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FINAL REPORT

Designated Substances and Hazardous Building Materials Assessment

Washrooms
Building Asset 243939
Major's Hill Park
Ottawa, Ontario

FEBRUARY 26, 2009

PROJECT NO. 1048176

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FINAL REPORT TO **Leslie Scott**
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National Capital Commission
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FOR **Designated Substances and Hazardous**
Building Materials Assessment

ON **Washrooms**
Building Asset 243939
Majors Hill Park
Ottawa, Ontario

February 26, 2009

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EXECUTIVE SUMMARY

Jacques Whitford Stantec Limited. (Jacques Whitford) was retained by the National Capital Commission to conduct a designated substances and hazardous building materials assessment of the Washrooms, Building Asset 243939 located in Majors Hill Park in Ottawa, Ontario. The scope of the assessment included designated substances and hazardous building materials such as polychlorinated biphenyls (PCBs), ozone-depleting substances (ODSs), urea-formaldehyde foam insulation (UFFI), fecal waste, and mold.

All work was carried out in accordance with the requirements of Section 30 of the Ontario Occupational Health and Safety Act (OHSA). The designated substances assessment list includes those substances designated under the OHSA and included (but was not limited to) asbestos, lead, mercury and silica as the most likely designated substances to be present.

Based on a visual assessment and laboratory analysis, designated substances and hazardous building materials were observed to be present at the subject building. **Table 1** below provides a summary of the materials observed and recommendations on their management.

Table 1 – Summary of Findings and Recommendations

Issue	Comments	Recommendation
Acrylonitrile	Possibly present in stable form in paints and adhesives.	None required.
Arsenic	Possibly present in paints and adhesives.	See lead recommendations.
Asbestos	No friable or non-friable asbestos-containing materials were observed to be present at the subject building. Presumed asbestos-containing materials (PACMs) were observed to be present in the form of caulking and roofing materials. These materials were observed to be in good condition and were not sampled to preserve their integrity.	Prior to demolition or renovation work, materials confirmed to contain asbestos should be removed in accordance with Ont. Reg. 278/05. Should a material suspected to contain asbestos fibres become uncovered during renovation or demolition activities, all work in the areas that may disturb the material should be stopped. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with O.Reg. 278/05.
Benzene	Likely present in stable form in paints and adhesives.	None required.
Coke Oven Emissions	None observed.	None required.
Ethylene Oxide	None observed.	None required.
Isocyanates	None observed.	None required.
Lead	Three (3) samples of major paint applications were collected in the form of paint chip samples and submitted to EMSL for lead content analysis. The results of the laboratory testing indicated that none of the samples were in excess of the 5,000 ppm (0.5% wt) criterion for lead-based paint. Two of the	Corrective action or remedial work on materials that may contain lead should be undertaken in a manner so as to avoid generating fine particulate matter or fumes. Airborne lead dust or fumes should not exceed the Ministry of Labour Time Weighted Average Exposure Value of 0.05 mg/m ³ during the removal of paints and products containing any concentration of

Table 1 – Summary of Findings and Recommendations

Issue	Comments	Recommendation
	<p>three paint samples contained detectable concentrations of lead.</p> <p>Lead may be present within other applications (e.g. solder in electronic equipment; solder caulking in bell fittings for cast iron pipes; ceramic tile glaze, vent and pipe flashings).</p>	<p>lead.</p> <p>Construction or renovation work that may disturb lead-containing materials should follow the recommendations provided in the document entitled "Guideline: Lead on Construction Projects", issued by the Ministry of Labour in September 2004.</p>
Mercury	<p>Mercury vapour is likely to be present in fluorescent light tubes observed throughout the subject building.</p> <p>Mercury may also be present in paints and adhesives.</p>	<p>Mercury or mercury vapour poses no risk to workers or occupants provided the mercury containers remain intact and undisturbed.</p>
Silica	<p>Silica may be present in concrete, cement, ceiling tiles, bricks and ceramic materials that were observed to be present at the subject areas.</p>	<p>Ensure workers performing demolition activities are not exposed to airborne silica levels in excess of 0.05 mg/m³ by providing respiratory protection, wetting down work area and providing workers with a station to properly wash prior to exiting the work area.</p> <p>Construction or renovation work that may disturb silica containing materials should follow the recommendations provided in the document entitled "Guideline: Silica on Construction Projects", issued by the Ministry of Labour in September 2004.</p>
Vinyl Chloride	<p>Likely present in stable form in pipes, conduits and interior finishes.</p>	<p>None required.</p>
Polychlorinated Biphenyls (PCBs)	<p>None observed.</p>	<p>None required</p>
Ozone-Depleting Substance (ODS)	<p>None observed.</p>	<p>None required.</p>
Fecal Waste	<p>None observed.</p>	<p>None required.</p>
Radioactive smoke detectors	<p>None observed.</p>	<p>None required.</p>
Urea Formaldehyde Foam Insulation (UFFI)	<p>None observed.</p>	<p>None required.</p>
Mold	<p>None observed.</p>	<p>None required.</p>

The statements made in this Executive Summary text are subject to the same limitations included in the Assessment Limitations Section 6.0 and the Closure Section 8.0, and are to be read in conjunction with the remainder of this report.

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1.0 INTRODUCTION

Jacques Whitford Stantec Limited (Jacques Whitford) was commissioned by the National Capital Commission to conduct a Designated Substances and Hazardous Building Materials Assessment of the Washrooms, building asset number 243939, located in Majors Hill Park in Ottawa, Ontario. The scope of the assessment included designated substances and hazardous building materials such as polychlorinated biphenyls (PCBs), ozone-depleting substances (ODSs), urea-formaldehyde foam insulation (UFFI), fecal waste, and mold.

All work was carried out in accordance with the requirements of Section 30 of the Ontario Occupational Health and Safety Act (OHSA). The designated substances assessment list includes those substances designated under the OHSA and included (but was not limited to) asbestos, lead, mercury and silica as the most likely designated substances to be present. The site work was conducted by Meghan Friesen of Jacques Whitford on January 28, 2009 based on Proposal No. 1047753 dated January 6, 2009.

The purpose of the assessment was to check for any potential designated substances and hazardous building materials present at the subject building, as required under the OHSA.

1.1 Building Description

The subject building is a one storey washroom facility with a custodial closet with an associated crawlspace and a men's and women's washroom. The building is located at the north end of Majors Hill Park. The total floor area assessed was approximately 45 square meters.

1.2 Assessment Objectives

The objective of the assessment was to:

- prepare an assessment report that identifies potential designated substances and hazardous materials and the potential risk to human health and the environment associated with the identified materials; and,
- provide recommendations for the management of these materials.

1.3 Scope of Work

The scope of work for this assessment involved the following:

- a review of existing information, including site drawings and previous assessment reports, where available;
- a "room-by-room" visual assessment of the interior of the subject building for the presence of designated substances and hazardous building materials;
- the collection of representative bulk samples from building materials suspected of containing asbestos fibres for the determination of the type and concentration of asbestos;
- the collection of representative paint chip samples from building surfaces for the determination of the lead content in paint finishes; and,



- preparation of a report documenting the results of the assessment, providing an interpretation of the laboratory analysis results and recommendations for the management of designated substances and hazardous materials observed.

2.0 DOCUMENT REVIEW

No documents were provided by National Capital Commission in reference to the Washrooms building.

3.0 ASSESSMENT METHODOLOGY

The building materials and contents were visually examined to check for the presence of the following designated substances in accordance with the requirements of the OHSA, Section 30:

- Acrylonitrile RRO 835/90 amended to 101/04;
- Arsenic RRO 836/90 amended to 102/04;
- Asbestos RRO 837/90 amended to 103/04; and O.Reg. 278/05;
- Benzene RRO 839/90 amended to 105/04;
- Coke Oven Emissions RRO 840/90 amended to 106/04;
- Ethylene Oxide RRO 841/90 amended to 107/04;
- Isocyanates RRO 842/90 amended to 108/04;
- Lead RRO 843/90 amended to 109/04;
- Mercury RRO 844/90 amended to 110/04;
- Silica RRO 845/90 amended to 111/04; and,
- Vinyl Chloride RRO 846/90 amended to 112/04.

In addition to the designated substances listed above, a visual assessment for the following hazardous materials was also completed:

- Polychlorinated Biphenyls (PCBs);
- Ozone-Depleting Substances (ODSs);
- Fecal Waste;
- Radioactive Smoke Detectors;
- Urea Formaldehyde Foam Insulation (UFFI); and,
- Mold.

Refer to **Appendix A** for background information and regulatory framework on the above mentioned designated substances and hazardous materials.

A description of the methodology used to assess for the more common designated substances typically found in buildings including asbestos, lead, silica and mercury, is provided in the following sections.

3.1 Asbestos

A room-by-room visual assessment of readily accessible areas was made in order to check for the presence of materials suspected of containing asbestos and to provide recommendations on the management of ACMs.

3.2 Lead

A room-by-room visual assessment of accessible areas was made in order to check for the presence of materials that may contain lead. These materials included paint applications, wiring and plumbing etc.

3.3 Mercury

An assessment for equipment, which is likely to contain mercury, was completed at the subject building. Information on the type of equipment (i.e., gauges, switches, batteries, thermometers, etc.), model and serial numbers and quantities was recorded, where available.

3.4 Silica

An assessment for the presence of silica was conducted at the subject building. The presence of silica in building materials such as concrete, masonry, stone, terrazzo, refractory brick, ceiling tiles etc. was noted during the assessment.

3.5 Polychlorinated Biphenyls (PCBs)

A review for the presence of PCBs in electrical equipment was completed at the subject building. Equipment that is generally suspected of containing PCBs includes lamp ballasts, transformers, hydraulic fluid, compressors, switchgear and capacitors.

3.6 Ozone-Depleting Substances (ODSs)

An assessment for equipment likely to contain ozone-depleting substances (ODSs) was completed at the subject building. Information on the type of equipment, manufacturer and type and quantity of refrigerants was recorded, where available.

3.7 Urea Formaldehyde Foam Insulation (UFFI)

An assessment for the potential presence of urea formaldehyde foam insulation (UFFI) was completed. This involved the assessment of exterior and interior walls for evidence of repaired openings (i.e., nozzle holes) made to facilitate the installation of the insulation. Wherever possible, an assessment of wall cavities through existing openings was made.

4.0 ASSESSMENT RESULTS AND DISCUSSION

The results of the assessment for designated substances and hazardous materials are discussed below. Refer to **Appendix A** for background information on the above mentioned designated substances and hazardous materials.

4.1 Acrylonitrile

Acrylonitrile may be present in stable form in paints and adhesives.

4.2 Arsenic

Arsenic or arsenic compounds may be present in paints and adhesives.

4.3 Asbestos

Asbestos-containing materials (ACMs) are grouped into two classifications, friable and non-friable materials. Friable ACMs are those that can easily be crumbled or broken apart by mere hand pressure. When these materials break apart asbestos fibres are then released into the atmosphere. Non-friable ACMs or “manufactured products” are materials that by the nature of their manufacturing/construction do not readily allow the release of asbestos fibres. These materials should not be cut or shaped with power tools, since this procedure may allow for the release of the asbestos fibres.

The sampling locations are indicated on the floor plan located in **Appendix C**. Summary and occurrence reports are provided in **Appendix D and Appendix E**.

A copy of the laboratory Certificate of Analysis for the asbestos analysis is included in **Appendix F**.

4.3.1 Friable Asbestos-Containing Materials

No friable asbestos-containing materials were observed or identified by laboratory analysis to be present at the subject building at the time of the assessment.

4.3.2 Non-friable Asbestos-Containing Materials

No non-friable asbestos-containing materials were observed or identified by laboratory analysis to be present at the subject building at the time of the assessment.

4.3.3 Non-Asbestos-Containing Materials

The following materials present in the building were sampled and were identified by laboratory analysis not to contain asbestos:

- Drywall joint compound (Samples DJC-01a, DHC-01b and DJC-01c, asbestos not detected); and,
- Sheet flooring (Samples SF-01a, SF-01b and SF-01c; asbestos not detected).

The sampling locations are indicated on the floor plan located in **Appendix C**. The summary report is provided in **Appendix D**.

A copy of the laboratory Certificate of Analysis for the sample is included in **Appendix E**.

4.3.4 Presumed Asbestos-Containing Materials

Presumed asbestos-containing materials were observed to be present at the subject building in the form of:

- Insulated piping within wall cavities;
- Door and window caulking materials; and,
- Roofing materials.

These materials were not sampled during the assessment to preserve their integrity and to avoid damage. The materials were observed to be in good condition. As these materials are known to have been manufactured with asbestos, they should be presumed to be asbestos-containing unless proven otherwise by laboratory analysis.

4.4 Benzene

Benzene as a constituent of hydrocarbon-based mixtures is present in a stable form in roofing materials, paints and adhesives.

4.5 Coke Oven Emissions

Based on the history of the subject building, it is not suspected that coke oven emissions are of concern.

4.6 Ethylene Oxide

Ethylene oxide was not observed at the subject building at the time of the assessment.

4.7 Isocyanates

No isocyanate compounds were noted to be stored or used at the subject building; however, these compounds may be present in paint finishes.

4.8 Lead

A room-by-room visual assessment of accessible areas was made in order to check for the presence of materials that may contain lead. These materials included paint applications, wiring, etc.

Three (3) paint chip samples of representative paint applications were collected and submitted to EMSL for lead content analysis by Flame Atomic Absorption Spectrophotometry, following US EPA Method No. 7420. The results of the laboratory testing indicated that none of the samples were in excess of the 5,000 ppm (0.5% wt) criterion for lead-based paint. Two of the three remaining paint samples contained detectable concentrations of lead.

Lead may be present within other applications (e.g. solder in electronic equipment; solder caulking in bell fittings for cast iron pipes; ceramic tile glaze, vent and pipe flashings).

A copy of the laboratory Certificate of Analysis for the paint chip testing is included in **Appendix G**. The sampling locations are indicated on the floor plan located in **Appendix C**.

4.9 Mercury

Mercury vapour is likely to be present in fluorescent light tubes observed throughout the subject building. Mercury may be present in paint and adhesives.

4.10 Silica

Generally, silica is expected to be present in concrete and cement that constitute the building materials used at the building.

4.11 Vinyl Chloride

Generally, vinyl chloride (monomer) is likely to be present in stable form within the PVC piping and conduits, where applicable.

4.12 Polychlorinated Biphenyls (PCBs)

No suspected ODSs were observed in the building at the time of assessment.

4.13 Ozone-Depleting Substances (ODSs)

No suspected ODSs were observed in the building at the time of assessment.

4.14 Fecal Waste

Fecal waste was not observed at the subject building at the time of the assessment.

4.15 Radioactive Smoke Detectors

No smoke detectors were observed in the building at the time of assessment.

4.16 Urea Formaldehyde Foam Insulation (UFFI)

UFFI was not observed to be present at the subject building at the time of the assessment.

4.17 Mold

No mold was observed in the building at the time of assessment.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations based on the results of this assessment are provided in the following sections for each designated substance and hazardous material. The following Designated Substances and Hazardous Building Materials do not require any action and are not addressed in this section:

- Acrylonitrile;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Fecal Waste;
- Mercury;
- Ozone Depleting Substances;
- Polychlorinated Biphenyls (PCBs);
- Radioactive Smoke Detectors;
- Vinyl Chloride; and,
- Urea Formaldehyde Foam Insulation (UFFI).

5.1 Arsenic

Arsenic may be present in paints and adhesives. To limit the potential risks to human health and the environment, the management of arsenic in paint would be addressed following precautions taken for lead-containing materials.

5.2 Asbestos

Should a material suspected to contain asbestos fibres become uncovered during renovation or demolition activities, all work in the areas that may disturb the material should be stopped to limit the potential risks to human health and the environment. Samples of the suspect material should be submitted for laboratory analysis to determine if asbestos fibres are present. Confirmed asbestos materials should be handled in accordance with O.Reg. 278/05.

5.3 Isocyanates

Isocyanates may be present in paint finishes, varnishes, polyurethane plastics, synthetic rubbers, foams and adhesives. Dusts from solid forms of isocyanates may be a hazard and inhalation of these dusts should be avoided. Follow recommendations pertaining to lead for the management of this compound during activities that may generate dusts to limit the potential risks to human health and the environment.

Hot work (i.e., torching and welding) on surfaces that contain isocyanates may lead to the production of free isocyanates and other toxic gases such as carbon monoxide and hydrogen cyanide. Hot work on these materials should be avoided and personal protective equipment that includes respiratory protection, safety goggles or gloves should be used.

5.4 Lead

To limit the potential risks to human health and the environment, work that may disturb lead-containing materials should follow the recommendations provided in the document entitled “Guideline: Lead on Construction Projects”, issued by the Ministry of Labour in September 2004.

Leachate testing of materials coated with lead-based paint is required under most provincial waste regulations to determine if the waste material is possibly toxic or hazardous for decisions with respect to disposal. Paint determined to be lead leachate toxic/hazardous must be disposed of as lead waste in accordance with the various provincial waste regulations.

In Ontario, leachate waste is regulated under the General – Waste Management Regulations (O.Reg. 347/90), the criteria with respect to leachate are noted in Schedule 4 of the regulation, and disposal options and requirements are noted in regulations.

5.5 Silica

Work that may disturb silica-containing materials should follow the recommendations provided in the document entitled “Guideline: Silica on Construction Projects”, issued by the Ministry of Labour in September 2004.

To limit the potential risks to human health and the environment, precautions should be taken as required during demolition projects on concrete (i.e., coring through concrete slabs, demolition of masonry or concrete units) to ensure that workers’ exposure levels to silica do not exceed 0.05 mg/m³. This can be achieved by:

- providing workers with respiratory protection;
- wetting the surface of the materials to prevent dust emissions; and,
- providing workers with facilities to properly wash prior to exiting the work area.

5.6 Mold

To limit the potential risks to human health and the environment, workers undertaking activities in the vicinity of mold impacted building material should become familiar with the hazards of working near mold and take appropriate health and safety precautions to protect against exposure to mold. Recommendations provided in the document titled “Mold Guidelines for the Canadian Construction Industry” issued in 2004 should be followed.

6.0 ASSESSMENT LIMITATIONS

This report reflects the observations made at the subject building only.

6.1 Asbestos-Containing Materials

Due to the limitations of access restrictions, the asbestos content of some materials, if present, could neither be confirmed nor denied within the subject building. Suspected ACMs that were not sampled include, but are not limited to, the following:

- insulated piping within wall cavities;
- sub-grade materials; and,
- the mechanical inner linings of heating, ventilation and air conditioning (HVAC) units.

If encountered during renovation or other activities, any suspected ACMs not observed within this report should be presumed to contain asbestos and handled as such until otherwise proven, through analytical testing.

6.2 Elemental Mercury

Visual assessment for the presence of mercury-containing equipment at the subject building was conducted in accessible areas only. The presence of mercury or mercury-containing equipment in inaccessible areas including, but not limited to, ceiling spaces, wall cavities and crawlspaces, or as internal parts of HVAC mechanisms, was not assessed.

6.3 Polychlorinated Biphenyls

Conclusions and recommendations regarding the presence of PCBs within the subject building are based on limited observations, and are presented to provide guidance regarding the likelihood that PCB-containing equipment is or is not present within the subject building.

7.0 CLOSURE

This report has been prepared for the sole benefit of the National Capital Commission. The report may not be used by any other person or entity without the express written consent of Jacques Whitford Stantec Limited and the National Capital Commission.

Any use which a third party makes of this report, or any reliance on decisions based on it, is the responsibility of such third parties. Jacques Whitford Stantec Limited 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 information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgment of Jacques Whitford Stantec Limited based on the data obtained from the work. The conclusions are based on the site conditions encountered by Jacques Whitford Stantec Limited at the time the work was performed at the specific assessment and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on building

construction and conditions, weather, building usage and other factors. Due to the nature of the investigation and the limited data available, Jacques Whitford Stantec Limited cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

We trust that the above is satisfactory for your purposes at this time. Should you have any questions or concerns, or require additional information, please do not hesitate to contact the undersigned at your convenience.

This report was prepared by Meghan Friesen and reviewed by Kevin Daly.

Respectfully submitted,

JACQUES WHITFORD STANTEC LIMITED



Meghan Friesen, B.A.
Report Author



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APPENDIX A

Designated Substances and Hazardous Building Materials Background Information

Designated Substances

Acrylonitrile

Acrylonitrile is a clear liquid that may be colourless or yellow and that readily reacts with other chemicals to produce long, chain-like molecules (polymers). Acrylonitrile-based polymers are used to produce nitrile rubbers, plastics, acrylic fibres, coatings and adhesives. Workers are typically exposed to acrylonitrile at manufacturing facilities that produce the aforementioned products through inhaling its vapour, direct skin contact, or through ingestion. Although acrylonitrile may be present in some of the building materials, including adhesives and coatings, the chemical will likely be bonded in the polymer form. Therefore, it is not expected that an adverse exposure to acrylonitrile will occur unless the building materials are heated to extreme temperatures. Acrylonitrile vapours may become released from the acrylonitrile-based polymers during a process where high temperatures are applied.

Arsenic

The presence of arsenic in the paint coating on interior and exterior finishes is possible. The comments concerning lead paint, discussed in Section 5.8, will address the potential arsenic emissions. As the painted surfaces will be handled as per the proposed lead regulation, it is not expected that arsenic concentrations in the air will exceed the maximum allowable time weighted average exposure value (TWAEV) for a worker to arsenic (0.01 mg/m³).

Asbestos

Asbestos is typically found in plaster, mechanical insulation, gaskets, thermal insulation on pipes, refractory material, roofing felts, floor tiles, ceiling tiles and parging, heat resistant panels, incandescent light fixture reflector plates, and any other material requiring a high degree of durability or thermal resistance. The common use of potential (breakable by hand) asbestos-containing materials (ACMs) in construction ceased voluntarily in the mid-1970s; however, the spray application of asbestos-containing fireproofing was not prohibited until 1986.

During the assessment, locations to collect discrete bulk asbestos samples of suspect building materials were observed. Samples of representative materials were then collected at these locations in accordance with the requirements of the new asbestos regulation, Ontario Regulation 278/05 made under the Occupational Health and Safety Act filed June 10, 2005 that comes into effect November 1, 2005.

The Revised Regulations of Ontario (1990), Regulation 347 - Waste Management Regulation requires the disposal of asbestos waste in a double sealed container, properly labeled and free of cuts, tears or punctures. The waste must be disposed of at a licensed waste Station which has been properly notified of the presence of asbestos waste.

The transport of asbestos waste to the disposal site is covered by the federal "Transportation of Dangerous Goods Act". Asbestos waste is to be handled by a licensed waste hauler.

Benzene

Historically, benzene has been produced as a by-product of coal gasification and metallurgical coke production in steel making. The light oil product from such processes contains benzene, toluene, ethyl benzene and xylene, and these components are separated by distillation. Today, most benzene is produced from the refining of petroleum.

Benzene has applications as a solvent in synthetic rubber manufacturing and processing, and in paints, varnishes, stains, adhesives, roofing materials and sealants. The use of benzene in tire and other rubber goods manufacturing and as a solvent and component of paints and adhesives has declined considerably as a result of concerns about workplace exposure. Nevertheless, it is often present in trace quantities in petroleum and aromatic solvents, some of which have replaced benzene in many uses. Benzene is also a minor component of gasolines sold in Canada.

The maximum allowable TWAEV for a worker to benzene is 0.5 ppm. Based on the age of the subject building, it is possible that benzene was present in the paints, adhesives and roofing materials used during the original construction of the subject building. However, over time, the benzene component typically volatilizes out of the paints, solvents and roofing bitumens and is released into the ambient air. Therefore, it is likely that only trace levels of benzene presently exist in these building materials. It is not expected that benzene emissions from any existing building materials on site will exceed the allowable TWAEV.

Coke Oven Emissions

Coke oven emissions are found in the exhaust from the burning process of coke.

Ethylene Oxide

Ethylene oxide is a common by product of fumigation or sterilization procedures.

Isocyanates

Isocyanates are a class of chemicals used in the manufacture of certain types of plastics, foams and roof insulation. The Isocyanate (-CNO) group reacts very readily with certain other types of molecules, a property responsible for the usefulness of Isocyanates in industry. Due to the high reactivity of the Isocyanate group, exposure to Isocyanates can result in primary irritation, sensitization and hypersensitivity reactions. The respiratory system, the eyes and the skin are the main areas affected by exposure. Isocyanates in their initial form are found as a vapour, a mist, or a dust which become airborne and then taken into the body. Once the Isocyanates are chemically bonded to other chemicals during manufacturing processes, the Isocyanates are not readily available to become airborne unless heated. Therefore, Isocyanate exposure is not expected to be a concern as long as the burning of plastics, foams, and insulation is not carried out.

Lead

The Ontario Ministry of Labour (MOL) Health and Safety Guidelines for Lead on Construction Projects, made under the Occupational Health and Safety Act, September, 2004, states that the removal of lead paint is not required unless work on these materials are likely to produce airborne lead dust or fumes, for example during welding, torch cutting, sanding and sand blasting. If these operations are likely to occur during building renovations or demolition, it is recommended that the removal of lead paint be carried out in accordance with procedures outlined in the proposed regulation.



Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Metallic lead is used to make products such as electric storage batteries, ammunition, lead solder, radiation shields, pipes, and sheaths for electric cables. Metallic lead is sometimes combined with other metals such as copper, tin and antimony as lead alloys for use in the manufacture of a variety of metal products.

Organic lead compounds contain a lead atom covalently bonded to carbon. Common examples of organic lead compounds include lead “soaps” such as lead oleates, high pressure lubricants, and anti-knock agents in gasoline.

Inorganic lead compounds (or lead salts) result when lead is combined with an element other than carbon. Examples are lead oxide, lead chromate, lead carbonate and lead nitrate. Inorganic lead compounds may occur as solids or in solutions, and are used in insecticides, pigments, paints, frits, glasses, plastics, and rubber compounds.

Lead may affect the health of workers if it is in a form that may be inhaled, ingested or absorbed through the skin. Lead dust consists of small, solid particles of metallic lead or lead compounds that are generated by sanding, grinding, polishing, and sawing operations. Lead fume is produced in significant amounts when solid lead or materials containing lead are heated to temperatures above 500o C, as in welding and flame cutting or burning.

In Canada, the past use of lead in both interior and exterior paint was extensive. In 1976, Canadian regulations limited the amount of lead in interior paint to 0.5% by weight. The Time Weighted Average Exposure Value (TWAEV) for exposure of a worker to lead is 0.05 mg/m³ (RRO 843/90). The Occupational Health and Safety exposure limits should not be exceeded.

Mercury

Mercury is commonly found in building with mercury vapour lighting, thermostats, thermometers, and electrical mercury switches.

Silica

Silica, also referred to as free crystalline silica, is found in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles. Prolonged exposure to, and inhalation of free crystalline silica, may result in respiratory disease known as silicosis, which is characterised by progressive fibrosis of the inner lung tissue and marked shortness of breath or impaired lung function. The maximum TWAEV for airborne Silica dust is 0.05 mg/m³.

Vinyl Chloride

Vinyl chloride is found in many applications in building such as plumbing pipes, protective coatings on insulated pipes and interior finishes (i.e., vinyl baseboard trim). Vinyl chlorides in the above materials are bound in a solid matrix and are unlikely to become airborne such that it would exceed the maximum allowable TWAEV of 2.6 mg/m³.

Hazardous Building Materials

Polychlorinated Biphenyls (PCBs)

PCBs are used as a coolant in electrical equipment such as transformers and capacitor in fluorescent lamps ballasts. The use of PCBs as a coolant was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152, and Ontario Regulation 362, under the Environmental Protection Act, prohibit the use of PCBs in the above electrical equipment installed after July 1, 1980. Ontario Regulation 833/90 dictates a TWAEV of 0.05 mg/m³ for exposure to airborne concentrations of PCBs.

Ozone-Depleting Substances (ODS)

Ozone-depleting substances are chemical agents usually used in freezers and compressors for refrigeration. They have also been used as aerosol additives and in the production of foam insulation. The use of ODS is regulated in Ontario under the Environmental Protection Act (EPA), Part VI and in Regulation 356. The "Montreal Protocol" is an international effort to reduce the use of ODSs worldwide.

Ozone-Depleting Substances Regulation SOR/99-7 applies to all buildings and facilities excluding those owned or maintained by the federal government of Canada and their agents. The regulation prohibits the release of halocarbons contained in refrigeration systems, air conditioning systems, fire extinguishers (except to fight a fire that is not a fire caused for training purposes) or containers or equipment used in the re-use, recycling, reclamation or storage of a halocarbon.

The regulation also imposes restrictions on the servicing and dismantling, disposing of or decommissioning of any system containing halocarbons and requires the recovery of halocarbons into an appropriate container by a certified individual. The regulation also details an owner's record-keeping obligations.

Urea Formaldehyde Foam Insulation (UFFI)

Urea Formaldehyde Foam Insulation is foam plastic developed as an improved means of insulating difficult-to-reach wall cavities in buildings. It is made up of a mixture of urea-formaldehyde resin, a foaming agent and compressed air that cures when injected. Most installations occurred between 1977 and 1980. Its use was banned in 1980 by the Government of Canada, when concerns over possible health considerations over the release of formaldehyde gas during the curing process were raised.

Tell tale signs of UFFI installation include evidence of small patched holes, two to seven centimetres in diameter that are usually spaced at regular intervals on exterior or interior walls. UFFI may also be visible around electrical outlets or switch plates.

Mold

There are a number of peer reviewed guidelines or standards, recognized by Canadian provincial and federal regulatory authorities, that provide advice for mold management.

These reference documents include:

- Mould Guidelines for the Canadian Construction Industry, Canadian Construction Association, CCA Standard Document 82-2004.
- Guidelines for the Assessment and Remediation of Fungi in Indoor Environments. New York City Department of Health, 2000 (NYC 2000).

- Bioaerosols: Assessment and Control. ACGIH 1999.
- Field Guide for the Determination of Biological Contaminants in Environmental Samples, American Industrial Hygiene Association, 1996.
- Fungal Contamination In Public Buildings: A guide to recognition and management, Environment Health Directorate, Health Canada, 1995.
- Indoor Air Quality in Office Buildings: A Technical Guide, Health Canada, 1995.
- Report of an Expert Panel on Fungal Contamination Indoors. Public Health Branch, Ontario Ministry of Health, July 1999.
- Significance of Fungi in Indoor Air - Report of Working Group, Canadian Public Health Association.
- Mold Remediation in Schools and Commercial Buildings, United States Environmental Protection Agency, March 2001.
- Guidelines for the Investigation, Assessment & Remediation of Mould in Workplaces, Workplace Safety and Health Division, Manitoba Department of Labour, March 2001.

Health effects related to the inhalation of microbials are detailed in the Report of the Federal-Provincial Advisory Committee on Environmental and Occupational Health entitled *Indoor Air Quality in Office Buildings: A Technical Guide*. According to this document, chronic exposure to most fungi can induce allergic or asthmatic reactions in humans, and a very few species can cause disease directly. Some molds are "toxigenic", producing mycotoxins that often accumulate in the spores. The inhalation of the spores containing certain mycotoxins has been shown to induce many of the symptoms normally associated with Sick Building Syndrome (SBS). Some individuals classed as immuno-compromised are very susceptible to some microbial exposures.

APPENDIX B

Regulatory Background Information

REGULATORY BACKGROUND

Ontario Occupation Health and Safety Act

The OHSA sets out, in very general terms, the duties of employers and others to protect workers from health and safety hazards on the job. More specific legal requirements can be found in Section 30 and in various regulations made under the OHSA. Section 30 deals with the presence of Designated Substances on construction projects. It requires the owner of a project to determine if Designated Substances are present on a project and to inform all potential contractors prior to entering into a binding contract. Ontario Regulation 278/05, entitled *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair operations* outlines sampling, management, and abatement criteria for Asbestos.

Ontario Environmental Protection Act

The Ontario Environmental Protection Act (1990) provides all applicable environmental regulations for the Province of Ontario. Under the act, individual regulations are written for different environmental aspects and environmental safety. Regulations applicable to hazardous building materials include: General Waste Management (O.Reg. 347/90), Ozone Depleting Substances (O.Reg. 356/90) and Waste Management – PCBs (O.Reg. 362/90).

Federal Legislation and Policy

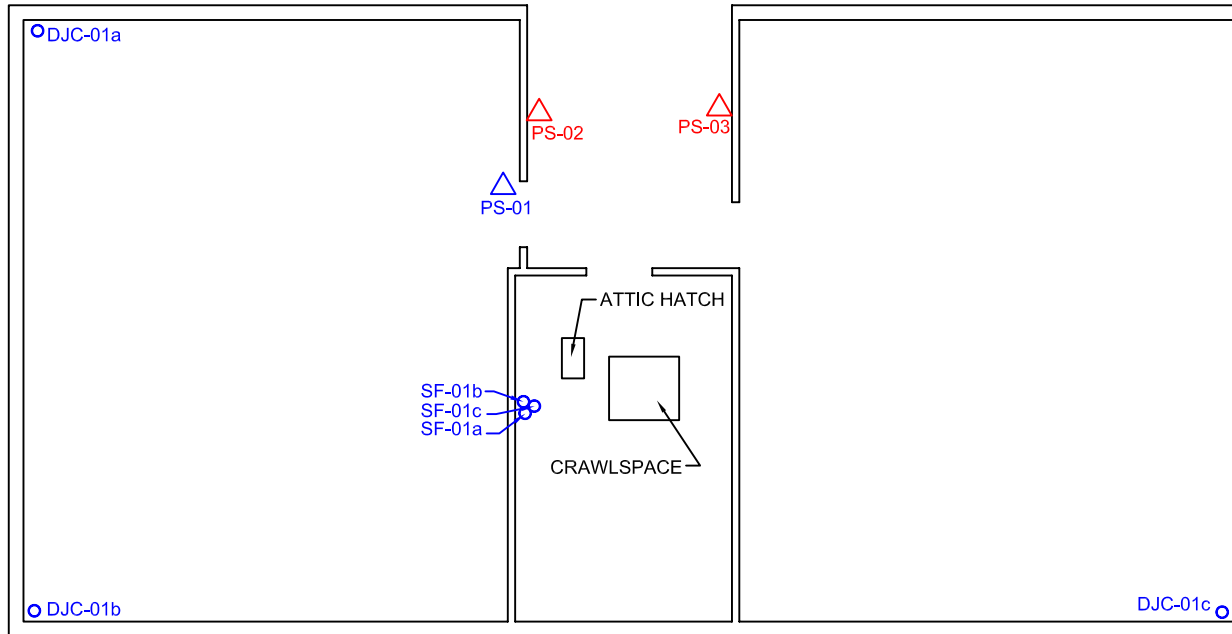
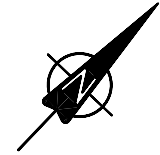
Federal legislation and policies applicable to hazardous materials and this project includes:

- PWGSC Departmental Policy 057 – Asbestos Management;
- The Federal Chlorobiphenyls Regulation (SOR/91-152) under the Environmental Protection Act;
- The Federal Halocarbons Regulations (SOR/99-255);
- The Transportation of Dangerous Goods Act; and,
- Canada Labour Code, Part II.



APPENDIX C

Floor Plans Showing the Location of Designated Substances Including
Sample Locations




WASHROOMS

LEGEND

- SAMPLE NOT CONTAINING ASBESTOS
- △ PAINT CHIP SAMPLE, LESS THAN DETECTION
- △ PAINT CHIP SAMPLE, DETECTABLE LEAD CONCENTRATION

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A JACQUES WHITFORD STANTEC LIMITED PROJECT AND MUST NOT BE USED FOR OTHER PURPOSES.

FLOOR PLAN SHOWING LOCATIONS OF DESIGNATED SUBSTANCES INCLUDING BULK SAMPLE LOCATIONS WASHROOMS, ASSET ID 243939 MAJOR'S HILL PARK, OTTAWA, ONTARIO	Scale: N.T.S.		Job No.: 1048176	Dwg. No.: 1	
	Date: 2009/02/19	Dwn. By: CD VJ JW2009020203	Appd. By: KD		
Client: NATIONAL CAPITAL COMMISSION					

APPENDIX D

Summary of Results of Analysis of Bulk Samples for Asbestos Content

Summary of Bulk Sample Analysis for Asbestos Type and Content

Sample Number	Sampling Location	Description of Sampled Material	Asbestos Type and Content	Analysis
DJC-01A	women's washroom	drywall joint compound	None detected	PLM
DJC-01B	women's washroom	drywall joint compound	None detected	PLM
DJC-01C	women's washroom	drywall joint compound	None detected	PLM
SF-01A	custodial closet	grey sheet flooring	None detected	PLM
SF-01B	custodial closet	grey sheet flooring	None detected	PLM
SF-01C	custodial closet	grey sheet flooring	None detected	PLM

20-Feb-09

1

Notes:

PLM - Polarized Light Microscopy
TEM - Transmission Electron Microscopy
BS - Bulk Sample
nd - None Detected
SP - Stop Positive (not analyzed)

APPENDIX E

Laboratory Analytical Report – Asbestos: Polarized Light Microscopy



EMSL Analytical, Inc.

107 Haddon Ave., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-4960 Email: westmontasblab@EMSL.com

Attn: **Meghan Friesen
Jacques Whitford
2781 Lancaster Road
Suite 200
Ottawa, Ontario, CN K1B1A7**

Customer ID: JACQ30P
Customer PO: 1048176, Z9100
Received: 02/02/09 9:15 AM
EMSL Order: 040902849

Fax: (613) 738-0721 Phone: (613) 738-0708
Project: **1048176, PHASE Z9100**

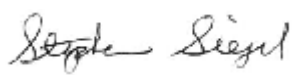
EMSL Proj:
Analysis Date: 2/5/2009
Report Date: 2/5/2009

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DJC-01A <i>040902849-0001</i>	WOMEN'S WASHROOM	White Fibrous Heterogeneous	5% Cellulose	95% Non-fibrous (other)	None Detected
DJC-01B <i>040902849-0002</i>	WOMEN'S WASHROOM	White Fibrous Heterogeneous	5% Cellulose	95% Non-fibrous (other)	None Detected
DJC-01C <i>040902849-0003</i>	WOMEN'S WASHROOM	White Fibrous Heterogeneous	5% Cellulose	95% Non-fibrous (other)	None Detected
SF-01A <i>040902849-0004</i>	CUSTODIAL CLOSET	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
SF-01B <i>040902849-0005</i>	CUSTODIAL CLOSET	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
SF-01C <i>040902849-0006</i>	CUSTODIAL CLOSET	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected

Analyst(s)

*Ilea Gomes (4)
Melissa Klinedinst (2)*



Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. The limit of detection as stated in the method is 1%. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.
Analysis performed by EMSL Westmont (NVLAP #101048-0), NY ELAP 10872

APPENDIX F

Summary of Results of Analysis of Paint Samples for Lead Content

Summary of Results of Analysis of Paint Samples for Lead Content

Sample Number	Sampling Location	Description	Lead Content (ppm)
PS-01	drywall washroom wall	cream paint	<100 ppm
PS-02	washroom trim	blue paint	<110 ppm
PS-03	exterior wood	grey paint	<120 ppm

19-Feb-09

1

Notes:

nd - none detected
ppm - parts per million
PS - paint Sample

APPENDIX G

Laboratory Analytical Report – Lead: Paint Chip Analysis



EMSL Analytical

3 Cooper St., Westmont, NJ 08108

Phone: (856) 858-4800 Fax: (856) 858-9551 Email: westmontleadlab@emsl.com

Attn: **Meghan Friesen
Jacques Whitford
2781 Lancaster Road
Suite 200
Ottawa, Ontario, CN K1B1A7**

Customer ID: JACQ30P
Customer PO: 1048176Z9100
Received: 02/02/09 10:33 AM
EMSL Order: 200901325

Fax: (613) 738-0721 Phone: (613) 738-0708
Project: **1048176, Phase Z9100**

EMSL Proj:

Report Date: 2/4/2009

Lead in Paint Chips by Flame AAS (SW 846 3050B*/7420)

<i>Client Sample Description</i>	<i>Lab ID</i>	<i>Collected</i>	<i>Analyzed</i>	<i>Lead Concentration</i>
PS-01 drywall washroom wall-cream paint	0001		2/4/2009	<100 ppm
PS-02 washroom trim- blue paint	0002		2/4/2009	<110 ppm
PS-03 exterior wood- grey paint	0003		2/4/2009	<120 ppm

Shannon Kauffman, Lead Lab Supervisor
or other approved signatory

Reporting limit is 0.01 % wt. The QC data associated with these sample results included in this report meet the method quality control requirements, unless specifically indicated otherwise. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities.

* slight modifications to methods applied Samples received in good condition unless otherwise noted. Quality Control Data associated with this sample set is within acceptable limits, unless otherwise noted

ACCREDITATIONS: NJ-NELAP: 04653, AIHA Environmental Lead Laboratory Approval Program: 100194