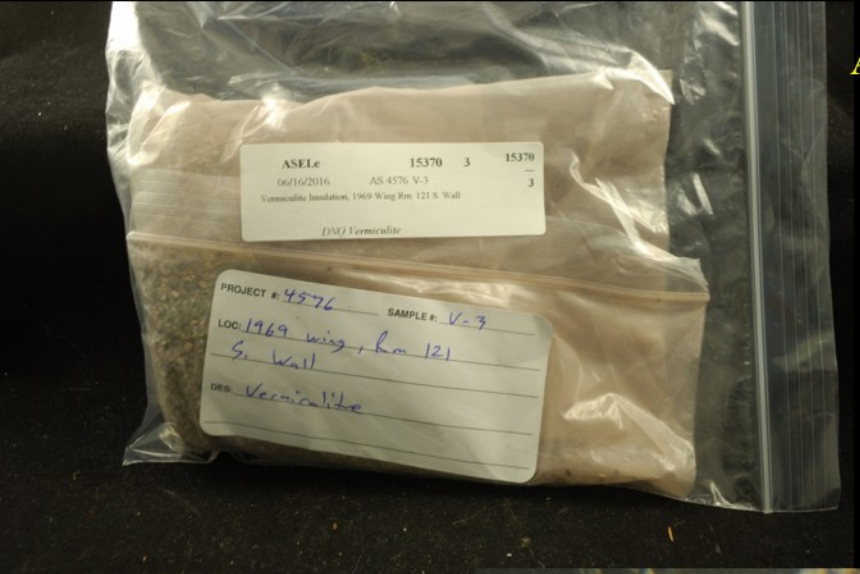
washed & sieved





asbestos fibres
[asbesiform amphibole]

slightly uncrossed polars
polarized light microscopy ~90x

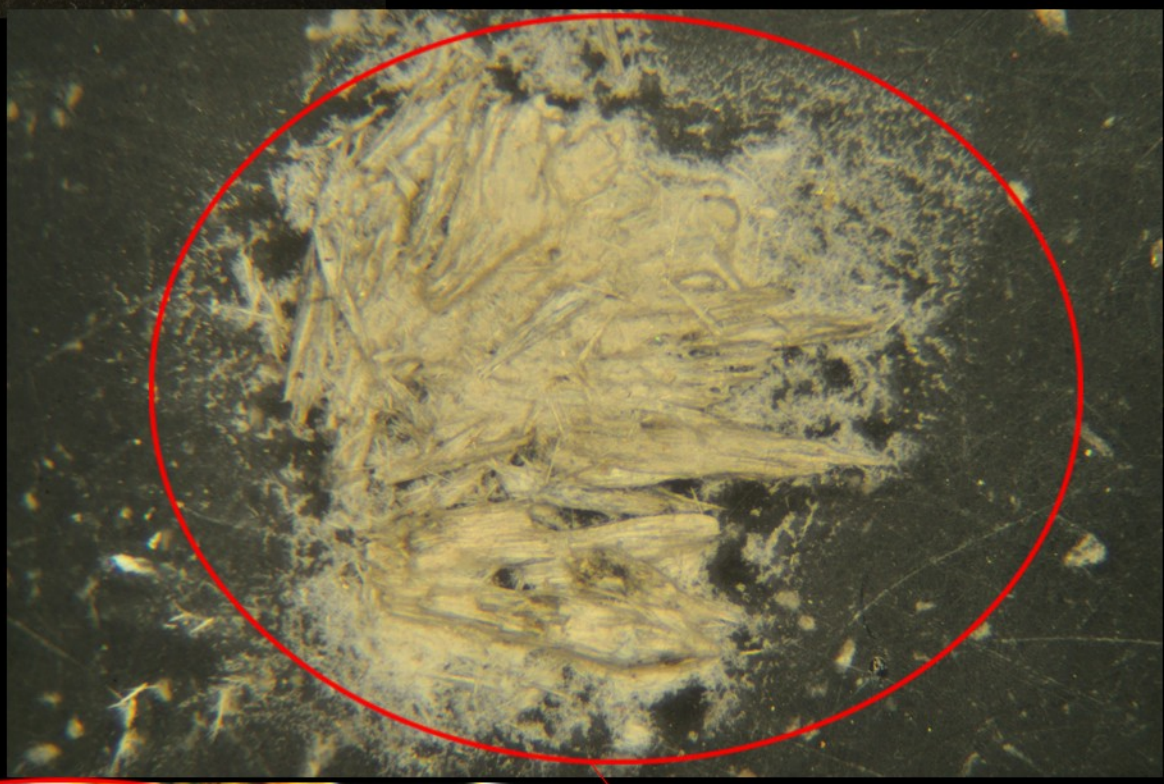


AS 4576 V-3 St. Patrick's Elementary
1969 Wing Rm. 121 S. Wall
Vermiculite Insulation
15370 . 03

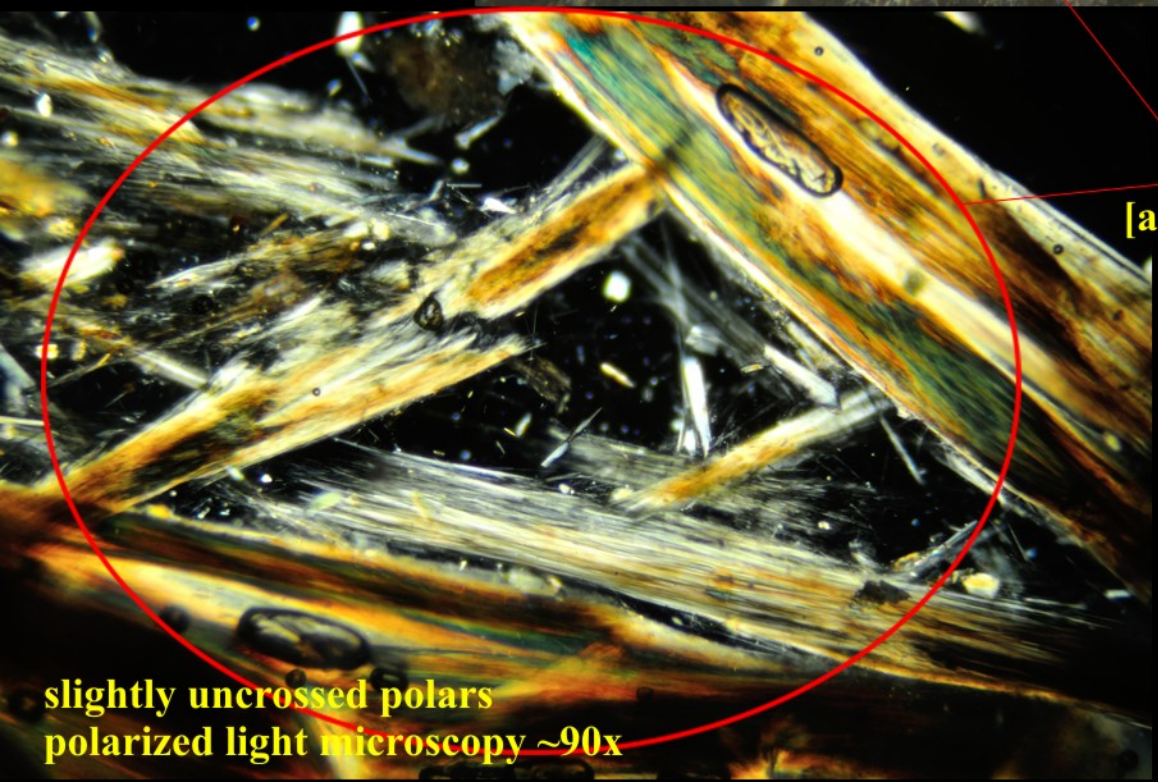
stereo binocular microscopy ~ 25x

submitted sample

washed & sieved



asbestos fibres
[asbesiform amphibole]



slightly uncrossed polars
polarized light microscopy ~90x

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955950 **Description:**Paint Lt Grey **Result (% by Weight):**<0.0069
Client No.:L-1 **Location:**62' Rm 113 Behind Door **Result (ppm):**<69
Comments:***

Lab No.:5955951 **Description:**Paint Dk Grey **Result (% by Weight):**0.026
Client No.:L-2 **Location:**62' Rm 113 Door Frame **Result (ppm):**260
Comments:

Lab No.:5955952 **Description:**Paint Yellow **Result (% by Weight):**0.21
Client No.:L-3 **Location:**62' Boys Washroom **Result (ppm):**2100
Comments:

Lab No.:5955953 **Description:**Coating Beige **Result (% by Weight):**0.042
Client No.:L-4 **Location:**62' Boys Washroom Stall **Result (ppm):**420
Comments:*

Lab No.:5955954 **Description:**Paint Cream **Result (% by Weight):**<0.0060
Client No.:L-5 **Location:**62' Rm 109 East Wall **Result (ppm):**<60
Comments:

Lab No.:5955955 **Description:**Paint Cream **Result (% by Weight):**<0.0059
Client No.:L-6 **Location:**62' Rm 114 Server Rm **Result (ppm):**<59
Comments:

Lab No.:5955956 **Description:**Paint White **Result (% by Weight):**0.13
Client No.:L-7 **Location:**62' Entry Vestibule **Result (ppm):**1300
Comments:

Lab No.:5955957 **Description:**Paint Mint Green **Result (% by Weight):**0.14
Client No.:L-8 **Location:**62' Entry Vestibule **Result (ppm):**1400
Comments:

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

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Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955958 **Client No.:**L-9	**Description:**Paint Emerald Green **Location:**62' Entry Vestibule	**Result (% by Weight):**<0.0071 **Result (ppm):**<71 **Comments:**
Lab No.:5955959 **Client No.:**L-10	**Description:**Paint Cream **Location:**62' Main Hallway Com. Washroom	**Result (% by Weight):**0.064 **Result (ppm):**640 **Comments:**
Lab No.:5955960 **Client No.:**L-11	**Description:**Paint Dk Green **Location:**62' Main Hallway Shelf	**Result (% by Weight):**0.066 **Result (ppm):**660 **Comments:**
Lab No.:5955961 **Client No.:**L-12	**Description:**Paint Dk Blue **Location:**62' Hallway Door To Rm 110	**Result (% by Weight):**0.019 **Result (ppm):**190 **Comments:**
Lab No.:5955962 **Client No.:**L-13	**Description:**Paint Lime Green **Location:**62' Clerks Office	**Result (% by Weight):**<0.0059 **Result (ppm):**<59 **Comments:**
Lab No.:5955963 **Client No.:**L-14	**Description:**Paint Lt Blue **Location:**62' Rm 102 Door Frame	**Result (% by Weight):**0.0094 **Result (ppm):**94 **Comments:**
Lab No.:5955964 **Client No.:**L-15	**Description:**Paint Tan **Location:**65' Nevil Office	**Result (% by Weight):**0.0073 **Result (ppm):**73 **Comments:**
Lab No.:5955965 **Client No.:**L-16	**Description:**Paint Navy Blue **Location:**62' Janitors Rm	**Result (% by Weight):**0.11 **Result (ppm):**1100 **Comments:**

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
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Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955966 **Client No.:**L-17	**Description:**Paint Blue **Location:**62' Rm 115	**Result (% by Weight):**0.011 **Result (ppm):**110 **Comments:**
Lab No.:5955967 **Client No.:**L-18	**Description:**Paint Brown **Location:**62' Furnace Rm Door	**Result (% by Weight):**3.8 **Result (ppm):**38000 **Comments:**
Lab No.:5955968 **Client No.:**L-19	**Description:**Paint Yellow **Location:**62' Girls Bathroom	**Result (% by Weight):**0.19 **Result (ppm):**1900 **Comments:**
Lab No.:5955969 **Client No.:**L-20	**Description:**Paint Lt Grey **Location:**62' Rm 113	**Result (% by Weight):**<0.0077 **Result (ppm):**<77 **Comments:**
Lab No.:5955970 **Client No.:**L-21	**Description:**Paint Dk Grey **Location:**62' Rm 113	**Result (% by Weight):**0.043 **Result (ppm):**430 **Comments:**
Lab No.:5955971 **Client No.:**L-22	**Description:**Paint Mint Green **Location:**65' Vestibule	**Result (% by Weight):**0.14 **Result (ppm):**1400 **Comments:**
Lab No.:5955972 **Client No.:**L-23	**Description:**Paint Emerald Green **Location:**72' Vestibule	**Result (% by Weight):**0.017 **Result (ppm):**170 **Comments:**
Lab No.:5955973 **Client No.:**L-24	**Description:**Paint Brown **Location:**62' Furnace Rm Door	**Result (% by Weight):**3.6 **Result (ppm):**36000 **Comments:***

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955974 **Client No.:**L-25	**Description:**Paint Dk Green **Location:**65' Main Hallway Shelf	**Result (% by Weight):**0.090 **Result (ppm):**900 **Comments:**
Lab No.:5955975 **Client No.:**L-26	**Description:**Paint Lime Green **Location:**65' Main Hallway Nevil Office	**Result (% by Weight):**<0.0090 **Result (ppm):**<90 **Comments:**
Lab No.:5955976 **Client No.:**L-27	**Description:**Paint White **Location:**65' Gym East Wall	**Result (% by Weight):**<0.0074 **Result (ppm):**<74 **Comments:**
Lab No.:5955977 **Client No.:**L-28	**Description:**Paint Off-White/Cream **Location:**65' Nevil Office Area	**Result (% by Weight):**<0.0070 **Result (ppm):**<70 **Comments:**
Lab No.:5955978 **Client No.:**L-29	**Description:**Paint Off-White/Cream **Location:**65' Furnace Rm	**Result (% by Weight):**<0.0085 **Result (ppm):**<85 **Comments:**
Lab No.:5955979 **Client No.:**L-30	**Description:**Paint Tan **Location:**65' Furnace Rm Door	**Result (% by Weight):**<0.0066 **Result (ppm):**<66 **Comments:**
Lab No.:5955980 **Client No.:**L-31	**Description:**Paint Pale Green **Location:**65' Vestibule	**Result (% by Weight):**0.095 **Result (ppm):**950 **Comments:**
Lab No.:5955981 **Client No.:**L-32	**Description:**Paint Pale Green **Location:**72' Rm 128	**Result (% by Weight):**0.066 **Result (ppm):**660 **Comments:**

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
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Signature:
Analyst: Chad Shaffer

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Frank E. Ehrenfeld, III
Laboratory Director

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Client: Alberta Safety & Environmental Services
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Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955982 **Client No.:**L-33	**Description:**Paint Beige **Location:**65' Rm 117 (Kitchen)	**Result (% by Weight):**<0.0059 **Result (ppm):**<59 **Comments:**
Lab No.:5955983 **Client No.:**L-34	**Description:**Paint Blue **Location:**65' Rm 118 Door Frame	**Result (% by Weight):**0.12 **Result (ppm):**1200 **Comments:**
Lab No.:5955984 **Client No.:**L-35	**Description:**Paint White **Location:**65' Rm 119 Door Frame	**Result (% by Weight):**0.094 **Result (ppm):**940 **Comments:**
Lab No.:5955985 **Client No.:**L-36	**Description:**Coating Grey And Black **Location:**65' Vestibule Shoe Rack	**Result (% by Weight):**0.67 **Result (ppm):**6700 **Comments:**
Lab No.:5955986 **Client No.:**L-37	**Description:**Paint Grey **Location:**69' Gym Storage Floor	**Result (% by Weight):**0.30 **Result (ppm):**3000 **Comments:**
Lab No.:5955987 **Client No.:**L-38	**Description:**Paint Pale Green/Blue **Location:**69' Gym Storage Walls	**Result (% by Weight):**0.033 **Result (ppm):**330 **Comments:**
Lab No.:5955988 **Client No.:**L-39	**Description:**Paint Lt Blue **Location:**62' Rm 102	**Result (% by Weight):**0.030 **Result (ppm):**300 **Comments:**
Lab No.:5955989 **Client No.:**L-40	**Description:**Paint Dk Blue **Location:**69' Rm 121	**Result (% by Weight):**0.0095 **Result (ppm):**95 **Comments:**

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5955990 **Client No.:**L-41	**Description:**Paint Dk Green **Location:**72' Rm 131	**Result (% by Weight):**<0.0062 **Result (ppm):**<62 **Comments:**
Lab No.:5955991 **Client No.:**L-42	**Description:**Paint Bright Green **Location:**72' Rm 131 Booth	**Result (% by Weight):**<0.0070 **Result (ppm):**<70 **Comments:**
Lab No.:5955992 **Client No.:**L-43	**Description:**Paint Yellow/Lime Green **Location:**72' Rm 130	**Result (% by Weight):**0.035 **Result (ppm):**350 **Comments:**
Lab No.:5955993 **Client No.:**L-44	**Description:**Paint Brown **Location:**72' Rm 123 Door Frame	**Result (% by Weight):**0.22 **Result (ppm):**2200 **Comments:***
Lab No.:5955994 **Client No.:**L-45	**Description:**Paint Beige **Location:**72' Rm 124 Storage/Furnace	**Result (% by Weight):**<0.0081 **Result (ppm):**<81 **Comments:**
Lab No.:5955995 **Client No.:**L-46	**Description:**Paint Yellow **Location:**62' Com. Washroom	**Result (% by Weight):**0.11 **Result (ppm):**1100 **Comments:***
Lab No.:5955996 **Client No.:**L-47	**Description:**Coating Tan **Location:**62' Girl's Washroom Stalls	**Result (% by Weight):**1.2 **Result (ppm):**12000 **Comments:***
Lab No.:5955997 **Client No.:**L-48	**Description:**Paint Navy Blue **Location:**62' Rm 108	**Result (% by Weight):**0.061 **Result (ppm):**610 **Comments:**

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/16/2016
Date Analyzed: 6/23/2016 4:57:03 PM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Appendix to Analytical Report:

Customer Contact:
Analysis: ASTM D3335-85a

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Paint
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by ASTM D3335-85a by AAS

Certification:
- National Lead Laboratory Program (NLLAP): AIHA-LAP, LLC No. 100188
- NYSDOH-ELAP No. 11021

Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation.

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B.

Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies.

LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled).

* Insufficient sample provided to perform QC reanalysis (<200 mg)

** Not enough sample provided to analyze (<50 mg)

*** Matrix / substrate interference possible.

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CERTIFICATE OF ANALYSIS

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Client: ALB464

Report Date: 6/23/2016
Report No.: 512318 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a complete list with highlighted disclaimers pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com.**

* NOTE: Multiple samples received in container. Composite analysis requested per EPA/HUD guidelines not covered by NLLAP/AIHA accreditation.

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/29/2016
Report No.: 513338 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.:5966550 **Description:**1"x1" Tile, Tan Paint **Result (% by Weight):**<0.0063
Client No.:L-49 **Location:**72' Wing Girl's Washroom **Result (ppm):**<63
Comments:***

Lab No.:5966551 **Description:**1"x1" Tile, Tan Paint **Result (% by Weight):**0.0055
Client No.:L-50 **Location:**72' Wing Boy's Washroom **Result (ppm):**55
Comments:***

Lab No.:5966552 **Description:**4"x4" Mottled Tile, Green Paint **Result (% by Weight):**<0.0062
Client No.:L-51 **Location:**72' Wing Girl's Washroom **Result (ppm):**<62
Comments:***

Lab No.:5966553 **Description:**4"x4" Mottled Tile, Green Paint **Result (% by Weight):**<0.0052
Client No.:L-52 **Location:**72' Wing Boy's Washroom **Result (ppm):**<52
Comments:***

Lab No.:5966554 **Description:**4"x4" Tile, White Paint **Result (% by Weight):**0.0070
Client No.:L-53 **Location:**72' Wing Girl's Washroom **Result (ppm):**70
Comments:***

Lab No.:5966555 **Description:**4"x4" Tile, White Paint **Result (% by Weight):**0.0042
Client No.:L-54 **Location:**72' Wing Boy's Washroom **Result (ppm):**42
Comments:

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 6/29/2016
Date Analyzed: 6/29/2016 12:00:00 AM
Signature:
Analyst: Chad Shaffer

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
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Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/29/2016
Report No.: 513338 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Appendix to Analytical Report:

Customer Contact:
Analysis: ASTM D3335-85a

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager: cdavis@iatl.com
iATL Account Representative: Alyssa Peiffer
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Paint
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by ASTM D3335-85a by AAS

Certification:
- National Lead Laboratory Program (NLLAP): AIHA-LAP, LLC No. 100188
- NYSDOH-ELAP No. 11021

Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation.

All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.

Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B.

Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies.

LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled).

* Insufficient sample provided to perform QC reanalysis (<200 mg)

** Not enough sample provided to analyze (<50 mg)

*** Matrix / substrate interference possible.

iATL INTERNATIONAL
ASBESTOS TESTING LABORATORIES

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client: Alberta Safety & Environmental Services
208, 2216 27th Ave NE
Calgary AB T2E 7A7

Client: ALB464

Report Date: 6/29/2016
Report No.: 513338 - Lead Paint
Project: St. Patrick's Elementary
Project No.: AS 4576

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a complete list with highlighted disclaimers pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com.**

* NOTE: Multiple samples received in container. Composite analysis requested per EPA/HUD guidelines not covered by NLLAP/AIHA accreditation.

ASE | SERVICES
ALBERTA SAFETY & ENVIRONMENTAL SERVICES

BULK MOULD ANALYSIS REPORT

Client: Alberta Infrastructure
Project #: AS 4575
Description: St. Patrick's School

Sample Date: 26-Jun-16
Analysis Date: 29-Jun-16

Sample #	Lab #	Sample Description	Background Debris[1]	Mould Spore Identification	Relative Amount[2]
M-1	L16-7-01	Room 101 Ceiling	Low	Mycelial Fragments	Low
M-2	L16-7-02	Room 110 Ceiling	Low	Cladosporium	Low
M-3	L16-7-03	Room 107 Ceiling	Moderate	No Fungal Structures Detected	
M-4	L16-7-04	1965 Addition Hallway Ceiling	Low	No Fungal Structures Detected	
M-5	L16-7-05	Room 118 Ceiling	Low	No Fungal Structures Detected	
M-6	L16-7-06	Room 120 Ceiling	Low	No Fungal Structures Detected	
M-7	L16-7-07	Room 121 Ceiling	Low	Chaetomium Cladosporium	Low Low
M-8	L16-7-08	1969 Addition Hallway Ceilinig	Low	No Fungal Structures Detected	
M-9	L16-7-09	Room 129 Ceiling	Low	No Fungal Structures Detected	
M-10	L16-7-10	Room 131	Low	Chaetomium	Low

Notes:
1 Background Debris refers to loading of non-fungal fragments.'Low'=0-10%; 'Moderate'=11-30%; 'High'=>30%
2 Relative amount: 'Low' = <10 per mm^2 of tape surface;Moderate' = 10-100 per mm^2; 'High' = >100 per mm^2

Results Reviewed by: Jake Koethler Date: 29-Jun-16

P: 403.475.0963 • TF: 1.877.520.0963 • F: 403.475.0971 • 208-2216 27th Avenue N.E. • Calgary, AB T2E 7A7
www.aseservices.ca

Parkland Geotechnical Consulting Ltd.
3177 5th Avenue North
Lethbridge, AB, T1H 0P2
www.parklandgeo.com
T: 403 381 0989

June 3, 2016
File # PRO5089

Joanne.Smith@sahuri.com
Original will remain on file

SAHURI + Partners Architecture Inc.
Suite 201, 123 Forge Road SE
Calgary, Alberta
T2H 0S9

ATTN: **Ms. Joanne Smith, Architect, AAA, MRAIC**
Partner

RE: Geotechnical Investigation Proposal
St. Patrick's Elementary School Internal Alterations
5302 - 48 Street, Taber, Alberta

1.0 INTRODUCTION

Parkland Geotechnical Consulting Ltd. (ParklandGEO) is pleased to submit the following proposal regarding geotechnical engineering services available for the proposed internal alterations to St. Patrick's Elementary School, located at 5302 - 48 Street, in Taber, Alberta.

ParklandGEO has significant experience on similar school projects throughout Alberta. We have the people and resources to complete this work in a timely and cost effective manner; and we believe we have local knowledge which will be beneficial to the project design team.

2.0 HEALTH AND SAFETY

ParklandGEO considers the safety and well-being of our employees a core value of the company. No work will be undertaken unless the safety of all employees, contractors, and the public has been protected. ParklandGEO and any subcontractors will perform a hazard assessment prior to commencing any site project work. Unsafe conditions will be identified and corrective actions will be taken prior to any work being undertaken. All workplace injuries on near-miss incidents will be investigated immediately by ParklandGEO. ParklandGEO will prescribe to all terms and conditions with respect to safety on the job site. Our safety objective for this project is to complete the work using safe procedures and behaviours, resulting in zero injuries or near-miss incidents. ParklandGEO is COR certified with the Alberta Construction Safety Association (ACSA). ParklandGEO is also a participating member of the ISN Networld safety database as well as Comply Works (formerly Canadian HSE Registry Ltd).

3.0 SCOPE OF WORK

The scope of work for the geotechnical site investigation will include the following:

- Review existing geotechnical reports, geological maps and any other geotechnical documentation associated with the site.
- Contact Alberta First Call and arrange for a private locate to clear underground utility lines.
- Drill 3 boreholes at the site to a minimum depth of 10 m below grade or auger refusal.
- Carry out Standard Penetration Tests (SPTs) at 1.5 m depth intervals in the boreholes and collect disturbed soil samples at 1.0 m depth intervals.
- Backfill all boreholes to ground level upon completion and remove all remaining boring spoils offsite.
- A geodetic survey to provide accurate locations and elevations at the borehole locations.
- Install standpipe piezometers in the boreholes to monitor the groundwater levels about 1 to 2 weeks following drilling.
- On the final groundwater monitoring trip, all piezometers would be abandoned, sealed with bentonite chips, and cut flush to ground surface.
- Upon completion of the fieldwork, selected soil samples will be tested. The proposed tests include: water content analysis on disturbed samples, grain size distribution (sieve and hydrometer), soil plasticity (Atterberg limits), and tests to determine the concentration of water soluble sulphates.
- Prepare a report which will include a description of the soil conditions, the occurrence of groundwater, and any unusual or noteworthy factors.

  Geotechnical recommendations, would include:

  - site preparation, including stripping, excavations and backfill requirements;
  - foundations, including footings and piles;
  - lateral earth pressure parameters for walls;
  - floor slabs;
  - cement type;
  - pavement structures;
  - groundwater and impacts on construction;
  - frost depth and precautions to mitigate frost action;
  - site grading and drainage; and
  - other factors which may be relevant.

4.0 PROPOSED GEOTECHNICAL BUDGET

The proposed budget to perform the site investigation is **$7,600.00 plus GST**, based on the following cost breakdown.

Task	Budget
Project Management (Review, Planning, Safety, Private Service Locate)	$ 700.00
Drilling Subcontractor & Supplies (3 Boreholes)	$ 3,100.00
ParklandGEO Field Engineer (Drilling, Borehole Survey, Water Levels)	$ 1,300.00
Routine Soil Testing (Moistures, Grain Size, Plasticity, SO_4)	$ 700.00
Geotechnical Report	$ 1,800.00
Total	$ 7,600.00
Additional Services (if requested):	
Extra 10 m Deep Borehole (scheduled with initial boreholes)	$ 1,000.00/hole
Groundwater Levels (per extra trip)	$ 200.00/trip
Extra Equipment and Disbursements	Cost plus 10 %

We have assumed the drilling work can be performed by a truck mounted power auger drilling rig. The cost above does not include any allowance for site access problems. Wet ground conditions or deep snow cover may require some site access work which would be invoiced as a disbursement on a cost plus 10% basis. We have assumed that the underground service locates can be performed through Alberta 1 Call and a private service locate at the site. The budget above does not allow for any additional meetings or hearings. If there are any requirements for ParklandGEO's attendance at meetings, our service will be invoiced on a hourly and expense basis (ie. mileage).

5.0 GEOTECHNICAL SCHEDULE

ParklandGEO is willing to mobilize to the site within one week of authorization, depending on weather conditions, site access and drill rig availability. We anticipate that it will take about one week to mobilize to the site after authorization. The drilling will take about one day to complete and the laboratory testing program will take two to three weeks to complete. The geotechnical report will be ready three to four weeks after drilling, but preliminary design information can be provided shortly after drilling, upon request.

6.0 FINANCIAL TERMS

The budget above does not include GST. ParklandGEO proposes to invoice the project as a lump sum. For the geotechnical program, an invoice for 75 % of the budget will be sent upon completion of the field program and an invoice for the remaining 25 % will be sent with the final report. Our invoices are due upon receipt and we expect payment within 30 days so that we are able to pay our drilling subcontractor as soon as possible. No hold backs will apply and interest will be charged at 1 percent per month on all overdue accounts. Acceptance of this proposal is acknowledgment

and acceptance of our Agreement for Professional Services (see attached).

7.0 QUALIFICATIONS

ParklandGEO operates eight offices in Alberta located in Lethbridge, Calgary, Red Deer, Medicine Hat, Sherwood Park, Grande Prairie, Peace River, and Fort McMurray. This project will be based out of our Lethbridge office. Our present core staff includes over 100 people throughout the province and our expected peak staff level for the 2016 season will be about 120 people including seasonal materials technicians. ParklandGEO's laboratory is CCIL certified for concrete, aggregate, and asphalt testing and our present core staff technicians and junior/intermediate engineers have passed the required individual testing as part of this certification.

Since beginning operations in 2000, ParklandGEO has completed over 2500 geotechnical assessments and over 5000 construction testing assignments on a wide range of projects from schools to industrial facilities to commercial office towers. ParklandGEO has a wide variety of experience on school projects throughout Alberta, including:

- **Aspen Woods Elementary School, Calgary (2014 - Ongoing)** – Geotechnical investigation and materials testing for a new school in Calgary, Alberta.

- **Prairie Christian Academy Expansion, Three Hills (2014 - Ongoing)** – Geotechnical investigation and materials testing for the expansion of an elementary school in Three Hills, Alberta.

- **Proposed K-6 Francophone School, Calgary (2014)** – Geotechnical investigation and environmental site assessment for a new school in Calgary, Alberta.

- **Proposed K-5 School, Airdrie (2014)** – Geotechnical investigation and environmental site assessment for a new school in east Airdrie, Alberta.

- **Siksika Reservation School Site, Siksika Nation Reserve #146 (2012)** – New school at the Siksika Nation Reserve about 80 km east of Calgary, Alberta. Geotechnical investigations at two potential sites being considered for the new school.

- **Holy Trinity Catholic School, Olds (2010)** – Geotechnical investigation, environmental site assessment and materials testing for a new catholic school in southwest Olds, Alberta.

8.0 PERSONNEL ASSIGNMENT

Mark Brotherton, P.Eng. - Senior Reviewer

The principal review engineer for the project will be Mark Brotherton, the principal geotechnical engineer for the company. Mr. Brotherton has over 30 years of geotechnical experience including working in Alberta since 1983. Mr. Brotherton has performed hundreds of geotechnical investigations and has provided geotechnical consulting services for a wide range of schools and

educational facilities similar to this one.

Bartek Ryczywolski, P.Eng. - Project Manager

The project manager for this project will be Bartek Ryczywolski, a project engineer with over 9 years of geotechnical experience, and the manager of our Calgary office. Mr. Ryczywolski has served as project manager for geotechnical investigations and has provided geotechnical consulting services for a wide range of projects including several schools. He has significant experience in reviewing geotechnical test data and geotechnical report writing.

Trevor Benson, B.Eng. - Field Engineer

Mr. Ryczywolski will be assisted by Trevor Benson, a field engineer based in our Lethbridge office. Mr. Benson has extensive soil sampling and materials testing experience in Lethbridge and the surrounding area.

The resumes of the project team are attached. Other qualified and experienced field and office staff may be utilized, if required, in order to ensure that the project timelines are met.

9.0 CLOSURE

Parkland Geotechnical Consulting Ltd. looks forward to working with the SAHURI + Partners Architecture Inc. on this project. If you have any questions or comments regarding our proposal, please do not hesitate to contact the undersigned.

Respectfully submitted,
PARKLAND GEOTECHNICAL CONSULTING LTD.

Bartek Ryczywolski, P.Eng.
Geotechnical Engineer, Manager

Attach / Resumes (3)
Experience - Schools and Education
Insurance Coverage (2)
Permit to Practice
Agreement for Professional Services - Geotechnical

Mark Brotherton, P.Eng
Principal Geotechnical Engineer

Location: Red Deer, Alberta
P: 403 343 2428
C: 403 357 0121
mark.brotherton@parklandgeo.com

30 Years Experience

PRACTICE AREAS

GEOTECHNICAL ENGINEERING

GEOTECHNICAL
- Field Investigations
- Geotechnical Design
- Slope Stability
- Foundation Design
- River Crossings

MATERIALS
- QA/QC Testing
- Materials Testing
- Failure Investigations
- Foundation Inbspection

MULTI-DISCIPLINE
- Site Assessment
- Waste Management
- Landfill Design
- Landfill Assessment
- Groundwater Monitoring
- Project Management

PHASE I ESA

PHASE II ESA
- Soil & Groundwater Assessment
- Delineation
- Risk Assessment

REMEDIATION
- Tendering
- Project Management
- Closure Monitoring
- Construction Supervision

EDUCATION

1983 University of Alberta B.Sc., Civil Engineering

EXPERIENCE OVERVIEW

Project Management:
- Managed over 1000 projects over 25 years, performed field investigations, wrote reports, performed data interpretation and acted as a client liaison.
- Local Red Deer manager of a full service geotechnical office for a large international consulting company with annual revenues up to $1.5 million.

Geotechnical Engineering:
- Performed hundreds of geotechnical investigations on sites in Central and Northern Alberta and has performed geotechnical consulting services to a wide variety of projects which have included hospitals, arenas, bridges, tunnels, roads, subdivisions, landfills, retaining walls, and industrial installations.
- Developed specific expertise in site development and foundation construction for difficult soil conditions common to the Red Deer area.
- Experience outside of conventional foundation and site work has included mine planning, tailing disposal design, slope stability studies, seepage studies, earth filled dam reviews, and construction monitoring on major foundation projects.

Materials Engineering:
- Experience includes materials engineering consulting services, site inspections, pavement design, pavement and concrete failure investigation, field and laboratory testing of soil, quality control set-up of concrete batch plant and two materials-testing laboratories.

Geo Environmental:
- Experience on a wide variety of geotechnical/environmental projects including rural development studies for acreage and intensive livestock operations, hydrogeological site assessments, environmental site assessments, underground fuel storage tank investigations, contaminant clean-up and site reclamations.
- Project manager and geotechnical engineer on a number of multi-discipline environmental projects such as Red Deer CP Rail Yard Relocation and the Nova Chemicals Hydrogeological Studies at Joffre, Alberta.

Waste Management & Landfills:
- Performed geotechnical engineering on a wide variety of waste management projects including landfills, waste transfer stations and dry waste sites.
- Project manager and specialist on several large multi-disciplined waste management studies such as the City of Red Deer Waste Management Facility and Landfill Expansion Project, Red Deer CP Rail Yard Relocation Project and the Nova Chemicals Hydrogeological Studies at Joffre.

LANGUAGES

- Proficient in English for Reading, Writing and Speaking.

Mark Brotherton, P.Eng
Principal Geotechnical Engineer

Location: Red Deer, Alberta
P: 403 343 2428
C: 403 357 0121
mark.brotherton@parklandgeo.com

EMPLOYMENT RECORD

2000 - Present	Parkland Geotechnical Consultants Ltd.	Principal Geotechnical Engineer
1994 - 2000	AGRA Earth & Environmental Ltd.	Senior Geotechnical Engineer
1988 - 1994	HBT AGRA Limited, Red Deer, AB	Geotechnical Engineer
1985 - 1987	Hardy BBT Limited, Edmonton, AB	Geotechnical Engineer
1983 - 1985	Shelby Engineering Limited, Edmonton, AB	Geotechnical Engineer
1982 (Summer)	Northwest Hydraulic Consultants Ltd.	Engineer in Training
1981 (Summer)	Hardy Associates (1978) Ltd., Red Deer, AB	Engineer in Training

REGISTRATIONS

- Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)

SELECTED PROJECT EXPERIENCE:

Over the past 25 years Mr. Brotherton has been involved as project engineer for over 3000 projects including hundreds of geotechnical site investigations. The following is a selected list of Alberta geotechnical projects. The projects listed only include those where Mr. Brotherton was the Geotechnical Engineer of Record. Specific project detail can be provided upon request.

Highway/Expressways/Rail:

32nd Stree Rehabiliation Program and 40th Avenue Intersection
Gaetz Avenue and 32nd Street Intersection, Red Deer,
Northland Drive, Red Deer
39th Street Upgrade, Camrose
North Taylor Drive Extension Taylor Drive/CP Rail Overpass, Red Deer
Waskasoo Creek Bridge, Liberty Ind. Park, Red Deer County
Johnstone Drive (urban expressway), Red Deer
Delburne Road (S.H. 595) Widening (urban expressway), Red Deer
Highway 2:22 Service Road Widening and Upgrade Projects, Innisfail
South Taylor Drive/CP Rail Relocation Project (urban expressway), Red Deer
CP Rail Bridge & CP/Highway 2 Tunnel, Red Deer/Red Deer River

Land Development:

Red Deer -	Victoria Park, Aspen Ridge, Devonshire, Oriole Park West, Lonsdale, Kingsgate, Lancaster, West Lake, Johnstone Park, Inglewood, Vanier Park, Kentwood, Timberlands, Timberstone subdivisions and City CP and CN Rail Yard redevelopments
Sylvan Lake -	Ryders Ridge, Lakeway Landing and Fox Run subdivisions
Lacombe -	Iron Wolf, Regency Park, Willows, Elizabeth Park and Lincoln Park subdivisions
Blackfalds -	Cottonwood, Ruttan, Roth and Rolling Hills subdivisions

Foundations:

Agri-trade Centre/ Centrium, Red Deer
Grande Prairie Regional Hpspital, Grande Prairie
Red Deer's Collicut Leisure Centre, Red Deer
Queen Ellizabeth II Hospital, Grande Prairie
Hunting Hills & Notre Dame High Schools, Red Deer
Fox Run School Campus, Sylvan Lake
Rocky Mountain House Multi-School Campus, Rocky Mountain House
Red Deer Regional Hospital 2002/06 Expansion
Southpointe Common (Wal-Mart, Home Depot, various CRU's), Red Deer
Nova Chemicals Joffre 2000 Plant Expansions, Joffre
Union Carbide P2 and LP-7 Plant Expansions, Prentiss
Amoco Prairie Rose LAO Plant, Joffre

Bartek Ryczywolski, P.Eng.
Geotechnical Engineer, Manager

Location: Calgary, Alberta
P: 403 252 5036
C: 403 803 6811
bartek.ryczywolski@parklandgeo.com

9 Years Experience

PRACTICE AREAS

GEOTECHNICAL

Field Investigations
Geotechnical Design
Slope Stability
Retaining Walls
Reinforced Earth Slopes

MATERIALS

Foundation Inspection
QA/QC Testing
Materials Testing

EDUCATION

2002 - 2006 University of Calgary Bachelor of Science in Civil Engineering

EXPERIENCE OVERVIEW

Project Management:

- Mr. Ryczywolski manages the local geotechnical group in the Calgary office.
- Mr. Ryczywolski has served as the project manager for many geotechnical engineering projects throughout Alberta. He is an experienced project manager who has acted in leadership roles and trained junior staff.

Geotechnical Engineering

- Mr. Ryczywolski's experience includes a wide variety of geotechnical projects, located throughout western and central Canada, including commercial, industrial, residential, institutional, high-rise and oil and gas development. Has significant experience in reviewing geotechnical test data and geotechnical report writing.
- Experienced in site inspections including piling inspections and footing inspections. Experienced in assessing a wide variety of geotechnical problems at sites, including slope failure, foundation failure, shoring wall failure, poor soil conditions, water seepage, settlement and cracking.
- Has been involved in numerous slope monitoring and stability assessments. Experienced with slope stability software analysis.
- Has designed numerous retaining walls and reinforced earth slopes and if familiar with analysis and software for earth retaining structures.
- Extensive soil sampling experience throughout Alberta. Experienced with solid/hollow stem auger, Becker Hammer, direct push, Sonic, and air rotary drilling. Experienced with rock classification and coring.
- Geotechncal laboratory testing experience includes routine soil classification tests (hydrometer, sieve, Atterberg Limits), proctor tests, CBR's, strength testing (compression, triaxial, direct shear), and consolidation tests on various soil types.

Materials Engineering:

- Mr. Ryczywolski's materials testing and materials engineering experience includes site inspections and field/laboratory testing of soil, concrete and asphalt. Experienced in field compaction testing and concrete testing.

REGISTRATIONS

Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Association of Professional Engineers and Geoscientists of BC (APEGBC)
Calgary Geotechnical Society

LANGUAGES

Proficient in Reading, Writing and Speaking English.

EMPLOYMENT RECORD

2013 - Present	ParklandGEO	Geotechnical Engineer
2011 - 2013	McIntosh Lalani Engineering	E.I.T. / Geotechnical Engineer
2007 - 2011	ParklandGEO	Engineer-In-Training
May - Sept 2006	Global Engineering and Testing	Field and Laboratory Technician

Bartek Ryczywolski, P.Eng.
Geotechnical Engineer, Manager

Location: Calgary, Alberta
P: 403 252 5036
C: 403 803 6811
bartek.ryczywolski@parklandgeo.com

SELECTED PROJECT EXPERIENCE

Mr. Ryczywolski has served as project manager for geotechnical investigations located throughout western and central Canada. He has provided geotechnical consulting services for a wide variety of projects including commercial, industrial, residential, institutional, and high rise developments, bridges, roads, and retaining walls. A portion of his geotechnical engineering experience is summarized below;

GEOTECHNICAL ENGINEERING - FOUNDATIONS	LOCATION
Aspen Woods Elementary School - project manager, slope stability analysis, reporting	Calgary, AB
Canadian Tire Store - project manager, reporting, construction supervision	Stettler, AB
56 Storey Commercial Office Tower - project manager, field engineer, reporting	Calgary, AB
Prairie Christian Academy Building Addition - project manager, reporting	Three Hills, AB
University of Calgary Gymnasium Renovations and Building Addition - project manager, reporting	Calgary, AB
8 Storey Condominium Building - project manager, field engineer, reporting	Calgary, AB
Fire Hall and County Office Building - project manager, reporting	Nordegg, AB
Sunnyside Condominium Building - project manager, field engineer, reporting	Calgary, AB
Frontier Industrial Park Fabrication Building - project manager, reporting	Rocky View County, AB
Service Station and Store - project manager, field engineer, reporting, construction supervision	Bragg Creek, AB
Multi-Bay Industrial Buildings - project manager, reporting	Fort McMurray, AB
GEOTECHNICAL ENGINEERING - LAND DEVELOPMENT	
Sage Hill Common Commercial Subdivision - project manager, reporting	Calgary, AB
Multifamily Development - project manager, field engineer, reporting, construction supervision	Chestermere, AB
Auburn Bay Multifamily Development - project manager, field engineer, reporting	Calgary, AB
300 Acre Residential Subdivision - project manager, slope stability analysis, reporting	Lacombe, AB
114 Acre Industrial Business Park - project manager, reporting	Penhold, AB
GEOTECHNICAL ENGINEERING - RETAINING WALLS AND MSE	
Mahogany Lake Perimeter Retaining Wall Global Stability Review - analysis, design, reporting, construction supervision	Calgary, AB
Cougar Ridge Gabion Basket Wall - analysis, design, construction supervision	Calgary, AB
Riverstone of Cranston MagnumStone Retaining Wall - project manager, analysis, design	Calgary, AB
Seton Lock Block Retaining Wall - project manager, analysis, design	Calgary, AB
Geogrid Reinforced Earth Slope - project manager, analysis, design, construction supervision	Exshaw, AB
GEOTECHNICAL ENGINEERING - SLOPES	
Spruce Drive Slope Rehabilitation Review - field engineer, slope stability analysis, remedial design, reporting, construction supervision	Red Deer, AB
7 Avenue Refinement - project manager, field engineer, slope stability analysis, construction supervision	Invermere, BC
West Pine Creek Subdivision - project manager, field engineer, slope stability analysis, reporting	Calgary, AB
Buffalo Sands Subdivision - project manager, field engineer, slope stability analysis, reporting	Stettler County, AB

Trevor H. Benson, B.Eng
Geotechnical Engineer
Lethbridge Office Manager

Location: Lethbridge, Alberta
C : 403 877 0069
O : 403 381 0989
trevor.benson@parklandgeo.com

11 Years Experience

PRACTICE AREAS

GEOTECHNICAL ENGINEERING

GEOTECHNICAL
- Field Investigations
- Geotechnical Report **Preparation**
- Slope Stability

ENVIRONMENTAL
- Soil Testing
- Groundwater Testing

MATERIALS
- Project Management
- QA/AC Testing
- Materials Testing
- Failure Investigations
- Construction Monitoring
- Rebar and Roofing Inspection
- Surveying
- Dynamic Compaction Monitoring

OTHER

CompTIA A+ Computer Tech.
Clean Class 5 Alberta Drivers Licence

EDUCATION

1993-1995	Lakehead University	B.Eng. In Civil Engineering
1989-1991	Lethbridge College	Diploma In Civil Engineering Technology
1988-1989	University of Lethbridge	Pre-Engineering Program

EXPERIENCE OVERVIEW

Geotechnical Engineering: Worked on a wide variety of geotechnical projects including commercial, residential and industrial buildings, roads, dams, subdivisions, oil and gas sites, and many other projects. AutoCAD experience drawing site plans to include in reports. Footing inspection and bearing capacity determination in the field.

Geotechnical laboratory testing experience includes detailed soils classification, atterberg limits, proctor tests .

Materials Engineering: Managed QA/QC testing related to site grading, subgrade preparation, pile inspection, proof roll inspections, pile inspections, vibration monitoring and road construction, roofing, fire proofing and rebar inspections, concrete testing and failure analysis.

He was a Registered Professional Engineer in Alberta from 1997 to 2000

Held Certified Engineering Technologist designation in AB, Ontario, and A.Sc.T in BC.

EMPLOYMENT RECORD

2015 - Present	Parkland Geotechnical Consulting Ltd.	Geotechnical Engineer

Mr. Benson is currently working on geotechnical report preparation, lab and field work, concrete and asphalt mix designs, and business development. He took over the role of Lethbridge Office Manager in January of 2016.

1997-2000	Hasegawa Engineering	Junior Engineer

Mr. Benson was involved in field inspection ans supervision on a wide variety of projects including environmental water sampling for lagoons and subdivisions on the Blood Tribe Reserve. He also surveyed for topographical map preparation on several subdivisions near Coaldale.

1998 - 2000	Lethbridge College	Instructor for the Concrete Technology Course

Mr. Benson taught both the theory and lab portions of the concrete technology course in the Civil Engineering Technology Program.

Trevor H. Benson, B.Eng
Geotechnical Engineer

Location: Lethbridge, Alberta
P: 403 877 0069
C: 403 915 2102
trevor.benson@parklandgeo.com

1995 - 1997	Amec Foster Wheeler	Junior Engineeer

Mr. Benson worked in Scarborough, Abbotsford, Red Deer, and Prince George offices for AMEC Foster Wheeler on field inspection and report preparation for concrete, asphalt, soils, flat roofing, rebar inspection, dynamic compaction , Pre-load consolidation surveying and monitoring. Assisted in the design of a sediment dam for erosion mitigation on CFB Chilliwack and subsequent monitoring.

1991 - 1994	Amec Foster Wheeler and EBA Tetra Tech.	Materials Technologist

Performed the full range of concrete, asphalt and soils testing in both the lab and field including compaction, proof rolling, stripping inspections, concrete testing, asphalt coring and in situ tests, sieves, proctors, limits, marshalls, hydrometers.

SELECTED PROJECT EXPERIENCE:

Oldman River Dam - Inspection and lab sieve analysis for filter drains in core of main embankment.

Dickson Dam - Concrete testing and inspection on power house for hydro genration.

Highway 407 in Toronto - Supervision and testing for mass concrete pours on road and bridge decks.

Superstore in Red Deer and Chilliwack - Concrete, compaction, dynamic compaction and vibration monitoring for above projects.

Union Carbide plant at Prentiss near Red Deer - Concrete testing and specification enforcement.

Shell Caroline Gas Plant - Concrete testing.

Westcoast Energy Pipeline, Northern B.C. - Concrete and compaction testing, site supervision and problem solving.

ParklandGEO has worked on over 60 school and educational facilities across Alberta since 2000; and our staff have worked on over 140 projects over the past 30+ years and for both new facilities and expansions. Our typical services include: field investigations and engineering design for deep foundations, assessment of new foundation systems placed adjacent to old structures, and construction monitoring and materials testing services through all stages of construction. We have also conducted Phase 1 Environmental Site Assessments as part of the planning and design.

Penhold 7-12 School - ASAP III Project ($12M - 2013) - provided geotechnical and materials testing services for the construction of a new school.

Red Deer Catholic K-5 Elementary School - ASAP III Project ($8.7M - 2013) - provided geotechnical and materials testing services for the construction of a new school.

Red Deer Catholic K-5 Elementary School - ASAP III Project ($10.3M - 2013) - provided geotechnical and materials testing services for the construction of a new school.

Red Deer New Francophone K - 12 School - ASAP III Project ($8.0M - 2013) - provided geotechnical and materials testing services for the construction of a new school.

Lacombe Composite High School and Football Facility (2006 & 2012), Wolf Creek Public Schools - provided geotechnical and materials testing services for the school, as well as the addition of a new bus lane, parking lot, and green house.

Confluence Campus, Rocky Mountain House ($25M - 2005) - geotechnical investigation and materials testing for new school.

Red Deer College BCTL Campus Extension ($50 - 2009) - geotechnical investigation and materials testing for new trades wing.

Aspen Heights Elementary School, Berry Architecture & Associates, Red Deer - provided geotechnical and materials testing services for construction of an addition to existing school.

St. Francis of Assisi Middle School, Red Deer ($6.8M - 2003) - geotechnical investigation and materials testing for the new school.

Innisfail Middle School, Innisfail ($6.4M - 2003) - geotechnical investigation and materials testing for new school.

Terrace Ridge School, Innisfail ($4M - 2003) - geotechnical investigation for new school.

Mattie McCullough Elementary School, Red Deer ($4.6M - 2003) - geotechnical and materials testing for new school.

Holy Trinity Catholic School, Olds ($9M - 2010) - geotechnical engineering, Environmental Site Assessment and materials testing during construction.

Our Lady of the Rosary, Sylvan Lake ($4.5M - 2006) - geotechnical investigation and materials testing for new school.

Lindsay Thurber Comprehensive High School Modernization ($12M - 2004) - geotechnical engineering, environmental assessment, remediation and materials testing for school additions.

Parkland Immanuel Christian School, Edmonton - geotechnical investigation and materials testing services during construction of two building additions for new classrooms and adjacent church.

G. H. Dawe School Campus 2010 Upgrade ($9.5M - 2010), Red Deer - provided materials testing services and foundation inspections.

Botha School - provided engineering consulting services including field and groundwater monitoring program to investigate flooding problem.

William E. Hay High School Modernization, Clearview School Division No. 71, Stettler - provided geotechnical and materials testing services, including footing inspection.

Grande Prairie Composite High School - provided materials testing and pile monitoring services during construction of new school.

Clairmont Community School - provided geotechnical, materials testing , pile monitoring services during design and construction of a new school.

Mother Teresa Catholic School & Community Centre, Grande Prairie - provided materials testing and pile monitoring services during construction of new school.

Maude Clifford Public School, Grande Prairie - provided materials testing and pile monitoring services during construction of new school.

Grande Prairie Christian School - provided materials testing and pile monitoring services during construction of an addition.

Rainbow Lake School Addition, Fort Vermilion School District #52 - provided geotechnical investigation and design services, as well as materials testing and pile monitoring during construction of school addition.

O'Chiese Reservation School Site, Clearwater County - provided geotechnical engineering services for the assessment of two potential new school sites.

Sisika Reservation School Site, Wheatland Country - provided geotechnical consulting services for the assessment of two potential new school sites.

CERTIFICATE OF INSURANCE

CERTIFICATE HOLDER: **Dated: May 30, 2016**

To Whom It May Concern

NAMED INSURED:	**BROKER:**
Parkland Geotechnical Consulting Limited (and as per Policy) A-14, 6120 - 2 Street SE Calgary, AB T2H 2L8	Lloyd Sadd - Quadrant Insurance Brokers Eau Claire Place II – 350, 521 – 3rd Ave SW Calgary, AB T2P 3T3 PH: 403-254-1021

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policies below. The insurance afforded is subject to the terms, conditions and exclusions of the applicable policy.

COMPANIES AFFORDING COVERAGE:

Company Letter "A" XL Specialty Insurance Company (100% of limit shown on Policy)

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE	POLICY EXPIRY DATE	LIMIT
PROFESSIONAL LIABILITY					
A	Errors & Omissions	DPX9447021	06/01/16	06/01/17	$2,000,000 Per Claim $2,000,000 Aggregate

CANCELLATION

Should the Professional Liability policy be cancelled before the expiration date thereof, the issuing company will endeavor to mail ***NIL*** days written notice to the certificate holder named above, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representative.

LLOYD SADD - QUADRANT INSURANCE BROKERS

per: _____

NAVACORD COMPANY

LloydSadd Quadrant INSURANCE BROKERS

Date: May 30, 2016

CERTIFICATE OF INSURANCE

This certificate is issued as a matter of information only and confers no rights upon the certificate holder and imposes no liability on the insurer. This certificate does not amend, extend or alter the coverage afforded by the policies below.

INSURED'S FULL NAME AND MAILING ADDRESS

Parkland Geotechnical Consulting Limited
102, 4756 Riverside Drive
Red Deer, Alberta
T8H 2W8

BROKER'S FULL NAME AND MAILING ADDRESS

Access Insurance Group Ltd.
4435 99 Street
Edmonton, Alberta
T6E 5B6
Broker's Client ID: PARKL-4

CERTIFICATE HOLDER

To Whom it May Concern

COVERAGES

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain. The insurance afforded by the policies described herein is subject to all terms, exclusions and conditions of such policies.

TYPE OF INSURANCE **LIMITS**

Type of Policy And Insurer	Policy Number	Effective Date 12:01AM (DD/MM/YYYY)	Expiration Date 12:01AM (DD/MM/YYYY)	Limits of Liability
General Liability	MPR2876003	06/01/2016	01/06/2017	$5,000,000 Per Occurrence $5,000,000 Aggregate Products and Completed Operations Personal & Advertising Injury $5,000,000 Sudden & Accidental Pollution Employer's Liability $5,000,000 Forest & Prairie Fire Fighting Expense Contractual Liability Primary Non-Contributory Clause Contractual Liability Broad Form Property Damage Cross Liability Non-Owned Auto
Auto Liability Owned	64008313	01/06/2016	01/06/2017	$5,000,000 Combined Single Limit
Property Contractors Equipment – All Risk	MPR2876003	06/01/2016	01/06/2017	$ 905, 970 Limit

DESCRIPTION OF BUSINESS OPERATIONS

Engineering, materials testing and environmental services.

THIS CERTIFICATE OF INSURANCE IS ISSUED AT THE REQUEST AND FOR THE BENEFIT OF THE INSURED AND THE CERTIFICATE HOLDER. ACCESS INSURANCE GROUP LTD. SHALL HAVE NO LIABILITY TO ANY OTHER PARTY WHO PLACES ANY RELIANCE HEREON.

SIGNATURE OF AUTHORIZED REPRESENTATIVE:

PRINT NAME AND POSITION HELD: Darlene Fistric Senior Account Manager

Date: May 30, 2016

APEGA The Association of Professional Engineers and Geoscientists of Alberta

PERMIT TO PRACTICE

P07312

Parkland Geotechnical Consulting Limited

Is Hereby Authorized to Engage in the Practice of Engineering in the Province of Alberta

Lonnie J. Parenteau P.Eng.

President

Carol Moen P.Eng.

Registrar

Start Date: June 1, 2016
Expiry Date: May 31, 2017
Permit Holder Since: June 6, 2000

REFERENCE: **PRO5089 - St. Patrick's Elementary School Internal Alterations**

THIS AGREEMENT IS ENTERED INTO this 3 day of June, 2016 between SAHURI + Partners Architecture Inc. "CLIENT" and PARKLAND GEOTECHNICAL CONSULTING LTD., hereinafter referred to as "CONSULTANT".

WHEREAS CLIENT desires CONSULTANT to perform certain technical services, the CLIENT and CONSULTANT have agreed that such services shall be performed in accordance with the terms and conditions set forth herein.

THE PARTIES HERETO AGREE TO THE FOLLOWING TERMS AND CONDITIONS:

1. STANDARD OF CARE - In the performance of professional services, the CONSULTANT will use that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same or similar localities. No other warranty expressed or implied is made or intended by this agreement or by furnishing oral or written reports of the findings made.

2. INTERPRETATION OF THE REPORT - The CLIENT recognizes that subsurface conditions will vary from those encountered at the location where borings, surveys, or explorations are made and that the data, interpretations and recommendation of the CONSULTANT are based solely on the information available to him. Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities will be based on commonly accepted practices in geotechnical consulting practice in this area. The CONSULTANT will not be responsible for the interpretation by others of the information developed.

3. SITE INFORMATION - The CLIENT agrees to fully cooperate with the CONSULTANT and provide all information with respect to the past, present and proposed conditions and use of the Site whether specifically requested or not. The CLIENT acknowledges that in order for the CONSULTANT to properly advise and assist the CLIENT in respect of the investigation of the Site, the CONSULTANT is relying upon full disclosure by the CLIENT of all matters pertinent to an investigation of the Site.

   Where specifically stated in the scope of work, the CONSULTANT will perform a review of the historical information obtained or provided by the Client to assist in the investigation of the Site unless and except to the extent that such a review is limited or excluded from the scope of work.

4. RIGHT OF ENTRY - The CLIENT is responsible for ensuring that the CONSULTANT is provided unencumbered access to the property to the extent necessary for the CONSULTANT to complete the scope of work to CONSULTANT's satisfaction. The CLIENT is solely responsible for obtaining permission and permits for the CONSULTANT to enter onto the subject site, including informing tenants. The CLIENT shall also provide the CONSULTANT with the location of all underground utilities and structures on the subject site, unless otherwise agreed to in writing. While the CONSULTANT will take all reasonable precautions to avoid and minimize any damage to any sub-terrain utilities or structures, the CLIENT agrees to hold the CONSULTANT harmless for any damage to any sub-terrain utilities or structures or any damage occasioned in gaining access to the subject site.

5. COMPLETE REPORT - The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to the CONSULTANT by the CLIENT, communications between the CONSULTANT and the CLIENT, and to any other reports, writings or documents prepared by the CONSULTANT for the CLIENT relative to the specific Site, all of which constitute the Report. The word "Report" shall refer to any and all of the documents referred to herein. In order to properly understand the suggestions, recommendations and opinions expressed by the CONSULTANT, reference must be made to the whole of the Report. The CONSULTANT cannot be responsible for use of any part or portions of the report without reference to the whole report. The CLIENT agrees that any and all reports prepared by the CONSULTANT shall contain the following statement:

   > "This report has been prepared for the exclusive use of (CLIENT NAME). Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. PARKLAND GEOTECHNICAL CONSULTING LTD.

accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report."

The CLIENT agrees that in the event that any such report is released to a third party, such disclaimer shall not be obliterated or altered in any manner. The CLIENT further agrees that all such reports shall be used solely for the purposes of the CLIENT and shall not be released or used by others without the prior written permission of the CONSULTANT.

6. LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER
There is no warranty, expressed or implied, by the CONSULTANT that:
   a. the investigation shall uncover all potential contaminants or environmental liabilities on the Site; or
   b. the Site will be entirely free of all contaminants as a result of any investigation or cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential contaminants on the Site.

   The CLIENT acknowledges that:
   a. the investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;
   b. any assessment regarding geological conditions on the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations, hence there can be no assurance that undetected geological conditions, including soils or groundwater are not located on the Site;
   c. any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
   d. any assessment is also limited by the scientific possibility of determining the presence of unsuitable geological conditions for which scientific analyses have been conducted; and
   e. the analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation; and
   f. there are risks associated with the discovery of hazardous materials in and upon the lands and premises which may inadvertently discovered as part of this investigation. The CLIENT acknowledges that it may have a responsibility in law to inform the owner of any affected property of the existence or suspected existence of hazardous materials. The CLIENT further acknowledges that any such discovery may result in the fair market value of the lands and premises and of any other lands and premises adjacent thereto to be adversely affected in a material respect.

7. CONTROL OF WORK SITE AND JOBSITE SAFETY - The CONSULTANT is only responsible for the activities of its employees on the jobsite. The presence of the CONSULTANT personnel on the Site shall not be construed in any way to relieve the CLIENT or any contractors on Site from their responsibilities for Site safety. The CLIENT undertakes to inform the CONSULTANT of all hazardous conditions, or possible hazardous conditions which are known to him. The CLIENT also recognizes that the activities of the CONSULTANT may uncover previously unknown hazardous materials and that such a discovery may result in the necessity to undertake emergency procedures to protect the CONSULTANT employees as well as the public at large and the environment in general. The CLIENT also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the CLIENT agrees that notification to such bodies by the CONSULTANT will not be a cause of action or dispute.

8. DELAYS AND INTERRUPTIONS - Should the CONSULTANT be delayed or interrupted by others in the performance of its services or be required to perform additional services as a result of any delay or interruption caused by others, the CONSULTANT shall be equitably compensated by the CLIENT for all costs, charges and expenses which it may incur resulting from such delay or interruption.

9. COST ESTIMATES - Estimates of remediation or construction costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for environmental remediation only represent the cost to clean up known contaminants that have been identified during the course of the investigation. The CONSULTANT shall not be liable for the accuracy of any estimates of remediation costs provided.

10. LIMITATION OF RESPONSIBILITY

LIMITATION OF LIABILITY - The CLIENT hereby agrees that to the fullest extent permitted by the law the CONSULTANT's total liability to CLIENT for any and all injuries, claims, losses, expenses or damages whatsoever arising out of or in anyway relating to the Project, the Site, or this agreement from any cause or causes including but not limited to the CONSULTANT's negligence, errors, omissions, strict liability, breach of contract, or breach of warranty shall not exceed the total amount paid by the CLIENT for the services of the CONSULTANT under this contract or $50,000, whichever is lesser.

NO SPECIAL OR CONSEQUENTIAL DAMAGES - The CLIENT and CONSULTANT agree that to the fullest extent permitted by law the CONSULTANT shall not be liable to the CLIENT for any special, indirect or consequential damages whatsoever, whether caused by the CONSULTANT's negligence, errors, omissions, strict liability, breach of contract, breach of warranty or other cause of causes whatsoever.

INDEMNIFICATION - To the fullest extent permitted by law, the CLIENT agrees to defend, indemnify and hold the CONSULTANT, its directors, officers, employees, agents and subcontractors, harmless from and against any and all claims, defence costs, including legal fees on a full indemnity basis, damages, and other liabilities arising out of or in any way related to the CONSULTANT's reports or recommendations concerning this Agreement, the CONSULTANT's work and presence on the project property, or the presence, release, or threatened release of hazardous substances or pollutants on or from the Site; provided that the CLIENT shall not indemnify the CONSULTANT against liability for damages to the extent caused by the negligence or intentional misconduct of the CONSULTANT, its agents or subcontractors.

11. FINANCIAL CONTRACTUAL TERMS - The CONSULTANT will submit monthly invoices to the CLIENT and a final bill upon completion of the work. Payment is due upon presentation of invoice and is past due thirty (30) days from the date the invoice is received. No holdbacks will apply to the fees earned herein or to third party billings associated with the CONSULTANT's work. The CLIENT agrees to pay a finance charge of one and one-half percent (1.5%) per month (which is equivalent to an annual rate of interest, compounded monthly, of 19.56%) on past due accounts. If payment remains past due forty-five (45) days from the date the invoice is sent, then the CONSULTANT shall have the right to suspend all work under this Agreement, without prejudice, and all reasonable demobilization and other suspension costs will be paid by CLIENT. The CLIENT agrees that any collection fees, including consultant, agency, legal fees on a full indemnity basis and court fees, incurred by the CONSULTANT shall be payable over and above the contract amount.

12. EXTENT OF AGREEMENT - This Agreement represents the entire Agreement between the CLIENT and the CONSULTANT and supercedes any and all prior negotiations, representations, or agreements, either written or oral. Work beyond the scope of services or re-doing any part of the services through no fault of the CONSULTANT, shall constitute extra work and shall be paid for by the CLIENT on a “time and materials” basis in addition to any other payment provided for in this Agreement.

13. DISPUTES - Any dispute arising hereunder shall first be resolved by taking the following steps, where a successive step is taken if the issue is not resolved at the preceding step: 1) by technical and contractual personnel for each party performing this Subcontract, 2) by executive management of each party, 3) by mediation, 4) by arbitration if both parties agree, or 5) through the court system of the jurisdiction of the CONSULTANT office that entered this Agreement.

14. TERMINATION - This Agreement may be terminated by the CONSULTANT for any reason whatsoever upon ten (10) days written notice supplied by the CONSULTANT to the CLIENT. In the event that this Agreement is terminated by the CONSULTANT, the CLIENT shall pay the CONSULTANT for all work performed by the CONSULTANT and any de-mobilization charges by the CONSULTANT incurred to the date of the notice of termination of the Agreement.

DEVELOPMENT PERMIT
FORM B

TOWN OF TABER

Planning Department
A4900-50 Street
Taber AB T1G 1T1
ph: (403) 223-5500
fx: (403) 223-5530
email: planning@taber.ca

APPLICATION NO: DP 17- 12 ZONING IR

DATE OF DECISION: March 27, 2017 ROLL NO. 5347010

Applicant		Owner of Land	
Name:	Jilaine Lask		Holy Spirit Catholic Schools
Address:	Suite 201, 123 Forge Road, SE, Calgary, AB T2H 0S9		620 12 B Street North, Lethbridge, AB T1H 2L7
Telephone:	403-228-9307		

Location

Municipal Address: 5302 48th Street

Legal Description: Lots: N/A

Block: S1 Plan: 4536JK

Description of Work: As per Development Permit Application 17-12, Addition and Renovation for School, Elementary, Permitted Use (Institutional and Recreational District (IR)

Permit Conditions (also see Standard Conditions attached):

1. The site is to be developed as per site plan submitted,
2. The applicant must obtain a Building Permit to ensure the development complies with the Alberta Fire Code and Alberta Building Code. It shall be the responsibility of the applicant to obtain any necessary Plumbing, Electrical, or Gas permits,
3. If sprinkler permits are required under the Alberta Building Code, a separate building permit application must be made in conjunction with the permit for the building, and a copy provided for the Town of Taber,
4. The applicant must ensure that the contractor commissioned for the construction has a valid Business License for the Town of Taber,
5. A lot drainage (grade) plan illustrating water will not accumulate at or near the buildings (positive drainage), nor accumulate on the lot, and will not adversely affect adjacent properties shall be produced by a qualified professional and supplied to the Town of Taber prior to the Building Permit being issued. In addition, the foundation must be staked by a qualified professional,
6. During construction, the site shall be maintained in a neat and orderly manner so as to ensure that neighbours are not directly impacted by construction activity. This includes parking of construction vehicles and storage of construction materials, debris, and topsoil. Any damage to neighbours property, including fences, driveways, or landscaping that occurs due to this construction shall be repaired. Erosion shall be controlled so that soil and dust is not conveyed off site. Standing water on the site shall be controlled by the applicant. (Noncompliance of these items are subject to fines as indicated under Bylaw 4-2008),
7. In accordance with policy 68C08/21/00, a $2500.00 damage deposit shall be forwarded to the Town office (Planning Department) prior to demolition. Any damages to public streets, sidewalks, or services as a result of construction of this project shall be restored to Town standards at the applicant's expense prior to issuance of an occupancy permit,
8. During construction, if it is deemed necessary to install or replace the servicing connections to the existing public infrastructure the applicant will enter into a Servicing Agreement with the Town of Taber to ensure new sanitary sewer and water lines are in accordance with Town Standards;
9. Prior to occupancy, the applicant will provide a Real Property Report to the Town of Taber.

Issued by: _____
Development Officer

The personal information provided as part of this application is collected under Section 303 and 295 of the Municipal Government Act and in accordance with Section 32(c) of the Freedom of Information and Protection of Privacy Act. The information is required and will be used for issuing permits, Land Use Bylaw enforcement and property assessment purposes. The name of the permit holder and the nature of the permit are available to the public upon request.

If you have any questions about the collection or use of the personal information provided, please contact the Town of Taber FOIP Coordinator at A4900 – 50th Street, Taber, Alberta T1G 1T1 or phone at (403) 223-5500.

STANDARD DEVELOPMENT CONDITIONS

The development outlined on the reverse side is subject to the following conditions:

1. This permit indicates that only the development to which it relates is authorized in accordance with the provisions of the Land Use By-law, and in no way relieves or excuses the applicant from complying with the Land Use By-law or any other by-law, laws, order and/or regulations affecting such development.

2. This permit, issued in accordance with the Notice of Decision, is valid for a period of 24 months from the date of issue if development has commenced within this time period. If, at the expiry of 24 months, the development has not been commenced or carried out with reasonable diligence, this permit shall be null and void.

3. If this Development Permit is issued for the construction of a building,
   a) all finished grades shall be consistent with the approved site/grading plan.
   b) the finished exterior cladding shall be consistent with that shown in the submitted architectural plans.
   c) the exterior of the building, including painting, shall be completed within 24 months from the date of the issue of the Development Permit.

4. The development officer may, in accordance with the Municipal Government Act, take such action as is necessary to ensure that the provisions of this by-law are complied with.

5. This Permit is not transferable.

6. **Compliance with Town of Taber Bylaws, Alberta Building Code, and all other Provincial Codes and Regulations. It shall be the responsibility of the applicant to obtain the necessary Building, Plumbing, Electrical, and Gas permits from an accredited agency.**

7. **Any alterations or improvements deemed necessary to Municipal Services or Local Improvements adjacent to the property shall be the sole responsibility of the applicant.**

TABER

BUILDING PERMIT APPLICATION

A 4900 – 50 Street
Taber, AB T1G 1T1
Phone: 403-223-5500 Fax 403-223-5530

SUPERIOR SAFETY CODES INC.

Label TTB B 0015 17 MU
Town of Taber

Other Permits Required: ☒ Electrical ☒ Plumbing ☒ Gas ☐ PSDS

Permit Type: ☐ Owner ☐ Contractor ☒ ARCHITECT ON BEHALF OF OWNER Development Permit Number: 17-12

Application Date (M/D/Y): _____ Estimated Completion Date (M/D/Y): 06/08/2018

Owner Name: Holy Spirit Catholic Schools Mailing Address: 620 12 B St. N

City: Lethbridge Prov: AB Postal Code: T1H 2L7 Phone: 403 329 5555

Alt Phone: _____ Email Address: palmarin@holyspirit.ab.ca Fax: 403-327-9595

~~Contractor~~ ARCHITECT: SAUCI + PARTNERS ARCHITECTURE Mailing Address: SUITE 201, 123 FORGE ROAD SE

City: CALGARY Prov: AB Postal Code: T2H 0S9 Phone: 403-228-9307

Alt Phone: _____ Email Address: _____ Fax: 403-228-4699

Municipality: TOWN OF TABER Street Address: 5302 48TH STREET

Unit #: _____ Lot: _____ Block: 51 Plan: 4636JK Subdivision Name: _____

Legal Subdivision: Part of: _____ ¼ Sect: _____ Twp: _____ Rg: _____ W of: _____ Tax Roll #: 5347010

Directions: _____

Architect and/or Engineer (if applicable): JAIME SMITH Phone: 403-228-9307

Project Information: ☐ Commercial ☐ Residential ☐ Multi Family ☐ Industrial ☒ Institutional ☐ Oil & Gas

Type of Work: ☐ New ☒ Renovation ☒ Addition ☐ Accessory Building ☐ Basement Dev. ☐ Manufactured Home ☒ Demolition ☐ Other

☐ sq. meters ☐ sq. feet No. of Stories: 1 Building Classification: A2 PART 3 GROUP A2 ABC 3.2.2.27

Main Area: 2,313 m² 2313M²

2nd Floor Area: N/A

Basement Area: N/A

Developed ☐ Yes ☐ No

Garage Area: N/A

☐ Detached ☐ Attached

Detailed Description of Work and/or intended use or occupancy of the building:
EXISTING ELEMENTARY SCHOOL TO BE RENOVATED; SMALL ADDITION TO BE ADDED.
EXISTING 2136M² ADD 187M² = TOTAL 2323M²

Permit Applicant Declaration: The permit applicant certifies that this installation will be completed in accordance with the Alberta Safety Codes Act and Regulations and work will commence within 90 days. The permit applicant/owner acknowledges that as per Section 12(2) of the Alberta Safety Codes Act; Superior Safety Codes Inc. is not liable for any decision related to the system of inspections, examinations, evaluations and investigations including but not limited to a decision relating to their frequency and the manner in which they are carried out. The personal information provided on this form is protected by the Freedom of Information of Privacy Act.

JILAINE LASK — Permit Applicant Name (Please print)

Jilaine Lask — Permit Applicant Signature

_____ — Homeowner's Signature (Homeowner permits only)

25000 FT²

Project Value (Materials & Labour): $ 6,139,000 **Total Developed Area:** 24,896.92 Sq. Ft.

Permit Fee: $ 4979.40 *SCC Levy: $ 199.18 **TOTAL FEE:** $ 5178.58

*SCC Levy is 4% of the permit fee with a minimum of $4.50 and a maximum of $560

2,313 m²
2323 M²

Payment Method: ☐ Debit ☐ Cheque ☐ Cash Authorization / Cheque Number _____

Permit Validation Section *to be completed by the Building Safety Codes Officer:*

Special Conditions: See Plans Examination Report C. Pierson

C. PIERSON — SCO's Name (print or type)

SCO's Signature

SCO's Designation Number D7025 Date of Issue (M/D/Y): MAR 29/17

SUPERIOR SAFETY CODES INC. PERMITS & INSPECTIONS

INSPECTION REQUESTS please contact Superior Safety Codes at:
Ph. 403-320-0734 or 1-877-320-0734 Fax 403-320-9969
Allow 48 hours notice for inspection

Revised: May 11, 2010

SUPERIOR SAFETY CODES INC.

PERMITS & INSPECTIONS

PLANS EXAMINATION REPORT
ASSEMBLY OCCUPANCIES

Date: Mar 29/17

Permit No.: **TTB B 0015 17 MU** Development Permit: **17-12** File No.:

Applicant:	**Sahuri & Partners Architecture**	Phone:	**403-228-9307**
Address:	**Suite 201, 123 Forge Rd SE**	Fax:	
	Calgary, AB.	Cell:	
Postal Code:	**T2H 0S9**		
Owner:	**Holy Spirit Catholic Schools**	Phone:	**403-327-9555**
Address:	**620 12 B St N**	Fax:	
	Lethbridge, AB.	Cell:	
Postal Code:	**T1H 2L7**		
Contractor:	**Same as Applicant**	Phone:	
Address:		Fax:	
		Cell:	
Postal Code:			

Project Location:
Civic Address: **5302 48 St**
Municipality: **Town of Taber,** Alberta
Legal Address: Lot: Block: **S1** Plan: **4536JK**
NW 1/4 Sec: Twp: Rge: West of **M**

Building Classification
Part **3,** Group **A, Division 2 - Assembly** – Article 3.2.2.27.

Building Area: **2323** m² Building Height: **One Storey** Facing **One** Street(s)

Inspections Required

☒ Foundation	☒ Framing/Interim	☒ Final
Complete Before Backfill	Rough-In Plumbing/Electrical/ HVAC Complete Before Drywall	Complete Before Occupancy

Please allow for two days notice on any inspections. Note that the Articles are only brief descriptions, and do not list all exceptions. To call for the required inspections, please contact Superior Safety Codes in Lethbridge, at 1-877-320-0734.

GENERAL CONDITIONS:

1. All municipal zoning and development requirements are satisfied.
2. All work, materials and administration of construction, will comply with the Alberta Building Code.
3. All requirements of the Plumbing and Gas, Boilers, Elevators, Fire, Electrical Safety Services and other authorities will be met where applicable.
4. Construction must begin within 90 days of permit issuance.
5. Construction may not be abandoned for more than 120 days without prior written notification submitted to this office.
6. Construction must be completed within 1 year from permit issuance unless the authority having jurisdiction has granted an extension.

PLEASE POST THE BUILDING PERMIT PLACARD IN AN OBVIOUS LOCATION VISIBLE AT THE SITE ENTRANCE

☐ Calgary	25, 2015 – 32 Avenue NE	T2E 6Z3	Ph: 403.717.2344	Toll Free Ph: 1.888.717.2344	Fax: 403.717.2340	Toll Free Fax: 1.888.717.2340
☐ Edmonton	14613 – 134 Avenue	T5L 4S9	Ph: 780.489.4777	Toll Free Ph: 1.866.999.4777	Fax: 780.489.4711	Toll Free Fax: 1.866.900.4711
☐ Grande Prairie	1st Floor 10525 – 100 Avenue	T8V 0V8	Ph: 780.882.8777	Toll Free Ph: 1.877.882.8777	Fax: 780.882.7677	Toll Free Fax: 1.877.882.8775
☐ Red Deer	3, 6264 – 67A Street	T4P 3E8	Ph: 403.358.5545	Toll Free Ph: 1.888.358.5545	Fax: 403.358.5085	Toll Free Fax: 1.866.358.5085
☐ Lethbridge	422 North Mayor Magrath Drive	T1H 6H7	Ph: 403.320.0734	Toll Free Ph: 1.877.320.0734	Fax: 403.320.9969	
☐ Lloydminster	Bay 1, 2914 – 50 Avenue	T9V 2S5	Ph: 780.870.9020		Fax: 780.870.9036	

The following list of general requirements are minimum construction guidelines that apply to most conventional constructions. Please review the list and pay special attention to the comments.

NOTE: All code references are to Division B of the Alberta Building Code 2014 unless otherwise stated.

Professional & Owner Involvement

- Article 2.2.13.2.(C) The owner and any registered professional(s) are to notify this office, in writing, should any registered professional of record cease to be retained at any time during the construction of the project.
- Article 2.2.13.6.(C) Written assurance is to be submitted to this office, from the professional engineer supervising construction, verifying that the construction was in compliance with the requirements of the Alberta Building Code and any permits issued.

  The owner, or constructor, is to provide written assurance from the person supervising construction, verifying that the construction was in compliance with the requirements of the Alberta Building Code and any permits issued.
- Article 2.2.14.1.(C) The constructor is responsible jointly and severally with the owner for any construction work undertaken.
- Article 2.2.14.2.(C) The owner is to ensure the work undertaken does not damage or create a hazard to adjacent properties.
- **Article 2.4.3.2.(C) Before issuing an occupancy permit or giving permission to occupy, the Authority Having Jurisdiction is to receive assurance in the form set out in Schedule C-1 and/or C-2, from the coordinating registered professional that the building or portion of the building to be occupied substantially complies with the requirements of the Alberta Building Code.**

Additional Documentation Required

- Article 2.2.3.2.(C) Plans for the automatic fire suppression system are to be submitted for review prior to installation of any portion of the system.

  As the project requires professional involvement, the drawings are to be signed and sealed by a professional engineer and submitted with the required A and B schedules.
- Article 2.2.3.3.(C) Plans for the fire alarm system are to be submitted for review prior to installation of any portion of the fire alarm system.

  As the project requires professional involvement, the drawings are to be signed and sealed by a professional engineer and submitted with the required A and B schedules.
- Article 2.2.6.2.(C) Plans for heating, ventilating and air-conditioning systems are to be submitted for review prior to installation of any portion of the HVAC system.

  As the project requires professional involvement, the drawings are to be signed and sealed by a professional engineer and submitted with the required A and B schedules.
- Article 2.2.7.2.(C) Plans electrical systems are to be submitted for review prior to installation of any portion of the electrical system.

  As the project requires professional involvement, the drawings are to be signed and sealed by a professional engineer and submitted with the required A and B schedules.

Radon Gas

New building code requirements aim to ensure a basic level of protection for buildings by providing for a subfloor depressurization system rough-in. These requirements will mitigate the soil gas risks in buildings

should they have radon after construction and a complete gas extraction system is required to be provided.* These following requirements are a minimum level of safety as deemed by Health Canada:

- Unless the space between the air barrier system and the ground is designed to be accessible for the future installation of a subfloor depressurization system, the dwelling is to provided with the rough-in for a radon extraction system.
- Floors-on-ground (basement slabs/slabs-on-grade), are to be provided with a rough-in for subfloor depressurization consisting of;
  a) a gas-permeable layer, an inlet and an outlet, or
  b) clean granular material and a pipe not less than 100 mm installed through the floor at or near center of the slab so that:
    i) its bottom end opens into the granular layer with not less than 100 mm of granular material projecting beyond the terminus of the pipe,
    ii) its top end permits connection to depressurization equipment and is provided with an airtight cap,
    iii) the pipe is clearly labeled near the cap and, if applicable every 1.8 m (6 ft.), and at every change of direction to indicate that it is intended for the removal of radon from below the slab.
- Concrete slabs-on-ground are to be at least 75 mm (3") thick exclusive of topping on top of 0.15 mm (6 mil) polyethylene lapped not less than 300 mm. The polyethylene sheet is to be sealed around the slab perimeter to the inner wall surfaces by a flexible sealant.

  All penetrations through the slab-on-ground air barrier are to be sealed, including pipes, conduits, cleanouts etc.

  * ***If radon is a concern, radon testing devices are available through a wide range of retailers and service providers. Health Canada recommends a minimum 3 month radon test, preferably during the heating season (October to April), in the lowest normally occupied living area of the home. As radon concentrations can vary over time, measurements gathered over a longer period of time will give a better indication of average annual concentration.***

Alberta Building Code – Specific Requirements

- Article 3.1.3.1. Major occupancies are to be separated from adjoining major occupancies by fire separations having fire-resistance ratings conforming to Table 3.1.3.1.
- Article 3.1.11.4. Fire blocks are to be provided:
  a) at all interconnections between concealed vertical and horizontal spaces in interior coved ceilings, dropped ceilings and soffits in which the exposed construction materials within the space have a flame-spread rating more than 25.
  b) at the end of each run and at each floor level in concealed spaces between stair stringers in which the exposed construction materials within the space have a flame spread rating more than 25.

  Fire blocking materials are to consist of 12.7 mm thick gypsum board or 0.38 mm thick sheet steel with all joints continuously supported.
- Article 3.1.11.5. Horizontal concealed spaces within a floor or roof assembly of combustible construction, in which sprinklers are not installed, is to be separated into compartments not more than:
  a) 600 m^2 in area with no dimension more than 60 m if the exposed construction materials within the space have a flame-spread rating not more than 25.
  b) 300 m^2 in area with no dimension more than 20 m if the exposed construction materials within the space have a flame-spread rating more than 25.

  In a building permitted to be of combustible construction the materials used to separate concealed spaces into compartments are permitted to be:
  a) solid lumber not less than 38 mm thick
  b) phenolic bonded plywood, waferboard, or strandboard not less than 1.5 mm thick with the joints supported, or

c) two thicknesses of lumber, each not less than 19 mm thick with the joints staggered, where the width or height of the concealed space requires more than one piece of lumber not less 38 mm thick to block of the space.

- Article 3.2.4.5. The fire alarm systems, including the voice communication capability where provided, is to be installed in conformance with CAN/ULC-S524, "Installation of Fire Alarm Systems."

  The fire alarm system is to be verified in conformance with CAN/ULC-S537, "Verification of Fire Alarm Systems," to ensure they are operating satisfactorily.

  A copy of the Verification of Compliance is to be submitted for review.

- Article 3.2.4.8. The owner of the building is to provide evidence of compliance to the Authority Having Jurisdiction by means of a Fire Protective Signaling Certificate from a certified listing agency showing:
  a) the address of the building,
  b) the listed fire alarm installation company, and
  c) the listed fire alarm monitoring company.

- Article 3.2.4.9. The fire alarm system annunciator is to be installed in close proximity to the building entrance that faces a street or an access route for fire department vehicles.

- Article 3.2.4.13. As a fire alarm is system is installed, the air handling system is to be designed tp prevent the circulation of smoke upon a signal form a duct-type smoke detector if the air-handling system :
  a) serves more than one storey,
  b) serves more than one suite in a storey, or
  c) serves more than one fire compartment.

- Article 3.2.4.14. As the building has a fire alarm system, the central vacuum cleaning system is to be designed to shut down upon activation of the fire alarm system.

- Article 3.2.5.5. A fire hydrant is to be located such that the length of the access route from the hydrant to the fire department pumper vehicle plus the unobstructed path of travel for the fire fighter from the pumper vehicle to the principal entrance of the building is not more than 90 m and the unobstructed path of travel for the firefighter from the vehicle to the building is not more than 45 m.

- Article 3.2.5.7. The owner is to verify whether or not a supply of water not less than the quantity derived from the formula in this Article is available for firefighting purposes.

- Article 3.2.5.7. As the building exceeds 600 m² in area and is sprinklered, a supply of water not less than that shown in NFPA-13, "Installation of Sprinkler Systems" is to be available for firefighting purposes. Please reply to this office showing calculations for:
  a) the water supply required,
  b) the water supply available, and if there is a deficiency in supply, and
  c) an outline of a proposal of how the water supply requirement is to be met.

- Article 3.2.5.15. The fire department connection for is to be located so that the unobstructed distance from the fire department connection to a hydrant is not more than 45 m and is unobstructed.

  The fire department connection is to be located no closer than 3 m and no further than 15 m from the principal entrance to the building.

- Article 3.2.7.3. Emergency lighting, providing not less than 10 lx at the floor or tread level for a period of not less than 30 minutes, is to be provided to illuminate each required exit and the path of travel to those exits.

  As the lighting levels in the building could be below that which would provide easy identification of the exit doors, emergency lighting is to be provided to illuminate each exit and the path of travel to the exits.

- Article 3.3.1.21. Rooms for the storage of janitorial supplies are to be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than one hour.

Doors into these rooms are to be equipped with a positive latching mechanism, a self-closing device and are to have a fire-protection rating of not less than 45 minutes.

- Article 3.3.1.26. Storage rooms are to be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than one hour.

  Doors into these rooms are to be equipped with a positive latching mechanism, a self-closing device and are to have a fire-protection rating of not less than 45 minutes.

- Article 3.3.2.3. Non-fixed seating is to conform to the Alberta Fire Code.

  Contact your local Fire Authority for further details.

- Article 3.4.5.1. As the building occupant load appears to exceed 150 persons, every exit door is to have an exit sign placed over or adjacent to it.

  If the exit sign is externally lighted an external lighting source is required to properly charge the photoluminescent sign.

  * ***Every exit sign is to conform to the dimensions and colour indicated in ISO Standards, "Graphical Symbols Safety Colours and Safety Signs".***

- Article 3.4.6.5. As the stairway exceeds 1,100 mm in width a handrail, mounted between 865 mm and 965 mm, is to be provided on both sides of the stairway.

  At least one handrail at the sides of a stairway or ramp, is to extend horizontally not less than 300 mm beyond the top and bottom of the stairway or ramp.

  Unless interrupted by doorways or newels at changes in direction, at least one handrail is to be continuous throughout the length of the stairway or ramp.

- Article 3.4.6.12. Ensure each exit door opens on a vertical axis in the direction of exit travel.

- Article 3.4.6.16. As the occupant load appears to exceed 100 persons, every exit door equipped with a latching mechanism, is to be equipped with a device (panic hardware), that will release the latch and allow the door to swing open when a force of not more than 90 N is applied to the device in the direction of exit travel.

- Article 3.6.2.1. The mechanical room is to be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than 1 hour.

  Doors into these rooms are to be equipped with a positive latching mechanism, a self-closing device and are to have a fire-protection rating of not less than 45 minutes.

- Article 3.6.4.3. As the concealed space between the ceiling and roof assembly appears to be used as a plenum, ensure that all materials within the ceiling space have a flame-spread rating of not more than 25 and a smoke developed classification of not more than 50 (ie. no combustible piping, exposed wood framing members, etc.).

- Article 3.6.4.7. As the roof elevation is more than 4 m above grade and air-conditioning equipment is installed on the roof, direct access is to be provided to the roof by an interior stair.

  Fixed access is to be provided to rooftop heating, ventilating, or air-conditioning equipment that is installed on a sloped roof.

- Article 3.7.2.2. A room in which a water closet or urinal is installed must be mechanically ventilated to the exterior of the building and have a self-closing door.

  Washrooms for public use are to be of the elongated type and provided with a seat of the open front type.

- Article 3.7.2.6. Wall and floor surfaces below the uppermost surfaces of the urinals are to be protected from deterioration by impervious and durable materials for a distance from the urinal to a point not less than 900 mm (3 ft.) from the projected outline of the urinal on to the wall or floor.

- Article 3.8.1.1. The building entrance and washroom facilities are to be made barrier free accessible in accordance with the appropriate requirements in Section 3.8. of the Alberta Building Code.

  The Chief Building Administrator may grant a relaxation of one or more of the Barrier-Free requirements in Section 3.8 of the Alberta Building Code, if an owner can demonstrate to the satisfaction of the Chief Building Administrator that the specific requirements are unnecessary, or extraordinary circumstances prevent conformance.

  Contact Alberta Municipal Affairs at 1-866-421-6929, for further information.

- Article 3.8.3.1. Signs incorporating the international symbol of accessibility for persons with physical disabilities are to be installed to indicate the location of barrier-free entrances and washrooms.

- Article 3.8.3.3. Every door that provides barrier-free path of travel through an entrance, including the interior doors of a vestibule, where provided are to be equipped with a power door operator that allows persons to activate the opening of the door from either side if the entrance serves;
  a) a hotel,
  b) a building of Group B, Division 2 major occupancy, or
  c) a building of Group A, Group B, Division 3, Group D or E major occupancy more than 500 m² in building area.

- Article 4.1.5.3. All floor systems are to be designed for a uniformly distributed live load of 4.8 kPa (100 lb/ft²).

  Design drawings, for the floor system, are to be signed and sealed by a professional engineer, authorized to practice in the Province of Alberta and submitted to this office for review.

  Design drawings, from the floor truss manufacturer, indicating the required design load, are to be submitted to this office for review.

- Article 5.6.2.2. Where precipitation can accumulate on sloped or horizontal assemblies, provision is to be made for drainage conforming to the Plumbing and Drainage regulations made pursuant to the Safety Codes Act and the National Plumbing Code.

  National Plumbing Code: Flow control roof drains may be installed provided one or more scuppers are installed not more than 30 m apart along the perimeter of the building which:
  i) are designed to handle 200% of the 15 minute rainfall intensity, and
  ii) limit the maximum depth of controlled to 150 mm.

  Where the height of the parapet is more than 150 mm or exceeds the height of the adjacent wall flashing:
  a) emergency roof overflows or scuppers are to be provided, and
  b) there is to be a minimum of 2 roof drains.

- Article 6.2.2.1. Air quantities for ventilation purposes is not to be less than the value given in ASHRAE 62, "Ventilation for Acceptable Indoor Air Quality".

- Article 6.2.3.11. A sufficient quantity of make-up air (pre-heated during winter operation) is to be provided to the building for the exhaust ventilation systems noted above. The makeup air facilities are to be interlocked with the exhaust devices they serve so that both operate together.

  A food establishment in which food is prepared and the process generates odours, smoke, steam or heat is to have a mechanical ventilation system that includes canopies, ductwork and fans to remove odours, smoke, steam or heat to the exterior of the building.

Alberta Building Code – General Requirements

- Article 3.1.8.1. Ensure that the integrity of all required fire separations is maintained behind all recessed fixtures.

- Articles 3.1.8.3. Ensure that where all vertical fire separations are not continuous to the underside of the roof/floor deck above that the required fire separation is maintained entirely in the ceiling membrane. Table 2.3.J., "Chapter 2 - Fire Performance Ratings", lists times assigned to such ceiling membranes.

  The fire separation is to terminate so that smoke-tight joints are provided where it abuts on or intersecta;

a) a floor,
b) a roof slab, or
c) a roof deck.

- Articles 3.1.8.5. & 3.1.8.11.-13. All required fire-protection rated door assemblies are to be installed in conformance with Chapter 2 to 14 of NFPA 80, 'Fire Doors and Windows'; this includes door, frame, hardware, noncombustible threshold (except for twenty (20) minute fire-protection rated assemblies) and self-closing device.

- Article 3.1.9.1. Pipes which penetrate a fire separation are to be noncombustible and tightly fitted or sealed at the penetration by a fire stop system that when subjected to the fire test method in CAN/ULC-S115, "Fire Tests of Fire Stop Systems," has an F rating not less than the fire-protection rating required for closures in the fire separation.

  Pipes which penetrate a firewall or a horizontal fire separation that is required to have a fire-resistance rating in conformance with Article 3.2.1.2. are to be noncombustible and tightly fitted or sealed at the penetration by a fire stop system that when subjected to the fire test method in CAN/ULC-S115-M, "Fire Tests of Firestop Systems," has an FT rating not less than the fire-resistance rating for the fire separation.

- Article 3.1.9.4. Combustible piping is not to be used in any part of a drain, waste and vent piping system where any part of that system partly or wholly penetrates a fire separation required to have a fire-resistance rating or penetrates a membrane that forms part of an assembly required to have a fire-resistance rating, except:
  a) combustible drain, waste and vent piping not located in a vertical shaft is permitted to penetrate a fire separation required to have a fire-resistance rating or a membrane that forms part of an assembly required to have a fire-resistance rating provided the piping is sealed at the penetration by a firestop system that has an F rating not less than the fire-resistance rating required for the fire separation. The rating is to be based on CAN/ULC-S115-M, "Fire Tests of Firestop Systems" with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side,
  b) combustible drain piping is permitted to penetrate a horizontal fire separation provided it leads directly from a noncombustible water closet through a concrete floor slab, or
  c) combustible drain, waste and vent piping is permitted on one side of a vertical fire separation provided it is not located in a vertical shaft.

  Combustible drain, waste and vent piping is permitted on one side of a vertical fire separation provided it is not located in a vertical service space.

- Article 3.1.13.2. Interior wall and ceiling finishes, including glazing and skylights, are to have a surface flame-spread rating of not more than 150, except where more stringent requirements apply.

- Article 3.2.4.6. Where life safety and fire protection systems are installed to comply with the provisions of this Code or the Alberta Fire Code, the commissioning of these integrated systems are to be performed as a whole to ensure the proper operation and inter-relationship between the systems.

- Article 3.2.5.16. Portable fire extinguishers are to be provided, installed and maintained throughout the building during and after construction in conformance with Part 8 of the Alberta Building Code and NFPA 10, "Standard for Portable Fire Extinguishers", the Fire Prevention Act and regulations made pursuant to that Act.

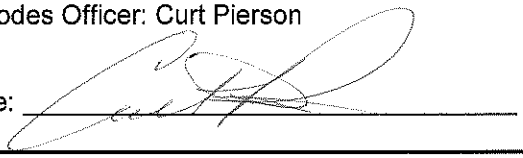
- Article 3.4.6.16. Every exit door is to be openable from the inside without the use of keys, special devices or specialized knowledge of the door opening mechanism.

- Article 3.8.3.3. Door operating devices located in a barrier-free path of travel are to be of a design which does not require tight grasping and twisting of the wrist as the only means of operation.

- Article 8.1.2.1. Where the building is undergoing construction, alteration or demolition, measures are to be taken at the building site in conformance with Part 8 of the Alberta Building Code and with the safety requirements of the Alberta Fire Code.

The list of Specific/General Requirements is a condensed version of essential construction guidelines and may not cover all the requirements in your construction or changes made on site. Neither the issuance of a permit, nor inspections made by the Authority Having Jurisdiction, will in any way relieve the owner (or the owners representative) of a building from full responsibility for carrying out the construction or having the construction carried out in accordance with the requirements of the Safety Codes Act and regulations made pursuant to that Act, this Code, or the permit, including compliance with any special conditions required by the Authority Having Jurisdiction.

Safety Codes Officer: Curt Pierson Designation No. **D** 7025

Signature: 

FROM (Bidder):

_____
(Bidder Legal Name)

_____
(Bidder Operating Name)

_____
(Mailing Address)

_____
(City, Province, Postal Code)

_____
(Contact Name and Tile for this Bid)

_____ _____
(Telephone) (Fax)

_____
(Email Address)

TO: Tender Administrator
Infrastructure
2nd Floor, (2700)
6950 - 113 Street NW
Edmonton, Alberta T6H 5V7

PROJECT: **ST. PATRICK ELEMENTARY SCHOOL**
School Modernization

Project ID: 016559G **Plan No:** B4166A-0001
Building No: B4166A

2. We, the undersigned, having examined and read the Bid Documents for the above noted project, including all issued Addenda (if any), and having visited the site and examined all conditions affecting the Work, are satisfied we understand the Bid Documents and declare ourselves competent to undertake and complete the Work and do hereby irrevocably bid and agree to carry out the Work in accordance with the Bid Documents, for the stipulated price in Canadian dollars of:

_____
(Total In Words)

_____ DOLLARS ($ _____)
(Total In Figures)

which price **excludes** GST.

3. This bid includes cash allowances, and all costs associated therewith, specified in Section 01 21 13 of the Specifications.

4. The following Bid Form supplements are being submitted as part of our bid submission:

   1. Bid security as specified in Section 00 43 13 of the Specifications.

6. We acknowledge that we are required to maintain a valid Standard COR, COREL or TLC for the duration of the Work of this Contract as specified in Section 01 35 29 – Work Site Safety.

7. If notified in writing by the Province of the acceptance of this bid within 35 days after the bid closing time, the undersigned will, within 15 days after date of issuance of such notification, execute a formal Agreement with the Province for the performance of the Work for the above stated compensation and comply with all other requirements of the Bid Documents.

8. It is understood that, with respect to this Bid Form, should any item be omitted or illegible, should any alteration be made to the text, or should any condition be added on or submitted with the Bid Form, the bid may be declared informal and the bid may be rejected.

9. Executed this _____ day of _____, 20_____.

NAME AND ADDRESS OF BIDDER: (Print or Type) _____

_____

_____

SIGNATURE OF AUTHORIZED REPRESENTATIVE(S):	NAME AND STATUS OF PERSON(S) SIGNING BESIDE: (Print or Type)
_____	_____
_____	_____

1. TYPE AND AMOUNT OF BID SECURITY

.1 Provide bid security in the form of a bid bond, a certified cheque or bank draft in an amount not less than 10% of the bid price.

.2 Bids not accompanied by bid security will be rejected as non-compliant.

2. BID BOND

.1 Bid bond shall be based on the Canadian Construction Documents Committee (CCDC) standard form of bid bond, CCDC 220, 2002 edition.

.2 Consign bid bond to "Her Majesty the Queen in right of Alberta, as represented by the Minister of Infrastructure". Ensure that the bid bond is **executed, sealed,** and **dated** by both Bidder and surety.

.3 The bond shall be enforceable for the earlier of the bid acceptance period as specified in the Instructions to Bidders or until the bond's principal enters into the formal contract and gives the specified Performance Security and Security for Payment of Claims.

.4 A bid bond that is improperly completed or executed may cause the bid to be rejected as non-compliant if, in the Province's judgment, such improper completion or execution of the bid bond potentially renders the bid bond unenforceable.

.5 Bid bond may, upon request and at the Province's sole discretion, be returned to unsuccessful bidders.

3. CERTIFIED CHEQUE OR BANK DRAFT

.1 Bid security provided in the form of a certified cheque or bank draft does not negate the successful bidder's obligation to provide surety bonds as specified in Section 00 61 13 and Section 00 61 90.

.2 Bidders providing bid security in the form of a certified cheque or bank draft shall, as a condition of contract award, submit a Consent of Surety or Agreement to Bond issued by duly incorporated surety company authorized to transact business of surety ship in the Province of Alberta. If a Bidder fails to submit an acceptable Consent of Surety or Agreement to Bond by the earlier of:

.1 a date that the Province may request in writing, or
.2 seven days before expiry of the bid acceptance period,

the bid will be rejected as non-compliant.

.3 Make certified cheque or bank draft payable to the "Government of Alberta".

.4 The Province will return certified cheques and bank drafts to unsuccessful bidders promptly upon expiry of the bid acceptance period or, at the Province's sole discretion, before expiry of the bid acceptance period.

4. BIDDER DEFAULT

.1 If a Bidder whose bid is accepted by the Province in writing, without conditions, and within the acceptance period specified in the Bid Documents, refuses or fails within 15 days after the date of issuance of the written acceptance of the bid:

.1 to sign a formal Agreement with the Province for the performance of the Work, and
.2 to provide surety bonds as specified in Section 00 61 13 and Section 00 61 90,

the Bidder shall be liable to the Province for the difference in money between the amount of its bid and the greater amount for which a contract for the Work is entered into with some other Bidder, up to the maximum amount of the bid security provided.

.2 If a Bidder provides bid security in the form of a certified cheque or bank draft, and fails to submit a Consent of Surety or Agreement to Bond as specified in 3.2, the Bidder shall be liable to the Province for the difference in money between the amount of its bid and the greater amount for which a contract for the Work is entered into with some other Bidder, up to the maximum amount of the bid security provided.

END OF SECTION

AGREEMENT BETWEEN HER MAJESTY THE QUEEN AND CONTRACTOR

This Agreement made on the _____ day of _____ in the year _____

by and between

Her Majesty the Queen in the right of Alberta, as represented by the Minister of Infrastructure, hereinafter called the "Province"

and

_____

Name of Contractor

_____

Address

hereinafter called the "Contractor".

The Province and the Contractor agree as follows:

ARTICLE 1 - THE WORK

The Contractor shall perform the Work required by the Contract Documents for:

Taber – St. Patrick Elementary School Modernization

Title of the Work and the Project

and for which **Sahuri + Partners Architecture Inc.**

Name of Consultant

is acting as the Consultant, and is hereinafter called the "Consultant", and do and fulfill everything indicated by this Agreement.

ARTICLE 2 - CONTRACT DOCUMENTS

The Contract Documents referred to in Article 1 of this Agreement are further defined in the Definitions portion of the Conditions of Contract but are generally comprised of the following:

- The Letter of Contract Award
- This Agreement Form, once executed by both parties
- Amendments, if any, made prior to execution of the Agreement Form
- Conditions of Contract
- Issued Specifications
    - Portions of Division 0 that have application during the performance of the Contract
    - Divisions 1 to 50
- Issued Drawings
- Schedules
- Subsequent amendments made in accordance with the provisions of the Contract.

ARTICLE 3 - CONTRACT TIME

Subject to adjustment of the Time as provided for in the Contract Documents, the Contractor shall:

1. Mobilize by the ___day of_____, in the year_____;
2. Attain Interim Acceptance of the Work by 8th day of June, in the year 2018;
3. Attain Practical Completion of the Work within forty-five (45) days after the date of Interim Acceptance of the Work.

Time shall be of the essence in regard to the performance of the Work. Failure to attain Interim Acceptance of the Work on the specified date shall result in liquidated damages of $23,140.00 per month or part of a month assessed against the Contractor until Interim Acceptance of the Work is achieved.

ARTICLE 4 - CONTRACT PRICE

The Contract Price is _____ dollars

and _____ cents (_____) in Canadian funds.

Contract Price includes all measures necessary to ensure completion of each stage or milestone of the Work, attaining Interim Acceptance of the Work, and attaining Practical Completion of the Work by the dates or times established therefore. Such measures include, but are not limited to:

.1 Special measures to arrange for and ensure the availability of labour, products, and construction machinery and equipment when and as required;

.2 Premium time, including overtime and double shifting;

.3 Progress acceleration; and

.4 Additional steps necessary to ensure completion of each stage or milestone, Interim Acceptance of the Work, or Practical Completion of the Work by the dates established therefore.

ARTICLE 5 - GOODS AND SERVICES TAX

The Province represents and warrants that, as the purchaser of the goods and services provided under this Contract, no amount payable under this Contract is subject to Goods and Services Tax (GST) or harmonized Sales Tax (HST) under Part IX of the Excise Tax Act (Canada) as amended. The Government of Alberta's GST Registration Number is 1240 72513 RT0001.

ARTICLE 6 - PAYMENT

The Province shall make payments in Canadian funds to the Contractor on account of the Contract Price in accordance with the Payment Conditions and other applicable provisions of the Contract Documents.

ARTICLE 7 - SUCCESSION

The Contract Documents are to be read into and form part of this Agreement and the whole shall constitute the Contract between the parties, and subject to the law and the provisions of the Contract Documents shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

The Parties have made this Contract

HER MAJESTY THE QUEEN IN RIGHT OF ALBERTA, as represented by the Minister of Infrastructure	(Name of Contractor)
Per:	Per:
Signature	Signature
SIGNED by the Minister of Infrastructure of the Province of Alberta, or the duly authorized representative.	SIGNED by the duly authorized representative of the Contractor who has authority to bind the Contractor.
Print Name	Print Name
Title	Title
Date	Date

1. CONTRACT PERFORMANCE SECURITY

.1 Contractor shall provide security for performance of the Contract in the form of a Performance Bond for 50% of the Contract Price.

.2 Bond shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Performance Bond, CCDC Document No. 221.

.3 Bond shall be issued by a duly incorporated surety company authorized to transact business of suretyship in the Province of Alberta.

.4 Consign bond to "Her Majesty the Queen in right of Alberta, as represented by the Minister of Infrastructure".

.5 Submit bond to the Province within 15 days after date of issuance of Letter of Acceptance of bid.

END OF SECTION

1. SECURITY FOR PAYMENT OF CLAIMS

.1 Contractor shall provide security for payment to claimants for labour and material used or reasonably required for use in the performance of the Contract. Such security shall be in the form of a Labour and Material Payment Bond for 50% of the Contract Price.

.2 Bond shall be the Province's standard form of Labour and Material Payment Bond, Document 00 61 90B-A, latest edition, a copy of which is appended hereto. An electronically fillable version can be downloaded from: http://www.infrastructure.alberta.ca/Content/docType486/Production/00_61_90B-A_eForm.pdf

.3 Bond shall be issued by a duly incorporated surety company authorized to transact business of suretyship in the Province of Alberta.

.4 Submit bond to the Province within 15 days after date of issuance of Letter of Acceptance of bid.

.5 Post a copy of the Labour and Material Payment Bond at the Place of the Work, as specified in Section 00 73 90.

END OF SECTION

Labour and Material Payment Bond

Bond No: **Amount:** (50% of Contract Price) **Contract No.:**

Project:

KNOWN ALL PERSONS BY THESE PRESENTS THAT

(Principal)

of the of in the Province of , as Principal Alberta

-and-

(Surety)

of the of in the Province of

a surety authorized to transact business in the Province of Alberta, are held and firmly bound unto:

HER MAJESTY THE QUEEN in right of Alberta, as represented by the Minister of Infrastructure (the "Province"), as Trustee, for the use and benefit of claimants as herein below defined, in the sum of:

dollars

to be paid to the Province, or to whom the Province may direct, and the Principal and Surety bind themselves and each of them and their respective successors, heirs, executors, administrators and assigns jointly and severally, to pay the said sum under the terms of these presents:

WHEREAS the Principal has entered into a written contract with the Province, dated the day of A.D. being Contract No. (the "Contract") and which Contract is by reference made a part hereof;

AND WHEREAS it is a term of the Contract that a Labour and Material Payment Bond be provided in favour of the Province, as contained herein;

NOW THEREFORE the conditions of this obligation are such that if the Principal shall make payment to all claimants for all labour and material used or reasonably required for use in the performance of the Contract and should such payment be properly made, then this obligation shall be null and void; otherwise, this obligation and these conditions will remain in full force and effect, subject to the following conditions:

1. For the purpose of this bond:

   (a) "claimant" means a person, including a body corporate, or a partnership, and the heirs, executors, administrators or other legal representatives of a person to whom the context can apply according to law, who has provided labour and material and who has not been paid for the same by the Principal or a subcontractor, in accordance with the Principal's or subcontractor's obligation to do so, provided that a person who rents equipment to the Principal or a subcontractor to be used in performance of the Contract under a contract which provides that all or a part of the rent is to be applied towards the purchase price thereof, shall only be a claimant to the extent of the prevailing Alberta Roadbuilders and Heavy Construction Association rental rates for the period during which the equipment was used in the performance of the Contract.

   (b) "labour and material" means labour, equipment, materials or services used or reasonably required for use in the performance of the Contract.

   (c) "services" means water, gas, electrical power, light, heat, oil, gasoline, steam, telephone, architectural, engineering and technical services, construction camp rental and catering, and other similar services, consumed or incurred, by the Principal or a subcontractor, at the Place of the Work and in the performance of the Work of the Contract.

   (d) "subcontractor" means
      (i) a person not contracting directly with the Province, but contracting with a contractor who holds a contract with the Province, for the provision of labour and material, and
      (ii) a person contracting with the person first mentioned in subclause (i) for the provision of labour and material.

2. The Surety acknowledges and agrees that Surety means a person who guarantees to the Crown the payment of creditors.

3. The Principal and the Surety hereby jointly and severally agree with the Province, as Trustee, that every claimant who has not been paid as provided for under the terms of his contract with the Principal or subcontractor before the expiration of a period of 90 days after the date on which the last of such claimant's work or labour was done or performed or materials were furnished by such claimant, may, as beneficiary of the trust herein provided for, sue on this Bond, prosecute the suit to final judgment for such sum or sums as may be justly due to such claimant under the terms of his contract with the Principal or subcontractor, and have execution thereon; provided that the Province is not obliged to do or take any act, action or proceeding against the Surety on behalf of any claimant to enforce the provisions of this Bond. If any act, action or proceeding is taken either in the name of the Province or by joining the Province as a party to such proceeding, then such act, action or proceeding shall be taken on the understanding and basis that the claimant who takes such act, action or proceeding shall indemnify and save harmless the Province against all costs, charges and expenses or liabilities incurred thereon and any loss or damage resulting to the Province by reason thereof; provided still further that, subject to the foregoing terms and conditions, a claimant may use the name of the Province to sue on and enforce the provisions of this Bond.

Labour and Material Payment Bond

4. No suit or action shall be commenced pursuant to clause 3. hereof by any claimant unless such claimant shall give notice within the time limits hereinafter set forth, to each of the Principal, Surety and Province, stating the amount that is claimed. Such notice shall be served by mailing the same to the Principal, Surety and Province at the addresses shown in this bond, or served in any manner in which legal process may be served in the Province of Alberta. Such notice shall be given:

   (a) in respect of any claim for the amount or any portion thereof required to be held back from the claimant by the Principal or subcontractor under the terms of the claimant's contract with the Principal or subcontractor, within 120 days after such claimant should have been paid in full under the claimant's contract with the Principal or subcontractor,

   (b) in respect of any claim other than for the holdback or portion thereof, referred to above, within 120 days after the date upon which such claimant did or performed the last of the work or furnished the last materials for which such claim was made under the claimant's contract.

5. Any suit by a claimant under this Bond shall be instituted before the expiration of 1 year from the date on which the Principal ceased work on the Contract, including work under the guarantees and warranties provided in the Contract, and shall be instituted in a court of competent jurisdiction in the Province of Alberta.

6. Upon receipt, at the address shown in this bond, by the Surety, of a notice of claim from a claimant, the Surety shall:

   (a) immediately commence its investigation of the claim, and

   (b) within 15 days, send, in writing, to the claimant and the Province, an acknowledgement of the notice of claim and a statement of the procedures to be followed by the claimant in order to attempt to settle the claim.

7. Pursuant to clause 6. hereof and following compliance with the procedures referred to in clause 6. and;

   (a) providing the claim is not being disputed, the Surety or the Principal, or both, shall make payment to the claimant within 30 days after the date of agreement on the quantum of the claim; or

   (b) in the event the claim is being disputed, the Surety or the Principal, or both, shall, within 30 days, notify, in writing, the claimant and the Province of the dispute, setting out the grounds of dispute.

8. Any material change in the Contract between the Principal and the Province shall not prejudice the rights or interests of any claimant under this Bond, who is not instrumental in bringing about or has not caused such change.

9. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith, and in accordance with the provisions hereof, by the Surety.

10. Where the aggregate of claims appears to the Province to exceed the sum of the bond amount and money due and payable to the Principal, the Province and the Surety may agree to suspend payment until all claimants have substantiated their claims.

11. The Surety shall not be liable for a greater sum than the maximum amount specified in this Bond.

ADDRESSES FOR NOTICES shall be:

MINISTER of Infrastructure, Corporate Strategies & Services, Procurement Branch #2700, 2nd Floor, 6950 - 113 Street, Edmonton, Alberta. T6H 5V7, Attention: Tender Administrator

PRINCIPAL:

SURETY:

IN WITNESS WHEREOF the Principal and the Surety have signed and sealed this Bond, this _____ day of _____ in the year _____

SIGNED, SEALED and DELIVERED by the Principal

Signature

Name of Person Signing

Apply Principal's Seal Here

Signing Capacity of Person Signing

SIGNED, SEALED and DELIVERED by the Surety

Signature

Name of Person Signing

Apply Surety's Seal Here

Signing Capacity of Person Signing

1. INTENT

.1 The following definitions shall apply to all Contract Documents. Terms used in the Contract Documents which are defined in this Section shall have the meanings designated in these definitions.

2. DEFINITIONS

.1 The "Consultant" is the architect, the engineer, or other person or entity identified as such in the Agreement. The term Consultant means the Consultant or the Consultant's authorized representative.

.2 The "Contract" is the undertaking by the Province and the Contractor to perform their respective duties, responsibilities and obligations as prescribed in the Contract Documents and represents the entire agreement between the Province and the Contractor. The Contract Documents form the Contract.

.3 The "Contract Documents" consist of: the Letter of Acceptance; the executed Agreement between the Province and the Contractor; the Conditions of Contract, including Definitions, Payment Conditions, Security Conditions as applicable, Insurance Conditions, General Conditions, Supplementary Conditions when used, conditions related to Public Works Act claims, surety bonds when provided; those parts of the Bidding Requirements documents having application during performance of the Contract; other documents contained in Division 0 of the Specifications; Divisions 1 to 50 of the Specifications; the Drawings; Schedules; and such other documents as may be identified as Contract Documents. The Contract Documents shall include amendments thereto made before execution of the Agreement and subsequent amendments thereto made in accordance with provisions of the Contract.

.4 "Contract Deficiency" means a deficiency in the Work, or part thereof, for which the Contractor is responsible under the Contract Documents and includes a deficiency in any design for which the Contractor is responsible.

.5 "Contract Price" means the total amount payable by the Province to the Contractor under the Contract Documents as stated in the Agreement, including authorized adjustments thereto. Contract Price excludes federal Goods and Services Tax.

.6 "Contract Time" means the period of time specified in the Contract Documents for attainment of Interim Acceptance of the Work, including authorized adjustments thereto.

.7 "Contract Unit Price" means the amount payable by the Province to the Contractor under the Contract Documents for a single unit of each separately identified item of work for which a unit price arrangement is prescribed as the basis of payment, as stated in the Unit Price Schedule, including authorized adjustments thereto.

.8 "Contractor" means a person, firm or corporation contracting directly with the Crown to perform the Work in conformance with the Contract Documents.

.9 "Contractor Start-Up" means the sub-phase of Facility Start-Up ending with Interim Acceptance of the Work, during which the Contractor performs a pre-planned program of activities including starting, testing, inspecting, adjusting, balancing, correcting Contract Deficiencies, and other similar activities.

.10 The "Crown" means Her Majesty the Queen in right of Alberta, as represented by the Minister of Infrastructure

.11 "Day" means the calendar day.

.12 "Department" means the Department of Infrastructure as represented by the Minister. "Infrastructure", “Crown”, “Province” and “Minister” shall be synonymous with "Department".

.13 "Facility Start-Up" means the phase of the Work which includes the sub-phases of Contractor Start-Up, Performance Testing, and Fine Tuning and ends with Final Acceptance of the Work.

.14 "Final Acceptance of the Work" means when the entire Work, except those items arising from the warranty provisions of the Contract Documents, has been performed to the requirements of the Contract Documents and is so declared, in writing, by the Province.

.15 "Fine Tuning" means the sub-phase of Facility Start-Up, commencing upon Practical Completion of the Work and ending with Final Acceptance of the Work, during which the Province identifies Contract Deficiencies arising under normal operating conditions, after user occupancy, and Contractor corrects such Contract Deficiencies.

.16 “*FOIP Act*” means the *Freedom of Information and Protection of Privacy Act* (Alberta), as amended from time to time.

.17 "Interim Acceptance of the Work" means when the prerequisites to Interim Acceptance of the Work required by the Contract Documents are fulfilled and the Work is ready for use or is being used for the purpose intended and the state of the work is so declared, in writing, by the Province.

.18 "Materials" means material, machinery, equipment, fixtures and other items forming the Work or part thereof but does not include machinery and equipment used for performance of the Work and normally referred to as construction machinery and equipment.

.19 "Other Contractor" means any person, firm or corporation employed by or having a separate contract with the Crown for work other than that required by the Contract Documents.

.20 "Performance Testing" means the sub-phase of Facility Start-Up commencing upon Interim Acceptance of the Work and ending with Practical Completion of the Work, during which the Province performs a pre-planned program of testing and inspecting and the Contractor corrects Contract Deficiencies.

.21 “Personal Information” means “personal information” as defined in the *FOIP Act*.

.22 "Place of the Work" means the designated site or location of the Project of which the Work may be the whole or a part.

.23 "Practical Completion of the Work" means when Contract Deficiencies identified during Performance Testing and previously identified but outstanding Contract Deficiencies have been corrected by the Contractor, or addressed and a course of action established by the Province, and the state of the Work is so declared, in writing, by the Province.

.24 "Products" is synonymous with Materials.

.25 "Project" means the total construction of which the Work to be provided under the Contract Documents may be the whole or a part.

.26 "Regulatory Requirements" means laws, ordinances, rules, regulations, orders, codes, and other legally enforceable requirements in effect at the Place of the Work and applicable to the performance of the Work.

.27 "Stipulated Price Arrangement" means a contractual arrangement that prescribes a lump sum as payment for performance of the work to which it relates.

.28 "Subcontractor" means a person, firm or corporation having a direct contract with the Contractor for the performance of a part of the Work at the Place of the Work.

.29 "Sub-subcontractor" means a person, firm or corporation having a direct contract with a Subcontractor for the performance of a part of the Work at the Place of the Work.

.30 "Total Completion of the Work" means when all items arising from the one year warranty period required by the Contract Documents have been corrected by the Contractor and the state of the Work is so declared, in writing, by the Province.

.31 "Unit Price Arrangement" means a contractual arrangement that prescribes the product of a Contract Unit Price multiplied by a number of units of measurement of a class as payment for performance of the work to which it relates.

.32 "Work" means the total construction and related services required by the Contract Documents.

.33 "Working Day" means days other than Saturdays, Sundays and holidays which are observed by the construction industry at the Place of the Work.

END OF SECTION

1. GENERAL

1.1 CONTRACT DOCUMENTS

.1 The Contract Documents shall be signed by the Province and the Contractor.

.2 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

.3 The intent of the Contract Documents is to include the labour, Products and services necessary for the performance of the Work in accordance with these documents. It is not intended, however, that the Contractor shall supply Products or perform work not consistent with, covered by or properly inferable from the Contract Documents.

.4 Nothing contained in the Contract Documents shall create any contractual relationship between the Consultant and the Contractor, a Subcontractor, a Sub-subcontractor, a supplier, or their agent, employee, or other person performing any of the Work.

.5 In the event of conflicts between Contract Documents the following shall apply:

.1 figured dimensions shown on a drawing shall govern even though they may differ from dimensions scaled on the same drawing,

.2 drawings of larger scale shall govern over those of smaller scale of the same date,

.3 schedules shall govern over drawings,

.4 specifications shall govern over schedules and drawings,

.5 addenda shall govern over applicable portions of documents published during the tendering process,

.6 change orders shall govern over applicable portions of documents identified in 5.1 to 5.5 inclusive,

.7 the General Conditions of Contract shall govern over specifications, schedules and drawings,

.8 Supplementary Conditions shall govern over the General Conditions of Contract, specifications, schedules and drawings,

.9 the executed Agreement between the Province and the Contractor shall govern over all documents, and

.10 Amendments made after the execution of the Agreement Form shall govern over the executed Agreement between the Province and Contractor.

Notwithstanding the foregoing, documents of later date shall always govern.

.6 Words and abbreviations which have well known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

.7 References to the masculine or the singular shall be considered to include the feminine and the plural as the context requires.

.8 The Contractor shall be responsible for printing, at its expense, as many copies of the Contract Documents or parts thereof as are reasonably necessary for the performance of the Work. The Province will make available appropriate source documents from which the Contract Documents may be printed.

.9 The Contractor shall keep one copy of current Contract Documents and shop drawings at the Place of the Work, in good order and available to the Province. This requirement shall not be considered to include the executed set of Contract Documents.

.10 The Contract Documents, models and copies thereof furnished by the Province are and shall remain the Province's property with the exception of the signed contract set belonging to the Contractor. Such documents and models shall be used only with respect to the Work and shall not be used on other work. Such documents and models shall not be copied or revised in any manner without the written authorization of the Province.

.11 Models furnished by the Contractor at the Province's expense are the property of the Province.

1.2 LAW OF THE CONTRACT

.1 This Contract shall be governed by an interpreted in accordance with the laws in force in Alberta and the parties irrevocably attorn to the exclusive jurisdiction of the courts of Alberta.

.2 The Contractor shall comply with the provisions of all laws, now in force or in force after the signing of this Contract, that expressly or by implication apply to the Contractor in performing the work of this Contract.

.3 Article 1.2 shall survive the Contract.

1.3 RIGHTS AND REMEDIES

.1 Except as expressly provided in the Contract Documents, the duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

.2 No action or failure to act by the Province or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

1.4 REPORTING OF CONFLICTS, ERRORS AND DISCREPANCIES

.1 If, during the performance of the Work, the Contractor finds a conflict, error or discrepancy in the Contract Documents, the Contractor shall so report to the Province in writing at once and, before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from the Province; however, the Contractor shall not be liable to the Province for failure to report any conflict, error or discrepancy in the Contract Documents unless the Contractor had actual knowledge thereof or should reasonably have known thereof.

.2 The Contractor shall, pursuant to 1.4.1, obtain from the Province any dimensions required but not indicated in figures in the Contract Documents nor calculable from figures in the Contract Documents. Scaling of drawings, for any purpose, shall be at the Contractor's risk.

1.5 RELATIONSHIP OF PARTIES

.1 The relationship of the Contractor to the Province in performing the services under this Contract is that of an independent contractor, and nothing in this Contract is to be construed as creating and agency, partnership, joint venture or employment relationship between the Contractor and the Province.

1.6 CONFLICT OF INTEREST AND ETHICAL CONDUCT

.1 The Contractor shall ensure that there is not a conflict of interest or an apparent conflict of interest on the part of the Contractor or its employees, subcontractors or agents in relation to the Work, and all Work shall be performed in accordance with high ethical standards, including without limitation the following:

.1 the Contractor and its employees, subcontractors and agents shall not influence, or seek to influence, or otherwise take part in a decision of the Province knowing that the decision might further their private interests;

.2 where the Work involve providing advice, making recommendations to the Province or exercising discretionary authority regarding a right, permission, privilege, status, contract or benefit, then such advice, recommendations or discretion must be provided, made or carried out impartially and without bias;

.3 except for payment as set out in this Contract, the Contractor and its employees subcontractors or agents shall not accept any collateral gift, payment, commission or other direct benefit arising from or connected to the performance of the Services;

.4 the Contractor and its employees, subcontractors and agents shall not have any financial interest in the business of a third party that causes, or would appear to cause, a conflict of interest in connection with the performance of the Work;

.5 the Contractor, upon request by the Province, shall deliver copies of all written ethical standards, conflict of interest policies and codes of conduct established or observed by the Contractor in its business practices or in relation to its employees, subcontractors or agents; and

.6 the Contractor shall comply with, and ensure that, its employees, subcontractors and agents comply with, the *Lobbyists Act* (Alberta), as amended from time to time.

.2 In the event the Contractor becomes aware of any matter that causes or is likely to cause a conflict of interest in relation to the performance of the Work, the Contractor shall immediately disclose such matter to the Province in writing. Upon such disclosure, the Contractor shall not commence or continue performance of the Work without the prior written consent of the Province. If the Province is of the opinion the Contractor or its employees, subcontractors or agents are in a conflict of interest, the Province may terminate this Contract in accordance with Article 2.3.1.2.

2. PROVINCE

2.1 PROVINCE'S RIGHT TO PERFORM WORK OR TAKE WORK OUT OF CONTRACTOR'S HANDS

.1 If the Contractor should be adjudged bankrupt, or makes a general assignment for the benefit of creditors because of his insolvency or if a receiver is appointed because of his insolvency, the Province, without prejudice to any other right or remedy he may have, by giving the Contractor or receiver or trustee in bankruptcy written notice, may:

.1 take the Work out of the Contractor's hands, or
.2 terminate the Contract, in accordance with Article 2.3.

.2 If the Contractor should neglect to prosecute the Work properly or otherwise fails to comply with the requirements of the Contract to a substantial degree, the Province may notify the Contractor in writing that he is in default of his contractual obligations and instruct him to correct the default in the 5 Working Days immediately following the receipt of such notice.

.3 If the correction of the default referred to in Article 2.1.2 cannot be completed in the 5 Working Days specified, the Contractor shall be in compliance with the Province's instructions if he:

.1 commences the correction of the default within the specified time, and

.2 provides the Province, within the specified time, with an acceptable schedule for such correction, and

.3 completes the correction in accordance with such schedule.

.4 If the Contractor fails to correct the default referred to in Article 2.1.2 in the time specified or subsequently agreed upon, the Province, without prejudice to any other right or remedy he may have, may:

.1 correct such default and deduct the cost thereof from any payment then or thereafter due the Contractor, or

.2 if the Contractor has provided a performance bond, require the surety company to correct such default in accordance with the conditions of the performance bond, or

.3 take all or any part of the Work out of the Contractor's hands, or

.4 terminate the Contract, in accordance with Article 2.3.

.5 If all or any part of the Work is taken out of the Contractor's hands, the Province may:

.1 employ such means as he sees fit to have the Work completed, and

.2 take possession of the premises and products and utilize the construction machinery and equipment subject to the rights of third parties, and

.3 withhold further payments to the Contractor until the Work is completed.

.6 If all or any part of the Work is taken out of the Contractor's hands, the Province may:

.1 if the Contractor has not provided contract performance security:

.1 charge the Contractor, upon Final Acceptance of the Work, the amount by which the full cost of completing the Work, including a reasonable allowance to cover the cost of corrections to work performed by the Contractor that may be required under Article 6.3, Warranty, exceeds the unpaid balance of the Contract Price; however if such cost of finishing the Work is less than the unpaid balance of the Contract Price, he shall pay the Contractor the difference, and

.2 on expiry of the warranty period, charge the Contractor the amount by which the cost of corrections to his Work under Article 6.3, Warranty, exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the Contractor the difference, or

.2 if the Contractor has provided contract performance security in the form of a performance bond, exercise the provisions of the performance bond in accordance with the conditions of such bond and the Contract Documents, or:

.3 if the Contractor has provided contract performance security in the form of a security deposit, convert the security deposit to his own use; the amount realized shall be deemed to be an amount due from the Province to the Contractor under the Contract and any balance of such amount that remains after payment of all losses, damage, and claims of the Province and others shall be paid by the Province to the Contractor if in the Province's opinion, it is not required for the purposes of the Contract.

.7 The Contractor's obligations under the Contract as to quality, correction and warranty of the work performed by him up to the time of the Work being taken out of the Contractor's hands, shall continue after the Work is taken out of the Contractor's hands.

2.2 PROVINCE'S RIGHT TO SUSPEND WORK

.1 The Province may require the Contractor to suspend performance of the Work either for a specified or an unspecified period by giving a written notice of suspension to the Contractor.

.2 When a notice referred to in Article 2.2.1 is received by the Contractor, he shall suspend all operations in respect of the Work except those that, in the opinion of the Province, are necessary for the care and preservation of the Work.

.3 The Contractor shall not, during a period of suspension, remove any part of the Work, Products or construction machinery and equipment from the Place of the Work without the consent of the Province.

.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the Work and shall be entitled to an increase in Contract Price, an extension of Contract Time, or both, where such increase in Contract Price, extension of Contract Time, or both, are directly attributable to the suspension.

.5 If, upon the expiration of a period of suspension of more than 30 days, the Province and the Contractor agree that the performance of the Work will be continued by the Contractor, the Contractor shall resume performance of the Work subject to any terms and conditions agreed upon by the Province and the Contractor.

.6 If, upon the expiration of a period of suspension of more than 30 days, the Province and the Contractor do not agree that performance of the Work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the Work, the notice of suspension shall be deemed to be a notice of termination of Contract by the Province.

2.3 PROVINCE'S RIGHT TO TERMINATE CONTRACT

.1 The Province may, by giving a written notice of termination to the Contractor, terminate the Contract:

.1 pursuant to Article 2.1.1, 2.1.4, 2.2.6 or

.2 at any other time.

.2 When a notice referred to in Article 2.3.1 is received by the Contractor, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the Contract.

.3 If the Province terminates the Contract pursuant to Article 2.1.1 or 2.1.4, the Contractor shall be entitled to be paid for all work performed in accordance with the Contract Documents up to the date of termination.

.4 If the Province terminates the Contract pursuant to Article 2.2.6 or 2.3.1.2., the Contractor shall be entitled to be paid for all work performed in accordance with the Contract Documents up to the date of termination, including reasonable profit and for loss sustained upon Products and construction machinery and equipment and such other damages as the Contractor may have sustained as a result of the termination of the Contract.

2.4 CHANGES IN THE WORK

.1 The Province, without invalidating the Contract, may make changes in the Work consisting of additions, deletions or other modifications, the Contract Price and Contract Time being adjusted if required.

.2 Changes in the Work shall be authorized by written order from the Province.

2.5 VALUATION OF CHANGES

.1 The value of any change shall be determined by one or more of the following methods, as selected by the Province:

.1 By acceptance of a lump sum, properly itemized and supported by Subcontractors', Sub-subcontractors' and Suppliers' signed quotations and other substantiating data as may be required by the Province to permit evaluation.

.2 By unit prices agreed upon.

.3 By cost plus percentage or fixed fee.

.2 In cases of extra work to be paid for under method 2.5.1.3, the Contractor shall keep and present in such form as the Province may direct, a correct account of the actual cost of labour, materials, and equipment, together with vouchers. The Province shall certify as to the amount due the Contractor.

.3 In cases of extra work to be paid for under method 2.5.1.2, the Contractor shall keep and present in such form as the Province may direct, a correct account of the actual quantities related to each of the agreed upon unit prices, together with vouchers. The Province shall certify as to the amount due the Contractor.

.4 On extra work authorized by the Province, and to be paid for under method 2.5.1.1, the allowance for overhead and profit shall be based on the following schedule:

.1 For work performed by Contractor's own forces, including work performed to accommodate work performed by Subcontractors, the Contractor shall be entitled to a mark-up of 15% on its actual Direct Costs related to the change in the work for overhead costs and profit.

.2 For work performed by Subcontractors, including work performed to accommodate work performed by Sub-subcontractor:

.1 Each Subcontractor shall be entitled to a mark-up of 15% on actual Direct Costs related to the change in the work for overhead and profit.

.2 Contractor shall be entitled to 10% on the Subcontractors' total price to cover their Administrative Fee and profit.

.3 For work performed by Sub-subcontractors:

.1 Each Sub-subcontractor shall be entitled to a mark-up of 15% on actual Direct Costs related to the change in the work for overhead and profit.

.2 Subcontractor shall be entitled to 10 % on the Sub-subcontractors' total price to cover their Administrative Fee and profit.

.3 Contractor shall be entitled to 10 % on the Subcontractor’s above total price to cover their Administrative Fee and profit.

.5 If a change results in a decrease in cost, the amount of credit to be given to the Province by the Contractor shall be the amount of the actual decrease without overhead and profit.

.6 If a change involves both extras and credits and results in an increase in cost, overhead and profit shall be allowed on the increase only.

.7 The Contractor shall include in his proposal for change a statement as to the effect the proposed change will have on the Contract Time.

2.6 CHANGES IN SUB SURFACE CONDITIONS

.1 The Contractor shall promptly notify the Province in writing if the subsurface conditions at the Place of the Work differ substantially from those indicated in the Contract Documents or represented to the Contractor before submission of tender.

.2 After investigation should the Province agree that conditions do differ substantially, appropriate instructions for changes in the Work will be issued.

3. CONTRACTOR

3.1 CONTRACTOR'S RESPONSIBILITIES FOR AND CONTROL OF THE WORK

.1 The Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for:

.1 The means, methods, techniques, sequences and procedures of construction and for coordinating all parts of the Work under the Contract.

.2 The design, erection, operation, maintenance and removal of temporary structural and other temporary facilities and the design and execution of construction methods required in their use.

.3 Construction safety at the Place of the Work and for compliance with the regulatory requirements required by the applicable legislation.

.2 Notwithstanding the provisions of 3.1.1.1 and 3.1.1.2, or provisions to the contrary elsewhere in the Contract Documents, the Contractor shall not be held responsible for:

.1 the design or selection of a specific means, method, technique, sequence, or procedure of construction, nor

.2 the design or selection of a temporary structural or other temporary facility, which is indicated in and required by the Contract Documents.

.3 The Contractor shall be responsible for seeing that the finished Work complies accurately with the Contract Documents.

3.2 SUPERINTENDENCE

.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Place of the Work while the Work is being performed.

.2 The superintendent shall be satisfactory to the Province and shall not be changed except for good reason and only then after consultation with the Province.

.3 The superintendent shall be the Contractor's representative at the Place of the Work and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor.

3.3 CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

.1 If the Work should be stopped or otherwise delayed for a period of 30 days or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the Contractor or of anyone directly or indirectly employed or engaged by him, the Contractor may, without prejudice to any other right or remedy he may have, by giving the Province written notice, terminate the Contract.

.2 If the Contractor terminates the Contract pursuant to Article 3.3.1, he shall be entitled to be paid for all work performed in accordance with the Contract Documents up to the date of termination, including reasonable profit and for loss sustained upon Products and construction machinery and equipment and such other damages as the Contractor may have sustained as a result of termination of the Contract.

3.4 HOLD HARMLESS AGREEMENT

.1 Each party shall indemnify and hold harmless the other, its employees and agents against and from any and all third party claims, demands, actions, or costs (including legal costs on a solicitor-client basis) to the extent arising from

.1 that party's breach of this Contract, or

.2 the negligence, other tortious act of wilful misconduct of that party, or those for whom it is legally responsible, relation to the performance of its obligations under this Contract.

.2 The Contractor shall indemnify and hold harmless the Province against and from any loss or damage to real or personal property of the Province to the extent arising from the Contractor's breach of this Contract or from the negligence, other tortious act or wilful misconduct of the Contractor, or those for whom it is legally responsible.

.3 Article 3.4 survives the Contract.

3.5 SECURITY

.1 The Contractor shall, if and as specified elsewhere in the Contract Documents, provide:

.1 contract performance security in the form of a security deposit or a surety bond, and

.2 security for payment of claims in the form of a security deposit or a surety bond, and

.3 other security which may be specified.

.2 The Province reserves the right to require the Contractor to provide one or more of the aforementioned types of security notwithstanding that such security may not have been required by the Tender Documents prior to tender closing. Should the Province exercise this right, the Contract Price shall be increased by the actual cost of such security provided.

.3 Surety bonds shall be issued by a duly incorporated surety company authorized to transact business of suretyship in the Province of Alberta and shall be properly executed.

.4 The Province may, for reasonable cause, object to use of surety company proposed by the Contractor, and may require the Contractor to provide a surety bond issued by another surety company acceptable to the Province, with no change in Contract Price.

.5 If, at any time during term of surety bond, surety company is declared bankrupt, becomes insolvent or its right to do business anywhere in Canada is terminated, the Contractor shall within 10 days thereafter substitute another surety bond and surety company acceptable to the Province, with no change in Contract Price.

.6 The Province reserves the right to provide the surety company with progress reports on the Work.

3.6 WORKERS' COMPENSATION ACT AND OCCUPATIONAL HEALTH AND SAFETY ACT

.1 Upon request from the Province, deliver to the Province a certificate from the Workers' Compensation Board showing that the Contractor is registered and in good standing with the Board.

.2 The Contractor shall pay all fees in connection with Workers' Compensation and comply with all requirements of the *Workers' Compensation Act* (Alberta), and as amended from time to time.

.3 The Contractor shall comply with all safety requirements as contained in the Regulations as issued under authority of the latest edition of the *Occupational Health and Safety Act* (Alberta).

3.7 LABOUR

.1 Unless otherwise specified in the Contract Documents, the Contractor shall provide and pay for all labour necessary for the performance of the Work.

.2 Persons employed in performing the Work shall be skilled in and competent to properly perform the tasks assigned to them and, when required by laws, rules, regulations or the Contract Documents, qualified to do so.

.3 The Contractor shall maintain good order and discipline among persons employed at the Work site.

3.8 EMPLOYMENT CONDITIONS

.1 The Contractor agrees and shall ensure that wages, hours of work and other conditions of employment of all persons employed by the Contractor, any Subcontractor and any Sub-subcontractor in the performance of any work required by this Contract shall be in compliance with the requirements of the Alberta Employment Standards Act, the Alberta Labour Relations Act and any other applicable law, rule, regulation or order.

3.9 PATENT FEES

.1 The Contractor shall pay the royalties and patent licence fees required for the performance of the Contract.

3.10 PRODUCTS

.1 Unless otherwise indicated in the Contract Documents, the Contractor shall provide and pay for all products, tools, construction machinery and equipment, water, heat, light, power, transportation and other facilities and services necessary for the performance of the Work.

.2 Products provided shall be new unless otherwise indicated in the Contract Documents. Products which are not specified shall be of a quality best suited to the purpose required and their use subject to the Province's approval.

3.11 USE OF PREMISES

.1 The Contractor shall confine construction machinery and equipment, the storage of products, and the operations of workers to the Place of the Work and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by regulatory requirements, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with products or construction machinery and equipment.

3.12 PROTECTION OF WORK AND PROPERTY

.1 The Contractor shall protect the Work and the Province's property and property adjacent to the Place of the Work from damage and shall be responsible for damage which may arise as a result of his operations under the Contract except damage which occurs as the result of:

.1 errors in the Contract Documents,

.2 acts or omissions by the Province, or Other Contractors.

.2 Should the Contractor, in the performance of the Contract, damage the Work, the Province's property, or property adjacent to the Place of the Work, the Contractor shall be responsible for the making good of such damage at the Contractor's expense.

3.13 INSPECTION OF WORK

.1 The Province, authorized representatives of the Province, including testing agencies, and authorities having jurisdictional interests shall, at reasonable times, have proper and safe access to the Work, including parts of the Work in preparation at locations other than the Place of the Work, for the purposes of observation, inspection and testing.

.2 If work is designated for special tests, inspections or approvals in the Contract Documents, or by the Province's instructions, or regulatory requirements, the Contractor shall give the Province timely notice requesting inspection. The Contractor shall arrange for inspections by authorities having jurisdiction and shall give the Province timely notice of the date and time.

.3 If the Contractor covers or permits to be covered work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, he shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed and make good such work at his own expense.

.4 The Province may order any part or parts of the Work to be specially examined should he believe that such work is not in accordance with the requirements of the Contract Documents. If, upon examination such work be found not in accordance with the requirements of the Contract Documents, the Contractor shall correct such work and pay the cost of examination and correction. If such work be found in accordance with the requirements of the Contract Documents, the Province shall pay the cost of examination and replacement.

3.14 REJECTED WORK

.1 Defective work, whether the result of poor workmanship, use of defective products, or damage through carelessness or other act or omission of the Contractor and whether incorporated in the Work or not, which has been rejected by the Province as failing to conform to the Contract Documents shall be removed promptly from the Place of the Work by the Contractor and replaced or re-executed promptly in accordance with the Contract Documents at the Contractor's expense.

.2 Other Contractors' work destroyed or damaged by such removals or replacements shall be made good promptly at the Contractor's expense.

.3 If, in the opinion of the Province, it is not expedient to correct defective work or work not performed in accordance with the Contract Documents, the Province may deduct from the Contract Price the difference in value between the work as performed and that called for by the Contract Documents, the amount of which will be determined in the first instance by the Province.

3.15 FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

.1 The Contractor acknowledges that this Contract, including without limitation the name of the Contractor, fees payable, the Term, and details of the Services may be subject to disclosure under the *FOIP Act*, The Contractor further acknowledges that the *FOIP Act* applies to the Province's Information (as defined in Article 3.16) collected, used or disclosed in the performance of Work, and the Contractor shall adhere to the *FOIP Act* in its collection, use and disclosure of any Personal Information,

.2 The Contractor shall not collect, use or disclose any Personal Information under this Contract except as reasonably required to fulfill its obligations under this Contract, or as otherwise expressly authorized in writing by the Province.

.3 Upon request, the Contractor shall, at the Contractor's expense, and within five business days, provide to the Province any records that are requested under the access provisions of the *FOIP Act* that are in the custody or under the control of the Contractor. Should the Contractor receive an access request under the *FOIP Act*, the Contractor shall not respond to it, but shall immediately forward the access request to the Province for further handling.

.4 In providing the Services the Contractor shall make every reasonable effort to ensure that Personal Information that is to be or is actually used to make a decision that directly affects an individual, is both complete and accurate. At the Province's request the Contractor must correct, within five business days of the request, Personal Information that the Contractor may have either collected or compiled about an individual pursuant to this Contract.

.5 The Contractor shall:

.1 protect Personal Information against any unauthorized access, use disclosure, loss, destruction or alteration;

.2 immediately advise the Province of any actual or potential unauthorized access, use, disclosure, destruction or alteration of Personal Information and provide all reasonable assistance to the Province to prevent or remedy the same; and

.3 provide the Province with any information regarding the Contractor's security measures that the Province may require to verify compliance with the *FOIP Act*.

.6 The Contractor shall store only in Canada all records of Personal Information which are disclosed to the Contractor under this Contract, including records that are collected, used or stored on behalf of the Province.

.7 The Contractor shall act on any direction that the Province may provide with regard to the use, collection, access, security, disclosure, alteration, loss or destruction of the Personal Information.

.8 Article 3.16 survives the Contract.

3.16 NON-DISCLOSURE OF INFORMATION

.1 Except as provided in Articles 3.15 and 3.16, all information, regardless of form, including Personal Information, that is obtained, generated, provided or collected by the Contractor in the performance of the Work (the "Province's Information"), shall not be disclosed or published by the Contractor without the prior written consent of the Province. The Contractor may disclose the Province's Information to employees, subcontractors or agents of the Contractor who have a need to know for the purpose of performing the Work, provided that the Contractor has a confidentiality agreement with the agent or permitted subcontractor containing confidentiality provisions substantially similar to this Contract.

.2 Subject to Article 3.15 the Contractor's obligations in Article 3.16 do not apply to information or documents which:

.1 are or become publicly available through no act or omission of the Contractor;
.2 are independently developed without benefit of the Province's Information; or
.3 are received by or from a third party without restriction and without a breach of an obligation of confidentiality.

.3 The Contractor shall retain the Province's Information as confidential and shall make reasonable security arrangements against unauthorized access, use, disclosure, loss, destruction or alteration of the Province's Information. The Contractor shall immediately advise the Province of any unauthorized access, use, disclosure, loss or destruction of the Province's Information, and shall provide the Province any assistance reasonably required to rectify such a situation.

.4 The Contractor shall return or deliver the Province's Information to the Province upon completion or termination of this Contract, or upon request of the Province.

.5 The Province's Information may be disclosed to the extent required by law or court order, provided that the Province is given reasonable notice and opportunity to seek to prevent or limit its disclosure.

.6 No press release, public announcement or other public commentary relating to this Contract shall be made by the Contractor without the prior written approval of the Province.

.7 Article 3.16 survives the Contract.

4. PROVINCE AND CONTRACTOR

4.1 INTERPRETATION OF CONTRACT DOCUMENTS BY PROVINCE

.1 The Province shall be, in the first instance, the interpreter of the requirements of the Contract Documents, and the judge of the performance thereunder by the Contractor. Interpretations and decisions of the Province shall be consistent with the intent of the Contract Documents.

4.2 CLAIMS

.1 If the Contractor intends to claim any additional payment, or if the Province intends to make a claim against the Contractor for an adjustment in payment other than permitted under the Contract, the claimant shall give notice of its intention to the other party as soon as possible and not later than 7 days after the event giving rise to the claim first arises or the claimant first becomes aware of such event.

.2 Failure to serve a notice of claim within the prescribed time period will prejudice the claimant's right to proceed with the claim, unless the claimant can demonstrate that such delayed notice did not prejudice the other party's ability to take measures to minimize any additional costs arising from the claim.

.3 Upon occurrence of the event referred to in Article 4.2.1, the claimant shall take all reasonable measures required to mitigate any loss or damage which may be incurred as a result of such event.

.4 Upon occurrence of the event referred to in Article 4.2.1, the Contractor shall keep such contemporary records as may reasonably be necessary to support any claim he may subsequently wish to make, including records of time and cost relating to labour, products, construction equipment and other resources used in the work. The Contractor shall permit the Province to inspect all such records and shall supply him with copies thereof as and when the Province so instructs.

.5 Within 14 days, or such other reasonable time as may be agreed by the Province, of giving notice under Article 4.2.1, the Contractor shall send to the Province an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based.

.6 Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Province may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. In cases where interim accounts are sent to the Province, the Contractor shall send a final account within 14 days after the end of the effects resulting from the event.

.7 The parties shall make bona fide efforts to resolve a claim as soon as possible after receipt thereof. When a party in receipt of a claim issues its final written position on the claim or fails to do so within a reasonable period of time, and the claim is not resolved to the satisfaction of both parties, the claim shall be considered a dispute and shall be settled in accordance with Article 4.3.

.8 The Contractor shall be entitled to have included in any progress payment such amount in respect of any claims as the Province may consider due to the Contractor. If information is insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such information may substantiate to the satisfaction of the Province.

4.3 SETTLEMENT OF DISPUTES

.1 If a dispute of any kind arises between the Province and the Contractor in connection with, or arising out of, the Contract or the execution of the Work, whether during the execution of the Work or after its completion and whether before or after repudiation or other termination of the Contract, the matter in dispute shall be settled in accordance with the processes identified in the document entitled "Dispute Resolution Process for Government of Alberta Construction Contracts", Appendices A, B, C, D, and E.

.2 In the event of conflict between the aforementioned Appendices and other provisions of the Contract, the Appendices shall govern.

4.4 ASSIGNMENT

.1 The Contractor shall not assign the Contract, either in whole or in part, nor shall he sublet the Contract as a whole, without the previous written consent of the Province, which consent shall be at the Province's sole discretion.

.2 The Province shall not be bound by any assignment by the Contractor of any monies payable or to become payable to the Contractor under the Contract, without the written consent of the Province, which consent:

.1 will not be given for a general assignment of book debts, but
.2 may, at the Province's sole discretion, be given for a specific assignment of all or part of monies payable to the Contractor under the Contract.

4.5 ACCOUNTING

.1 Keep and maintain in accordance with Canadian generally accepted accounting principles complete and accurate books, records and accounts relating to this Contract and, on demand, provide to the Province these documents to examine, audit and make copies and take extracts; and

.2 Keep the documents referred to in clause 4.5.1 for three years following the completion of termination of the Contract.

.3 Article 4.5 survives the Contract.

5. OTHER PARTIES

5.1 SUBCONTRACTORS

.1 The Contractor agrees to preserve and protect the rights of the parties under the Contract with respect to work to be performed under subcontract and to:

.1 enter into contracts or written agreements with his Subcontractors to require them to perform their work in accordance with and subject to the terms and conditions of the Contract Documents, and

.2 be as fully responsible to the Province for acts and omissions of his Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by him.

The Contractor therefore agrees that he will incorporate the terms and conditions of the Contract Documents into all subcontract agreements he enters into with his Subcontractors.

.2 The Contractor agrees to employ those Subcontractors proposed by him on the List of Subcontractors and accepted by the Province at the signing of the Agreement.

.3 The Province may, for reasonable cause, object to the use of a proposed Subcontractor and require the Contractor to employ another Subcontractor.

.4 In the event that the Province requires a change from a proposed Subcontractor, the Contract Price shall be adjusted by the difference in cost and markup occasioned by such required change, except where such change is required due to noncompliance with the Contract Documents, in which case there shall be no change in Contract Price.

.5 The Contractor shall not be required to employ as a Subcontractor a person or firm to whom he may reasonably object.

.6 The Province may, upon reasonable request and at his discretion, provide to a Subcontractor information as to the percentage or quantity of the Subcontractor's work for which payment has been approved.

.7 Nothing contained in the Contract Documents shall create a contractual relationship between a Subcontractor and the Province.

5.2 OTHER CONTRACTORS

.1 The Province reserves the right to let separate contracts in connection with the Project of which the Work is part.

.2 Unless otherwise specified, the Province shall coordinate the work and insurance coverages of Other Contractors as they affect the Work of this Contract.

.3 The Contractor shall report to the Province, any apparent deficiencies in Other Contractor's work which would affect the work of this Contract. Failure by the Contractor to so report promptly, may invalidate any claims against the Crown by reason of the deficiencies of Other Contractors' work.

.4 The Province will take reasonable precautions to avoid labour disputes or other disputes on the project arising from the work of Other Contractors.

5.3 OBLIGATIONS TO AND CLAIMS OF THIRD PARTIES

.1 The Contractor shall, with respect to lawful obligations of and lawful claims against the Contractor or any Subcontractor arising from the Contract:

.1 discharge such obligations of and satisfy such claims against the Contractor, and

.2 ensure the discharge of such obligations of and the satisfaction of such claims against Subcontractors.

.2 The Contractor shall, when requested by Province, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in Article 5.3.1.

5.4 AUTHORITY OF THE CONSULTANT

.1 Where reference is made in the Contract Documents to the Province in respect of administrative duties, responsibilities and authority of the Province, the Consultant will have authority to act on behalf of the Province only to the extent provided in Article 5.5, unless otherwise modified by written agreement as provided in Article 5.4.2.

.2 The duties, responsibilities, and limitations of authority of the Consultant as set forth in Article 5.5 shall be modified or extended only with the written consent of the Province, the Contractor, and the Consultant.

5.5 ROLE OF THE CONSULTANT

.1 The Consultant will, to the extent set forth in this Article, provide administration of the Contract during the progress of the Work until Total Completion of the Work.

.2 The Consultant will visit the Place of the Work at appropriate intervals to become familiar with the progress and quality of the Work and to determine if the Work is proceeding in general conformity with the Contract Documents.

.3 If the Province and the Consultant agree, the Consultant will provide at the Place of the Work, one or more project representatives to assist in carrying out the Consultant's responsibilities.

.4 Based on the Consultant's observations and evaluation of the Contractor's applications for payment, the Consultant will recommend to the Province amounts to be paid to the Contractor in accordance with the Contract Documents, including deductions from, and withholding of, amounts payable.

.5 The Consultant will have authority to inspect work in accordance with Article 3.13 and reject work in accordance with Article 3.14.

.6 During the progress of the Work, the Consultant will furnish supplemental instructions to supplement the Contract Documents as required for the performance of the Work. Such supplemental instructions will be consistent with the intent of the Contract Documents and will not involve adjustment in the Contract Price or Contract Time.

.7 The Consultant will receive, review and take appropriate action upon all Contractor's submittals required by the Contract Documents.

.8 The Consultant will issue to the Contractor requests for proposals for changes in the Work, receive, review, and evaluate Contractor proposals for changes in the Work, and prepare Change Orders in accordance with the Contract Documents.

.9 The Consultant will conduct inspections of the Work to determine, in accordance with the Contract Documents, the dates of Interim Acceptance of the Work, Practical Completion of the Work if applicable, Final Acceptance of the Work, and Total Completion of the Work.

6. REQUIREMENTS OF CONTRACT

6.1 CONTRACT TIME

.1 Time and all time limits stated in the Contract Documents are of the essence of the Contract. Contractor shall perform work expeditiously and with adequate forces to complete the Work of the Contract within the time specified in the Contract Documents.

6.2 DELAYS

.1 If the Contractor is delayed in the completion of the work by force majeure, or by any Other Contractor or by anyone under the control of any one of them, or by changes ordered in the work, then the Contract Time shall be extended for such reasonable time as the Province may decide.

.2 If the Contractor is delayed in completion of the work by labour disputes, legal strikes, lockouts (including lockouts decreed or recommended by a recognized contractors' association for its members of which the Contractor is a member), fire, unusual delay by common carriers or unavoidable casualties or, without limiting any of the foregoing, by any cause of any kind whatsoever beyond the Contractor's control, then at the Province's discretion the Contract Time shall be extended for a period of time due to such delays.

6.3 WARRANTY

.1 Neither the final payment, nor any provision in the Contract Documents shall relieve the Contractor from responsibility for faulty materials or workmanship which appear within a period of one (1) year from the date of Interim Acceptance of the Work, or such other periods as may be specified for parts of the Work, and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom which appear within such periods.

.2 The Province shall give notice of observed defects promptly.

END OF SECTION

1. SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify the following Infrastructure standard documents as specified herein:

.1 Section 00 73 80 - Payment Conditions, 2016-03-15 Edition.

.2 Section 00 72 00 - General Conditions of Contract, 2017-02-22 Edition.

.3 Section 00 71 00 - Definitions.

Provisions which are not so modified remain in full force and effect.

2. PAYMENT CONDITIONS

Add the following article to Section 00 73 80 - Payment Conditions:

12. LIQUIDATED DAMAGES

.1 School jurisdictions, and ultimately the Province will suffer damages if the Contractor does not achieve Interim Acceptance of the Work by the date that it is required as set out in the Agreement Form. Such damages may be suffered as a result of having to lease alternative space for students, transporting students to alternative locations, or having to incur other costs in making alternative arrangements to accommodate students.

.2 Notwithstanding any clause, section or article of this Contract, the Province may, upon the date set for Interim Acceptance of the Work, in the Agreement Form, without prejudice to any other method of recovery, deduct all or part of the amount payable to the Province as liquidated damages for delay by Contractor, from any monies payable or which may become payable to the Contractor under the Contract.

.1 Therefore the Contractor, and if applicable, its surety, shall be liable for and shall pay to the Province, as liquidated damages for delay, the sum of twenty three thousand one hundred and forty dollars ($23,140.00) for each consecutive calendar month or part of a month that elapses after the date listed for Interim Acceptance on the Agreement Form.

.3 If applicable, the number of days of excusable delay pursuant to Force Majeure shall be subtracted from the total number of days of delay in calculating the liquidated damages.

.4 The parties agree that the specified amount of the liquidated damages represents their genuine pre-estimate of the particular damages arising from the delay.

.5 If there are insufficient monies remaining payable or to become payable to the Contractor under the Contract to permit deduction of the total amount of liquidated damages:

.1 the Contractor shall pay to the Province the difference between the amount deducted as liquidated damages from monies remaining payable or to become payable under the Contract and the total amount of liquidated damages, and

.2 if the Contractor fails to pay to the Province such amount due as liquidated damages within 30 Days from the date of written notification to do so, the Province may:

.1 if the Contractor has provided contract performance security in the form of a performance bond, exercise the provisions of the performance bond, or

.2 if the Contractor has provided contract performance security in the form of a security deposit, deduct such amount from the security deposit.

.6 The deduction or payment of liquidated damages shall not relieve the Contractor from its obligation to continue to complete the Work or from any other of its obligations and liabilities under the terms of this Contract.

3. GENERAL CONDITIONS OF CONTRACT

The following articles within Section 00 72 00 – General Conditions of Contract are revised as follows:

Article 1 – General

Delete Item 1.2 in its entirety, and insert a revised Item 1.2 as follows:

1.2 LAW OF THE CONTRACT

.1 Subject to article 4.3, this Contract shall be governed by an interpreted in accordance with the laws in force in Alberta and the parties irrevocably attorn to the exclusive jurisdiction of the courts of Alberta.

Delete Item 1.4 in its entirety, and insert a revised Item 1.4 as follows:

1.4 REPORTING OF CONFLICTS, ERRORS AND DISCREPANCIES

.1 The Contractor shall review the Contract Documents and shall report promptly to the Consultant and the Owner any error, inconsistency, or omission the Contractor may discover. Such review by the Contractor shall be undertaken with the standard of care described in Article 1.5 below. Except for its obligation to make such review and report the result, the Contractor does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. The Contractor shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the Contract Documents, which the Contractor could not reasonably have discovered through the exercise of the required standard of care. If the Contractor does discover any error, inconsistency, or omission in the Contract Documents, the Contractor shall not proceed with the work affected until the Contractor has received corrected or missing information from the Consultant.

.2 If, at any time, the Contractor finds errors, inconsistencies, or omissions in the Contract Documents or has any doubt as to the meaning or intent of any part thereof, the Contractor shall immediately notify the Consultant, and request clarification. Neither the Owner nor the Consultant will be responsible for the consequences of any action of the Contractor based on oral instructions.

.3 The Contractor shall obtain from the Province any dimensions required, but not indicated in figures in the Contract Documents nor calculable from figures in the Contract Documents. Scaling of drawings, for any purpose, shall be at the Contractor's risk.

Delete Item 1.5 in its entirety, and insert a revised Item 1.5 as follows:

1.5 RELATIONSHIP and COVENANT

.1 The relationship of the Contractor to the Province in performing the services under this Contract is that of an independent contractor, and nothing in this Contract is to be construed as creating and agency, partnership, joint venture or employment relationship between the Contractor and the Province.

.2 The Contractor covenants with the Province to cooperate with the Consultant and to provide its skill and judgment in furthering and protecting the interests of the Province during execution of the Work. The Contractor shall provide the Work in accordance with the Contract Documents and accepted construction practices. The Contractor shall employ its best efforts to perform the Work diligently and in an

expeditious, economical, and financially prudent manner, consistent with the best interests of the Province.

Article 2 – Province

Delete Item 2.1 in its entirety, and insert a revised Item 2.1 as follows:

2.1 PROVINCE'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, SUSPEND THE WORK OR TERMINATE THE CONTRACT

.1 If the Contractor should be adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the Contractor's insolvency or if a receiver is appointed because of the Contractor's insolvency, the Province, without prejudice to any other right or remedy the Province may have, by giving the Contractor or receiver or trustee in bankruptcy written notice, may:

.1 take the Work out of the Contractor's hands, or
.2 terminate the Contract, in accordance with Article 2.3.

.2 If the Contractor should: neglect to prosecute the Work, or fails or neglects to maintain the approved construction schedule provided pursuant to CONSTRUCTION SCHEDULE, or otherwise fails to comply with the requirements of the Contract Documents, and if the Province has given a written statement to the Contractor that sufficient cause exists to justify such action, the Province may notify the Contractor, in writing, that the Contractor is in default of the Contractor's contractual obligations and instruct the Contractor to correct the default in the five (5) Working Days immediately following the receipt of such notice.

.3 If the correction of the default referred to in Article 2.1.2 cannot be completed in the 5 Working Days specified or in such other time periods as may be subsequently stated in writing by the Owner, the Contractor shall be in compliance with the Province's instructions if the Contractor:

.1 commences the correction of the default within the specified time, and

.2 provides the Province, within the specified time, with an approved construction schedule for such correction, and

.3 corrects the default in accordance with the Contract terms and with such schedule.

.4 An "approved construction schedule" as referred to in Article 2.1.3.2. means a schedule approved by the Consultant and the Owner wherein the default can be corrected within the balance of the Contract Time and shall not cause delay to any other aspect of the Work or the work of other contractors, and in no event shall it be deemed to give a right to extend the Contract Time.

.4 If the Contractor fails to correct the default referred to in Article 2.1.2 in the time specified or subsequently stated in writing by the Owner, the Province without prejudice to any other right or remedy the Owner may have, may:

.1 correct such default and deduct the cost, including Owner's expenses, thereof from any payment then or thereafter due the Contractor, or

.2 if the Contractor has provided a performance bond, require the surety company to correct such default in accordance with the conditions of the performance bond, or

.3 take all or any part of the Work out of the Contractor's hands, or

.4 terminate the Contract, in accordance with Article 2.3.

.5 If the Owner terminates the Contractor's right to continue with the Work as provided in Articles 2.1.1 through 2.1.4, the Owner shall be entitled to:

.1 take possession of the Work and products at the premises, subject to the rights of third parties, utilize the construction equipment at the premises; finish the Work by whatever method the Owner may consider expedient, and

.2 withhold further payment to the Contractor until the Work is complete, and

.3 charge the Contractor the amount by which the full cost of finishing the Work as certified by the Consultant, including compensation to the Consultant for the Consultant's additional services and a reasonable allowance as determined by the Consultant to cover the cost of corrections to Work performed by the Contractor that may be required under WARRANTY, exceeds the unpaid balance of the Contract Price; and

.4 on expiry of the warranty period, charge the Contractor the amount by which the cost of corrections to the Contractor's work under WARRANTY exceeds the allowance provided for such corrections; and

.5 if the Contractor has provided contract performance security in the form of a performance bond, exercise the provisions of the performance bond in accordance with the conditions of such bond and the Contract Documents, or

.6 if the Contractor has provided contract performance security in the form of a security deposit, convert the security deposit to his own use; the amount realized shall be deemed to be an amount due from the Province to the Contractor under the Contract and any balance of such amount that remains after payment of all losses, damage, and claims of the Province and others shall be paid by the Province to the Contractor if in the Province's opinion, it is not required for the purposes of the Contract.

.6 The Contractor's obligations under the Contract as to quality, correction and warranty of the work performed by him up to the time of the Work being taken out of the Contractor's hands, shall continue after the Work is taken out of the Contractor's hands.

2.2 PROVINCE'S RIGHT TO SUSPEND WORK

Delete Item 2.2.1 in its entirety, and insert a revised Item 2.2.1 as follows:

.1 The Owner may suspend Work under this Contract at any time for any reason and without cause or liability upon giving the Contractor notice in writing to that effect.

Delete Item 2.2.4 in its entirety, and insert a revised Item 2.2.4 as follows:

.4 In such event, the Contractor shall be entitled to be paid for all Work performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon Products and Construction Equipment, but in no event shall the Contractor be entitled to be compensated for any indirect, special, or consequential damages incurred.

Delete Item 2.2.5 in its entirety, and insert a revised Item 2.2.5 as follows:

.5 In the event that the suspension continues for more than thirty (30) calendar days, the Contract shall be deemed to be terminated and the provisions of Article 2.3.2 shall apply.

Delete Item 2.2.6 in its entirety.

Delete Item 2.3 in its entirety, and insert a revised Item 2.3 as follows:

2.3 PROVINCE'S RIGHT TO TERMINATE CONTRACT

.1 In addition to the Owner terminating the Contractor's right to continue with the Work as provided in Articles 2.1.1 through 2.1.4, the Owner may terminate this Contract at any time for any reason without cause and without liability upon giving the Contractor fifteen (15) Working Days' notice in writing to that effect.

.2 In such event, the Contractor shall be entitled to be paid for all Work performed including reasonable profit, for loss sustained upon Products and Construction Equipment, but in no event shall the Contractor be entitled to be compensated for any loss of profit on unperformed portions of the Work, or indirect, special, or consequential damages incurred.

.3 When a notice referred to in Article 2.3.1 is received by the Contractor, the Contractor shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the Contract.

Article 3 – Contractor

Delete Item 3.8 in its entirety, and insert a revised Item 3.8 as follows:

3.8 EMPLOYMENT CONDITIONS

.1 The Contractor agrees and shall ensure that wages, hours of work and other conditions of employment of all persons employed by the Contractor, any Subcontractor and any Sub-subcontractor in the performance of any Work required by this Contract shall be in compliance with the requirements of the applicable law.

Article 4 – Province and Contractor

Add Item 4.3.3 as follows:

.3 Notwithstanding anything in the Contract Documents, any dispute regarding termination or suspension is limited to a claim for damages, setting aside a notice of termination being expressly excluded from Article 4.3.1.

Article 6 – Requirements of Contract

Delete Item 6.1 in its entirety, and insert a revised Item 6.1 as follows:

6.1 TIME

.1 Time and all time limits stated in the Contract Documents are of the essence. Contractor shall perform work expeditiously and with adequate forces to complete the Work of the Contract within the time specified in the Contract Documents.

Delete Item 6.2 in its entirety, and insert a revised Item 6.2 as follows:

6.2 DELAYS

.1 If the Contractor is delayed in the completion of the Work by Force Majeure then the Contract Time shall be extended for such reasonable time as the Province may decide.

2 No claim for delay shall be made and the Contract Time shall not be extended due to the effects of weather or arising from the Contractor's efforts to maintain the Contract schedule.

4. DEFINITIONS

Add the following definitions to Section 00 71 00 - Definitions:

"**Baseline Construction Schedule**" means the initial construction schedule set out in the detail specified in Section 01 11 05, Article 7.

"Critical Path" means the sequence of activities that add up to the longest overall duration to complete the Work. It is the shortest time possible to complete the Work. Any delay of an activity identified on the Critical Path directly impacts the Interim Acceptance date. The Work may entail several, parallel, near critical paths.

"Critical Path Method Format" means a schedule that illustrates the Critical Path and the near critical paths for the Work.

"Float" means the amount of time that a task can be delayed without causing a delay to subsequent tasks and task completion dates.

"Force Majeure" means an event that is beyond the control of the party relying on the Force Majeure, which directly delays or directly interrupts the performance of any obligation under this Agreement and is limited to:

.1 a natural disaster of overwhelming proportions (such as, but not limited to forest fire, tempest, earthquake, tsunami, or flood);

.2 war, government hostilities (whether war be declared or not), invasion, act of foreign enemies, government mobilisation, government requisition, or embargo;

.3 riot, rebellion, revolution, insurrection, or civil war;

.4 nuclear explosion, contamination by ionizing radiation, epidemic, or quarantine restriction; or

.5 act or threat of terrorism.

"**Mobilize**" means the Contractor completed the process of making the work site, set out in Section 01 11 00, ready for the Work including securing the site, providing electricity, and providing contributory items essential to the Work.

"Mobilization" means the Contractor has obtained all required insurance, bonds and permits; has completed all preparatory work necessary to support the movement of personnel, equipment, supplies, and incidentals to the project site; and has furnished and erected field offices and other facilities necessary for the commencement of the Work.

END OF SECTION

1. RELATED REQUIREMENTS

.1 Hold Harmless Agreement: General Conditions of Contract.

.2 Workers Compensation: General Conditions of Contract.

2. GENERAL REQUIREMENTS FOR INSURANCE

.1 Without restricting the generality of the hold harmless provisions of the General Conditions of Contract and without limiting his obligations or liabilities under the Contract, Contractor shall, unless otherwise specified, provide, maintain, and pay for the insurance coverages specified in this Section.

.2 Form: Insurance policies shall be placed with Insurers who comply with the Insurance Act (Alberta) and be in forms and amounts acceptable to Province. All required insurance shall be primary and shall not require the pro rata sharing of any loss by any insurer of the Province.

.3 Duration: Unless otherwise specified, required insurance coverages shall be maintained continuously from date of commencement of the Work until date of Final Acceptance of the Work by Province.

.4 Waiver of Recourse: Contractor waives all rights of recourse against Province for damages to Contractor's property.

.5 Deductible: Amount of deductible on any insurance provided by Contractor shall be reasonable and shall be subject to Province's approval.

.6 Notice of Cancellation of Policy: Each required policy, except for the automobile policy, shall be endorsed to provide the Province with not less than 30 Days advance written notice of cancellation including cancellations for non-payment of premium.

.7 Proof of Insurance: Prior to commencement of any activities on site, Contractor shall provide Province with proof that insurance coverages are in effect and meet specified conditions. Such proof shall be in the form of completed Infrastructure Certificates of Insurance (00 73 16B-BPL eForm, 00 73 16B-BPP eForm) as well as any other evidence of insurance required in this contract. In addition, Contractor shall at any time upon request, promptly submit to the Province a certified true copy of any insurance policy and shall otherwise provide proof of any required insurance, in a form acceptable to Province. Delivery to and examination by the Minister of any policy of insurance evidencing such insurance shall not relieve the Contractor of any of its obligations pursuant to the provisions of this Contract and shall not operate as a waiver by the Minister of any rights.

.8 Subcontractors' Insurance: Contractor shall ensure that his Subcontractors provide their own General Liability Insurance, Automobile Liability Insurance, where such risks exist, Aircraft and Watercraft Liability Insurance, and Other Insurance equivalent to that specified herein. With respect to General Liability Insurance, Contractor may alternatively provide such insurance on a wrap-up basis insuring himself, his Subcontractors, and anyone employed directly or indirectly by himself or his Subcontractors to perform a part of the Work.

.1 The Named Insureds on such wrap up liability policy shall be the Contractor, the Province and the respective school boards. Other insureds shall include all subcontractors, consultants and subconsultants involved in the Work, whether named or unnamed in the policy. Such policy must contain cross liability and severability of interest clauses. Such wrap up liability insurance policy must not exclude loss or damage to existing structures that do not fall within the scope of the construction project.

.2 The requirements under Article 3 – General Liability Insurance shall apply to such wrap up liability insurance and in addition, the policy shall contain completed operations liability coverage, which shall remain in effect for a period of 12 months after the date of Interim Acceptance of the Work.

.3 If a wrap up liability insurance policy is obtained, upon Interim Acceptance of the Work, the Contractor shall obtain and maintain General Liability insurance in compliance with 3.1 and shall ensure that all of his Subcontractors provide their own General Liability insurance in compliance with 3.1. This insurance shall remain in place until Final Acceptance of the Work.

3. GENERAL LIABILITY INSURANCE

.1 Contractor shall provide General Liability Insurance with limits of not less than $5,000,000.00 inclusive per occurrence and in aggregate with respect to products and completed operations, insuring against bodily injury, personal injury, and property damage including loss of use thereof. To achieve the desired limit, primary insurance and umbrella or excess liability insurance may be used. Such liability insurance policy must not exclude loss or damage to existing structures that do not fall within the scope of the construction project. Such insurance shall include but not be limited to coverage for:

.1 Products and Completed Operations liability.
.2 Non-owned automobile liability (minimum sub-limit $2,000,000).
.3 Broad form property damage endorsement.

.2 Where such further risks exist, General Liability Insurance shall also include coverage for the following, to limits specified in 3.1, unless otherwise noted:

.1 Elevator and hoist liability.
.3 Operation of attached machinery.
.4 Forest fire-fighting expenses (minimum sub-limit $250,000).

.5 Sudden and accidental pollution coverage (as per IBC 2313 or similar. Minimum sub-limit $1,000,000).

.3 General Liability Insurance shall:

.1 **not** include Province as a named insured, and
.2 shall be maintained continuously until twelve months following date of Interim Acceptance of the Work or until date of Final Acceptance of the Work, whichever is later.

4. AUTOMOBILE LIABILITY INSURANCE

.1 Contractor shall provide Automobile Liability Insurance on all vehicles owned or licensed in Contractor's name, with limits of not less than $2,000,000.00 inclusive per occurrence for bodily injury, death, and property damage.

5. AIRCRAFT AND WATERCRAFT LIABILITY INSURANCE

.1 Where such risks exist, Contractor shall provide Aircraft Liability Insurance and Watercraft Liability Insurance on all aircraft and watercraft, owned, operated or licensed in Contractor's name and non-owned aircraft and watercraft used in Contractor's operations, with limits of not less than $5,000,000 inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof.

6. COURSE OF CONSTRUCTION AND BOILER AND MACHINERY/EQUIPMENT BREAKDOWN INSURANCE

.1 Contractor shall provide Course of Construction Insurance in the form of an “all risks” Builder's Risk Policy on a replacement cost basis, insuring not less than the sum of the amount of the Contract Price and the full value of Products specified to be provided by Province for incorporation into the Work. Such insurance shall include coverage for all modular classrooms on a replacement cost basis (including transportation and installation costs), which is not less than $ 0.00 per unit.

.1 This insurance requirement cannot be satisfied with an installation floater.

.2 The named insureds on the policy shall be the Contractor, the Province and the respective school boards. Other insureds shall include all subcontractors, consultants and subconsultants, whether named or unnamed in the policy, and all others having an insurable interest in the Work.

.3 The Province as a named insured must have the right to make a claim directly to the insurer.

.4 Coverage shall extend to any location and while in transit and shall be maintained continuously until date of Interim Acceptance of the Work.

.2 Where such risks exist, Contractor shall provide Boiler and Machinery/Equipment Breakdown Insurance, insuring not less than the replacement value of the Work. Such insurance shall include coverage for all modular classrooms on a replacement cost basis (including transportation and installation costs), which is not less than $0.00 per unit.

.1 Such risk shall be deemed to exist when the Work includes any boiler, fired or unfired pressure vessel, refrigerating or air conditioning system, mechanical or electrical machine or apparatus used for the generation, transmission or utilization of mechanical or electrical power.

.2 The insurance coverage shall not be less than the insurance provided by a comprehensive boiler and machinery policy.

.3 The policy shall have the same limits as specified for the course of construction policy and shall be written on a replacement cost basis and shall cover all boilers, pressure vessels and other objects insurable under a standard boiler and machinery policy.

.4 The policy shall include:

.1 The Contractor, the Province and the respective school boards as named insureds,

.2 All subcontractors, consultants and subconsultants of every tier, whether named or unnamed in the policy, and all others having an insurable interest in the Work as other insureds.

.5 The policy shall be maintained continuously until date of Interim Acceptance of the Work or until such objects have been installed, tested and accepted by the Province, whichever is the latest.

7. PROPERTY COVERAGE FOR MODULAR CLASSROOMS

.1 The Contractor shall be responsible for all loss or damage, on a replacement cost basis (including transportation and installation costs), to the modular classrooms until Final Acceptance of the Work.

8. ASBESTOS ABATEMENT / ENVIRONMENTAL IMPAIRMENT LIABILITY INSURANCE

.1 When asbestos abatement forms part of the work of the project provide Asbestos Abatement / Environmental Impairment Liability Insurance coverage specified in Section 00 73 16.90 - Asbestos Abatement / Environmental Impairment Liability Insurance.

9. OTHER INSURANCE

.1 Contractor shall provide, maintain and pay for any additional insurance required to be provided by law, or which he considers necessary to cover risks not otherwise covered by insurance specified in the Contract Documents.

END OF SECTION

Alberta Infrastructure

Certificate of Liability Insurance
(Standard Form)

INSTRUCTIONS:

- This certificate must be completed by the Contractor's insurance agent, broker or insurer and submitted to Infrastructure **prior to commencement of any activities** by the Contractor on site. Refer to the Insurance Conditions in the Contract Documents for detailed description of insurance requirements, including required coverages.
- Insurer's or broker's certificate of insurance form is **not acceptable** in lieu of this Infrastructure form.
- It is understood that this certificate is issued as information and accurately depicts coverages afforded by the polices described herein.
- Submit completed certificate to: **Tender Administrator**
  Infrastructure
  Procurement Services
  2nd Floor (2700), 6950 – 113 Street NW
  Infrastructure Building
  Edmonton, Alberta T6H 5V7

Identification of Insured

Contractor's Name		
Contractor's Address		
City / Town	Province	Postal Code

Identification of Contract

Contract Name (location and description of the Work as it appears in the Contract Documents)	Project ID (from Contract Documents) Contract Number Plan Number

General Liability Insurance

Complete either the General Liability or the Wrap Up Liability Section, whichever is applicable.

General Liability Insurer's Name		
General Liability Policy Number	Expiry Date ____ / ___ / ___ year month day	Limit of Liability (per occurrence)
Umbrella or Excess Liability Insurance Insurer's Name		
Umbrella or Excess Liability Insurance Policy Number (if applicable)	Expiry Date ____ / ___ / ___ year month day	Limit of Liability (per occurrence)

The following is not an exhaustive list of insurance requirements for this coverage under the Contract but are those for which we require confirmation at this time.

Please check the following boxes to confirm that the General Liability Policy and, if applicable, Umbrella or Excess Liability Insurance Policy contains the following **required** coverages or conditions:

- ☐ Non-owned automobile liability (minimum sub-limit $2,000,000)
- ☐ Broad form property damage endorsement
- ☐ Products and Completed Operations Liability

Alberta Infrastructure

Certificate of Liability Insurance
(Standard Form)

Wrap Up Liability Insurance

Complete either the General Liability or the Wrap Up Liability Section, whichever is applicable.

Insurer's Name		
Policy Number	Expiry Date ____ / __ / __ year month day	Limit of Liability (per occurrence)
List the Named Insureds on the policy		

The following is not an exhaustive list of insurance requirements for this coverage under the Contract but are those for which we require confirmation at this time.

Please check the following boxes to confirm that the Wrap Up Liability Insurance Policy contains the following **required** coverages and conditions:

- ☐ Policy to remain inforce until Interim Acceptance of the Work / Substantial Performance of the Work.
- ☐ Non-owned automobile liability (minimum sub-limit $2,000,000)
- ☐ Broad form property damage endorsement
- ☐ Infrastructure, as a named insured, has a right to make a claim directly to the insurer
- ☐ Completed operations coverage remains in effect for 12 months after the date of Interim Acceptance of the Work / Substantial Performance of the Work.

Certification

The undersigned hereby certifies that:

- The policies described herein, subject to their terms, conditions, and exclusions, have been issued to the named insured and are in force at this time.
- Coverages afforded under said policies will not be cancelled, including for non-payment of premium, unless thirty (30) days advanced written notice has been given Infrastructure at the address shown on page 1 of this form and each of the policies have been endorsed to this effect.
- The undersigned is an authorized representative of each of the insurance companies listed herein, and has full knowledge of the facts set forth herein and believes them to be true.

Name of Issuing Agency			
Address of Issuing Agency			
City / Town	Province	Postal Code	Telephone No.
Name of Authorized Representative (print or type)	Signature of Authorized Representative		Date of Issue

Certificate of Property Insurance
(Standard Form)

INSTRUCTIONS:

- This certificate must be completed by the Contractor's insurance agent, broker or insurer and submitted to Infrastructure **prior to commencement of any activities** by the Contractor on site. Refer to the Insurance Conditions in the Contract Documents for detailed description of insurance requirements, including required coverages.
- Insurer's or broker's certificate of insurance form is **not acceptable** in lieu of this Infrastructure form.
- It is understood that this certificate is issued as information and accurately depicts coverages afforded by policies described herein.
- Do not modify or alter this certificate except to enter required information in spaces provided.
- Submit completed certificate to: **Tender Administrator**
  Infrastructure
  Procurement Services
  2nd Floor (2700), 6950 – 113 Street NW
  Infrastructure Building
  Edmonton, Alberta T6H 5V7

Identification of Insured

Contractor's Name		
Contractor's Address		
City / Town	Province	Postal Code

Identification of Contract

Contract Name (location and description as it appears in the Contract Documents)	Project ID (from Contract Documents) Contract Number Plan Number

Builder's Risk Insurance

Insurer's Name		
Policy Number	Expiry Date _____ / __ / __ year month day	Total Insured Value

Limits of Liability

$_____ ☐ At Place of Work

$_____ ☐ At any other location

$_____ ☐ In transit

List the Named Insureds on the policy

Alberta Infrastructure

Certificate of Property Insurance
(Standard Form)

Builder's Risk Insurance (Cont'd)

The following is not an exhaustive list of insurance requirements for this coverage under the Contract but are those for which we require confirmation at this time.

Please check the following boxes to confirm that the Builder's Risk Insurance Policy contains the following **required** coverages and conditions:

- ☐ All risks Builder's Risk policy
- ☐ Covers Project on replacement cost basis
- ☐ Infrastructure, as a named insured, has the right to make a claim directly to the insurer
- ☐ Primary Insurance, **not** requiring pro rata loss sharing with any other insurers of the Province
- ☐ Includes the following as Additional or Other Insureds: subcontractors, consultants. sub-consultants of every tier and all others with an insurable interest in the Work

Boiler and Machinery / Equipment Breakdown Insurance

Insurer's Name		
Policy Number	Expiry Date ____ / __ / __ year month day	Limit of Liability (per occurrence)
List the Named Insureds on the policy		

Please check the following boxes to confirm that the Boiler and Machinery Insurance Policy contains the following **required** coverages and conditions:

- ☐ All risks coverage
- ☐ Infrastructure, as a named insured, has the right to make a claim directly to the insurer
- ☐ Comprehensive boiler and machinery policy
- ☐ Covers Project on a replacement cost basis
- ☐ Primary Insurance, **not** requiring pro rata loss sharing with any other insurers of the Province
- ☐ Includes the following as Additional or Other Insureds: subcontractors, consultants. sub-consultants of every tier and all others with an insurable interest in the Work

Certification

The undersigned hereby certifies that:

- The policies described herein, subject to their terms, conditions, and exclusions, have been issued to the above named insured and are in force at this time.
- Coverages afforded under said policies will not be cancelled including for non-payment, unless thirty (30) days advance written notice has been given to Infrastructure at the address shown on page 1 of this form and each of the policies has been endorsed to this effect.
- The undersigned is an authorized representative of each of the insurance companies listed herein, and has full knowledge of the facts set forth herein and believes them to be true.

Name of Issuing Agency			
Address of Issuing Agency			
City / Town	Province	Postal Code	Telephone No.
Name of Authorized Representative (print or type)	Signature of Authorized Representative		Date of Issue

1. RELATED INSURANCE REQUIREMENTS

.1 Related Insurance requirements are specified in:

.1 Section 00 73 16.20B - Insurance Conditions – School Projects 0.25M to 10M.

2. ASBESTOS ABATEMENT / ENVIRONMENTAL IMPAIRMENT LIABILITY INSURANCE

.1 Contractor, or Subcontractor, when applicable, shall provide Asbestos Abatement/Environmental Impairment Liability insurance with limits of no less than $5,000,000.00 per occurrence. Such insurance shall include all operations associated with hazardous materials removal and shall be written on an occurrence basis form. A "claims made" insurance policy is not acceptable.

.2 Prior to commencement of asbestos abatement activities on site, Contractor shall provide Owner with proof that insurance coverage is in effect and meets specified conditions in the form of a completed Infrastructure Asbestos Abatement Liability Insurance Certificate 00 73 16B-ALC eForm

END OF SECTION

Insurance Certificate for Asbestos Abatement Liability

INSTRUCTIONS:

- This certificate must be completed by the Contractor's insurance agent, broker or insurer and submitted to Infrastructure **prior to commencement of any activities** by the Contractor on site. Refer to the Insurance Conditions in the Contract Documents for detailed description of insurance requirements, including required coverages.
- Insurer's or broker's certificate of insurance form is **not acceptable** in lieu of this Infrastructure form.
- It is understood that this certificate is issued as information and accurately depicts coverages afforded by policies described herein.
- Submit completed certificate to: **Tender Administrator**
  Infrastructure
  Procurement Services
  2nd Floor (2700), 6950 – 113 Street NW
  Infrastructure Building
  Edmonton, Alberta T6H 5V7

Identification of Insured

Contractor's Name		
Contractor's Address		
City / Town	Province	Postal Code

Identification of Contract

Contract Name (location and description as it appears in the Contract Documents)	Project ID (from Contract Documents) Contract Number Plan Number

Asbestos Abatement Liability Insurance

Complete either the Asbestos Liability Insurance or the Environmental Impairment Liability Section, whichever is applicable.

Insurer's Name		
Policy Number	Expiry Date _____ / ___ / ___ year month day	Limit of Liability (per occurrence)

Please check the following boxes to confirm that the Asbestos Abatement Liability Insurance Policy is written on the following basis:

☐ Occurrence basis

☐ Includes all operations associated with asbestos abatement and hazardous material removal.

Alberta Infrastructure

Insurance Certificate for Asbestos Abatement Liability

Environmental Impairment Liability Insurance

Complete either the Asbestos Liability Insurance or the Environmental Impairment Liability Section, whichever is applicable.

Insurer's Name		
Policy Number	Expiry Date _____ / ___ / ___ year month day	Limit of Liability (per occurrence)

Please check the following boxes to confirm that the Environmental Impairment Liability Insurance Policy is written on the following basis:

☐ Occurrence basis

☐ Includes all operations associated with asbestos abatement and hazardous material removal.

Certification

The undersigned hereby certifies that:

- The policies described herein, subject to their terms, conditions, and exclusions, have been issued to the above named insured and are in force at this time and contain the coverage and terms shown herein.
- Coverages afforded under said policies will not be cancelled, including for non-payment of premium, unless thirty (30) days advance written notice has been given to Infrastructure at the address shown on page 1 of this form and each of the policies has been endorsed to this effect.
- The undersigned is an authorized representative of each of the insurance companies listed herein, and has full knowledge of the facts set forth herein and believes them to be true.

Name of Issuing Agency			
Address of Issuing Agency			
City / Town	Province	Postal Code	Telephone No.
Name of Authorized Representative (print or type)	Signature of Authorized Representative		Date of Issue

1. RELATED REQUIREMENTS

.1	General Conditions of Contract	Section 00 72 00.
.2	Workers' Compensation Board submittals:	Section 01 33 00.
.3	Contract Price breakdown:	Section 01 33 00.
.4	Cash flow forecast:	Section 01 33 00.

2. BASIS OF PAYMENT

.1 When payment is on the basis of a Stipulated Price Arrangement, amounts claimed by Contractor for progress payments shall be consistent with the approved Contract Price breakdown.

.2 When payment is on the basis of a Unit Price Arrangement, amounts claimed by Contractor for progress payments shall be based on the Contract Unit Prices.

3. STATUTORY DECLARATION FORM

.1 Use the AI/MS Form 00 73 80B-A eForm – Statutory Declaration of Payment Distribution form when submitting applications for payment which is available at: http://www.infrastructure.alberta.ca/Content/docType486/Production/00_73_80B_A_eForm.pdf .

4. PROGRESS PAYMENTS

.1 Contractor shall submit monthly application for payment to the Province.

.2 Application for payment shall be dated the last day of the payment period agreed to with the Province and the amount claimed shall be for the value, at that date and for that payment period, of:

.1 work performed, including labour provided and material supplied and set in place, and

.2 material stored at the Place of the Work, but not incorporated into the Work.

.3 Contractor shall submit with application for payment:

.1 data broken down into general requirements and trade scopes on a line-by-line basis as per the approved contract price breakdown as required under Section 01 33 00 to permit the Province to evaluate amount claimed,

.2 completed statutory declaration form with second and subsequent applications for payment, and

.3 any additional information requested by the Province.

.4 The Province will review application for payment and may make adjustments to amount claimed.

.1 Subject to receiving all documents and information as set out herein the Province will notify the Contractor of all adjustments to the application for payment on a line by line basis within 13 calendar days.

.2 If adjustments to the application for payment have been made, the Contractor shall adjust the application for payment with the noted adjustments and submit the updated application directly to the Province within 3 calendar days of notification of adjustments.

.3 The Contractor shall adjust future application for payments based on the noted adjustments.

.5 Subject to receiving all documents and information as set out herein, and subject to any deductions, set-off, holdback, and withholdings permitted by this Contract, the Province will make payments on application for payment, as adjusted if applicable, on or before 30 calendar days after the initial receipt of the application for payment and as per Article 4.3 to the satisfaction of the Province.

.6 Subject to any deductions, set-off, holdback, and withholdings permitted by this Contract, should either party fail to make payment as they become due under the terms of the Contract or in an award by arbitration, interest on such unpaid amounts shall become due and payable until payment at two percent (2%) per annum above the prime rate. The interest rate shall be the prime rate of interest quoted by the Canadian Imperial Bank of Commerce (CIBC).

5. HOLDBACK

.1 Notwithstanding any article of this Contract, the Province will hold back 10% from each progress payment in addition to any other any deductions, set-off, and withholdings permitted by this Contract.

.2 Contractor may submit to the Province written application for payment of holdback monies after attaining the Letter of Interim Acceptance of the Work.

.3 Further to the application of payment, after a period of 45 days from the date of the Letter of Interim Acceptance of the Work, the Contractor shall obtain and submit the following:

.1 Letter of clearance from Workers' Compensation Board,

.2 completed statutory declaration form, and

.3 any additional information requested by the Province.

.4 Amount of holdback monies payable after the Province has issued a Letter of Interim Acceptance of the Work shall be subject to any deductions, set-off, and withholdings permitted by this Contract.

6. WITHOLDINGS AND DEDUCTIONS

.1 The Province may withhold all or part of any amount payable to Contractor in order to protect the Province or third parties from loss due to:

.1 in the opinion of the Province evidence of the Contractor's:

.1 failure to make payments to Subcontractors or for labour, materials or equipment,

.2 failure to ensure that Subcontractors make payments to Sub-subcontractors or for labour, materials or equipment,

.3 failure to complete any part of the Work within the ~~Contract~~ time agreed by the Province,

.4 inability to complete the Work for the unpaid balance of the Contract Price, or

.5 failure to perform the Work in accordance with the Contract Documents,

.2 Notwithstanding any clause in this Contract, pursuant to the *Public Works Act* (Alberta) the Province may withhold funds from any amount for which the Contractor submits an invoice or a request for payment in an amount:

.1 sufficient to pay a claim made pursuant to the *Public Works Act* (Alberta);

.2 as determined by the Province, acting reasonably; or

.3 sufficient to pay more than one of the above.

.3 Notwithstanding any Article in this Contract, the Province may withhold funds from any amount for which the Contractor requests payment, in addition to other deductions, holdback, set-off, and withholdings permitted by this Contract, in an amount:

.1 for which the Consultant adjusts an application for payment for work the Consultant deems, on a line-by-line basis, has not been sufficiently completed for the amount claimed;

.2 equal to that which is the subject of the Dispute Resolution Process pursuant to this Contract;

.3 up to three times the Province’s estimate of the cost to the Province of remedying Work not performed in accordance with this Contract including non-conforming Work that may have been accepted under a previous payment;

.4 up to three times the Province's estimate of the cost to the Province of remedying any defects described in the Letter of Interim Acceptance of the Work;

.5 of such sums as permitted by law;

.6 of such sums as may be required to satisfy:

.1 any unpaid and overdue account that is enforceable against the Province,

.2 any penalty, fee, order, award, or judgment which may be enforced by the Court of Queen's Bench of Alberta,

.3 other third party claims related to the Work, or

.4 costs incurred by the Province to satisfy any of the matters noted in this Contract plus costs on a solicitor and own client basis; or

.7 as set out or permitted in more than one section or Article of this Contract.

.4 Notwithstanding any section of this Contract, the Province may deduct from all payments to the Contractor such amounts as are required by the *Income Tax Act (Canada)*.

.5 Without limiting the application of Article 12 Set-Off, the Contractor irrevocably grants to the Province the right to claim against or call upon the withholding and, without limitation, set-off, out of any money due or payable at any time to the Contractor by the Province, in order to recover any overpayment to the Contractor or to recover any other sums which are due and payable to the Province by the Contractor.

7. PROGRESSIVE PAYMENT OF HOLDBACK

.1 Payment of holdback for a Subcontract may be requested as set out in the *Builders' Lien Act*. When the Contractor or a Subcontractor is of the opinion that the work of that Subcontractor is substantially performed as described in the *Builders' Lien Act* (Alberta) for Subcontractor's part of the Work, the Contractor shall deliver to the Province, with a copy to the Consultant and the Subcontractor a certificate of substantial performance of the Subcontractor's portion of the work, complete with the issue date, for verification by the Province.

.2 The Province will review that portion of the work and will promptly, and in any event, no later than 20 calendar days after receipt of the certificate of substantial performance of the Subcontractor's portion of the work:

.1 verify the validity of the certificate of substantial performance of the Subcontractor's portion of the Work and advise the Subcontractor, the Contractor and the Consultant, in writing, or

.2 advise the Subcontractor, the Contractor and the Consultant, in writing, that the Subcontractor portion of the work is not substantially performed and give reasons why.

8. PAYMENT OF HOLDBACK

.1 After the Province verifies the certificate of Substantial Performance of the Work, as set out in Section 01 77 20 or article 7 above (Progressive Payment of Holdback):

1. on expiry of a period of 45 calendar days from the date of the certificate of Substantial Performance of the Work,
2. any builders' lien has been removed from the relevant land title,
3. any *Public Works Act* claims, or other third party claims related to the Work and received by the Province, being resolved or addressed and a course of action being agreed to between the Province and the Contractor, the Contractor shall, with the Contractor's next regular application for payment, submit:

.1 an application for payment of the Contractor's or Subcontractor's portion of the holdback amount using Infrastructure's Holdback Release form which is available at http://www.infrastructure.alberta.ca/3590.htm, and

.2 an AI/MS Form of 'Statutory Declaration' completed by the Subcontractor,

.3 Worker's Compensation Board Clearance Letter,

.4 Contractor Letter of Declaration, and

.5 Proof of posting certificate of Substantial Performance.

.6 Notwithstanding the provisions of the preceding paragraphs, and notwithstanding the wording of such certificates, the Contractor shall ensure that such Subcontract work or Products are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when such certificates were issued.

.7 In accordance with Section 00 72 00, Article 6.3 – Warranty, substantial performance of a Subcontractor's work or subsequent payment of its holdback does not relieve the Subcontractor of its warranty obligations for a period of one (1) year from the date of Interim Acceptance of the Work, or such other periods as may be specified for parts of the Work.

9. FINAL PAYMENT

.1 The unpaid balance of the Contract Price will be payable by the Province to the Contractor provided:

.1 the Province has issued a Letter of Final Acceptance of the Work,

.2 any disputes have been resolved or addressed, and a course of action agreed to between the Province and Contractor,

.3 third party claims received by the Province have been resolved, or addressed and
a course of action agreed to between the Province and Contractor, and

.4 final adjustment of accounts has been rendered and agreed to between the Province and Contractor.

.2 Contractor shall submit written application for final payment, including:

.1 Letter of clearance from Workers' Compensation Board,

.2 completed statutory declaration form, and

.3 statement of final adjustment of accounts.

10. FEDERAL GOODS AND SERVICES TAX

.1 Each application for payment shall exclude any amount for federal Goods and Services Tax.

.2 The Province represents and warrants that, as the purchaser of the Services provided under this Contract, no amount payable under this Contract is subject to the Goods and Services Tax (GST) or Harmonized Sales Tax (HST) under Part IX of the Excise Tax Act (Canada) as amended. The Government of Alberta’s GST Registration Number is 1240 72513 RT0001.

11. TITLE TO AND ACCEPTANCE OF WORK

.1 Contractor warrants that title to work and materials covered by any application for payment will pass to the Province, at the time of payment, free and clear of all claims, interests and encumbrances.

.2 Except where caused directly and specifically by the Province withholding any amount payable under this Agreement (not including any amount disputed by the Province in good faith), the Contractor shall promptly pay all proper accounts for work done or materials furnished under all contracts it enters into relating to the Work, excepting those sums required to be retained under the provisions of any applicable statute of Alberta, and shall not by any act or omission cause, encourage, suffer or allow any lien or claim under any such statute or in equity to be made against the Province or a school jurisdiction or be filed or registered against the Place of the Work by reason of work, services or materials supplied or claimed to have been supplied for the Work. The Contractor shall at its own expense promptly take all steps required to effect a discharge of any lien or deal with any claim so filed or registered.

.3 Contractor further warrants that materials, stored at the Place of the Work and for which payment has been received, shall not be removed from the Place of the Work and shall be kept secure and protected.

.4 Payments made by the Province shall not be construed as an acceptance that the Work, Products, or any part thereof is complete, is satisfactory or is in accordance with the Contract Documents.

12. SET-OFF

.1 The Province is entitled to set-off against any payment due and owing to the Contractor or against any withholding, only an amount:

.1 finally determined (that is, no longer subject to the Dispute Resolution Procedure) to be payable by the Contractor to the Province under this Agreement; or

.2 paid by the Province under and in accordance with any statute in respect of any lien or claim arising from any act or omission of the Contractor, or those for whom it is legally responsible, in relation to the Work, or by reason of work, services or materials supplied or claimed to have been supplied for the Work.

.2 The Province, upon becoming aware that it is or may become obligated to pay and before paying an amount contemplated by Article 10.1.2 such that a right of set-off may arise under Article 10.1.2, shall give the Contractor such advance notice as may be practicable in the circumstances (without exposing the Province to any risk of being obliged to pay the same amount twice), with a view to affording Contractor an opportunity to dispute (provided the Province is satisfied the dispute is bona fide), or make arrangements to remove or eliminate the lien or claim.

END SECTION

Alberta Infrastructure

Statutory Declaration
of Payment Distribution

Identification of Contract

Contract Name (location and description of the Work as it appears in the Contract Documents)	Contract ID: _____ Date of this application for Payment: _____ Month _____ Day _____ Year Date of last (immediate preceding) application for payment for which payment has been received: _____ Month _____ Day _____ Year

Identification of Declarant (person making the declaration)

Full Name of Declarant		Position or Title (with Contractor)	
Legal Name of Contractor (the "Contractor")		Trade or Operating Name of Contractor, if applicable	
Business Address			
City or Town	Province		Postal Code

Declaration

I, the undersigned, solemnly declare that as of the date of this application for payment, I am an authorized signing officer or partner of the Contractor named in the Contract identified above, and as such have authority to bind the Contractor, and further declare that:

.1 All the Contractor's lawful obligations, in respect of workers and in respect of labour and materials contracted for and performed before the date of the last payment received (as identified above), are fully discharged, except for hold back monies properly retained payments deferred by lawful agreement, or amounts withheld by legitimate dispute as clearly identified to the party to whom the funds have been withheld;

.2 All payments required to be made by the Contractor have been made in full including all previous Progressive Holdback Payments (if any), and these payments were made within 10 calendar days from the date of last payment received by the Contractor on this Contract;

.3 No liens related to the Work of this Contract are registered against the lands upon which the Work is performed; and

.4 The Contractor has received from its Subcontractors a declaration consistent with this declaration; and

.5 I have personal knowledge of the contract identified and verily believe the facts stated in this Statutory Declaration to be true.

I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

Making a false or fraudulent declaration is a contravention of the Criminal Code of Canada, and could carry, upon conviction, penalties including fines, imprisonment, or both.

_____
Signature of declarant

Attestation (to be completed by a person empowered to receive declarations, e.g. Commissioner of Oaths, Notary Public, etc.)

DECLARED before me at _____ this _____ day of _____ 20 ___
City/Town and Province

_____
Signature of person before whom declaration is made

_____
Authority to receive solemn declarations

_____
Name (please print)

Any changes or corrections on this Statutory Declaration must be initialed by the Individual before whom the declaration is made.

1. RELATED SECTIONS

.1	Payment Conditions:	Section 00 73 80.
.2	Construction Schedules:	Section 01 32 16.
.3	Contract Price Breakdown:	Section 01 33 00.
.4	Contractor Start-Up Report Forms:	Section 01 33 35.
.5	Contract Acceptance Procedures:	Section 01 77 20.
.6	Facility Start-Up Procedures:	Section 01 91 01.

2. FACILITY START-UP COSTS

.1 Facility Start-Up costs means all Contractor costs, including Subcontractor and Sub-subcontractor costs for performing Facility Start-Up work and providing related services as specified in Section 01 91 01.

.2 Include Facility Start-Up costs in Contract Price.

3. FACILITY START-UP AMOUNTS

.1 Notwithstanding payment conditions specified in Section 00 73 80, and regardless of actual Facility Start-Up costs, portions of the Contract Price, in the following amounts, shall not become due and payable except as specified in Article 4.:

.1	Mechanical subcontract portion:	$25,000.00
.2	Electrical subcontract portion:	$20,000.00
.3	Prime Contract portion:	$40,000.00
	Total:	$ 85,000.00

.2 Incorporate amounts specified above as separate line items in Contract Price breakdown specified in Section 01 33 00.

4. FACILITY START-UP PAYMENTS

.1 Facility Start-Up payments will be made upon completion of each sub-phase of Facility Start-Up as follows:

.1 Preparation for Facility Start-Up: 5% of total amount specified in 3.1 will be payable by the Province to Contractor provided that the Province has approved Facility Start-Up sub-schedules specified in Section 01 32 16 and Contractor Start-Up report forms specified in Section 01 33 35.

.2 Contractor Start-Up: 25% of total amount specified in 3.1 will be payable by the Province to Contractor provided that the Province has issued a Letter of Interim Acceptance.

.3 Performance Testing: 50% of total amount specified in 3.1 will be payable by the Province to Contractor provided that the Province has issued a Letter of Practical Completion.

.4 Fine Tuning: 20% of total amount specified in 3.1 will be payable by the Province to Contractor provided that the Province has issued a Letter of Final Acceptance.

.2 Payments specified in 4.1 shall not be subject to adjustment, regardless of actual Facility Start-Up costs.

.3 Facility Start-Up payments are separate from progress payments and payment of holdback specified in Section 00 73 80.

.4 Facility Start-Up payments are not subject to holdback.

5. PARTIAL PAYMENT FOR FACILITY START-UP

.1 When partial utilization of the Work by the Province is required and partial payment for Facility Start-Up is a condition of such partial utilization, the applicable conditions specified in this Section shall apply to the part of the Work to be utilized.

END OF SECTION

1. GENERAL

.1 The Public Works Act (Alberta) applies to this Project.

.2 The Public Works Act allows any person who has not received proper payment, regardless of their level in the contracting chain, to make a claim directly to the Province.

.3 This Section specifies procedures for making a claim under the Public Works Act.

2. POSTING OF CLAIMS INFORMATION

.1 Contractor shall display, at the Place of the Work, on a bulletin board of adequate size, a copy of each of the following:

.1 This Specification Section.

.2 AI/MS Form 00 73 90B A eForm - Statement of Public Works Act Claim (http://www.infrastructure.alberta.ca/Content/docType486/Production/00_73_90B_A_eForm.pdf).

.3 Labour and Material Payment Bond, if provided under the Contract.

.2 Protect display in plastic sleeves and maintain in legible condition for duration of Contract.

3. CLAIMS PROCEDURE

.1 Complete Statement of Public Works Act Claim form (copy appended to this Section) and submit form by **"Registered Mail"** to address indicated on the form not later than 45 Days after the last day on which labour, equipment, material or services giving rise to claim were provided.

.2 Province will acknowledge receipt of claim in writing.

.3 The claimant shall, if requested by Province, submit additional evidence in support of claim.

4. EXTRACT FROM PUBLIC WORKS ACT

Notice of claim

14(1) When

(a) a person provides labour, equipment, material or services used or reasonably required for use in the performance of a contract with the Crown for the construction, alteration, demolition, repair or maintenance of a public work, and

(b) that person is not paid by the party who is legally obliged to pay that person,

that person may send a notice of that person's claim to the Province, or agent of the Crown that is responsible for the public work.

(2) *Omitted from this extract. Not applicable to this Contract.*

(3) The notice of claim, other than for a claim referred to in subsection (2), must

(a) be sent by registered mail not later than 45 days after the last day on which the labour, equipment, material or services were provided, and

(b) set out the nature and amount of the claim in a form satisfactory to the Crown.

END OF SECTION

Alberta Infrastructure

Statement of Public Works Act Claim

Submit completed claim form by **"Registered Mail"** to:

Tender Administrator
Procurement Section,
Alberta Infrastructure,
2nd Floor, 6950-113 Street, Edmonton, Alberta T6H 5V7
Telephone: (780) 427-3962 Fax: (780) 422-9686

Claimant

Name				
Address				City or Town
Province	Postal Code	Telephone	Fax	E-mail Address

Project

This claim is made in respect of the following project: (location & description) Project ID / Plan No: (either or both, if known)	Legal Description of the Land:

Details of Claim

1 Our contract is with (name of contracting party): (and General Contractor, if known)

2 This claim is made in respect of the following work (provide short description of labour, equipment, materials or services provided):

3 Time: (Last day on which labour, equipment, materials or services were provided)

☐ The work related to this claim was fully performed on: _____ (Month (name of)) _____ (Day) _____ (Year)
OR

☐ The work related to this claim is not yet fully performed but payment for work performed to _____ (Month (name of)) _____ (Day) _____ (Year)
(Today's Date)

has not been received as of _____ (Month (name of)) _____ (Day) _____ (Year)

4 Amount

The amount of this claim is $ _____ , which includes $ _____ in holdback monies.

5 Declaration:

I, the undersigned, am or represent the claimant named above and declare that the information provided is true and correct;

_____ Printed name of declarant

_____ Signature of declarant

For Alberta Infrastructure Use Only

Contract ID.:	Plan No. or Building No.	Confirmed Project ID.:	Date Sent:	Date Received:	Date Acknowledged:
Comments:					

S.P.1. CONNECTIONS TO PUBLIC INFRASTRUCTURE

If new connections are required to be made to public infrastructure, the Contractor will be required to enter into a Town of Taber standard servicing agreement. This will be a condition of the development permit.

END OF SECTION

1. WORK OF THIS CONTRACT

.1 Work of this Contract comprises the following:

.1 Interior and exterior renovation and addition to the St. Patrick Elementary School, located at 5302 48 Street, Taber, Alberta, in accordance with Drawings and Specifications prepared by Sahuri + Partners Architecture Inc. and their consultants.

.2 The Contractor acknowledges that there is existing building with kindergarten located adjacent to the School and as detailed in the Site Layout drawing. Existing Kindergarten building shall continue to operate and remain fully functional during the Construction Period. For greater certainty, and as otherwise required by the Agreement, the Contractor as "prime contractor" to take all required safety precautions in undertaking construction/renovation on this School Site having regard to existing kindergarten building adjacent to the School Site. Site work which may negatively impact continued operations of the existing building shall be scheduled to coincide with the School Board's summer break. Such work be coordinated with the School Board prior to its commencement.

.1 Note there is currently an existing electrical meter may be feeding back to the school. That meter is fed from overhead.

.2 Disconnect the SuperNet and School Board will provide Shaw or Telus in there temporarily on their own.

.3 Maintain existing gas meter.

.3 The Contractor acknowledges that there is an existing parking lot and garbage enclosure located on the School Site, as shown in the Site Layout drawing which must be continuously accessible during the Construction Period. The existing vehicular access shall be shared by both the School Board and Contractor's construction forces during the Construction Period.

.4 Storage Sheds relocated to asphalt field on the north side; no concrete (its basketball field) 2 conduits required, one for security one for power.

.5 Owner to have access to storage C-Can located on site during construction.

.2 LEED: although LEED credits are not being sought, LEED Best Practice procedures are being followed for finishes, lighting, and waste management during construction.

2. CONTRACT TIME

.1 Refer to Section 01 11 05 – Contract Time and Time Control.

3. CONTRACTUAL ARRANGEMENT

.1 Work shall be performed under a single contract under a Stipulated Price Arrangement.

4. CONTRACTOR'S USE OF PREMISES

.1 Contractor shall limit his use of premises to allow for:

.1 User occupancy.
.2 Work of Other Contractors.
.3 Public use.

.2 Contractor to allow public access to playgrounds, Owner access to on-site c-can storage, and public access to Kindergarten building, and parking located on site.

.3 Refer to Site Plan for Contractor access.

5. USER OCCUPANCY

.1 User may occupy premises during portions of construction period. Cooperate with the Province and user's representative to minimize conflict and to facilitate usage.

.2 User will temporarily vacate portions of the premises to permit access to those areas for performance of the Work.

3. Scheduled Owner Occupancy and Completion Date: June 8, 2018.

6. RESPONSIBILITY FOR EXISTING PROPERTY

.1 Contractor shall assume responsibility for the care, custody and control of property (including existing irrigation) which is assigned to him for performance of the Work. Contractor shall assume full responsibility for and shall make good damage to existing property attributable to performance of Work of this Contract within and outside of the property lines including but not limited to:

1. Work required to be done to existing roads, curbs, gutters, sidewalks and landscaping.
2. Connecting new and existing roads, curbs, gutters, sidewalks and landscaping.
3. Provision of new roads, curbs, gutters, sidewalks and landscaping portions thereof.
4. Making good of damage to existing roads, curbs, gutters, sidewalks and landscaping caused by work of this Contract.

END OF SECTION

1. RELATED SECTIONS

.1	Agreement Form:	Section 00 52 13.
.2	Summary of Work:	Section 01 11 00.
.3	Construction Schedules:	Section 01 32 16.
.4	Network Analysis Schedules:	Section 01 32 17.
.5	Contract Acceptance Procedures:	Section 01 77 20.

2. DEFINITIONS

.1 Critical Product: a product whose delivery time is critical to the completion of one or more stages of the Work.

3. CONTRACT TIME

.1 Time and all time limits stated in the Contract Documents are of the essence of the Contract. Contractor shall perform work expeditiously and with adequate forces to:

.1 attain completion of each stage of the Work or milestone, within the time specified therefor for completion of each stage or milestone,

.2 attain Interim Acceptance of the Work within the specified , and

.3 attain Practical Completion of the Work within the time specified.

.2 The Province's pre-planned activities, which will be performed during Performance Testing as specified in Section 01 91 01 Facility Start-Up Procedures, will take approximately five (5) Days from date of Interim Acceptance of the Work, to complete.

4. CONTRACT URGENCY

.1 Attainment of contract stages, completion times, and milestones specified in any Article or schedule approved by the Province, including times for completion of contract stages established by Contractor, contract stages specified in Section 01 11 00, in the construction progress schedule specified in Section 01 32 16, Interim Acceptance of the Work, Practical Acceptance of the Work, within the specified time is urgent and imperative.

.2 If contract stages, completion times, and milestones specified in any Article or schedule approved by the Province, including times for completion of contract stages established by Contractor, contract stages specified in Section 01 11 00, and in the construction progress schedule specified in Section 01 32 16, Interim Acceptance of the Work, or Practical Completion of the Work is not attained within the specified time, the Province and the school jurisdiction will suffer loss or damages.

.3 Such damages may be suffered as a result of having to lease alternative space for students, transporting students to alternative locations, or having to incur other costs in making alternative arrangements to accommodate students, as well as incurring further extra costs.

5. TIME CONTROL SYSTEM

.1 Contractor shall provide and maintain a system of time control to identify, schedule and monitor activities related to progress of the Work.

.2 Time control system shall be based on construction progress schedules specified in Section 01 32 16 and herein.

.3 Incorporate contract stages, completion times, and milestones specified herein, including times for completion of contract stages established by Contractor, contract stages specified in Section 01 11 00, and in the construction progress schedule specified in Section 01 32 16.

.4 Times and dates for completion of contract stages shall, upon acceptance by the Province, form the basis for the time control system.

6. PROGRESS ACCELERATION

.1 If, in the Province's opinion, the progress of the Work, or any stage or part thereof, is too slow to ensure attainment of any contract stages, completion times, milestones, Interim Acceptance of the Work, or Practical Completion of the Work within the time, the Contractor shall, upon written notification by the Province to do so, take such measures including, but not limited to, those specified in Agreement Form, Article 4., as are deemed necessary by the Province to accelerate progress to ensure attainment of the Work within the within the time specified in any Article or schedule agreed to by the Province.

.2 The Contractor shall not be entitled to any extra payment for measures taken or to accelerate progress to ensure attainment of any contract stages, completion times, milestones, Interim Acceptance of the Work, or Practical Completion of the Work within the time specified in any Article or schedule agreed to by the Province.

7. BASELINE CONSTRUCTION SCHEDULE

.1 The Contractor shall, in coordination with Section 01 32 16 and the Agreement Form:

.1 within ten (10) Working Days following the award of the Contract, prepare and submit to the Owner and the Consultant for their review and acceptance, a Construction Schedule that indicates the timing of the activities of the Work and provides sufficient detail of the critical events and their inter-relationship to demonstrate the Work will be performed in conformity with the dates set out for each contract stage, completion times, milestones, Interim Acceptance of the Work, and Practical Completion of the Work within the time set out therefore, and in accordance with the Contract Documents. Once accepted by the Owner and the Consultant, the Construction Schedule submitted by the Contractor shall become the **Baseline Construction Schedule**,

.2 provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province,

.3 monitor the progress of the Work on a weekly basis relative to the Baseline Construction Schedule, or any successor or revised schedule accepted in writing by the Province, update the schedule on a monthly basis and advise the Consultant and the Owner in writing of any variation from the Baseline Construction Schedule or slippage in the schedule;

.4 provide all the required expertise and resources **without** change to the Contract Price if such expertise and resources are deemed necessary to meet the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province; and

.5 ensure that the Contract Price includes all costs required to phase or stage the Work.

.2 If, at any time, it should appear to the Owner or the Consultant that the actual progress of the Work is behind the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province or is likely to become behind the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province, or if the Contractor has given notice of such to the Owner or the Consultant pursuant to Article 6.1, the Contractor shall, either at the request of the Owner or the Consultant, or following giving notice pursuant to Article 6.1, Progress Acceleration, take appropriate steps to cause the actual progress of the Work to conform to the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province. Within five (5) calendar days of the request by the Owner or the Consultant or the notice being given pursuant to Article 6.1., the Contractor shall produce and present to the Owner and the Consultant a plan demonstrating how the Contractor will achieve the recovery of the Baseline Construction Schedule or any successor or revised schedule accepted in writing by the Province.

8. CONTRACT STAGES, COMPLETION TIMES, AND MILESTONES

Stage	Time for Completion	Completion Milestone
Mobilization:	[Established by Contractor]	N/A
Preparation and review of submittals related to Critical Products:	[Established by Contractor]	Acceptance by the Province
Demolition of existing buildings complete:	August 25, 2017	Acceptance by the Province
Envelope of Mechanical Room and New Addition complete	November 10, 2017	Acceptance by the Province
Server Room complete and functional for SuperNet services connection:	April 6, 2018	Acceptance by the Province
Interim Acceptance of the Work	June 8, 2018	Interim Acceptance Letter Issued
Access provided to school jurisdiction for commencing fit-up:	July 2, 2018	Acceptance by the Province
Site Work complete:	July 15, 2018	Acceptance by the Province
Practical Completion of the Work:	July 22, 2018	Practical Completion Letter Issued

END OF SECTION

1. INTENT

.1 Include specified cash allowances, and all costs associated with each cash allowance, in the Contract Price. Ensure that each allowance and its associated costs are included only once in the Contract Price.

2. MONITORING OF SOLAR TECHNOLOGY SYSTEM

.1 Provide Cash Allowance for: supply and installation of materials required for monitoring of Solar Technology System as follows.

.2 Amount of each cash allowance includes:

.1 Actual cost of Materials.
.2 Applicable taxes, except GST.
.3 Delivery to site.
.4 Handling on site.
.5 Labour and all other costs related to installation.

.3 Allow the lump sum of **$25,000.00** for the supply and installation of:

.1 Solar Technology System additional furniture and equipment for monitoring package.
.2 Solar Technology System website fees in support of the monitoring package. to track energy production and sharer data with the school community, students and teachers, through a mobile-friendly website.
.3 Electrical and IT scope of work required to connect monitoring package.

.4 Amount of cash allowance does **NOT** include any other costs including all applicable Subcontractor, Sub-Subcontractor, and Contractor's overhead and profit related to that cash allowance, which must be included separately in the Contract Price. Supply and installation of PV system as shown on architectural electrical drawings, metering and wiring are also excluded from the cash allowance and shall be included in the Contract Price.

3. RELOCATION OF EXISTING SHEDS AND GARAGES

.1 Provide Cash allowance for supply and installation of materials and services required for relocation of existing sheds and garages.

.2 Amount of each cash allowance includes:

.1 Actual cost of Materials and Services.
.2 Applicable taxes, except GST.
.3 Delivery to site.
.4 Handling on site.
.5 Labour and all other costs related to decommissioning and installation.

.3 Allow the lump sum of **$30,000.00** for the supply and installation of:

.1 Craning and moving services required to relocate existing sheds and garages on site.
.2 All repairs to sheds and garages damaged during relocation.
.3 All repairs to landscaping and playground equipment damaged during relocation.
.4 Electrical work required to disconnect/connect power and data as required.

.4 Amount of each cash allowance does **NOT** include any other costs including all applicable Subcontractor, Sub-Subcontractor, and Contractor's overhead and profit related to that cash allowance, which must be included separately in the Contract Price. Supply and installation of electrical conduits and wiring to sheds new location as shown on electrical drawings are also excluded from the cash allowance and shall be included in the Contract Price.

4. DOOR ACCESS SECURITY SYSTEM

.1 Provide Cash allowance for supply and installation of materials and services required for Door Access Security System.

.2 Amount of each cash allowance includes:

.1 Actual cost of Materials and Services.
.2 Applicable taxes, except GST.
.3 Delivery to site.
.4 Handling on site.
.5 Labour and all other costs related to commissioning and installation.

.3 Allow the lump sum of **$20,000.00** for the supply and installation of:

.1 Security head-end equipment fully compatible with Pegasys P2000, appurtenances and field devices as required and as shown on these drawings & specifications. Connect devices and equipment to Electrical Contractor supplied & installed wiring..
.2 All coordination with the door hardware supplier, Electrical Contractor and other trades as required for a complete and operational system.
.3 All required programming.
.4 All commissioning and testing of system and confirmation of monitoring agency.

.4 Amount of each cash allowance does **NOT** include any other costs including all applicable Subcontractor, Sub-Subcontractor, and Contractor's overhead and profit related to that cash allowance, which must be included separately in the Contract Price. The following are also excluded from the cash allowance and shall be included in the Contract Price:

.1 Supply and installation of electrical conduits and wiring between devices and head-end equipment as shown on electrical drawings and specifications.

5. INTRUSION ALARM SECURITY SYSTEM INCLUDING FIRE ALARM SYSTEM MONITORING SYSTEM

.1 Provide Cash Allowance for supply and installation of materials and services required for Intrusion Alarm Security System Including Fire Alarm System Monitoring System.

.2 Amount of each cash allowance includes:

.1 Actual cost of Materials and Services.
.2 Applicable taxes, except GST.
.3 Delivery to site.
.4 Handling on site.
.5 Labour and all other costs related to commissioning and installation.

.3 Allow the lump sum of **$15,000.00** for the supply and installation of:

.1 All DSC security head-end equipment, appurtenances and field devices as required and as shown on these drawings & specifications. Connect devices and equipment to Electrical Contractor supplied & installed wiring.
.2 All monitoring equipment to connect to the fire alarm system. Including, but limited to, Fire Monitoring Panel, Universal Wireless Commercial Fire Alarm Communicator, Remote GSM cellular module (minimum 4G), all required power supplies and keypad interfaces, and any required appurtenances.
.3 All coordination with the Electrical Contractor, Fire Alarm System representative and other trades as required for a complete and operational system.
.4 All required programming.
.5 All commissioning and testing of system and confirmation of monitoring agency prior to the fire alarm verification.

.4 Amount of each cash allowance does **NOT** include any other costs including all applicable Subcontractor, Sub-Subcontractor, and Contractor's overhead and profit related to that cash allowance, which must be included separately in the Contract Price. The following are also excluded from the cash allowance and shall be included in the Contract Price:

.1 Supply and installation of electrical conduits and wiring between devices and head-end equipment as shown on electrical drawings and specifications.
.2 Supply and installation of fire alarm system as shown on electrical drawings and specifications.
.3 Verification of fire alarm system as detailed in electrical specifications.

6. BMS/CONTROLS/EMCS

.1 Provide Cash Allowance for supply and installation of BMS/controls/EMCS.

.2 All building mechanical system's automation, controls, and energy managements control system (EMCS) as described in the following specification Sections:

23 08 95 EMCS Start-Up and Testing
230923 EMCS General Requirements
23 09 24 EMCS Network Communications and System Configuration
23 09 25 EMCS Central/Portable Control Stations and Peripherals
23 09 26 EMCS Remote Control Units
23 09 27 EMCS Terminal Control Units
23 09 28 EMCS Field Work
23 09 29 EMCS Sensors, Devices and Actuators
23 09 30 EMCS Point Schedules
23 09 93 EMCS Control Sequences

.3 Provide Metasys DDC controls for school renovation. Low voltage wiring will be free air where possible but placed in EMT conduit where exposed.

.1 Provide and install Metasys DDC BACnet controls for control of twenty seven (27) zones
.2 Provide and install Metasys DDC BACnet controls for Heating system
.3 Provide and install Metasys DDC BACnet controls for AHU-1 and AHU-2
.4 Provide and install Metasys DDC BACnet controls for exhaust fan systems
.5 Extend Metasys BACnet network throughout building
.6 Program new controllers and add all points to Metasys system
.7 Commission system operations and field points
.8 Provide operator training

.4 Price excludes: line voltage wiring; installation of valves, provision of control dampers, overtime labor

.5 Cash allowance price for the scope will be **$150,000.00 plus GST** .

7. EXPENDITURE OF CASH ALLOWANCES

.1 Upon receipt of required documentation to permit pricing and a "Charge Order Request for Proposal" from the Province, identify potential suppliers and Subcontractors as applicable, and obtain at least three competitive prices for each cash allowance item. Where a cash allowance includes work that would be most efficiently performed by the Contractor's own forces, provide the Province with a price proposal for performing own forces work.

.2 If requested by the Province, disclose to the Province originals of all bids, quotations and other price related information received from suppliers or Subcontractors.

.3 The Province will determine by whom and for what amount(s) the items included in each cash allowance will be performed. Obtain the Province's prior approval before entering into a subcontract, amending an existing subcontract, or performing any own forces work included in a cash allowance. All cash allowance expenditures and the maximum expenditure amount must be authorized in writing by the Province in the form of a "Cash Allowance Charge Order."

.4 Upon the Province's approval of expenditure of a cash allowance, the Contractor's responsibilities for cash allowance items are the same as for other work of this Contract.

.5 Where expenditure of a cash allowance has been approved by the Province, the value of completed Work or delivered Materials included in the cash allowance may be claimed as part of the Contractor's monthly applications for payment, in accordance with the Contract payment conditions. Cash allowance expenditures claimed must not exceed the maximum expenditure amount authorized by the Province.

8. ADJUSTMENT OF CONTRACT PRICE

.1 When the total maximum amount expended for a cash allowance item is determined, the Contract Price will be adjusted accordingly by change order as follows:

.1 Where the amount expended for a cash allowance item is less than the specified amount of the cash allowance, the Province will be credited for the unexpended amount as a credit change order, in accordance with the General Conditions of Contract. The Province will not be credited for the Contractor's overhead and profit on the unexpended amount.

.2 Where the amount to be expended for a cash allowance item exceeds the specified amount of the cash allowance, the excess amount, plus an amount for the Contractor's overhead and profit on the excess, will be processed as a change order in accordance with the General Conditions of Contract.

.3 Multiple cash allowances will not be combined for the purpose of calculating adjustments to the Contract Price as specified above.

.2 The Contractor is not entitled to any extra payment on account of a specified cash allowance, except as specified above, and is not entitled to any unexpended allowance amounts.

END OF SECTION

1. INTENT

.1 This Section is to be read in conjunction with, and is subject to, General Condition 2.5 – Valuation of Changes of the General Conditions of Contract.

.2 The General Conditions of Contract provide for valuation of changes by three different methods: lump sum, unit price, and cost plus.

2. DEFINITIONS

.1 “Administrative Fee” means the fee permitted for the administration of all paperwork related to a change in the work and any other work not covered by Direct Cost and Overhead Cost. The Administrative Fee does not cover profit.

.2 "Construction Equipment Cost" means the cost of rented or owned equipment, including cost of loading, transportation, unloading, erection, maintenance, fuel, dismantling and removal. This excludes small tools customarily used to carry out the Work by workers and valued at less than $500.00.

.3 “Direct Cost" means actual costs of material and labour as used in the valuation of changes article in the General Conditions of Contract. Direct Cost is the sum of costs directly related to or necessarily and properly incurred by Contractor, Subcontractors and Sub-subcontractors in the performance of a change in the Work. Direct Cost shall exclude Overhead Cost and profit but shall include:

- .1 Operation and maintenance of site offices,
- .2 Administration at site offices,
- .3 Material Cost,
- .4 Total Labour Cost,
- .5 Travel and Subsistence Cost,
- .6 Temporary Work Cost,
- .7 Construction Equipment Cost,
- .8 additional bonding and insurance cost,
- .9 salaries and other compensation of on-site superintendents and other supervisory personnel,
- .10 planning, estimating, and scheduling of work costs,
- .11 consumable and expendable materials for small tools, and
- .12 Schedule Impact Cost, only where the change has an impact on critical path items,

.4 "Direct Labour Cost" means base wage costs of employees including overtime premium where applicable, but excludes Payroll Burden Cost.

.5 "Material Cost" means cost of all Materials, including transportation and storage thereof. All rebates, refunds, returns from sale of surplus Materials, and trade discounts other than prompt payment discounts, shall be credited to the Province.

.6 "Overhead Cost" means Contractor's, Subcontractors' and Sub-subcontractors' costs related to:

.1 operation and maintenance of head offices and branch offices,

.2 administration at head offices and branch offices,

.3 general management, legal, audit, and accounting services,

.4 buying organization,

.5 corporate tax,

.6 financing and other bank charges,

.7 salaries and other compensation of off-site personnel,

.8 recruitment and training of on-site staff, and

.9 all other costs not defined as direct costs.

.7 "Payroll Burden Cost" means actual costs paid by the employer for statutory charges and benefit costs additional to Direct Labour Cost. It includes the employer's contributions to Canada Pension Plan, Employment Insurance, Workers' Compensation Board, vacation pay, statutory holiday pay, health and wellness plan, and pension plan. It also includes the actual employer paid incentives for expendable and non-expendable small tools with a value of less than $500.00, safety and protective equipment, education and training, and other payroll costs which are hourly wage dependent.

.8 "Schedule Impact Cost" means Contractor's, Subcontractors' and Sub-subcontractors' costs related to an increase in the Contract Time where the change has an impact on the Project's critical path.

.9 "Temporary Work Cost" means cost of temporary structures, facilities, services, controls, and other temporary items used in the performance of a Change in the Work, including maintenance, dismantling and removal, less any residual value after dismantling and removal.

.10 "Total Labour Cost" means sum of Direct Labour Cost and Payroll Burden Cost.

.11 "Travel and Subsistence Cost" means travel and subsistence costs incurred by employees when working beyond a reasonable commuting distance from their normal place of residence.

3. SCHEDULE OF LABOUR RATES

.1 Submit to the Province for approval, within 21 days after date of commencement of Contract, a Schedule of Labour Rates in the form of Document 01 23 63A appended to this Section.
(http://www.infrastructure.alberta.ca/Content/docType486/Production/01_26_63B_A_eForm.pdf)

.2 Labour rates stated in Schedule shall be the hourly labour rates that will be applied when estimating increases and decreases in cost resulting from changes in the Work. Assume that work will be performed during regular working hours, not premium time.

.3 Approved Schedule of Labour Rates will be used solely for evaluating Contractor Proposals for changes in the Work. Nothing specified herein, nor the submission of a Schedule of Labour Rates by Contractor, shall be construed to mean that the Province has established, or will establish, minimum wages or benefits applicable to the Work, other than those required by law.

.4 Include all trades that will be employed in the Work, including trades employed by Subcontractors and Sub-subcontractors.

.5 Provide a breakdown indicating hourly labour rates for Direct Labour Cost, Payroll Burden Cost, and the resulting total labour cost for journeymen, apprentices, foremen and other applicable classifications within each trade.

.6 Labour rates stated in Schedule shall be consistent with rates that will actually be paid in the normal performance of the Work, during regular working hours, and shall not exceed the following:

.1 Where collective agreements apply:

.1 rates for Direct Labour Cost shall not exceed rates established by collective agreements, and

.2 rates for Payroll Burden Cost shall not exceed rates established by collective agreements and statutory charges.

.2 Where collective agreements do not apply:

.1 rates for Direct Labour Cost shall not exceed rates prevailing in the locality of the Project, and

.2 rates for Payroll Burden Cost shall not exceed 45% of rates for Direct Labour Cost.

.7 The Province's approval of rates provided in the Schedule of Labour Rates will be conditional upon compliance with the foregoing requirements. Approval will be based on most current information available to the Province on Alberta construction industry wages and benefits.

.8 Contractor may request an amendment to an approved rate stated in the Schedule of Labour Rates, if and when required on account of a change in the rate that will actually be paid in the normal performance of the Work. If Contractor can prove to the Province's satisfaction that a different rate will actually be paid, the Province may, at its sole discretion, approve such a change in rate.

4. CHANGE ORDER PROCEDURES - LUMP SUM METHOD OF VALUATION

.1 The Province will issue a Request for Proposal to Contractor.

.2 Contractor shall submit a Contractor Proposal stipulating:

.1 a lump sum increase, decrease, or no change in the Contract Price, and

.2 an increase, decrease, or no change in the Contract Time,

on account of the proposed change in the Work.

.3 Include in Contractor Proposal a detailed breakdown of lump sum increase or decrease, indicating Contractor's, and where applicable Subcontractors' and Sub-subcontractors':

.1 itemized direct costs applicable to the proposed change in the Work, and

.2 applicable amounts for overhead and profit, in accordance with percentages specified in the General Conditions of Contract.

Do not include costs that would otherwise be incurred in the normal performance of the Work.

.4 Include in detailed breakdown of Contractor Proposal a further breakdown of the total labour cost component indicating, for each applicable trade and trade classification, the labour rate(s) and the number of hours from which the total labour cost is derived.

.5 Include in detailed breakdown of Contractor Proposal only those labour rates included in Schedule of Labour Rates and previously approved by the Province, in writing, unless the extra work cannot be performed during regular working hours and the Province has given approval, in writing, for premium time labour rates.

.6 Upon the Province's approval and acceptance of the Contractor Proposal, a "Change Order" will be issued to Contractor.

END OF SECTION

From (Contractor)

Name				
Address				
City or Town	Province	Postal Code	Telephone	Fax

Project

(Project Name and Location)
Project ID or PIN

This Schedule of Labour Rates is submit in compliance with the requirements of Section 01 26 63 - Change Order Procedures of the Contract Documents.

It is understood that:

.1 This Schedule of Labour Rates is subject to Minister's approval and will be used solely for evaluating Contractor Proposals for changes in the Work.

.2 The Minister has not est ablished, and does not intend to establish, minimum wages or benefits applicable to the Work, other than those required by law.

Schedule: See next page.

Labour rates for trades employed by Contractor:

Name of Trade	Trade Classification	Direct Labour Cost ($/hour)	Payroll Burden Cost ($/hour)	Total Labour Cost ($/hour)
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00

We hereby declare that the above stated labour rates are, to the best of our knowledge, the rates that will actually be paid in the normal performance of the Work, during regular working hours, and do not include any overhead cost or profit.

Signature	Name of Contractor	Date

Labour rates for trades employed by
Subcontractors and Sub-subcontractors:

Name of Trade	Trade Classification	Direct Labour Cost ($/hour)	Payroll Burden Cost ($/hour)	Total Labour Cost ($/hour)
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
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				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00

We hereby declare that the above stated labour rates are, to the best of our knowledge, the rates that will actually be paid in the normal performance of the Work, during regular working hours, and do not include any overhead cost or profit.

Signature	Name of Subcontractor / Sub-subcontractor	Date

FROM: _____

(Name of Contractor)

PROJECT: **ST. PATRICK ELEMENTARY SCHOOL**
School Modernization

Completion and Submission Instructions:

.1 Within 15 days after date of commencement of the Contract (date of issuance of letter of acceptance), complete and submit this list to:

Tender Administrator
Infrastructure
Corporate Strategies & Services
2nd Floor, 2700
Infrastructure Building
6950 – 113 Street NW
Edmonton, Alberta T6H 5V7

.2 Enter cost for all requested items of work.

.3 For items of work to be performed by the Contractor's own forces, enter the cost of such work, exclusive of general requirements costs.

Cost Breakdowns List: See next page.

Division 02

Demolition	**$** _____
Hazardous Materials	**$** _____

Division 03 _____

Concrete Finishing	**$** _____

Division 04 _____

Masonry Units	**$** _____

Division 05 _____

Structural Steel	**$** _____
Wind Bearing Metal Stud Systems	**$** _____
Metal Fabrications	**$** _____
Metal Stairs	_____

Division 06 _____

Supply of Architectural Woodwork and Millwork	**$** _____
Rough Carpentry (includes the installation of Division 6 Supply Only items and Division 8 Unit Windows, excl Finish Carpentry, Heavy Timber items)	**$** _____

Division 07 _____

Thermal Protection	**$** _____
Roofing and Siding	**$** _____
Flashing and Sheet Metal	**$** _____
Firestopping (excluded for Mechanical and Electrical sub-trades)	**$** _____
Caulking and Sealants	**$** _____

Division 08

Supply of Hollow Metal Doors and Frames	**$** _____
Supply of Wood Doors	**$** _____
Supply of Rolling Shutter	**$** _____
Supply of Folding Grilles	**$** _____
Supply of Monumental Aluminum Framed Folding/Paired Panel System	**$** _____
Supply of Aluminum Curtain Wall and Aluminum Windows	**$** _____

Supply and Installation of Glass and Glazing	**$** _____
Division 09	_____
Drywall	**$** _____
Steel Stud Framing	**$** _____
Tile	**$** _____
Component Ceiling Systems	**$** _____
Wood Flooring - Refinish	**$** _____
Resilient Floor Coverings	**$** _____
Painting	**$** _____
Division 10	
Marker Boards and Tackboards	**$** _____
Toilet Compartments	**$** _____
Cubical Curtains and Track	**$** _____
Wall Protection	**$** _____
Washroom Accessories	**$** _____
Signage	**$** _____
Lockers	**$** _____
Flagpoles	**$** _____
Division 12	
Roller Window Shades	**$** _____
Recessed Pedimats	**$** _____
Division 20	
Demolition – Mechanical Scope	$ _____
Plumbing and Piping	**$** _____
Ventilation and Sheet Metal	**$** _____
Equipment	**$** _____
Insulation and Firestopping	**$** _____
Fire Protection Systems	**$** _____

Division 26

Demolition – Electrical Scope	**$** _____
Power Distribution and Wiring Systems	**$** _____
Lighting and Control Systems	**$** _____
Data Systems	**$** _____
Structured Cabling	**$** _____
Audio-Visual Systems	**$** _____
Fire Alarm Systems	**$** _____
Security Systems	**$** _____
Photo-Voltaic (PV) Solar System	**$** _____

Division 31

Site Clearing	**$** _____
Excavation	**$** _____
Backfill	**$** _____

Division 32

Asphalt Paving	**$** _____
Concrete Paving, Curbs and Gutters	**$** _____

Division 33

Underground Utilities	**$** _____

END OF SECTION

1. GENERAL COORDINATION

.1 Coordinate all construction activities as required to ensure efficient and orderly installation of each part of the Work.

.2 Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule and coordinate construction activities in the sequence required to obtain the best results.

.3 Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

.4 Make adequate provisions to accommodate items scheduled for later installation under separate contract or by the Province's own forces.

2. ADMINISTRATIVE PROCEDURES

.1 Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities shall include, but not be limited to, the following:

.1 Preparation of schedules.
.2 Installation and removal of temporary facilities.
.3 Delivery and processing of submittals.
.4 Progress meetings.
.5 Contract acceptance procedures.

3. GENERAL INSTALLATION PROVISIONS

.1 Require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

.2 Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

.3 Inspect Materials immediately upon delivery and again prior to installation. Reject damaged and defective items.

.4 Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

.5 Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Province for final decision.

.6 Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

.7 Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

.8 Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Province for final decision.

.9 Supervise construction activities to ensure that no part of the Work, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

4. CUTTING AND REMEDIAL WORK

.1 Do the cutting and remedial work required to make the several parts of the Work come together properly.

.2 Coordinate the Work to ensure that this requirement is kept to a minimum.

.3 Cutting and remedial work shall be performed by specialists familiar with Materials affected and shall be performed in a manner to neither damage nor endanger the Work.

END OF SECTION

1. RELATED SECTIONS

.1 Construction Schedules: Section 01 32 16.
.2 Contractor Start-Up Report Forms: Section 01 33 35.

2. PRE-CONSTRUCTION MEETING

.1 Schedule a pre-construction meeting within 15 Days after date of commencement of the Contract and prior to commencement of activities at the Place of the Work.

.2 Purpose: to review personnel assignments, responsibilities, and administrative and procedural requirements.

.3 Location: Infrastructure offices.

.4 Meeting Chaired By: the Province’s representative.

.5 Attendees:

.1 Contractor's representatives: Contractor's senior management, Contractor's project manager, Contractor's site superintendent, representatives of major Subcontractors,

.2 Province's representatives: as determined by the Province.

.6 Agenda:

.1 Introduction of the Province's and Contractor's representatives.

.2 Review of significant contractual responsibilities and administrative and procedural requirements.

.3 Other business.

3. CONSTRUCTION PROGRESS MEETINGS

.1 Schedule regular construction progress meetings during the course of the Work.

.2 Purpose: to monitor construction progress and to identify problems and action required for their solution, to expedite the Work.

.3 Frequency: every two weeks, or as otherwise directed by the Province.

.4 Location: Contractor's site office.

.5 Attendees:

.1 Contractor's representatives: Contractor's project manager, Contractor's site superintendent and when so requested by the Province, Subcontractors, suppliers and other parties involved in the Work. Contractor's representatives shall be qualified and authorized to act on behalf of the party each represents.

.2 Province's representatives: as determined by the Province.

.6 Meeting Chaired By: Province's representative.

.7 Agenda:

.1 Review and approval of minutes of previous meeting.
.2 Review of items of significance that could affect progress.
.3 Other topics for discussion as appropriate to current status of the Work.

.8 Minutes: the Province's prime consultant will record minutes and distribute copies to all attendees within seven Days after meeting.

4. COMMISSIONING (PRE-FACILITY START-UP) MEETINGS

.1 Commissioning (Pre-Facility Start-Up) meetings shall be held from the start of the Work until the Contractor Start-Up subschedules specified in Section 01 32 16, and the Contractor Start-Up report forms specified in Section 01 33 35, have been approved by the Province.

.2 Purpose: To monitor development of Contractor Start-Up subschedules and Contractor Start-Up report forms.

.3 Frequency: Every two weeks, or as otherwise directed by the Province.

.4 Location: Contractor's site office or other location agreed to between the Province and Contractor.

.5 Attendees:

.1 Contractor's representatives: Contractor's project manager, Contractor's site superintendent, mechanical and electrical Subcontractors, Commissioning Agent and when so requested by the Province, Sub-subcontractors, suppliers and other parties involved in the Work. Contractor's representatives shall be qualified and authorized to act on behalf of the party each represents.

.2 Province's representatives: as determined by the Province.

.6 Meeting Chaired By: Province's representative.

.7 Agenda:
- .1 Review and approval of minutes of previous meeting.
- .2 Review of progress of Contractor Start-Up subschedule preparation.
- .3 Review of progress of Contractor Start-Up report form preparation.
- .4 Identification of problems impeding progress.
- .5 Other business.

.8 Minutes: Same as construction progress meetings.

5. COMMISSIONING (FACILITY START-UP) PROGRESS MEETINGS

.1 Commissioning (Facility start-up) progress meetings shall be held during Facility Start-Up.

.2 Purpose: to monitor commissioning (Facility Start-Up) progress and to identify problems and action required for their resolution, to expedite Facility Start-Up.

.3 Frequency: every two weeks, or as otherwise directed by the Province.

.4 Location: same as Commissioning (Pre-Facility Start-Up) meetings.

.5 Attendees: same as Commissioning (Pre-Facility Start-Up) meetings.

.6 Meeting Chaired By: Province's representative.

.7 Agenda:
- .1 Review and approval of minutes of previous meeting.
- .2 Review of Commissioning (Facility Start-Up) progress.
- .3 Identification of problems impeding progress towards achievement of Commissioning (Facility Start-Up) milestones.
- .4 Review of outstanding Contract Deficiencies.
- .5 Review of Change Orders and Requests for Proposals.
- .6 Other business.

.8 Minutes: same as construction progress meetings.

6. WARRANTY MEETINGS

.1 Warranty meetings shall be held between Final Acceptance of the Work and Total Completion of the Work.

.2 Purpose: to bring to Contractor's attention Contract Deficiencies identified during warranty period, determine action required for their correction, and monitor progress of Contract Deficiency correction.

.3 Frequency: called by the Province on an as-needed basis.

.4 Location: as agreed to between the Province and Contractor.

.5 Attendees: same as construction progress meetings.

.6 Meeting Chaired By: Province's representative.

.7 Agenda:

.1 Review and approval of minutes of previous meeting.
.2 Review of progress of Contract Deficiency correction.
.3 Identification of problems impeding Contract Deficiency correction.
.4 Review of outstanding Contract Deficiencies.
.5 Other business.

.8 Minutes: same as construction progress meetings.

END OF SECTION

1. RELATED SECTIONS

.1	Contract Time:	Section 01 11 00.
.2	Work sequence:	Section 01 11 00.
.3	Products supplied by Province:	Section 01 11 00.
.4	Cash Allowances:	Section 01 21 13.
.5	Shop Drawings, Product Data and Samples:	Section 01 33 23.
.6	Commissioning (Facility Start-Up) Procedures:	Section 01 91 01.

2. CONSTRUCTION PROGRESS SCHEDULE

.1 Format of Schedule:

.1 The Baseline Construction Schedule set out in Section 01 11 05, any successor schedule approved in writing by the Province, and associated sub-schedules, shall be provided in Critical Path Method Format.

.2 The Baseline Construction Schedule and updates shall be prepared using a computer based project management software package acceptable to the Province.

.3 Include concise and accurate activity descriptions.

.4 Incorporate legends required to interpret symbols used.

.5 Incorporate appropriate time scales covering both calendar and Working Days, months, and years.

.6 As a minimum requirement, indicate the earliest start date, earliest finish date, and total Float for each activity. Clearly identify the Critical Path and first level sub-critical paths broken down by trade.

.2 Content of Schedule:

.1 List and provide a separate bar for each activity.

.2 Indicate for each activity, the earliest start date, earliest finish date, and total Float.

.3 Indicate projected percentage of completion for each activity as of first day of each month.

.4 Provide a separate bar for each specified allowance. List each definable activity for each allowance. Include dates for receipt of documentation or information pertaining to work covered by allowances.

.5 Include a separate bar, coordinated with subschedules, for Contractor Start-Up for:

.1 Each mechanical system specified in Division 20-25.

.2 Each electrical system specified in Division 26.

.6 Include a milestone to mark commencement of Contractor Start-Up program.

.1 Include a milestones for mock-ups: millwork, classroom teaching wall, paint.
.2 Include milestone for millwork shop drawings.
.3 Include date when new structure will be erected.
.4 Include date when building will be fully enclosed for winter.
.5 Include milestone for data room readiness as per SuperNet requirements.

.7 Include separate bars for the Performance Testing and Fine Tuning subphases of Facility Start-Up.

.3 Progress Updates:
.1 Keep schedule on site and up-to-date for duration of Contract.
.2 Indicate actual progress of work.
.3 Indicate major changes in scope.
.4 Progress updates are to be presented in comparison to the initial Baseline Construction Schedule.

.4 Submissions:
.1 Within 15 Days after date of commencement of Contract, submit a copy of the Baseline Construction Schedule for the Province's review and acceptance at the pre-construction meeting.
.2 The Contractor shall submit a schedule update with each monthly application for payment or as required by the Province.

3. SUBSCHEDULES

.1 Provide subschedules to define the following portions of prime Construction Progress Schedule in greater detail:

.1 Mechanical.
.2 Electrical.
.3 Contractor Start-Up.

.2 Form of Subschedules: same as Construction Progress Schedule.

.3 Content of Mechanical and Electrical Subschedules: same as Construction Progress Schedule, except more detailed.

.4 Content of Contractor Start-up Subschedules:

.1 List and provide a parent bar for the following:

.1 Each mechanical system specified in Division 20-25.
.2 Each electrical system specified in Division 26.

.2 Include milestone dates for the completion of Construction Progress Schedule tasks which are linked to the start dates for Contractor Start-up tasks.

.3 Group Contractor Start-up tasks by system and provide a separate bar for the one or more tasks within each of the following activities:

.1 Pre-start tests and inspections.
.2 Start-up procedures, including manufacturer's site services where required.
.3 Testing, adjusting and balancing.
.4 Preparation of reports.
.5 Province's review of systems and reports.
.6 Contract Deficiency correction.

.4 Indicate start and completion dates for each activity.

.5 Progress Revisions: same as Construction Progress Schedule. Confirm subschedules remain coordinated with Construction Progress Schedule.

.6 Submissions: submit subschedules together with Construction Progress Schedule.

4. SUBMITTALS LIST

.1 Prepare a submittals schedule that lists each element of Work for which submittals will be provided, and shop drawings, product data, LEED documentation, and samples are required, in addition to other submittals..

.2 Indicate anticipated dates when the Province will receive each submittal from the Contractor.

.3 Indicate dates by which each submittal must be reviewed or approved in order to maintain continued construction activity and progress of the Work.

.4 Submit the Submittals Schedule for the Province's review within 15 days after date of commencement of Contract.

.5 After review, the Province may require submission of additional information or request that some proposed submittals not be submitted. Submittals not requested may not be processed or reviewed by the Province.

END OF SECTION

1. RELATED SECTIONS

.1	Cost Breakdown List	Section 01 29 70
.2	Construction Schedules	Section 01 32 16
.3	Shop Drawings, Product Data and Samples	Section 01 33 23
.4	Contractor Start-Up Report Forms	Section 01 33 35
.5	Product List	Section 01 62 35
.6	Closeout Procedure	Section 01 77 00
.7	Contract Acceptance Procedures	Section 01 77 20
.8	Operation and Maintenance Data and Manuals	Section 01 78 23
.9	Spare Parts and Maintenance Materials	Section 01 78 43

2. WORKERS' COMPENSATION BOARD CERTIFICATE

.1 Before commencement of activities at the Place of the Work, obtain and submit to the Province a certificate of an account with the Workers' Compensation Board.

3. CASH FLOW FORECAST

.1 Before submission of the first application for payment submit to the Province, for approval, a draft cash flow forecast showing expected monthly application for payments for the duration of the Contract.

.2 At a minimum the format of the cash flow forecast submission must include the original cash flow forecast, actual monthly application for payments, and updated forecasts for comparison.

.3 Submit updated cash flow forecasts, reflecting any changes and coordinated with the approved construction schedule, with each monthly application for payment or as requested by the Province.

.4 When the monthly actual cash flow forecast differs from the approved construction schedule, provide a recovery plan if requested by the Province, demonstrating how the Contractor will achieve the latest approved construction schedule as specified in Section 01 32 16 or Section 01 32 17, and in accordance with the Agreement Form, Article 4.

4. COST BREAKDOWN

.1 Before submission of first application for payment, submit to the Province a complete, itemized breakdown of the Contract Price, providing as a minimum:

.1 all subcontract amounts,
.2 cost of all own forces work,
.3 cost of all major supply only items,
.4 all specified allowance amounts,
.5 cost of general requirements items, including Contractor's overhead and profit.
.6 cost of As-built drawings for each trade.
.7 cost of Operation and Maintenance manuals for each trade.

.2 The cost breakdown must aggregate to the total amount of the Contract Price.

5. PHOTOGRAPHS

.1 Provide progress photographs taken every two weeks.

.2 Take progress photos from two separate viewpoints determined by the Province; of exterior until building is closed in and interior thereafter.

.3 In addition, illustrate any special operation, phase of construction or special detail of unusual interest for record purposes.

.4 Take photos of primary entrance at substantial completion.

.5 Forward one clear digital photographs in .jpg format, 150 dpi resolution minimum, 3 MB maximum of each photograph along with monthly progress estimates. Provide the following information on each photograph:

Date:
Name of Contractor:
Name of Project:
Set Number:

.6 On completion of building, provide a photograph of the completed project, taken from the best possible view point to show the completed project to its best advantage. Provide two 200 mm x 250 mm colour prints of the photograph.

.7 All photographs will become the Province's property, to be used for whatever purposes the Province may desire.

6. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES - GENERAL

.1 Submit to the Province, for review, shop drawings, product data and samples called for by the Contract Documents and for such other items as the Province may reasonably request. Do not proceed with work until related submission has been reviewed.

7. SHOP DRAWINGS

.1 Shop Drawings means technical data specially prepared for work of this Contract including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form.

.2 Submit shop drawings presented in a clear and thorough manner to appropriately illustrate the work.

8. PRODUCT DATA

.1 Product Data means standard printed information describing materials, products, equipment and systems; not specially prepared for work of this Contract, other than the designation of selections.

.2 Product data consisting of manufacturers' standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and descriptive data will be accepted in lieu of shop drawings provided that:

.1 information not applicable to the work of this Contract is deleted, and

.2 standard information is supplemented with information specifically applicable to the work of this Contract.

9. SAMPLES

.1 Samples means cuts or containers of materials or partial sections of manufactured or fabricated components which are physically identical to products proposed for use.

10. SUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

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

.2 Determine and verify:

.1 Field measurements.
.2 Field construction criteria.
.3 Catalogue numbers and similar data.
.4 Conformance with Contract Documents.

.3 Notify the Province, in writing, on the submission and at the time of submission, of deviations from requirements of Contract Documents.

.4 Submit one set of transparent sepias for each required shop drawings and one set of clear reproducible pre-printed or photocopied information for product data submission.

.5 Make corrections or changes to rejected submittals and resubmit, as specified for initial submittal.

.6 After final review, the Province will reproduce at its expense, the number of prints he requires, and return reviewed sepia. Contractor shall reproduce at his expense the number of prints required for performance of the Work.

.7 The Province's review of submittals does not relieve Contractor from responsibility for errors and omissions, nor deviations from requirements of the Contract Documents.

END OF SECTION

1. INTENT

.1 Submit to the Province, for review, shop drawings, product data and samples called for by the Contract Documents and for such other items as the Province may reasonably request.

.2 Until submittal is reviewed, do not proceed with work involving the relevant product.

2. RELATED SECTIONS

.1 Submittals Schedule: Section 01 32 16.

3. SHOP DRAWINGS

.1 Shop drawings means technical data specially prepared for work of this Contract; including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form.

.2 Present shop drawings in a clear and thorough manner to appropriately illustrate the work.

.3 Identify field dimensions on drawings.

.4 Identify shop drawings by appropriate references to sheet, detail, schedule or room numbers.

.5 Maximum drawing size: 860 x 1120 mm.

.6 Leave a clear space of 100 mm x 75 mm on each sheet of shop drawings for placement of the Province's review stamp.

.7 Submit one set of mylars for each required shop drawing.

4. PRODUCT DATA

.1 Product data means standard printed information describing materials, products, equipment and systems; not specially prepared for work of this Contract, other than the designation of selections.

.2 Clearly mark product data to identify products.

.3 Manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and descriptive data will be accepted in lieu of shop drawings provided that:

.1 information not applicable to work of this Contract is deleted, and

.2 standard information is supplemented with information specifically applicable to the work of this Contract.

.4 Submit clear reproducible information as follows:

.1 One copy when product data is submitted as:

.1 Data sheets larger than 216 mm x 355 mm. Submit mylars.
.2 Unbound data sheets 216 mm x 355 mm or smaller. Submit printed or photocopied sheets.

.2 Ten copies when product data is submitted as follows:

.1 Information which cannot be duplicated using a photocopier with an automatic document feeder, such as bound or multi-fold information.

.2 Information containing photographs or other information that does not reproduce well on a commercial photocopier.

5. SAMPLES

.1 Samples means cuts or containers of materials or partial sections of manufactured or fabricated components which are physically identical to products proposed for use and which establish minimum standards by which the work will be judged.

.2 Label samples as to origin and intended use in the Work.

6. MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in the specifications, include for Work of all sections required to provide mock-ups, and as follows:

.1 Teaching wall mock-up including electrical rough ins and plywood backing.

.2 Millwork mock-up – including all classroom typical millwork.

.3 Exterior elevation finishes mock-up.

.4 Paint mock-up – including area which consist all paints included in finish board.

.5 Tile Flooring

.2 Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required to comply with the requirements of this Section, and any additional requirements listed in the technical Sections, using materials indicated for the completed Work.

.3 Build mock-ups in location and of size indicated or, if not indicated, as directed by Consultant.

.4 Co-ordinate construction of mock-ups so that the same personnel will supervise construction of the various parts as will do so in the finished Work.

.5 Construct in locations acceptable to the Consultant.

.6 Notify Consultant, seven (7) days in advance of dates and times when mock-ups will be constructed, so as not to cause any delay in the Work.

.1 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.

.2 If requested, the Consultant will assist in preparing a schedule fixing the dates for preparation.

.7 Sample installations must indicate materials, patterns, joints, colours, shades, installation methods and level of workmanship.

.8 Demonstrate the proposed range of aesthetic effects and workmanship.

.9 Obtain Consultant's acceptance of mock-ups prior to starting work, fabrication or construction; modify or replace unacceptable mock-ups as directed by the Consultant and as required to obtain acceptance.

.10 Adjust sample installations as required to conform with the referenced standards, the drawings, and this specification, and to gain acceptance by the Consultant, at no additional cost to the Owner.

.11 Maintain Mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.

.12 Do not proceed with construction of the remainder of the work represented by the mock-ups, until they have been reviewed, altered as required to gain acceptance, and accepted by the Consultant.

.13 Accepted sample installations will become the standard for the project and may be incorporated into the Work, if the mockup is in an undisturbed condition at time of Substantial Performance of the Work and may become part of the completed Work where they form a part of the completed Work. Any work which does not match the accepted mock-ups will be rejected and replaced to match accepted mock-ups.

7. SUBMITTAL PREPARATION

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

.2 Determine and verify:

.1 Field measurements.
.2 Field construction criteria.
.3 Catalogue numbers and similar data.
.4 Conformance with Contract Documents.

.3 Coordinate each submittal with requirements of work and Contract documents. Individual drawings will not be reviewed until all related shop drawing and product data are available.

.4 Notify the Province, in writing, on the submittal and at the time of submission, of deviations from requirements of Contract Documents.

8. SUBMISSION REQUIREMENTS

.1 Make submittals sufficiently in advance of date that reviewed submittals will be required and in such sequence as to cause no delay in the Work.

.2 Accompany submittals with transmittal letter, 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.

.3 Submittals shall include:

.1 Date and revision dates.
.2 Project title and number.
.3 Name of:
  .1 Contractor.
  .2 Subcontractor.
  .3 Supplier.
  .4 Manufacturer.
  .5 Name of detailer when details not prepared by Contractor, sub-contractor, or supplier.
.4 Contractor's stamp, initialed or signed, certifying review of submittal, verification of field measurements, and compliance with Contract Documents.

.4 Make corrections or changes to rejected submittals and resubmit, as specified for initial submission.

9. RESPONSIBILITY FOR ERRORS, OMISSIONS AND DEVIATIONS

.1 The Province's review of submittals does not relieve Contractor from responsibility for errors and omissions, nor deviations from requirements of the Contract Documents.

10. REPRODUCTION OF SUBMITTALS

.1 After final review, the Province will reproduce at his expense, the number of copies he requires, and return reviewed reproducible documents. Contractor shall reproduce at his expense the number of copies required for performance of the Work.

END OF SECTION

1. RELATED SECTIONS

.1 Facility Start-Up Procedures: Section 01 91 01.

2. CONTRACTOR START-UP REPORT

.1 Provide Contractor Start-Up report forms for the following:

.1 Each mechanical system specified in Division 20 and 25.
.2 Each electrical system specified in Division 26.

.2 A set of proforma Contractor Start-Up report forms are available from the Province. These forms may be used in preparation of system reports. Modify the proforma forms and create new forms as required to provide a complete set of start-up report forms.

.3 Contractor may use his own start-up forms provided that they comply with specified requirements of Contractor Start-Up program.

.4 Include Manufacturer's equipment start-up reports, test certificates and balancing reports under the appendix to the Contractor Start-Up report.

.5 Provide an index of the start-up report content and a sub-index for each system category. Include divider tabs for each system category and sub-tabs for each individual system. Similarly provide an index and divider tabs to organize the report's appendix.

.6 Preface each system in the report with:

.1 A list of equipment that makes up the system.

.2 Adjacent to the list of equipment, include columns to indicate status of equipment operation, to date and to sign off equipment start-up.

.3 Space to record equipment and operational problems which can not be corrected within the scheduled Contractor start-up program, and which may delay Interim Acceptance of the Work.

3. SUBMISSIONS

.1 Submit draft of project specific Contractor Start-Up report forms for the Province's review and comment within fourteen (14) weeks after date of commencement of Contract. Coordinate requirements for draft document with the Province. Draft Contractor Start-Up report forms shall be complete with blank manufacturer's equipment start-up forms, test certificates and balancing reports.

.2 Submit final Contractor Start-Up report forms to the Province no later than 4 weeks after receipt of the Province's review and comments on draft submission.

.3 Submit Contractor Start-Up reports, complete with all data entered, prior to Interim Acceptance of the Work.

END OF SECTION

1 General

1. INTENT

.1 The intent of Delegated Design Submittals required by this section is to account for professional engineering responsibility for design, review and acceptance of components of Work forming a part of permanent Work in accordance with Building Code, and that has been assigned to a design entity other than Consultant including, but not limited to, the following:

.1 Design requiring structural analysis of load bearing components and connections.

.2 Design requiring compliance with fire safety regulations.

.3 Design requiring compliance with life or health safety regulations.

.2 This section provides standard forms for submittal of Letter of Commitment and Letter of Compliance required complying with requirements of Building Code and design delegated to a professional Engineer within technical specification sections.

.3 Delegated Design Submittals are not required for components of Work requiring engineering for temporary Work (for example: crane hoisting, engineered lifts, false Work, shoring, concrete formwork) that would normally form a part of Contractor's scope of Work.

.4 The requirements of this section are in general conformance with recommended Responsibilities for Engineering Services for Building Projects published by Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA), with regards to duties of specialty professionals appointed during construction period.

.5 The requirements of this section do not diminish responsibilities of Consultant's role as Registered Professional of Record; submittals will be used by Consultant to establish that Work is substantially performed in accordance with Building Code.

2. DELEGATED DESIGN

.1 Performance and Design Criteria: Provide products and systems complying with specific performance and design criteria indicated where professional design services or certifications by a design professional are specifically required of Trade Contractor by Contract Documents.

.2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant and Construction Manager.

.3 Delegated design will be required for elements designed by a specialty professional, which may include:

.1 Elements normally fabricated off-site

.2 Elements that require specialized fabrication equipment or a proprietary fabrication process not usually available at job site (for example: open web steel joists, wood trusses, combination wood and metal or plywood joists, prefabricated wood or metal buildings, noise and vibration isolation devices, elevators).

.3 Elements requiring civil engineering, not normally a part of scope of services performed by architectural; structural; mechanical; electrical; or geotechnical disciplines of Consultant (for example: structural steel connection design, steel deck design).

2 Products

1. LETTER OF COMMITMENT

.1 Submit a signed and sealed Letter of Commitment on company letterhead addressed to Consultant in accordance with format in Appendix A attached to the end of this Section prior to starting Work requiring design and seal of a professional engineer.

2. LETTER OF COMPLIANCE

.1 Submit a signed and sealed Letter of Compliance on company letterhead addressed to Consultant in accordance with format in Appendix B attached to the end of this Section on completion of Work requiring design and seal of a professional engineer.

3 Execution

1. IMPLEMENTATION

.1 Include summary of Work described in technical specification section as a part of the required Letter of Commitment.

.2 Prepare required submittals and present to Consultant within sufficient time to allow for Consultant’s detailed review and acceptance.

APPENDIX A

LETTER OF COMMITMENT

Submit a signed and sealed letter of commitment on company letterhead in the form as follows:

[Date]

Consultant of record
[Consultant's Address]

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Commitment for Delegated Design of [System of Component of Work]
[Name of Project]
[Project Number]
[City, Province]

As the retained registered professional engineer for design and field review of the above named component of Work and project, I hereby give assurance I am qualified to perform the following Work as required by Contract Documents:

1. [List appropriate design services for System or Component of Work];
2. Preparation of shop and erection documents;
3. Review fabrication of [structural] [fire rated] [life and health safety] components;
4. Review erection of [structural] [fire rated] [life and health safety] components.
5. [Modify list to suit System of Component of Work.]

I hereby give assurance that I will be responsible for above noted Work as described in Section [?????] – [Name of Section] of Project Manual, including requirements of addenda, change orders and change directives.

I also undertake to be responsible for field review of fabrication and erection of [structural] [fire rated] [life and health safety] components as required to ascertain substantial compliance with the Building Code and Contract Documents.

I will notify you in writing if my responsibility is terminated at any time during the course of Work covered by this Letter of Commitment.

Retained Professional Engineer

Signature

Date

(Apply seal)

APPENDIX B

LETTER OF COMPLIANCE

[Date]

Consultant of Record
[Consultant's Address]

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Compliance for Delegated Design of [System of Component of Work]
[Name of Project]
[Project Number]
[City, Province]

I hereby give assurance that I have fulfilled my obligations for field review as outlined by previously submitted Letter of Commitment.

I hereby give assurance that aspects of [structural] [life and health safety] Work as defined by previously submitted Letter of Commitment substantially comply with Contract Documents and Building Code.

Retained Professional Engineer

Signature

Date

(Apply seal)

END OF SECTION

1. INTENT

.1 These procedures apply to requirements for patching and making good around new and existing work.

2. SITE VISIT

.1 Review existing site conditions during bid period. Investigate ceiling plenums, duct shafts, wall structures and other building systems affected by the Work.

.2 Confirm dimensions of applicable existing equipment with field measurements.

.3 Use visit to note required materials which may be difficult provide and notify the Province as soon as possible.

3. SUBMITTALS

.1 Comply with requirements of Section 01 33 00.

.2 Submit drawings of structural alterations and temporary support systems for the Province's review before proceeding with structural alterations.

.3 Provide drawings fully detailing alterations to structure, signed and sealed by a professional structural engineer registered to practice in the Province of Alberta.

.4 Submit, for the Province’s approval, details of methods other than specified coring, drilling, or cutting.

4. STRUCTURAL ALTERATIONS

.1 Do not cut, cut into or alter any building structure, or bearing walls and partitions until proposed methods and procedures for doing so, including temporary support system, are reviewed by the Province.

.2 Conform strictly to approved details. Cut or remove only to extent shown on engineer's drawing reviewed by the Province.

5. SPECIAL PROTECTION REQUIREMENTS

.1 Protect unaffected finishes, equipment and adjacent work from damage caused by cutting, moving, removal and patching operations. Protect surfaces which will remain as part of finished work.

.2 Notify the Province immediately of damage to fireproofing coatings.

.3 Protect fireproofing coating to structural members. If damaged due to work of this Contract, restore damaged areas to original condition using materials to match existing colour, texture and required fire protection rating.

.4 Protect personnel, building occupants and public from airborne dust and contaminants when cleaning spray fireproofing or contaminant-generating materials from structure.

.5 Protect area below welding work from sparks and molten metal, using wet double canvas blankets.

6. CUTTING, REMOVAL AND FITTING

.1 Make cuts with clean, true, smooth edges. Provide patches inconspicuous in final assembly.

.2 Use electric percussion tools to cut clay tile, plaster and concrete blocks.

.3 Carefully remove material being cut. Do not cut services discovered.

.4 Where required, carefully remove modular, manufactured type finishes, including lay-in ceiling tile in component ceiling systems.

.5 Fit alteration work airtight to pipes, sleeves, ducts, conduits and other required penetrations through building elements.

7. MATERIALS

.1 Obtain new products to patch, match or extend existing products and meet or exceed quality of existing products.

.2 Quality of existing products, available for assessment during pre-bid site visit, shall serve as basis for requirements for appearance and performance of materials used in the Work.

.3 Where existing material cannot be matched with new, salvaged material may be used subject to approval by the Province.

.4 Where matching materials are not available, the Province will consider similar product which meets same performance requirements as existing.

.5 Obtain acceptance of the Province before installing any materials not matching existing.

8. PATCHING, EXTENDING AND MAKING GOOD TO EXISTING WORK

.1 Patch, extend and make good existing work using skilled workers able to match existing quality. Quality of work shall meet technical requirements for similar components throughout Specifications.

.2 Where a portion of existing finished surface is damaged, lifted, stained, or otherwise imperfect, patch or replace with matching materials. Match existing finishes unless specified otherwise.

.3 If patched or imperfect surface was painted or coated, repaint or recoat entire surface area.

.4 Replace damaged lay-in type ceiling tile and other components with new.

.5 Patch surfaces and materials exposed by partition removal, with finishes to match adjacent.

.6 Restore existing work damaged during construction to a condition matching existing finishes.

9. TRANSITIONS

.1 Make transitions as smooth as possible where new work abuts or finishes flush with existing work.

.2 Match existing adjacent work in texture and appearance, providing transition invisible to the eye from distance of 2 meters.

.3 When smooth transition is not practicable, e.g., from a smooth finish to masonry, tile or plaster, terminate existing surface along a straight line at a natural point of division and provide trim to the Province's approval.

.4 Where two or more spaces become one space and planes are nominally continuous, re-work floors and walls and ceilings to provide planes meeting without breaks, steps or bulkheads.

.5 Where change of plane exceed 75 mm, obtain instructions from the Province for method of executing transition.

10. EXISTING SERVICES

.1 Establish location and extent of services in area of work and notify the Province of findings before starting Work.

.2 Inform the Province immediately of unknown services that are encountered. Confirm findings in writing.

11. ALTERATIONS TO MECHANICAL AND ELECTRICAL SERVICES

.1 Refer to mechanical and electrical drawings and Divisions 20-23 and 26 of the Specifications for extent of mechanical and electrical alterations.

.2 Perform alterations with minimum disturbance to existing work.

.3 Access service runs in ceiling spaces through light fixture openings and ceiling access panels where possible. Subject to the Province's approval, provide bulkheads to conceal services where ceiling spaces are not accessible.

.4 Except in mechanical and electrical rooms, conceal the following:

.1 ducts
.2 pipes
.3 raceways
.4 conduit runs
.5 junction boxes

using chases and cut-outs in walls and floors, underfloor ducts and ceiling spaces.

.5 Patch and make good existing work, where damaged due to alterations to and installation of services.

12. CORING, DRILLING AND SAW-CUTTING CONCRETE

.1 Complete an x-ray inspection of affected concrete area before coring. Employ the services of an experienced x-ray inspector. Confirm with the Province before coring or drilling, location of reinforcing steel and raceways that may be present.

.2 Perform coring and drilling after normal working hours, unless specified otherwise. Confirm coring and drilling times with the Province.

.3 Wet or dry core drilling and saw-cutting are acceptable. Reduce amount of cooling water used to minimum required and collect water used in suitable containers, or use a suitable vacuum system that will collect water.

.4 Do not core structural beams or cut conduits or reinforcing steel without written permission from the Province.

END OF SECTION

1. WORK SITE SAFETY - THIS CONTRACTOR IS "PRIME CONTRACTOR"

.1 The Contractor shall, for the purposes of the *Occupational Health and Safety Act* (Alberta), and for the duration of the Work of this Contract:

.1 be the "prime contractor" for the "work site", and

.2 do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with the Act and its regulations, as required to ensure the health and safety of all persons at the "work site".

.2 The Contractor shall direct all Subcontractors, Sub-subcontractors, Other Contractors, employers, workers and any other persons at the "work site" on safety related matters, to the extent required to fulfill its "prime contractor" responsibilities pursuant to the Act, regardless of:

.1 whether or not any contractual relationship exists between the Contractor and any of these entities, and

.2 whether or not such entities have been specifically identified in this Contract.

.3 The Province does not anticipate that there will be any contractors, other than those performing the Work of this Contract, engaged in work at the "work site" during the performance of the Work of this Contract.

2. CERTIFICATE OF RECOGNITION (COR)

.1 Safety certification, as specified in Section 00 21 13 - Instructions to Bidders, is a condition of contract award.

.2 The Contractor shall maintain a valid standard COR, COREL, or TLC for the duration of the Work of this Contract.

END OF SECTION

1. DEFINITIONS

.1 Regulatory requirements means laws, by-laws, ordinances, rules, regulations, codes, orders of authorities having jurisdiction, and other legally enforceable requirements applicable to the Work and which are or become in force during the performance of the Work.

2. GENERAL

.1 Comply with regulatory requirements.

.2 Except as otherwise specified, apply for, obtain, and pay all fees associated with, permits, licenses, certificates, and approvals required by regulatory requirements and the Contract Documents, based on:

.1 regulatory requirements and fees in force on date of tender submission, and

.2 any change in regulatory requirements or fees scheduled to become effective after date of tender submission and of which public notice has been given prior to date of tender submission.

.3 The Province will obtain permanent easements and rights of servitude which may be required for performance of the work.

.4 Contractor shall give all notices required by regulatory requirements.

3. CONTRACT DOCUMENTS

.1 Contractor shall not be responsible for verifying that Contract Documents comply with regulatory requirements. If Contract Documents are at variance therewith, or changes which require modification to Contract Documents are made to regulatory requirements, by authorities having jurisdiction, subsequent to date of tender closing, Contractor shall notify The Province in writing, requesting direction, immediately such variance or change becomes known to him. The Province may make changes required to Contract Documents, and any resulting change in Contract Price or Contract Time will be made in accordance with the General Conditions of Contract.

.2 If Contractor fails to notify the Province in writing and obtain the Province's direction as required in paragraph 3.1 and performs work knowing it to be contrary to regulatory requirements, Contractor shall be responsible for and shall correct violations thereof and shall bear costs, expenses and damages attributable to his failure to comply with provisions of such regulatory requirements.

4. ALBERTA BUILDING CODE

.1 Conform to and perform work in accordance with the Alberta Building Code 2014, except as otherwise indicated in Contract Documents.

5. PERMITS

.1 Contractor is responsible for obtaining required permits listed but not limited to the following:

.1 Demolition Permit
.2 Solar Panels – Microgeneration Application required for Solar Panel Connection

.2 Contractor to apply, obtain and pay for permits related to demolition and damage deposits. Price of demolition permit ($100.00) and damage deposit ($2,500), prior to construction start.

.3 Development Permit: The Province will apply for, obtain, and pay for development permit if required. Refer to Section 00 31 00 for Development Permit obtained.

.4 Building Permit:

.1 The Province will apply for, obtain, and pay for building permit. Refer to Section 00 31 00 for Building Permit obtained.

.2 Contractor shall display the building permit and such other permits in a conspicuous location at the Place of the Work.

.5 Occupancy Permits:

.1 Where required by authority having jurisdiction, Contractor shall apply for, obtain, and pay for occupancy permits, including partial occupancy permits.

.2 Where Contract Document deficiencies are required to be corrected in order to obtain occupancy permits, including partial occupancy permits, the Province will issue appropriate instructions to correct the Work.

.3 Turn occupancy permits over to the Province.

END OF SECTION

1. TESTING BY CONTRACTOR

.1 Contractor shall furnish to the Province, upon request, test results from testing performed by Contractor.

2. TESTING BY PROVINCE

.1 The Province reserves the right to employ services of independent testing agencies to establish if work complies with Contract Documents. The Province will appoint and pay for services of such testing agency.

.2 Where tests or inspections, by the Province appointed testing agency, indicate work is not in accordance with the Contract Documents, additional tests or inspections, as the Province may require, to verify acceptability of corrected work, shall be paid for by Contractor.

3. INSPECTION OF LINES AND LEVELS

.1 When the setting out of main lines for the building is complete, and floor elevations established, request the Province, in writing, to inspect this work.

.2 Do not proceed with any further work until this inspection is made and confirmed in writing.

4. REFERENCE STANDARDS

.1 Within the text of these specifications, reference may be made to the following standards:

.1 ANSI - American National Standards Institute
.2 ASTM - American Society for Testing and Materials
.3 CGSB - Canadian General Standards Board
.4 CSA - Canadian Standards Association
.5 CAN - National Standard of Canada (published by CGSB)
.6 FM - Factory Mutual Engineering Corporation
.7 ULC - Underwriters Laboratories of Canada

.2 The referenced standard and any amendments in force on the day of receipt of bids shall be applicable to the work during the duration of the Contract.

END OF SECTION

1. INTENT

.1 Provide temporary facilities and controls specified in this Section and as otherwise required for performance of work of the Contract.

2. REFERENCE DOCUMENTS

.1 Canadian General Standards Board (CGSB):

.1	CAN/CGSB 1.189-00	Exterior Alkyd Primer for Wood
.2	CGSB 1.59-97	Alkyd Exterior Gloss Enamel

.2 Canadian Standards Association (CSA):

.1	CSA-A23.1/A23.2-04	Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete
.2	CSA-0121-M1978(R2003)	Douglas Fir Plywood
.3	CAN/CSA-S269.2-M1987 (R2003)	Access Scaffolding for Construction Purposes
.4	CAN/CSA-Z321-96 (R2001)	Signs and Symbols for the Occupational Environment

3. SUBMITTALS

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

4. DESIGN OF TEMPORARY FACILITIES

.1 Contractor shall be responsible for design and safety of temporary facilities. Temporary facilities of such nature that engineering proficiency is required for their design to ensure safety during construction shall be designed by a Professional Engineer in the employ of the Contractor. Before the temporary structure is used, the person responsible for the design or his representative, shall inspect the structure and issue a certificate stating that it has been constructed according to his design.

5. FIELD OFFICES AND SHEDS

.1 Contractor's Office: Provide and maintain, during the entire progress of the work, a suitable office on the site, for own use, with suitable tables or benches for the examination of drawings, specifications, etc., and where all notices and instructions from the Province may be received and acknowledged. Provide meeting space for 15 persons with chairs and table space for site meetings.

.2 Province and School Board representative have free access to use contractor site office during construction.

.3 Materials Storage: Provide suitable weather and waterproof storage buildings for the storage and protection of materials. These buildings shall be under lock and key maintained in good condition until the completion of the building.

6. UTILITIES

.1 Sanitary Facilities: Provide and maintain during the work, temporary toilets for the use of all workmen employed on the work. Toilets in the finished portion of the building shall not be used by workmen. Comply with the Provincial Board of Health Regulations under the Public Health Act. Provide separate facilities for both sexes as required.

.2 Water Supply: Provide a continuous supply of clean, potable water for all trades.

.3 Temporary Light and Power: Provide and pay all costs in connection with temporary light and power required for execution of the work and maintain this service in good working order.

.4 Temporary Heating: Make provision for heating the building during its erection and until date of Interim Acceptance of the Work by the Province. Ensure the temporary heating system will maintain a minimum temperature of 16°C in the building enclosure from shell construction to completion of the interior work. For this purpose, heaters and radiators specified for the project may not be used. Pay all costs for temporary heating up to the date of Interim Acceptance of the Work by the Province. The cost of any boilers, chimneys, pumps, piping, valves, heaters, radiators, etc., necessary for a temporary hookup shall be borne by the Contractor. Any portion of the building's heating or ventilating system used by the Contractor shall be restored to "new" condition, placed in permanent positions as indicated on Drawings before acceptance by the Province. Warranty period on equipment used temporarily shall commence on date of Interim Acceptance of the Work.

.5 Telephone: Arrange and pay for telephone service to the above-mentioned offices for the duration of the Contract. Long distance calls made by the Province will be recoverable.

.6 It is the intention of the Province to supply temporary services where specified. However, in the event of any unforeseen occurrence, the Province may discontinue such temporary service, without notice, and without acceptance of any liability, for damage or delay, caused by such withdrawal of temporary services.

8. BARRIERS

.1 Hoarding: Supply and erect hoarding at job site to locations indicated on drawings. Hoarding shall be 2400 mm high, consisting of wood uprights set firmly in the ground, faced with new 12.5 mm Fir, Pine or Poplar plywood, rough sheathing grade plywood, factory pre-treated, pre-stained green with wood preservative on both sides. Maintain in good condition during construction. When hoarding is no longer required, it shall be removed from the site. Demolished material shall become property of Contractor. Required for existing daycare side and playground area.

.2 Chain Link Barrier: Standard chain link barrier for remainder of area is acceptable.

.3 Supply, erect and maintain barricades, sidewalk sheds, catch platforms, and accessories as required by authorities having jurisdiction. When no longer required, remove from the site. Demolished material shall become property of Contractor.

9. CONSTRUCTION AIDS

.1 Appliances and Scaffolding: Furnish all necessary transportation, scaffolding, forms, labour, tools and mechanical appliances, machinery, services and material required for executing the work.

10. TEMPORARY ENCLOSURES

.1 Requirements specified herein are additional to and are intended to supplement requirements pertaining to temporary enclosures specified elsewhere in the Contract Documents.

.2 Provide temporary barriers and enclosures as required to ensure that construction work and activities continue uninterrupted and unhampered by adverse weather conditions for duration of construction period.

11. PROTECTION OF THE PUBLIC AND FIRE SAFETY

.1 Comply with requirements of the Alberta Building Code, Part 8, except as specified otherwise.

.2 Provide and maintain temporary fire protection equipment during performance of Work required by the Province in accordance with governing codes, regulations, and bylaws.

.3 Burning rubbish and construction waste materials is not permitted on site.

12. SECURITY

.1 Provide and pay for responsible security personnel, acceptable to the Province, to guard site and contents of site after working hours and during holidays.

.2 Equip exterior temporary doors with hardware and locks.

.3 Secure building against illegal entry at end of each work day.

13. ACTIVITIES GENERATING VIBRATION, NOISE OR SAFETY CONCERNS

.1 Operations considered by the Province to generate vibration, noise or safety concerns include, but are not limited to, the following:

.1 Jack hammering.
.2 Cutting and coring of concrete.
.3 Use of powder actuated fasteners.

.2 Do the following when work generating vibration, noise or safety concerns may affect user or user operations.

.1 Coordinate with the Province and user representative.

.2 Schedule and coordinate hours of work with user representative.

.3 Stop operations generating vibration, noise or safety concerns when instructed verbally or in writing by the Province. Do not resume such operations until authorized by the Province.

14. PREVENTING MOULD DURING CONSTRUCTION

.1 Monitor interior relative humidity conditions in relation to surface temperatures to prevent generation of moisture that may contribute to mould growth on the surface of organic construction materials.

.2 If using temporary heaters, use a type that exhausts combustion products directly to the exterior of building enclosures. Do not use temporary heaters that exhaust combustion products into building enclosures.

.3 Install insulation concurrently with air and vapour retarder.

.4 Protect all organic construction materials from the elements, before, during, and after their installation.

.5 Refer to CCA 82 - 2004 "Mould Guidelines for the Canadian Construction Industry", published by the Canadian Construction Association, for additional information about mould, its implications and recommendations on its prevention.

.6 Promptly report to the Minster any mould growth observed at the work site. If the Province determines that such mold growth was caused by the Contractor's operations, the Contractor shall promptly remove it in accordance with procedures prescribed by the Province, at no cost to the Province.

15. CLEANING DURING CONSTRUCTION

.1 At regular intervals during progress of work, clean-up building premises and site and dispose of waste material, rubbish, and debris.

.2 Do not allow waste material, rubbish, and debris to accumulate and become an unsightly or hazardous condition. Maintain site in a clean and orderly condition.

.3 Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

.4 Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.

.5 Sprinkle dusty debris with water as required.

.6 Lower waste material in a controlled manner; do not drop or throw materials from heights.

.7 Clean interior building areas prior to commencement of site painting and finishing operations and continue cleaning on an as-needed basis and to eliminate dust, until building is ready for occupancy.

.8 Ensure that each Subcontractor engaged on the Work bears his full responsibility for cleaning up during and upon completion of his work in accordance with provisions of this article.

16. REMOVAL AND RESTORATION

.1 Remove temporary facilities specified in this Section, prior to request for inspection for Final Acceptance.

.2 Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to original condition.

END OF SECTION

1. RELATED REQUIREMENTS

.1 Substitutions during bidding period: Instructions to Bidders.

2. DEFINITIONS

.1 Proprietary specification means a specification which includes one or more proprietary names of products or manufacturers, or both, and may also include descriptive, reference standard, or performance requirements, or any combination thereof.

.2 Non-proprietary specification means a specification which includes descriptive, reference standard or performance requirements, or any combination thereof, but does **not** include proprietary names of products or manufacturers.

.3 Substitution means a product or manufacturer not specified by proprietary name which may be acceptable in place of a product or manufacturer which is specified by proprietary name.

3. PRODUCT OPTIONS

.1 For products specified by non-proprietary specification:

.1 select any product by any manufacturer, which meets requirements of Contract Documents.

.2 For products specified by proprietary specification:

.1 select any product or manufacturer named, or

.2 substitute an unnamed product or manufacturer in accordance with Article 4. of this Section.

.3 For products specified by proprietary specification and accompanied by words indicating that substitutions will not be accepted:

.1 select any product or manufacturer named; substitutions are not permitted.

4. SUBSTITUTIONS

.1 Substitute Products: Where substitute products are permitted, unnamed products will be accepted by the Minister, subject to the following:

.1 Substitute products shall be the same type as, be capable of performing the same functions as, and meet or exceed the standards of quality and performance of the named product(s). Substitutions shall not require revisions to Contract Documents nor to work of Other Contractors.

.2 Substitute Manufacturers: Where substitute manufacturers are permitted, unnamed manufacturers will be accepted by the Minister, subject to the following:

.1 Substitute manufacturers shall have capabilities comparable to those of the named manufacturer(s). Substitutions shall not require revisions to Contract Documents nor to work of Other Contractors.

.3 In making a substitution Contractor represents that:

.1 he has investigated substitute product or manufacturer, or both, and has determined that it meets the criteria specified in 4.1 or 4.2, or both, and

.2 he will make any changes to the Work necessitated by the substitution as required for the Work to be complete in all respects, and

.3 he waives claims for additional costs and time caused by substitution which may subsequently become apparent.

.4 Substitutions shall not be ordered nor installed without Minister's acceptance.

.5 If in Minister's opinion, a substitution does not meet requirements of Contract Documents, Contractor shall, at no extra cost to Minister, provide a product which, in Minister's opinion, does meet requirements of Contract Documents.

5. PROPRIETARY SPECIFICATIONS

.1 Notwithstanding specified proprietary names of either or both products or manufacturers, products provided shall meet other applicable requirements of Contract Documents. Modify products if necessary to ensure compliance with all requirements of Contract Documents.

6. CHANGES TO ACCEPTED PRODUCTS AND MANUFACTURERS

.1 Products and manufacturers accepted by Minister for use in performance of Work of Contract shall not be changed without Minister's written consent.

.2 Submit requests to change accepted products and manufacturers to Minister in writing, including product data indicated in article 7.

7. PRODUCT DATA

.1 When requested by Minister, submit complete data substantiating compliance of a product with requirements of Contract Documents. Include the following:

.1 Product identification, including manufacturer's name and address.

.2 Manufacturer's literature providing product description, applicable reference standards, and performance and test data.

.3 Samples, as applicable.

.4 Name and address of projects on which product has been used and date of each installation.

.5 For substitutions and requests for changes to accepted products, include in addition to the above, the following:

.1 Itemized comparison of substitution with named product(s). List significant variations.

.2 Designation of availability of maintenance services and sources of replacement materials.

END OF SECTION

1. RELATED REQUIREMENTS

.1 Submittals: Section 01 33 00.
.2 Product options and substitutions: Section 01 62 00.

2. SUBMITTALS

.1 Comply with requirements specified in specification Section 01 33 00.

.2 Within 15 days of date of commencement of Contract, submit four (4) copies of Document 01 62 35A - Products List, complete with names of products and manufacturers for each item of work listed.

3. PRODUCTS LIST

.1 Comply with requirements specified in Document 01 62 35A appended to this section.

.2 Province's Review: The Province will with reasonable promptness:

.1 Review the Contractor's submission and determine whether products and manufacturers named comply with requirements of Contract Documents.

.2 Notify the Contractor, in writing, of acceptance or rejection of products and manufacturers named.

.3 If requested in writing by the Contractor, provide details relating to non-compliance of products.

.3 Upon rejection of a Contractor proposed product the Contractor shall:

.1 Provide, at no additional cost to the Province, a product meeting the requirements of the Contract Documents, and acceptable to the Province.

END OF SECTION

1. FROM:(Contractor) _____
(Name)

_____
(Address)

TO: [Name of Project Manager],
[ ],
[ ],
[ ],
[ ], [ ]
[ ],

PROJECT: [Name]

[Location]

Plan/Project No.: Job/Bldg. No.:

2. It is understood that:

.1 This Products List forms part of the Contract Documents for the above project.

.2 Product names/model numbers and manufacturer's names are provided for the Items of Work listed.

.3 All Items of Work are not necessarily listed.

3. In submitting this Products List the Contractor represents that:

.1 Products and manufacturers named meet the applicable requirements of the Contract Documents and have been selected in accordance with requirements of specification Section 01 62 00.

.2 Substitutions, if any, in lieu of specified proprietary products, comply with applicable requirements of specification Section 01 62 00.

4. The following conditions apply to the Products List:

   .1 The Province will determine whether the named products and manufacturers meet requirements of the Contract Documents and shall have the right to reject named products and manufacturers that, in the Province's opinion, do not meet such requirements.

   .2 Province's acceptance of a product or manufacturer, proposed by Contractor in Products List, shall not relieve Contractor from his responsibility to comply with Contract Documents, including the submission of shop drawings, product data and samples which may be required.

   .3 Products and manufacturers accepted by the Province shall be used in the performance of the Work and shall not be changed without the Province's written consent.

5. Products specified by the proprietary method are indicated with an asterisk (*).

6. Products List:

Spec. Section Number	Item of Work	Product Name/ Model No.	Manufacturer's Name

END OF SECTION

1. RELATED SECTIONS

.1	Submittals	Section 01 33 00.
.2	Cleaning during construction and waste disposal:	Section 01 50 00.
.3	Contract Acceptance Procedures	Section 01 77 20.

2. SUBMITTALS

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

3. DELIVERY, STORAGE AND HANDLING

.1 Protect packaging during delivery, storage and handling to prevent development of mould and mildew on packaging and on products.

.2 Request that suppliers provide cleaning materials to minimize packaging and equipment.

.3 Deliver materials in recyclable, or in reusable packaging, such as cardboard, wood paper, or reusable blankets which will be reclaimed by supplier or manufacturer for recycling.

4. CLEANING MATERIALS

.1 Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

5. FINAL CLEANING

.1 Perform final cleaning operations specified herein prior to request for inspection for Interim Acceptance of the Work.

.2 Use experienced workers or professional cleaners for final cleaning.

.3 Remove grease, paint spots, dirt, dust, stains, labels, fingerprints and other foreign matter from interior and exterior surfaces; vacuum and dust behind grilles, louvres and screens; wash floor surfaces not otherwise finished; clean metal doors and frames; clean metal work; clean equipment; clean hardware; clean and polish glass on both sides; clean and polish mirrors.

.4 Repair, patch and touch-up marred surfaces to match adjacent finishes.

.5 Clean existing exterior glazing.

.6 Replace cracked and broken glass.

.7 Ensure that cleaning agents and methods do not remove finishes and permanent protective coatings on surfaces being cleaned. Follow manufacturer's printed maintenance requirements for cleaning.

.8 Leave all surfaces in perfectly clean and unsoiled condition to the Province's satisfaction.

8. WASTE DISPOSAL REQUIREMENTS

.1 Remove all waste generated during cleaning operations from site.

END OF SECTION

1. CONTRACT ACCEPTANCE PROCEDURES

.1 Prior to requesting the Province's inspection for Interim Acceptance, Contractor shall do the following:

.1 Ensure that the Work is ready for use for the purpose intended.

.2 Review Contract Documents and inspect Work to confirm that prerequisites to Interim Acceptance of Work have been fulfilled and that Work is ready for inspection for Interim Acceptance.

.2 Submit written request to the Province for inspection for Interim Acceptance of the Work, certifying that prerequisites have been fulfilled and specifying known exceptions in the form of a list of items to be completed, corrected or submitted.

.3 Results of the Province's inspection for Interim Acceptance will form initial Contract Deficiency list.

.4 Following inspection, the Province will:

.1 issue a Letter of Interim Acceptance stating effective date of Interim Acceptance of the Work, with a copy of the Contract Deficiency list attached thereto, or

.2 advise Contractor that prerequisites to Interim Acceptance are not fulfilled and repeat inspection for Interim Acceptance as necessary.

.5 Upon issuance of Letter of Interim Acceptance, the Province will assume responsibility for care, custody and control of the Work, including responsibility for:

.1 Facility operation, including all systems and equipment.
.2 Maintenance.
.3 Security.
.4 Property insurance.
.5 Utility costs.

.6 Prior to requesting the Province's inspection for Final Acceptance, Contractor shall do the following:

.1 Ensure that the entire Work, except those items arising from the warranty provisions of the Contract Documents, has been performed to the requirements of the Contract Documents.

.2 Review Contract Documents and inspect Work to confirm that prerequisites for Final Acceptance of Work have been met and that Work is ready for inspection for Final Acceptance.

.7 Submit written request to the Province for inspection for Final Acceptance of Work, including copy of the Province's most recent Contract Deficiency list, and certifying that each Contract Deficiency has been corrected or otherwise resolved in a manner agreed to between the Province and Contractor. List known exceptions, if any, in request.

.8 Following inspection, the Province will:

.1 issue a Letter of Final Acceptance, stating effective date of Final Acceptance of Work, or

.2 advise Contractor of Contract Deficiencies which must be corrected prior to issuance of Letter of Final Acceptance.

2. FINAL CLEANING

.1 Perform final cleaning prior to request for inspection for Interim Acceptance of the Work.

.2 Use experienced workers or professional cleaners for final cleaning.

.3 Remove grease, paint spots, dirt, dust, stains, labels, fingerprints and other foreign matter from interior and exterior surfaces.

.4 Repair, patch and touch-up marred surfaces to match adjacent finishes.

.5 Replace cracked and broken glass.

.6 Ensure that cleaning agents and methods do not remove finishes and permanent protective coatings on surfaces being cleaned.

.7 Broom clean or remove snow and ice from all exterior paved areas designed for pedestrian or vehicular traffic, including parking areas.

.8 Remove waste, surplus materials and temporary facilities from the site.

.9 Leave all surfaces in perfectly clean and unsoiled condition.

3. PROJECT RECORD DOCUMENTS

.1 The Province will provide a set of ozalid prints for record drawing purposes.

.2 Maintain project record drawings separate from construction drawings and record deviations from Contract Documents caused by site conditions and changes ordered by Minister. Mark changes in red coloured ink.

.3 Record the following:

.1 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

.2 Field changes of dimensions and detail.

.3 Changes made by change and field order.

.4 Submit project record drawings to Minister before or with request for inspection for Interim Acceptance.

4. OPERATION AND MAINTENANCE DATA

.1 Provide Minister with 3 copies of operation and maintenance data, as called for in the Contract Documents, made up as follows:

.1 Bind data in vinyl hard cover, variable capacity, expanding binder with full metal hinge and slide lock mechanism for 215 x 280 mm size paper.

.2 Enclose title sheet, labeled "Operating and Maintenance Data Manual", project name, date and list of contents.

.3 Organize contents into applicable sections of work to parallel project specifications section break-down. Identify each section with tabs of laminated mylar plastic.

.2 Include the following information plus data specified.

.1 Maintenance instructions for finished surfaces and materials.

.2 Copy of hardware and paint schedules.

.3 Names, addresses and phone numbers of subcontractors and suppliers.

.4 Guarantees, warranties and bonds indicating:

.1 Name and address of project.
.2 Warranty/Guarantee/Bond commencement date and duration.
.3 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
.4 Signature and seal of Contractor.

.5 Additional material/equipment used in project listed under various sections showing name of manufacturer and source of supply.

.3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.

.4 Include one complete set of reviewed shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

.5 Submit operation and maintenance manuals before or with request for inspection for Interim Acceptance.

5. SPARE PARTS AND MAINTENANCE MATERIALS

.1 Deliver specified spare parts and maintenance materials before request for inspection for Interim Acceptance.

.2 Use unbroken cartons, or if not supplied in cartons, they shall be securely packaged. Clearly mark as to content.

.3 If applicable, identify colour, room number or area where materials are used.

END OF SECTION

1. SUMMARY OF PROCESS

.1 A Contract acceptance process shall be used to facilitate the Province's acceptance of the Work. The process can be summarized as follows:

.1 Interim Acceptance of the Work:

.1 Fulfillment of prerequisites to Interim Acceptance and substantial performance.
.2 Inspection for Interim Acceptance and substantial performance.
.3 Issuance of Letter of Interim Acceptance and certificate of substantial performance.

.2 Final Acceptance of the Work:

.1 Fulfillment of prerequisites to Final Acceptance.
.2 Inspection for Final Acceptance.
.3 Issuance of Letter of Final Acceptance.

.3 Total Completion of the Work:

.1 Fulfillment of prerequisites to Total Completion.
.2 Inspection for Total Completion.
.3 Issuance of Letter of Total Completion.

2. RELATED SECTIONS

.1	Regulatory Requirements:	Section 01 41 00.
.2	Temporary Facilities and Controls:	Section 01 50 00.
.3	Final Cleaning:	Section 01 74 23.
.4	Operation and Maintenance Data:	Section 01 78 23.
.5	Project Record Documents:	Section 01 78 39.
.6	Spare Parts and Maintenance Materials:	Section 01 78 43.
.7	Equipment and Systems Demonstration and Instruction:	Section 01 79 00.
.8	Facility Start-Up Procedures:	Section 01 91 01.
.9	Starting of Equipment and Systems:	Section 01 91 05.
.10	Testing, Adjusting and Balancing:	Section 01 91 10.

3. PREREQUISITES TO INTERIM ACCEPTANCE

.1 Prior to requesting the Province's inspection for Interim Acceptance, Contractor shall do the following for both the core school and modular classrooms, not necessarily in order listed:

.1 Perform Contractor Start-Up activities as specified in Section 01 91 01.

.2 Obtain and submit evidence of compliance with regulatory requirements as specified in Section 01 41 00, including the following:

.1 Occupancy permit(s).
.2 Inspection/operating certificates.

.3 Remove from project site temporary facilities as specified in Section 01 50 00, along with construction tools, equipment, mock-ups and similar items.

.4 Complete starting of systems and equipment as specified in Section 01 91 05.

.5 Complete testing, adjusting and balancing of systems and equipment as specified in Section 01 91 10.

.6 Complete equipment and systems demonstration and instruction as specified in Section 01 79 00.

.7 Complete final cleaning as specified in Section 01 74 23.

.8 Submit project record documents as specified in Section 01 78 39.

.9 Submit LEED support documentation as described in Section 01 35 18.

.10 Submit operation and maintenance data as specified in Section 01 78 23.

.11 Provide spare parts and maintenance materials as specified in Section 01 78 43.

.12 Make final change-over of locks and transmit keys to the Province as specified in Section 08 70 00.

.13 Complete installation of architectural finish items, including all mechanical and electrical covers and trims.

.14 Ensure that all Contract Deficiencies which may affect operation of systems [or execution of Performance Testing program] have been corrected.

.15 Ensure that the Work is complete and ready for use for the purpose intended.

.16 Review Contract Documents and inspect Work to confirm that prerequisites to Interim Acceptance of Work have been fulfilled and that Work is ready for inspection for Interim Acceptance.

5. INSPECTION FOR INTERIM ACCEPTANCE AND SUBSTANTIAL PERFORMANCE

.1 Submit written request to the Province for inspection for Interim Acceptance of the Work and verifying the certificate of Substantial Performance, certifying that prerequisites specified in Article 4. above have been fulfilled. Unless prior written permission listing a specific exception was provided in advance by both the Province and the Consultant, the Contractor shall not request an Interim Acceptance inspection if there are known exceptions.

.2 The Province will within a reasonable time after receipt of Contractor's request:

.1 proceed with inspection, or

.2 advise Contractor that prerequisites are not adequately fulfilled.

.3 Results of the Province's inspection for Interim Acceptance will form initial Contract Deficiency list and the Province may implement withholdings or take other measures permitted by the Contract.

6. INTERIM ACCEPTANCE AND SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Following inspection, the Province will:

.1 issue a Letter of Interim Acceptance stating effective date of Interim Acceptance of the Work, with a copy of the Contract Deficiency list attached thereto and verify the certificate of Substantial Performance, or

.2 advise Contractor that prerequisites to Interim Acceptance and Substantial Performance are not fulfilled and repeat inspection as necessary. Liquidated damages will be assessed if the Contractor does not attain Interim Acceptance of the Work on the date set out in the Agreement Form, Article 4.

.2 Upon issuance of Letter of Interim Acceptance and verifying the certificate of Substantial Performance, the Province will assume responsibility for care, custody and control of the Work, including responsibility for:

.1 Facility operation, including all systems and equipment.
.2 Maintenance.
.3 Security.
.4 Property insurance.
.5 Utility costs.

7. PREREQUISITES TO FINAL ACCEPTANCE

.1 Prior to requesting the Province's inspection for Final Acceptance, Contractor shall do the following:

.1 Ensure that Letter of Practical Completion has been issued by the Province and perform Fine Tuning activities as specified in Section 01 91 01.

.2 Ensure that the entire Work, including the correction of all Contract Deficiencies, except those items arising from the warranty provisions of the Contract Documents, has been performed to the requirements of the Contract Documents.

.3 Review Contract Documents and inspect Work to confirm that prerequisites for Final Acceptance of Work have been met and that Work is ready for inspection for Final Acceptance.

8. INSPECTION FOR FINAL ACCEPTANCE

.1 Submit written request to the Province for inspection for Final Acceptance of the Work, including copy of the Province's most recent Contract Deficiency list, and certifying that each Contract Deficiency has been corrected or otherwise resolved in a manner agreed to between the Province and Contractor. List known exceptions, if any, in request.

.2 The Province will within a reasonable time after receipt of Contractor's request:

.1 proceed with inspection, or

.2 advise Contractor that prerequisites are not adequately fulfilled.

9. FINAL ACCEPTANCE OF THE WORK

.1 Following inspection, the Province will:

.1 issue a Letter of Final Acceptance, stating effective date of Final Acceptance of Work, or

.2 advise Contractor of Contract Deficiencies which must be corrected prior to issuance of Letter of Final Acceptance.

10. PREREQUISITES TO TOTAL COMPLETION

.1 The prerequisites to Total Completion of the Work are:

.1 Final Acceptance of the Work.

.2 Expiry of one year warranty period, excluding extended warranties, if any.

.3 Items arising from the one year warranty period required by the Contract Documents shall have been corrected by the Contractor.

11. INSPECTION FOR TOTAL COMPLETION

.1 Just prior to end of one year warranty period, the Province will conduct an inspection for Total Completion.

12. TOTAL COMPLETION OF THE WORK

.1 Following inspection, the Province will:

.1 issue a Letter of Total Completion, or

.2 advise Contractor of items which must be corrected prior to issuance of Letter of Total Completion.

END OF SECTION

1. INTENT

.1 Contractor shall obtain all specified operation and maintenance data.

.2 Using operation and maintenance data submitted by Contractor, the Province will prepare operation and maintenance manuals for the following:

.1 All mechanical equipment and systems specified in Division 23.
.2 All electrical equipment and systems specified in Division 26.

.3 Contractor shall prepare and submit operation and maintenance manual(s) for all other equipment, systems, materials, and finishes not included above.

2. DESCRIPTION OF TYPES OF OPERATION AND MAINTENANCE DATA

.1 Contractor Designed System Data: includes the following for systems designed by Contractor:

.1 System Design Criteria
.2 System and Controls Descriptions
.3 System and Controls Schematics
.4 Operating Instructions

.2 Installation Instructions: manufacturer's printed instructions describing manufacturer's recommended installation procedures.

.3 Operating Instructions: manufacturer's printed instructions describing proper operation.

.4 Equipment Identification: name plate information for each piece of equipment, on forms approved by the Province.

.5 Maintenance Instructions: manufacturer's printed instructions describing manufacturer's recommended maintenance.

.6 Spare Parts Lists: parts lists and manufacturer's recommended spare parts.

.7 Suppliers and Contractors List: list of contractors and suppliers who supplied and installed equipment, systems, materials or finishes, organized by Division and system. Includes company name, address, and telephone number.

.8 Tag Directories: directory identifying tag number and equipment description and location.

.9 Drawings List: list of contract drawings.

.10 Shop Drawings: final reviewed shop drawings.

.11 Product Data: manufacturer's product data for equipment, systems, materials and finishes.

.12 Certifications: includes the following:

.1 Copies of inspection reports prepared by authorities having jurisdiction.

.2 Certified copies of test reports prepared by independent testing agencies.

.3 Any other certificates required by the Contract Documents.

.13 Warranties and Bonds: Province's copy of manufacturer's warranties, maintenance bonds and service contracts.

.14 Reports: includes the following:

.1 Reports documenting the performance of tests required by the Contract Documents and the results of those tests.

.2 Documentation of other material, equipment or system related information required by the Contract Documents.

3. CONTRACTOR PREPARED OPERATION AND MAINTENANCE MANUAL(S)

.1 General Organization:

.1 Include the following in each volume:

.1 Title page.
.2 Table of contents. Identify volume number where listed information is located.
.3 Ten percent free space for additional data.

.2 Present textual information, schematics and data on 21.5 X 28 cm, 75 g/m2, white bond paper.

.2 Manual Contents Organization:

.1 For each major equipment, system, materials or finishes area, organize operation and maintenance data as follows:

.1 Operation Division: include the following, as applicable:

.1 System Design Criteria.
.2 System and Controls Descriptions.
.3 System and Controls Schematics.
.4 Operating Instructions.

.2 Maintenance Division: include the following, as applicable:

.1 Maintenance Tasks and Schedules.
.2 Spare Parts.
.3 Suppliers and Contractors.
.4 Tags and Directories.

.3 Contract Document Division: include the following, as applicable:

.1 Drawings List.
.2 Shop Drawings and Product Data.
.3 Certifications.
.4 Warranties and Bonds.
.5 Maintenance Brochures.
.6 Reports.

.3 Document Binding Methods:

.1 Standard 21.5 X 28 cm sheets: punch sheets to fit binder.

.2 Sheets up to 28 X 41.5 cm: punched and neatly folded to allow use without removing from binder.

.3 Drawings larger than 28 X 41.5 cm: insert drawings in sturdy vinyl envelopes with reinforced binding holes, open on one side and overall folded size not exceeding 21.5 X 28 cm. Do not punch holes in drawings.

.4 Binders:

.1 Commercial quality, fabric coated, hard covers attached to spine with metal piano hinges, three post, designed to accommodate 21.5 X 28 cm paper. Maximum 100 mm thick.

.2 Silk-screen project title and identification, in white, on front cover and spine of binder.

.3 Colour of Binder Fabric and:

.1 Mechanical: Blue, Ontario Buckram colour #OBV460.

.2 Electrical: Red, Ontario Buckram colour #OBV037.

.3 Architectural/Structural/Specialties: Dark Green, Ontario Buckram colour #OBV375.

.4 Binders containing multiple disciplines (Mechanical, Electrical and Architectural) Binder fabric to be Architectural fabric colour.

.5 Divider Tabs:

.1 Heavy weight coloured paper, mylar laminated with tab number and title printed on tab as follows:

.1 Main Divisions: White tabs,labeled with division name, two bank tab length.

.2 Sections of a Main Division: tabs of same colour as Binder fabric for Mechanical, Electrical or Architectural sections of a Main Division, labeled with section name, four bank tab length.

.3 Subsections: tabs of same colour as Binder fabric for Mechanical, Electrical or Architectural subsections, printed label, eight bank tab length.

4. SUBMISSION OF OPERATION AND MAINTENANCE MANUAL(S)

.1 Submit four copies of completed Contractor prepared operation and maintenance manual(s) prior to Interim Acceptance of the Work.

END OF SECTION

1. DESIGNATION OF PROJECT RECORD DOCUMENTS

.1 Request from the Province at commencement of the Work the following documents to be designated and retained as project record documents:

.1 One copy of specifications manual(s):
.2 Two complete sets of Drawings.
.3 One set of all Addenda issued.

2. MAINTENANCE OF PROJECT RECORD DOCUMENTS

.1 Store record documents in site office apart from documents used for construction.

.2 Label each document "PROJECT RECORD" in neat, large printed letters.

.3 Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.

.4 Keep record documents available for inspection by the Province.

3. RECORDING INFORMATION ON PROJECT RECORD DRAWINGS

.1 Record information on ozolid drawings.

.2 Use coloured erasable pencils to record information.

.3 Use different colours to record information pertaining to each major system.

.4 Record changes and variations from Contract Drawings concurrently with construction process. Do not conceal any work until required information is recorded.

.5 Legibly mark project record drawings to record actual construction, including:

.1 Measured depths of foundation elements in relation to finished first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances. Reference locations to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances concealed in construction. Reference to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes to equipment layout and services.

4. SUBMISSION OF PROJECT RECORD DOCUMENTS

.1 Prior to placing concrete slab, submit one set of project record drawings showing locations of:

.1 Site services.
.2 Underslab services, equipment and materials.

.2 Submit balance of completed project record documents before or with application for Interim Acceptance of the Work.

.3 Submit with each submission a covering letter including:

.1 Date of Submission.
.2 Project Title, Plan No. and Centre Code.
.3 Contractor's name, address and telephone number.

END OF SECTION

1. RELATED SECTIONS

.1 Contract Acceptance Procedures: Section 01 77 20.

2. SOURCE OF SUPPLY

.1 Provide spare parts manufactured by original equipment manufacturer.

.2 Provide maintenance materials identical to those installed.

3. DELIVERY, STORAGE, AND HANDLING

.1 Deliver required items to the Place of the Work and store in temporary locations determined by Contractor or permanent locations designated by Province.

.2 Deliver and store items in original factory packaging or other securely packaged form.

.3 Identify, on carton or package, name of item, colour or part number, as applicable. Identify equipment, system, area, room no., etc. for which each item is intended.

.4 Maintain an inventory list of all items delivered. For each item, record description of item, quantity, and location where stored.

.5 Stored items shall remain in Contractor's care, custody, and control until Interim Acceptance of the Work. Protect stored items against theft or damage.

.6 Handle items as necessary, until stored in permanent locations designated by Province.

4. ACCEPTANCE

.1 Prior to requesting Province's inspection for Interim Acceptance, do the following:

.1 Review Contract Documents and compare with inventory list to verify that all required items have been delivered.

.2 Verify that items listed on inventory list are in their designated storage locations.

.3 Inspect items to verify that they meet specified requirements and are in serviceable condition.

.4 Arrange for delivery of any missing items.

.5 Arrange for replacement of items not meeting specified requirements or not in serviceable condition.

.6 Provide the Province with copy of inventory list indicating status of all required items.

.2 Review inventory list with the Province during the Province's inspection for Interim Acceptance.

.3 For items not delivered prior to Interim Acceptance of the Work, provide a duplicate copy delivery slip and obtain Province's signature upon delivery. The Province will only accept responsibility for care, custody, and control of items properly received and signed for.

END OF SECTION

1. RELATED SECTIONS

.1 Facility Start-Up Procedures: Section 01 91 01.

2. CONTRACTOR LED SEMINARS

.1 Contractor shall organize equipment and system seminars for the following:

.1 All Division 23 Mechanical equipment and systems.

.2 All Division 26 Electrical equipment and systems.

.2 Contractor shall chair the seminars and be responsible for the following, as specified in this Section:

.1 Preparation of agendas and outlines.
.2 Seminar organization.
.3 Explanation of design philosophy.
.4 Equipment presentations.
.5 System demonstrations.
.6 Seminar and demonstration questions.

3. AGENDAS AND OUTLINES

.1 Prepare agendas and outlines including the following:

.1 Equipment and systems which will be included in seminars.

.2 Name of companies and representatives presenting at seminars.

.3 Outline of each seminar's content.

.4 Time and date allocated to each system and item of equipment.

4. SEMINAR ORGANIZATION

.1 Coordinate content and presentations for seminars.

.2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.

.3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.

.4 Coordinate proposed dates for seminars with the Province and select mutually agreeable dates.

.5 Prepare to digitally record demonstration and training sessions, including video and audio.

5. RECORDING DEMONSTRATION AND TRAINING SEMINARS

.1 Digitally record demonstration and training sessions, including video and audio, and provide to the Province as fololows:

.1 Record training sessions and provide to Owner on DVD Disks.

.2 Provide training DVDs to be clear audible, and of good quality, suitable for training personnel.

.3 Confirm recorded training session is clear enough to viewers are able to review session easily with all demonstration and instructions clearly viewable and audible.

6. EXPLANATION OF DESIGN PHILOSOPHY

.1 Explain design philosophy of each system. Include following information:

.1 An overview of how system is intended to operate.
.2 Description of design parameters, constraints and operational requirements.
.3 Description of system operation strategies.
.4 Information to help in identifying and troubleshooting system problems.

7. EQUIPMENT PRESENTATIONS

.1 Present information dealing with equipment. Include following in presentations:

.1 Explanation of how equipment operates.
.2 Recommended preventative and routine maintenance.

.2 Digitally record demonstration and training sessions and provide to the Province on clear and audible, good quality, DVD disks.

8. SYSTEM DEMONSTRATIONS

.1 Demonstrate operation of equipment and systems. Include the following in demonstration:

.1 Start-up and shut down.
.2 Operation.
.3 Scheduled and preventative maintenance.
.4 Troubleshooting.

.2 Demonstration may be conducted at time of original starting with the Province's prior approval.

9. SEMINAR AND DEMONSTRATION QUESTIONS

.1 Be prepared to answer all questions raised by the Province at demonstrations and seminars. If unable to satisfactorily answer questions immediately, provide written response within three days.

END OF SECTION

1. GENERAL

.1 A facility start-up process shall be used to bring the facility to a fully operational state, free of deficiencies, in the most efficient and timely manner achievable.

.2 This Section specifies the Contractor's and Province's responsibilities during each of the following successive sub-phases of Facility Start-Up:

.1 Contractor Start-Up which leads to Interim Acceptance of the Work.
.2 Performance Testing which leads to Practical Completion of the Work.
.3 Fine Tuning which leads to Final Acceptance of the Work.

2. RELATED SECTIONS

.1	Contractor Start-Up Report Forms:	Section 01 33 35.
.2	Facility Start-Up Payments:	Section 00 73 83.
.3	Closeout Procedures	Section 01 77 00.
.4	Contract Acceptance Procedures:	Section 01 77 20.
.5	Equipment and Systems Demonstration and Instruction:	Section 01 79 00.
.6	Starting of Equipment and Systems:	Section 01 91 05.
.7	Testing, Adjusting and Balancing:	Section 01 91 10.

3. CONTRACTOR START-UP

.1 Contractor shall do the following during Contractor Start-Up, not necessarily in order listed:

.1 Start equipment and systems as specified in Section 01 91 05.

.2 Test, adjust and balance equipment and systems as specified in Section 01 91 10.

.3 Demonstrate equipment and systems as specified in Section 01 79 00.

.4 Complete and submit Contractor Start-Up reports including:

.1 Contractor's system and equipment start-up reports.
.2 Testing, adjusting and balancing reports.
.3 Manufacturers' equipment start-up reports.

.5 Review Contract Documents and inspect the Work to ensure completeness of the Work and compliance with requirements of Contract Documents.

.6 Correct Contract Deficiencies identified as a result of the foregoing and as may be identified by the Province**.**

.7 Execute Change Orders issued by the Province.

.8 Perform all other work and activities required for fulfillment of prerequisites to Interim Acceptance of the Work as specified in Section 01 77 20.

.2 The Province will do the following during Contractor Start-Up.

.1 Carry out pre-interim inspections as necessary.

.2 Witness manufacturers' equipment start-up.

.3 Verify starting, testing, adjusting and balancing by Contractor.

.4 Review and approve Contractor Start-Up reports.

.5 Cooperate in systems and equipment demonstration and instruction.

.6 Initiate Change Orders as required.

.7 Verify correction of Contract Deficiencies by Contractor.

.8 Verify execution of Change Orders by Contractor.

.9 Perform other activities related to Interim Acceptance of the Work as specified in Section 01 77 20.

.3 The preceeding will be carried out in an ongoing cycle of:

.1 Province's inspections.
.2 Documentation of results.
.3 Diagnosis of problems.
.4 Correction of Contract Deficiencies and execution of Change Orders as required.
.5 Verification of results.

4. PERFORMANCE TESTING

.1 Performance Testing will commence upon Interim Acceptance of the Work.

.2 The Province will do the following during Performance Testing:

.1 Carry out a series of preplanned systems and equipment operating tests under conditions simulating, to the extent possible, full and partial operating loads.

.2 Record test results.

.3 Diagnose problems and determine whether they are the result of Contract Deficiencies.

.4 Initiate Change Orders as required.

.5 Repeat tests as required following correction of Contract Deficiencies and execution of Change Orders by Contractor and verify results.

.6 Perform other activities related to Practical Completion of the Work as specified in Section 01 77 20.

.3 Contractor shall do the following during Performance Testing:

.1 Correct Contract Deficiencies previously outstanding and those identified during Performance Testing.

.2 Execute Change Orders issued by the Province.

.4 The preceding will be carried out in an ongoing cycle of:

.1 Performance testing.
.2 Documentation of results.
.3 Diagnosis of problems.
.4 Correction of Contract Deficiencies and execution of Change Orders as required.
.5 Verification of results.

5. FINE TUNING

.1 Fine Tuning shall commence upon Practical Completion of the Work.

.2 Contractor shall do the following during Fine Tuning:

.1 Correct all Contract Deficiencies previously outstanding and those identified during Fine Tuning.

.2 Execute Change Orders issued by the Province.

.3 Perform all other work and activities required for fulfillment of prerequisites to Final Acceptance of the Work as specified in Section 01 77 20.

.3 The Province will do the following during Fine Tuning:

.1 Conduct user surveys and take environmental measurements as necessary to identify existing and potential problems.

.2 Initiate Change Orders as required.

.3 Perform other activities related to Final Acceptance of the Work as specified in Section 01 77 20.

6. SEASONAL CONSTRAINTS

.1 Notwithstanding all-inclusive requirements specified in this Section, additional separate cycles of Contractor Start-Up, Performance Testing and Fine Tuning may be necessitated at a later time on equipment and systems whose full operation is dependent on seasonal conditions.

.2 Contractor's responsibilities with respect to such later Facility Start-Up activities shall be as specified in this Section.

7. PARTIAL UTILIZATION OF WORK

.1 When partial utilization of the Work is required, the applicable requirements specified in this Section shall apply to the part(s) of the Work to be utilized.

END OF SECTION

1. INTENT

.1 Perform starting of each system and each item of equipment in accordance with the general requirements specified herein.

2. RELATED SECTIONS

.1	Contractor Start-Up subschedule:	Section 01 32 16.
.2	Contractor Start-Up Report Forms:	Section 01 33 35.
.3	Facility Start-Up Procedures:	Section 01 91 01.

3. PREPARATION

.1 Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during starting process.

.2 Coordinate sequence for starting of various equipment and systems.

4. MANUFACTURERS' SITE SERVICES

.1 When specified in Divisions 02-49, or when otherwise requested by the Province, require manufacturer to provide authorized representative to be present at site to do the following:

.1 Inspect**,** check and approve equipment and systems installation prior to starting**.**

.2 Supervise placing equipment and systems in operation**.**

.3 Provide a written report verifying that equipment*:*

.1 has been properly installed and lubricated,
.2 is in accurate alignment,
.3 is free from any undue stress imposed by connecting lines or anchor bolts**,** and
.4 has been satisfactorily operated under load conditions.

5. STARTING

.1 Verify that each item of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, and other conditions affecting starting and operation.

.2 Take corrective action as necessary.

.3 Execute starting under supervision of Contractor's personnel and, when specified or requested by the Province, manufacturer's authorized representative.

.4 Place equipment and systems in operation in proper sequence and in accordance with approved Contractor Start-Up subschedule.

END OF SECTION

1. INTENT

.1 Contractor shall be responsible for testing, adjusting and balancing of all:

.1 piped, ducted, wired and wireless services and systems, including all components and equipment forming part thereof, and

.2 manually and mechanically operated systems including all components and equipment forming part thereof.

.2 Contractor shall perform testing, adjusting and balancing with Contractor's qualified personnel, or employ and pay for a qualified organization to perform such services.

.3 Perform testing, adjusting and balancing after starting of equipment and systems.

.4 Provide personnel, operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.

.5 Report to the Province any deficiencies or defects noted during testing, adjusting and balancing, which cannot be promptly corrected.

2. RELATED SECTIONS

.1 Contractor Start-Up Report Forms: Section 01 33 35.
.2 Facility Start-Up Procedures: Section 01 91 01.

3. PREPARATION

.1 Prepare each system and item of equipment for testing, adjusting and balancing.

.2 Verify that each systems and equipment installation is complete and in continuous operation.

.3 Verify ambient conditions.

4. TESTING, ADJUSTING AND BALANCING

.1 Testing: Perform tests to confirm compliance with requirements of Contract Documents. Take corrective action as necessary.

.2 Adjusting: Perform adjustments to ensure proper, efficient and safe operation.

.3 Balancing: Perform balancing to ensure that the various parts of system are in a proper state of equilibrium.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Project Coordination:	Section 01 31 13.
.2	Construction Schedules	Section 01 32 16.
.3	Submittal Procedures	Section 01 33 00.
.4	Waste Management and Disposal	Section 01 74 19.
.5	Temporary facilities:	Division 01.
.6	Soils for Earthwork:	Section 31 05 13.

1.2 REFERENCE DOCUMENTS

.1 CSA S350, Code of Practice for Safety in Demolition of Structures.

1.3 EXISTING CONDITIONS

.1 Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

1.4 SUBMITTALS

.1 Where required by authorities having jurisdiction, submit for approval, drawings, diagrams, details and supporting data clearly showing sequence of demolition and removal work of building supporting structures and underpinning. Provide Province with copy of such drawings.

.2 Drawings for structural elements shall be designed by and bear signature and stamp of qualified professional engineer registered in the Province of Alberta.

.3 Submit Waste reduction progress reports and Demolition Waste Audit in accordance with 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 PROTECTION

.1 Prevent movement or settlement of adjacent work. Provide and place bracing or shoring and be responsible for safety and support of such work. Be liable for any such movement or settlement, and any damage or injury caused.

.2 Cease operations and notify Province if safety of any adjacent work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Province.

.3 Ensure safe passage of building occupants around area of demolition.

.4 Cease operations and notify the Province immediately for special protective and disposal instructions when asbestos materials or other hazardous materials, other than those identified, are uncovered during the work of this project.

.5 Prevailing weather conditions and weather forecasts shall be considered. Demolition work shall not proceed when weather conditions constitute a hazard to the workers and site.

.6 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.

.7 Temporarily suspended work that is without continuous supervision, shall be closed to prevent entrance of unauthorized persons.

.8 Provide shoring for excavation adjacent to bearing walls and footings. Refer to Section 31 23 16.

1.6 TEMPORARY PARTITIONS

.1 Erect and maintain dustproof partitions, seal off ducts as required to prevent spread of dust and fumes to other parts of the building. On completion, remove partitions and make good surfaces to match adjacent surfaces.

1.7 SALVAGEABLE AND RECYCLABLE MATERIALS

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Contractor's property. Maximize to the fullest extent possible, salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

.2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

.3 A current listing of recyclers specializing in specific categories of materials may be obtained during normal office hours from:

Alberta Environment
Recycling Branch
Recycle Info Line
Phone: (780) 427-6982 or 1-800-463-6326

1.8 WASTE

.1 Demolition waste shall be handled according to Waste Management and Disposal, Section 01 74 19.

.2 Prepare a Demolition Waste Audit and provide inventory of quantities of materials to be salvaged for reuse, recycling and disposal in accordance with requirements in Section 01 74 19, Waste Management and Disposal.

2. Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment as required to perform work of this section.

3. Execution

3.1 MATERIALS TO BE RETAINED BY PROVINCE

.1 Carefully remove the following items to be retained by the Province and obtain instructions from Province regarding disposition of these items:

Location	Description	Quantity
Indicated on Drawings	Fire Alarm Panel	1

.2 School Board representative to remove all materials for retention before construction including but not limited to: toilets, sinks, furnishings, appliances, electronic equipment, servers, telephones, millwork, and other items indicated.

3.2 MATERIALS TO BE REUSED

.1 Structural, Mechanical and Electrical Items as indicated on Drawings.

3.3 EXISTING SERVICES

.1 Disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment that must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.

.2 Disconnect and cap all mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by the gas company or by a qualified tradesman in accordance with gas company instructions.

.3 Essential Services: Maintain all essential services to all areas.

.4 In each case notify the affected utility company in advance and obtain approval where required, before commencing with the work on main services.

3.4 SELECTIVE DEMOLITION

.1 Reuse of Building Elements: this project has been designed to result in end of project rates for reuse of building elements as follows: do not demolish building elements beyond what is indicated on Drawings without approval by Province.

3.5 APPLICATION

.1 Carry out demolition work in accordance with CSA S350, unless otherwise specified.

.2 Remove from the site all materials indicated to be removed.

.3 Carry out demolition in a manner to minimize inconvenience to adjacent occupied space.

.4 Carry out demolition in an orderly and careful manner.

.5 Demolition by explosives or methods to initiate a "Rapid Progressive Failure" of any portion of a structure will not be permitted without written permission of the Province and all authorities having jurisdiction.

.6 Before commencing general demolition, separate by hand demolition, attached structures to remain from structure to be demolished.

.7 Sprinkle exterior debris with water to prevent dust. Do not cause flooding, contaminated runoff or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.

.8 Lower waste materials in a controlled manner; do not drop or throw materials from heights.

.9 Burning of materials on site is not permitted.

3.6 RESTORATION

.1 Restore to its original condition any portion of the building demolished unnecessarily, at no expense to the Province.

.2 Immediately as the work progresses, repair all vibration and excavation damages to existing adjacent properties and active underground services.

.3 Walls of adjoining structures that were not exposed prior to demolition shall be adequately protected from all weather.

3.7 CLEAN-UP

.1 For clean-up during demolition and for final cleaning, comply with requirements of Division 01.

END OF SECTION

1. General

1.1 RELATED SECTIONS

.1	Scheduling of work:	Division 01.
.2	Submittals:	Section 01 33 00.
.3	Temporary Facilities and Controls:	Section 01 50 00.
.4	Waste Management and Disposal	Section 01 74 19.

1.2 REFERENCE DOCUMENTS

.1 American National Standards Institute (ANSI):

- .1 ANSI A10.8-2001 Safety Requirements for Scaffolding

.2 Canadian Standards Association (CSA):

- .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures

.3 Hazardous Materials Information Review Act, 1985

.4 Motor Vehicle Safety Act (MVSA), 1995

.5 National Fire Protection Association (NFPA):

- .1 NFPA 241-04 Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.3 SUBMITTALS

.1 Prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 19 and indicate:

- .1 Descriptions of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
- .2 Schedule of selective demolition.
- .3 Number and location of dumpsters.
- .4 Anticipated frequency of tippage.
- .5 Name and address of haulers.

1.4 EXISTING CONDITIONS

.1 Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

1.5 PROTECTION

.1 Take precautions to guard against damage to adjacent work. Be liable for any damage or injury caused.

.2 Cease operations and notify Province if safety or any adjacent work appears to be endangered. Do not resume operations until reviewed with the Province.

.3 Ensure safe passage of building occupants around and through area of demolition.

.4 Cease operations and notify the Province immediately for special protective and disposal instructions when asbestos materials or other hazardous materials [, other than those identified,] are uncovered during the work of this project.

.5 Protect temporarily suspended work that is without continuous supervision to prevent access by unauthorized persons.

1.6 SALVAGEABLE AND RECYCLABLE MATERIALS

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Contractor's property. Maximize to the fullest extent possible, salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

.2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk

.3 A current listing of recyclers specializing in specific categories of materials may be obtained during normal office hours from:

Alberta Environment
Recycling Branch
Recycle Info Line
Phone: (780) 427-6982 or 1-800-463-6326
Website:www.recyclinghotline.ca

2. Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment as required to perform the work of this section.

3. Execution

3.1 MATERIALS TO BE RETAINED BY PROVINCE

.1 Relics and antiquities, commemorative plaques, and tablets, and similar objects remain the property of the Province of Alberta and shall be protected.

3.2 MATERIALS TO BE REUSED

.1 Carefully remove, store and protect for re installation of the following material and/or equipment:

.1 Electrical panels.
.2 Electrical switch gear and controls.
.3 Facebrick, cleaned and made ready for re use.
.4 Doors and hardware.
.5 Cabinet work and fitments.
.6 Miscellaneous or ornamental metals.
.7 Shelving.
.8 Equipment Mechanical Electrical Kitchen Laundry Vending Athletic Lavatory Admin.

3.3 DEMOLITION

.1 Unless otherwise specified, carry out demolition in accordance with CSA S350.

.2 Completely demolish the items scheduled and immediately remove materials from the premises.

.3 Carry out demolition work in a manner to least inconvenience adjacent occupied building area.

.4 Carry out demolition in an orderly and careful manner.

.5 Lower waste materials in a controlled manner; do not drop or throw materials from heights.

3.4 EXISTING SERVICES

.1 Disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.

.2 Disconnect and cap all mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by the gas company or by a qualified tradesman in accordance with gas company instructions.

.3 Essential Services: Maintain fire alarm and all essential services to all areas.

.4 In each case notify the affected utility company in advance and obtain approval where required, before commencing with the work on main services.

3.5 RESTORATION

.1 Make good any demolition to the existing work beyond that necessary for carrying out new work, at no expense to the Province.

3.6 CLEAN UP

.1 Remove all debris and rubbish away from site at regular intervals.

.2 Remove all tools and equipment from site.

END OF SECTION

1. General

1.1 INTENT

.1 Hazardous materials have been identified in existing building materials, refer to Section 00 31 00 for Hazardous Material Assessment.

.2 Recommendations contained in this report are to be followed as may be applicable to work of this Section. Removal, disturbance of hazardous materials is to be carried out by contractor experienced and licensed in work of this type.

.3 Removal of asbestos and other hazardous building materials is within the scope of this contract.

.1 Subcontractor shall be a firm that employs qualified workers with asbestos and hazardous materials removal training and certification to perform the work.

.4 Third Party Agency hired by Owner's Representative will monitor the hazardous material removal, including conducting the following:

.1 Air monitoring and inspections associated with asbestos abatement

.2 Sampling and documentation of additional suspect materials discovered during abatement or demolition

.3 Documentation of additional hazardous building materials identified and associated changes to scope.

.4 Supplemental sampling to further delineate previously identified hazardous building materials, if requested or required.

.5 Documentation of changes to scope (additions or reductions) based on results of supplemental sampling of previously identified materials, if requested or required

.6 Visual verification and documentation of hazardous building material removal, where necessary.

.7 The Subcontractor is responsible to coordinate with the Third Party Agency.

.5 Sub Contractor shall submit the following information to the General Contractor:

.1 Applicable “Notice of Project” documentation pertaining to asbestos abatement, to authorities having jurisdiction

.2 The name(s) of the waste facility or facilities (e.g. recycling facilities, landfills, destruction facilities, etc.) where the hazardous building material shall be disposed.

.3 Copies of the scale tickets, manifests, waybills and/or other and written confirmation(s) of disposal (i.e. landfill weigh scale receipts).

.4 Documentation outlining the number of loads, unit measures, date and time of each load transported to the disposal facility.

.5 General Contractor may request additional scaling of the trucks at any time during transportation.

1.2 REGULATIONS, STANDARDS AND/OR CODES

.1 Regulations, standards and/or codes including, but not limited to the following will apply to the abatement work to be conducted:

.1 The Alberta Occupational Health and Safety Act, Regulations and Code (2009)

.2 The current version of the Alberta Asbestos Abatement Manual published by the Government of Alberta, Employment, Immigration and Industry

.3 The Alberta Users Guide for Waste Managers (1996)

.4 Alberta's Dangerous Goods Transportation and Handling Act

.5 The Federal Transportation of Dangerous Goods Regulation

.6 The Federal PCB Regulations (SOR/2008-273).

.7 Alberta Waste Management Act - Ozone Depleting Substances and Other Halocarbons Regulation

.8 The Federal Halocarbons Regulation

.9 Canadian Construction Association Standard Construction Document CCA 82 "mould guidelines for the Canadian construction industry"

.10 ABSA the pressure equipment safety authority

1.3 DOCUMENTS

.1 Refer to Section 00 31 00 for available project information including Hazardous Materials Assessment.

1.4 SCOPE OF ABATEMENT ACTIVITIES

.1 Abatement shall be conducted to remove and dispose of hazardous building materials as identified in the reports referenced herein, in accordance with applicable regulations, guidelines, standards and/or best practices for such work.

.2 The information pertaining to identified hazardous building materials listed below is provided for information purposes only. Verification and/or measurement of the amount of each hazardous building material listed are the responsibility of the Subcontractor, and can be conducted at the mandatory site viewing, if necessary.

1.5 RECOMMENDATIONS

.1 Refer to recommendations by listed in attached information.

.2 Recommendations contained in this report are to be followed as may be applicable to work of this Section. Removal, disturbance of hazardous materials is to be carried out by contractor experienced and licensed in work of this type.

END OF SECTION

1. General

1.1 REFERENCE DOCUMENTS

.1 Canadian Standards Association:

.1 CSA-A23.1 Concrete Materials and Methods of Concrete Construction.
.2 CSA-A23.2 Methods of Test for Concrete.

1.2 APPOINTMENT OF TESTING AGENCY

.1 The Minister may hire a CSA-approved Testing Agency who shall test concrete, reinforcement, and grout as per this specification.

.2 Testing paid for by the Minister:

.1 Review of initial mix designs.

.2 Testing as outlined in Section 3.0, except for testing required by the Contractor for stripping of formwork.

.3 Testing paid for by the Contractor:

.1 Review of Contractor requested mix design changes.

.2 Any waiting time incurred by the Testing Agency in excess of 1/2 an hour.

.3 Any additional costs due to overtime, shift work, holiday or weekend work, except that the Minister will pay for holiday or weekend pickup when the concrete was placed on a regular workday.

.4 Costs for testing required by the Contractor for stripping of formwork, such as field cure cylinders etc.

.5 Cost for retesting or additional testing of concrete or reinforcement where tests have failed to meet the specified requirements.

2. Duties

2.1 RESPONSIBILITY OF THE CONTRACTOR

.1 The Contractor shall cooperate fully with the Testing Agency.

.2 The Contractor shall give the Testing Agency at least four (4) hours prior notice of a concrete placement.

.3 Contractor shall provide a finished product that meets the specification. If initial tests indicate that the concrete failed to meet the specification, additional testing is necessary. This testing shall be done by a CSA-approved Testing Agency, but need not be the Minister's agency.

.4 Core strengths must equal the specified strength if tested dry or 85% of specified if tested wet, with wet or dry tests as per the Standard.

2.2 RESPONSIBILITY AND DUTIES OF THE TESTING AGENCY

.1 The Testing Agency is responsible to the Minister and has the authority to, and is expected to, reject any concrete not meeting the specifications.

.2 If the Testing Agency becomes aware that concrete is being placed without their notification, or if insufficient notice is received, then the Testing Agency shall notify the Minister immediately.

.3 Low 7-day, 28-day and 56-day strength tests shall be brought immediately to the attention of the Minister.

3. Testing - Concrete And Reinforcement

3.1 GENERAL

.1 All strength tests shall be numbered consecutively and the cylinders marked as follows:

.1 7-Day Test: Marked "A".
.2 28-Day Test: Two (2) cylinders marked "B" and "C".
.3 56-Day Test: Where these are required by the drawings and specifications, two (2) cylinders marked "D" and "E".

.2 Test reports shall record:

.1 Name of Project
.2 Date and time of sampling
.3 Name of supplier
.4 Delivery truck number
.5 Batch time and discharge time
.6 Identification of sampling and testing technicians
.7 Exact location in the structure of the concrete sampled
.8 Design strength of concrete sampled
.9 Admixtures, cement type, maximum aggregate size
.10 Air and concrete temperature
.11 Slump, and air content

.3 Field cured cylinders shall be marked "F".

.4 Slump tests shall be performed prior to the addition of super-plasticizers.

.5 Tests for slump and air content shall be taken with each strength test and as required by the specifications and drawings.

.6 Analysis of Concrete Production

.1 A summary table and associated strip charts shall be submitted to the Minister for all classes of structural concrete placed on projects with 25 or more compressive strength tests.

.2 Summary tables are to indicate at least the following information:

.1 Classification of Concrete.
.2 Project name.
.3 Test number.
.4 Compressive strength of concrete.
.5 Supplier's ticket number.
.6 Date concrete placed.
.7 Time batched.
.8 Time tested.
.9 Slump.
.10 Air entrainment.
.11 1-7 day and 2–28 day compressive strength test results for each test.
.12 Average strength and within test variation for the two (2) 28-day concrete test results for each test
.13 Moving average of 3 consecutive 28 day concrete test results.
.14 Average and standard deviation of 28 day concrete test results and an evaluation of conformance to CSA production guidelines.

.3 Charts shall plot concrete slump, air content, individual compressive strength tests, and the moving average of 3 consecutive compressive strength tests.

.4 Tables and charts for each type or class of concrete are to be provided on a monthly basis for concrete supplied for the structure until completion of the concrete work.

.5 When 56 day concrete testing is permitted by the Minister, summary charts and tables shall be provided for concrete tested at 56 days.

3.2 REGULAR TESTING - CONCRETE

.1 Conform to the standard, except each test shall consist of three (3) cylinders - one (1) for 7-day strength and two (2) for 28-day strength.

.2 Regular testing applied to all elements not listed in Clause 3.3 - Full Time Testing.

3.3 FIELD CURED CYLINDERS

.1 Field cure cylinders shall be stored on the floor right below the slab they represent and be protected against wind unless the floor below is heated, in which case they shall be stored on top of the slab but covered with a plywood box. The cylinders are to be undisturbed at this location until picked up by the Testing Agency.

END OF SECTION

1. General

1.1 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

.1 Install following materials specified to be supplied under other Sections of these project specifications:

.1 Fabricated components, anchor bolts, bearing plates, sleeves and other inserts to be built into concrete.

1.2 REFERENCES DOCUMENTS

.1 American Concrete Institute (ACI):

.1	ACI 347	Guide to Formwork for Concrete

.2 Canadian Standards Association (CSA):

.1	CSA A23.1	Concrete Materials and Methods of Concrete Construction
.2	CAN/CSA-O86	Engineering Design in Wood
.3	CSA O121	Douglas Fir Plywood
.4	CSA O151	Canadian Softwood Plywood
.5	CSA O153	Poplar Plywood
.6	CAN/CSA-S269.3	Concrete Formwork
.7	CAN/CSA–Z809	A Sustainable Forest Management System

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings for formwork in accordance with Division 01.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.

.3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.4 Each shop drawing submission shall bear stamp and signature of a qualified professional engineer registered or licensed in the Province of Alberta.

1.4 QUALITY ASSURANCE

.1 Design, construct, and erect formwork in accordance with CSA A23.1, CSA S269.3, ACI 347, and all applicable construction safety regulations for the place of the work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for in accordance with Section 01 74 19 – Waste Management and Disposal.

2. Products

2.1 MATERIALS

.1 Wood formwork materials:

.1 Wood formwork shall be Forest Stewardship Council (FSC) Certified unless it is rented or otherwise re-cycled wood material.

.2 Formwork materials:

.1 Concrete without special architectural features: use plywood and wood formwork materials to CAN/CSA O86. Square-edged, smooth surfaced panels true in plane, free of holes, surface markings, or defects.

.3 Form ties:

.1 Concrete without special architectural features: use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.4 Void Forms: low density bead board, structurally sufficient to support weight of wet concrete mix until initial set, 100 mm thick, or as indicated on drawings.

2.2 ACCESSORIES

.1 Form release agents: Ecologo certified under the Environmental Choice Program (ECP) or, if not Ecologo certified, Contractor shall:

.1 provide a product that conforms to the requirements for concrete release agents in accordance with ECP Certification Criteria Document (CCD) 143 governing Asphalt and Concrete Release Agents, excluding the provisions under Conditions for Ecologo Use and,

.2 if requested, provide the Minister with the same rights as the ECP under CCD 143 with regard to verification for product compliance.

.2 Sealant: as specified in Section 07 92 00 – Joint Sealers.

.3 Corner or Chamfer Fillets: extruded plastic or mill finished pine 20 mm width, maximum possible lengths, mitre ends.

.4 Sealing Tape: reinforced, self-adhesive, waterproof kraft.

3. Execution

3.1 FORMWORK PREPARATION

.1 Apply form release agent in accordance with manufacturer's recommendations, prior to placing reinforcing steel, anchoring devices and embedded parts.

3.2 TOLERANCES

.1 Construct formwork to produce concrete with dimensions, lines, and levels within tolerances specified in ACI 347.

OR

.1 Construct formwork to produce concrete with dimensions, lines, and levels within the following tolerances. Tolerances are not cumulative.

.1 Deviation from Vertical Line: 6 mm in 3 m, 9 mm in 6 m, and 20 mm in 12 m or more.

.2 Deviation from Flat Surface, for Walls and Floors: 3 mm in 3 m.

.3 Deviation from Horizontal Line: 6 mm in 3 m.

.4 Deviation from Linear Building Lines from Drawings and Position of Columns, Walls, and Partitions: 6 mm.

.5 Deviation in Cross Sectional Dimensions of Columns and Beams, and in Thickness of Slabs and Walls: plus or minus 6 mm.

3.3 FABRICATION AND ERECTION

.1 Verify lines, levels, and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Obtain Minister's approval for use of earth forms framing openings not indicated on drawings.

.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.4 Refer to architectural drawings for concrete and concrete members requiring architectural exposed finishes.

.5 Do not place shores and mud sills on frozen ground.

.6 Provide site drainage to prevent washout of soil supporting shores and mud sills.

.7 Fabricate and erect formwork in accordance with CAN/CSA S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA A23.1.

.8 Align form joints and make watertight. Keep form joints to a minimum.

.9 Use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners of concrete members, unless specified otherwise.

.10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.11 Construct forms for architectural concrete, and place ties as indicated and as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.12 Build in anchors, sleeves, and other inserts required to accommodate work specified in other sections. Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including paint.

.13 Clean formwork in accordance with CAN/CSA-A23.1, prior to placing concrete.

.14 Re-use of formwork and falsework subject to requirements of CAN/CSA-A23.1.

.15 Arrange and assemble formwork to permit removal without damage to concrete. Arrange forms to allow removal without removal of principle shores, where these are required to remain in place.

3.4 INSERTS, EMBEDDED ITEMS, AND OPENINGS

.1 Provide formed openings where required for pipes, conduits, sleeves or other work to be embedded in and passing through concrete members. Obtain Minister's approval before framing openings in slabs, beams, and columns, not shown on drawings.

.2 Accurately locate and set in place items which are to be cast directly into concrete.

.3 Coordinate forming of openings, slots, recesses, chases, and setting of sleeves, bolts, anchors, and other inserts with work of other Sections as required.

.4 Coordinate installation of concrete accessories.

.5 Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings in bottom of forms to allow flushing water to drain.

.6 Close temporary ports or openings with tight fitting panels, flush with inside face of forms, neatly fitted so no leakage occurs and to provide uniform surface on exposed concrete.

3.5 CLEANING

.1 Clean forms as erection proceeds, to remove foreign matter. Remove cuttings, shavings, and debris from within forms. Ensure that water and debris drain to the exterior through clean-out ports.

.2 During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and concrete construction proceed within a heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

.1 Do not remove forms and falsework until concrete has gained sufficient strength to carry its own weight, plus construction loads and other design loads that are liable to be imposed. Verify strength of concrete by compression tests to the satisfaction of the Minister.

.1 Remove falsework progressively, in accordance with CSA 269.1 and ensure that no shock loads or unbalanced loads are imposed on the structure.

.2 Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

.3 Leave forms loosely in place for protection until curing requirements are complete.

.4 Store removed forms for exposed architectural concrete in a manner that surfaces to be in contact with fresh concrete will not be damaged. Marked or scored forms will be rejected.

3.7 FIELD QUALITY CONTROL

.1 Inspect and check complete formwork, falsework, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties and parts are secure.

.2 Inform Minister when formwork is complete and has been cleaned, to allow for inspection.

.3 For all exposed concrete surfaces do not re-use wood type formwork more than 3 times. Do not patch formwork.

.4 Allow Minister to review each section of formwork prior to re-use. Formwork may be re-used if approved by the Minister.

END OF SECTION

1. General

1.1 REFERENCES DOCUMENTS

.1 American Concrete Institute (ACI):

.1 ACI 315 ACI Detailing Manual

.2 American Society for Testing and Materials (ASTM):

.1 A775/A775M Standard Specification for Epoxy-Coated Steel Reinforcing Bars

.3 Canadian Standards Association (CSA):

.1	CSA A23.1	Concrete Materials and Methods of Concrete Construction
.2	CSA A23.3-04	Design of Concrete Structures
.3	CAN/CSA-G30.18	Carbon Steel Bars for Concrete Reinforcement
.4	CAN/CSA-G40.21-04	Structural Quality Steels
.5	CAN/CSA-W186-M90	Welding of Reinforcing Bars in Reinforced Concrete Construction

.4 Concrete Reinforcing Steel Institute (CRSI):

.1 Reinforcing Steel Manual of Standard Practice.

1.2 TESTING

.1 As per Section 03 05 05 – Testing of Concrete and Reinforcement.

1.3 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings including placing of reinforcement in accordance with Division 01.

.2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Minister, with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice – by Reinforcing Steel Institute of Canada.

.3 Detail lap lengths and bar development lengths to CSA A23.3. Provide Class B tension lap splices unless otherwise indicated or stipulated by the Standard.

1.4 QUALITY ASSURANCE

.1 Provide Minister, upon request, with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

.2 Inform Minister, upon request, of proposed source of material to be supplied.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle reinforcing steel, welded wire fabric and accessories in manner that prevents contamination which reduces bond, and damage to fabricated forms.

.2 Protect reinforcement from rust, dirt, grease, form oil and other bond-breaking substances.

.3 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 19 – Waste Management and Disposal.

2. Products

2.1 REINFORCEMENT MATERIALS

.1 Provide materials with minimum 25% recycled content.

.2 Reinforcing Steel: billet steel, grade 400, deformed bars to CAN/CSA G30.18, unless indicated otherwise.

.3 Reinforcing Steel: weldable low alloy steel deformed bars to CAN/CSA-G30.18.

.4 Chairs, Bolsters, Bar Supports and Spacers: to CSA A23.1.

.5 Mechanical Splices: subject to Minister's approval.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA A23.1, ACI 315, and Reinforcing Steel Manual of Standard Practice – by Reinforcing Steel Institute of Canada.

.2 Obtain Minister's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Minister, weld reinforcement in accordance with CAN/CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

.5 Fabricate within the following tolerances:

.1 Sheared Length: +/- 25 mm
.2 Stirrups, Ties and Spirals: +/- 10 mm
.3 Other Bends: +/- 25 mm

.6 Locate reinforcing splices not shown on drawings at points of minimum stress.

3. Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Minister.

.2 When field bending is authorized, bending procedure shall conform to the Standard.

.3 Replace bars which develop cracks or splits.

3.2 PLACEMENT DETAILING

.1 Conform to CSA A23.1 and CSA A23.3 for hooks, bends, laps, and similar details not specifically shown.

.2 For support bars not shown on drawings, use the sizes and spacing for applications as follows:

.1 Slab Top Reinforcing (10M): 10M bars spaced at 1000 mm o.c. maximum.

.2 Slab Top Reinforcing (15M and larger): 15M bars spaced at 1200 mm o.c. maximum.

.3 Slab Bottom Reinforcing: 15M bars spaced at 1200 mm o.c. maximum.

.4 Beam Stirrups: 15M bar in each corner.

.3 Reinforce slab and wall openings, unless otherwise shown, as follows:

.1 Openings with greatest dimension of 600 mm or less: four 15M diagonal bars, 900 mm longer than greatest opening dimension.

.2 Openings with greatest dimension larger than 600 mm: two 15M bars on each side, top and bottom, 1500 mm longer than greatest opening dimension.

.3 Reinforce circular openings as square.

.4 Secure chairs for reinforcing in place located at 1200 mm o.c. maximum.

.5 Provide horizontal "L" shaped corner bars of same cross section and spacing as horizontal bars or welded wire fabric around wall and grade beam corners.

.6 Cover electrical conduit, ductwork or piping buried in slabs with 600 mm wide strip of 102 x 102 x MW13.3 x MW13.3 welded wire fabric. If principal slab reinforcement is placed above conduit then place 600 mm strip under conduit. Position of reinforcing steel takes precedence over conduit, ductwork, or piping.

3.3 PLACEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA A23.1. Chair slab reinforcing not further apart than 1.2 m in either direction.

.2 Place, support and secure reinforcement against displacement. Do not deviate from required position.

.3 Do not displace or damage vapour barrier. Repair and reposition vapour barrier as required.

.4 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

.5 Prior to placing concrete, obtain Minister's approval of reinforcing material and placement.

.6 Ensure reinforcement location is maintained to provide required concrete cover to reinforcement during placement of concrete.

.7 Place reinforcing steel in mezzanine floor slab to provide concrete cover for 1 hour fire endurance, as required by the Alberta Building Code.

.8 Place reinforcing steel to provide concrete cover as follows:

Item	Cover [mm]
Beam Stirrups	50
Footings and concrete formed against earth	75
Slabs on Fill	50

.9 .Maintain alignment as follows:

Item	Tolerance Plus or Minus [mm]
Slabs	5
Other Structural Members	10
Rebar bends and Ends	25

3.4 CLEANING

.1 Ensure concrete reinforcing is clean and free from oil and deleterious matter.

.2 Remove all loose scale, loose rust, and other deleterious matter from surfaces of reinforcing.

3.5 SCHEDULE

Location	Reinforcement
Foundation walls, foundation framing members, and slabs-on-grade	Deformed bars and wire fabric, unfinished. Chairs, bolsters bar supports and spacers, non-corrosive finish or construction
Slab on metal deck	Deformed bars and wire fabric, unfinished.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

1.	Waste Management and Disposal	Section 01 74 19.
2.	Cast-in-place concrete piles:	Section 31 62 13.
3.	Concrete forms and accessories:	Section 03 11 00.
4.	Concrete Reinforcement:	Section 03 20 00.
5.	Concrete floor finishes:	Section 03 35 10.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM C109/C109M-08	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
.2	ASTM C295-08	Standard Guide for Petrographic Examination of Aggregates for Concrete
.3	ASTM C309-08	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
.4	ASTM C330-05	Standard Specification for Lightweight Aggregates for Structural Concrete.
.5	ASTM C332-07	Standard Specification for Lightweight Aggregates for Insulating Concrete.
.6	ASTM C618-08a	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
.7	ASTM C827-01a (2005)	Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
.8	ASTM C939-02	Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
.9	ASTM D412-06ae2	Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
.10	ASTM D624-00(2007)	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
.11	ASTM D1751-04(2008)	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
.12	ASTM D1752-04a(2008)	Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

.2 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-51.34-M86	Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
.2	CGSB 81-GP-1M- 77	Flooring, Conductive and Spark Resistant.
.3	CAN/CSA-A23.1-04	Concrete Materials and Methods of Concrete Construction.
.4	CAN/CSA-A23.2-04	Methods of Test for Concrete.
.5	CAN/CSA-A23.3-04	Design of Concrete Structures.
.6	CAN/CSA-A3000-08	Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.3 SUBMITTALS

.1 Test and Evaluation Reports:

.1 Testing shall conform to CSA A23.2

.2 Concrete work may be tested by a testing firm retained by the Minister.

.3 Submit the following to testing firm:

.1 Results of petrographic examination of aggregates to ASTM C295, representative of aggregates to be supplied for project.
.2 Samples of fine and coarse aggregate.
.3 Proposed concrete mix design.

.4 Provide casual labour to the testing firm's field personnel for the purpose of obtaining and handling sample materials.

.5 Advise testing firm in advance of concrete placement.

.6 Provide and maintain facilities at the site for storage of concrete test cylinders for the first 24 hours.

.7 Provide copies of mill test reports of cement as required.

.8 Secure sufficient three and seven day cylinders for testing by concrete supplier to ensure concrete quality control.

.9 Provide at least one cube test, to ASTM C109/C109M, on grout used under base plates and machinery.

.10 Conduct core tests when required.

.11 Testing firm will do the following:

.1 Take three test cylinders from each 60 m3 of concrete, or fraction thereof, of each type of concrete placed in any one day.

.2 Take samples of concrete mix close to the point of final deposit in the form. Contractor shall provide suitable access to the Work for obtaining samples.

.3 Moist cure and test one cylinder in 7 days and moist cure and test the remaining two cylinders in 28 days.

.4 Take one additional test cylinder when the temperature is likely to fall below 0°C within 48 hours after placing and no provisions have been made to heat the concrete to greater than 10°C. Test cylinder to be cured on job-site under same conditions as concrete it represents and tested in 7 days.

.5 Make at least one slump test and one entrained air test for each set of test cylinders taken.

.12 Results of field tests will be reported immediately to the Contractor by the field representative of the testing firm. These results do not imply approval or disapproval of the work, but are for the Contractor's information. Acceptability of the work will be determined by the Minister.

.13 Results of concrete tests will be forwarded to the Minister and to the Contractor. Included with the results will be the following information: Name of Project, Date of Sampling, Name of Supplier, Delivery Truck Number, Identification of Sampling and Testing Technician and exact location in the structure of the concrete sampled.

.14 Testing firm personnel are not authorized to revoke, relax, enlarge or release any requirements of the specification, nor to accept or reject any portion of the work.

.15 Contractor may arrange and pay for additional tests for use as evidence to expedite construction.

.16 Strength evaluation tests and analysis:

.1 The Minister may order an independent testing firm to obtain cores, x-rays, or similar non-destructive tests.

.2 The Minister may order a load test and/or analysis as defined by CSA A23.3, Section 18, if the non-destructive tests are impractical or inconclusive.

.3 Reinforce by additional construction or replace as directed by the Minister at own expense, concrete judged inadequate by structural analysis or by results of load tests.

.4 Pay the cost of testing and/or analysis which is required to demonstrate the adequacy of the structure which does not meet the requirements for strength or which has been placed before formwork and reinforcing have been inspected and approved by the Minister.

.5 The Minister may order additional testing at any time even though the required tests indicate that the strength requirements have been met. In this instance the Minister will pay for those tests that meet the specified requirements and the Contractor shall pay for those that do not.

1.4 QUALITY ASSURANCE

.1 Cast-in-place concrete to conform to CSA A23.1. These standards shall be available in Contractor's site office for use of Contractor and Minister.

.2 Failure to comply with the requirements that control strength and durability will result in the structure being considered potentially deficient.

.3 A structure will be considered potentially deficient when:

.1 Concrete used is not as specified in Concrete Mix Schedule in this Section.
.2 Improper curing methods or materials are used.
.3 There has been inadequate protection of concrete from extremes of temperature during early stages of curing and strength development.
.4 There has been mechanical injury from fire, construction overload or premature removal of forms.
.5 Poor workmanship is determined.
.6 Concrete differs from the required dimensions.

.4 Concrete not conforming to the lines, detail, strength, and grade specified herein or as shown on drawings shall be modified or replaced at the Contractor's expense.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 CONCRETE MATERIALS

.1 Portland Cement, Supplementary Cementing Materials to CAN/CSA A3000.

.2 Aggregates: to CSA A23.1 and as follows.

.1 Coarse aggregate to be normal density.

.3 Water: potable, to CSA A23.1.

.4 Admixtures: to CAN/CSA-A23.1. Minister to approve accelerating or set retarding admixtures during cold and hot weather placing.

.1 Air Entrainment: conforming to CAN3-A266.1.

.2 Chemical: conforming to CAN3-A266.2;

.3 Pozzolanic Mineral: conforming to CAN/CSA-A23.5, Type F-flyash.

2.2 CONCRETE ACCESSORIES

.1 Curing Compound: CSA A23.1 clear and to ASTM C309, Type 1 – Chlorinated rubber.

.2 Shrinkage Compensating Grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents. Compressive strength of 16 MPa at 24 hours and 50 MPa at 28 days.

.1 Consistency: as follows:
- .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30 seconds.
- .2 Flowable: to ASTM C827. Flow table, 5 drops in 3 seconds, (ASTM C109, applicable portions) 125 to145 %.
- .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 seconds, (ASTM C109, applicable portions) 100 to125 %.
- .4 Dry pack to manufacturer's requirements.

.3 Bonding Agent: high polymer resin emulsion, mixed with cement mortar or grout to form a water resistant adhesive bond.

.4 Dampproof Membrane 150 micrometre polyethylene film to CAN/CGSB-51.34.

.5 Polyethylene film: 0.15 mm thickness to CAN/CGSB-51.34.

.6 Dampproofing, emulsified asphalt, mineral colloid type: to CAN/CGSB-37.2.

.7 Premoulded Joint Fillers: bituminous impregnated fiberboard to ASTM D1751 12 mm thickness x required width.

.8 Non-Ferrous Grout: pre-mixed, non-shrink, minimum 35 MPa compressive strength.

2.3 MIX

.1 Supply concrete mix proportioned to produce concrete specified in Concrete Mix Schedule.

.2 Requirements not specified in Schedule shall conform to CSA A23.1.

.3 Use of admixtures, other than air-entraining admixtures, are not permitted without prior approval of the Minister.

.4 Fly ash up to a maximum of 20% of the total cement content may be used for concrete placed at the following locations:

.1 Slabs, Grade Beams and Pile Caps: 20%

.5 Superplasticizers shall be used in strict accordance with the recommendations of the manufacturer. Concrete slump after superplasticizing shall not exceed 200 mm.

.6 All admixtures are subject to Minister's approval. List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Minister's approval.

3. Execution

3.1 PREPARATION

.1 Obtain Minister's approval before placing concrete. Provide Minister and testing agency 24 hours notice prior to placing concrete.

.2 Coordinate placement of inserts and joint devices with erection of concrete formwork and formwork accessories.

.3 Pumping of concrete is permitted only after approval of equipment and mix.

.4 Ensure reinforcement and inserts are not disturbed during concrete placement.

.5 Prior to placing concrete obtain Minister's approval of method for protection of concrete during placing and curing.

.6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality of concrete, ambient air temperature and test samples taken.

.7 Clean previously placed concrete with steel brush. Use acid if necessary. Mix and brush on bonding agent in accordance with manufacturer's instructions.

.8 In locations where new concrete is dowelled into existing work, drill holes into existing work. Place steel dowels and pack solid with shrinkage compensating grout to anchor and hold dowels in place as indicated.

.9 Do not place load upon new concrete until authorized by the Minister.

3.2 SLEEVES AND INSERTS

.1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by the Minister.

.2 Where approved by the Minister, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by the Minister.

.3 Do not cut, bend, eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from the Minister before placing of concrete.

.4 Check locations and sizes of sleeves and openings shown on drawings.

.5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.6 Conduit and pipe embedded in concrete shall:

.1 Not displace more than 4% of the cross sectional area of a column, including the area of concrete displaced by the bending of the conduit, or the exit path of the conduit out of the column.
.2 Not exceed one-third of the solid portion of the slab thickness.
.3 Not be spaced closer than three diameters on centre.
.4 Have a minimum concrete cover of 25 mm.

3.3 ANCHOR BOLTS AND BASE PLATES

.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

.2 Grout under base plates using procedures in accordance with manufacturer’s recommendations which result in 100% contact over grouted area.

3.4 DAMPPROOF MEMBRANE

.1 Install dampproof membrane on prepared sub-grade under concrete slabs-on-grade inside building.

.2 Lap dampproof membrane minimum 150 mm at joints and seal as recommended by manufacturer.

.3 Seal punctures in dampproof membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.

3.5 JOINT FILLERS

.1 Furnish filler for each joint in 2 pieces for depth and width required for joint. Top piece to be sized to provide 12 mm from top of slab to portion of joint filler to remain.

.2 Fasten abutting pieces of joint filler and hold to shape by stapling or other positive fastening.

.3 Locate and form isolation, construction, expansion joints as indicated. Install joint filler.

.4 Remove upper portion of joint filler after slab has hardened to a point where removal will not damage slab edges.

3.6 PLACING CONCRETE

.1 Perform cast-in-place concrete work in accordance with CAN/CSA-A23.1.

.2 Revise, re-seat and correct improperly positioned reinforcing, immediately before placing concrete.

.3 Place concrete as a continuous operation stopping only at construction joints indicated on the drawings or as follows: At center of span of suspended slabs, beams and joists; in walls and columns immediately above or below floor construction; at center of steel beam that supports concrete slab.

.4 Construction joints at center of span of suspended slabs beams and joists shall be adequately doweled and keyed.

.5 Place floor slabs on grade as one continuous pour between construction joints indicated on drawings. Control joints for each pour shall be formed by sawing a continuous 1/4 slab depth slot at 6 m centers each way unless otherwise indicated on drawings. Sawing shall be done as soon as the concrete has sufficiently hardened to prevent raveling of the edges but in no case later than 18 hours after the concrete slab has been placed.

.6 Isolate slabs on grade from vertical concrete using pre-moulded joint fillers extending from bottom of slab to within 12 mm of slab surface unless otherwise indicated.

.7 Use winter concreting methods in accordance with CAN/CSA A23.1 when the mean daily temperature falls below 5°C.

.8 Provide a camber of 0.02% of span for beams unless noted otherwise on drawings.

.9 Use procedures noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surfaces are not damaged.

.10 Vibrate concrete using the appropriate size equipment as placing proceeds in strict accordance with Clause 19.5 of CSA-A23.1. Check frequency and amplitude of vibrations prior to use. Provide additional standby vibrators in the event of equipment failure.

.11 In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout.

.12 Do not place concrete if carbon monoxide producing equipment has been in operation in the building during the 12 hours preceding the pour. This equipment shall not be used during placing, or for 24 hours after placing. During placing and curing concrete, surfaces shall be protected by formwork or by an impermeable membrane from direct exposure to carbon dioxide, combustion gases or drying from heaters.

.13 Honeycomb or embedded debris in concrete is not acceptable.

.14 Remove and replace defective concrete.

3.7 CURING

.1 Cure concrete in accordance with CAN/CSA-A23.1 and as follows.

.2 Wet cure flat slabs and floors shown to receive paint, ceramic tile, quarry tile, terrazzo, toppings.

.3 All concrete shall receive moist curing for a period of seven days. One of the following methods shall be used as soon as the concrete has hardened sufficiently to prevent marring:

.1 Surface covered with canvas, burlap or other satisfactory material and kept thoroughly wet.
.2 Surface sealed with polyethylene sheeting and the concrete kept thoroughly wet.
.3 Subject to the approval of the Minister, a liquid membrane curing compound used in accordance with the manufacturer's recommendations, may be used. Membrane to remain intact during the curing period.

.4 Surfaces of concrete that are protected by formwork which is left in place for seven days shall not require any additional curing except as specified for hot weather. If the formwork is removed in less than seven days, the concrete shall receive moist curing until seven days have elapsed since the concrete was placed.

.5 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.6 Curing compounds shall not be used on concrete surfaces to receive topping or other type of bonded finish unless approved by the Minister.

.7 Protect freshly placed and consolidated concrete against damage or defacement from adverse weather conditions.

.8 Coat exposed concrete walking surfaces not to receive an integral hardener with curing compound of type that provides permanent seal.

.9 Do not use curing compound in locations where chemical hardener is to be used.

3.8 FINISHING AND TREATMENT OF SLAB OR FLOOR SURFACES

.1 Refer to Section 03 35 10 for concrete floor finishes.

.2 Provide scratch finish where bonded topping, terrazzo, floor tile is to be applied. Provide required depressions to accommodate bonded topping, terrazzo, floor tile.

.3 Provide swirl-trowelled finish where resilient floor tile, resilient sheet floor tile, and carpet is to be applied.

.4 Provide swirl-trowelled finish unless otherwise indicated.

.5 Provide float finish to surfaces to receive roofing or waterproofing membrane. Consolidate and strike off concrete and complete surface with a power float to true plane not exceeding 5 mm in 3 m.

.6 Slab and floor finish tolerance, unless specified otherwise, in accordance with CAN/CSA-A23.1, straight edge method to following locations:

Floor Slab Location	Finish Tolerance
Internal and External Slabs On Grade	straight edge value of ± 8 mm in 3 meters F_F = 20, F_L = 15

.7 Provide floor level at walls with uniform minimum slope of 1% to floor drain, where applicable.

.8 Sprinkling of dry cement or a mixture of dry cement and sand over concrete surface is not acceptable.

.9 Depress floors for ceramic tile, quarry tile, terrazzo, toppings as shown on drawings.

3.9 BULL FLOATING

.1 Bull float floor surfaces to remove ridges and fill voids immediately after screeding.

.2 Complete bull floating before any excess moisture or bleed water is visible on the surface.

3.10 MECHANICAL FLOATING

.1 Mechanically float floor surfaces when bleed water has disappeared and surfaces are sufficiently hard to prevent working excess mortar to the surface.

.2 Continue floating as necessary to produce surfaces of uniform texture, free from hollows, bumps and screed marks.

.3 For surfaces to be trowelled, continue floating as necessary to embed coarse aggregate particles firmly below surface mortar.

.4 Hand float in restricted areas, corners, etc.

3.11 TROWELLING

.1 Trowel floor surfaces with mechanical trowelling machines fitted with steel blades.

.2 Commence trowelling when surface is sufficiently hard to prevent working excess fine material to the surface.

.3 Perform additional trowelling at intervals so final trowelling is done just before concrete becomes so hard that further trowelling is ineffective.

.4 Finished trowelled surfaces to be hard, dense, and free from blemishes or other imperfections.

.5 Hand trowel in restricted areas, corners, etc.

3.12 TEXTURED SURFACES

.1 Final trowelling to be spin trowel or hand swirl finish.

.2 Immediately after final trowelling, brush or fine broom surfaces with a hair broom.

.3 Immediately after mechanical floating, broom surfaces with a stiff bristled broom.

.4 Protect textured floors from damage during construction.

3.15 TOPPINGS

.1 Topping [mixture] to meet the following requirements.

.1 Monolithic, [ ] mm thickness: [ ].
.2 Bonded overlay, [ ] mm thickness: [ ].

.2 In pouring base course, make allowance for bonded overlay topping thickness.

.3 Place monolithic topping before base course has completely set in accordance with CAN/CSA-A23.1 and bonding agent manufacturer's recommendations.

.4 Place bonded overlay topping over hardened base course in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.

.5 Follow Minister's instructions in case of conflicting requirements arise between CAN/CSA-A23.1 and topping manufacturer's recommendations.

.6 Apply cement/sand grout, latex bonding agent modified cement/sand grout, epoxy bonding agent to base course in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.

.7 Ensure joints in topping are of the same as those in base course. Also ensure that joint locations precisely match those in base course.

3.16 FINISHING FORMED SURFACES

.1 Upon removal of forms, treat imperfections in formed surfaces in accordance with CSA A23.1 and to Minister's approval.

.2 Modify or replace concrete not conforming to the quality, lines, details and elevations specified herein or as shown on drawings.

.3 Finish all exposed formed concrete surfaces with smooth rubbed finish according to CSA A23.1.

.4 Rough Finish Concrete Surfaces not Exposed to View: Place concrete against forms true and plane. Cut off form ties a minimum of 10 mm below concrete surface. Patch tie holes and defects. Remove fins exceeding 5 mm.

.5 Smooth Finish Overhead Surfaces Exposed to View: Place concrete against plywood, steel or tempered hardboard. Patch tie holes and defects. Remove fins.

3.17 GROUT

.1 Mix non-shrink grout to consistency specified in part 2 of this Section as required for use intended and apply in accordance with manufacturer's instructions. Install under columns, beams and equipment bases as shown on drawings, in accordance with the manufacturer's recommendations.

3.18 EQUIPMENT PADS

.1 Provide concrete pads for equipment where indicated on drawings. Adjust dimensions of pads to reviewed shop drawings.

.2 Insert bolts and sleeves and pack with non-shrink grout, in accordance with setting details and templates.

.3 Steel trowel surfaces smooth. Chamfer exposed edges.

3.19 SLABS ON FILL

.1 Vapour barrier to be 10 Mil minimum UNO. Seal punctures and damaged edges of vapour barrier before placing concrete. Use vapour barrier material, lapped over punctures and damaged areas 150 mm in all directions. Seal with tape.

.2 Place adjustable screeds at suitable locations. Do not pierce vapour barrier.

.3 Place concrete to required elevations shown on drawings.

.4 Separate slabs-on-fill from vertical surfaces with a suitable smooth faced bond breaker.

.5 Saw cut control joints with true square edges within 24 hours after finishing. Cut in pattern shown on drawings. Use 5 mm thick blade, cut to 1/3 depth of slab

3.20 COLD AND HOT WEATHER CONCRETING

.1 Conform to the requirements of CSA A23.1.

.2 Protect slabs being finished during drying conditions above 25° C, and/or during high winds with moisture retention film.

3.21 CONCRETE MIX SCHEDULE

Component	Min. Comp. Strength @ 28 Days (MPa)	Max. Water/ Cement Ratio	Nominal Agg. Size (mm)	Slump Range* (mm)	Air Content Range (%)	Minimum Cement Content (kg/m³)	Cement Type
Weather Exposed Concrete:							
Exterior slabs On Grade (Exprosure Class C-1)	35	0.4	20-5	60-100	5-8	335	GU
Reinforced Pile Caps and Grade Beams (Exposure Class S-2)	32 @ 56 Days	0.45	20-5	70-100	4-7	335	HS

Component	Min. Comp. Strength @ 28 Days (MPa)	Max. Water/ Cement Ratio	Nominal Agg. Size (mm)	Slump Range* (mm)	Air Content Range (%)	Minimum Cement Content (kg/m³)	Cement Type
Non-Weather Exposed Concrete: Exposure Class: N							
Slabs-on-grade	35	0.45	20-5	60-80	None		GU
Masonry Core Fill	20	0.55	20-5	130-180	None		GU

*Subject to Minister's prior written approval, maximum slump may be increased beyond specified range by the use of chemical admixtures.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Cast-in-place concrete:	Section 03 30 00.

1.2 REFERENCE DOCUMENTS

.1 Canadian Standards Association (CSA):

.1	CAN/CSA-A23.1-00	Concrete Materials and Methods of Concrete Construction.
.2	CAN/CGSB-25.20-95	Surface Sealer for Floors

.2 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD):

.1	SCAQMD Rule 1113-04	Architectural Coatings.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination

.1 Coordinate the work of this section with the work of Section 03 30 00 as required for hardeners to ensure proper application.

1.4 SUBMITTALS

.1 Product Data

.1 Submit product data for each product in accordance with Division 01.

.2 Include application instructions for hardeners and sealers

.3 Submit WHMIS MSDS – Material Safety Data Sheets for each product. Indicate VOC levels.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements

.1 Deliver materials to site in containers sealed and labeled by manufacturers.

.2 Storage and Handling Requirements

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

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

1.6 SITE CONDITIONS

.1 Provide temporary lighting, as required, to provide a minimum of 1200 watt light source, placed 2.5 meters above floor surface, for each 40 m^2 of floor being finished.

.2 Maintain ambient temperature of 10°C minimum from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.3 Ensure substrate is within moisture limits prescribed by product manufacturers.

.4 Ventilate enclosed spaces as required during product application and for 48 hours after application.

2. Products

2.1 MATERIALS

.1 Use chemical hardeners that are non toxic, biodegradable and have zero or low VOCs.

.2 Non-Metallic Floor Hardener: premixed, dry shake surface hardener, cement to hardener ratio of 2 to 1, clear cement, light reflective.

.1 Volcanic basaltic aggregate (Traprock).

.2 Quartz aggregate.

.3 Slip Resistant Abrasive Aggregate: crushed emery with minimum 50% aluminum oxide.

.4 Surface Sealer: to CAN/CGSB-25.20, Type 2 – Water Based, clear.

.1 Surface sealers manufactured or formulated with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, hexavelant chromium and their compounds are not acceptable.

.2 Surface sealer shall be compatible with the hardener and shall be manufactured by the hardener manufacturer.

.3 Surface sealer shall have less than 100g/l of VOC in accordance with SCAQMD Rule #1113.

.5 Thick-bed mortar: Latex additive mixed with Portland cement and sand in accordance with manufacturer's recommendations.

.6 Self-leveling and smoothing underlayment: Performance standard to ASTM C349 (and CGSB 71-GP-30M), Type 2, minimum compressive strength 30 MPa (4400 psi) after 28 days.

.7 Feather edging: Polymer-modified, cementitious, 2 component, fast setting, trowel applied.

2.2 SELF-LEVELING CONCRETE TOPPING

.1 Self-Leveling Concrete Topping: Self-leveling, no troweling, Portland cement-based topping for resurfacing, smoothing or leveling of interior concrete. Do not install in areas of moving joints or cracks.

.1 Depth: 6 mm to 38 mm in one operation, 127 mm with addition of appropriate aggregate.

.2 Primer: as recommended by concrete topping manufacturer.

.3 Sealer: as recommended by concrete topping manufacturer for protection against oil, salt, water and surface wear, compatible with concrete topping.

.4 Compressive Strength: in accordance with ASTM C109, 5300 psi (373 kg/cm^2) at 28 days.

.5 Flexural Strength: in accordance with ASTM C348, 1000 psi (70 kg/cm^2) at 28 days.

3. Execution

3.1 VERIFICATION OF CONDITIONS

.1 Verify that substrate and surfaces are ready to receive work.

3.2 HARDENED FLOOR FINISH

.1 Apply non-metallic floor hardener to manufacturer's instructions and as follows.

.2 Use measured areas to ensure accurate quantity is applied.

.3 Apply hardener in two shakes; first shake – 2/3 of rate specified, second shake – 1/3 of rate specified.

.4 Use slip resistant aggregate in strict accordance with manufacturer's written application and finishing instructions.

.5 Immediately after first mechanical floating, apply first hardener shake uniformly by broadcast method.

.6 Float first shake when hardener is saturated by the concrete mix and has started to blend with the concrete mortar.

.7 Immediately after floating first shake, apply second shake perpendicular to direction of first shake.

.8 Float second shake, when saturated by moisture absorbed from concrete, once to produce coarse textured non-slip finish.

.9 Flat steel trowel to produce fine textured non-slip finish.

3.3 CONCRETE SEALER

.1 Apply surface sealer in accordance with manufacturer's written instructions.

3.4 FINISHING FLOORS AND SLABS

.1 Finish floors and slabs in accordance with CSA A23.1 and ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces; do not wet concrete surfaces.

.2 Float (Initial) Finishing:

.1 Consolidate surface with power driven floats or by hand floating if area is small or inaccessible to power driven floats.

.2 Re-straighten, cut down high spots, and fill low spots.

.3 Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

.4 Apply float finishing to surfaces receiving trowel finishing.

.3 Trowel (Final) Finishing:

.1 Commence trowel finishing after all bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the working of excess mortar to the surface.

.2 Apply first trowelling and consolidate concrete by hand or power-driven trowel after applying float finishing; continue trowelling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance; repair or smooth any surface defects that would telegraph through applied coatings or floor coverings.

.3 Apply a trowel finishing to surfaces exposed to view or to be covered with resilient flooring, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

.4 Finish surfaces to the tolerances as follows:
Finishing: Methods, tools and equipment employed to achieve levelness or surface flatness for shored slabs and slabs-on-grade, and durability indicated and as follows:

.5 F5-Finishing: Floors having an overall F-number of FF 45 x FL 35; no similar CSA A23.1 Slab Finishing.

.4 Trowel and Fine Broom Finishing:

.1 Apply trowel finishing to surfaces where large format tile is scheduled for installation by either thickset method.

.2 Slightly scarify surface with a fine broom While concrete is still plastic.

.3 Finish surfaces to the tolerances above.

.5 Broom Finishing:

.1 Apply a broom finishing to exterior concrete platforms, steps, and ramps, and elsewhere as indicated:

.2 Slightly roughen trafficked surface by brooming with fibre bristle broom perpendicular to main traffic route immediately after float finishing.

.3 Coordinate required final finishing with Consultant before application.

.6 Moisture Reducing Finish: Prepare floor to ICRI CRP 3 or 4 as directed by manufacturer's written instructions

3.5 INSTALLATION OF REHABILITATION MATERIALS

.1 Basic Treatment

.1 The basic treatment to all formed concrete surfaces, exposed or unexposed, is to be to CSA-A23.1/A23.2.

.2 Do not repair honeycomb areas until inspected by Consultant. Fill honeycomb in non-structural elements with mortar; repair honeycomb in structural elements in accordance with CSA Standards.

.2 Filling

.1 Apply self-leveling and smoothing underlayment working into all nooks, cracks and spaces to fill flush with top of floor slab. Trowel to a smooth surface.

.2 Use feathering edging to fill and level depressions up to 19 mm in thickness, to fill cracks, holes, chips etc. where topping must be finished to a feather edge. Apply in strict accordance to manufacturer's instructions.

.3 At juncture of resilient flooring and exposed concrete to provide feather edging for a distance of 150 mm from + 3 mm to 0 mm, as indicated.

.4 Prepare substrate and install as per manufacturers recommendations, smooth finish.

.3 Slab Finishes

.1 The tops of all floor slabs, are to be brought to an even, level or sloping surface as indicated on the drawings, ready to receive the specified finish, in accordance with CSA-A23.1/A23.2.

.2 Depress floor slabs as required for floor finishes.

.3 All surfaces shall be true and level to a tolerance in plane of 3 mm in 3 m unless specified more stringent above.

.4 Let the leveling coat harden and cure sufficiently before laying specified flooring.

3.6 INSTALLATION SELF-LEVELING CONCRETE TOPPING

.1 Prepare substrate in accordance with manufacturer's written instructions. Concrete to be free of oil, wax, grease, asphalt, latex and gypsum compounds, curing and sealing compounds and any other contaminant that might act as a bond breaker.

.1 Apply self-leveling concrete topping in accordance with manufacturer's written instructions.

END OF SECTION

1. General

1.1 RELATED SECTIONS

.1	Waste Management and Disposal	Section 01 74 19.
.2	Reinforcement in grout or concrete filled masonry cavities:	Section 03 30 00.
.3	Built-in precast concrete components:	Section 03 45 00.
.4	Glass Unit Masonry:	Section 04 23 00.
.5	Custom metal fabrications:	Section 05 50 00.
.6	Granular Insulation:	Section 07 21 23.
.7	Rigid insulation:	Section 07 21 13.
.8	Sheet Membrane Air/Vapour Seal:	Section 07 26 00.
.9	Metal flashings for roofing:	Section [ ].
.10	Sealants:	Section 07 92 00.

1.2 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

.1 Reinforcement supplied under Section 03 30 00.

.2 Custom metal fabrications supplied under Section 05 50 00.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A641/641M	Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
.2	ASTM A653M	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
.3	ASTM C140	Sampling and Testing Concrete Masonry Units.
.4	ASTM C426	Linear Drying Shrinkage of Concrete Masonry Units.

.2 Canadian Standards Association (CSA):

.1	CAN/CSA A82.1	Burned Clay Brick (Solid Masonry Units Made From Clay or Shale)
.2	CAN3-A82.8	Hollow Clay Brick.
.3	CSA A165 Series	CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3), Includes Update No. 1 (2006)
.4	CSA A179	Mortar and Grout for Unit Masonry
.5	CAN3-S304	Masonry Design For Buildings
.6	CSA S304.1	Design of Masonry Structures

.7	CSA A371	Masonry Construction for Buildings
.8	CSA A370	Connectors for Masonry
.9	CAN/CSA-A3000	Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005)

.3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD):

.1	SCAQMD Rule 1168-05	Adhesives and Sealants Applications.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate lines, levels and coursing with work of other Sections.

.2 Obtain built-in items prior to start of this work.

1.5 SUBMITTALS

.1 Samples:

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

.2 Provide 5 clay brick and concrete masonry units showing range of colour and texture possible within colour specified.

.3 Provide samples of masonry connectors, joint reinforcement, flashings, weeps and vents.

.4 Obtain approval from Minister before ordering.

.2 Test and Evaluation Reports:

.1 Comply with requirements of Division 01.

.2 Submit copies of test reports by an independent testing agency, accredited for this type of testing by the Standards Council of Canada, demonstrating that:

.1 Concrete masonry complies with CSA A165 Series and specified requirements.

.2 Clay brick complies with CSA A82.1 and specified requirements.

.3 Masonry connectors and their fasteners comply with CSA A370 and specified requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver masonry units on pallets, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.

.2 Unload and store on dry, level areas.

.3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings which will provide protection from the elements but allow for air circulation.

.4 Protect masonry materials from damage during all phases of delivery, storage and handling.

.5 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 CLAY BRICK MASONRY UNITS

.1 Burned Clay Brick: to CAN/CSA-A82.1 and as follows:

.1 Grade: SW for face brick exposed to weather.

.2 Type: To match existing.

.3 Size: To match existing.

.4 Colour and Texture: To match existing. Do colour and texture blending prior to delivery.

.2 Hollow Clay Brick: to CAN3-A82.8 and as follows:

.1 Classification: Type I(H) for face brick exposed to weather.

.2 Size: To match existing.

.3 Colour and Texture: To match existing.

2.2 CONCRETE MASONRY UNITS

.1 Concrete Block Masonry Units: to CSA A165.1 and as follows:

.1 Classification: H/20/C/M.

.2 Method of Curing: Autoclave or low pressure steam curing is acceptable, provided that masonry units comply with linear shrinkage and moisture content requirements of CSA A165.1 for type M units at time of delivery to site. Notwithstanding the foregoing, age all units before delivery to site, as follows:

.1 Autoclaved units: minimum 7 days.
.2 Low pressure steam cured units: minimum 28 days.

.3 Sizes: as indicated on drawings.

.4 Special Shapes: Bond beam, lintel beam, corner and other shapes as required or indicated on drawings. Provide external corner units as a single unit, with required architectural face appearance on one side and one end.

.5 Face Textures, Finishes and Colours: Following types, as indicated on drawings:

.1 Smooth face, natural colour.

2.3 HORIZONTAL JOINT REINFORCEMENT

.1 Reinforcement which will also function as masonry connectors:

.1 Conventional Continuous Welded Ties/Reinforcing: to CSA A370, in ladder or truss configuration.

.2 Reinforcement:

.1 Steel Wire: to ASTM A641/A641M, hot dip galvanized.

.2 Continuous Welded Double Wire Welded Ladder or Truss Type: to CSA A370.

.3 Single Wire Type: 3.8 mm diameter.

.3 For continuous welded ladder or truss type, provide:

.1 widths to suit wall widths, and

.2 prefabricated tee-shaped and 90° corner configurations for use at wall intersections and corners.

2.4 MASONRY CONNECTORS

.1 Select any suitable conventional or non-conventional type as defined by CSA A370, and as follows:

.1 Corrosion Protection: level I for interior walls, level II for exterior walls.

.2 Maximum unsupported length of connectors in cavity shall not exceed that permitted by CSA A370 or recommended by connector manufacturer, whichever is the smaller dimension.

.3 Connectors selected shall accommodate differential vertical movement of 16 mm between masonry veneer and structural backup.

2.5 FASTENERS FOR MASONRY CONNECTORS

.1 Design Criteria: capable, when installed in specified substrates, of meeting requirements of CSA A370.

.2 Corrosion Resistance: to requirements of CSA A370.

.3 Screws: steel, hex washer head, to suit substrate.

.4 Inserts: drilled-in, compression type with 2-component epoxy adhesive capsule and sleeve where fastened to existing masonry backup.

.5 Nails: steel, spiral type, suitable for substrate.

.6 Provide fastener types as follows:

Substrate	Fastener Type
Steel Studs	Screws
Structural Steel	Screws
Masonry & Standard Aggregate Concrete	Inserts, screws or nails
Concrete with light-weight aggregate	Inserts with adhesive

2.6 ACCESSORIES

.1 Control Joint Fillers: Preformed rubber, neoprene or polyvinylchloride, size and profile to suit intended application and as indicated on drawings.

.2 Cavity Weeps/Vents: Preformed plastic or galvanized steel, 100 mm long.

2.7 MORTAR AND GROUT

.1 Mortar: to CSA A179, property specifications, and as follows:

Location	Mortar Type	Maximum Compressive Strength*	[Colour]
All Locations	S	13 MPa	To match existing.

*Average of six 50 mm cubes, job prepared, tested @ 28 days.

.2 Mortar Colour Admixtures: Metallic oxide pigments. Colour will be selected by Minister from manufacturer's standard range. Pigments shall not exceed 10-15% by weight of cement content.

.3 Masonry cement is not permitted.

.4 Grout: to CSA A179.

2.8 FLASHINGS

.1 Butyl Rubber Base Flashing: minimum 1.2 mm thick butyl sheet rubber strips.

.2 Sheet Steel Base Flashing: minimum 0.60 mm thick, to ASTM A653M, formed as detailed, galvanized with Z275 zinc coating.

.3 Modified Bitumen Base Flashing: SBS modified sheet membrane, minimum 1.0 mm thick self-adhering type or minimum 3.0 mm thick torch-applied type.

2.9 CLEANING COMPOUNDS

.1 Use low VOC products.

3. Execution

3.1 EXAMINATION

.1 Examine work of other Sections upon which work of this Section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved.

3.2 COLD WEATHER REQUIREMENTS

.1 For masonry work which will be done below 5°C, measure temperatures of masonry material prior to use; maintain temperatures as close as possible for mortar batches; ensure mortar temperature on mortar boards does not exceed 50°C; use dry masonry units; lay masonry on unfrozen surfaces free from snow and ice; use windbreaks when laying masonry not protected by enclosures; provide a high-low registering thermometer where directed on site.

.2 When mean air temperature will, over a 24 hour period, go below 5°C but not below 0°C, conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C. Protect entire constructed masonry by enclosing within weatherproof membrane for 48 hours.

.3 When mean air temperature will, over a 24 hour period, go below 0°C but not below -4°C, conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C and maintain temperature of mortar boards above 0°C. Protect entire constructed masonry by enclosing within weatherproof membrane for 48 hours.

.4 When mean air temperature is below -4°C, conduct laying of masonry in enclosures heated to maintain air temperature above 0°C. Conduct masonry work as for normal temperatures except heat water and sand to produce mortar temperatures between 5°C and 50°C and heat units if necessary so that temperature of units at time of laying is minimum -7°C. Maintain enclosure in position for 48 hours and maintain air temperature within enclosure at minimum 0°C.

3.3 MIXING MORTAR

.1 Mix mortar in accordance with CSA A179, using maximum amount of water consistent with workability.

.2 Provide gauging equipment and ensure that shovel count is accurate.

.3 Use mechanical mixer of one sack minimum capacity for large batches, mechanically mixing for not less than 3 minutes and not more than 5 minutes. Hand mixing may be used for small batches.

.4 Re-temper mortar to replace water lost by evaporation.

.5 Use and place mortar in final position within 2 hours after mixing.

.6 For coloured mortar, mix coloured pigment with 10% to 15% dry cement by weight. Do not use same mixer for regular and coloured mortar.

3.4 PLACING OF MASONRY, GENERALLY

.1 Meet or exceed requirements of CSA A371.

.2 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.

.3 Construct cavity walls using techniques that will minimize mortar dropping in cavity space. This may require the use of batten boards to catch mortar droppings. No mortar shall bridge cavity space or plug cavity vents at bottom of cavity.

3.5 PLACING CLAY BRICK MASONRY UNITS

.1 Except when outdoor temperature within 24 hours of placing is less than 5°C, and if IRA (Initial Rate of Absorption) exceeds 1.55 g/min/1000 mm^2, dampen clay brick 3 to 24 hours before installation. Do not saturate. Do not lay until surface is dry.

3.6 PLACING CONCRETE MASONRY UNITS

.1 Do not wet concrete masonry units prior to installation. Cut with dry blade saws.

.2 Place units in face shell mortar bedding for running bond.

.3 Remove excess mortar from cores intended for grouting. Puddle or vibrate grout to completely fill cores.

3.7 BONDS AND PATTERNS

.1 Except where otherwise indicated on drawings, lay up all masonry in Running Bond.

3.8 JOINTING

.1 Tool mortar joints to a dense, smooth surface, after thumbprint hard.

.2 Except where otherwise indicated on drawings, provide following joint types at specified locations:

Location	Joint Type
Exposed:	
Exterior concrete masonry	To match existing
Interior concrete masonry	To match existing
Exterior clay brick masonry	To match existing
Interior clay brick masonry	To match existing
Concealed:	
In cavity walls	Flush
Behind caulking at door frames, window frames, parapets, roof junctures, wall junctures, and similar construction	Flush
Walls to receive plaster, gypsum window frames, parapets, roof junctures, wall junctures, and similar construction	Flush
Walls to receive paint and similar thin finish coatings	Concave

3.9 INSTALLATION OF REINFORCEMENT

.1 Install reinforcement in accordance with CSA 371 and as indicated on drawings.

.2 Place horizontal joint reinforcement in accordance with CSA 371, and as follows:

.1 Place in first and second mortar joints above and below openings. Extend reinforcement minimum 600 mm past openings.

.2 Place in first and second mortar joints below tops of walls.

.3 Stop horizontal reinforcement on each side of control joints.

3.10 INSTALLATION OF MASONRY CONNECTORS

.1 Install masonry connectors in accordance with CSA A370.

.2 Comply with fastener manufacturer's recommendations for edge distance in applicable substrates. Do not fasten into mortar joints of masonry backup.

.3 Install top row of masonry connectors not more than one-half of typical tie spacing below top of veneer panels.

.4 Ensure that connectors installed over or through sheathing are adequately fastened to studs or other structural framing.

3.11 INSTALLATION OF FLASHING

.1 Install flashing under exterior masonry walls and as indicated on drawings.

.2 Extend flashings through brick veneer, turn up minimum 200 mm on back-up substrate.

.3 Secure butyl rubber flashing to back-up substrate with adhesive as detailed on drawings.

.4 Lap joints 150 mm and seal with adhesive.

3.12 INSTALLATION OF ACCESSORIES

.1 Control Joints: install continuous control joint fillers as indicated on drawings.

.2 Cavity Vents:

.1 Install vents in vertical joints immediately over flashing and near tops of walls, in exterior wythes of cavity wall construction at 600 mm o.c. horizontally.

.2 Do not install vent tubes in control or expansion joints. Refer to Section 07 92 00 for venting of control and expansion joints.

3.13 BUILT-IN WORK

.1 Build-in all door and window frames, steel lintels, anchors and bolts, and any other items to be built into masonry.

3.14 CUTTING AND FITTING

.1 Fit and cut chases for piping, conduits, ducts, and sleeves. Install grounds, blocking, inserts, etc., as required.

.2 Do all cutting, fitting, drilling, patching and making good for other trades.

.3 Obtain the Minister's approval before cutting any part which may impair appearance or strength of the work.

3.15 CLEANING

.1 Clean off excess mortar and smears.

.2 Clean and wash masonry surfaces with masonry manufacturer's approved solution using only fibre brushes. Clean a trial area and obtain Minister's approval before proceeding.

.3 In accordance with Section 01 74 19, Waste Management and Disposal, promptly remove from job site and divert from landfill mortar droppings, broken units, and waste resulting from work of this Section.

END OF SECTION

1 General

1.1 INTENT

.1 Inspection and testing carried out by the Owner's inspection and testing agency is intended to confirm that the steel Trade Contractors' own quality assurance and quality control procedures are functioning effectively.

.1 To verify that the steel Trade Contractors' own quality assurance and quality control procedures shall be capable of confirming that the Work is performed in accordance with the Contract Documents.

.2 Terms of reference for the inspection and testing services for structural steel, open web steel joists and steel deck include the following:

.1 The inspection and testing agency is responsible for review of the work performed by the steel trade contractor and reporting to the Owner that the work is in compliance with the applicable References and Contract Documents.

.2 The responsibility for quality of construction and compliance with Contact Documents rests solely with the Contractor. Inspection and testing by the Owner shall not be deemed to relieve the Contractor of any of his/her obligations.

.3 The Consultant (for steel testing and inspection) will make all engineering decisions with respect to rejection criteria and rework required and inform the Owner.

1.2 DEFINITIONS

.1 Quality Management Plan: Quality Management Plan performed by the steel Trade Contractor capable of confirming that the work of steel fabrication and erection is conducted in accordance with the Contract Documents. Owner's Site and Source Quality Control requirements in this section do not replace or eliminate the requirement of the Trade Contractor to perform their own Quality Management Plan.

.2 Site Quality Control: Inspections and testing performed during the installation of components and that is further defined as site assembled or installed work occurring as a part of execution; work that is not performed in the shop or off site.

.3 Source Quality Control: Inspections and testing performed during fabrication of components and that is further defined as shop assembled or manufactured products; work that is not performed on site.

1.3 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA):

.1 CAN/CSA S16-14, Design of Steel Structures

.2 CSA W47.1-09 (R2014), Certification of Companies for Fusion Welding of Steel
.3 CSA W55.3-08, Certification of Companies for Resistance Welding of Steel and Aluminum
.4 CSA W59-13, Welded Steel Construction (Metal Arc Welding)
.5 CSA W178.1-2014, Certification of Welding Inspection Organizations
.6 CSA W178.2-2014, Certification of Welding Inspectors

.2 Canadian Welding Bureau (CWB Group Industry Services):

.1 CWB 113E, 94-1, Weld Quality and Examination Methods Study Guide

.3 Miscellaneous Applicable References:

.1 Alberta Building Code, 2014
.2 Division 01 – General Requirements, and Technical Specifications
.3 Reviewed Shop Drawings

1.4 ADMINISTRATION REQUIREMENTS

.1 Review work of Quality Control; notify Consultant, General Contractor and Owner of non-compliant workmanship or materials within one (1) day of discovery.

.2 Invoicing - Prepare detailed monthly invoices addressed to the Owner and submit to the Consultant for review.

1.5 SUBMITTALS

.1 Provide required information in accordance with Submittal Procedures and General Requirements.

.1 Inspection Reports: Submit a report of each inspection detailing the following for each review:
.1 Name and Certificate Number of welders involved.
.2 Copy of welding procedure for all welds not pre-qualified by CSA W59
.3 Identification mark of each member reviewed and compliance status.

.2 Final Report: Submit a final report summarizing previous reports and specifically stating a belief as to the compliance of the work, signed by the testing agency's inspector responsible for the testing and inspection program with copies sent to the following:
.1 Owner
.2 Consultant
.3 General Contractor
.4 Structural Steel Trade Contractor

2 Products

2.1 SOURCE QUALITY CONTROL

.1 Structural Steel and Open Web Steel Joists:

- .1 Review correlated mill test certificates for compliance with specified material.
- .2 Review structural steel and confirm that steel is supplied by an acceptable source in accordance with the requirements of the Contract Documents; confirm that source of steel sections is clearly identified with raised lettering embossed on at least one face of the steel sections.
- .3 Randomly check member dimensions, thicknesses, lengths and fabrication details for tolerance.
- .4 Check milling of columns and base plates.
- .5 Examine coatings and application to verify compliance.
- .6 Visually examine designated members for compliance with requirements of Architecturally Exposed Steel.
- .7 Random examination of loading to ensure proper handling and shipping.

.2 Welding:

- .1 Review shop welding procedures and welders' qualification certificates for the processes required.
- .2 Perform 100% visual examination of all welds for size, length and workmanship.
- .3 Perform magnetic particle inspection of randomly selected welds (5 to 10% of connections).
- .4 Perform ultrasonic examination of 100% of complete penetration welds subject to tension and of 10% of those subject to compression.
- .5 Perform 100% visual examination of welds and workmanship of embedded plates.
- .6 Perform 100% ultrasonic testing of splices of truss chord members.

.3 Headed Shear Connectors:

- .1 Review supplier, grade, diameter, length, and head geometry for compliance.
- .2 Perform 100% visual review of connector welds.
- .3 Perform Bend tests in accordance with CSA W59 if visual review indicates less than full 360 degree flash and hammer strike makes a dull sound indicating incomplete fusion.

.4 Reports: Report the following for each review of shop fabricated work:

- .1 Name and Certificate Number of welders involved,
- .2 Identification mark of members reviewed and compliance status.

3 Execution

3.1 SITE QUALITY CONTROL

.1 Structural Steel Framing and Open Web Steel Joists:

- .1 Review erectors welding procedures and welders' qualification certificates for the procedures required.
- .2 Examine steel for shipping and handling damage.
- .3 Randomly examine erected work for fit-up, dimensions, tolerances, alignment and plumbness; include checking by instrument a minimum of 10% of beams and 10% of columns in the building for plumbness, alignment, and tolerance.
- .4 Make a note of any temporary bracing installed by the steel Erector including measures to provide stability to the steel structure during erection.
- .5 Perform the following inspections:
  - .1 100% visual examination of site welds for size, length and workmanship.
  - .2 Magnetic particle inspection of 100% of site welds for moment connections.
  - .3 Magnetic particle inspection of randomly selected other site welds (5 to 10% of connections).
  - .4 Review slip-critical connections to confirm that faying surfaces are free from oil and other deleterious substances, and that coatings, if any, are in compliance.
  - .5 Random verification that bolts are tightened in accordance with the turn-of-nut method on 10% of connections with pre-tensioned bolts.
  - .6 Random verification that bolts are snug tight and that connected plies are in firm contact on 10% of other bolted connections.
  - .7 Examine site applied coatings and application for compliance.
  - .8 Review open web steel joist bearings to confirm compliance.
  - .9 Review open web steel joists for compliance of suspended loads and attachments.
  - .10 Base plates and cap plates:
    - .1 Check grouting of column base plates and bearing plates to confirm compliance. Inspect at least three columns to confirm correct grouting procedures are used.
    - .2 Confirm that contact of base plates and levelling plates meets CAN/CSA S16 tolerances.
    - .3 Check for full bearing of column sections to base and cap plates.
    - .4 Check special bearing details of sliding expansion joint bearings.

.11 Check reinforcement and work around all holes and openings authorized to be cut at site.

.2 Steel Deck: Perform the following inspections:

.1 100% visual inspection to confirm deck type, profile and galvanizing / coating, check that composite deck units have suitable lugs or deformations to provide composite action with concrete; obtain and review substantiating test data from Subcontractor.
.2 Random review of deck sheet thickness for 10% of deck.
.3 Review the span layout (continuity) of the deck sheet over supports for compliance with the Contract drawings.
.4 100% visual review of deck side fastening sheet to sheet and fastening to supporting structure.
.5 Visually inspect welds for size, spacing, and workmanship.
.6 Visually inspect mechanical fasteners for size, type, spacing, and workmanship.
.7 Examine condition of supporting members after steel deck has been welded to determine if supporting members were damaged.
.8 Examine openings / cut-outs in the deck and confirm edge reinforcement.

.3 Headed Shear Connectors: Perform the following inspections:

.1 Review supplier, grade, diameter, length, and head geometry for compliance.
.2 Confirm that Subcontractor uses proper procedures to determine generator, control unit, and stud welder settings at the start of each production period in accordance with CSA W59.
.3 Perform the following inspections:
.1 100% visual review of connector welds.
.4 Perform Bend tests in accordance with CSA W59 if visual review indicates less than full 360 degree flash and hammer strike makes a dull sound indicating incomplete fusion.

.4 Structural Fasteners: Perform the following inspections:

.1 100% visual inspection to confirm identification markings
.2 100% visual inspection to confirm proper fit or evidence of glulam splitting or shrinkage openings

END OF SCHEDULE OF SERVICES

1. General

1.1 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A108	Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
.2	ASTM F1554	Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength
.3	ASTM A325	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
.4	ASTM A490	Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength

.2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA):

.1	CISC/CPMA 1-73a	A Quick Drying One-Coat Paint for use on Structural Steel
.2	CISC/CPMA 2-75	A Quick Drying Primer for use on Structural Steel

.3 Canadian Standards Association (CSA):

.1	CAN/CSA-G40.20/G40.21	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels
.2	CAN/CSA-G164	Hot Dip Galvanizing of Irregularly Shaped Articles
.3	CAN/CSA-S16	Design of Steel Structures
.4	CSA S136	Design of Cold-Formed Steel Structural Members
.5	CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures
.6	CSA W59	Welded Steel Construction (Metal Arc Welding)

.4 Green Seal: Standards:

.1	GS-11-10	Paints and Coatings, Third Edition, January 1, 2010

.5 Master Painters Institute:

.1 Master Painters Institute Green Performance Standard GPS-1-08

.6 The Society for Protective Coatings (SSPC):

.1	SSPC SP 3	Power Tool Cleaning
.2	SSPC SP-6	Commercial Blast Cleaning

1.2 DESIGN CRITERIA

.1 Design connections and other work not detailed on drawings, but necessary for completion of the Work, in accordance with requirements of Alberta Building Code, CAN/CSA-S16 and CSA S136.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Where structural steel is scheduled to be finish painted, ensure that shop paint primer is compatible with painting coats specified in Division 09, Painting and Finishing Schedules.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications, and data sheet in accordance with Section 01 33 00 Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings and product data prior to commencement of fabrication.

.2 Shop Drawings shall include shop details and erection diagrams and shall indicate framing and grid lines, bearing and anchorage details, framed openings, accessories, schedule of materials, camber and loadings, fasteners, method of torquing bolts, and welds using American Welding Society basic weld symbols.

.3 Shop drawings for work designed by fabricator shall bear the stamp and signature of a specialty structural engineer registered in the Province of Alberta.

.3 Manufacturer Reports:

.1 Submit three copies of certified mill test reports for the materials used.

1.5 QUALITY ASSURANCE

.1 Comply with applicable requirements of CAN/CSA-S16 and CAN/CSA-S136.

.2 Do welding in accordance with CSA W59.

.3 Welding shall be undertaken only by a company approved by the Canadian Welding Bureau to the requirements of CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for in accordance with Section 01 74 19 – Waste Management and Disposal.

1.7 QUALIFICATIONS

.1 Structural steel fabricator shall have minimum five (5) years experience in the fabrication of structural steel.

.2 Structural steel erector shall have minimum five (5) years experience in the erection of structural steel.

.3 Steel fabricators and erectors must be certified under requirements of CSA W47.1 as required by CSA S16.

.4 Welding procedures, welders, and welding operations shall be qualified in accordance with Canadian Welding Bureau Standards.

1.8 EXAMINATIONS

.1 Examine and verify all measurements and dimensions critical to the work of this contract.

1.9 TESTING AND FIELD REVIEW

.1 See Section 05 00 50 - Testing of Structural Steel, Steel Joist Framing and Steel Decking.

.2 The Specialty Structural Engineer responsible for shop drawings, or their representative, shall visit the site to review in place the connections and components designed by that Specialty Structural Engineer. The Specialty Structural Engineer shall be satisfied or take steps to ensure that these connections and components substantially comply with the Specialty Structural Engineer's design. The Specialty Structural Engineer shall then provide a sealed and signed letter to the Minister to this effect.

.3 Prior to the commencement of work, provide a schedule of shop fabrication to the Testing Agency.

.4 The Contractor shall advise the Testing Agency of the scheduling of all shop and field work pertaining to this Project. The Contractor shall permit the testing agency full access to the fabrication shop and the site, for the purpose of carrying out his work and he shall provide assistance required to aid in the performance of the inspection and testing.

2. Products

2.1 MATERIALS

.1 Steel: Structural quality, to CAN/CSA-G40.20.

.2 Rolled Structural Steel Sections: to CAN/CSA-G40.21, Type W, grade indicated on drawings, shop primed. Finish painted where exposed to view.

.3 Hollow Structural Steel Sections: to CAN/CSA-G40.21, Type W, grade indicated on drawings, Class C, shop primed. Galvanize exterior sections.

.4 Cold Rolled Sections: Conforming to CAN/CSA S136 with yield strength of 380 Mpa.

.5 Bolts: to ASTM A325.

.6 Anchor Bolts: Conforming to ASTM F1554, yield strength 36 ksi.

.7 Welding Materials: Conforming to CSA W59.

.8 Shear Stud Connectors: to ASTM A108.

.9 Galvanizing: Conforming to ASTM A123M; minimum 600 grams per square metre coating.

.10 Shop Paint Primer: as specified in Division 09, Painting and Finishing Schedules.

.11 Zinc rich paint and touch-up primer for interior surfaces: meeting requirements of Green Seal Standard GS-11, Paints and Coatings, for VOC content to be less than 250 g/l.

2.2 DESIGN

.1 Unless otherwise noted, connections and trusses shall be designed by the Specialty Structural Engineer to the reference Standards.

.2 Connections of the type and detail shown on the drawings shall be used. Modifications to the specified connection types and details will not be permitted without prior approval from the Minister.

.3 The following connections, and any connections so noted on the structural drawings, shall be designed as slip critical and shall be pre-tensioned:

.1 Trusses.
.2 Connections for supports of running machines or other live loads that produce impact or cyclic loads.
.3 Connections where bolts are subject to repeated tensile loads.
.4 Connections using slotted holes in the direction of the load or oversize holes unless specifically designed to accommodate movement.

.4 Connections for wind or seismic lateral load-resisting elements, such as bracing and drag struts, and others so noted on the structural drawings may be designed as bearing connections, but shall be pre-tensioned.

.5 Other bolted connections may be snug tight.

.6 Use standard connection types where connections are not detailed on the structural drawings.

.7 Design shall be for the forces and loads shown on the drawings and shall allow for the effects of beam deflections. Provide a minimum of two (2) 19 mm (3/4") diameter A325 bolts or an equivalent weld for all beam to girder and beam to column connections. If forces or loads are not given, the connection shall be designed for the maximum uniform distributed load that the member can carry for the span shown.

.8 Structural steel members spliced for ease of fabrication or transportation shall have splices designed to develop the full strength and stiffness of the member. Splices shall be subject to non-destructive testing as directed by the Minister. The cost for such testing shall be borne by the Contractor.

.9 Provide stiffeners in beam webs at all locations where beams pass over supports. Unless noted otherwise in the structural drawings, web stiffeners shall be 10 mm minimum.

.10 Provide separators for all double members in accordance with CSA S16.

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 and CSA-S136.

.2 Camber steel members as indicated on drawings.

.3 Shop weld shear stud connectors with automatic stud welding equipment. Thoroughly clean surface to which studs are to be welded. Ensure stud stem is perpendicular to surface to which it is attached.

2.4 SURFACE PREPARATION AND SHOP PRIMING

.1 Where structural steel is scheduled to be finish painted, prepare surfaces in accordance with Steel Structures Painting Council, SP-6 – Commercial Blast Cleaning.

.2 Apply shop paint primer in accordance with manufacturer's instructions to a dry film thickness of 50 to 75 micrometers.

3. Execution

3.1 ERECTION

.1 Erect structural steel in accordance with CAN/CSA-S16, CSA W59, and CSA S136.

.2 Structural steel erector is fully responsible for erection methods, equipment, workmanship, and safety precautions.

.3 Obtain Minister's approval prior to field cutting or altering of members.

.4 Field touch up shop paint primer at bolts, welds and burned or scratched surfaces. Use same primer as applied in shop.

END OF SECTION

1. General

1.1 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A108	Standard Specifications for Steel Bars, Carbon, Cold-Finished, Standard Quality

.2 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers' Association (CPMA)CISC/CPMA 2-75A quick Drying Primer for use on Structural Steel.

.3 Canadian Standards Association (CSA):

.1	CAN/CSA-G40.20/G40.21	General Requirements for Rolled or Welded Structural Quality Steels
.2	CAN/CSA-S16	Design of Steel Structures
.3	CSA S136	Design of Cold-Formed Steel Structural Members
.4	CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures
.5	CSA W59	Welded Steel Construction (Metal Arc Welding)

.4 Green Seal: Standards:

.1	GS-11	Paints and Coatings, Third Edition, January 2010.

.5 Master Painters Institute:

.1 Master Painters Institute Green Performance Standard GPS-1-08

.6 The Society for Protective Coatings (SSPC):

.1	SSPC SP-3	Power Tool Cleaning
.2	SSPC SP-6	Commercial Blast Cleaning

1.2 DESIGN CRITERIA

.1 Design members, connections and other work not detailed on drawings, but necessary for completion of the Work, in accordance with dimensions and loadings indicated on drawings, and requirements of Alberta Building Code, CAN/CSA-S16 and CSA S136, the Canadian Institute of Steel Construction (CISC) "Code of Standard Practice for Buildings" and "Steel Joist Facts".

.2 The deflection due to live load shall not exceed 1/360 of the span unless noted otherwise on the drawings.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Where structural steel is scheduled to be finish painted, ensure that shop paint primer is compatible with painting coats specified in Division 09, Painting and Finishing Schedules, and product meets MPI GPS-1-08 standard for maximum allowable VOC content.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings and product data prior to commencement of fabrication.

.2 Shop Drawings shall include shop details and erection diagrams and shall indicate framing and grid lines, bearing and anchorage details, framed openings, accessories, schedule of materials, camber and loadings, fasteners, method of torquing bolts, and welds using American Welding Society basic weld symbols.

.3 Shop drawings for work designed by fabricator shall bear the stamp and signature of a professional engineer registered in the Province of Alberta.

.3 Test and Evaluation Reports

.1 Minister may appoint and pay for services of testing agency to perform testing and inspection of work of this Section.

.2 Notify Minister prior to commencement of fabrication work so that testing and inspection may be properly scheduled.

.3 When defects are revealed, Minister may request additional testing and inspection at Contractor's expense.

.4 Manufacturer Reports:

.1 Submit three copies of certified mill test reports for the materials used.

1.5 QUALITY ASSURANCE

.1 Welding shall be undertaken only by a company approved by the Canadian Welding Bureau to the requirements of CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

1.7 QUALIFICATIONS

.1 Open web steel joist fabricator shall have minimum five (5) years experience in the fabrication of open web steel joists.

.2 Steel Joist erector shall have minimum five (5) years experience in the erection of open web steel joists.

.3 Steel fabricators and erectors must be certified under requirements of CSA W47.1 as required by CSA S16.

.4 Welding procedures, welders and welding operations shall be qualified in accordance with Canadian Welding Bureau Standards.

1.8 EXAMINATIONS

.1 Examine and verify all measurements critical to the work of this contract.

1.9 SUBMITTALS

.1 The Contractor shall submit, before starting work, written evidence of qualification of the steel fabricators and erectors for welding under Canadian Welding Bureau requirements.

.2 The Contractor shall submit, before starting work, written evidence of ability to weld reinforcing steel to structural steel in accordance with CSA W186.

.3 When requested, submit copies of mill test reports properly correlated to the materials used on the project.

.4 Provide a schedule of fabrication to the Minister and Testing Agency prior to the commencement of the fabrication.

1.10 SHOP DRAWINGS

.1 Submit shop drawings and product data prior to commencement of fabrication.

.2 Shop Drawings shall include shop details and erection diagrams and shall indicate framing and grid lines, bearing and anchorage details, framed openings, accessories, schedule of materials, camber and loadings, fasteners, method of torquing bolts, and welds using American Welding Society basic weld symbols.

.3 Shop drawings for work designed by fabricator shall bear the stamp and signature of a specialty structural engineer registered in the Province of Alberta.

1.11 TESTING AND FIELD REVIEW

.1 See Section 05 00 50 - Testing of Structural Steel, Steel Joist Framing and Steel Decking.

.2 Prior to the commencement of work provide a schedule of shop fabrication to the Testing Agency.

2. Products

2.1 MATERIALS

.1 Steel: structural quality to CAN/CSA-G40.20 and CAN/CSA-G40.21.

.2 Welding Materials: to CSA W59.

.3 Shop Paint Primer: as specified in Division 09, Painting and Finishing Schedules.

.4 Zinc rich paint and touch-up primer for interior surfaces: meeting requirements of Green Seal Standard GS-11, for VOC content to be less than 250 g/l.

2.2 DESIGN

.1 Unless otherwise noted open web steel joists shall be designed by the Specialty Structural Engineer to the reference Standards.

.2 Design joists of the depth and spacing shown on the drawings to carry the loads shown on the drawings in accordance with CSA S16.

.3 Design of bridging for steel joists shall conform to the requirements of CSA S16, unless otherwise indicated on the drawings. Refer to the drawings for areas of non-typical joist bridging and bracing.

.4 Joists shall have a live load deflection of less than 1/360 of the span unless noted otherwise.

.5 Line up openings and webs in adjacent joists to allow for passage of pipe, ducts, conduits, etc. Make allowance in joist design for support of pipes, ducts, conduits, etc.

.6 Where joists frame into both sides of a support, extend the top chord of the joists to the center of the support, unless shown otherwise.

.7 Where joists frame into one side of a support, extend the top chord of the joists to the far side of the support, unless shown otherwise.

2.3 FABRICATION

.1 Fabricate steel joists and accessories in accordance with CAN/CSA-S16 and CSA S136.

.2 Camber joists to dead load deflection indicated on drawings.

.3 Fabricate top and bottom chord extensions where indicated. Provide ceiling support extensions to bottom chord as required to support ceiling construction.

2.4 SURFACE PREPARATION AND SHOP PRIMING

.1 Where steel joists are scheduled to be finish painted, prepare surfaces in accordance with Steel Structures Painting Council, SP-6 Commercial Blast Cleaning.

.2 Apply shop paint primer in accordance with CAN/CSA-S16 and manufacturer's instructions to a dry film thickness of 50 to 75 micrometers.

3. Execution

3.1 ERECTION

.1 The steel joist erector is fully responsible for erection methods, equipment, workmanship and safety precautions.

.2 Steel joists shall bear on beams as per section 2.2, but in no case shall be less than 65 mm on supporting steel members. Connect to supporting steel with a 5 mm x 30 mm long fillet weld at each side. Secure to bearing plates on masonry walls in the same manner, bearing 100 mm minimum.

.3 Erect steel joists and bridging in accordance with CAN/CSA-S16, CSA W59 and CSA S136.

.4 Obtain Minister's approval prior to field cutting or altering of joists or bridging.

.5 Field touch up shop paint primer at bolts, welds and burned or scratched surfaces. Use same primer as applied in shop.

END OF SECTION

1. General

1.1 RELATED SECTIONS

.1	Waste Management and Disposal	Section 01 74 19.
.2	Structural Steel Framing	Section 05 12 00.
.3	Open Web Steel Joists	Section 05 12 19.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A653/A653M	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 Canadian Standards Association (CSA):

.1	CAN/CSA-S16	Limit States Design of Steel Structures
.2	CSA W47.1-03	Certification of Companies for Fusion Welding of Steel Structures
.3	CSA W59-M1989	Welded Steel Construction (Metal Arc Welding)

.3 Green Seal: Standards:

.1	GC-03	Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997

1.3 REQUIREMENTS

.1 Comply with applicable requirements of CSA S136.

.2 Except where otherwise specified, comply with applicable requirements of Canadian Sheet Steel Building Institute standards.

.3 Do welding in accordance with CSA W59.

1.4 DESIGN CRITERIA

.1 Design of metal decking shall be in accordance with CSA S136.

.2 Design deck to safely support loads shown on drawings.

.3 Deck units shall be continuous over three or more spans where possible.

.4 Live load deflection shall not exceed 1/360 of span for roofs and 1/360 of span for floors.

1.5 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 Submittal Procedures.

.2 Shop drawings:

.1 Indicate decking plan, joints, anchorages, supports, projections, opening and reinforcement, details and accessories.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 MATERIALS

.1 Sheet Steel: to ASTM A653M, zinc coated to Z275 coating designation.

.2 Touch-Up Primer for Galvanized Steel: zinc-rich, organic, ready mixed, to CAN/CGSB-1.181-99 meeting requirements of Green Seal Standard GC-03, 1997, for VOC content to be less than 250 g/l.

.3 Acoustic Insulation: fibrous type, profiled to suit deck flutes.

.4 Acoustic Closures: 25 mm tick, closed cell foam rubber, profiled to deck corrugations.

2.2 DECK AND RELATED ACCESSORIES

.1 Roof Deck: 0.76 mm thickness base sheet steel Z275 zinc coating, 38 mm deep profile, and as indicated on drawings.

.2 Mezzanine Deck: 0.91 mm thickness base sheet steel, Z275 zinc coating, 38 mm deep profile, ribbed vertical webs.

.3 Closure Strips, Flashing, Cover Plates: 0.76 mm minimum thickness base sheet steel, Z275 zinc coating, or required profiles and sizes.

3. Execution

3.1 FABRICATION

.1 Fabricate deck sections to CSA S136, Canadian Sheet Steel Building Institute (CSSBI) and to dimensions indicated on drawings.

.2 Provide a male and female lip for each section of steel deck.

3.2 INSTALLATION - GENERAL

.1 Reinforce steel deck openings shown on the drawings unless otherwise noted.

.2 Reinforce openings up to 450 mm in any dimension with 50 x 50 x 6 mm steel angles. Place angles at right angles to ribs and weld to a minimum of two flutes each side of opening.

.3 Install decking according to design sheet widths and depths. Correct sheet spread during installations.

.4 Locate all end joints over support. Lap all end joints on non-cellular deck 50 mm minimum.

.5 Minimum end bearing on steel supports shall be equal to the depth of the deck.

.6 Wire brush, clean and touch-up welds and scarred areas on top surface or metal decking with touch-up primer.

3.3 ROOF DECK INSTALLATION

.1 Fasten roof deck to all supports with 20 mm diameter fusion welds at 300 mm on centre.

.2 Mechanically fasten side laps at 300 mm on centre by button punching.

.3 Install 150 mm minimum width continuous cover plates where deck changes direction. Weld in place at 300 mm on centre maximum.

.4 Install angle or channel closures full length on all deck edges at perimeter, walls and openings.

.5 Install acoustical closures over walls and partions.

.6 Fasten deck to provide structural diaphragm in accordance with requirements shown on drawings.

3.4 FLOOR AND DECK INSTALLATION

.1 Lap end joints on non-cellular deck 50 mm minimum. Butt ends of cellular deck. Install steel cover plates over open joints greater than 3 mm.

.2 Fasten to all supports with 20 mm diameter fusion welds at 450 mm on centre maximum.

.3 Mechanically fasten sidelaps at 610 mm on centre by button punching or 25 mm welds at 900 mm on centre.

.4 Install angles, closure strips and flashing, extended to top concrete slab to contain wet concrete, at all deck edges around perimeter, at openings, at columns, etc. Use adequate metal thickness to maintain wet concrete in place without distortion.

.5 Install acoustical closures over all walls and partitions.

END OF SECTION

1. General

1.1 RELATED SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Masonry connectors:	Section 04 20 00.
.4	Steel fabrications:	Section 05 50 00.
.5	Gypsum board:	Section 09 29 00.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A653/A653M	Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process

.2 Canadian General Standards Board (CGSB):

.1	CAN/CGSB 1.181	Ready Mixed Organic Zinc Rich Coating
.2	CAN/CGSB 7.1	Lightweight Steel Wall Framing Components

.3 Canadian Sheet Steel Building Institute (CSSBI):

.1	CSSBI 51	Lightweight Steel Framing Design Manual
.2	CSSBI Fact Sheet #3	Care and Maintenance of Prefinished Sheet Steel Building Products
.3	CSSBI Technical Bulletin Vol. 7, No. 2	Changing Standard Thicknesses for Canadian Lightweight Steel Framing Applications
.4	CSSBI S5	Wind Bearing Steel Studs

.4 Canadian Standards Association (CSA):

.1	CSA W47.1	Certification of Companies for Fusion Welding of Steel Structures

.5 Green Seal: Standards:

.1	GC-03	Green Seal Environmental Criteria for Anti-Corrosive Paints, Current Edition

.6 Master Painters Institute:

.1 Master Painters Institute Green Performance Standard GPS-1-08

1.3 DESCRIPTION OF SYSTEM

.1 Provide exterior wall stud framing system to resist wind loads, consisting of the following components:

.1 Studs.
.2 Top and bottom tracks.
.3 Bridging and bracing.
.4 Top and bottom track connections to main structure, including fabrications to accommodate main structure deflections.
.5 Head, sill and jamb members at wall openings.
.6 Framing component connections.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate work of this Section with fixtures supported by wind load bearing metal stud systems. Such fixtures may include, but are not limited to: architectural woodwork, premanufactured casework, plumbing fixtures, and electrical fixtures and panels.

.2 Coordinate work of this Section with masonry connectors specified in Section 04 20 00.

.2 Inspection by Minister:

.1 Provide minimum 72 hours notice to Minister prior to commencement of work of this Section.

.2 Do not conceal stud system until inspected by Minister.

1.5 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit product data for mechanical fasteners, indicating sizes, shear, and pull-over loading capacity where applicable. Provide data indicating thickness and type of corrosion protection coating.

.3 Submit product data indicating suitability of explosive powder actuated fasteners for application.

.2 Shop Drawings:

.1 Submit shop drawings detailing anchorage and framing connections. Indicate type, size and spacing of fastening devices.

.3 Certificates:

.1 Submit Certificate of welder qualifications specified in this Section.

.4 Manufacturer Reports:

.1 Submit certified copies of mill reports covering chemical and mechanical properties, and coating designation of steel used for this project.

1.6 QUALITY ASSURANCE

.1 Welder Qualifications:

.1 Welding shall be by company certified by the Canadian Welding Bureau to CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 FRAMING MEMBERS

.1 Cold-formed Sheet Steel: to ASTM A653M, grade [A] [D]. Thicknesses of framing members specified or indicated on drawings is exclusive of galvanized coating.

.2 Configuration and Cutouts: to CAN/CGSB-7.1, centres of cutouts shall be minimum 300 mm from stud ends.

.3 Galvanized Zinc Coating: to ASTM A653M, minimum Z275 coating.

.4 Bridging and Bracing: as indicated on drawings.

.5 Colour Coding: in accordance with Lightweight Steel Framing Manual, published by Canadian Sheet Steel Building Institute, 1988 edition.

.6 Stud Sizes and Spacing: as indicated on drawings.

.7 Bottom Track Sizes: as indicated on drawings.

.8 Top Track Sizes: as indicated on drawings.

2.2 ANCHORING DEVICES

.1 Drilled Inserts: steel, cadmium plated or hot-dip galvanized, sizes as indicated on drawings.

.2 Bolts and nuts: to ASTM A307, sizes as indicated on drawings, with large flat type steel washers, sized to suit fasteners, hot-dip galvanized.

.3 Explosive Powder Actuated Fasteners: as recommended by manufacturer for the application, subject to approval by Minister.

2.3 FRAMING CONNECTION DEVICES

.1 Screws: self-drilling and tapping, sizes as indicated on drawings, and as follows:

.1 Material: stainless steel or steel with minimum 0.008 mm cadmium or zinc coating.

.2 Head Profile: hex, pan, and low-profile type.

.3 Length: adequate to penetrate not less than 3 fully exposed threads beyond joined materials.

.2 Welding Electrodes: minimum tensile strength series of 480 MPa, suitable for material being welded.

2.4 ACCESSORIES

.1 Touch-Up Primer for Galvanized Steel: zinc-rich, organic, ready mixed, to CAN/CGSB-1.181 meeting requirements of Green Seal Standard GC-03, 1997, for VOC content to be less than 250 g/l.

3. Execution

3.1 ERECTION

.1 Provide continuous top and bottom tracks.

.2 Space studs as indicated on drawings. Coordinate spacing with panel products to be applied against framing.

.3 Cut members using saw or shear. Flame cutting is not permitted.

.4 Except as indicated otherwise on drawings, provide double studs at wall openings greater than stud space in width, and at door and window jambs. Locate studs not more than 50 mm from each side of openings.

.5 Provide minimum of three studs at corners.

.6 Provide cross-studs secured to studs, and additional framing as required for support of fixtures mounted to walls.

.7 After erection, refinish damaged finishes, welds, fastener heads and nuts with zinc-rich paint, in accordance with paint manufacturer's instructions.

3.2 ANCHORAGE AND CONNECTIONS

.1 Securely anchor metal stud systems to main structure with fasteners spaced at maximum 600 mm o.c., and located not more than 50 mm from track ends. Unless otherwise indicated, anchor components as follows:

.1 To concrete with drilled inserts.

.2 To steel with screws, welds, explosive powder actuated fasteners, or bolts as detailed on drawings.

.2 Install powder actuated fasteners in accordance with manufacturer's instructions, strictly observing minimum recommended edge distances for the applicable substrate.

.3 Connect framing members using bolts, screws or welds, and as detailed on drawings.

.4 Use wafer head screws or welds where panel products will be installed against fastening devices.

.5 Do welding in accordance with ANSI/AWS D1.3 - Structural Welding Code - Sheet Steel.

3.3 ERECTION TOLERANCES

.1 Out of Plumb: maximum 1/500 of member length.

.2 Track Camber: maximum 1/1000 of member length.

.3 Gap Between End of Studs and Web of Tracks: maximum 4 mm.

.4 Stud Spacing: plus or minus 3 mm from specified spacing. Cumulative error in spacing shall not exceed requirements for applied panel products.

END OF SECTION

1. General

1.1 RELATED SECTIONS

.1	Waste Management and Disposal	Section 01 74 19.
.2	Metal car plug-in rails:	Section 32 17 10.
.3	Steel guard posts:	Section 32 17 10.
.4	Metal stairs and railings:	Section [.]

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A53/A53M	Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless
.2	ASTM A269	Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
.3	ASTM 307	Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

.3 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-1.105	Quick-Drying Primer
.2	CAN/CGSB 1.40	Anti corrosive Structural Steel Alkyd Primer
.3	CAN/CGSB 1.181	Ready Mixed, Organic Zinc Rich Coating

.4 Canadian Standards Association (CSA):

.1	CAN/CSA-G40.20/ G40.21	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels
.2	CAN/CSA G164	Hot Dip Galvanizing of Irregularly Shaped Articles
.3	CAN/CSA S16.1	Limit States Design of Steel Structures
.4	CSA W48 06	Filler Metals and Allied Materials for Metal Arc Welding (Developed in co operation with the Canadian Welding Bureau)
.5	CSA W55.3	Certification of companies for resistance welding of steel and aluminum
.6	CSA W59	Welded Steel Construction (Metal Arc Welding) (Imperial Version)

.5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA):

.1	CISC/CPMA 2-75	A Quick Drying Primer for use on Structural Steel

.6 Green Seal: Standards:

.1 GC-03 Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997

.7 Master Painters Institute:

.1 Master Painters Institute Green Performance Standard GPS-1-08

.8 The Society for Protective Coatings (SSPC):

.1 SSPC SP 6 / NACE No. 3 Commercial Blast Cleaning

.9 Steel Structures Painting Council:

.1 Surface Preparation Standards, latest editions

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

.1 Supply following products for installation under other Sections:

.1 Anchor bolts, bearing plates, sleeves and other inserts to be built into concrete and masonry elements and required for anchorage and support of fabricated steel components.

.2 Fabricated steel components to be built into concrete and masonry.

.2 Supply instructions and templates as required for accurate setting of inserts and components.

1.4 SUBMITTALS

.1 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures clearly indicating:

.1	Components	.4	Dimensions
.2	Core metal thicknesses	.5	Fabrication details
.3	Finishes	.6	Installation details

.2 Certificates:

.1 Submit Certificate of welder qualifications specified in this Section.

1.5 QUALITY ASSURANCE

.1 Qualifications of Welders:

.1 Welding of load supporting components shall be performed by companies certified by Canadian Welding Bureau in accordance with CSA W47.1.

.2 Welders shall be qualified by Canadian Welding Bureau for classification of Work being performed.

.2 Workmanship Standards:

.1 Resistance Welding: to CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.2 Fusion welding: to CSA W59, Welded Steel Construction (Metal Arc Welding).

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Schedule delivery of components to site to coincide with installation of this work.

.2 Storage and Handling Requirements:

.1 Store components to prevent damage and distortion.

.2 Protect finishes from scratches and soiling.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21-04, Grade 300W.

.2 Deformed steel bars: of billet steel to CSA G30.18-04, grade 400.

.3 Bolts and nuts: to ASTM A325.

.4 Shop Paint Primer: as specified in Division 09, Painting and Finishing Schedules.

.5 Zinc rich paint on exterior applications: to CAN/CGSB-1.181 as specified in Division 09, Painting and Finishing Schedules.

.6 Zinc rich paint and touch-up primer for interior surfaces: meeting requirements of Green Seal Standard GC-03, for VOC content to be less than 250 g/l.

.7 Isolation coating: acid and alkali resistant asphaltic paint.

2.2 FABRICATION

.1 Shop fabricate components where possible.

.2 Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine, file and fit joints, corners, copes and mitres.

.3 Exposed joints and connections shall be tight, flush and smooth unless otherwise indicated.

.4 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes as required to facilitate installation of such work.

.5 Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation.

2.3 SURFACE PREPARATION

.1 Thoroughly clean and suitably pretreat steel prior to finishing.

.2 Remove loose mill scale, rust, oil, grease, dirt and other foreign matter using one or more of the following methods:

.1 solvent cleaning
.2 wire brushing
.3 power wire brushing
.4 sandblasting

.3 Grind smooth sharp projections.

2.4 FINISHES

.1 Refer to "Schedule of Components" for component finishes. Unless otherwise indicated apply prime paint finish to unscheduled components.

.2 Prime Paint:

.1 Shop apply one coat of prime paint to components prior to assembly.
.2 Apply primer to properly prepared surfaces at temperature above 7° C to a dry film thickness of 50 to 75 micrometers.
.3 Leave surfaces to be welded unpainted.

.3 Galvanized:

.1 Hot dip galvanize components to ASTM A123M.
.2 Minimum zinc coating of 600 g/m^2.
.3 Where size permits galvanize components after assembly.

.4 Zinc Rich Paint:

.1 Clean metal in accordance with surface preparation requirements of CAN/CGSB-1.181.

.2 Apply one coat of zinc rich paint to all surfaces exposed after assembly to minimum dry film thickness of 60 micrometres. Apply coating immediately after cleaning.

.5 Isolation Coating:

.1 Apply an isolation coating to contact surfaces of following components in contact with cementitious materials and dissimilar metals except stainless steel: (1) exterior components (2) interior components exposed to high humidity conditions.

3. Execution

3.1 INSTALLATION

.1 Install components square, straight and true to line.

.2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:

.1 To concrete and solid masonry with expansion shields and bolts.
.2 To hollow construction with toggle bolts.
.3 To thin metal with screws or bolts.
.4 To thick metal with bolts or by welding.
.5 To wood with bolts for heavy and medium duty fastenings; with screws for light duty fastenings.

.3 After installation, site clean and refinish damaged finishes, welds, bolt heads and nuts. Refinish with primer or zinc rich paint to match original finish.

3.2 SCHEDULE OF COMPONENTS

.1 Provide following components as specified herein and as shown on drawings.

ITEM No. 1 – Foot Grille Recess Perimeter Frame.

.1 Materials: Steel, grade 300W.
.2 Fabrication: Shop welded.
.3 Finish: Galvanized.
.4 Installation: Cast-in.
.5 Locations: As indicated on drawings.

.2 In addition to the above, provide other steel fabrications shown on Drawings.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Setting anchor bolts in concrete forms:	Section 03 30 00.
.2	Concrete fill in landing and stair pans:	Section 03 30 00.
.3	Finish painting:	Section 09 91 05.

1.2 DESIGN

.1 All stairs and landing sections, attachments and connections, except where members are specifically sized on the drawings shall be designed to support a minimum live load of 4.8 kN/m^2.

.2 The design, detailing and fabrication shall be in accordance with CAN/CSA-S16.1.

1.3 REQUIREMENTS

.1 Do welding work to CSA W59. Provide and make available on site a copy of referenced standard

1.4 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A53/A53M-07	Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless
.2	ASTM A269-08	Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
.3	ASTM A307-07b	Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

.2 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-1.105-M91	Quick-Drying Primer
.2	CAN/CGSB 1.40-97	Anti corrosive Structural Steel Alkyd Primer
.3	CAN/CGSB 1.181-99	Ready Mixed, Organic Zinc Rich Coating

.3 Canadian Standards Association (CSA):

.1	CAN/CSA-G40.20/ G40.21-04	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels
.2	CAN/CSA S16.1-94 (R2000)	Limit States Design of Steel Structures

.3 CSA W59-03(R2008) Welded Steel Construction (Metal Arc Welding) (Imperial Version)

.4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA):

.1 CISC/CPMA 2-75 A Quick Drying Primer for use on Structural Steel

.5 Green Seal: Standards:

.1 GC-03 Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997

.6 Master Painters Institute:

.1 Master Painters Institute Green Performance Standard GPS-1-08

.7 The Society for Protective Coatings (SSPC):

.1 SSPC SP 6/NACE No. 3 00 Commercial Blast Cleaning

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit stamped Shop Drawings of ladder including connection details.
.3 Clearly indicate construction details, sizes of steel sections, thickness or gauge of steel sheet, profiles, attachments, dimensions and field joints.

2. Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.21 Type 38W.

.2 Welding materials: to CSA W59.

.3 Shop Paint Primer: as specified in Division 09, Painting and Finishing Schedules meeting requirements of MPI GPS-1-08 standard for VOC content.

.4 Zinc rich paint on exterior applications: to CAN/CGSB-1.181 as specified in Division 09, Painting and Finishing Schedules meeting requirements of MPI GPS-1-08 standard for VOC content.

.5 Zinc rich paint and touch-up primer for interior surfaces: meeting requirements of Green Seal Standard GC-03, for VOC content to be less than 250 g/l.

2.2 FABRICATION

.1 Weld or bolt all connections.

.2 Accurately form connections with exposed faces flush, mitres and joints tight.

.3 Grind or file exposed welds and steel sections smooth.

2.3 ACCESS LADDERS

.1 Construct access ladders in accordance with Alberta OH&S safety codes.

.1 Side Rails: Nominal 65 mm x 10 mm at 450 mm O/C, extend side rails to 1200 mm above upper surface, loop and return side rails for roof access ladders.

.2 Rungs: Nominal 21 mm diameter rungs shouldered and welded at 300 mm O/C maximum, rungs starting at 300 mm maximum above lower entry level or roof surface, finished with acceptable non-slip tread surface.

.3 Ladder Mounts: Nominal 65 mm x 10 mm brackets at maximum spacing of 3050 mm with support at the top of the side rails, and centreline of rungs at 150 mm from the wall face.

.4 Safety Extension: Install telescoping ladder extension to top two ladder rungs in accordance with manufacturer's written instructions for roofs penetrating roof access hatches.

.5 Usage Classification: Service

.6 Quality of Finish: Level 3; Finish: Galvanized for exterior, prime paint for interior.

.2 Fixed Ladder Extension Safety Post:

.1 Adjustable spring balanced safety post with adjustable mounting brackets to fit ladder-rung spacing.

.2 Ladder extension equipped with automatic self-lock when fully extended; upward and downward movement controlled by stainless steel spring balance mechanism.

.3 Finish: Safety yellow enamelled steel

2.4 EXTERIOR METAL GRATE STAIRS AND CATWALKS

.1 Gratings, Treads and Landings:

.1 Type: W-19-4 welded steel construction in accordance with NAAMM MBG 531, as follows:

.1 Treads: Rectangular bearing bars: 25 mm x 5 mm at 30 mm O/C.

.2 Cross bars: 32 mm2 at 100 mm O/C.

.3 Landing: 38 mm x 3.2 mm serrated bearing bars and twisted cross bars.

.2 Anchorage: Welded.

.3 Finish: Hot dipped galvanized 550 g/m2 in accordance with ASTM A653.

.4 Surface: Plain

.5 Fasteners: 6 mm Ø galvanized fasteners, located over end and mid-span (if any) bearing locations in accordance with NAAMM MBG 531.

.6 Nosings: Landings and stair nosings, manufacturer's standard welded checker plate nosing.

2.5 PIPE RAIL BALUSTRADES

.1 Balusters and handrails shall be 42 mm outer diameter steel pipe.

.2 Wall handrails and brackets shall be as detailed.

.3 Cap and weld exposed ends of balusters and handrails. Fill and grind smooth.

2.6 BALUSTRADES

.1 Construct balustrades as detailed.

.2 Weld balustrades to stringers as indicated.

.3 Wall brackets and handrails shall be as indicated.

2.7 SHOP PAINTING

.1 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7°C.

.2 Surfaces to be embedded in concrete shall not be painted.

.3 Apply two coats of primer to parts inaccessible after final assembly. Apply one coat of primer to exposed stair surfaces.

3. Execution

3.1 INSTALLATION OF STAIRS AND CATWALK

.1 Install staircases plumb and true in exact locations, using welded connections wherever possible to provide a rigid structure.

.2 Provide all necessary anchors, bolts and plates as required for connecting stairs to the structure.

.3 Touchup and make good any damage to priming coat.

.4 Ensure alignment with adjacent construction. Coordinate with related work to ensure no interruption in installation.

3.2 INSTALLATION OF LADDERS

.1 Install ladders plumb and true in exact locations, using welded connections wherever possible to provide a rigid structure.

.2 Provide all necessary anchors, bolts and plates as required for connecting ladders to the structure.

.3 Touchup and make good any damage to priming coat.

.4 Ensure alignment with adjacent construction. Coordinate with related work to ensure no interruption in installation.

3.3 PIPE HAND AND GUARD RAILING SCHEDULE

.1 Provide handrails and brackets of the minimum diameter, standard weight pipe required to resist design loads, outer diameter 42 mm unless otherwise indicated on the drawings, and as follows:

- .1 Return ends of metal wall handrails toward wall with radius corner and stop handrail 13 mm from wall with flat end.
- .2 Space brackets at a maximum of 1200 mm and not more than 300 mm from the ends.
- .3 Design railings, and supports, in accordance with loads specified in the Building Code.
- .4 At least one handrail at side of stairway or ramp shall extend horizontally not less than 300 mm beyond top and bottom of stairway or ramp in accordance with Building Code.
- .5 Weld posts to cast-in designed to resist post loads in accordance with the Building Code.
- .6 Cap the ends of tube rails with 3 mm steel plate. Weld all around.
- .7 Usage Classification: Industrial

.8 Quality of Finish: Level 2; Finish: Galvanized for exterior, prime paint for interior.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Architectural Woodwork	Section 06 40 00.
.4	Sheet Metal Flashing and Trim	Section 07 62 00.
.5	Gypsum Board Assemblies	Section 09 29 00.
.6	Back priming equipment backboards	Section 09 91 30.

1.2 REFERENCE DOCUMENTS

.1 Alberta Roofing Contractors' Association, (ARCA):

.1 Manual on Good Roofing Practice and Accepted Roofing Systems.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM A307-10, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

.2 ASTM C954-11, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

.3 American Wood Preservers Association (AWPA):

.1 AWPA Book of Standards, 2002

.4 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-51.34-M86	Vapour Barrier, Polyethylene Sheet for Use in Building Construction
.2	CAN/CGSB-51-GP-51M	Polyethylene Sheet for Use in Building Construction
.3	CAN/CGSB-71.26-M88	Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems

.5 Canadian Standards Association (CSA):

.1	CSA B111-74(R2003)	Wire Nails, Spikes and Staples
.2	CSA G164-M92(R2003)	Hot Dip Galvanized of Irregularly Shaped Articles
.3	CSA O80 Series-08	Wood Preservation
.4	CSA O112 Series-M1977 (R2006)	Adhesives for Wood
.5	CSA O121-08	Douglas Fir Plywood
.6	CAN/CSA O141-05(R2009)	Softwood Lumber
.7	CSA O151-09	Canadian Softwood Plywood
.8	CSA O153–M1980(R2008)	Poplar Plywood
.9	CSA O325.0-92 (R2003)	Construction Sheathing
.10	CSA O437 Series – 93(R2006)	Standards on OSB and Waferboard
.11	CSA O452 Series – 94(R2001)	Design Rated OSB

.6 Green Seal: Standards:

.1	GS-11	Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, May, 1993

.7 National Lumber Grading Authority (NLGA):

.1	NLGA-07	Standard Grading Rules for Canadian Lumber

.8 SCAQMD South Coast Air Quality Management District, California State (SCAQMD):

.1	SCAQMD Rule 1113-04	Architectural Coatings
.2	SCAQMD Rule 1168-05	Adhesives and Sealants Applications

.9 Underwriters Laboratories Canada (ULC):

.1	CAN/ULC S102-10	Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit manufacturer's printed product literature, specifications and datasheet.

.3 Submit MSDS sheets or official manufacturer literature stating no urea-formaldehyde was used in the manufacturing of composite wood.

1.4 QUALITY ASSURANCE

.1 Regulatory Agency Approvals:

.1 Material shall comply with applicable requirements of Alberta Building Code (ABC).
.2 Lumber shall be graded and stamped by an agency certified by Canadian Lumber Standards Administrative Board.
.3 Plywood shall be graded and stamped in accordance with applicable CSA standards.
.4 Panel products shall be marked with a recognized, visible grade stamp.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Protect materials from weather in transit and on job site.

.2 Storage and Handling Requirements:

.1 Store materials a minimum of 150 mm off the ground on raised supports. Cover materials with waterproof covering. Provide adequate air circulation and ventilation under covering.

.2 Do not store seasoned materials in wet or damp areas.

.3 Protect edges and corners of sheet materials from damage during handling and storage.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

1.6 CERTIFICATES

.1 For products treated with preservative or fire-retardant by pressure impregnation submit following information certified by authorized signing officer of treatment plant:

.2 Information listed in AWPA M2 applicable to specified treatment.

.3 Moisture content after drying following treatment with water-borne preservative or fire retardant.

.4 Indicate acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

2. Products

2.1 LUMBER

.1 Grades: Use CLS grade-marked lumber conforming to the Standard Grading Rules for Canadian Lumber published by the National Lumber Grades Authority.

.2 Lumber: to CAN/CSA 0141, softwood, S-P-F, S4S, surface-dry, graded and stamped in accordance with current National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

.1 Moisture Content: maximum 19% at time of installation.
.2 Finger jointed lumber is not acceptable.

.3 Framing and Board Lumber: in accordance with ABC and as specified in schedules.

.4 Furring, Blocking, Nailing Strips, Grounds, Rough Bucks, Cants, Curbs Fascia Backing and Sleepers: S4S, “Standard” or better grade for board, post and timber sizes, “Standard” light framing or better for dimension sizes.

2.2 PANEL PRODUCTS

.1 Provide panel products manufactured with phenol-formaldehyde or formaldehyde-free adhesives.

.2 Canadian Softwood Plywood: to CSA O325, 10 mm thick S1S, with no knot fillers detrimental to areas to receive finish, thickness as indicated on Drawings.

.3 Douglas Fir Plywood: to CSA 0121, thickness as indicated on Drawings.

.4 Poplar Plywood: to CSA 0153, standard construction, thickness as indicated on Drawings.

2.3 FASTENING DEVICES AND HARDWARE

.1 Nails and Spikes: to CSA B111:

.1 Use common spiral nails and spiral spikes except where indicated otherwise.

.2 Use hot dip galvanized finished steel for exposed exterior work, highly humid interior areas and for pressure - preservative and fire-retardant treated lumber.

.2 Bolt, nut, washer, screw and pin type fasteners: hot dip galvanized finish to CSA G164.

2.4 ANCILLARY MATERIALS

.1 Surface applied wood preservative: copper napthanate base or pentachlorophene, prepared in accordance with CSA O80.15, coloured green.

.1 SCAQMD Rule #1113 - Architectural Coatings.
.2 Maximum allowable VOC limit 350 g/L.

.2 Polyethylene Film: to CAN/CGSB-51.34, 100 micrometre thick.

.3 Sealing Tape: minimum 60 mm width, polypropylene sheathing tape with acrylic adhesive, or duct tape of same width.

2.5 PRESSURE PRESERVATIVE TREATED WOOD

.1 Pressure Preservative Treated lumber:

.1 Lumber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Accreditation Board in accordance with CAN/CSA O80.20M.
.2 Species: Pine or Spruce-Pine
.3 Grade: No.2 or better structural posts and lumber, pieces may be grade stamped or shipment certified by letter of compliance.
.4 Grading authority: NLGA, paragraph 131CC
.5 Use Classification and Preservative Agent: Update information in this paragraph with information contained in linked document.
.6 Material having twisted grain or structural defects affecting integrity of lumber will not be acceptable for this project.
.7 Use only material with radius edges, minimum 6 mm.
.8 Kiln dry lumber materials to 8% moisture content or less.
.9 SCAQMD Rule #1113 - Architectural Coatings.
.10 Maximum allowable VOC limit 350 g/L.
.11 CSA O80 using water borne preservative treatment.

.1 SCAQMD Rule #1113 - Architectural Coatings.
.2 Maximum allowable VOC limit 350 g/L.

.2 Water-borne preservative treated wood shall have maximum moisture content of 19% after treatment.

.1 SCAQMD Rule #1113 - Architectural Coatings.
.2 Maximum allowable VOC limit 350 g/L.

.3 Fire-Retardant: to CSA O80.20, to provide:

.1 Flame Spread Classification: FSC to meet requirements listed on Drawings.
.2 Smoke developed Rating: to meet requirements listed on Drawings.

.4 Provide coatings that do not contain chemical listed in GS-II.

2.6 MISCELLANEOUS MATERIALS

.1 Recycled Content in fasteners: Fabricated from 100% re-melted steel.
.2 Fire Rated Intumescent Coating: Refer to Section 07 81 23.
.3 Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
.4 Rough Hardware (bolts, nuts, washers, etc.): Hot dip galvanized in conformity to CSA G164 or Grade A low carbon steel, conforming to ASTM A307.
.5 Rigid Insulation: as specified in Section 07 21 13 – Rigid Board Insulation.
.6 Adhesive:
.1 Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, GS-36 for Commercial Adhesive, and as specified.
.7 Sealant: non-hardening butyl sealant as specified in Section 07 92 00 – Sealant.
.8 Lifting ring: 76 mm x 76 mm plate, with 8 mm x 8 mm forged steel drop ring pull, black finish.

3. Execution

3.1 ROUGH CARPENTRY WORK

.1 Accurately frame and properly assemble rough carpentry work. Include necessary nails or other connectors.

3.2 APPLICATION OF SURFACE APPLIED WOOD PRESERVATIVE

.1 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of surface applied wood preservative before installation.

.2 Application – Fire Retardant

.1 Treat indicate material by pressure impregnation with fire-retardant chemicals in accordance with CSA O80.20.

.2 Following treatment, kiln-dry material to maximum moisture content of 8%.

.3 Application – Field Treatment

.1 Comply with AWPA M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.

.2 Remove chemical deposits on treated wood to receive applied finish. Refer to Section 09 91 05 – Painting and Finishing General Requirements.

.3 Site applied tough-ups to meet requirements of SCAQMD Rule #1113 - Architectural Coatings at time of building permit for fire retardant coating.

.4 Maximum allowable VOC limit g/L.
.1 650 g/L if clear fire retardant.
.2 350 if fire retardant is pigmented.

.5 Provide coatings that do not have chemicals listed in GS-II.

3.3 ERECTION OF FRAMING MEMBERS

.1 Install members true to line, levels and elevations. Space uniformly.

.2 Construct continuous members from pieces of longest practicable length.

.3 Install spanning members with "crown-edge" up.

.4 Install blocking to facilitate installation of finishing materials, fixtures, specialty items and trim.

3.4 WOOD FURRING AND BLOCKING

.1 Install wood plates where indicated. Erect plumb and true. Rigidly support and securely anchor to masonry, concrete, and metal stud framing..

.2 Provide and install wood strapping or furring indicated on drawings.

.3 Strapping: Shimmed out plumb, square and true to line. Use 19 mm x 64 mm at 406 mm o.c. unless indicated otherwise.

.4 Furring: As indicated.

.5 Install at least one row of solid blocking to wood stud walls not more than 2440 mm high, two rows if over 2440 mm high.

.6 Install blocking behind all sheathing and wallboard joints, and where required for items to be fixed to walls.

3.5 TELEPHONE AND ELECTRICAL EQUIPMENT BACKBOARDS

.1 Provide backboards for mounting telephone and electrical equipment as indicated. Use 19 mm thick Canadian Softwood Plywood/S1S or Douglas Fir Plywood/G1S on 19 x 38 mm furring around perimeter and at maximum 300 mm intermediate spacing.

.2 Prior to installing back boards ensure that backboards are back primed as specified in Section 09 91 05.

3.6 MISCELLANEOUS

.1 Install wood stud framing for temporary weather closure and cladding. Construct to resist wind pressures.

.2 Install bracing to masonry walls and piers during construction until structure provides sufficient lateral support.

.3 Install support for masonry lintels.

.4 Install plywood shims at window openings.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Waste Management and Disposal	Section 01 74 19.
.2	Rough Carpentry	Section 06 10 00.
.3	Wood Trusses:	Section 06 17 53.

1.2 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Division 01 for requirements pertaining to product options and substitutions.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A653/A653	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 Canadian Standards Association (CSA):

.1	CSA B111	Wire Nails, Spikes and Staples
.2	CSA O80 Series-08/O80 S2	Wood Preservation
.3	CSA O80.20	Fire-Retardant Treatment of Lumber by Pressure Processes
.4	CAN/CSA O86	Consolidation(R2006), Engineering Design in Wood

.3 FSC Forest Stewardship Council:

.1	FSC-STD-01-001	FSC Principle and Criteria for Forest Stewardship
.2	FSC-STD-20-002	Structure and Content of Forest Stewardship Standards V2-1
.3	FSC Certified Bodies	

.4 Green Seal: Standards:

.1	GS-11	Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, May, 1993

.5 National Lumber Grading Authority (NLGA):

.1	NLGA	Standard Grading Rules for Canadian Lumber

.6 SCAQMD South Coast Air Quality Management District, California State (SCAQMD:

.1	SCAQMD Rule 1113	Architectural Coatings

.2 SCAQMD Rule 1168 Adhesives and Sealants Applications

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 Submittal Procedures.

.2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 33 00 Submittal Procedures. Indicate VOC's for:

.1 Wood Preservative.
.2 Adhesives.

1.5 QUALITY ASSURANCE

.1 Regulatory Agency Approvals:

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Protect materials from weather upon delivery to job site.

.2 Storage and Handling Requirements:

.1 Store materials on raised supports. Cover materials with waterproof covering. Provide adequate air circulation and ventilation.

.3 Do not store seasoned materials in wet or damp areas.

.4 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 DESCRIPTION

.1 Sustainability Characteristics:

.1 Provide materials that have been extracted, harvested, recovered and processed within minimum distances required to the final point of manufacture. Provide

materials from a manufacturing facility within minimum distance required from Project site and delivered to Project site by acceptable transportation method.

2.2 MATERIALS

.1 Lumber: Seasoned, select and commercial grade S-P-F. Kiln dry to 15 percent maximum moisture content for 38 mm deck to 19 percent maximum content for 64 mm and 89 mm deck. "Veed" one side. Pre-drill at 750 mm on centre for lateral spiking.

.2 Deck Sizes: To NLGA and to match existing:

.1 [38 mm Deck] - [38 mm x 137-181 mm] – Single tongue and groove.
.2 [64 mm Deck] - [64 mm x 141 mm] – Double tongue and groove.
.3 [89 mm Deck] - [89 mm x 141 mm] – Double tongue and groove.

.3 Piece Lengths: 10% of quantity supplied shall be 1.8 m to 3 m in length. 45% of quantity supplied shall be 5 m and longer.

2.3 ACCESSORIES

.1 Nails: To CSA B111:
.1 Finish: galvanized finish.
.2 Sizes: as recommended in [CAN/CSA O86] [ASTM 653/653M].
.3 Supply 200 mm spiral spikes for lateral nailing.

.2 Splines: galvanized metal, as recommended by decking manufacturer.

2.4 WOOD TREATMENT

.1 Pressure Preservative Treated Wood: in accordance with CSA O80 Series to match existing.

.3 Provide coatings that do not contain chemical listed in GS-II.

3. Execution

3.1 GRADE

.1 Install select grade where decking is exposed in finished structure and where specifically indicated. Install commercial grade elsewhere.

3.2 PATTERN

.1 Multiple Span: Install decking in accordance with CAN3-O86, controlled random continuous over two spans pattern.

.2 Single and double spans: End joints shall be over support.

.3 Provide minimum of one bearing support for each plank except for cantilevers which shall extend over two supports. Install sloping deck with tongues up. Join butt ends with splines to ensure a tight square fit,

.4 Touch up end cuts with preservative.

3.3 PRE-DRILLED HOLES

.1 For 64 mm and 89 mm deck drill 6 mm diameter holes horizontally through centre of section at 750 mm on centre unless otherwise indicated drawings.

3.4 NAILING

.1 Nail each piece at each support with one toe nail and one face nail.

.2 Nails shall penetrate 38 mm into supporting members.

.3 Side nail 64 mm and 89 mm Deck with 200 mm spiral spikes to adjoining piece through pre-drilled horizontal holes.

3.5 TREATMENT APPLICATION

.1 Application Preservative:

.1 Treat to CSA O80 Series to match existing.

.5 Provide coatings that do not have chemicals listed in GS-II.

3.6 CLEANING

.1 Remove tool marks, bruises and scratches after completing erection. Replace damaged decking if repairs are not approved by the consultant.

3.7 PROTECTION

.1 Provide temporary waterproof covering to protect exposed decking before applying roofing.

END OF SECTION

1. General

1.1 SECTION INCLUDES

.1 This section includes requirements for supply, fabrication, factory finishing and delivery to the job site, and installation of shop manufactured casework indicated on the drawings including, but not limited to, the following:

- .1 Decorative laminate finished casework and cabinets
- .2 Decorative laminate finished countertops
- .3 Fabric finished casework
- .4 Hardware forming a part of casework and cabinets fabricated by this Section
- .5 Shelving
- .6 Shop finishing of casework, cabinets and countertops
- .7 Structural supports incorporated into casework
- .8 Wood veneer finished casework and cabinets

.2 Provide work of this section in accordance with AWMAC Northern Alberta Chapter Trade Definitions.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Custom Metal Fabrications:	Section 05 50 00.
.4	Rough Carpentry	Section 06 10 00.
.5	Hardware, keying:	Section 08 70 00.
.6	Plumbing Fixtures and Trim	Section 22 42 00.

1.3 REFERENCE DOCUMENTS

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI):

- .1 Architectural Woodwork Standards, 1st Edition, 2009
- .2 AWMAC Guarantee and Inspection Service Guide and Manual

.2 American National Standards Institute (ANSI):

.1	ANSI/BHMA A156.9 -2010	American National Standard for Cabinet Hardware.
.2	ANSI/NPA A208.1-2009	Particleboard
.3	ANSI A208.2-2009	Medium Density Fiberboard (MDF) for Interior Applications
.4	ANSI/HPVA HP-1-2009	Standard for Hardwood and Decorative Plywood

.3 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-11.3-M87	Hardboard
.2	CAN/CGSB-71.20-M88	Adhesive, Contact, Brushable

.4 Canadian Standards Association (CSA):

.1	CSA B111-1974 (R2003)	Wire Nails, Spikes and Staples
.2	CSA O112.4 Series -M77(R2006)	Wood Adhesives
.3	CSA O112.5-Series -M77(R2006)	Urea Resin Adhesives for Wood (Room- and High-Temperature Curing)
.4	CSA O112.7-Series-M77(R2006)	Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing)
.5	CSA O121-08	Douglas Fir Plywood
.6	CSA O141-05 (R2009)	Softwood Lumber
.7	CSA O151-09	Canadian Softwood Plywood
.8	CSA O153-M1980 (R2008)	Poplar Plywood

.5 International Organization for Standardization (ISO):

.1	ISO 14040-06	Environmental Management-Life Cycle Assessment - Principles and Framework
.2	ISO 14041-98 (R2003)	Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis

.6 National Electrical Manufacturers Association (NEMA):

.1	ANSI/NEMA LD-3-05	High-Pressure Decorative Laminates

.7 National Hardwood Lumber Association (NHLA):

.1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998

.8 National Lumber Grading Authority (NLGA):

.1	NLGA-07	Standard Grading Rules for Canadian Lumber

1.4 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Section 01 62 00 for requirements pertaining to product options and substitutions.

1.5 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 Submittal Procedures.

.2 Submit manufacturer's product literature for items not manufactured by architectural woodwork manufacturer, when requested.

.3 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for:

.1 Finishes
.2 Adhesives

.2 Shop Drawings:

.1 Indicate materials, factory finishes, thicknesses, and hardware. Include plans, elevations, sections and details at the following recommended drawing scales:

.1 Plans and elevations – 1:20
.2 Sections – 1:10
.3 Details – 1:2
.4 Material Legend and Finish Legend

.2 Indicate construction details, locations of built-in items, connections, attachments, anchorage and location of exposed fastenings, as applicable.

.3 Samples:

.1 Submit 215 mm x 280 mm samples of panel products for each factory applied finish system.

.2 Submit 32 mm x 350 mm samples of lumber of each species.

.3 Finish one side and edge of samples representing items to receive factory finishes.

.4 Submit 3-5 - 300 mm square samples of veneer flitches laminated to substrate when requested.

.5 Submit samples of plastic laminate for selection of colour.

.4 Manufacturer’s Instructions:

.1 Submit manufacturer’s installation instructions.

.2 Submittals: submit sustainable submittals as follows:

.1 Composite Wood products including core materials, must contain no added urea-formaldehyde resins.

.2 Adhesives used to fabricate laminated assemblies must contain no urea-formaldehyde.

1.6 CLOSEOUT SUBMITTALS

.1 Record Documentation:

.1 Comply with requirements of Division 01.

.2 Provide project record sheet identifying project title and address, Contractor and architectural woodwork manufacturer.

.3 Provide one set of reviewed shop drawings, indicating modifications to materials and shop finishes, and type and source of hardware and any specialty items used.

1.7 QUALITY ASSURANCE

.1 Regulatory Agency Approvals:

.1 Lumber shall be graded and stamped by an agency certified by Canadian Lumber Standards Administrative Board.

.2 Plywood shall be graded and stamped in accordance with applicable CSA standards.

.3 Particleboard, fibreboard, and wood based composite panels shall conform to ANSI standards.

.2 Manufacturers:

.1 Materials and workmanship shall meet or exceed recommendations and requirements of AWMAC Manual.

.2 Requirements of this Section shall govern in case of conflict between this Section and the AWMAC Manual.

.3 Reference to custom or premium grade in this Section shall be as defined in the AWMAC Manual.

.4 Items without a grade specified shall be custom grade.

.5 Maintain a copy of the specified AWMAC Manual at the factory, readily available for duration of work.

.6 Installer shall be responsible for supplying field dimensions that will affect the work of this Section.

.3 Testing Agencies:

.1 Arrange and pay for inspection by an AWMAC appointed inspector at the plant and at the site, regardless of whether or not the architectural woodwork subcontractor or supplier is a member of AWMAC.

.2 Submit a copy of the AWMAC inspection report with the AWMAC Certificate of Guarantee or the maintenance bond.

.4 Mock-Ups:

.1 Provide mock-up of the following components to site:

.1 Teaching wall for Owner approval prior to construction of all Teaching Walls.

.2 Millwork, as indicated.

.2 Keep approved mock-up on site.

.3 Approved mock-up shall establish minimum standard and may be incorporated into finished work of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Make no delivery until site conditions have stable humidity and temperature conditions as required by AWMAC standards and are adequate to receive the work of this Section. Protect materials from weather while in transit to site.

.2 Storage and Handling Requirements:

.1 Adequately protect finish surfaces during moving, handling and storage.

.2 Store architectural woodwork items on level surfaces in ventilated areas, protected from direct sunlight and extreme changes in temperature or humidity.

1.9 WARRANTY

.1 Extended Warranty:

.1 Provide a two year extended warranty on the work of the architectural woodwork trade, commencing on the date of Interim Acceptance of the Work. The terms of this extended warranty shall be the same as those provided under the terms of the AWMAC Certificate of Guarantee.

.2 The foregoing shall not be construed to mean that the architectural woodwork subcontractor or supplier must be a member of AWMAC or that an AWMAC Certificate of Guarantee must be provided.

.2 Security for Extended Warranty:

.1 Provide security for the performance of Contractor's obligations under the extended warranty in the form of:

.1 an AWMAC Certificate of Guarantee, or

.2 a maintenance bond in the amount of 100% of the value of the architectural woodwork subcontract and in a form acceptable to the Minister.

.2 Submit AWMAC Certificate of Guarantee or maintenance bond prior to Interim Acceptance of the Work.

2. Products

2.1 LUMBER, GENERAL

.1 Materials: to AWMAC Manual, except where otherwise specified.

.1 Framing lumber: specified species or SPF, no. 1 grade, S4S.
.1 CSA O141, kiln dried; dressed 4 sides.
.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Hardwood lumber: meeting AWMAC custom grade, edge grain for species specified.
.1 National Hardwood Lumber Association (NHLA).
.2 AWMAC custom grade, moisture content as specified.

.2 Moisture Content: between 4-9%.

2.2 PANEL PRODUCTS, GENERAL

.1 Provide panel products manufactured with formaldehyde-free adhesive.

.2 Materials and Moisture Content: to AWMAC Manual, except where otherwise specified.

.3 Particleboard: Meeting ANSI 208.1 Grade M-2 for interior use, minimum 720 kg/m³ density and Grade M-3, minimum 750 kg/m^3 particleboard for countertops and shelves; clearly mark panels with grade mark in visible location; extruded particleboard having loose cores with voids will not be permitted; having no added urea formaldehyde.

.4 Medium Density Fibreboard (MDF): Meeting ASTM D1037 and ANSI A208.2, Premium Grade for interior use, minimum 700 kg/m³ density; formaldehyde emissions shall be 0.30 ppm or less per 0.424m^2/m^3 of room volume.

.5 Tempered Hardboard: to CAN/CGSB-11.3, Type 2, minimum density of 476 kg/m^3.

.6 Softwood Plywood: to applicable CSA standards referenced in AWMAC Manual, G2S.

.7 Hardwood Plywood: to CSA-O115. Graded in accordance with the Official Grading Rules for Canadian Hardwood Plywood.

.8 High Pressure Decorative Laminate (HPDL): Meeting CAN3 A172 or ANSI/NEMA LD3 composed of phenolic resin impregnated Kraft paper filler stock for Class 1 Decorative Laminate of Grade required by AWMAC Manual.

.1 Refer to Interior Materials Legend on Drawing A005 for colour and finishes, indicated as PLAM1, and PLAM2.

2.3 ACCESSORIES

.1 Silicone Sealant: to CAN/CGSB-19.13, Shore A hardness 15-25.

.2 Laminated plastic adhesive:

.1 Adhesive: contact adhesive to CAN/CGSB-71.20.

.2 Adhesives urea-formaldehyde free.

.3 Other Accessories: to AWMAC Manual.

2.4 CASEWORK HARDWARE

.1 Where products are specified by proprietary names, other unnamed products may be substituted in accordance with the requirements of Section 01 62 00 – Product Options and Substitutions.

.2 Fasteners:

.1 Draw Bolt Fasteners: Mitre butt joint fastener, adjustable and requiring no special tools for installation, galvanized.

.2 Non-exposed Fasteners: Fabricators choice consistent with quality level specified.

.3 Hinges: to ANSI-A156.9, B01612 – concealed hinge, self closing, 120 to 125 degree of opening, full overlay type for screw attachment complete with mounting plates.

.1 Acceptable products:

1 Model 71T558 by Blum.

.2 Model HD1311-552 by Mepla.

.3 Model A00P94 by Salice.

.4 Model 9956 by Hettich.

.3 Door and Drawer Pulls: back mount, 100 mm wire D pulls, brushed finish.
.1 Acceptable Products:
.1 CBH 220-101
.2 Häfele America Co. 115.61.601
.3 Hettich Canada LP Columbus 41, 1170 122 40/320
.4 Richelieu, Collection BP33205170
.5 Stanley 4484 x 101

.4 Drawer Slides For Drawers Up To 150 mm Deep but less than 406 mm wide: to ANSI-A156.9, B85051, side mount, steel construction, ¾ extension, ball bearing operation, rail disconnect system, bright zinc finish, length as required.

.1 Acceptable Products:
.1 Model 2037 by Accuride.
.2 Model 8150 by Knape & Vogt.
.3 Model LP KA3434 by Hettich.

.5 Drawer Slides for drawers deeper than 150 mm but less than 406 mm wide: to ANSI-A156.9, B85051, side mount, steel construction, full extension, ball bearing operation, bright zinc finish, length as required.
.1 Acceptable Products:
.1 Model 3834 by Accuride.
.2 Model 8400 by Knape and Vogt.
.4 Model LP KA 5632 by Hettich.

.6 Lateral File Drawers: Heavy duty type, 25 mm over-travel extension, sequential sliding, hand-rail lift-off disconnect, length to suit drawer box; side mounted, 1067 mm maximum drawer width, 91 kg capacity, rating based on 50,000 cycle test; clear zinc finish:

.1 Acceptable Products:
.1 Model 3640 by Accuride
.2 Model LP KA4620 by Hettich Canada
.3 Model 8805 by Knape & Vogt

.7 Stainless Steel Pins: Steel pin shelf supports:
.1 Basis of Design: Richelieu 2291180

.8 Stainless Steel Pins: Steel pin shelf supports and sockets:
.1 Basis of Design: Richelieu 2292-180/5829-180

.9 Locks: Nickel finished, Master Keyed, keyed alike in groups, cam lock with plate, adjust keying groups to suit requirements: Confirm keying required (keyed alike in groups, supply keying schedule), Teachers' station keyed separately.

.1 Acceptable Products:
.1 Dom 225-240 Series, Richelieu
.2 CompX National
.3 Trimline

2.5 CASEWORK, GENERAL

.1 Fabricate casework to AWMAC grade specified in the individual casework articles in this Section.

.2 Furring, Blocking, Nailing Strips and Grounds: standard grade, to NLGA grading rules, for boards and dimension lumber.

.3 Framing: pine species.

.4 Case Bodies, Ends, Dividers, Bottoms and Doors and Exposed Backs: 19 mm unfinished thickness.

.5 Non-exposed Backs: 12 mm unfinished thickness for all base, tall and wall cabinets with hanging strips and minimum of 12 mm for wall cabinets without hanging strips.

.6 Thickness of Shelves Prior to Finishing:

.1 Unsupported lengths up to 813 mm: 19 mm particle board. or 19 mm veneer core plywood.
.2 Unsupported lengths between 814 mm and 914 mm: 19 mm veneer core plywood.
.3 Unsupported lengths between 915 mm and 1066 mm: 25 mm particle board or 27 mm veneer core plywood.
.4 Unsupported lengths between 1067 mm and 1219 mm: 27 mm veneer core plywood.

.7 Fabricate drawers of box construction as follows:

.1 Perimeters: 12 mm thickness prior to finishing, solid birch or maple for clear and opaque finishes and plywood or particleboard for plastic laminate finish.

.2 Bottoms: 12 mm thickness prior to finishing, MDF or tempered hardboard, dadoed or grooved into perimeter, captured on 4 sides.

.3 Faces: 19 mm thickness prior to finishing.

.8 Edge banding:

.1 PVC Banding: 3 mm PVC banding with exposed edges and corners machine profiled to 3 mm radius; colour to match with surface finish. Shelves to have edge banding on all edges. All exposed and semi-exposed millwork parts edges to have edge banding.

.9 Maximum gap between adjacent doors or drawers shall be 3 mm.

.10 When screw fastening, fasten into MDF or particle board by pre-drilling holes as required and inserting plastic or metal screw dowels to receive screw fasteners.

2.6 CASEWORK, CLEAR FINISH

.1 AWMAC Quality Grade: Custom.

.2 Construction: to AWMAC Manual for flush overlay, except as otherwise detailed on drawings.

.3 Edge banding:

.1 Wood Veneer: No. 1 grade species and finish to match with surface finish, mitred solid edge. Finish all 4 sides of shelves.

.2 PVC Banding: 3 mm PVC banding with exposed edges and corners machine profiled to 3 mm radius; colour to match with surface finish. Shelves to have edge banding on all edges. All exposed and semi-exposed millwork parts edges to have edge banding.

.4 Exposed and Semi-exposed Parts:

.1 Panel Products:

.1 Plywood Species: Birch.
.2 Core: veneer. Use only particle board core for doors and drawer fronts.
.3 Veneer Grade: AA.
.4 Veneer Cut: rotary-cut.
.5 Veneer Match: book.

.5 Finish: Shop Finish, clear finish.

2.6 CASEWORK, HIGH PRESSURE DECORATIVE LAMINATE (HPDL) FINISH

.1 AWMAC Quality Grade: Custom.

.2 Construction: to AWMAC Manual for flush overlay, except as otherwise detailed on drawings.

.3 Exposed and Semi-exposed Parts:

.1 Panel Products:

.1 Core: hardwood species, shop sanded exterior grade veneer core plywood, G2S, or industrial grade particleboard. Use only particle board core for doors and drawer fronts.

.2 High Pressure Decorative Laminate (HPDL):

.1 Horizontal General Purpose Grade (HGS): thickness of 1.2 mm ±0.12 mm, used on the following:

.1 Horizontal surfaces, unless specified otherwise.
.2 Edges of core materials.

.2 Vertical General Purpose Grade (VGS): thickness of 0.7 mm ±0.10 mm, used on the following:

.1 Vertical surfaces, unless specified otherwise.
.2 Exposed portions of case bodies, including ends, divisions and bottoms.
.3 Exposed shelves.
.4 Casework Doors: exposed and semi-exposed surfaces.
.5 Drawer Faces: exposed and semi-exposed surfaces.

.3 Liner Grade (CLS): thickness of 0.5 mm ±0.10 mm, used on the following:

.1 Semi-exposed shelves.
.2 Interior portions of case bodies.
.3 All surfaces of drawer boxes.

.4 Laminate backer grade (BKL): thickness of 0.5 mm ±0.10 mm, used on the following:

.1 Concealed surface of casework backs.
.2 Concealed surfaces, unless specified otherwise.

.5 Laminate Finish and Surface: matte finish, smooth surface. Vertical wood grain direction.

.6 Laminate Colour and Pattern: to be selected by Minister from manufacturer's standard range.

2.7 HIGH PRESSURE DECORATIVE LAMINATE (HPDL) COUNTERTOPS AND BACKSPLASH, SELF-EDGE TYPE

.1 Laminate (HPDL): horizontal general purpose grade (HGS), thickness of 1.2 mm ±0.12 mm, vertical general purpose grade (VGS), thickness of 0.7 mm ±0.10 mm, laboratory grade, general purpose grade and laminate backer grade (BKL), thickness of 0.5 mm ±0.10 mm.

.1 Laminate Finish and Surface: matte finish, smooth surface. Describe textured surface.

.2 Laminate Colour and Pattern: Refer to Interior Materials Legend on Drawing A005.

.2 Core: poplar, spruce (exterior grade) or birch (interior grade) shop sanded exterior grade veneer core plywood, G2S, minimum 19 mm thickness or industrial grade particleboard, minimum 29 mm thickness. Provide plywood core at sink areas and within minimum 610 mm to each side of sink.

.3 Backing: HPDL backer applied to underside of countertops and back of backsplash.

.4 Edge Type: PVC, as detailed on drawings.

.5 Backsplash: profile as detailed on drawings.

2.8 FABRICATION

.1 Details for casework shall conform to flush overlay design.

.2 Set nails and countersink screw, apply plain wood filler to indentations, sand smooth and leave ready to receive finish.

.3 Shop install cabinet hardware.

.4 Use draw bolts in countertops and casework joints.

.5 Provide hairline joints in architectural woodwork.

.6 Fabricate work for delivery to site in sizes easily handled and to ensure passage through building openings.

2.9 FACTORY FINISHING MATERIALS

.1 Factory finishing materials: Use only products included in Manufacturers' Product List of the Master Painter Institute Architectural Specification Manual, latest edition.

.2 Backprimers: white Latex primer or gloss varnish thinned 25%, compatible with exposed finish, as applicable.

.3 Do not use combination filler/stain.

2.10 FACTORY FINISHING

.1 Comply with applicable requirements and recommendations for factory finishing in AWMAC Manual.

.2 Refer to Architectural Woodwork Schedule at end of this Section for factory finishing requirements.

.3 Applied and cured coatings shall be uniform in thickness, sheen, colour and texture, and free of defects detrimental to appearance or performance.

.4 Backprime the following surfaces that will be concealed after installation:

.1 Unfinished surfaces in contact with concrete, masonry, floors or floor finishes.
.2 Underside of front edges of countertops and toe-spaces.
.3 Other surfaces that may be subjected to moisture during normal use or cleaning operations.

.5 Use two coats tinted wood primer to back prime components receiving opaque finishes.

.6 Use gloss lacquer veneer varnish, to back prime components receiving clear finishes.

3. Execution

3.1 VERIFICATION OF CONDITIONS

.1 Verify job site conditions in accordance with AWMAC Manual.

.2 Verify humidity and temperature conditions are stable and as recommended in AWMAC Manual.

.3 Do not deliver to site until job site conditions comply with the requirements outlined in the AWMAC Manual.

.4 Confirm site dimensions prior to shop drawings.

3.2 INSTALLATION

.1 Install items in accordance with AWMAC Manual.

.2 Position items accurately, secure and rigid.

.3 Scribe and cut as required to fit neatly to abutting walls and recesses and to projecting, intersecting or penetrating objects.

.4 Apply smallest practicable bead of silicone sealant at junction of backsplashs and adjacent wall finish.

.5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.6 Back prime surfaces of cut-outs for sinks, drains and other mechanical services that will be concealed after installation. Electrical outlets are not allowed behind millwork, if outlets exist, notify the Minister.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Wall mock-up including work of this Section:	Division 01.
.4	Masonry connectors:	Section 04 20 00.
.5	Non-rigid fibrous insulation:	Section 07 21 16.
.6	Sheet Membrane Air and Vapour Seal	Section 07 26 00.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM D1248-05	Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable
.2	ASTM D4101-09	Standard Specification for Polypropylene Injection and Extrusion Materials

.2 Underwriters Laboratories of Canada (ULC):

.1	CAN/ULC-S701-05	Thermal Insulation, Polystyrene, Boards and Pipe Coverings
.2	CAN/ULC-S702-09	Thermal Insulation Mineral Fibre for Buildings

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Sequencing:

.1 Schedule application of insulation to follow immediately after installation of sheet membrane air and vapour seal and to proceed concurrently with it.

1.4 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 Submittal Procedures.

.2 Provide two copies of most recent data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit manufacturers' literature for insulation and fastening systems, indicating compliance with specifications.

.4 Provide two copies of MSDS for all products and indicate VOC content for manufacturer's recommended mastics.

1.5 QUALITY ASSURANCE

.1 Certifications:

.1 Polystyrene insulation shall be tested, certified and labelled for conformance with CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering, in accordance with, ULC, or other certification program accredited by Standards Council of Canada.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Store to protect materials from wind, moisture, sunlight and accidental ignition.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

1.7 SITE CONDITIONS

.1 Install insulation during dry weather conditions.

2. Products

2.1 INSULATION

.1 Extruded Polystyrene, Type 4: to CAN/ULC-S701. And ASTM C578, Type IV. Rigid closed–cell polystyrene foam board. ASTM C518, thermal conductivity of "k" = 0.20 Btu in./hr. ft.2 degrees F (0.029 W/m oC) at 75 degrees F (24 degrees C), when fully aged at 5 years. ASTM D1621, 25 psi (172 kPa) compressive strength. ASTM E96/E96M water vapor permeance rating of maximum 1.1 perm (57.2 ng/Pa s m^2). Provide manufacturer's standard sizes in thickness and thermal resistance "R" values indicated.

.2 Polyisocyanurate Wall Insulation: Foil faced polyisocyanurate, preformed rigid insulation in accordance with CAN/ULC S704, having LTTR RSI ≥1.05/25 mm; with Flame Spread/Smoke Density Classification <100/<450 in accordance with CAN/ULC S102; square edges, board size to manufacturers maximum standard x thickness required to achieve insulation value indicated on Drawings

2.2 BOARD DIMENSIONS AND SHAPE

.1 Minimum Width: 400 mm.

.2 Minimum Length: 1200 mm.

.3 Thickness: as indicated on Drawings.

2.3 FASTENERS

.1 Fasteners shall be specifically designed to anchor insulation by frictional resistance within structurally adequate substrates. They shall be inserted into and compressed against surrounding substrates, either by being driven or screwed, and shall be one of the following types:

.1 Plastic: with integral shank and head of minimum 45 mm diameter to distribute stresses, of high density polyethylene to ASTM D1248 or high density polypropylene to ASTM D4101.

.2 Carbon Steel or Stainless Steel: of nail, screw or expansion type, with separate hot-dip galvanized sheet steel or high density polyethylene or polypropylene stress distribution plates of minimum 50 mm diameter or width.

.3 One of the following combination masonry connectors/insulation fasteners:

.1 Masonry Connectors: as specified in Section 04 20 00, designed, with or without optional insulation retainer plates, to function as insulation fasteners.

.2 Plastic Wedges: with locking ribbed surface, designed to secure rigid insulation when installed with ladder type masonry connectors complying with Section 04 20 00 and factory modified to provide rigid anchorage for wedges.

.2 Performance requirements for installed insulation fasteners:

.1 Pullout Resistance: minimum 200 N, perpendicular to applicable substrates and within temperature range of -30°C to +40°C.

.2 Corrosion Resistance: carbon steel components shall show not more than 15% of the surface rusted, and coatings shall not blister, peel or crack, when tested to Corrosion Test Procedure of Factory Mutual Research Approval Standard, Class I Roof Covers (4470).

3. Execution

3.1 INSTALLATION OF INSULATION

.1 Install insulation boards horizontally in two layers. Offset vertical joints minimum 300 mm.

.2 Over gypsum sheathing and stud framing at 400 mm o.c., locate vertical joints at mid-point between studs.

.3 Install tightly against dry substrate. Provide continuity of thermal protection to building elements and spaces.

.4 Cut and trim insulation neatly to fit around corners and penetrations. Take care to prevent cutting sheet membrane air and vapour seal.

.5 Butt joints tightly. Deform board edges as required to maintain tight butt joints at insulation fasteners and other penetrations located at board joints.

3.2 INSTALLATION OF FASTENERS

.1 Secure all above grade and partially above grade insulation boards with fasteners, anchored to substrates capable of providing specified fastener pull-out performance. Do not anchor to gypsum sheathing.

.2 Install fasteners following fastener manufacturer's recommendations for type of substrate, drill bits, edge distance, installation methods, and ambient and substrate temperature conditions.

.3 Space fasteners horizontally at:

.1 maximum 800 mm o.c., and

.2 minimum 100 mm and maximum 200 mm from vertical board joints.

.4 Space fasteners vertically:

.1 at all horizontal board joints and on centre line of board widths, or

.2 at 1/4 of board width from all horizontal joints.

.5 Do not use plastic fasteners in horizontal, suspended installations.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Polyethylene Sheet Vapour Retarder:	Section 09 29 00.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM C553-08	Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
.2	ASTM C665-06	Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
.3	ASTM C1320-05 (2009)	Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 Underwriters Laboratories of Canada (ULC):

.1	CAN/ULC-S702-09	Thermal Insulation Mineral Fibre for Buildings.
.2	CAN/ULC S703-01	Standard for Cellulose Fibre Insulation (CFI) for Buildings, Includes Amendment 1.

1.3 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide two copies of most recent data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide two copies of MSDS for all products and indicate VOC content.

.3 Samples:

.1 Submit duplicate representative samples of each type of insulation material.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver insulation and accessories in original unopened packaging or cartons bearing manufacturer's seals and labels.

.2 Storage and Handling Requirements:

.1 Store materials under cover on raised platforms, away from moisture. Keep dry at all times.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 BATT INSULATION

.1 Fibrous Glass Batts: GREENGUARD Certified preformed insulation without a membrane, sized for friction fit between framing, thermal resistance (RSI) as indicated in insulation schedule.

.2 Fibrous Mineral Wool Batts: preformed mineral slag insulation without membrane, sized for friction fit between framing, thermal resistance (RSI) as indicated in insulation schedule.

.3 Refer to Section 09 29 00 for acoustic batts installed in interior partitions.

3. Execution

3.1 PREPARATION

.1 Ensure all in-wall construction is complete before beginning installation.

.2 Install insulation after building substrate materials are dry.

.3 Ensure substrate materials are properly installed and complete before beginning installation.

3.2 INSTALLATION - GENERAL

.1 Install insulation materials in accordance with manufacturer's recommendations.

.2 Install insulation to maintain continuity of thermal protection of building elements and spaces.

.3 Fit insulation tightly around openings and protrusions in plane of insulation.

.4 Install adequate blocking at eaves to ensure proper ventilation of attic space.

3.3 INSTALLATION OF BATT INSULATION

.1 Install batts between framing members, structural components and other items snug and tight.

.2 Cut and trim batts neatly to fit spaces. Use batts free from ripped or damaged back and edges.

.3 Do not compress insulation to fit into spaces.

END OF SECTION

1. General

1.1 INTENT

.1 Provide flexible sheet membrane:

.1 continuously adhered to wall substrates, bridging joints and gaps,

.2 sealed to vapour retarders in built-up roofing assemblies,

.3 installed to permit an effective seal at window frames, door frames, and other components fitted into openings in building envelope, and,

.4 sealed to pipes, ducts, conduits, masonry connectors and other items penetrating the building envelope.

.2 The intent is to provide a continuous barrier to air movement and an effective barrier to water vapour transmission through the building envelope.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Unit Masonry:	Section 04 20 00.
.4	Sheet Membrane Waterproofing:	Section 07 13 00.
.5	Rigid Board Insulation:	Section 07 21 13.
.6	Sealants:	Section 07 92 00.
.7	Hollow Metal Frames:	Section 08 12 13.
.8	Aluminum Windows:	Section 08 51 13.
.9	Glazed Curtain Walls:	Section 08 44 13.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM D412-06ae2	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
.2	ASTM D903-98 (2004)	Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
.3	ASTM E96/E96M-05	Standard Test Methods for Water Vapor Transmission of Materials

.2 Canadian General Standards Board (CGSB):

.1	CAN/CGSB 37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Select products to be compatible with adjoining membranes previously installed under related Sections.

.2 Select products from a single manufacturer, or products which are compatible, from different manufacturers.

.2 Sequencing and Scheduling:

.1 If climatic conditions may result in condensation between membranes and substrates, schedule installation of insulation to immediately follow installation of membranes.

.2 Install membranes over joints and gaps before installing membranes over adjacent substrates.

.3 Install membrane on sloped roofs after installation of membrane on walls, to provide a lap over wall membrane.

.4 Unless membrane will be adhered directly to window frames or other components fitted into openings, install membrane before installation of such components.

.5 Provide reasonable notice to Minister to allow inspection of completed installation prior to concealing work of this Section.

1.5 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit product data illustrating membranes and accessory materials and indicating compliance with specified requirements.

.3 Submit statement from manufacturer(s), indicating products supplied under this Section are compatible with one another and with products previously installed under the work of related Sections.

.3 Samples:

.1 Provide duplicate 200 mm x 200 mm samples of membrane adhered to all project substrates, including adjoining membranes specified in other Sections.

1.6 QUALITY ASSURANCE

.1 Inspection Agencies:

.1 Minister will engage and pay for inspection services. This inspection is not intended to replace or limit, in any way, Contractor's quality control procedures.

.2 Provide reasonable notice to the Minister to allow for inspection of each stage of the work of this Section.

.2 Mock-ups

.1 Prior to installation of system, provide minimum 2.4 m x 2.4 m site mock-up showing methods of attachment, terminations at wall openings and penetrations, reveals, custom shapes, flashings, joints, colours and textures required.

.2 Approved mock-up will establish a minimum standard. Mock-up may [not] be incorporated into finished work of this Section. Retain and maintain mock-up for reference during construction. Promptly remove rejected mock-ups from site.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Provide adequate protection of materials and work of this section from damage by weather and other causes.

1.8 SITE CONDITIONS

.1 Apply materials under environmental conditions recommended by manufacturer.

.2 Ensure substrates temperatures and ambient air temperatures are within range recommended by membrane manufacturer. Provide hoarding and temporary heating if required.

2. Products

2.1 SHEET MEMBRANE

.1 Material: styrene-butadiene-styrene (SBS) modified bitumen, premanufactured sheet, with manufacturer's standard reinforcement, compatible with substrates and adjoining membranes, and specifically designed for air and vapour seal application.

.2 Method of Adhesion: self-adhering.

.3 Performance Requirements:

Attribute	Criterion	Test Method
Tensile & lap joint strength, machine & cross-direction	Min. 17 N/cm	CGSB 37GP56M
Elongation at break, machine & cross-direction	Min. 4%	ASTM D41206ae2 (Die C)
Peel adhesion of self-adhering membranes	Min. 8 N/cm	ASTM D903,
Flexibility, low temperature	Pass	CGSB37GP56M
Crack bridging capability	No evidence of cracking or splitting	CGSB37GP56M
Water vapour permeance	Maximum 15 ng/(Pa)(m^2)(s)	ASTM E96/E96M, water method

2.2 JOINT MEMBRANE

.1 Material, Method of Adhesion, and Performance: same as Sheet Membrane, except elongation at break, in machine and cross-direction, shall be minimum 50%.

2.3 TRANSITION MEMBRANE

.1 Material, Method of Adhesion, and Performance: same as Sheet Membrane, except internally reinforced, and minimum thickness 2.5 mm.

2.4 ACCESSORY MATERIALS

.1 Primers, Surface Conditioners and Mastic: proprietary to self-adhesive membrane product and water-based as recommended by membrane manufacturer, compatible with substrates, including, but not limited to, the following:

.1 Metal substrates.
.2 Concrete which may contain form release agents.
.3 Wood substrates to which preservative or fire retardant treatment has been applied.

3. Execution

3.1 EXAMINATION AND PREPARATION

.1 Verify substrate conditions are acceptable before starting installation of membranes.

.2 Prepare substrate surfaces in accordance with membrane manufacturer's printed recommendations.

.3 Apply primer to substrates to receive membranes, in accordance with manufacturer's recommendations.

3.2 INSTALLATION, GENERALLY

.1 Install membranes in accordance with membrane manufacturer's recommendations, and to ensure continuity of air and vapour seal. Neatly trim membrane terminations.

.2 Lap horizontal membrane joints to shed water to exterior.

.3 Install Sheet Membrane over Joint Membrane installed over joints and gaps.

.4 The following are unacceptable:

.1 Fishmouths and folds.
.2 Blisters and bulges.
.3 Insufficient overlaps.
.4 Inadequate adhesion.
.5 Punctures, tears, cuts.
.6 Other similar defects.

3.3 INSTALLATION OVER JOINTS AND GAPS

.1 Install Joint Membrane, minimum 200 mm wide, centred over joints and gaps.

.2 Lap ends of Joint Membranes minimum 150 mm.

.3 Do not loop Joint Membranes into joints.

3.4 INSTALLATION ON WALLS

.1 Install Sheet Membrane on walls.

3.5 INSTALLATION AT TRANSITIONS TO BUILT-UP ROOFING

.1 Install Transition Membrane at transitions to built-up roofing.

.2 Lap Transition Membrane minimum 200 mm over roofing vapour retarder and over Sheet Membrane on walls.

3.6 INSTALLATION AT PENETRATIONS

.1 Cut membrane to ensure it is installed tight to penetrations.

.2 Provide flanged membrane collar around mechanical and electrical penetrations. Flange shall be at plane of surrounding membrane.

.3 Apply mastic where membrane has been cut to fit around penetrations.

END OF SECTION

1. General

1.1 SECTION INCLUDES

.1 This Section includes requirements for:

.1 A spray applied rigid cellular polyurethane thermal insulation foam product applied where indicated, so as to provide a continuous air seal.

.2 A spray applied thermal barrier over the polyurethane. Thermal barrier may or may not be required. Refer to Article 1.3.

1.2 RELATED REQUIREMENTS:

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM D1621-04a	Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
.2	ASTM D1622-08	Standard Test Method for Apparent Density of Rigid Cellular Plastics
.3	ASTM D1623-09	Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
.4	ASTM D2126-09	Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
.5	ASTM D2842-06	Standard Test Method for Water Absorption of Rigid Cellular Plastics
.6	ASTM E84-09c	Standard Test Method for Surface Burning Characteristics of Building Materials
.7	ASTM E96/E96M-05	Standard Test Methods for Water Vapor Transmission of Materials

.2 Underwriters Laboratories of Canada (ULC):

.1	CAN/ULC S102-07	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.4 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide two copies of most recent data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide two copies of MSDS for all products and indicate VOC content.

1.5 QUALITY ASSURANCE

.1 Regulatory Agency Approvals

.1 Whichever of the following products is used, Contractor shall be responsible for obtaining approval for use in intended applications from authority having jurisdiction:

.1 Spray applied polyurethane foam containing integral fire inhibitors.

.2 Thermal barrier required for protection of spray applied polyurethane foam without integral fire inhibitors.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Store to protect materials from wind, moisture, sunlight and accidental ignition.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

1.7 SITE CONDITIONS

.1 Maintain minimum ambient temperature of 5°C for minimum 24 hours before, during and 72 hours after completion of application.

2. Products

2.1 PRODUCT OPTIONS

.1 Contractor shall select one of the following options:

.1 Provide spray applied polyurethane foam containing integral fire inhibitors. An additional, separate thermal barrier is not required.

.2 Provide spray applied polyurethane without integral fire inhibitors. An additional, separate thermal barrier is required.

2.2 SPRAY APPLIED POLYURETHANE FOAM

.1 Spray Applied Polyurethane Foam: rigid, cellular thermal insulation with following properties when applied:

Property	Test Method	Requirement
Density	ASTM D1622	42 kg/m^3 max. 10 kg/m^3 min.
Compressive strength	ASTM D1621	104 kPa with max. 10% deformation
Tensile Strength	ASTM D1623	138 kPa min.
Response to thermal and humid aging	ASTM D2126	12% max. volume change
Water absorption	ASTM D2842	5% max. by volume
Water vapour permeability	ASTM E96E96M	Core: max. 180 ng/(Pa.s.m^2) Skins: max. 60 ng/(Pa.s.m^2)

.2 Spray Applied Polyurethane Foam Containing Integral Fire Inhibitors: same properties as specified in 2.1.1, with following additional fire hazard classification properties when tested to CAN/ULC-S102 or ASTM E96E96M:

.1 Flame spread: max. 10.
.2 Smoke developed: max. 500.
.3 Fuel contributed: 0.

2.3 THERMAL BARRIER

.1 Thermal Barrier: spray applied fire retardant overcoat meeting applicable requirements of the Alberta Building Code for a thermal barrier over foamed plastic.

3. Execution

3.1 VERIFICATION OF CONDITIONS

.1 Inspect areas to receive work of this Section and ensure conditions are suitable to begin application.

.2 Ensure that all work penetrating through air seal is complete.

.3 Ensure that appropriate back-up material has been installed in all large voids.

3.2 PROTECTION OF EXISTING WORK

.1 Protect from overspray all finish surfaces which will be exposed to view.

3.3 SUBSTRATE PREPARATION

.1 Clean substrates of dirt, dust, grease, oil, loose material and other matter which may affect bond of spray applied materials.

.2 If recommended by manufacturer, prime substrates in accordance with manufacturer's instructions.

.3 Remove oil from galvanized sheet steel substrates and apply prime coating in accordance with manufacturer's instructions.

3.4 SPRAY APPLIED POLYURETHANE FOAM APPLICATION

.1 Spray apply polyurethane foam in accordance with manufacturer's instructions. Use equipment recommended by manufacturer.

.2 Apply material as indicated and in sufficient thickness to achieve a complete air seal.

.3 Wall/decking Junctures: provide continuous gusset profiled seal, extending 150 mm vertically and horizontally from juncture. Ensure application leaves no voids.

.4 Windows & Doors: apply only enough product to form an effective air seal toward warm side of frames, do not fill entire cavity with foam. If application deforms frames, remove foam, restore frame alignment and re-apply foam.

3.5 THERMAL BARRIER APPLICATION

.1 Spray apply fire retardant overcoat to spray applied polyurethane foam surfaces, in sufficient thickness to provide a thermal barrier meeting the Alberta Building Code and requirements of authority having jurisdiction.

3.6 AIR SEAL APPLICATION SCHEDULE

.1 Provide air seal at the following:

.1 Juncture of external walls and roofs.
.2 Perimeter of windows & doors.
.3 Other locations indicated on drawings.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Sealants:	Section 07 92 00.
.4	Windows:	Section 08 51 13.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM A653/ A653M-09	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 Aluminum Association (AA):

.1	AA-C22-A41	Anodized Clear Coatings
.2	AA-C22-A42	Integral Colour Coatings

.3 American Architectural Manufacturers Association (AAMA):

.1	AAMA 508-05	Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems

.4 Canadian General Standards Board (CGSB):

.1	CAN/CGSB-93.1-M85	Sheet Aluminum Alloy, Prefinished, Residential
.2	CGSB 19-GP-5M, 1984	Sealing Compound, One Component, Acrylic Base, Solvent Curing (Incorporating Amendment No. 1)

.5 SCAQMD South Coast Air Quality Management District, California State (SCAQMD):

.1 SCAQMD Rule #1168, June 2006

1.3 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Division 01 for requirements pertaining to product options and substitutions.

1.4 WALL SYSTEM

.1 Wall assembly to be field assembled.

1.5 SYSTEM DESCRIPTION

.1 Construct the wall to provide for expansion and/or contraction of component material as will be caused by an ambient temperature range of 85°C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.2 Design members to withstand their own weight, and the design loads due to the pressure and suction of wind as calculated in accordance with Alberta Building Code 2014 and applicable municipal regulations, to a maximum allowable deflection of 1/180 of span between attachments.

.3 Provide for positive drainage, to the exterior face of the wall, any water entering at joints and/or any condensation occurring within the wall construction, all to NRC "Rain Screen Principles".

.4 Meet R values as indicated on Drawings.

.5 The wall system shall accommodate, by means of expansion joints, any movement in the wall itself and between the wall and the building structure, caused by structural movements (deflection and wracking, etc.) and/or thermal expansion and contraction without permanent distortion, damage to infills, cracking of joints, breakage of seals, or water penetration.

.6 Design the wall system to accommodate the tolerances of the structure, provided irregularities do not exceed them, and clearances shown are maintained.

.7 Maintain the following tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/10 m of length and 20 mm/100 m max.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

.8 Design, assemble and secure wall system to the building structural frame in a manner that will keep any stresses on sealants within manufacturers' recommended maximum.

1.6 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS, Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for:

.1 Adhesives

.3 Shop Drawings

.1 Submit shop drawings in accordance with Division 01.

.2 Clearly indicate dimensions, siding profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, and related work.

.4 Samples

.1 Submit duplicate samples in accordance with Division 01.

.2 Samples to be representative of material, finish, colour and profile of specified work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Stack panel sheets tilted to provide water run-off.

.2 Storage and Handling Requirements:

.1 Cover components to protect from direct moisture penetration. Arrange stacks in a manner to encourage air movement.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 MATERIALS

.1 Sheet steel: exposed to exterior, to ASTM A653/A653M, grade A, Z275 coating designation, factory precoated with modified silicone paint finish, 2 coat system dry paint film thickness of 0.025 mm conforming to film test procedures described in CSSBI Bulletin No. 5. Colour to be from standard range.

.2 Aluminum/Zinc Galvanized Sheet Steel Corrugated Cladding: Tension levelled, Commercial Steel (CS) designation, Type A, Grade 275 (40) in accordance with ASTM A792 and as follows:

.1 Thickness: Minimum 0.76 mm (0.030") base metal thickness, or thicker as required to meet design loads.

.2 Galvanizing Designation: AZM180 (AZ60), applied evenly to both sides; acceptable materials: Dofasco Inc., Galvalume

.3 Insulation: fibrous glass to 32 kg/m^3 density, refer to Section 07 21 16.

.4 Screws: cadmium plated steel, purpose made, head colour same as exterior sheet, dished steel/neoprene.

.5 Sealant: one component acrylic to CGSB 19-GP-5M, of colour to match siding.

.6 Gaskets: soft pliable vinyl, extruded profile, to achieve weathertightness when installed.

2.2 COMPONENTS

.1 Exterior sheet: factory preformed prepainted metal, to profile indicated on drawings, male and female lipped edges, vinyl gasket shop fitted into female lip, of 0.76 mm core thickness metal.

.1 Metal Cladding: to match Vicwest AD 300-R

.2 Corrugated Metal Cladding: To match Vicwest 7/8" Corrugated

.2 Exterior corners: of same profile, material and finish as adjacent siding material, shop cut and brake formed to right angle, concealed corner brace, hairline exposed joint, pop rivet connections with painted head to match siding.

.3 Exposed joint: perpendicular to profile, ends of siding sheet shop cut clean and square, backed with tight fitting filler lapping back of joint, pop rivet connections, all exposed components shall be colour matched to siding.

.4 Accessories: cap flashings, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, of same material and finish as exterior siding, brake formed to shape.

.5 Sub-girts: of 1.2 mm steel, galvanized to ASTM A653M-96, Z275 coating designation, profiled to accept liner and exterior sheet with structural attachment to building frame.

3. Execution

3.1 INSPECTION

.1 Field measure building frame. Confirm that variations in level and plumb are acceptable prior to erection of wall.

.2 Commencement of site erection shall mean acceptance of building conditions.

3.2 PREPARATION

.1 Protect contact surfaces of metals in contact with concrete, mortar, plaster or other cementitious surface with protective coating.

.2 Touch up building framing members with primer as required.

3.3 INSTALLATION (SHOP ASSEMBLED)

.1 Install all wall/siding assemblies by erection crews approved by material fabricator to written instructions.

.2 Install liner sheet and 'Z' bar girts to structural wall supports, using self tapping screws. Interlock and seal side and end joints. Precaulk female joint to ensure continuous air barrier seal.

.3 Install insulation to ensure continuous thermal barrier in conjunction with air/vapour barrier formed by liner sheet.

.4 Install exterior finish siding to internal sub-girts with concealed fasteners.

.5 At vertical profiles for exterior siding, provide notched and formed top closures, caulked and sealed to arrest weather penetration.

.6 Provide alignment bars, brackets, clips, inserts, shims, etc. as required to securely and permanently fasten the wall system to the building structure.

.7 Completed installation to be free from noise, rattles, wind whistles, or noise due to thermal movement.

3.4 INSTALLATION (FIELD ASSEMBLED)

.1 Erect shop assembled wall system, attaching to building framing system with inside fasteners.

.2 Install wall/siding assembly by erection crews approved by material fabricator to written instructions.

.3 Install wood assembly to achieve thermal/air/vapour barrier.

.4 Perimeter caulk with sealant, install wall/siding over sill flashings, install cap flashings and ensure completed installation is continuous perimeter sealed.

.5 At vertical profiles for exterior siding, provide notched and formed top closures, caulked and sealed to arrest weather penetration.

3.5 CONTROL/EXPANSION JOINTS

.1 Construct control joints as detailed.

.2 Cover sheets, of brake formed profile, of same material and finish as adjacent material.

.3 Attach with purpose made fasteners, exposed head of same colour as adjacent surface.

3.6 CLEANING

.1 Wash down exposed exterior surfaces using a solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean when construction is completed.

.2 Remove excess sealant by the moderate use of mineral spirits or other solvent acceptable by the sealant manufacturer.

END OF SECTION

1 General

1.1 SUMMARY

.1 This Section includes requirements for an aluminum composite panel assembly and forming an integrated rain screen assembly vented horizontally and vertically including, to match existing; but not limited to, the following:

.1 Exterior Panel Cladding: Anchorages, shims, furring, fasteners, girts, flashings and adapters, and closures.
.2 Accessory Cladding: Parapets, column covers, soffits, sills, borders and fillers integral to the panel system and required for a complete assembly.

1.2 DEFINITIONS

.1 Delegated Design Professional Engineer: The professional engineer hired or contracted to the fabricator or manufacturer to design specialty elements, produce delegated design submittals and shop drawings to meet the requirements of the Project; who is registered in the province of the Work; and who is not the Consultant.

.2 APEGA's Responsibilities for Engineering Services for Building Projects.

1.3 REFERENCE STANDARDS

.1 American Architectural Manufacturer's Association (AAMA):

.1 AAMA 508-05, Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems
.2 AAMA 620-02, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates

.2 American National Standards Institute (ANSI):

.1 ANSI H35.1-2009, Standard Alloy and Temper Designation Systems for Aluminum

.3 American Society for Testing of Materials (ASTM):

.1 ASTM A653/A653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 ASTM B209-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
.3 ASTM C393/C393M-06 Standard Test Method for Flexural Properties of Sandwich Constructions by Beam Flexure

.4 Canadian General Standards Board (CGSB):

.1 CGSB 1.108-M89, Bituminous Solvent Type Paint

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of this Section with work of other sections that may have items supported by or built into aluminum composite panel assemblies including; but not limited to, supports and connectors to structure, doors and windows, mechanical and electrical penetrations, erection tolerances.

.2 Pre-Construction Meetings: Include required participants and an outline agenda for meeting and as follows:

.1 Meeting Time: Arrange meeting before starting work k this Section to discuss expectations for fit and finish of aluminum composite panel assemblies, quality of workmanship for installation of air and vapour retarders and transitions, continuity of insulation and relationship of wall system to adjacent components.

.2 Participants: Arrange for attendance by Contractor Subcontractor for this Section; Subcontractors of affected components of the Work, manufacturer’s representative and Consultant.

1.5 SUBMITTALS

.1 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Shop Drawings: Submit shop drawings indicating attachment methods, joinery, sealing methods and accommodation of thermal movement, drawing at a minimum half full size.

.2 Samples for Initial Selection: Manufacturer's colour charts or chips showing the full range of colors, textures, and patterns available for wall panels with factory applied finishes.

.3 Samples for Verification: Submit the following samples:

.1 Panels: Submit two (2)-300 mm x 300 mm samples of selected colour before ordering material.

.2 Accessories: Submit one (1) sample of clips, caps, battens, fasteners, closures, and other exposed panel accessories used in the final panel assembly.

.2 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Certificates: Submit qualification statement or certificate stating that fabricator and installer are approved by manufacturer and have the necessary tools, equipment and expertise to undertake work specified in this Section; include lists of completed projects with project names and addresses, names and addresses of consultants and owners indicating range of experience.

.2 Source Quality Control Submittals: Submit product test reports indicating compliance of manufactured wall panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.

.3 Site Quality Control Submittals: Submit written inspection report indicating compliance with manufacturers requirements for installation and system requirements.

.4 Delegated Design Submittals: Submit a Letter of Compliance signed and sealed by Delegated Design professional engineer.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Manufacturer: Use a manufacturer that has completed wall panel assemblies having similar extent and complexity as required for the Work of this Contract.

.2 Installers: Use experienced installers having experience with panel projects similar in material, design and extent as required for Work of this Contract with a record of successful in-service performance.

.3 Delegated Design Professional Engineer: Retain a professional engineer, registered in the province of the Work, to design fabrication and erection of the Work of this Section in accordance with applicable Building Code and Contract Documents requirements including; but not limited to, the following:

.1 Seal and signature to shop drawings and design submittals

.2 Site review and certification of installed components

.3 Letters of Commitment and Compliance.

.4 Manufacturer’s Engineering Recommendations: Perform composite wall panel work in accordance with written recommendations from panel manufacturer.

.5 Verify panel thickness based on maximum deflections provided in this Section and to suit building location and configuration.

.2 Mock-Ups:

.1 Provide mock-up of the following components to site:

.1 External cladding, as indicated.

.2 Keep approved mock-up on site.

.3 Approved mock-up shall establish minimum standard and may be incorporated into finished work of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver panels and other components so they will not be damaged or deformed; package panels for protection against damage during transportation or handling.

.2 Storage and Handling Requirements: Handling panels with care during unloading, storing, and erection to prevent bending, warping, twisting, and surface damage:

.1 Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight and ventilated covering

.2 Store panels in dry location

.3 Do not store panels in contact with other materials that might cause staining, denting, or other surface damage

1.8 SITE CONDITIONS

.1 Site Measurements: Verify locations of structural members and opening dimensions by site measurements before fabrication and indicate measurements on shop drawings for aluminum composite panel assemblies that are indicated to fit other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.

.2 Established Dimensions: Establish dimensions and proceed with fabricating wall panel assemblies without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual site dimensions correspond to established dimensions; allow for trimming and fitting.

1.9 WARRANTY

.1 General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 System Description: Plans, elevations, details, characteristics, and other requirements indicated are based upon materials and details provided by one manufacturer that forms the Basis-of-Design for products named in this Section and as follows:

.1 Responsibility: Delegated Design professional engineer is responsible for designing composite wall panel assembly, composite panel thickness and connections based on design loads, and verifying that installation meets requirements of the Authority Having Jurisdiction.

.2 Provide a pressure equalized rain screen system in accordance with good design practices as established by Canada Mortgage and Housing Corporation for curtain wall assemblies.

.3 Provide a system that has no visible fasteners, telegraphing or fastening on the exposed panel faces or other components that detract from a neat and flat finished appearance.

.4 Provide a system that does not place restraints on panel that could result in compressive skin stresses, and that will maintain a flat appearance regardless of temperature change.

.2 Design fabricated wall panel assemblies to meet or exceed the following minimum requirements:

.1 Wind Load: Determine wind loads using normal importance factors listed in the Building Code for deflection and strength, modified by the appropriate exposure, gust and pressure (internal and external) factors in accordance with Building Code structural commentaries

.2 Deflection Limitation: Maximum deflection of perimeter not to exceed L/175 or 19 mm; whichever is less, under system weight plus wind load (positive and negative) loads acting normal to plane of wall under 1 in 50 year sustained wind loading, and as follows:

.1 Maximum deflection criteria apply to horizontal plane of system, width and length, as well as vertical deflection.

.2 Include adequate stiffeners and fasteners are included to prevent excessive deflection.

.3 Thermal Movement: Design system that allows for thermal movements without buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects resulting from the following maximum change in ambient and surface temperatures:

.1 Base design calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.

.2 Temperature Range:

.1 Ambient Conditions: 65°C

.2 Surface Conditions: 100°C

.3 Operating Range: -32°C to +55°C

.4 Building Movement: Include provisions to accommodate movement in composite panel system and between composite panel system and building structure where these movements are caused by deflection of building structure.

.5 Drainage: Provide for positive drainage to the exterior of all water entering or condensation occurring within the system in accordance with NRC Rain Screen Principles.

2.2 COMPOSITE ALUMINUM BUILDING PANEL MATERIALS

.1 Aluminum Composite Panel: Two sheets of prefinished AA3000 Series aluminum sandwiching a polyethylene core, formed in a continuous process with no glues or adhesives between dissimilar materials, and as follows:

.1 Total composite thickness 4 mm

.2 Core: Polyethylene core

.3 Face Sheets: Nominal 0.50 mm thick

.4 Finish: Prefinished using manufacturer's standard Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene – Alkyl Vinyl Ether (FEVE) resin finish.

.5 Colour: Manufacturers standard Mica finish.

.6 Basis of Design: Alpolic Mica

2.3 COMPOSITE ALUMINUM BUILDING PANEL MATERIALS

.1 Aluminum Composite Panel: Two sheets of prefinished AA3000 Series aluminum sandwiching a polyethylene core, formed in a continuous process with no glues or adhesives between dissimilar materials, and as follows:

.1 Total composite thickness 4 mm

.2 Core: Polyethylene core

.3 Face Sheets: Nominal 0.50 mm thick

.4 Finish: Prefinished using manufacturer's standard 3 coat, thermo-cured system composed of specially formulated inhibitive primer, fluoropolymer colour coat, and clear alkyl ether resin; Fluoro Ethylene – Alkyl Vinyl Ether (FEVE) resin in accordance with AAMA 2605 coating thicknesses.
.5 Colour: Manufacturers standard colours.
.6 Basis of Design: Alpolic Solids

2.4 SYSTEM BACK-UP MATERIALS

.1 Girts: Fabricated from minimum 1.27 mm thickness galvanized steel to ASTM A653, Grade 230 with Z275 coating; finish material visible after assembly of wall panel to match aluminum panels.

.2 Sub-Girts: Structural quality steel to ASTM A653, with Z275 zinc coating to ASTM A792, adjustable double-angle profile as indicated to accept panel with structural attachment to building frame.

.3 Isolation Tape: Manufacturers standard material for separating dissimilar metals from direct contact.

.4 Exterior Sheathing: Refer to Section 09 29 00.

2.5 ACCESSORIES

.1 Extrusions: Formed aluminum members, sheet, and plate in accordance with ASTM B209 and manufacturers written recommendations and as follows:

.1 Perimeter Extrusions: Alloy: AA-6063-T5, mill finish where non-exposed; to match panels when exposed.
.2 Stiffeners: Alloy: AA-6063-T5, mill finish

.2 Panel Stiffeners: Structurally fastened or restrained at ends, secured to rear face of composite panel with silicone or double sided high bond isolating tape to prevent weather staining and frost lines to the face of the panel as recommend by panel manufacturer; size stiffeners to maintain panel flatness to specified tolerances; material as recommended by panel manufacturer.

.3 Sealants and Gaskets: Panel system components as recommended by panel manufacturer to meet performance requirements.

.4 Flashings: Fabricate flashing from 0.75 mm minimum thickness aluminum sheet, coloured to match panel where exposed to view; provide lap strip under flashing at butted conditions, with lapped surfaces sealed in a full bed of non-hardening sealant.

.5 Fasteners: Non-corrosive fasteners as recommend by panel manufacturer, and as follows:

.1 Attachment panel system to primary panel structural supports using manufacturer's recommended concealed fasteners.
.2 Use concealed fasteners for typical joinery.
.3 Obtain Consultant's acceptance where exposed fasteners are required in isolated conditions; Consultant will permit a limited number of exposed fasteners obscured within panel joinery using stainless steel fastenings, or in the face of panels using colour matched fastenings.

2.6 FABRICATION

.1 Fabricate composite wall panels and components to obtain profiles and details indicated on drawings and as indicated in shop drawings.

.2 Fabricate components at factory to the greatest extent possible using best shop practices as required by panel manufacturer.

.3 Fabricate components to match quality and installation of reviewed mock-up specified above.

3 Execution

3.1 PREPARATION AND EXAMINATION

.1 Obtain dimensions from job site before fabricating panels.

.2 Verify that building surfaces are smooth, clean and dry, and free from defects detrimental to the installation of the system.

.3 Notify General Contractor of conditions not acceptable for installation of system, start of work will indicate acceptance of substrate conditions.

.4 Inspect all panels and components prior to installation and verify that there is no shipping damage; do not install damaged panels, repair or replace as required for smooth and consistent finished appearance.

3.2 INSTALLATION

.1 Install exterior gypsum sheathing in accordance with Section 09 29 00.

.2 Install girts in accordance with manufacturer's instructions. Provide additional metal framing as may be required to conform to Performance Requirements.

.3 Install girts attached to structural support or wall framing, using recommended fasteners.

.4 Install fasteners into wall framing; do not remove fastener where fastener does not penetrate framing; removal of fastener will damage integrity of air/vapour membrane, realign fastener location and install new fastener in close proximity to original fastener so that it penetrates wall framing.

.5 Install flashings to divert all moisture and condensation to exterior. Trim and flash around doors, louvers, and windows.

.6 Install exterior metal cladding to structural support by hidden mechanical fasteners.

.7 Apply bituminous paint or caulking tape to insulate between the dissimilar materials and aluminum materials. Factory applied protective paint or G-90 galvanized steel is considered adequate insulation.

.8 Install pre-formed corners and end enclosures, sealed to arrest direct weather penetration.

.9 Install panels are aligned vertically and horizontally, and flush between adjacent panels to within tolerances indicated; with weep holes and drainage channels free of dirt and sealants that could impede the function of the rain screen assembly.

.10 Assemble and secure wall system so stresses on sealants are within manufacturers' recommended limits.

.11 Tolerances:

.1 Panel Dimensions: Allow for site adjustment and thermal movement.
.2 Panel Fabrication: Fabricate panels under controlled shop conditions to the greatest extent possible; site fabrication will only be permitted where minor adjustments are required to account for substrate variations that could not be identified during the preparation of shop drawings.
.3 Panel Lines, Breaks and Curves: Form changes in direction sharp, smooth, and free of warps or buckles.
.4 Panel Surfaces: Free of scratches or marks caused during fabrication and installation.
.5 Panel Bow: Maximum 0.8% of any 1830 mm panel overall dimension in width or length.
.6 Panel Flatness: Maximum 3 mm in 1525 mm deviation from panel flatness non-cumulative; no oil canning.
.7 Panel Joints: Maximum 1 mm lippage between any 2 adjacent panels not attached with same fastener; 0 mm lippage where 2 adjacent panels share the same fastener.

3.3 SITE QUALITY CONTROL

.1 Perform final inspection of completed work shall carried out by the manufacturer's representative; prepare a written report and submit to Consultant certifying that installation meets manufacturers requirements and detailing for systems described in this Section.

.2 Perform final inspection with Consultant, Contractor and Subcontractor, present; provide a minimum of 72 hours notice so that all parties can confirm their attendance.

3.4 TOUCH-UP AND CLEANING

.1 Remove and replace panels that are damaged and cannot be repaired; coordinate with Contractor for responsibility of repairs not caused by work of this Section.

.2 Remove strippable film coating or masking as soon as possible after surrounding material is installed.

.3 Remove excess materials, debris, and equipment at completion.

.4 Clean all panels clean and free of all grime and dirt.

.5 Touch-up damaged finishes with manufacturer’s recommended touch-up paint.

END OF SECTION

1. General

1.1 INTENT

.1 This Section specifies requirements common to bituminous membrane roofing work. Read in conjunction with the following related Sections:

.1	SBS Modified Bituminous Membrane Roofing:	Section 07 52 00.
.2	Metal Flashings for SBS Bituminous Membrane Roofing:	Section 07 62 00.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Wood blocking, curbs, control joint boxes, backslopes, nailers and cant strips:	Section 06 10 00.
.4	Batt insulation fill for curbs and control joint boxes:	Section 07 21 16.
.5	Counterflashings for mechanical equipment:	Section 20 05 29.
.6	Roof drains:	Section 22 05 90.

1.3 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

.1 Roof drain sleeves, supplied under Section 07 62 00.

.2 Prefinished sheet metal flashing matching metal cladding or panelling specified in Section 07 62 00.

1.4 REFERENCE DOCUMENTS

.1 Alberta Roofing Contractor's Association (ARCA):

.1 Roofing Applications Standard Manual

.2 American Society for Testing and Materials (ASTM):

.1	ASTM C728-05	Standard Specification for Perlite Thermal Insulation Board
.2	ASTM C1002-07	Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
.3	ASTM C1396/ C1396M-09	Standard Specification for Gypsum Board
.4	ASTM D2822-05	Standard Specification for Asphalt Roof Cement
.5	ASTM D3019-08	Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered

.3 Canadian Standards Association (CSA):

.1	CSA A123.3-05	Asphalt Saturated Organic Roofing Felt
.2	CAN/CSA A247-M86 (R1996)	Insulating Fiberboard
.3	CAN/CSA-O141-05	Softwood Lumber
.4	CSA O121-08	Douglas Fir Plywood
.5	CSA O151-04	Canadian Softwood Plywood
.6	CSA O437 Series-93 (R2006)	Standards on OSB and Waferboard (Includes Update #2)

.4 Factory Mutual:

.1	FM 4450	Approved Standard for Class 1 Insulated Steel Deck Roofs - with Agenda through 7/92

.5 Underwriters Laboratories of Canada (ULC):

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

1.5 DESCRIPTION OF SYSTEM

.1 Roofing Assembly Provide roofing assembly on structural deck consisting of:

.1 Auxiliary levelling surface.
.2 Vapour retarder.
.3 Insulation.
.4 Insulation Blocking.
.5 Insulation Cover Panels.
.6 Separator Sheet.
.7 Primary membrane.
.8 Accessories.

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Meet one (1) week prior to installation of roofing.

.1 Coordinate work of this Section with the following:

.1 Membranes connecting to roofing membranes.
.2 Construction at roof perimeters and penetrations.
.3 Plumbing vents and drains.
.4 Metal cladding matching colour of roof flashing.

1.7 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.3 Shop Drawings

.1 Comply with requirements of Division 01. Clearly indicate, with large scale details, flashings and control joints, plus details of the roofing which may be considered by the Minister as special.

.2 For slopes 2:12 and greater, provide a plan layout of insulation cover sheathing fastener locations. Attach comparable Factory Mutual tested assembly fastener description and layout.

.3 Provide tapered insulation manufacturer's roof plan indicating roof perimeters, penetrations, curbs, slopes, ridges, valleys and roof drain locations.

.4 Submit cap sheet trimming pattern at perimeters and penetrations and general seaming layout.

.4 Record Documents**:**

.1 Comply with requirements of Division 01.
.2 Include following information on project record documents:

.1 Date of completion of the roof membrane.

.2 List of materials, by manufacturer's product name, used in the roof assembly.

.3 Provide schematic roof plan on 8 1/2 x 11 drawing. Indicate changes from Contract drawings. Supplement with letter size detail drawings if applicable.

1.8 CLOSEOUT SUBMITTALS

.1 Warranty Documentation:

.1 Submit Warranty Certificate or Maintenance Bond prior to Interim Acceptance of the Work.

1.9 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer Qualifications:

.1 The foreman and at least one other roofer shall hold a three year Apprenticeship Certificate or a Journeyman Certificate.

.2 The rest of the roofing crew shall have at least partly completed the roofer apprenticeship program, and shall have submitted application to the appropriate provincial authority for certification as "Roofer".

.3 Torch-applicators shall be certified by membrane manufacturer.

.2 Inspection Agencies:

.1 Provide necessary facilities and co-operate with an independent Alberta Roofing Contractor Association (ARCA) Accepted Roofing Inspector engaged and paid for by the Minister

1.10 TESTING AND INSPECTION BY MINISTER

.1 Inspection of work of this Section will be performed and paid for by Minister.

.2 Notify Minister of commencement of the work and provide a schedule of roofing work.

.3 Accompany Minister during inspections.

1.11 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver materials, handle and store in original packages and containers with manufacturer's seals and labels intact. The manufacturer's name, brand, mass, specification number and lot number shall be shown on the labels.

.2 Storage and Handling Requirements:

.1 Do not store materials on roof in concentrations which exceed design live loads.

.2 Mix cap sheet and cap sheet flashing rolls to evenly distribute mineral surfacing colour variations.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

1.12 EXTENDED WARRANTY

.1 Provide an extended warranty stating:

.1 that the roofing system has been constructed in accordance with the Contract Documents, and

.2 that the Contractor shall, at no additional expense to the Minister, repair any actual leaks or deficiencies in the roofing system, occurring within two years after the date of Interim Acceptance of the Work, and which have resulted from faulty or improper workmanship.

.2 For the purpose of this extended warranty, the roofing system includes the roofing assembly and related sheet metal work.

.3 Minister will inspect the roofing system in the last three months of extended warranty period and will promptly inform Contractor of deficiencies.

.4 Stop leaks which have resulted from a deficiency, within a time reasonably determined by Minister.

.5 Correct deficiencies within 15 working days of notification by Minister, or as otherwise determined by the Minister.

1.13 SECURITY FOR EXTENDED WARRANTY

.1 If roofing system has been constructed by a member of the ARCA, Contractor shall obtain, on behalf of the Minister, an ARCA Ten (10) Year Warranty Certificate, at Contractor's option, for the performance of Contractor's obligations under the extended warranty. Minister will not accept other roofing certificates.

.2 If roofing system has been constructed by a non-member of ARCA, Contractor shall obtain a maintenance bond for the performance of Contractor's obligations under the extended warranty. Maintenance bond shall be:

.1 in the amount of 100% of the cost of materials and labour associated with the roofing and roofing related work performed under this Contract.

.2 in a form acceptable to the Minister, and consigned to Her Majesty The Queen, represented by the Minister Alberta Infrastructure.

2. Products

2.1 PRODUCTS, GENERALLY

.1 Except as specified otherwise, provide products to ARCA requirements.

.2 Sealing Compound: rubber-asphalt.

2.2 DECK LEVELLING BOARD

.1 Deck Levelling Board: thickness as indicated on Drawings, 1220mm x 2440mm; treated core, ends square cut; edges square, reinforced and treated water repellent faces. Stagger end joints of the deck levelling board a minimum of 1220mm.

.2 Gypsum Sheathing Board: to ASTM C1396, water repellent surfacing, minimum 12.7 mm thick.

2.3 VAPOUR RETARDER

.1 Vapour Retarder- A self-adhered vapour barrier membrane composed of SBS modified bitumen membrane with a non-slip surface.

2.4 INSULATION

.1 Provide insulation as detailed on Drawings:

.1 Flat and Sloped Insulation: Polyisocyanurate Insulation: to CAN/ULC-S704-03.

.1 Facer to be acrylic-coated and glass fibre reinforced compatible with roofing system components.

.2 Total thickness of flat stock insulation to be 200 mm. Install flat stock insulation panels in four (4) 50 mm layers.

.3 All insulation supplied to this project shall have 3rd party certification that it meets the requirements of CAN/ULC-S704 Type 3, Class 2.

.4 Maximum board size to be 1220 mm x 1220 mm.

.5 Cupped, curled or otherwise damaged boards as deemed by the third party building envelope inspector will not be accepted.

.6 All insulation shall be stamped with date stamp on date of manufacture and be fully factory cured prior to shipping to distributor and project.

.7 Cut to minimum slope or such other slopes as noted on the drawings.

.2 Insulation Blocking: pine or spruce to CAN/CSA-O141, construction grade, maximum 15% moisture content at time of installation, sized to match total thickness of insulation.

2.5 INSULATION OVERLAY BOARD

.1 Insulation cover board: composed of semi-rigid asphaltic board.

2.6 MEMBRANE

.1 Field Base Sheet

.1 Roofing membrane with a nonwoven polyester and glass mat reinforcement and SBS modified bitumen. Top and bottom surfaces are covered with a thermofusible plastic film surface to allow for the installation of a torch applied cap sheet.

.2 Base Stripping

.1 Description: Roofing membrane with non-woven polyester or glass mat reinforcement and SBS modified bitumen. The top face is covered with a thermofusible plastic film or talc sand surface to allow for the installation of torch-applied cap sheet. The underside is self-adhesive.

.2 Self-adhered SBS modified bituminous base stripping is to be applied only to new, primed non-treated plywood substrate installed over new perimeter (e.g. at inside face of parapet walls and outside faces of the curbs) or penetration substrates.

.3 Field Cap Sheet

.1 Description: Roofing membrane with non-woven polyester or glass mat reinforcement and SBS modified bitumen. The top face is covered with protective coloured granules.

.4 Cap Stripping

.1 Description: Roofing membrane with non-woven polyester or glass mat reinforcement and SBS modified bitumen. The top face is covered with protective coloured granules. Torch-applied cap stripping ply to be same as field cap sheet.

.5 Fire Prevention Tape

.1 Description: A self-adhesive flame stop membrane composed of glass fleece reinforcement and SBS modified bitumen and is designed to prevent penetration of open flame into voids, holes or gaps in substrate prior to application of a torch-applied membrane.

.6 Traffic Sheet: Description: Roofing membrane with non-woven polyester or glass mat reinforcement and SBS modified bitumen. The top face is covered with protective coloured granules. Torch-applied cap stripping ply to be same as field cap sheet. Installed at walkway locations.

2.7 ACCESSORIES

.1 Gypsum Sheathing Screws: to ASTM C1002, self-drilling type for sheet steel 0.76 mm and thicker.

.2 Tape: 50 mm wide self-adhering, cloth duct tape.

.3 Fasteners: to Factory Mutual 4450, 1989 edition. Fasteners through insulation shall meet requirements of Factory Mutual 4450, Appendix E.

.4 Fastener Discs: sheet steel, hot dip galvanized, minimum 75 mm diameter.

3. Execution

3.1 VERIFICATION OF CONDITIONS

.1 Examine all surfaces to receive work of this Section. Notify Minister of unacceptable surfaces.

.2 Verify that all roof openings, except roof drains and self-flashing plumbing vents, are curbed, as follows:

.1 Mounted on and attached directly to structural deck.
.2 Curb Height: 200 mm, measured from top of membrane.

.3 Verify that roof drains are installed at proper elevation relative to finished roof surface.

.4 Verify that control joints, and plywood and lumber nailer plates to walls and parapets are located and installed as detailed.

.5 Verify that cladding anchors are minimum 300 mm above finished roof membrane.

3.2 PROTECTION OF EXISTING WORK AND POLLUTION CONTROL

.1 Protect surrounding surfaces against damage from roofing work.

.2 Place plywood runways over the work for the movement of materials and other traffic during roofing installation.

.3 Where hoisting is necessary, hang tarpaulins to protect walls during delivery of hot asphalt from ground to roof.

.4 Location of kettle and tanker is subject to approval by Minister. Locate kettles and tankers:

.1 Away from building air inlets.
.2 To minimize bitumen odour to nearby occupied buildings.
.3 Away from building openings.
.4 So that smoke will not discolour building finishes.

3.3 FIRE SAFETY

.1 Inform Minister of unforeseen fire hazards and obtain instructions before proceeding or continuing with torch application.

.2 Keep suitable fire extinguishers within 10 metres of each torch in use and at kettles and tankers in use.

.3 Do not use torches near roof-mounted air intakes, wall cladding, combustible building paper and combustible finishes.

.4 Take additional precautions against fire as needed to provide adequate fire safety.

3.4 INSTALLATION, GENERALLY

.1 Tape joints of sheathing as required to prevent asphalt dripping through structural decks.

.2 Install materials to manufacturers' printed recommendations.

.3 Whenever practicable, complete sections of roofing on same day started.

.4 Perform moisture checks using an electronic moisture meter if work underway has become wet. Do not continue roofing until moisture content is reduced to levels acceptable to Minister.

.5 Equip kettles with thermometers. Provide portable thermometer to check thermometer attached to kettle and asphalt application temperatures.

.6 Keep kettles at least one-half full during working period. Add cold bitumen in small quantities. Stir contents of kettles frequently to prevent localized overheating.

.7 Maintain one qualified tradesman at the heating kettle at all times of operation.

.8 Apply sheet materials for continuous fusion of sheets and adhesion to substrates, with no ridges, blisters, buckles, wrinkles or voids.

.9 Apply separator sheet to uninsulated wood deck, to ARCA manual.

3.5 INSTALLATION OF AUXILIARY LEVELLING SURFACES

.1 Apply auxiliary levelling surfaces over structural deck, to ARCA manual and as specified.

.2 Except where specified otherwise in this Section or permitted in the ARCA manual, fasteners used to secure auxiliary levelling surfaces shall be threaded.

.3 Insulated Metal Decks:

.1 Cover entire metal deck with gypsum sheathing. Butt sheathing tightly together. Frequent trimming of sheathing may be required. Tape joints where sheathing not tightly butted together.

.2 Attach gypsum sheathing to deck using one of the following, at Contractor's option:

.1 Secure sheathing screws at 200 mm on centre along the edges of the sheet, not less than 25 mm from sheet edges, and at 400 mm on centre each way for the rest of the sheet: 46 screws per 1200 x 2400 sheet.

.2 Mechanically fasten gypsum sheathing to match tested assembly meeting Factory Mutual Class I-90 Windstorm Classification.

.3 Drive screws flush with sheathing surface. Do not break paper at periphery of fastening devices.

.4 Un-insulated Metal Decks: provide plywood auxiliary levelling surface.

3.6 INSTALLATION OF VAPOUR RETARDER ON GYPSUM SHEATHING

.1 Provide 2 ply # 15 felts, fully mopped.

3.7 FLEXIBLE FLASHING AND AIR SEAL MEMBRANE INSTALLATION

.1 Install flexible flashing as indicated on detail drawings.

.2 Fully adhere air seal membrane and flexible flashings to substrates and seal laps with adjoining roof vapour retarder assemblies and wall sheet membrane air and vapour seals.

.3 Lap joints minimum 150 mm and seal laps.

3.8 INSTALLATION OF WATER CUT-OFFS

.1 Install temporary water cut-offs to all insulation edges exposed at the end of each day's work.

.2 Construct permanent water cut-offs by endwrapping edge of insulation with a mopped single ply of organic felt.

.3 Provide permanent water cut-offs at roof area perimeters and at curbs.

3.9 INSTALLATION OF INSULATION

.1 Apply 1.2 kg/m^2 coat of hot asphalt to top of vapour retarder assembly and embed insulation boards. Align board edges each way.

.2 Ensure full adhesion. Fill insulation joints over 10 mm wide with insulation.

.3 Trim insulation neatly at roof drains to just slightly greater than diameter of drain sleeves or drain bodies, whichever is applicable.

3.10 INSTALLATION ON SLOPES 1:12 AND GREATER

.1 Install insulation blocking to ARCA requirements and as specified.

.2 Set insulation blocking in sealing compound on vapour retarder assembly and mechanically fasten to deck using fasteners. Recess fastener heads.

.3 For slopes up to, but not including, 2:12, mechanically fasten back-mopped insulation cover to insulation blocking, at 300 mm centres.

.4 For slopes at 2:12 and greater, secure insulation cover using wood fasteners and fastener discs, at spacing equal to or closer than tested assembly meeting or exceeding Factory Mutual I-90 Windstorm Classification.

.5 Extend primary membrane of adjoining lower slope roofs at least 1 m up the greater slope roof and fasten to insulation blocking or above cants with roofing nails at 150 mm centres.

3.11 INSTALLATION OF INSULATION COVER SHEATHING AND CANT STRIPS

.1 Install insulation cover sheathing over insulation.

.2 Align long edges of insulation cover sheathing. Offset short edges minimum 150 mm. Offset cover sheathing joints minimum 150 mm from insulation joints.

.3 Slopes up to 2:12: adhere insulation cover sheathing with 1.2 kg/m^2 coating of hot asphalt, backmopped before applying to MEPS insulation.

.4 Slopes 2:12 and Greater: mechanically fasten insulation cover sheathing to structural deck and insulation blocking. Use fasteners with fastener discs. Meet or exceed tested assembly meeting requirements for Factory Mutual I-90 Windstorm Classification.

.5 Install cant strips over insulation cover panels.

.6 Nail wood cant strips at 400 mm o.c., staggered along sloped face, to parapet.

3.12 INSTALLATION AT ROOF DRAINS

.1 Reduce insulation thickness by 13 mm to provide depressed roof areas measuring 2400 mm x 2400 mm, centred over roof drains. Make transition to depressed areas by uniformly sloping insulation over 100-200 mm.

.2 Trim insulation neatly at drain openings to fit around drain sleeves.

.3 Install sleeves, fully embedding flange in plastic cement. Trim drain sleeves so bottom edge is as shown on detail drawings.

.4 Install primary membrane, cutting neatly around drain flange.

.5 Torch cap sheet over base sheet centred over drain. Trim cap sheet stripping flush with inside of clamping ring.

.6 Refer to Section 07 62 00 for scuppers and downspouts.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Bituminous Membrane Roofing General Requirements:	Section 07 50 10.
.4	Metal Flashings for SBS Bituminous Membrane Roofing:	Section 07 62 00.

1.2 REFERENCE DOCUMENTS

.1 Alberta Roofing Contractor's Association (ARCA):

.1 Roofing Applications Standard Manual

.2 American Society for Testing and Materials (ASTM):

.1	ASTM D41-05	Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
.2	ASTM D2178-04	Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
.3	ASTM D6162-00a (2008)	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements
.4	ASTM D6163-00 (2008)	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements
.5	ASTM D6164-05e1	Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements

.3 Canadian General Standards Board (CGSB):

.1	CGSB 37-GP-9Ma	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
.2	CGSB 37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing
.3	CAN/CGSB 51.33-M89	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction

2. Products

2.1 PRIMARY MEMBRANE AND MEMBRANE FLASHING

.1 Provide two-ply SBS modified bitumen membrane, including SBS modified bitumen flashings, to manufacturer's recommendations conforming with ARCA accepted specifications, and as specified in this Section.

.2 Cap Sheet Finish: granules in colour selected by Minister from manufacturer's standard range.

.3 Membrane Flashing Finish: granules in colour selected by Minister from manufacturer's standard range.

3. Execution

3.1 INSTALLATION

.1 Install membrane components in accordance with requirements of ARCA Ten Year Certificate of Assurance.

.2 Use installation method as indicated on Primary Membrane Schedule at end of this Section.

.3 Torch apply sheet materials for continuous fusion of sheets and adhesion to substrates.

.4 Seal seams of nailed base sheets using cold or hot applied asphalt, or with torch heat application.

.5 Limit cap sheet bleed-out at seams to 12 mm. Cover excessive bleed-out and replace missing mineral surfacing by embedding matching colour granules.

.6 Torch-apply cap sheet and cap sheet flashing to seaming layout indicated on reviewed shop drawings.

.7 Primary membrane deficiencies shall include, but not be limited to, ridges, tenting, buckles, wrinkles and voids.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Environmental Procedures	Section 01 35 20.
.2	Waste Management and Disposal	Section 01 74 19.
.3	Reglets and through wall flashings:	Section 04 20 00.
.4	SBS Bituminous Membrane Roofing General Requirements:	Section 07 50 10.

1.2 REFERENCE DOCUMENTS

.1 Alberta Roofing Contractor's Association (ARCA):

.1 Roofing Applications Standard Manual

.2 Aluminum Association (AA):

.1	AA-C22-A41	Anodized Clear Coatings
.2	AA-C22-A42	Integral Colour Coatings

.3 American Society for Testing and Materials (ASTM):

.1	ASTM A653/ A653M-08	Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process
.2	ASTM D2822-05	Asphalt Roof Cement
.3	ASTM D3019-08	Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered

.4 SCAQMD South Coast Air Quality Management District, California State (SCAQMD):

.1 SCAQMD Rule #1168, June 2006

1.3 SUBMITTALS

.1 Submit duplicate samples in accordance with Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 1 Submittal Procedures.

.2 Submit two copies of WHMIS MSDS Material Safety Data Sheets in accordance with Section 01 33 00 Submittal Procedures. Indicate VOC's for sealants.

.3 Shop Drawings:

.1 Submit shop drawings in accordance with Division 01.

.2 Clearly indicate bending, folding, jointing, fastening installation details.

.4 Samples:

.1 Submit duplicate samples in accordance with Division 01.

.2 Submit full size samples of each joint and profile.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Handling Requirements:

.1 Store materials off ground and under cover in a dry, well ventilated enclosure.

.2 Stack preformed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and prepainted surfaces.

.4 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Management and Disposal.

2. Products

2.1 MATERIALS

.1 Galvanized Steel Sheet: commercial quality sheet to ASTM A653/A653M, with Z275 designation zinc coating.

.2 Prepainted Galvanized Steel: commercial quality to ASTM A653/A653M with Z275 zinc coating prepainted with baked on enamel with colours of proven durability for exterior exposure, to CSSBI Technical Bulletin No. 7, 5000 series. Prefinished metal flashing to match colour of prefinished metal cladding.

.3 Solder: 50% pig and 50% block tin.

.4 Flux: commercial quality as recommended by sheet metal manufacturer.

.5 Flashing Nails: #12 hot dipped zinc coated, annular ringed.

.6 Sheet Metal Screws: Cadmium plated, self tapping, pan head.

.7 Plastic Cement: to ASTM D2822.

.8 Lap Cement: to ASTM D3019.

.9 Sealing Compound: to Section 07 57 13.

.10 Sealant: one component, elastomeric, chemical curing, CAN/CGSB-19.13 VOC content compliant with SCAQMD Rule #1168, June 2006.

.11 Recessed Reglet: preformed 0.70 mm thick galvanized steel channel with face and ends covered with plastic tape.

.12 Flashing Anchor Clips: 0.80 mm thick galvanized steel.

2.2 FABRICATION, GENERALLY

.1 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.2 Backpaint sheet metal with bituminous paint on surface in contact with concrete, masonry, cementitious materials or dissimilar metal.

2.3 FABRICATION, FLASHING

.1 Maximum Joint Spacing:

.1 Parapet Face Flashings: 1200 mm.
.2 Cap Flashing 300 mm and Greater in Width: 1200 mm.
.3 All Other Flashings: 2400 mm.

.2 Construct flashing joints to allow for flashing movement, using flat "S" lock seams.

.3 Maintain minimum of 22 mm lap at all joints. Provide 25 mm anchor projection of "S" locks.

.4 At inside and outside corners, mitre the joint, and use upstanding seams, 25 mm minimum height and 22 mm minimum lap.

.5 Maintain minimum 1:5 slope on horizontal surfaces of flashings, parapets and control joints.

.6 Hem exposed edges on underside of all flashings.

.7 Fabricate cap flashing to have a drip leg minimum 110 mm high.

.8 Fabricate cap and counter flashings to lap 100 mm over base flashings.

2.4 FABRICATION, ROOF ACCESSORIES

.1 Form sheet steel roof drain sleeves, air-stops etc. from 0.70 mm galvanized steel.

.2 Fabricate roof scuppers from 0.70 mm, prepainted galvanized sheet steel with one piece deck flange, minimum 150 mm. Contour scuppers to cant strips.

.3 Fabricate splash pans from 0.70 mm galvanized steel.

.4 Fabricate air/firestop below control joint box from 0.70 mm galvanized steel.

.5 Fabricate roof drain sleeves as detailed on drawings, from 0.70 mm galvanized steel.

3. Execution

3.1 EXAMINATION OF SURFACES

.1 Examine surfaces to receive flashings. Notify the Minister of surfaces which are considered unacceptable to receive the work of this Section.

.2 The commencement of flashing work will imply unconditional acceptance of the surfaces and substrates to which the flashing is to be fastened.

.3 Verify that the following are located and installed as detailed on drawings:

.1 Plywood and lumber nailer plates to walls and parapets.
.2 Control joints.

3.2 PROTECTION OF EXISTING WORK

.1 Protect the work of other Sections from damage by the work of this Section.

.2 Place protection to the requirements and satisfaction of this Section before performing the work of other Sections.

3.3 FLASHING INSTALLATION, GENERALLY

.1 Install flashings not later than seven days after installation of the membrane on any particular section of the roof.

.2 Use 0.80 mm thick x 150 mm long anchor clips on fascia faces, and screws or annular ringed nails on the opposite face.

.3 Use exposed fastenings in approved locations. Install anchors using annular ringed nails.

.4 Fasten flashings of 1.2 m length and shorter, through the extended "S" locks. Fasten flashings over 1.2 m length, through the extended "s" locks, and at mid-length with a 150 mm long, 0.80 mm thick galvanized steel clip.

.5 Fasten flashings at maximum 600 mm O.C.

.6 Where possible, do not set base flashing screws less than 200 mm from top of roof membrane.

3.4 INSTALLATION OF FLASHING JOINTS

.1 Fit flashings together so that one end of each section is free to move in the joint. Do not use sealant at joints.

.2 Wipe and wash clean, soldered joints to remove traces of flux, immediately after soldering.

3.5 INSTALLATION AT REGLETS

.1 Assist in locating and installing recessed reglets, as required.

.2 Confirm reglet installation and report defects to the Minister.

.3 Insert metal flashing into reglets to form tight fit.

.4 Seal flashing into reglet with sealant.

3.6 GUM BOX INSTALLATION

.1 Fill gum boxes with plastic cement in two equal lifts. Separate lifts with one ply of organic felt, precision cut to fit the box.

.2 Built-up Roofing Membranes: apply two plies of organic felt stripping over flange and extend up face of box curb. Reinforce stripping with 2 layers of woven glass cloth.

.3 Modified Bituminous Roofing: apply roofing and flashing to membrane manufacturer's printed instructions.

3.7 SPLASH PAN INSTALLATION

.1 Install 0.80 mm thick, galvanized steel, 600 x 600 mm splash pans, with 25 mm high lip, at end of downspouts draining on roof.

.2 Bed and secure splash pan to roof as recommended by manufacturer.

3.8 VENT STACK INSTALLATION

.1 Install vent stacks to same elevation as top of curb.

.2 Size flashings to extend minimum 150 mm down curb base flashing and screw to base flashing.

END OF SECTION

1. General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1	Waste Management and Disposal	Section 01 74 19.
.2	Bituminous Membrane Roofing General Requirements	Section 07 50 10.
.3	Modified Bituminous Membrane Roofing	Section 07 52 00.
.4	Joint Sealants	Section 07 92 00.
.5	Painting	Section 09 91 05.

1.2 DESIGN REQUIREMENTS

.1 Design roof hatches to withstand 1.9 kPa external and 0.95 kPa internal loads accounting for regional snow load requirements and a temperature range of 80°C without damage to unit or permanent deformation to seals.

1.3 SUBMITTALS

.1 Action submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit product data for roof hatches including construction, hardware and finishes.

.2 Shop Drawings: Submit shop drawings indicating size and description of components, materials, attachment, description of frame and finish, and construction details

1.4 PROJECT CLOSEOUT SUBMISSIONS

.1 Provide maintenance data for hardware complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified.

2. Products

2.1 ROOF HATCHES

.1 Provide roof hatches with insulated double wall lids and insulated double wall curb frame with integral deck mounting flange and lid frame counter flashing with welded sealed corner joints, continuous weather tight perimeter gasketing and hot dip galvanized hardware, and as follows:

.1 Type and Size: Single leaf lid, 914 mm x 914 mm
.2 Curb and Lid Material: Galvanized steel sheet, nominal 2.0 mm minimum thickness.
.3 Insulation: Glass fibre insulation board, minimum 50 mm thickness.

.4 Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.

.5 Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.

.6 Hardware: Galvanized steel, counterbalanced spring latch with turn handles, butt or pintle type hinge system as standard for manufacturer, and padlock hasps inside and outside.

.7 Latching: Single point, using manufacturer's standard latching mechanism having hold open operating arm with vinyl grip handle to permit one handed release.

.2 Fabricate curbs to maintain a minimum height of 200 mm above top of roofing membrane; provide tapered curb to maintain level lid where slope is greater than 2% - 20 mm in 1000 mm.

2.2 ACCESSORY MATERIALS

.1 Screws: Manufacturer's standard galvanized steel for mounting curb to structure.

.2 Gaskets: Resilient gasket to inner face of lid in contact with hatch lid support frame.

.3 Ladder Safety Post: Refer to Section 05 51 00.

2.3 FINISHES

.1 Galvanized Steel Finishes: Prime painted ready for site finishing, refer to Section 09 91 05, colour selected by Consultant from full range.

2.4 FABRICATION

.1 Fabricate components free of twists, bends, or visual distortion and insulated.

.2 Fabricate flashings to collect and lead off accumulated condensation.

3. Execution

3.1 INSTALLATION, GENERALLY

.1 Erect components plumb, level and in proper alignment.

.2 Verify continuity of building envelope air barrier and vapour retarder systems.

.3 Adjust and seal assembly with provision for expansion and contraction of components.

.4 Secure prefabricated curb assembly to structure.

END OF SECTION

1. General

1.1 SUMMARY

.1 Provide roof anchors and safety restraints in accordance with requirements of Contract Documents.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.2 Canadian Standards Association (CSA International).

.1 CSA B272, Prefabricated Self-Sealing Roof Vent Flashings

.2 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 CSA-W47.1, Certification of Companies for Fusion Welding of Steel Structures.

.5 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.6 CSA W59, "Welded Steel Construction (Metal Arc Welding)".

.7 CSA W178.1, "Certification of Welding Inspection Organizations".

.8 CAN/CSA Z91, Health and Safety Code for Suspended Equipment Operations

.3 Master Painters Institute (MPI).

.1 Architectural Painting Specification Manual.

.4 The Society for Protective Coatings (SSPC).

.1 SP -2, Hand-Tool Cleaning.

1.3 SYSTEM DESCRIPTION

.1 Personal Restraint Assembly: Posts, steel rope loops, and attachments to resist lateral forces 24.03 kN at any point and in all directions, without damage or permanent set.

1.4 SUBMITTALS

.1 Submit WHMIS MSDS - Material Safety Data.

.2 Shop Drawings

.1 Indicate component profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

.2 Indicate welded connections using standard welding symbols include net weld lengths.

1.5 DELEGATED DESIGN REQUIREMENTS

.1 Submit Test Reports and substantiating engineering data and test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.

.2 Design structural support framing components and site inspect the installation under direct supervision of a Professional Structural Consultant experienced in design of this Work and licensed at the place where the Project is located.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Co-ordinate the Work with installation of roofing assembly and sheet metal work.

1.6 WELDERS' QUALIFICATIONS

.1 Do welding inspection to CSA W178.

.2 Resistance welding: to CSA W55.3.

.3 Fusion welding: to CSA W59.

.4 Welders Certificates: furnish welders' qualifications Consultant.

.5 Employ qualified and licensed welders possessing certificates for each procedure to be performed from authority having jurisdiction.

.6 Each welder to possess identification symbol issued by authority having jurisdiction.

.7 Certification of companies for fusion welding of steel structures to be in accordance with CSA-W47.1.

.8 Manufacturer Qualifications: company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.7 SITE CONDITIONS

.1 Verify dimensions, tolerances, and method of attachment with other work.

2. Products

2.1 ROOF ANCHOR

.1 Rotable Head, "Weld-In-Place" Pedestal Roof Anchor: Rotable Anchor Head (360 Degrees): Stainless steel "C" loop welded to stainless steel plate
- .1 Stainless steel swivel assembly
- .2 Length to suit schedule 40 pipe and steel plate welded to pipe pedestal.
- .3 18 gauge stainless steel flashcap and seal
- .4 22 gauge aluminum flashing
- .5 Fillet weld around pedestal base to structural member
- .6 Reinforcing of structural frame construction.

2.2 FABRICATION

.1 Fit and shop assemble items in largest practical sections, for delivery to site.

.2 Fabricate items with joints tightly fitted and secured.

.3 Continuously seal joined members by intermittent welds and plastic filler.

.4 Grind exposed joints flush and smooth with adjacent finish surface.

.5 Make exposed joints butt tight, flush, and hairline.

.6 Ease exposed edges to small uniform radius.

.7 Exposed Mechanical Fastenings: screws or bolts; consistent with design of component.

.8 Furnish and install components required for anchorage of fabrications.

.9 Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATION TOLERANCES

.1 Squareness: 3 mm maximum difference in diagonal measurements.

.2 Maximum Deviation From Plane: 1.5 mm from 1 m.

2.4 FINISHES

.1 Prepare uncoated steel (restraint post) surfaces: SSPC-SP 2, no more than 4 hours before applying epoxy primer.

.2 Concealed steel anchors, clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

.3 Do not prime surfaces in direct contact with concrete or where field welding is required.

.4 Concealed Structural Components and Anchors: galvanize after fabrication to CAN/CSA-G164 to minimum 600 g/sq m galvanized coating.

3. Execution

3.1 EXAMINATION

.1 Verification of existing conditions before starting Work.

.2 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

.1 Supply and install steel items required to be cast into concrete for Car Wash and/or attached to steel framing of Convenience Store as clean uncoated metal, with setting templates to appropriate sections.

3.3 INSTALLATION

.1 Install anchors or equipment in accordance with manufacturer's printed instructions, shop drawings and as specified.

.2 Ensure anchors or equipment is installed under the direct supervision of a Professional Engineer.

.3 Where necessary, provide protection against deterioration due to contact of dissimilar materials.

.4 Where bolting is used for fastening anchors, no fewer than two threads is to be exposed and the nut is to be positively locked by deforming threads, welding, pinning or equivalent method.

.5 Ensure work is inspected prior to application of roofing.

.6 Flashing

.1 Install roof support flashing in accordance with manufacturer's printed instructions.

.2 Torch membrane until bitumen is fluid and set flashing deck flange into fluid. Flash in flange with two overlapping layers of modified bitumen and seal with asphalt sealer. Do not overheat (melt) EPDM Base Seal.

3.4 ERECTION TOLERANCES

.1 Maximum Variation from Plumb/Level: 6 mm.

3.5 PROTECTION OF FINISHED WORK

.1 Protect finished Work from damage.

3.6 CLEANING

.1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

END OF SECTION

1. General

1.1 INTENT

.1 Provide firestopping to meet or exceed requirements of the Alberta Building Code as specified in this Section.

1.2 RELATED SECTIONS

.1	Environmental Procedures	Division 01.
.2	Waste Management and Disposal	Division 01.

1.3 REFERENCE DOCUMENTS

.1 Alberta Building Code, current edition.

.2 Underwriter's Laboratories of Canada ULC S115-05 - Standard Method of Fire Tests of Firestop Systems.

.3 Underwriter's Laboratories of Canada (ULC), ULC-FS-09 Firestop Systems and Components 2009 Edition.

.4 Warnock Hersey (WH) Certification Listings, current edition.

1.4 PERFORMANCE REQUIREMENTS

.1 Firestopping shall provide a rating as specified in Firestopping Schedule at end of this Section, when tested to ULC S115, for a rating period applicable to the fire separation.

.2 Firestopping of electrical and communications cables shall be easily re-enterable and re-sealable with negligible risk of damage to cables, and shall not require de-rating of electrical cables.

1.5 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Submit manufacturer's product data and MSDS for materials and systems. Include manufacturer's printed instructions for installation.

.3 Data shall indicate conformance with requirements of this Section, including ULC or Warnock Hersey system number.

1.7 COORDINATION AND SEQUENCING

.1 Coordinate construction of fire separations and penetrations through fire separations with work of this Section.

.2 Ensure penetrations have been completed prior to installing firestopping.

.3 Install firestopping prior to insulation of piping, unless insulation is part of a tested firestop system meeting requirements.

1.8 INSTALLER QUALIFICATIONS

.1 Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original, unopened packaging bearing manufacturer's seals and labels intact.

.2 Store materials off ground, under cover and away from moisture.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Division 01.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal containers, paper, steel strapping, plastic, polystyrene, corrugated cardboard packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.6 Unused material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Minister.

.8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

2. Products

2.1 SYSTEMS AND MATERIALS

.1 Firestopping systems: as listed under ULC-FS-09 Firestop Systems and Components 2009 Edition, or as listed in WH Listings under "Through-Penetration Firestopping Systems".

.2 Firestopping materials, whether used in a tested system or not, shall be:

.1 listed under ULC-FS-09 or under WH Listings,

.2 labelled with applicable ULC or WH label, and

.3 compatible with applicable substrates and openings.

.4 with VOC content less than the VOC limits of State of California's South Coast Air Quality Management District Rule #1168, June 2006.

.3 Provided that all other specified requirements can be met, use any of the following products, either singly or in combination:

.1 Elastomeric sealant.
.2 Elastomeric coating.
.3 Mineral fibre.
.4 Mortar.
.5 Intumescent putty.
.6 Poured-in-place silicone foam.
.7 Preformed silicone foam.
.8 Multi-cable transit system.
.9 Any other product which meets all other specified requirements.

.4 Primer: as recommended by firestopping manufacturer for applicable substrate.

3. Execution

3.1 VERIFICATION OF CONDITIONS

.1 Examine condition of voids to be filled to ensure suitability for firestop systems.

.2 Verify installation of service penetrations and adjacent construction has been completed.

3.2 PREPARATION

.1 Prepare substrates and surfaces to a clean, dry, and frost free condition, ready to receive firestopping.

.2 Prime substrates and surfaces to manufacturer's recommendations.

3.3 INSTALLATION

.1 Provide tested firestopping systems meeting specified performance requirements wherever the continuity of a fire separation is interrupted by mechanical, electrical or other service penetrations, or by any other openings, gaps or discontinuities.

.2 Install tested firestopping systems in accordance with manufacturer's recommendations and in strict conformance with tested systems.

.3 In locations for which there are no applicable tested firestopping systems, provide firestopping materials where indicated and as detailed on drawings. Install materials in accordance with manufacturer's recommendations.

.4 Where applicable, neatly tool or trowel firestopping surfaces remaining exposed and make flush with surrounding exposed surfaces.

3.4 FIRESTOPPING SCHEDULE

Location	Rating	[Systems/Materials]
Firewalls	FH	
Computer room	FH	Silicone foam or intumescent putty
All other fire separations	F	

END OF SECTION

1. General

1.1 REFERENCE DOCUMENTS

.1 Canadian General Standards Board (CGSB):

.1	CGSB 19 GP 5M-84	Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1)
.2	CAN/CGSB 19.13-M87	Sealing Compound, One-Component, Elastomeric, Chemical Curing
.3	CGSB 19-GP-14M	Sealing Compound, One Component, Butyl Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976)
.4	CAN/CGSB 19.17 - M90	One Component, Acrylic Emulsion Base Sealing Compound
.5	CAN/CGSB 19.24 - M90	Multicomponent, Chemical-Curing Sealing Compound

1.2 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures. Submittals shall describe the following:

.1 Cleaning compound
.2 Sealant
.3 Primers

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

.3 Samples:

.1 Submit samples of each type of material and colour to be used.

.2 Cure samples under identical conditions to job site, before submission.

.4 Manufacturer Reports:

.1 Provide report of random locations of installed work as follows:

.1 Make 150 mm long cut tests to certify thickness, hardness and surface finish conforms to intended design.

1.3 QUALITY ASSURANCE

.1 Manufacturers:

.1 Sealant manufacturers representative shall review site conditions, joint design and installers qualifications. Report unsatisfactory conditions to the Minister.

.2 Representative shall check container labels, random inspect preparation of substrate materials and random test installed work.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Receive and store materials as recommended by materials manufacturer.

.2 Storage and Handling Requirements:

.1 Maintain containers and labels in undamaged condition.

1.5 SITE CONDITIONS

.1 Existing Conditions:

.1 Examine substrate materials, joint voids and note temperature/humidity conditions. Report unacceptable conditions to the Minister.

.2 Commencement of work implies acceptance of conditions.

2. Products

2.1 MATERIALS

.1 Type S-1; acrylic sealant: One part acrylic latex, Shore A Hardness 20, conforming to CAN/CGSB-19.17-M and ASTM C834:

.1 Use acrylic sealant Type S-1 only on the interior and only in situations where little or no movement can occur.

.2 Type S-2; Silicone Sealant: Mould and mildew resistant, Shore A Hardness 15-25, conforming to ASTM C920, Type S, Grade NS, Class25, use NT, G, and A:

.1 Use mould and mildew resistant silicone sealant Type S-2 for non-moving joints in washrooms and kitchens; do not use on floors.

.3 Type S-3; Silicone Sealant: Exterior Weatherproofing Sealant, One-part, low modulus, neutral cure, Shore A Hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N, and ASTM C 920, Type S, Grade NS, Class 25, use NT, M, G, A and O, colour as selected by Consultant from Standard Range:

.1 Use silicone general construction sealant Type S-3 or polyurethane sealant Type S-7 and S-10 for all joints, interior and exterior, where no other specific sealant type specified; do not use on horizontal traffic joints or where immersed in water.

.4 NOT USED. Type S-4, Silicone Sealant: Butt glazing, one part, moisture curing, shore A hardness 15-25, conforming to CAN/CGSB-19.13-M, Classification C-1-40-B-N and C-1-25-B-N and ASTM C920, Type S, Grade NS, Class 25, use NT, G, A, O; Colour: clear (translucent):

.1 Use silicone glazing type S-4 for sealing butt glazing joints.

.5 Type S-5; interior acoustical sealant: Non-skinning, non-hardening, single component synthetic rubber sealant, conforming to CAN/CGSB-19.21-M:

.1 Use acoustical sealant Type S-5 for interior applications only where they will be fully concealed and only where no constant or consistent air pressure difference will exist across the joint.

.6 Type S-6; air-seal sealant: One part, silicone, shore A hardness 15 – 25, conforming to CGSB 19-GP-13M, classification C-1-40-B-N and C-1-25-B-N and ASTM C920, Type S, Grade NS, Class 25. Use NT, M, G, A and O:

.1 Use air seal sealant Type S-6 for exterior walls only where constant or consistent air pressure difference will exist across the joint.

.7 Type S-7; two part multi-component sealant: Chemical curing, non-sag, exterior wall sealant, Shore A Hardness 20-35, conforming to CAN/CGSB-19.24-M, Type 2, Class B, and ASTM C920, Type S, Grade NS, Class 25, use NT, M, and A:

.1 Use silicone general construction sealant Type S-3 or polyurethane sealant Type S-7 and S-10 for all joints, interior and exterior, where no other specific sealant type specified; do not use on horizontal traffic joints or where immersed in water.

.2 Use multi-component sealant Type S-7 for exterior vertical joints where large movement is anticipated; not for continuous water immersion.

.3 Use multi-component sealant type S-7 for edge joint sealant at slab edges at walls, columns, interior shaft walls and grade beams.

.8 Type S-8; horizontal joint sealant: Two component, self levelling, conforming to CAN/CGSB-19.24M, Type 1, Class A, and ASTM C920, Type M, Grade P, Class 5, use T, M, and O:

.1 Use multi-component sealant Type S-8 for horizontal joint sealant of plaza, floors and decks, exterior areas only, subject to pedestrian and vehicular traffic.

.9 NOT USED. Type S-9; fuel resistant sealant: Two component, polyurethane elastomeric, chemical cured, conforming to ASTM C 920, Type M, Grade P, Class 25:

.1 Use two component polysulphide fuel resistant sealant Type S-9 in pavement around diesel generators, and wherever fuel oils may be present.

.10 Type S-10; polyurethane sealant: One component, non-sag, for general construction, Shore A Hardness 15+, conforming to CAN/CGSB-19.13-M, Type 2, Classification MCG-2-25-A-N and ASTM C920, Type S, Grade NS, Class 25, Use NT, M, and A:

.1 Use silicone general construction sealant Type S-3 or polyurethane sealant Type S-7 and S-10 for all joints, interior and exterior, where no other specific sealant type specified; do not use on horizontal traffic joints or where immersed in water.

.11 Type S-11; saw-cut sealant: Multi-component, self-levelling, conforming to ASTM D2240:

.1 Use multi-component sealant type S-11 for saw-cuts in slabs on grade and horizontal joint sealant of plaza, floors and decks, interior areas only.

.12 Type S-12; control joint sealant: Two-component, solvent free, flexible epoxy urethane, load bearing, conforming to ASTM D2240, Shore A Hardness 65-75:

.1 Use two-component flexible epoxy sealant type S-12 for joint sealant where floor finished "concrete with hardener" and "Ashford Sealer" are specified elsewhere in the Project Manual.

2.3 PREFORMED SEALANTS

.1 Preformed Silicone Sealant System: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates:

.1 Use two-component flexible epoxy sealant type S-12 for joint sealant where floor finished "concrete with hardener" and "Ashford Sealer" are specified elsewhere in the Project Manual.

2.4 SEALANT BACKING

.1 Provide sealant backings of material and type that are non-staining, compatible with joint substrates, sealants, primers, and other joint fillers, and are approved for applications indicated by sealant manufacturer based on site experience and laboratory testing.

.2 Rod Type Sealant Backings:

.1 ASTM C1330, Type C (closed cell material with a surface skin), Type O (open cell material) or Type B (bi-cellular material with a surface skin).

.2 Use any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.

.3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

.4 Non-adhering to sealant, to maintain two sided adhesion across joint.

.3 Bond Breaker Tape: Self adhesive polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where three sided adhesion will result in sealant failure.

2.5 ACCESSORIES

.1 Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from pre-construction joint sealant substrate tests and site tests.

.2 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

.3 Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

3. Execution

3.1 PREPARATION

.1 Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

.1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

.2 Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.

.3 Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil free compressed air.

.4 Remove laitance and form release agents from concrete.

.5 Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

.6 Porous joint substrates include the following:

.1 Concrete.

.2 Masonry.

.3 Unglazed surfaces of ceramic tile.

.7 Nonporous joint substrates include the following:

.1 Metal.

.2 Glass.

.3 Porcelain enamel.

.4 Glazed surfaces of ceramic tile.

.8 Prime joint substrates as recommended in writing by joint sealant manufacturer, based on pre-construction joint sealant substrate tests or prior experience:

.1 Apply primer to comply with joint sealant manufacturer's written instructions.

.2 Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

.9 Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears; remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION OF JOINT SEALANTS

.1 Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

.2 Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

.3 Acoustical Sealant Application Standard: Comply with recommendations in ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

.4 Install sealant backings of type indicated to support sealants during application and at position required to produce cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

.1 Do not leave gaps between ends of sealant backings.

.2 Do not stretch, twist, puncture, or tear sealant backings.

.3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

.5 Install bond breaker tape behind sealants where sealant backings are not used between sealants and backs of moving joints.

.6 Install sealants at the same time backings are installed, and as follows:

.1 Place sealants so they directly contact and fully wet joint substrates.

.2 Completely fill recesses in each joint configuration.

.3 Produce uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

.7 Sealants: Immediately after sealant application and before skinning or curing begins, tool non-sag sealants to form smooth, uniform beads, to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint, and as follows:

.1 Remove excess sealant from surfaces adjacent to joints.

.2 Use tooling agents and profiles that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces in accordance with the figures listed in ASTM C1193 as follows:

.1 Provide concave joints in accordance with Figure 5A.

.2 Provide flush joint in accordance with Figure 5B.

.3 Provide recessed joint configuration in accordance with Figure 5C.

.4 Use masking tape to protect surfaces adjacent to recessed tooled joints.

.8 Install preformed tapes in accordance with manufacturer's written instructions.

.9 Install preformed silicone sealant system as follows:

.1 Apply masking tape to each side of joint, outside of area covered by sealant system.

.2 Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm (3/8”).

.3 Hold edge of sealant bead 6 mm (¼”) inside masking tape.

.4 Press silicone extrusion into sealant to wet extrusion and substrate within 10 minutes of sealant application.

.5 Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.

.6 Complete installation of sealant system in horizontal joints before installing in vertical joints.

.7 Lap vertical joints over horizontal joints.

.8 Cut silicone extrusion with a razor knife at ends of joints.

END OF SECTION