



# Englobe

Soils Materials Environment

## **Defence Construction Canada**

### **Stone Frigate Dormitory (R23) & Fort LaSalle (R33) Roof Replacement and Building Repairs Royal Military College, Kingston, Ontario**

#### **Designated Substances and Hazardous Materials Assessment DCC Project No.: KN149926, KN57606**

Date: January 29, 2016

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## 1 INTRODUCTION

Englobe Corp. ("Englobe") was retained by Defence Construction Canada (hereafter referred to as "the Client"), on behalf of the Department of National Defence ("DND"), to complete a survey of exterior walls and roof areas at both the Stone Frigate Dormitory (R23) and Fort LaSalle (R33) buildings located at the Royal Military College (RMC), Kingston, Ontario (hereafter referred to as the "Survey Areas") for designated substances and hazardous materials (hereafter referred to as the "Survey").

Englobe understands that the survey was required in advance of undertaking various works to the building envelopes in the Survey Area. Englobe understands that the work will include the removal and replacement of the old copper roofs, gutters, downspouts and ice guards and the scraping, sanding and re-painting of all sound wood work and the replacement of deteriorated wood, of the eave overhang. The project also includes masonry repairs of the R33 tower and masonry repairs at the stone frigate.

Drawing 1 illustrates the approximate locations of the Survey Areas.

The Survey is required by the Ontario Occupational Health and Safety Act in order to ascertain if workers involved in the planned work could encounter designated substances. There are eleven (11) substances that are regulated under provincial (Ontario) occupational health and safety legislation (i.e. referred to as 'Designated Substances'). The Designated Substances include the following materials:

- |                       |                  |
|-----------------------|------------------|
| ▶ Asbestos            | ▶ Lead           |
| ▶ Mercury             | ▶ Silica         |
| ▶ Isocyanates         | ▶ Vinyl Chloride |
| ▶ Benzene             | ▶ Acrylonitrile  |
| ▶ Coke oven emissions | ▶ Arsenic        |
| ▶ Ethylene Oxide      |                  |

Although Polychlorinated biphenyls (PCBs) are not defined as Designated Substances, if not properly managed, PCBs may be hazardous to workers involved in the planned work. Accordingly, PCBs have been included in this Survey.

## 2 BACKGROUND INFORMATION

As generally stated in the Statement of Work for this project, the work planned at both the Stone Frigate Dormitory (R23) and Fort LaSalle (R33) is in relation to the restoration of the exterior building envelopes, to ensure the heritage characters are protected and to ensure that they are recapitalized.

### 3 SCOPE OF WORK

The intent of this phase of work is to establish whether Designated Substances are present within the Survey Areas, and to provide recommendations as to how to manage the identified designated substances, in regards to both federal and provincial requirements as they pertain to health and safety of workers and others, including waste disposal.

The Survey aimed to accurately identify, locate and quantify all designated substances, as defined above, present in the Survey Areas. As such, minor destructive sampling of mortar and painted surfaces was undertaken and the Survey included destructive sampling of roofing materials and the subsequent patching of the roofing materials sampling locations.

The scope of work also included the analysis of representative paint chip and roofing samples for Toxicity Characteristic Leaching Procedure (TCLP) in order to provide guidance in categorizing hazardous waste and non-hazardous waste for disposal purposes.

### 4 PREVIOUS REPORTS

No previous Designated Substances and/or Hazardous Materials reports for the Survey Area were available to Englobe for review.

### 5 METHODOLOGY

The Survey field work was completed by Alexandra Joly Cross of Englobe on December 7, 2015. Specifically, the Survey included:

- ▶ Englobe completed a comprehensive survey within the Survey Area of all the exterior building materials identified as potentially being disturbed as part of the upcoming construction activities;
- ▶ Englobe engaged the services of a qualified roofing contractor to cut and repair access holes to facilitate inspection and sample collection by Englobe. Englobe consulted with DCC/DND to select mutually-agreeable intrusive sample locations and the repair materials and practices;
- ▶ The appropriate number of bulk samples of materials potentially asbestos-containing were collected and submitted for analysis of asbestos utilizing the technique of polarized light microscopy (PLM) with dispersion staining, in accordance with Ontario Regulation 278/05;
- ▶ Representative paint chip samples were collected and submitted for analysis of Metals and PCBs;
- ▶ A visual assessment for evidence of any of the other Designated Substances listed in O. Reg. 490/09, and any other hazardous materials (i.e. PCBs) was conducted.
- ▶ Samples of roofing materials were collected and submitted for Toxicity Characteristic Leaching Procedure (TCLP) in order to provide guidance in categorizing hazardous waste and non-hazardous waste for disposal purposes. Specifically, roofing materials samples

were submitted for TCLP analysis of Metals, PAH Compounds and PCBs. Samples of paint coatings were submitted for TCLP analysis of Metals and PCBs.

- ▶ Also, the Survey assessed the Survey Areas for the presence of other designated substances (i.e. Mercury, Isocyanates, Benzene, Coke oven emissions, Ethylene Oxide, Silica, Vinyl Chloride, Acrylonitrile, Arsenic, Lead).

Drawing 1 in Appendix 1 illustrates the approximate sampling locations of the various materials sampled as part of this Survey.

## 6 DISCUSSION AND SUMMARY OF FINDINGS

### 6.1 ASBESTOS CONTAINING MATERIALS (ACMS)

#### Background

Regulation 278/05, *Asbestos on Construction Projects and in Buildings and Repair Operations* (O. Reg. 278/05), made under the Ontario Occupational Health and Safety Act, defines an asbestos-containing material ("ACM") as "material that contains 0.5 per cent or more asbestos by dry weight". Therefore, for the purposes of this survey, any material that contains 0.5% or more asbestos by dry weight, as confirmed by laboratory analysis, is deemed to be an asbestos-containing material.

O. Reg. 278/05 defines the minimum number of bulk samples that are to be collected and analysed from each area of homogenous material. To ensure representative sampling of the materials suspected to contain asbestos, the required number of samples was collected from several differing locations and/or sources. O. Reg. 278/05 states: "if analysis establishes that a bulk material sample contains 0.5 percent or more asbestos by dry weight, it is not necessary to analyse other bulk material samples taken from the same area of homogenous material, and the entire area of homogenous material from which the bulk material sample was taken is deemed to be asbestos-containing."

Therefore, Englobe initially submitted for analysis one sample of each type of homogenous material observed during the Survey. If the reported concentration of asbestos fibres in the sample was 0.5% or more asbestos by dry weight, no additional samples of the same material were analysed and the entire area of that material was considered to be asbestos-containing. If the reported concentration of asbestos fibres in the sample was less than 0.5%, additional bulk samples of the same material were submitted for analysis, in accordance with Table 1 of Ontario Regulation 278/05. If the reported concentration of asbestos fibres in any one of the additional samples submitted for analysis was 0.5% or more asbestos by dry weight, the entire area of that material was considered to be asbestos-containing, regardless of previous results.

Each bulk sample selected by Englobe for analysis was submitted to the firm 'CA Labs L.L.C.' ("CA Labs"), located in Baton Rouge, Louisiana, U.S.A. CA Labs is an independent laboratory appropriately qualified to conduct such analysis and is certified under the National Voluntary Laboratory Accreditation Program ("NVLAP") (NVLAP lab code #200772-0). The samples were

analyzed using the technique of polarized light microscopy with dispersion staining in accordance with the methods and procedures set out in O.Reg. 278/05 for the determination of asbestos content (i.e. United States Environmental Protection Agency Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993).

### Findings

Bulk samples of materials suspected to contain asbestos were collected and submitted for laboratory analysis for asbestos content. Refer to the Asbestos Summary Tables attached in Appendix 2, which details the sampling locations, construction materials descriptions and the analytical results.

The findings are summarized as follows:

#### Non-Friable ACMs

Non-friable building construction materials identified in the Survey Area and sampled for analysis, specifically mortar and door and window sealant, where sampled and analyzed, were reported not to contain detectable concentrations of asbestos (i.e. not equal to or greater than 0.5%).

#### Friable ACMs

Friable building construction materials identified in the Survey Area and sampled for analysis, specifically roofing tar paper, where sampled and analyzed, were reported not to contain detectable concentrations of asbestos (i.e. not equal to or greater than 0.5%).

Refer to Appendix 3 for the Certificate of Analysis issued by CA Labs.

## **6.2 LEAD**

### Background

As stated in the Ontario Ministry of Labour publication titled 'Guideline- Lead on Construction Projects' (April 2011), lead can be found in construction materials, such as paints, coatings, mortar, concrete, solder and sheet metal. Also, lead is commonly found in other building components such as caulking on cast iron water pipes, glazing on porcelain tiles, and electrical wires and fixtures. There are no current regulatory requirements that would mandate the removal of such materials containing lead prior to construction/demolition activities, and no requirements for special disposal of such materials when generated as waste from construction/demolition activities provided that concentrations of lead present do not result in waste materials which are leachate toxic. A maximum concentration of 90 ppm lead in paint coatings is generally accepted as the industry standard as a guideline, for due diligence purposes. Concentrations of lead in waste materials exceeding 100 ppm have the potential to render a waste leachate toxic, depending on the leachability of the contaminant.

Each bulk sample selected by Englobe for analysis was submitted to the firm ALS Laboratory Group, London and Waterloo, Ontario ("ALS Labs"). ALS Labs is an independent laboratory



appropriately qualified to conduct such analysis and is accredited by the Standards Council of Canada (“SCC”) and the Canadian Association of Laboratory Accreditation (“CALA”) to conduct such analyses, in accordance with standard methods (MOE, US-EPA, ASTM, etc.) and generally accepted industry practices.

### Findings

In order to establish the lead content of paint coatings and mortar in the Survey Area, samples were acquired and submitted to ALS Labs for laboratory analysis of lead content. Refer to Appendix 4, the Laboratory Analysis Report issued by ALS Labs. The analytical results are summarized as follows:

Table 1 – Lead Analytical Results

SAMPLE ID #	SAMPLE DESCRIPTION	ANALYTICAL RESULTS FOR LEAD (ug/g)
PB-1	Beige paint applied to doors and windows at building R23.	913
PB-2	Beige/white paint on wood cornice of the original section of building R33.	109,000
3F, 3G, 3H	Stone Wall Mortar at building R23.	14.1 to 17.4
4H, 4I, 4J	Exterior Wall Mortar at building R23.	13.7 to 66.8
4D (LW)	Wall Mortar- dark gray, from the left wing of building R33	66.1
6D (LW)	Wall Mortar- light gray, from the left wing of building R33	12.2
7D (LW)	Wall Mortar- gray, from the left wing of building R33	17.5
3D (RW)	Wall Mortar- gray, from the right wing of building R33	92.2
6D (ORIG)	Wall Mortar- light beige, from the original portion of building R33	12.2
9D (ORIG)	Wall Mortar- gray/beige, from the original portion of building R33	18.8

As noted above, lead was detected in each sample of materials submitted for analysis, in certain instances at concentrations exceeding the guideline limit of 90 ppm.

Also, lead is present in the roofing materials sampled and submitted for TCLP analysis (i.e. lead was detected in the TCLP analysis, see Appendix 4 for the Laboratory Certificate of Analysis and Appendix 5 for the Analytical Results).

Inhalation of airborne lead is considered the primary route of occupational exposure. It is generally considered that, depending on the type of disturbance, airborne lead could be generated at hazardous levels from any amount of lead in a material. As such, there is no

established regulatory concentration of lead in materials above which lead-related precautions are required, should a lead-containing material be disturbed. Similarly, there is no established concentration of lead in materials below which lead-related precautions are not required.

Based on the findings of this assessment, and given the nature of the proposed work, the potential exists for workers involved in the planned construction/ renovation work to be exposed to lead, if mitigative measures are not adopted.

### 6.3 **MERCURY**

#### Background

Mercury is a silver-coloured metal that is liquid at room temperature. It may be used commercially in its pure metallic form or combined chemically with other elements as mercury compounds. Mercury can affect the health of workers if it is in a form that may be inhaled (e.g. mercury vapour, dusts), ingested or absorbed through the skin (e.g. liquid mercury).

#### Findings

No mercury vapour-containing fluorescent light bulbs or mercury containing thermostats were observed in the Survey Area.

Mercury is present in the above-noted paint samples submitted for TCLP analysis, but at concentrations which do not exceed the Schedule 4 Leachate Quality Criteria (i.e. mercury was detected in the TCLP analysis, see Appendix 4 for the Laboratory Certificate of Analysis and Appendix 5 for the Analytical Results).

Based on these findings, the potential exists for workers involved in the planned construction/ renovation work to be exposed to mercury, if mitigative measures are not adopted.

### 6.4 **SILICA**

#### Background

The Ontario Ministry of Labour publication entitled 'Silica on Construction Projects' (April 2011) provides worker exposure protective equipment, measuring and procedures to be followed to protect workers from silica exposure in carrying out construction tasks. This publication states that many construction activities can generate airborne silica-containing dust.

#### Findings

Silica is the primary component of many construction materials, and specifically silica will be present in the concrete and mortar located in the Survey Areas. Accordingly, the potential exists for workers involved in the planned construction/ renovation work to be exposed to silica, if mitigative measures are not adopted.

### 6.5 **POLYCHLORINATED BIPHENYLS (PCBS)**

#### Background

PCB usage and storage is controlled by Canadian Regulation SOR/2008-273. PCB materials are defined in Regulation 362 of the Ontario Environmental Protection Act ("O. Reg. 362").

PCB materials include materials that were designed and manufactured with PCBs (and have not been reclassified through PCB removal/destruction), and other materials with a PCB concentration greater than 50 ppm (i.e. equivalent to mg/kg). Although PCB materials are not classified as a 'Designated Substance' under the Ontario Occupation Health & Safety Act, such materials are characterized as being hazardous and as such, were assessed as part of the Survey.

#### Findings

In order to establish the PCB content of paint coatings in the Survey Area, samples were acquired and submitted to ALS Labs for laboratory analysis of PCB content. Refer to Appendix 4, the Laboratory Analysis Report issued by ALS Labs. The analytical results are summarized as follows:

Table 2 – PCB Analytical Results

SAMPLE ID #	SAMPLE DESCRIPTION	ANALYTICAL RESULTS FOR PCB (mg/kg)- equivalent to ppm
PB-1	Beige paint applied to doors and windows at building R23.	<2
PB-2	Beige/white paint on wood cornice of the original section of building R33.	25.4

As noted above, PCBs have been analytically confirmed in one (1) of the above-noted paint coating samples. However, the reported concentration of PCBs is below the above-noted 50 ppm concentration and, as such the paint coatings would not be classified under O. Reg. 362 as a PCB material.

Based on these findings, the potential exists for workers involved in the planned construction/renovation work to be exposed to PCBs, if mitigative measures are not adopted.

## 6.6 ACRYLONITRILE

There were no activities observed in the Survey Areas during the Survey that involve the use of products likely to contain acrylonitrile compounds in a regulated form (such as non-polymerized ingredients/ product components used to manufacture plastics, rubber, etc.).

## 6.7 ARSENIC

Arsenic was not detected in the samples of paint coatings submitted for bulk analysis, or in the leachate of the paint coatings. There were no other materials/products observed in the Survey Areas that are likely to contain arsenic compounds in a regulated form.

## **6.8 BENZENE**

There were no activities observed in the Survey Areas during the Survey that involve the use of products likely to contain benzene in a regulated form (such as fuels, solvents).

## **6.9 COKE OVEN EMISSIONS**

Coke oven emissions are not applicable to this facility, as coke ovens are not located in the building.

## **6.10 ETHYLENE OXIDES**

There were no indications of ethylene oxide gas cylinders observed in the Survey Areas during the Survey.

## **6.11 ISOCYANATE**

There were no activities observed in the Survey Areas that involve the use of products likely to contain regulated isocyanate compounds (such as ingredients/product components used to prepare and apply coating materials, packaging foam, adhesives etc.).

## **6.12 VINYL CHLORIDE**

Vinyl chloride is a raw material that has been used in the manufacture of certain plastics, and as propellant in aerosol products. Vinyl chloride can also occur as a degradation product generated by chemical/biological reactions on certain chlorinated solvents if present in soil or groundwater.

During the Survey, no indications of the use of vinyl chloride or chlorinated solvents were observed in the Survey Areas.

## **6.13 WASTE CHARACTERIZATION ANALYSIS**

As noted previously, the scope of work had also included the analysis of representative roofing material and paint coating samples for Toxicity Characteristic Leaching Procedure (TCLP) in order to provide guidance in categorizing waste for disposal purposes (i.e. hazardous or non-hazardous waste).

In order to characterize the roofing materials and paint coatings for waste disposal, one (1) composite sample of representative roofing materials and one (1) composite sample of the paint chip samples were submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis. The samples were submitted to ALS Laboratories for waste characterization analyses, in accordance with the procedures defined in O. Reg. 558 (Toxicity Characteristic Leachate Procedure "TCLP").

The leachate of the roofing material sample was analyzed for Metals, PAH Compounds and PCBs. The leachate of the paint chip sample was analyzed for Metals and PCBs. The analytical results may be referenced in Appendix 4 and are summarized on the Analytical Results for TCLP Waste Characterization table attached in Appendix 5. The results have been

compared to the Leachate Quality Criteria in Schedule 4 of O. Reg. 558, being the general waste management regulation in Ontario.

The above-noted parameters analysed either were not detected in the leachate of the roofing materials, or were detected but at concentrations that did not exceed the Leachate Quality Criteria referenced in Schedule 4 of O. Reg. 558. Accordingly, Englobe interprets the roofing materials not to be leachate toxic and therefore, for disposal purposes, the waste could be characterized as solid non-hazardous waste, as defined in O. Reg. 558.

The analysis of the leachate from the paint coating sample indicated that the concentration of lead in the leachate (i.e. 135 mg/L) exceeds the Leachate Quality Criteria (5 mg/L) referenced in Schedule 4 of O. Reg. 558. Accordingly, Englobe interprets that wastes generated from the scraping, sanding and/or replacement of painted wood work would be leachate toxic waste and therefore, for disposal purposes, the waste would be characterized as hazardous waste, as defined in O. Reg. 558. However, it is uncertain whether waste materials containing both paint coatings and substrate (i.e. plaster, drywall, wood, etc.) combined would be leachate-toxic.

## 7 CONCLUSION & RECOMMENDATIONS

The potential for worker exposure to the designated substances identified, during the planned work should be addressed as part of the health and safety plan of the contractor. The Occupational Health and Safety Act (OHSA) defines, in very general terms, the duties of employers and others to protect workers from health and safety hazards on the job. These duties include:

- ▶ taking all reasonable precautions to protect the health and safety of workers [clause 25(2)(h)];
- ▶ providing information, instruction and supervision to protect worker health and safety [clause 25(2)(a)]; and,
- ▶ acquainting a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent [clause 25(2)(d)].

Generally stated, the following substances identified by this Survey should be handled and disposed in accordance with the various applicable regulations, acts and guidelines as referenced below. Also, the applicable regulations, acts and guidelines referenced below should be consulted as to determine the recommended practices for managing worker exposure to certain designated substances.

Table 3 - Summary of Recommended Actions

SUBSTANCE	DESCRIPTION	ANALYSES & RECOMMENDATIONS
Asbestos	No asbestos-containing materials were identified.	<p>► Given that no ACMs were identified, Englobe interprets that an "Asbestos Condition Assessment and Response Chart", being a part of the Department of National Defence Canadian Forces Asbestos Management Directive, is not required.</p> <p>► During the planned work, if materials suspected to contain asbestos which have not been analyzed for asbestos content are encountered, the material should be assumed and managed as asbestos containing; or, sampled and analyzed for asbestos content prior to disturbing such materials. If such material is found to contain asbestos, they must be managed and disposed in accordance with O.Reg. 278/05 and Regulation 347 of the Ontario Environmental Protection Act.</p>
Lead	<p>Paint coatings and the leachate of paint samples have been reported to contain elevated concentrations of lead.</p> <p>The mortar samples and the leachate of the roofing materials have been confirmed to contain lead.</p> <p>The potential exists for workers involved in the planned construction/ renovation work to be exposed to lead, if mitigative measures are not adopted.</p>	<p>► There are no current regulatory requirements that would mandate removal of building materials containing metallic lead prior to the planned renovation/construction activities.</p> <p>► Elevated concentrations of lead were detected in the leachate of the paint coatings. Accordingly, Englobe interprets that paint coating wastes, consisting of only paint coatings generated from the scraping, sanding and/or replacement of painted wood work, would be characterized as hazardous waste, as defined in O. Reg. 558, and must be managed accordingly. It is uncertain whether waste materials containing paint coatings and substrate (i.e. plaster, drywall, wood, etc.) would be leachate-toxic.</p> <p>► Based on the findings of this assessment, and given the nature of the proposed work, the potential exists for workers involved in the planned construction/ renovation work to be exposed to lead, if mitigative measures are not adopted. Prior to conducting restoration and alteration work involving painted surfaces and/or mortar, review the Ontario Ministry of Labour publication 'Guideline - Lead on Construction Projects', April 2011, to determine what measures and procedures should be implemented during such work. For example, the above-noted guideline classifies the dry removal of lead-containing mortar using an electric or pneumatic cutting device as a Type 3A Operation which requires certain work area preparations, the implementation of dust control measures and the use of personal protection equipment.</p> <p>► The potential for worker exposure to lead should be addressed as part of the health and safety plan of the contractor. The risk of exposure can be mitigated through the application of proper worker health and safety precautions (i.e. work and dust control procedures that reduce dust generation, utilization of PPE and implement a worker hygiene program).</p>

SUBSTANCE	DESCRIPTION	ANALYSES & RECOMMENDATIONS
Silica	Silica is the primary component of many construction materials, and specifically silica will be present in the concrete and mortar located in the Survey Areas. Accordingly, the potential exists for workers involved in the planned construction/ renovation work to be exposed to silica, if mitigative measures are not adopted.	<p>► There are no current regulatory requirements that would mandate removal of building materials containing silica, and no requirements for special disposal of such materials when generated as waste from planned work.</p> <p>► Prior to conducting restoration and alteration work involving concrete and/or mortar, review the Ontario Ministry of Labour publication 'Guideline - Silica on Construction Projects', April 2011, to determine what measures and procedures should be implemented during such work. For example, the above-noted guideline classifies the dry mortar removal with an electric or pneumatic cutting device as a Type 2 Operation which requires certain work area preparations, the implementation of dust control measures and the use of personal protection equipment.</p> <p>► The potential for worker exposure to Silica planned work should be addressed as part of the health and safety plan of the contractor. The risk of exposure can be mitigated through the application of proper worker health and safety precautions (i.e. work and dust control procedures that reduce dust generation, utilization of PPE and implement a worker hygiene program).</p>
Mercury	<p>Mercury is present in the above-noted paint samples submitted for TCLP analysis (i.e. mercury was detected at low concentrations in the TCLP analysis).</p> <p>The potential exists for workers involved in the planned construction/ renovation work to be exposed to mercury, if mitigative measures are not adopted.</p>	<p>► Based on the reported concentrations of mercury in the TCLP sample, there are no current regulatory requirements that would mandate removal of building materials containing mercury, and no requirements for special disposal of such materials when generated as waste from planned work.</p> <p>► The potential for worker exposure to mercury during planned work should be addressed as part of the health and safety plan of the contractor. The risk of exposure can be mitigated through the application of proper worker health and safety precautions (i.e. work and dust control procedures that reduce dust generation, utilization of PPE and implement a worker hygiene program).</p>
PCBs	<p>PCBs were detected in one (1) of the paint coating samples submitted for analysis. However, the concentration of PCBs is reported well below the above-noted 50 ppm concentration and, as such the paint coatings would not be classified under O. Reg. 362 as a PCB material.</p> <p>PCBs were not detected in the TCLP samples analyzed.</p> <p>The potential exists for workers involved in the planned construction/ renovation work to be exposed to PCBs, if mitigative measures are not adopted.</p>	<p>► Based on the reported concentrations, there are no current regulatory requirements concerning PCBs in building materials, and no requirements for special disposal of such materials when generated as waste from planned work.</p> <p>► The potential for worker exposure to PCBs planned work should be addressed as part of the health and safety plan of the contractor. The risk of exposure can be mitigated through the application of proper worker health and safety precautions (i.e. work and dust control procedures that reduce dust generation, utilization of PPE and implement a worker hygiene program).</p>



SUBSTANCE	DESCRIPTION	ANALYSES & RECOMMENDATIONS
Waste Characterization	<p>The analysis of the leachate from the paint coating sample indicated that the concentration of Lead exceeded the Leachate Quality Criteria referenced in Schedule 4 of O. Reg. 558, and therefore would be characterized as leachate toxic waste.</p> <p>Roofing materials have been confirmed to not be leachate toxic.</p>	<p>► Wastes generated from the scraping, sanding and/or replacement of painted wood work would be characterized as hazardous waste, as defined in O. Reg. 558.</p> <p>► For disposal purposes, waste consisting of roofing materials could be characterized as solid non-hazardous waste, as defined in O. Reg. 558.</p>

## 8 STATEMENT OF LIMITATIONS

Englobe Corp. (Englobe) has prepared this report for the use of **Defence Construction Canada** and the **Department of National Defence**. The material in it reflects the judgment of Englobe in light of the information made available at the time of preparation. Any use, which a Third Party makes of this report, or any reliance on discussions to be made based on it, is the responsibility of such Third Parties. Englobe accepts no responsibility for damages, if any, suffered by any Third Party because of decisions made or actions taken based on this report.

It should be noted that this report details only the designated substances found within the Survey Areas, specifically pertaining to the construction materials of the exterior walls and roof areas at both the **Stone Frigate Dormitory (R23) and Fort LaSalle (R33) buildings located at the Royal Military College, Kingston, Ontario**. The Survey only considered issues pertaining to designated substances as detailed in this report as they relate to building materials described within this report.

Due to the nature of building construction, some inherent limitations exist as to the possible thoroughness of the Survey. This assessment is subject to any restrictions placed by physical obstructions, inaccessibility, time constraints, cost constraints, readily available documentation, safety considerations, confidentiality, and availability of individuals capable of providing pertinent background information. A reasonable site evaluation may not identify latent or hidden contamination or features. Information in this assessment may also change with time and thus only be accurate on the collection date.

Englobe warrants that the findings and conclusions contained within these reports have been prepared in accordance with generally accepted environmental Survey methods. There is a possibility that materials may exist which could not be reasonably identified within the scope of the assessment, or which were not apparent during the site inspections. Englobe cannot warrant or guarantee that the information provided is absolutely complete or accurate beyond current environmental consulting standards.

It should be noted that assessments made throughout this environmental assignment rely heavily on information supplied by others, including the test results and analyses of other consultants, laboratories or other testing services. While every effort has been made to use



reliable and multiple sources, Englobe makes no guaranty of the accuracy or completeness of this third party information available to us at the time of preparing this report.

## 9 REFERENCES

Ontario Government, Occupational Health and Safety Act, R.S.O. 1990.

Ontario Regulation 490/09, *Occupational Health and Safety Act: Designated Substances.*

*Asbestos on Construction Projects and in Buildings and Repair Operations – made under the Occupational Health and Safety Act.* Ontario Regulation 278/05 as amended.

Ontario Ministry of Labour, Occupational Health and Safety Branch, *Guideline: Lead on Construction Projects*, April 2011.

Ontario Ministry of Labour, Occupational Health and Safety Branch, *Guideline: Silica on Construction Projects*, April 2011.

Ontario Regulation 347 R.R.O. 1990, *Waste Management – General*, R.R.O. 1990, as amended.

Ontario Regulation 362 R.R.O. 1990, *Waste Management – PCBs*, R.R.O. 1990, as amended.

Canadian Regulation SOR/2008-273 of the Canadian Environmental Protection Act, *PCB Regulations*.

Canadian Products Safety Act, *Surface Coating Materials Regulations*, Hazardous Products Act, R.S.C c. H-3.

## Appendix 1 Drawings

10 cm

5

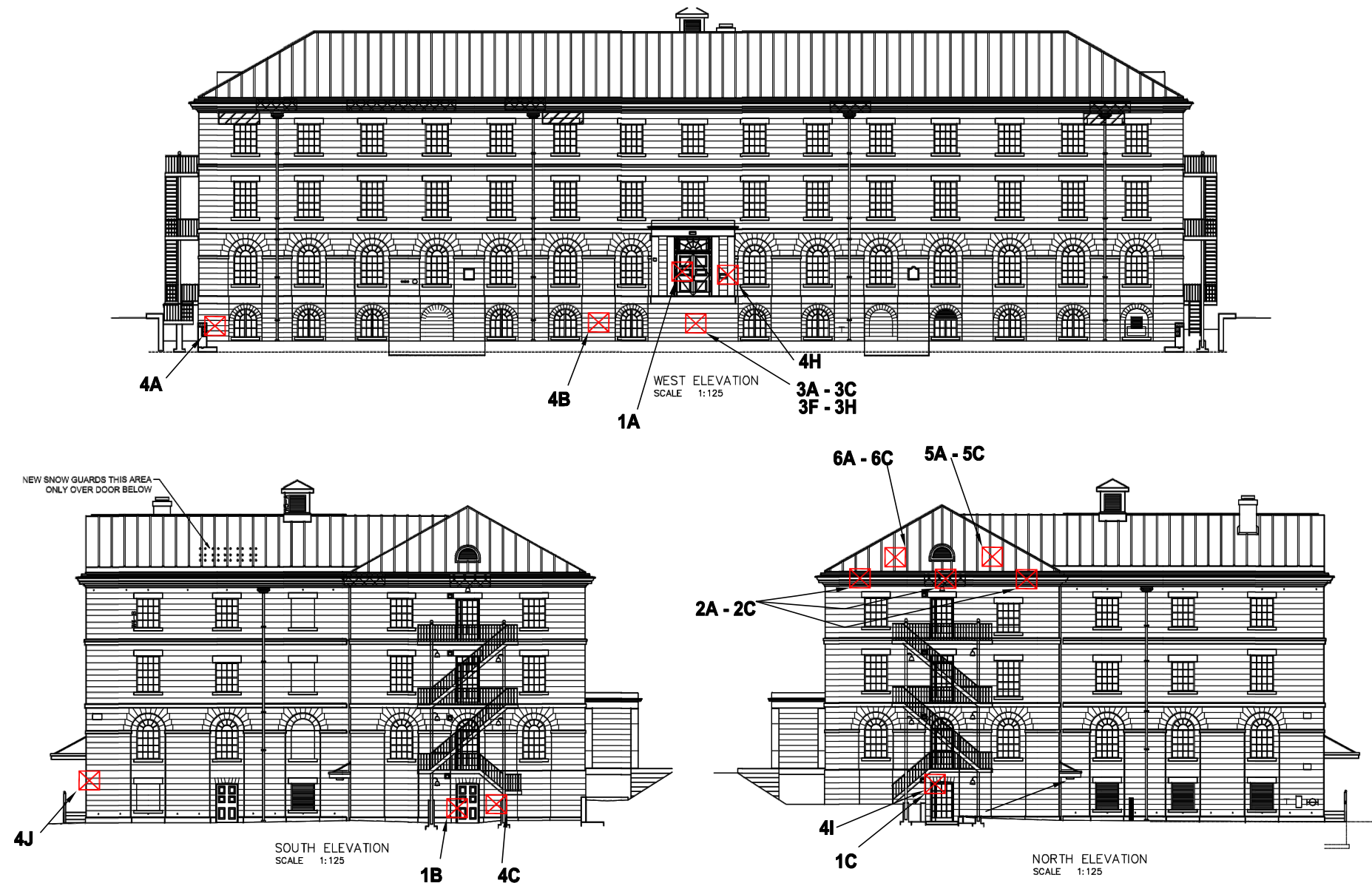
4

3

2

1

0



LEGEND :



APPROXIMATE SAMPLING LOCATION AND IDENTIFICATION NUMBER

NOTES :  
1-REFERENCE: Government of Canada, PF No. PF114851, Dwg No. K-K74-6601/26-302, May 22nd, 2015.

Project  
**DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS  
ASSESSMENT**  
**R23 & R33 ROOF REPLACEMENT**  
Project # KN149926

Title  
**SAMPLING LOCATIONS  
BUILDING R23**

 Englobe Corp.  
417 Exeter Road  
London (Ontario) N6E 2Z3  
Telephone : 519.680.3868  
Fax : 519.680.3870

Prepared <b>A.Jackson</b>	Discipline <b>Environmental</b>
Drawn <b>M.Banas</b>	Scale <b>Not to Scale</b>
Checked <b>K.Barendregt</b>	Date <b>2016-01-06</b>

Project manager <b>K.Barendregt</b>	Sequence no. <b>01 of 02</b>
--	---------------------------------

M. dept. <b>161</b>	Project <b>B-0012522-6</b>	Disc. <b>HG</b>	Dwg no. <b>001</b>	Rev. <b>10A</b>
------------------------	-------------------------------	--------------------	-----------------------	--------------------

10 cm

5

4

3

2

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1

2

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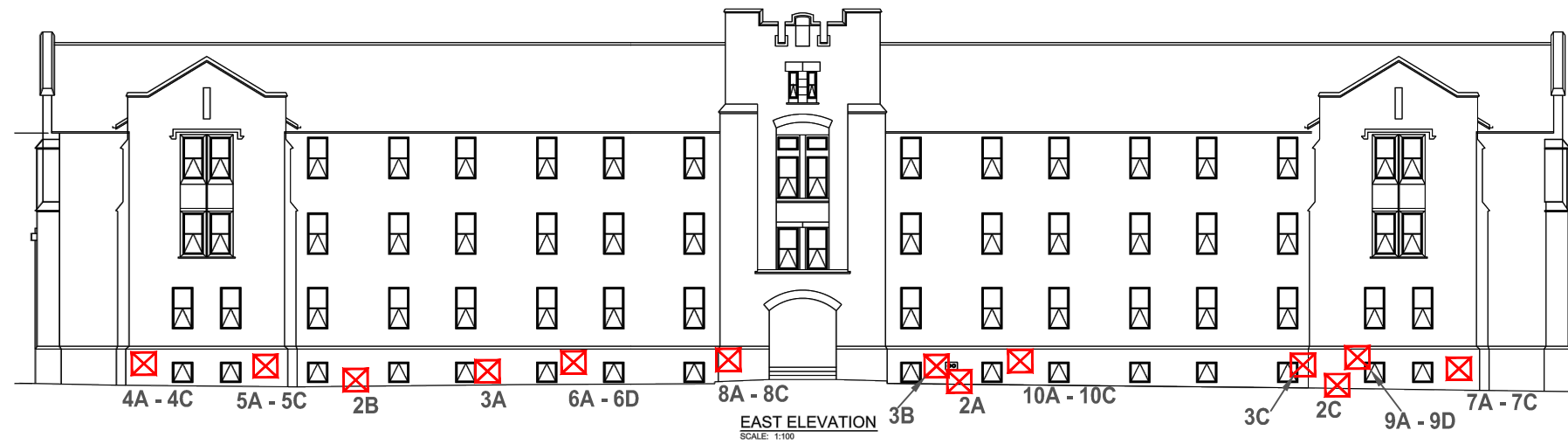
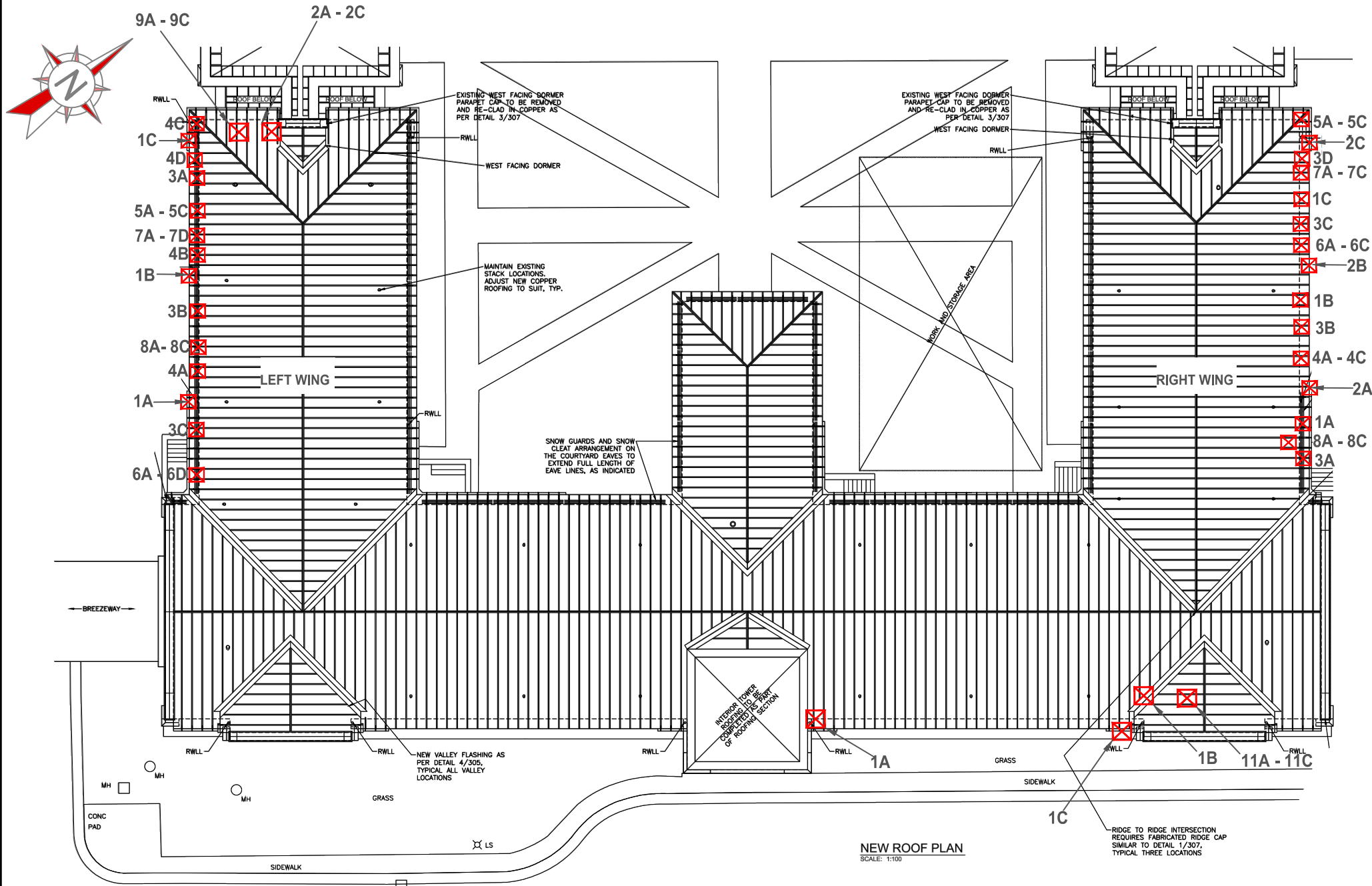
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G:\161\PROJECTS\0156-0012522 DCC KINGSTON\24\_CAD-6\SAMPLING\LOC.DWG



## LEGEND :



APPROXIMATE SAMPLING LOCATION AND IDENTIFICATION NUMBER

## NOTES :

1-REFERENCE: Government of Canada, PF No. PF114869, Dwg No. K-K72-6602/52-302, April 28th, 2015.

2-Samples taken along the right and left wings of the building were taken on the first storey of the building.

Project

**DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS  
ASSESSMENT**

**R23 & R33 ROOF REPLACEMENT**

Project # KN149926

Title

**SAMPLING LOCATIONS  
BUILDING R33**



**Englobe**

Englobe Corp.

417 Exeter Road  
London (Ontario) N6E 2Z3  
Telephone : 519.680.3868  
Fax : 519.680.3870

Prepared **A.Jackson**

Drawn **M.Banas**

Checked **K.Barendregt**

Discipline **Environmental**

Scale **Not to Scale**

Date **2016-01-06**

Project manager

**K.Barendregt**

Sequence no.

**02 of 02**

M. dept.

**161**

Project

**B-0012522-6**

Disc.

**HG 002 0A**

Dwg no.

**002 0A**

Rev.

**002 0A**

## **Appendix 2**

## **Asbestos Summary Tables**

**Analytical Results for Asbestos Content in Building Material Bulk Samples**  
**Designated Substances and Hazardous Materials Assessment**  
**Right Wing Building Section**  
**Fort LaSalle (R33)**  
**Royal Military College (RMC), Kingston, Ontario**

Sample Number	Suspect Material Description	Analytical Result
1A to 1C	Sealant- gray colour, applied to window and doors	Asbestos Not Detected
2A to 2C	Sealant- gray colour, applied to joint	Asbestos Not Detected
3A to 3C	Wall Mortar- gray, original	Asbestos Not Detected
4A to 4C	Wall Mortar- light gray, smooth	Asbestos Not Detected
5A to 5C	Wall Mortar- light beige	Asbestos Not Detected
6A to C	Wall Mortar- dark beige	Asbestos Not Detected
7A to 7C	Wall Mortar- gray & white/smooth	Asbestos Not Detected
8A to 8C	Roof underlay- gray cement and tar paper	Asbestos Not Detected



**Analytical Results for Asbestos Content in Building Material Bulk Samples**  
**Designated Substances and Hazardous Materials Assessment**  
**Original Building Section**  
**Fort LaSalle (R33)**  
**Royal Military College (RMC), Kingston, Ontario**

Sample Number	Suspect Material Description	Analytical Result
1A to 1C	Sealant- white colour, applied to roof	Asbestos Not Detected
2A to 2C	Sealant- gray colour, applied to joint	Asbestos Not Detected
3A to 3C	Sealant- gray coloured, applied to windows and doors	Asbestos Not Detected
4A to 4C	Wall Mortar- beige, pale	Asbestos Not Detected
5A to 5C	Wall Mortar- dark beige	Asbestos Not Detected
6A to C	Wall Mortar- light beige	Asbestos Not Detected
7A to 7C	Wall Mortar- dark gray, smooth	Asbestos Not Detected
8A to 8C	Wall Mortar- dark gray, white	Asbestos Not Detected
9A to 9C	Wall Mortar- gray/beige, original	Asbestos Not Detected
10A to 10C	Wall Mortar- gray, original	Asbestos Not Detected
11A to 11C	Roof underlay- tar paper	Asbestos Not Detected



**Analytical Results for Asbestos Content in Building Material Bulk Samples**  
**Designated Substances and Hazardous Materials Assessment**  
**Left Wing Building Section**  
**Fort LaSalle (R33)**  
**Royal Military College (RMC), Kingston, Ontario**

Sample Number	Suspect Material Description	Analytical Result
1A to 1C	Sealant- gray colour, applied to joint	Asbestos Not Detected
2A to 2C	Sealant- white colour, applied to roof	Asbestos Not Detected
3A to 3C	Sealant- gray coloured, applied to windows and doors	Asbestos Not Detected
4A to 4C	Wall Mortar- dark gray, original	Asbestos Not Detected
5A to 5C	Wall Mortar- light beige	Asbestos Not Detected
6A to C	Wall Mortar- gray, light, smooth	Asbestos Not Detected
7A to 7C	Wall Mortar- gray	Asbestos Not Detected
8A to 8C	Wall Mortar- dark beige	Asbestos Not Detected
9A to 9C	Roof underlay- tar paper	Asbestos Not Detected



**Analytical Results for Asbestos Content in Building Material Bulk Samples**  
**Designated Substances and Hazardous Materials Assessment**  
**Stone Frigate Dormitory (R23)**  
**Royal Military College (RMC), Kingston, Ontario**

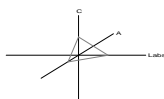
Sample Number	Suspect Material Description	Analytical Result
1A to 1C	Sealant- gray coloured, applied to windows and doors	Asbestos Not Detected
2A to 2C	Mortar/Cement- on mesh	Asbestos Not Detected
3A to 3C	Stone Wall Mortar	Asbestos Not Detected
4A to 4C	Exterior Wall Mortar	Asbestos Not Detected
5A to 5C	Sealant- brown coloured, applied to roof	Asbestos Not Detected
6A to C	Roof underlay- tar paper	Asbestos Not Detected

## **Appendix 3**

## **Laboratory Certificate of Analysis – Asbestos**

**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**

#### **EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project: B-12522  
Reference #: CBR15124503

Date: 12/28/2015

#### **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 performed. Calibrated liquid refractive oils are used as liquid mounting 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 conjunction 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 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 by 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 detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 0.50% 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). 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 of 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. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

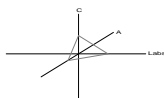
*Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM  
LDEQ*

*TDH 30-0370*

**CA Labs**  
Dedicated to  
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**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:** B-12522 **CA Labs Project #:** CBR15124503

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

**No Asbestos Detected.**

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

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

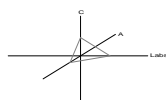
ca - carbonate  
gypsum - gypsum  
bi - binder  
or - organic  
ma - matrix  
mi - mica  
ve - vermiculite  
ot - other

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)

This report relates to the items tested. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.



## Polarized Light Asbestiform Materials Characterization

**Customer Info:** **Attn:**  
**EnGlobe Corp**  
417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868  
Fax # 519-680-3870

**Customer Project:**

B-12522

**Turnaround Time:** 5 day

**CA Labs Project #:**  
CBR15124503

**Date:** 12/28/2015

**Samples Received:** 12/22/2015

**Date Of Sampling:**

**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
1A		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
1B		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
1C		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
2A		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
2B		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
2C		1	Gray Sealant	Y	<b>None Deteced</b>		100% qu, ca, bi
3A		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

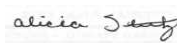
identification of asbestos types by dispersion attaining / becke line method.

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:



Chris Williams  
Analyst

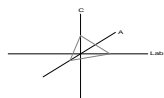


Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124503

Date: 12/28/2015

Samples Received: 12/22/2015

Date Of Sampling:

Purchase Order #: A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

3B		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

3C		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

4A		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

4B		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

4C		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

5A		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

5B		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

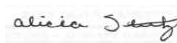
identification of asbestos types by dispersion attaining / becke line method.

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:



Chris Williams  
Analyst



Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

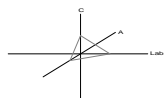
1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers  
2. Fire Damage no significant fiber damages effecting fibrous percentages  
3. Actinolite in association with Vermiculite  
4. Layer not analyzed - attached to previous positive layer and contamination is suspected  
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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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**Polarized Light Asbestiform Materials Characterization**

**Customer Info: Attn:**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

**Customer Project:**

B-12522

**CA Labs Project #:**

CBR15124503

Phone # 519-680-3868

Fax # 519-680-3870

**Turnaround Time:** 5 day

**Date:** 12/28/2015

**Samples Received:** 12/22/2015

**Date Of Sampling:**

**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

5C		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

6A		1	Gray Plaster	Y	<b>None Deteced</b>	2% ce	98% qu, ca
----	--	---	--------------	---	---------------------	-------	------------

6B		1	Gray Plaster	Y	<b>None Deteced</b>	2% ce	98% qu, ca
----	--	---	--------------	---	---------------------	-------	------------

6C		1	Gray Plaster	Y	<b>None Deteced</b>	2% ce	98% qu, ca
----	--	---	--------------	---	---------------------	-------	------------

7A		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

7B		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

7C		1	Gray Plaster	Y	<b>None Deteced</b>		100% qu, ca
----	--	---	--------------	---	---------------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

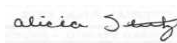
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bi - binder	ot - other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:



Chris Williams  
Analyst



Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

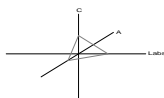
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Fax 225-751-5634

**Polarized Light Asbestiform Materials Characterization**

**Customer Info: Attn:**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

**Customer Project:**

B-12522

**CA Labs Project #:**

CBR15124503

Phone # 519-680-3868

Fax # 519-680-3870

**Turnaround Time:** 5 day

**Date:** 12/28/2015

**Samples Received:** 12/22/2015

**Date Of Sampling:**

**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

8A		1	Black Felt	Y	None Deteced	30% ce	70% qu, bi
----	--	---	------------	---	--------------	--------	------------

		2	Tan Plaster	Y	None Deteced	2% ce	98% qu, ca
--	--	---	-------------	---	--------------	-------	------------

8B		1	Black Felt	Y	None Deteced	30% ce	70% qu, bi
----	--	---	------------	---	--------------	--------	------------

		2	Tan Plaster	Y	None Deteced	2% ce	98% qu, ca
--	--	---	-------------	---	--------------	-------	------------

8C		1	Black Felt	Y	None Deteced	30% ce	70% qu, bi
----	--	---	------------	---	--------------	--------	------------

		2	Tan Plaster	Y	None Deteced	2% ce	98% qu, ca
--	--	---	-------------	---	--------------	-------	------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

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:

Chris Williams  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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

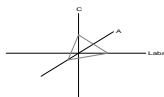
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



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**Crisp Analytical, L.L.C.**

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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**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project: B1-2522  
Reference #: CBR15124501

Date: 12/29/2015

#### **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 performed. Calibrated liquid refractive oils are used as liquid mounting 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 conjunction 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 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 by 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 detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 0.50% 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). 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 of 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. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

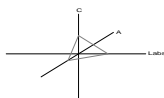
Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM  
LDEQ

TDH 30-0370

**CA Labs**  
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**Crisp Analytical, L.L.C.**

1929 Old Denton Road  
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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:** B1-2522 **CA Labs Project #:** CBR15124501

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

**No Asbestos Detected.**

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

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

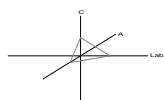
ca - carbonate  
gypsum - gypsum  
bi - binder  
or - organic  
ma - matrix  
mi - mica  
ve - vermiculite  
ot - other

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)

This report relates to the items tested. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road

London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B1-2522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124501

Date:

12/29/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

1A		1	White Sealant	Y	None Detected		100% qu, ma
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1B		1	White Sealant	Y	None Detected		100% qu, ma
----	--	---	---------------	---	---------------	--	-------------

1C		1	White Sealant	Y	None Detected		100% qu, ma
----	--	---	---------------	---	---------------	--	-------------

2A		1	Gray Sealant	Y	None Detected		100% qu, ma
----	--	---	--------------	---	---------------	--	-------------

2B		1	Gray Sealant	Y	None Detected		100% qu, ma
----	--	---	--------------	---	---------------	--	-------------

2C		1	Gray Sealant	Y	None Detected		100% qu, ma
----	--	---	--------------	---	---------------	--	-------------

3A		1	Gray Sealant	Y	None Detected		100% qu, ma
----	--	---	--------------	---	---------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

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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:

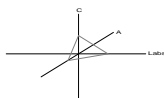
Stanley Massett III  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B1-2522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124501

Date:

12/29/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

3B		1	Gray Sealant	Y	<b>None Detected</b>		100% qu, ma
----	--	---	--------------	---	----------------------	--	-------------

3C		1	Gray Sealant	Y	<b>None Detected</b>		100% qu, ma
----	--	---	--------------	---	----------------------	--	-------------

4A		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

4B		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

4C		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

5A		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

5B		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

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:

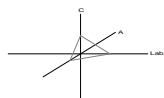
Stanley Massett III  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damage 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



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B1-2522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124501

Date:

12/29/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

5C		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

6A		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

6B		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

6C		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

7A		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

7B		1	Gray Plaster	Y	<b>None Detected</b>		10% qu, ca
----	--	---	--------------	---	----------------------	--	------------

7C		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

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:

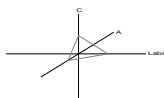
Stanley Massett III  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B1-2522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124501

Date:

12/29/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

8A		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

8B		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

8C		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

9A		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

9B		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

9C		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
----	--	---	-------------	---	----------------------	--	-------------

10A		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
-----	--	---	-------------	---	----------------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
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Approved Signatories:

Stanley Massett III  
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Senior Analyst  
Alicia Stretz

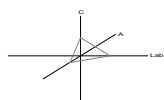
Laboratory Director  
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
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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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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:**  
**EnGlobe Corp**  
417 Exeter Road  
London, Ontario, Canada N6E 2Z3

**Customer Project:**

**CA Labs Project #:**  
CBR15124501

Phone # 519-680-3868  
Fax # 519-680-3870

B1-2522  
**Turnaround Time:** 5 day

**Date:** 12/29/2015  
**Samples Received:** 12/22/2015

**Date Of Sampling:**  
**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
10B		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
10C		1	Gray Mortar	Y	<b>None Detected</b>		100% qu, ca
11A		1	Black Felt	Y	<b>None Detected</b>	30% ce	70% qu, bi
11B		1	Black Felt	Y	<b>None Detected</b>	30% ce	70% qu, bi
11C		1	Black Felt	Y	<b>None Detected</b>	30% ce	70% qu, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)  
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.

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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)
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Approved Signatories:

Stanley Massett III  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

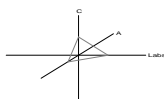
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6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
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9. < 1% Result point counted positive
10. TEM analysis suggested

**CA Labs**  
Dedicated to  
Quality

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**CA Labs, L.L.C.**

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

**Materials Characterization - Bulk Asbestos Analysis**

**Laboratory Analysis Report - Polarized Light**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project: B-12522

Reference #: CBR15124504

Date: 12/28/2015

**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 mounting 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 conjunction 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 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 by 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 detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 0.50% 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). 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 of 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. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM  
LDEQ

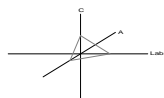
TDH 30-0370



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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**

<b>Customer Project:</b> B-12522			<b>CA Labs Project #:</b> CBR15124504	
Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

**No Asbestos Detected.**

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

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

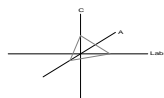
ca - carbonate  
gypsum - gypsum  
bi - binder  
or - organic  
ma - matrix  
mi - mica  
ve - vermiculite  
ot - other

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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## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124504

Date:

12/28/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

1A		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
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1B		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
----	--	---	--------------	---	----------------------	-------	----------------

1C		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
----	--	---	--------------	---	----------------------	-------	----------------

2A		1	Off-White Sealant	Y	<b>None Detected</b>		100% qu, ca, bi
----	--	---	-------------------	---	----------------------	--	-----------------

2B		1	Off-White Sealant	Y	<b>None Detected</b>		100% qu, ca, bi
----	--	---	-------------------	---	----------------------	--	-----------------

2C		1	Off-White Sealant	Y	<b>None Detected</b>		100% qu, ca, bi
----	--	---	-------------------	---	----------------------	--	-----------------

3A		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
----	--	---	--------------	---	----------------------	-------	----------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

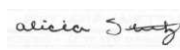
identification of asbestos types by dispersion attaining / becke line method.

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:



Chris Williams  
Analyst

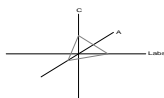


Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124504

Date:

12/28/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

3B		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
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3C		1	Gray Sealant	Y	<b>None Detected</b>	2% ce	98% qu, ca, bi
----	--	---	--------------	---	----------------------	-------	----------------

4A		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

4B		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

4C		1	Gray Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
----	--	---	--------------	---	----------------------	-------	------------

5A		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
----	--	---	-------------	---	----------------------	-------	------------

5B		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
----	--	---	-------------	---	----------------------	-------	------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

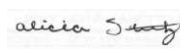
identification of asbestos types by dispersion attaining / becke line method.

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:



Chris Williams  
Analyst

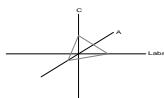


Senior Analyst  
Alicia Stretz

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8. Favorable scenario for water separation on vermiculite for possible analysis by another method  
9. < 1% Result point counted positive  
10. TEM analysis suggested



## Polarized Light Asbestiform Materials Characterization

**Customer Info:** **Attn:**  
**EnGlobe Corp**  
417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868  
Fax # 519-680-3870

**Customer Project:**  
B-12522  
**Turnaround Time:** 5 day

**CA Labs Project #:**  
CBR15124504

**Date:** 12/28/2015  
**Samples Received:** 12/22/2015

**Date Of Sampling:**  
**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
5C		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
6A		1	Gray Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
6B		1	Gray Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
6C		1	Gray Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
7A		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
7B		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca
7C		1	Tan Plaster	Y	<b>None Detected</b>	2% ce	98% qu, ca

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

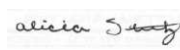
Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)  
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke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



Chris Williams  
Analyst

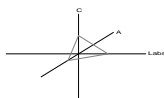


Senior Analyst  
Alicia Stretz

Laboratory Director  
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9. < 1% Result point counted positive  
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## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124504

Date:

12/28/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
8A		1	Tan Plaster	Y	None Detected	2% ce	98% qu, ca
8B		1	Tan Plaster	Y	None Detected	2% ce	98% qu, ca
8C		1	Tan Plaster	Y	None Detected	2% ce	98% qu, ca
9A		1	Black Felt	Y	None Detected	30% ce	70% qu, bi
9B		1	Black Felt	Y	None Detected	30% ce	70% qu, bi
9C		1	Black Felt	Y	None Detected	30% ce	70% qu, bi

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

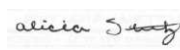
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gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:



Chris Williams  
Analyst



Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

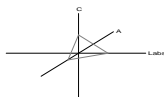
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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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**Crisp Analytical, L.L.C.**

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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**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project: B-12522

Reference #: CBR15124502

Date: 12/28/2015

**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 mounting 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 conjunction 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 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 by 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 detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 0.50% 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). 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 of 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. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

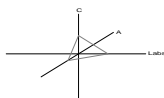
Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM  
LDEQ

TDH 30-0370

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Quality

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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:** B-12522 **CA Labs Project #:** CBR15124502

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

**No Asbestos Detected.**

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

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

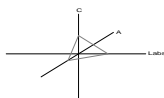
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gypsum - gypsum  
bi - binder  
or - organic  
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pe - perlite  
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br - brucite  
ka - kaolin (clay)

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## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124502

Date:

12/28/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Phone # 519-680-3868

Fax # 519-680-3870

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

1A		1	Gray Surfaced Tan Sealant	N	<b>None Detected</b>	2% ce	98% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

1B		1	Tan Sealant	Y	<b>None Detected</b>	2% ce	98% qu, bi, ca
----	--	---	-------------	---	----------------------	-------	----------------

1C		1	Tan Sealant	Y	<b>None Detected</b>	2% ce	98% qu, bi, ca
----	--	---	-------------	---	----------------------	-------	----------------

2A		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

2B		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

2C		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

2D		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

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ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

*Alicia Stretz*

Alicia Stretz  
Analyst

*Chris Williams*

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze

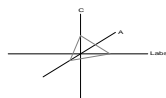
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



**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:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

**Customer Project:**

B-12522

**Turnaround Time:** 5 day

**CA Labs Project #:**

CBR15124502

**Date:**

12/28/2015

**Samples Received:**

12/22/2015

**Date Of Sampling:**

**Purchase Order #:**

A02282

Phone # 519-680-3868

Fax # 519-680-3870

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

2E		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

2F		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

2G		1	Tan Surfaced Gray Plaster	N	<b>None Detected</b>	3% fg	97% qu, bi, ca
----	--	---	---------------------------	---	----------------------	-------	----------------

3A		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

3B		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

3C		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

3D		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

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:

*Alicia Stretz*

Alicia Stretz  
Analyst

*Chris Williams*

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

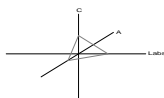
1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
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9. < 1% Result point counted positive
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**CA Labs**  
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Quality

**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:**

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Phone # 519-680-3868

Fax # 519-680-3870

**Customer Project:**

B-12522

**Turnaround Time:** 5 day

**CA Labs Project #:**

CBR15124502

**Date:**

12/28/2015

**Samples Received:**

12/22/2015

**Date Of Sampling:**

**Purchase Order #:**

A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

3E		1	Gray Plaster	Y	<b>None Detected</b>		100% qu, ca
----	--	---	--------------	---	----------------------	--	-------------

4A		1	Tan Plaster	Y	<b>None Detected</b>		100% qu, ot, ca
----	--	---	-------------	---	----------------------	--	-----------------

4B		1	Tan Plaster	Y	<b>None Detected</b>		100% qu, ot, ca
----	--	---	-------------	---	----------------------	--	-----------------

4C		1	Tan Plaster	Y	<b>None Detected</b>		100% qu, ot, ca
----	--	---	-------------	---	----------------------	--	-----------------

4D		1	Tan Plaster	Y	<b>None Detected</b>		100% qu, ot, ca
----	--	---	-------------	---	----------------------	--	-----------------

4E		1	Tan Plaster	Y	<b>None Detected</b>		100% qu, ot, ca
----	--	---	-------------	---	----------------------	--	-----------------

5A		1	Brown Sealant	Y	<b>None Detected</b>		100 qu, bi, ca
----	--	---	---------------	---	----------------------	--	----------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

**LDEQ**

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

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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:

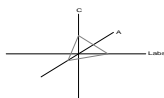
Alicia Stretz  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested



## Polarized Light Asbestiform Materials Characterization

Customer Info: Attn:

**EnGlobe Corp**

417 Exeter Road  
London, Ontario, Canada N6E 2Z3

Customer Project:

B-12522

Turnaround Time: 5 day

CA Labs Project #:

CBR15124502

Date:

12/28/2015

Samples Received:

12/22/2015

Date Of Sampling:

Purchase Order #:

A02282

Phone # 519-680-3868

Fax # 519-680-3870

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
----------	-------------	------------	---	-------------------------------	--	--------------------------------------	-------------------------------

5B		1	Brown Sealant	Y	None Detected		100 qu, bi, ca
----	--	---	---------------	---	---------------	--	----------------

5C		1	Brown Sealant	Y	None Detected		100 qu, bi, ca
----	--	---	---------------	---	---------------	--	----------------

6A		1	Black Roofing	Y	None Detected	40% ce	60% qu, bi
----	--	---	---------------	---	---------------	--------	------------

		2	Brown Paper	Y	None Detected	100% ce	
--	--	---	-------------	---	---------------	---------	--

6B		1	Black Roofing	Y	None Detected	40% ce	60% qu, bi
----	--	---	---------------	---	---------------	--------	------------

		2	Brown Paper	Y	None Detected	100% ce	
--	--	---	-------------	---	---------------	---------	--

6C		1	Black Roofing	Y	None Detected	40% ce	60% qu, bi
----	--	---	---------------	---	---------------	--------	------------

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)

Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for

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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:

Alicia Stretz  
Analyst

Senior Analyst  
Alicia Stretz

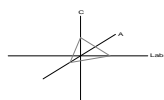
Laboratory Director  
Chris Williams

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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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Dedicated to  
Quality

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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:**  
**EnGlobe Corp**  
417 Exeter Road  
London, Ontario, Canada N6E 2Z3

**Customer Project:**  
B-12522  
**Turnaround Time:** 5 day

**CA Labs Project #:**  
CBR15124502

**Phone #** 519-680-3868  
**Fax #** 519-680-3870

**Date:** 12/28/2015  
**Samples Received:** 12/22/2015

**Date Of Sampling:**  
**Purchase Order #:** A02282

Sample #	Com ment	Layer #	Analysts Physical Description of Subsample	Homo- geneo us (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
2	Brown Paper			Y	None Detected	100% ce	

Baton Rouge NVLAP Lab Code 200772-0 TEM/PLM

TDH 30-0370

### LDEQ

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)  
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:

Alicia Stretz  
Analyst

Senior Analyst  
Alicia Stretz

Laboratory Director  
Chris Williams

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2. Fire Damage no significant fiber damages effecting fibrous percentages
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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

CBR15124503

# CHAIN OF CUSTODY

LVM Contact:

[Allen.Jackson@englobecorp.com](mailto:Allen.Jackson@englobecorp.com)

Phone No.:

(519) 680-3868

Laboratory:

CA Labs

Address:

12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809

Contact:

Phone: 225-751-5632

Fax: 225-751-5634

Project No.:

B-12522

Purchase Order No.:

A02282

**Sample Analysis:**

**Asbestos PLM (EPA/600/R-93/116)**

**Employ "Positive Stop" Analysis**

Read until result of >0.49% asbestos

Report Results:

Via Email

TAT Required:			5-day
---------------	--	--	-------

Sample Number	Suspect Material Description
1A to 1C	Sealant- gray colour, applied to window and doors
2A to 2C	Sealant- gray colour, applied to joint
3A to 3C	Wall Mortar- gray, original
4A to 4C	Wall Mortar- light gray, smooth
5A to 5C	Wall Mortar- light beige
6A to C	Wall Mortar- dark beige
7A to 7C	Wall Mortar- gray & white/smooth
8A to 8C	Roof underlay- gray cement and tar paper

Dad D✓

12/22/15  
12:00 pm



CBR15124501

# CHAIN OF CUSTODY

LVM Contact: [Allen.Jackson@englobecorp.com](mailto:Allen.Jackson@englobecorp.com)  
 Phone No.: (519) 680-3868  
 Laboratory: CA Labs  
 Address: 12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809  
 Contact: Phone: 225-751-5632 Fax: 225-751-5634  
 Project No.: B-12522  
 Purchase Order No.: A02282  
 Sample Analysis: Asbestos PLM (EPA/600/R-93/116) Employ "Positive Stop" Analysis  
 Report Results: Via Email Read until result of >0.49% asbestos

TAT Required:			5-day
33			

Sample Number	Suspect Material Description
1A to 1C	Sealant- white colour, applied to roof
2A to 2C	Sealant- gray colour, applied to joint
3A to 3C	Sealant- gray coloured, applied to windows and doors
4A to 4C	Wall Mortar- beige, pale
5A to 5C	Wall Mortar- dark beige
6A to C	Wall Mortar- light beige
7A to 7C	Wall Mortar- dark gray, smooth
8A to 8C	Wall Mortar- dark gray, white
9A to 9C	Wall Mortar- gray/beige, original
10A to 10C	Wall Mortar- gray, original
11A to 11C	Roof underlay- tar paper

DJ DJ 12/22/15  
 12:00 PM of 1

# CHAIN OF CUSTODY

CBR151241504

LVM Contact: [Allen.Jackson@englobecorp.com](mailto:Allen.Jackson@englobecorp.com)  
 Phone No.: (519) 680-3868  
 Laboratory: CA Labs  
 Address: 12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809  
 Contact: Phone: 225-751-5632 Fax: 225-751-5634  
 Project No.: B-12522  
 Purchase Order No.: A02282  
**Sample Analysis:** Asbestos PLM (EPA/600/R-93/116) **Employ "Positive Stop" Analysis**  
 Report Results: Via Email Read until result of >0.49% asbestos

TAT Required:			5-day
---------------	--	--	-------

Sample Number	Suspect Material Description
1A to 1C	Sealant- gray colour, applied to joint
2A to 2C	Sealant- white colour, applied to roof
3A to 3C	Sealant- gray coloured, applied to windows and doors
4A to 4C	Wall Mortar- dark gray, original
5A to 5C	Wall Mortar- light beige
6A to C	Wall Mortar- gray, light, smooth
7A to 7C	Wall Mortar- gray
8A to 8C	Wall Mortar- dark beige
9A to 9C	Roof underlay- tar paper

David Day  
 12/22/15 12:00 pm

CB1215124502

# CHAIN OF CUSTODY

tact:  
Vo.:  
Laboratory:  
Address:  
Contact:  
Project No.:  
Purchase Order No.:  
**Sample Analysis:**  
Report Results:

[Allen.Jackson@englobecorp.com](mailto:Allen.Jackson@englobecorp.com)  
(519) 680-3868  
CA Labs  
12232 Industriplex Blvd, Suite 32, Baton Rouge, LA 70809  
Phone: 225-751-5632 Fax: 225-751-5634  
B-12522  
A02282  
**Asbestos PLM (EPA/600/R-93/116)**  
Via Email

Employ "Positive Stop" Analysis  
Read until result of >0.49% asbestos

TAT Required:			5-day
---------------	--	--	-------

Sample Number	Suspect Material Description
1A to 1C	Sealant- gray coloured, applied to windows and doors
2A to 2C	Mortar/Cement- on mesh
3A to 3C	Stone Wall Mortar
4A to 4C	Exterior Wall Mortar
5A to 5C	Sealant- brown coloured, applied to roof
6A to C	Roof underlay- tar paper

Dad D/ 12/22/15  
12:00 pm



## **Appendix 4      Laboratory Certificate of Analysis- Bulk Analysis and TCLP**



EnGlobe Corp.  
ATTN: Allen Jackson  
417 Exeter Road  
LONDON ON N6E 2Z3

Date Received: 22-DEC-15  
Report Date: 04-JAN-16 09:15 (MT)  
Version: FINAL

Client Phone: 519-680-3868

## Certificate of Analysis

Lab Work Order #: L1717428

Project P.O. #: A02287

Job Reference: B-12522-6

C of C Numbers:

Legal Site Desc:

Gayle Braun  
Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 309 Exeter Road Unit #29, London, ON N6L 1C1 Canada | Phone: +1 519 652 6044 | Fax: +1 519 652 0671  
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1717428-2 WASTE 07-DEC-15  PB-1	L1717428-3 WASTE 07-DEC-15  PB-2			
Grouping	Analyte					
<b>SOIL</b>						
<b>Physical Tests</b>	% Moisture (%)	<0.10	<0.10			
<b>Metals</b>	Antimony (Sb) (ug/g)	<1.0	<20 <sup>DLHC</sup>			
	Arsenic (As) (ug/g)	<1.0	<20 <sup>DLHC</sup>			
	Barium (Ba) (ug/g)	68.4	6210 <sup>DLHC</sup>			
	Beryllium (Be) (ug/g)	<0.50	<20 <sup>DLHC</sup>			
	Boron (B) (ug/g)	6.4	<1000 <sup>DLHC</sup>			
	Cadmium (Cd) (ug/g)	1.86	5.8 <sup>DLHC</sup>			
	Chromium (Cr) (ug/g)	2.1	150 <sup>DLHC</sup>			
	Cobalt (Co) (ug/g)	247	81 <sup>DLHC</sup>			
	Copper (Cu) (ug/g)	72.7	<100 <sup>DLHC</sup>			
	Lead (Pb) (ug/g)	913	109000 <sup>DLHC</sup>			
	Molybdenum (Mo) (ug/g)	<1.0	<20 <sup>DLHC</sup>			
	Nickel (Ni) (ug/g)	1.5	<100 <sup>DLHC</sup>			
	Selenium (Se) (ug/g)	<1.0	<40 <sup>DLHC</sup>			
	Silver (Ag) (ug/g)	0.79	<20 <sup>DLHC</sup>			
	Thallium (Tl) (ug/g)	<0.50	<10 <sup>DLHC</sup>			
	Uranium (U) (ug/g)	<1.0	<10 <sup>DLHC</sup>			
	Vanadium (V) (ug/g)	2.2	<40 <sup>DLHC</sup>			
	Zinc (Zn) (ug/g)	1090 <sup>DLM</sup>	16900 <sup>DLM</sup>			
<b>Polychlorinated Biphenyls</b>	Aroclor 1242 (ug/g)	<1.0 <sup>DLM</sup>	<1.0 <sup>DLM</sup>			
	Aroclor 1248 (ug/g)	<1.0 <sup>DLM</sup>	<1.0 <sup>DLM</sup>			
	Aroclor 1254 (ug/g)	<1.0 <sup>DLM</sup>	25.4 <sup>DLHC</sup>			
	Aroclor 1260 (ug/g)	<1.0 <sup>DLM</sup>	<3.1 <sup>DLM</sup>			
	Total PCBs (ug/g)	<2.0 <sup>DLM</sup>	25.4 <sup>DLM</sup>			
	Surrogate: d14-Terphenyl (%)	102.2	103.2			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1717428-1 WASTE 07-DEC-15  TCLP (ROOFING MATERIALS)	L1717428-4 WASTE 07-DEC-15  COMPOSITE PB-1 & PB-2			
Grouping	Analyte					
<b>WASTE</b>						
Sample Preparation	Initial pH (pH units)	5.75	5.75			
	Final pH (pH units)	5.22 <sup>LTIS</sup>	5.38 <sup>LTIS</sup>			
TCLP Extractables	Acenaphthene (mg/L)	<0.0050				
	Acenaphthylene (mg/L)	<0.0050				
	Anthracene (mg/L)	<0.0050				
	Aroclor 1242 (mg/L)	<0.00020	<0.00020			
	Aroclor 1248 (mg/L)	<0.00020	<0.00020			
	Aroclor 1254 (mg/L)	<0.00020	<0.00020			
	Aroclor 1260 (mg/L)	<0.00020	<0.00020			
	Benzo(a)anthracene (mg/L)	<0.0050				
	Benzo(a)pyrene (mg/L)	<0.0010				
	Benzo(b)fluoranthene (mg/L)	<0.0050				
	Benzo(g,h,i)perylene (mg/L)	<0.0050				
	Total PCBs (mg/L)	<0.00040	<0.00040			
	Surrogate: 2-Fluorobiphenyl (%)	117.7 <sup>LTIS</sup>	118.2 <sup>LTIS</sup>			
TCLP Metals	Arsenic (As) (mg/L)	<0.050 <sup>LTIS</sup>	<0.50 <sup>LTIS</sup>			
	Barium (Ba) (mg/L)	<0.50 <sup>LTIS</sup>	<5.0 <sup>LTIS</sup>			
	Boron (B) (mg/L)	<2.5 <sup>LTIS</sup>	<25 <sup>LTIS</sup>			
	Cadmium (Cd) (mg/L)	<0.0050 <sup>LTIS</sup>	<0.050 <sup>LTIS</sup>			
	Chromium (Cr) (mg/L)	<0.050 <sup>LTIS</sup>	<0.50 <sup>LTIS</sup>			
	Lead (Pb) (mg/L)	0.188 <sup>LTIS</sup>	135 <sup>LTIS</sup>			
	Mercury (Hg) (mg/L)	<0.00010 <sup>LTIS</sup>	0.00217 <sup>LTIS</sup>			
	Selenium (Se) (mg/L)	<0.25 <sup>LTIS</sup>	<2.5 <sup>LTIS</sup>			
	Silver (Ag) (mg/L)	<0.0050 <sup>LTIS</sup>	<0.050 <sup>LTIS</sup>			
	Uranium (U) (mg/L)	<0.25 <sup>LTIS</sup>	<2.5 <sup>LTIS</sup>			
Polycyclic Aromatic Hydrocarbons	Benzo(k)fluoranthene (mg/L)	<0.0050				
	Chrysene (mg/L)	<0.0050				
	Dibenzo(ah)anthracene (mg/L)	<0.0050				
	Fluoranthene (mg/L)	<0.0050				
	Fluorene (mg/L)	<0.0050				
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0050				
	Naphthalene (mg/L)	<0.0050				
	Phenanthrene (mg/L)	<0.0050				
	Pyrene (mg/L)	<0.0050				
	Quinoline (mg/L)	0.0107				
	Surrogate: d10-Acenaphthene (%)	107.0				

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1717428-1	L1717428-4			
		Description	WASTE	WASTE			
		Sampled Date	07-DEC-15	07-DEC-15			
		Sampled Time					
		Client ID	TCLP (ROOFING MATERIALS)	COMPOSITE PB-1 & PB-2			
Grouping	Analyte						
<b>WASTE</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>	Surrogate: d12-Chrysene (%)	61.0					
	Surrogate: d8-Naphthalene (%)	99.5					
	Surrogate: d10-Phenanthrene (%)	105.5					

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Chromium (Cr)	DUP-H	L1717428-2, -3
Laboratory Control Sample	Naphthalene	LCS-H	L1717428-1
Matrix Spike	Chromium (Cr)	MS-B	L1717428-1, -4
Matrix Spike	Chromium (Cr)	MS-B	L1717428-1, -4
Matrix Spike	Naphthalene	RRQC	L1717428-1
<b>Comments:</b> RRQC: Matrix Spike recovery was above ALS DQO. Non-detected sample results are considered reliable.			

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
LTIS	Limited sample was available for TCLP inorganics and semi-volatiles extraction (< 100 grams). Extraction fluid volume and/or other elements of the TCLP method were scaled down proportionately to permit analysis. Test results from modified TCLP procedures may be unsuitable for regulatory purposes.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRQC	Refer to report remarks for information regarding this QC result.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>HG-TCLP-WT</b>	Waste	Mercury (CVAA) for O.Reg 347	SW846 7470A
<b>LEACH-TCLP-WT</b>	Waste	Leachate Procedure for Reg 347	EPA 1311
Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).			
<b>MET-200.2-CCMS-WT</b>	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.			
Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
<b>MET-TCLP-WT</b>	Waste	O.Reg 347 TCLP Leachable Metals	EPA 200.8
<b>MOISTURE-WT</b>	Soil	% Moisture	Gravimetric: Oven Dried
<b>PAH-TCLP-WT</b>	Waste	PAH for O. Reg 347	SW846 8270 (PAH)
Samples are leached according to TCLP protocol and then the aqueous leachate is extracted and the resulting extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.			
<b>PCB-511-WT</b>	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082
An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
<b>PCB-TCLP-WT</b>	Waste	PCBs for O. Reg 347	SW846 8270

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

### Chain of Custody Numbers:

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg ww* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

*<* - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

## Quality Control Report

Workorder: L1717428

Report Date: 04-JAN-16

Page 1 of 8

Client: EnGlobe Corp.  
417 Exeter Road  
LONDON ON N6E 2Z3

Contact: Allen Jackson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-200.2-CCMS-WT Soil</b>								
<b>Batch</b>	<b>R3352749</b>							
<b>WG2237863-2 CRM</b>		<b>WT-CANMET-TILL1</b>						
Antimony (Sb)			103.9		%		70-130	29-DEC-15
Arsenic (As)			115.1		%		70-130	29-DEC-15
Barium (Ba)			124.0		%		70-130	29-DEC-15
Beryllium (Be)			114.9		%		70-130	29-DEC-15
Cadmium (Cd)			110.5		%		70-130	29-DEC-15
Chromium (Cr)			118.9		%		70-130	29-DEC-15
Cobalt (Co)			113.5		%		70-130	29-DEC-15
Copper (Cu)			107.7		%		70-130	29-DEC-15
Lead (Pb)			98.4		%		70-130	29-DEC-15
Molybdenum (Mo)			110.0		%		70-130	29-DEC-15
Nickel (Ni)			113.0		%		70-130	29-DEC-15
Selenium (Se)			103.2		%		70-130	29-DEC-15
Silver (Ag)			106.6		%		70-130	29-DEC-15
Thallium (Tl)			104.8		%		70-130	29-DEC-15
Uranium (U)			114.5		%		70-130	29-DEC-15
Vanadium (V)			120.9		%		70-130	29-DEC-15
Zinc (Zn)			108.2		%		70-130	29-DEC-15
<b>WG2237863-4 LCS</b>		<b>1+2</b>						
Antimony (Sb)			103.5		%		80-120	29-DEC-15
Arsenic (As)			102.4		%		80-120	29-DEC-15
Barium (Ba)			104.2		%		80-120	29-DEC-15
Beryllium (Be)			104.3		%		80-120	29-DEC-15
Boron (B)			102.1		%		80-120	29-DEC-15
Cadmium (Cd)			97.4		%		80-120	29-DEC-15
Chromium (Cr)			103.6		%		80-120	29-DEC-15
Cobalt (Co)			101.3		%		80-120	29-DEC-15
Copper (Cu)			99.1		%		80-120	29-DEC-15
Lead (Pb)			98.3		%		80-120	29-DEC-15
Molybdenum (Mo)			105.1		%		80-120	29-DEC-15
Nickel (Ni)			101.2		%		80-120	29-DEC-15
Selenium (Se)			103.2		%		80-120	29-DEC-15
Silver (Ag)			99.9		%		80-120	29-DEC-15
Thallium (Tl)			92.5		%		80-120	29-DEC-15
Uranium (U)			96.8		%		80-120	29-DEC-15



## Quality Control Report

Workorder: L1717428

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-200.2-CCMS-WT</b>								
<b>Soil</b>								
<b>Batch</b>	<b>R3352749</b>							
<b>WG2237863-4</b>	<b>LCS</b>	<b>1+2</b>						
Vanadium (V)			103.4		%		80-120	29-DEC-15
Zinc (Zn)			95.7		%		80-120	29-DEC-15
<b>WG2237863-1</b>	<b>MB</b>							
Antimony (Sb)			<0.10		mg/kg		0.1	29-DEC-15
Arsenic (As)			<0.10		mg/kg		0.1	29-DEC-15
Barium (Ba)			<0.50		mg/kg		0.5	29-DEC-15
Beryllium (Be)			<0.10		mg/kg		0.1	29-DEC-15
Boron (B)			<5.0		mg/kg		5	29-DEC-15
Cadmium (Cd)			<0.020		mg/kg		0.02	29-DEC-15
Chromium (Cr)			<0.50		mg/kg		0.5	29-DEC-15
Cobalt (Co)			<0.10		mg/kg		0.1	29-DEC-15
Copper (Cu)			<0.50		mg/kg		0.5	29-DEC-15
Lead (Pb)			<0.50		mg/kg		0.5	29-DEC-15
Molybdenum (Mo)			<0.10		mg/kg		0.1	29-DEC-15
Nickel (Ni)			<0.50		mg/kg		0.5	29-DEC-15
Selenium (Se)			<0.20		mg/kg		0.2	29-DEC-15
Silver (Ag)			<0.10		mg/kg		0.1	29-DEC-15
Thallium (Tl)			<0.050		mg/kg		0.05	29-DEC-15
Uranium (U)			<0.050		mg/kg		0.05	29-DEC-15
Vanadium (V)			<0.20		mg/kg		0.2	29-DEC-15
Zinc (Zn)			<2.0		mg/kg		2	29-DEC-15
<b>MOISTURE-WT</b>								
<b>Soil</b>								
<b>Batch</b>	<b>R3345998</b>							
<b>WG2237145-2</b>	<b>LCS</b>							
% Moisture			98.3		%		90-110	24-DEC-15
<b>WG2237145-1</b>	<b>MB</b>							
% Moisture			<0.10		%		0.1	24-DEC-15
<b>PCB-511-WT</b>								
<b>Soil</b>								
<b>Batch</b>	<b>R3351013</b>							
<b>WG2237168-2</b>	<b>LCS</b>							
Aroclor 1242			103.4		%		60-140	30-DEC-15
Aroclor 1248			109.0		%		60-140	30-DEC-15
Aroclor 1254			100.1		%		60-140	30-DEC-15
Aroclor 1260			113.9		%		60-140	30-DEC-15
<b>WG2237168-1</b>	<b>MB</b>							



## Quality Control Report

Workorder: L1717428

Report Date: 04-JAN-16

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>PAH-TCLP-WT</b>		<b>Waste</b>						
<b>Batch</b>	<b>R3352317</b>							
<b>WG2239034-2</b>	<b>LCS</b>							
Acenaphthene			102.0		%		50-130	31-DEC-15
Acenaphthylene			103.6		%		50-130	31-DEC-15
Anthracene			98.8		%		50-130	31-DEC-15
Benzo(a)anthracene			100.3		%		50-140	31-DEC-15
Benzo(a)pyrene			102.0		%		60-140	31-DEC-15
Benzo(b)fluoranthene			99.6		%		50-140	31-DEC-15
Benzo(g,h,i)perylene			106.7		%		50-140	31-DEC-15
Benzo(k)fluoranthene			100.3		%		50-150	31-DEC-15
Chrysene			99.4		%		50-140	31-DEC-15
Dibenzo(ah)anthracene			106.2		%		50-140	31-DEC-15
Fluoranthene			102.6		%		50-150	31-DEC-15
Fluorene			101.9		%		50-150	31-DEC-15
Indeno(1,2,3-cd)pyrene			100.9		%		50-140	31-DEC-15
Naphthalene			167.9	LCS-H	%		50-130	31-DEC-15
Phenanthrene			100.0		%		50-130	31-DEC-15
Pyrene			109.9		%		50-140	31-DEC-15
Quinoline			130.1		%		50-150	31-DEC-15
<b>WG2239034-1</b>	<b>MB</b>							
Acenaphthene			<0.0050		mg/L		0.005	31-DEC-15
Acenaphthylene			<0.0050		mg/L		0.005	31-DEC-15
Anthracene			<0.0050		mg/L		0.005	31-DEC-15
Benzo(a)anthracene			<0.0050		mg/L		0.005	31-DEC-15
Benzo(a)pyrene			<0.0010		mg/L		0.001	31-DEC-15
Benzo(b)fluoranthene			<0.0050		mg/L		0.005	31-DEC-15
Benzo(g,h,i)perylene			<0.0050		mg/L		0.005	31-DEC-15
Benzo(k)fluoranthene			<0.0050		mg/L		0.005	31-DEC-15
Chrysene			<0.0050		mg/L		0.005	31-DEC-15
Dibenzo(ah)anthracene			<0.0050		mg/L		0.005	31-DEC-15
Fluoranthene			<0.0050		mg/L		0.005	31-DEC-15
Fluorene			<0.0050		mg/L		0.005	31-DEC-15
Indeno(1,2,3-cd)pyrene			<0.0050		mg/L		0.005	31-DEC-15
Naphthalene			<0.0050		mg/L		0.005	31-DEC-15
Phenanthrene			<0.0050		mg/L		0.005	31-DEC-15
Pyrene			<0.0050		mg/L		0.005	31-DEC-15



## Quality Control Report

Workorder: L1717428

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-TCLP-WT		Waste						
Batch	R3352553							
WG2239040-1	MB							
Aroclor 1242			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1248			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1254			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1260			<0.00020		mg/L		0.0002	31-DEC-15
Surrogate: 2-Fluorobiphenyl			103.2		%		40-160	31-DEC-15
WG2239040-3	MB							
Aroclor 1242			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1248			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1254			<0.00020		mg/L		0.0002	31-DEC-15
Aroclor 1260			<0.00020		mg/L		0.0002	31-DEC-15
Surrogate: 2-Fluorobiphenyl			138.4		%		40-160	31-DEC-15

# Quality Control Report

Workorder: L1717428

Report Date: 04-JAN-16

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## Legend:

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Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

---

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

---

# Quality Control Report

Workorder: L1717428

Report Date: 04-JAN-16

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## Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
<b>Physical Tests</b>							
% Moisture	2	07-DEC-15	24-DEC-15 09:53	14	17	days	EHTR
	3	07-DEC-15	24-DEC-15 09:54	14	17	days	EHTR
<b>TCLP Extractables</b>							
PAH for O. Reg 347	1	07-DEC-15	30-DEC-15 13:34	14	23	days	EHTR

## Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.  
EHTR: Exceeded ALS recommended hold time prior to sample receipt.  
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
EHT: Exceeded ALS recommended hold time prior to analysis.  
Rec. HT: ALS recommended hold time (see units).

### Notes\*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.  
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1717428 were received on 22-DEC-15 15:10.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

[illegible]





EnGlobe Corp.  
ATTN: Allen Jackson  
417 Exeter Road  
LONDON ON N6E 2Z3

Date Received: 27-JAN-16  
Report Date: 28-JAN-16 13:48 (MT)  
Version: FINAL

Client Phone: 519-680-3868

## Certificate of Analysis

Lab Work Order #: L1727479

Project P.O. #: A02306

Job Reference: B-12522-6

C of C Numbers:

Legal Site Desc:

Gayle Braun  
Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 309 Exeter Road Unit #29, London, ON N6L 1C1 Canada | Phone: +1 519 652 6044 | Fax: +1 519 652 0671  
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

		<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L1727479-1 WASTE 13-JAN-16  3D (RW)	L1727479-2 WASTE 13-JAN-16  4D (LW)	L1727479-3 WASTE 13-JAN-16  6D (LW)	L1727479-4 WASTE 13-JAN-16  7D (LW)	L1727479-5 WASTE 13-JAN-16  6D (ORIG)
<b>Grouping</b>	<b>Analyte</b>						
<b>SOIL</b>							
<b>Metals</b>	Lead (Pb) (ug/g)	92.2	66.1	12.2	17.5	12.2	

		Sample ID Description Sampled Date Sampled Time Client ID	L1727479-6 WASTE 13-JAN-16  9D (ORIG)				
Grouping	Analyte						
SOIL							
Metals	Lead (Pb) (ug/g)	18.8					

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
---------------	--------	------------------	--------------------

<b>MET-200.2-CCMS-WT</b>	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)
--------------------------	------	-----------------------------	-----------------------

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CRC ICPMS.

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction, depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
----------------------------	---------------------

### Chain of Custody Numbers:

#### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



## Quality Control Report

Workorder: L1727479

Report Date: 28-JAN-16

Page 1 of 2

Client: EnGlobe Corp.  
417 Exeter Road  
LONDON ON N6E 2Z3

Contact: Allen Jackson

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-200.2-CCMS-WT</b>		<b>Soil</b>						
<b>Batch R3389217</b>								
<b>WG2252133-2</b>	<b>CRM</b>	<b>WT-CANMET-TILL1</b>						
Lead (Pb)			84.4		%		70-130	28-JAN-16
<b>WG2252133-4</b>	<b>LCS</b>	<b>1+2</b>						
Lead (Pb)			105.1		%		80-120	28-JAN-16
<b>WG2252133-1</b>	<b>MB</b>							
Lead (Pb)			<0.50		mg/kg		0.5	28-JAN-16

# Quality Control Report

Workorder: L1727479

Report Date: 28-JAN-16

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## Legend:

---

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

---

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

[illegible]

## **Appendix 5      Analytical Results for TCLP Waste Characterization**



**Analytical Results for TCLP Waste Characterization**  
**Designated Substances and Hazardous Materials Assessment**  
**Buildings R23 & R33**  
**Royal Military College**  
**Kingston, Ontario**

Laboratory ID	Schedule 4	Detection	L1717428-1	L1717428-4
Sample ID	LQC	Limit	TCLP	COMPOSITE
Units	mg/L	mg/L	(ROOFING MATERIALS)	PB-1 & PB-2
Sampling Date			mg/L	mg/L
			7-Dec-15	7-Dec-15
<b>TCLP Extractables</b>				
Acenaphthene	--	0.0050	<0.0050	N.A.
Acenaphthylene	--	0.005	<0.0050	N.A.
Anthracene	--	0.0050	<0.0050	N.A.
Aroclor 1242	--	0.0002	<0.00020	<0.00020
Aroclor 1248	--	0.0002	<0.00020	<0.00020
Aroclor 1254	--	0.0002	<0.00020	<0.00020
Aroclor 1260	--	0.0002	<0.00020	<0.00020
Benzo(a)anthracene	--	0.005	<0.0050	N.A.
Benzo(a)pyrene	0.001	0.0010	<0.0010	N.A.
Benzo(b)fluoranthene	--	0.005	<0.0050	N.A.
Benzo(g,h,i)perylene	--	0.0050	<0.0050	N.A.
Total PCBs	0.3	0.0004	<0.00040	<0.00040
<b>TCLP Metals</b>				
Arsenic (As)	2.5	0.05	<0.050	<0.50
Barium (Ba)	100	0.5 / 5	<0.50	<5.0
Boron (B)	500	2.5 / 25	<2.5	<25
Cadmium (Cd)	0.5	0.005 / 0.05	<0.0050	<0.050
Chromium (Cr)	5	0.05 / 0.5	<0.050	<0.50
Lead (Pb)	5	0.0500	0.1880	<b>135.0</b>
Mercury (Hg)	0.1	0.0001	<0.00010	0.00217
Selenium (Se)	1	0.25 / 2.5	<0.25	<b>&lt;2.5</b>
Silver (Ag)	5	0.005 / 0.5	<0.0050	<0.050
Uranium (U)	10	0.25 / 2.5	<0.25	<2.5
<b>Polycyclic Aromatic Hydrocarbons</b>				
Benzo(k)fluoranthene	--	0.0050	<0.0050	N.A.
Chrysene	--	0.005	<0.0050	N.A.
Dibenzo(ah)anthracene	--	0.0050	<0.0050	N.A.
Fluoranthene	--	0.005	<0.0050	N.A.
Fluorene	--	0.0050	<0.0050	N.A.
Indeno(1,2,3-cd)pyrene	--	0.005	<0.0050	N.A.
Naphthalene	--	0.0050	<0.0050	N.A.
Phenanthrene	--	0.005	<0.0050	N.A.
Pyrene	--	0.0050	<0.0050	N.A.
Quinoline	--	0.005	<0.0050	N.A.

**Notes:**

**TCLP** Toxicity Characteristic Leaching Procedure

**LQC** Leachate Quality Criteria, as referenced in Schedule 4 of O. Reg. 347 (as amended by O. Reg. 558);

L1717428-1 Laboratory identification number;

mg/L Milligrams per litre, which is equivalent to parts per million ("ppm");

< Less than Detection Limit;

N.A. Not Analyzed

-- No Criteria

**XXX.XX** Reported result (i.e. leachate concentration) is equal to or exceeds the O. Reg. 558 Schedule 4 LQC, the waste is classified as hazardous, and therefore a 'subject waste'.

**XXX.XX** Detection limit exceeded the O. Reg. 558 Schedule 4 LQC. Test results from modified TCLP procedures may be unsuitable for regulatory purposes.