

File No.: 2026-079

June 11, 2026

s.22(1)

Dear s.22(1)

Re: **Request for Access to Records under the Freedom of Information and Protection of Privacy Act (the "Act")**

I am writing regarding your request dated January 21, 2026 under the ***Freedom of Information and Protection of Privacy Act*** for:

**The following records regarding "Arbutus Lands Lot 1/2" etc. (2111-2197 West 11th Ave, including 2526 Arbutus Street, and also the lands known and described as Lots 8 to 10, Block 364, District Lot 526, Group 1, New Westminster District, Plan 4905 – also known as the "Gordon Lands" or "Gordon's AutoBody" in some documents):**

- 1. Correspondence regarding site remediation efforts/agreements relating to the development/subdivision, including those by and between the City of Vancouver and Domtar Inc. ("Domtar") and also including Bastion Development Corporation ("Bastion"), Intrawest (Intracorp), Gordons Autobody, related entities, within the time period of January 1, 1997 to May 31, 1999; and**
- 2. Memos, staff reports, and correspondence pertaining to soils remediation pursuits and other subsequent events integral to subdivision, land exchange and permit activities with the City from January 1, 1993 to December 31, 1999.**

All responsive records are attached\*. Some information in the records has been severed (blacked out) under s.3(5)(a), s.15(1), and s.22(1) of the Act. You can read or download these sections here: [http://www.bclaws.ca/EPLibraries/bclaws\\_new/document/ID/freeside/96165\\_00](http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96165_00).

\*Please note that issued permits and other property-related records (such as Letters of Assurance) are routinely available on a fee for service basis from the Property Research section of the Development, Building & Licensing Department and are therefore not subject to the Act, as per s.3(5)(a). To access these routinely available records, please contact Property Research at [property.research@vancouver.ca](mailto:property.research@vancouver.ca). Permits can also be searched online at the following link:

[https://plposweb.vancouver.ca/Public/Default.aspx?PosseMenuName=PC\\_Search](https://plposweb.vancouver.ca/Public/Default.aspx?PosseMenuName=PC_Search). Please see the following link which also provides more information on obtaining property records: <https://vancouver.ca/home-property-development/request-property-research-and-copies-of-permits.aspx>.

Under Part 5 of the Act, you may ask the Information & Privacy Commissioner to review any matter related to the City's response to your FOI request by writing to: Office of the Information & Privacy Commissioner, [info@oipc.bc.ca](mailto:info@oipc.bc.ca) or by phoning 250-387-5629.

If you request a review, please provide the Commissioner's office with: 1) the request number (2026-079); 2) a copy of this letter; 3) a copy of your original request; and 4) detailed reasons why you are seeking the review.

Yours truly,

Kevin Tuerlings, FOI Case Manager, for

*[Signed by Kevin Tuerlings]*

**Siân Madsen, MA, MAS**  
**Acting Director, Access to Information & Privacy**

If you have any questions, please email us at [foi@vancouver.ca](mailto:foi@vancouver.ca) and we will respond to you as soon as possible. You may also contact 3-1-1 (604-873-7000) if you require accommodation or do not have access to email.

Encl. (Response package)

:ma



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**BUILDING BY-LAW COMPLIANCE REPORT**

**FOR**

**2111 WEST 11TH AVENUE**

**LOT 1 "ARBUTUS LANDS" PROJECT**

**VANCOUVER, B.C.**

**BU 411754**

**RECEIVED**

**JAN 13 2000**

**COMMUNITY SERVICES**

**Prepared for:**

**Arbutus Developments Ltd.  
#500 - 1681 Chestnut Street  
Vancouver, B.C.  
V6J 4M6**

**August 18, 1997  
(Revised January 28, 1998)  
(Revised December 29, 1999)**

**C4124.01**

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## INTRODUCTION

This report provides a summary of life safety and fire protection features to be incorporated into this project for compliance with Part 3 of the City of Vancouver Building By-Law No. 6134. *As this project was on hold for an extended period of time, this report has been revised to reflect design changes as well as proposed generic equivalencies under the New Vancouver Building By-Law.* It is intended that this report serve as a summary of Building By-Law compliance for the Authority Having Jurisdiction and as a design aid and reference tool for the design team to assist in providing a consistent approach to Building By-Law compliance throughout the project.

This report develops equivalency approaches to address the following issues:

- Equivalency for exposure to property line. *(EQ 400304(1))*
- Equivalency to permit combustible construction of north exterior wall for Suite 2G. *(EQ 400304(2))*

*The above equivalencies were submitted to the City on April 8, 1998 and were accepted on June 12, 1999. There were two additional equivalencies (EQ 400304(3) and (4)) which were accepted, however, have been withdrawn as they are no longer required.*

This report is based on the Building Permit drawings prepared by Nigel Baldwin Architects Ltd., and should be reviewed in conjunction with those drawings. The changes to this report are indicated by italics.

Building By-Law and fire protection features not specifically addressed in this report are assumed to be in compliance with the appropriate Codes and Standards.

It is the architects' and the design engineers' responsibility to ensure that the construction documents correctly reflect the fire protection features described in this report. CFT Engineering Inc. will review drawings and specifications and conduct field reviews to determine compliance with the proposed equivalencies as outlined in this report.

### **BUILDING DESCRIPTION**

The project will consist of a new four storey residential/commercial building located on Arbutus Street, between 10th & 11th Avenues in Vancouver. All commercial suites will front onto Arbutus Street. The ground floor will contain retail occupancies (Group E) and restaurants (Group A, Division 2) on the east side, and residential occupancies on the west side. The remaining storeys above the 2nd floor will contain residential suites.

Concrete or concrete block construction providing a 2 h fire-resistance rating will separate the commercial occupancies on the Ground Floor from the residential suites above and adjacent for compliance with Sentence 3.2.1.6.(1) of the 1999 Vancouver Building By-Law. A 2 h floor assembly will be extended across the entire ceiling of the commercial area and a vertical wall will separate residential suites on the ground floor from the ground floor retail occupancy. With the exception of the second floor slab separating the commercial and residential occupancies, the second to fourth floor levels, (residential) will be of combustible construction.

The building will be located above two levels of underground parking. The parking garage will be of noncombustible construction and classified as a Group F, Division 3 major occupancy.

The building will be fully sprinklered, provided with a fire alarm system and a standpipe system.

The building is considered to face three streets for the purposes of Building By-Law application, Arbutus Street, 11th Avenue and a new street, *Cranberry Drive*. The main entrance and Fire Department access point to the residential building is from 11th Avenue. Independent access is provided from Arbutus Street to each of the commercial units located along Arbutus Street. Access will also be provided along the new street to residential suites on the ground floor. Fire Department access to the building will be in accordance with the requirements of the Vancouver Building By-Law.

## **APPROACH TO BUILDING BY-LAW COMPLIANCE**

The following is an outline of the approach to Building By-Law compliance for this project.

### **CONSTRUCTION REQUIREMENTS**

The building will be classified as Group C (residential) major occupancy. The *commercial* retail units area on the ground floor of the building will be Group E and Group A, Division 2 major occupancies. The parking area on the Basement Levels will be classified as a Group F, Division 3 major occupancy. The following is a summary of building characteristics;

|                   |   |                                                                        |
|-------------------|---|------------------------------------------------------------------------|
| Major Occupancies | - | Group A, Division 2, Group C, Group E, and Group F, Division 3         |
| Construction      | - | Combustible - Group C, Levels 2, 3, and 4 **                           |
|                   | - | Noncombustible - Group A, Division 2, Group E, and Group F, Division 3 |
| Building Height   | - | 4 Storeys                                                              |
| Building Area     | - | 940 m <sup>2</sup> (10,118 sq. ft.)                                    |
| Streets           | - | 3 Streets (required to face 1 street)                                  |
| Sprinklered       | - | Yes                                                                    |
| Standpipe         | - | Yes                                                                    |
| Fire Alarm System | - | Yes                                                                    |

\*\* Second Floor slab over the commercial area will be of noncombustible construction providing a 2 h fire resistance rating.

*Four Storey Residential Building of Combustible Construction - A "generic equivalency" is proposed to construct this building under the construction requirements of Article 3.2.2.45 of the proposed new Vancouver Building By-Law. Article 3.2.2.45 permits combustible construction for a sprinklered residential occupancy up to four storeys in building height and 1 800 m<sup>2</sup> (19,376 sq. ft.) in building area. As required by Sentence 3.2.2.45.(2) of the proposed new Vancouver Building By-Law, floor assemblies and supporting structure will provide a 1 h fire-resistance rating.*

*Generic equivalency*

*Fire Containment in Group C, 4 Storey Building - Article 3.2.1.6 of the proposed new Vancouver Building By-Law addresses fire containment in a four storey Group C building. Sentence 3.2.1.6.(1) states that, "The occupancy separations in a four storey combustible building between a Group C occupancy and other major occupancies shall be constructed as a concrete fire separation with a fire-resistance rating not less than 2 h and all loadbearing walls and columns supporting the 2 h fire separation shall be noncombustible and have a fire-resistance rating of not less than 2 h." The proposed building will comply with the requirements of Sentence 3.2.1.6.(1) of the new Vancouver Building By-Law.*

Generic equivalency

*Maximum Building Height For Combustible Construction - A "generic equivalency" is proposed to meet the maximum building height requirements of Sentence 3.2.1.7.(7) of the New Vancouver Building By-Law. Sentence 3.2.1.7.(1) states that the maximum number of floor levels permitted in a building of combustible construction is four, subject to a mezzanine being considered as a floor level, the first storey being considered as the first level and the highest point of the highest level not to exceed 12 m from grade. This building will comply with the requirements of Sentence 3.2.1.7.(1) and will also comply with the construction requirements of Subsection 3.2.2 of the New Vancouver Building By-Law in support of the generic equivalency.*

Generic equivalency

*Wherever the construction requirements of the New Vancouver Building By-Law exceed those of By-Law 6134, the more restrictive requirements of the New 1999 Vancouver Building By-Law will be implemented.*

*Construction Requirements* - Article 3.2.2.45 of the 1999 Vancouver Building By-Law has more restrictive construction requirements for floor assemblies than Article 3.2.2.27. Article 3.2.2.45 requires the building to be sprinklered and permits a maximum area of 1 800 m<sup>2</sup>. With respect to the other major occupancies the following construction requirements of the 1999 Vancouver Building By-Law are applicable:

Group A, Division 2 - 3.2.2.24  
 Group E, Division 2 - 3.2.2.58  
 Group F, Division 3 - 3.2.2.75

Generic equivalency

The following is a summary of construction requirements applicable to this project:

|                                          |   |                                                                                               |
|------------------------------------------|---|-----------------------------------------------------------------------------------------------|
| Floor Assemblies                         | - | Constructed as fire separation providing not less than a 1 h fire-resistance rating.          |
| Roof Assemblies                          | - | Unoccupied roof assemblies do not require a fire-resistance rating in a sprinklered building. |
| Loadbearing Walls,<br>Columns and Arches | - | Shall have a fire-resistance rating not less than that required for the supported assembly.   |

Generic equivalency

As the building will be sprinklered, electrically supervised and monitored, the fire-resistance rating of the roof assembly is *not required*. However, since the party walls between residential suites will not be continuous through to the underside of the roof sheathing, the roof assembly will provide a 1 h fire-resistance rating.

Figure 1 summarizes the construction requirements for floor assemblies:

|          |                                                   |                           |    |
|----------|---------------------------------------------------|---------------------------|----|
| <i>f</i> | 1 h, combustible<br>(membrane rating) Residential |                           | 4  |
|          | 1 h, combustible<br>Residential                   |                           | 3  |
|          | 1 h, combustible<br>Residential                   |                           | 2  |
|          | 1 h, combustible<br>Residential                   | 2 h noncombustible<br>CRU | 1  |
|          | 2 h, noncombustible<br>Parking                    |                           | P1 |
|          | 2 h, noncombustible<br>Parking                    |                           | P2 |

Figure 1: Rating of Floor Assemblies

## SUITE SEPARATIONS/COMPARTMENTATION

Residential Portion - Sentence 3.3.4.2.(2) requires that the residential suites in the building be separated from each other and the public corridors by  $\frac{3}{4}$  h rated fire separations. *However, a 1 h fire-resistance rating will be provided to reflect the generic equivalencies proposed which are based on the 1999 Vancouver Building By-Law.*

*As the floor assemblies are permitted by Article 3.2.2.27 of By-Law 6134 to provide a  $\frac{3}{4}$  h fire-resistance rating, the public corridor fire separations would also be permitted a  $\frac{3}{4}$  h fire-resistance rating. However, as the fire-resistance rating for the floor assemblies will be upgraded to 1 h, so will the upgraded to 1 h, so will the public corridor fire separations on the residential levels. Doors between residential suites and public corridors will provide a 20 minute fire-protection rating in accordance with Sentence 3.1.6.7.(1).*

The residential entry lobby on the ground floor which also serves as an exit lobby, will be separated from all other occupancies by a 2 h fire separation.

The elevator on the 2nd, 3rd and 4th levels will be separated from the remainder of the building by a fire separation providing at least a 1 h fire-resistance rating. *Vertical service shafts on the 2nd, 3rd and 4th floor levels will be separated from the remainder of the floor area by a fire separation providing at least a  $\frac{3}{4}$  h fire-resistance rating.*

Retail Portion - Retail suites on the ground floor will be separated from one another by a fire separation that will provide at least a 1 h fire-resistance rating in accordance with Sentence 3.3.1.1.(1). The commercial occupancy on the ground floor will be separated from the residential by a 2 h fire separation for compliance with the occupancy separation requirements of Sentence 3.1.3.2.(1) and Table 3.1.3.A.

*Table 3.1.3.A requires an occupancy separation of 2 h between a Group E and Group A, Division 2 occupancy. Therefore, a 2 h separation will be provided between the restaurant units and the adjacent retail units.*

*The elevator shaft on the ground floor will be separated from the remainder of the floor area by a fire separation that will provide at least a 2 h fire-resistance rating. The requirements of Table 3.5.3.1 of the New Vancouver Building By-Law exceed the requirements of By-Law 6134 which permits  $1\frac{1}{2}$  h fire-resistance rating.*

Service shafts on the ground floor will be separated by construction providing a  $1\frac{1}{2}$  h fire resistance rating, in accordance with Table 3.5.3.A.

Parking Levels - The parking entry and loading area on the ground floor will be separated from all other occupancies by a fire separation that will provide at least a 2 h fire-resistance rating, as required by Table 3.1.3.A as the loading bay may be considered as a Group F, Division 2 occupancy.

*Table 3.5.3.1 of the 1999 Vancouver Building By-Law requires the elevator to be separated from the remainder of the floor area by a 2 h fire separation. This exceeds the 1½ h fire separation required by the By-Law 6134.*

In accordance with Table 3.5.3.A, service shafts on the parking levels will be enclosed in fire separations providing at least a 1½ h fire-resistance rating.

On the parking garage level, service and storage rooms will be separated from all other floor areas by at least a 1½ h fire separation in accordance with Sentence 3.3.7.6.(11).

**Exits** - Exits will be separated from the remainder of the floor area by a fire separation which provides the same fire-resistance rating as the floor assembly above, in accordance with Sentence 3.4.4.1.(1). All exits above the second floor slab are required to be enclosed by a 1 h fire separations. On all other floor levels exits are required to be enclosed in 2 h fire separations.

Pressurized vestibules required by Sentences 3.3.7.6.(1) and 3.3.7.6.(12) will be provided to control the spread of carbon monoxide where access is provided from the parking garage to the elevator which serves the floors above. The vestibule will be constructed in conformance with Sentence 3.3.7.6.(14), reproduced below.

- (14) Where access is provided through a vestibule, as required in Sentences (1), (12) and (13), the vestibule shall
- (a) be at least 1.8 m in length,
  - (b) be naturally ventilated to outside air by a vent that has an unobstructed area of not less than 0.1 m<sup>2</sup> for each door that opens into the vestibule but not less than 0.4 m<sup>2</sup>, or be mechanically ventilated at a rate of 14 m<sup>3</sup>/h for each square metre of vestibule floor surface area,
  - (c) have the openings between the vestibule and an adjoining occupancy provided with self-closing doors having no hold-open devices, and
  - (d) have the openings in Clause (c), and the wall containing such openings glazed with clear glass.

***Corridor Separation** - The corridor floors will be constructed using 38 mm x 140 mm (2 in. x 6 in.) wood joists. A double layer of 15.9 mm (5/8 in.) Type 'X' gypsum wallboard will be applied directly to the underside of the joists. Based on Tables 2.3.A and 2.3.C and Sentence 2.3.11.(1) and 2.3.11.(2) of the Supplement to the National Building Code of Canada 1990, the assembly will provide a 60 min fire-resistance rating. A dropped ceiling to enclose building services will be provided below this rated ceiling. Steel studs will support the dropped ceiling to allow a nonsprinklered concealed space.*

**Closures** - Closures in fire separations other than suite doors, and firestopping materials for service penetrations, will have a fire protection rating in accordance with Table 3.1.6.A, reproduced on the following page.

**Table 3.1.6.A.**  
Forming Part of Sentence 3.1.6.4.(2)

| Grade of Fire Separation,<br>h | Required Fire Protection<br>Rating of Closure,<br>h |
|--------------------------------|-----------------------------------------------------|
| ¾                              | ¾                                                   |
| 1                              | ¾                                                   |
| 1½                             | 1                                                   |
| 2                              | 1½                                                  |
| 3                              | 2                                                   |
| 4                              | 3                                                   |
| Column 1                       | 2                                                   |

Piping, ducts, wiring and similar penetrations through a required fire separation will be tightly fitted or the opening will be sealed at the penetration by ULC, cUL, or Warnock Hersey listed firestopping materials in compliance with Subsection 3.1.7.

Garage Security - Article 3.3.8.11 requires that where a storage garage contains 20 or more parking spaces, additional measures for assault security are required. The requirements of Sentence 3.3.8.11.(2), to maintain visual access from the garage into the elevator and stair lobbies, will be met. On the basement parking levels, glazing will be provided in the wall between the parking garage and the elevator lobby and in the walls between the parking garage and exit stair enclosure. The glazing will be wired glass protected by close spaced sprinklers in accordance with Sentence 3.3.8.11.(2).

In accordance with Sentence 3.3.8.11.(3), the stair shafts serving the parking level will be separated from the stair shafts serving floors above. Exit stairs serving the parking level will discharge directly to the exterior for conformance with Sentence 3.3.8.11.(4).

For compliance with the assault security requirements of Sentence 3.3.8.11(7), the specified minimum lighting levels are required at the entrance to the parkade, in traffic aisles and at the entrance to vestibules, stairs and elevators.

*Attic - The attic will be separated into individual compartments such that the attic is not common to more than 2 suites. Suite-to-suite fire separations on the uppermost storey will be continued to the underside of the roof sheathing or a membrane ceiling, providing a 1 h fire-resistance rating will be provided.*

Soffit Protection - *Since the building will be sprinklered, special soffit protection is not required based on Sentence 3.2.3.15.(4) of the proposed new Vancouver Building By-Law.*

Concealed Spaces - *In accordance with Article 3.1.9.1, concealed spaces in interior wall, ceiling and crawl spaces are required to be separated from concealed spaces in exterior walls and attics by fire stops conforming to Article 3.1.9.4, shown on the following page:*

- 3.1.9.4.(1)** Except as provided in Sentences (2) and (4), materials used to separate concealed spaces into compartments shall remain in place and prevent the passage of flames for a period of at least 15 min when subjected to the standard fire exposure in CAN4-S101, "Standard Methods of Fire Endurance Tests of Building Construction and Materials."
- Firestop materials
  - 
  - 
  - 
  -
- (2)** Gypsum wallboard at least 12.7 mm thick and sheet steel at least 0.38 mm thick need not be tested in conformance with Sentence (1) provided all joints have continuous support.
- - 
  -
- (3)** In buildings required to be of noncombustible construction, wood furring strips described in Subclause 3.1.4.5.(2)(a)(iv) need not be tested in conformance with Sentence (1).
- - 
  -
- (4)** In buildings permitted to be of combustible construction, materials used to separate concealed spaces into compartments may be
- - 
  - 
  - 
  - 
  - 
  - 
  - 
  - 
  -
- (a) solid lumber not less than 38 mm thick,
  - (b) phenolic bonded plywood not less than 12.5 mm thick or waferboard not less than 12.7 mm thick with joints supported, or
  - (c) 2 thicknesses of lumber each not less than 19 mm thick with joints staggered, where the width or height of the concealed space is such that more than 1 piece of 38 mm thick lumber is necessary to block off the space.
- (5)** Openings through materials in Sentences (1) to (4) shall be protected to maintain the integrity of the construction.
- -
- (6)** Where materials in Sentences (1) to (4) are penetrated by construction elements or by service equipment, firestop materials shall be used to seal the penetration.
- - 
  -

*In accordance with Article 3.1.9.3, every unsprinklered concealed space within a ceiling or roof assembly of combustible construction, including attic spaces, will be separated by construction confirming to Article 3.1.9.4 into compartments not exceeding 300 m<sup>2</sup> (3,229 sq. ft.) in area with no dimension greater than 20 m (66 ft.) where the exposed construction materials within the space have a flame-spread rating of greater than 25.*

## EXPOSURE ANALYSIS

The percentage of unprotected openings in the exterior walls of the building has been reviewed for conformance with Subsection 3.2.3. Table A provides a summary of the spatial separation calculations for the building. As permitted by Sentence 3.2.3.2.(1), each suite has been considered as a separate fire compartment for the purposes of the exposure analysis. These calculations are based on a fully sprinklered building.

**Table A**  
**Summary of Exposure Calculations**

| Location*       | Floor Level | Elev. | Area of E.B.F. (sq. ft.) | Limiting Distance Provided (Ft.) | U.P.O. Permitted ** (%) | U.P.O. Proposed (%) | Fire-Resistance Rating Required, (h) and Construction or Cladding |
|-----------------|-------------|-------|--------------------------|----------------------------------|-------------------------|---------------------|-------------------------------------------------------------------|
| Commercial Unit | Ground      | N     | 90                       | 14                               | 100                     | 34                  | -                                                                 |
| Loading Area    | Ground      | N     | 383                      | 1                                | 0                       | 0                   | 2 h, NC Construction                                              |
| Commercial Unit | Ground      | E     | 1,459                    | 40                               | 100                     | 49                  | -                                                                 |
| Commercial Unit | Ground      | S     | 289                      | 40                               | 100                     | 60                  | -                                                                 |
| Unit TH B       | Ground      | W     | 220                      | 40                               | 100                     | 60                  | -                                                                 |
| Unit 2A         | 2nd & 3rd   | N     | 381                      | 10.25                            | 49.6                    | 11                  | 1 h, NC Cladding                                                  |
| Unit 2B         | 2nd & 3rd   | N     | 338                      | 4                                | 14.7                    | 12.5                | 1 h, NC Construction                                              |
| Unit 1B         | 2nd & 3rd   | E     | 180                      | 40                               | 100                     | 57                  | -                                                                 |
| Unit 2C         | 2nd & 3rd   | S     | 342                      | 40                               | 100                     | 29                  | -                                                                 |
| Unit 2B         | 2nd & 3rd   | W     | 279                      | 40                               | 100                     | 68                  | -                                                                 |
| Unit 2G         | 4th         | N     | 284                      | 4 ***                            | 14.6                    | 20                  | 1 h, NC Construction                                              |
| Unit 2C         | 4th         | E     | 317                      | 40                               | 100                     | 43                  | -                                                                 |
| Unit 2F         | 4th         | S     | 334                      | 40                               | 100                     | 32                  | -                                                                 |
| Unit 2B         | 4th         | W     | 317                      | 40                               | 100                     | 71                  | -                                                                 |
| Corridor        | 4th         | N     | 45                       | 4                                | 16.9                    | 16.9                | 1 h, NC Construction                                              |

E.B.F. Exposing Building Face

U.P.O. Unprotected Openings

\*

Worst Case

\*\* Based on the building being fully sprinklered, each suite as a separate fire compartment.

\*\*\* Limiting distance from the unprotected glazing

- No restrictions

NC Noncombustible

Commercial units on the Ground floor will face Arbutus Street. Sentence 3.2.3.6.(2) permits unlimited unprotected openings in a first storey which faces a street and has a limiting distance of 9 m (29.5 ft.) or more. Therefore, unlimited unprotected openings are permitted in the east, west and south building facades.

The north exterior facade has a limiting distance to the adjacent property line which is not sufficient to allow the area of unprotected openings provided. Where shown in Table A, Unit 2G

will require exposure protection based on Table 3.2.3.A, a maximum of 14.6% unprotected openings is permitted and approximately 20% of unprotected openings is provided. These openings will be protected by a Fire Rated Glazing System which will be discussed further in the equivalency section. The corridor on the 4th floor level is provided with glazing on the north exterior facade, with a limiting distance of 1.2 m (4 ft.) to the property line. It is proposed that the area of unprotected openings not exceed 16.9% of the area of its exterior facade (see Table A).

Since the north exterior wall is located along the property line, it is required to be of noncombustible construction, and provide a 1 h fire-resistance rating based on Sentence 3.2.3.5.(1). The north exterior walls will be of masonry or concrete block for levels 1, 2, and 3. An equivalency is proposed to permit wood frame construction for the exterior walls of the 4th level suite which is setback 0.9 m (3 ft.) from the property line.

Compartment to Compartment Exposure - Unprotected openings within the residential suites have been arranged such that no exposure condition is created between adjacent fire compartments and the building conforms with the requirements of Sentence 3.2.3.10.(1).

Article 3.3.6.2 requires that where any storey of a building classified as a Group E major occupancy is required to be separated from the storey above or below by a fire separation, the openings in an exterior wall located vertically one above the other shall be separated by apron or spandrel walls at least 1 m (3.3 ft.) in height or by a canopy at least 1 m (3.3 ft.) wide at each floor level. The apron, spandrel or canopy is required to have a fire-resistance rating equivalent to the construction required for the floor assembly and need not be greater than 1 h.

Canopy Protection For Vertically Separated Openings - Article 3.2.3.16 of the 1999 Vancouver building By-Law requires vertically separated openings to be protected if the storey classified as a Group E or a Group F, Division 1 or 2 major occupancy is required to be separated from the storey above by a fire separation. The New Vancouver Building By-Law requires a canopy projection or setback of the exterior wall above the opening on the lower floor. Sentence 3.2.3.16.(3) waives the requirements for canopy protection of vertically separated openings where the building is sprinklered throughout. A "generic equivalency" is proposed to omit the required canopy under the existing Vancouver Building By-Law 6134 based on the building being fully sprinklered and that sprinkler system being monitored.

Generic equivalency

Exposure To Exit - An exposure condition exists from the glazing of the retail occupancy to the garage exit door on the north side of the building. The location of the exposure condition is shown in Appendix A. The glazing will be protected in accordance with the City of Vancouver Bulletin 94-8 using close spaced sprinklers (See Appendix B).

### FIRE DEPARTMENT ACCESS

Fire Department access to the residential portion of the building will be obtained from 11th Avenue. Fire Department access to each of the individual commercial units is provided from Arbutus Street. The Fire Department response point will be the main entrance to the residential portion of the building off West 11th Avenue. The new street, *Cranberry Drive*, will provide access to the residential suites on the west side of the building. The building is considered to face three streets.

One annunciator panel will serve the building. The fire alarm annunciator panel will be located within the main entrance to the lobby of the residential building. The Fire Department connection to the sprinkler and standpipe system will be located near the Fire Department response point. The location and configuration of the Fire Department response point, annunciator panel and Fire Department connection are subject to approval by the Vancouver Fire Department. *From the residential entrance, a stair is provided for the Fire Department to access all above grade floor levels. Adjacent to the residential entrance, a stair is provided for the Fire Department to access the parking garage.*

*A fire hydrant will be located within 45 m of the Fire Department connection at the main entrance.*

### AUTOMATIC SPRINKLER SYSTEM

The building will be sprinklered in conformance with the requirements of N.F.P.A. 13. Residential style sprinklers (quick response) will be used throughout the residential areas for conformance with Article 3.3.4.10. The parking garage will be provided with a dry pipe sprinkler system.

The sprinklers will be electrically supervised in conformance with Sentence 3.2.4.11.(5) and will cause a signal to be transmitted to the Fire Department in conformance with Sentence 3.2.4.11.(3).

Sprinklers will be zoned on a per floor basis, except for the *ground floor*. A separate zone will be provided for *the commercial* areas on the ground floor *and residential suites facing Cranberry Drive*. *This will permit the Fire Department to readily identify and respond to a fire on the ground floor from either Cranberry Street or Arbutus Street as applicable.*

Sprinklers will be utilized in lieu of heat detectors as permitted by Article 3.2.4.16. The zoning is discussed further in the Fire Alarm and Detection Section.

## STANDPIPE SYSTEM

For a four level building meeting the requirements of Article 3.2.2.27 and less than 4 000 m<sup>2</sup> (43,058 ft<sup>2</sup>) in area, Sentence 3.2.5.4.(2) requires a modified Class I standpipe service with a minimum water flow of 6.3 L/s and consisting of 38 mm (1½ in.) diameter hose connections in the stairway at each storey. For this project a Class I standpipe system with 64 mm (2½ in.) connections *is proposed*. Hose will not be provided. Additional 38 mm (1½ in.) hose stations will be located as necessary to provide the *required coverage*. *On the parkade levels, the Building By-Law 6134 would require 2½ in. hose connections in the exits and 1½ in. hose connections in the parkade floor area.*

*Compliance with the requirements of the 1999 Vancouver Building By-Law which requires 64 mm (2½ in.) hose connections in exit stairs and hose stations for 38 mm (1½ in.) diameter hose where the distance to any part of the floor area measured along the path of travel is more than 39.6 m (130 ft.) from the hose connection located in an exit.*

Generic Equivalency

In conformance with Sentence 3.2.5.4.(3), the standpipe system design, construction, installation and testing will be in conformance with the requirements of N.F.P.A. 14.

Fire Department connections for the sprinkler system and the standpipe system will be located adjacent to the main entrance off West 11th Avenue in a location approved by the Vancouver Fire Department.

## FIRE ALARM AND DETECTION SYSTEM

As required by Article 3.2.4.1 a fire alarm and detection system will be provided and an annunciator panel will be located at the main entrance to the building off West 11th Avenue. The main entrance to the building off West 11th Avenue will be the Fire Department response point for this project. The annunciator will be provided in accordance with Sentence 3.2.4.8.(1), with separate zone indication for each floor level, each shaft required to be equipped with a fire detector, and exit stairs.

The sprinkler systems will be provide in lieu of heat detection as permitted in Article 3.2.4.11. Sentence 3.2.4.8.(5) stipulates that the requirements for zone indication in Clauses 3.2.4.8.(1)(a) and (b) are waived provided the actuation of the zone indication is in compliance with the requirements for the sprinkler system. As such, heat detectors will not be provided as permitted by the Vancouver Building By-Law and the sprinkler system will be zoned on a per floor basis, except that separate zones will be provided for the *commercial and residential components* on the ground floor.

The *residential* suites on the main floor will be provided with a separate flow switch. On the main floor, the sprinkler systems will be identified with wording such as, "ground floor *residential* water flow" or the fire alarm system will indicate "ground floor *commercial* sprinkler flow". This approach will direct the Fire Department to the ground level entrances *to the residential suites off Cranberry Street or the commercial suites off Arbutus Street as applicable.*

The remaining alarm initiating devices will be zoned in compliance with *Clause 3.2.4.8.(1)(b)*.

The fire alarm system will automatically transmit signals to the Fire Department by an acceptable means, as described in Sentence 3.2.4.7.(3).

Smoke detectors will be provided in public corridors, at the top of the elevator shaft and exit stair shafts as required by Sentence 3.2.4.10.(4). Smoke alarms will be provided in each dwelling unit in accordance with Sentence 3.2.4.15.(1).

Manual pull stations will be installed on every floor near every required exit *in the residential component*, near the principal entrance *from each commercial unit*, in accordance with Article 3.2.4.12.

## EMERGENCY LIGHTING AND POWER

Emergency lighting will be provided in the building in the exits, public corridors, corridors used by the public, and in principle routes providing access to exits in an open floor area (parking levels). Batteries for emergency power will be provided for emergency systems, such as fire alarm and detection systems, emergency lighting and exit signs in accordance with Article 3.2.7.4.

## EXIT SYSTEMS

Commercial Suites - Each of the *commercial/retail* units is provided with exiting directly to the exterior via exit *doors* located at the front of the retail units adjacent to Arbutus Street. Article 3.3.1.4 and Table 3.3.1.A permit a single means of egress from a room or suite of Group E or Group A, Division 2 occupancy where the area of the room or suite does not exceed 150 m<sup>2</sup> (1,615 sq. ft.) or the travel distance does not exceed 15 m (50 ft.). *The restaurant and retail tenants proposed for the ground floor meet the travel distance and area requirements of the Vancouver Building By-Law 6134 for a single means of egress from a suite.*

Residential Occupancy - *As residential suites are sprinklered with quick response sprinkler, Sentence 3.3.1.4.(7) permits a travel distance for a room or a suite to be increased by 50%. The maximum travel distance permitted in residential suites is therefore 22.5 m (74 ft.). Maximum area of residential suites is 150 m<sup>2</sup> (1,615 sq. ft.). All residential suites are well within the area and travel distance limitations for a single means of egress from the suite.*

The second, third and fourth floor levels will be served by a public corridor provided with exit stairs at each end of the public corridor, meeting the requirements of the Vancouver Building By-Law.

The public corridor will be a minimum of 1 100 mm (44 in.) in width as required by Sentence 3.3.1.7.(1).

The proposed exit stairs serving below grade levels will be at least 1 100 mm (44 in.) in width in accordance with Clause 3.4.3.1.(2)(c). As permitted by Clause 3.4.3.1.(2)(d) above grade exit stairs may be a minimum of 36 in. (900 mm) in width.

The travel distance measured from a suite door to an exit will not exceed 45 m (150 ft.) in accordance with Sentence 3.4.2.4.(1).

Not more than 1 exit will lead through the entrance lobby in accordance with Sentence 3.4.4.1.(7). Clause 3.4.4.1.(7)(b) *requires* the width of the exit lobby to be not be less than its length or 5 m, whichever is the lesser dimension. *A generic equivalency is proposed to address this issue.*

*Exit Lobby - Clause 3.4.4.1.(7)(b) of the current Vancouver Building By-Law permits exiting through a lobby provided the width of the lobby at any point is not less than its length or 5 m (16.4 ft.) whichever is the lesser dimension. A generic equivalency is proposed based on the requirements of the new Vancouver Building By-Law. Sentence 3.4.4.2.(2) of the proposed new Vancouver Building By-Law does not require a minimum 5 m (16.4 ft.) exit lobby width.*

*Generic equivalency*

**Parkade Levels** - The P2 parking level is served by two exits and the P1 level is served by three exits. Exit stair shafts will be separated by a distance which exceeds  $\frac{1}{2}$  the diagonal dimension of the floor area and will therefore comply with Sentence 3.4.2.2.(1). The maximum permitted travel distance of 45 m (150 ft.) to an exit will not be exceeded.

## OCCUPANT LOAD & EXIT CAPACITY

The anticipated occupant loads for this building are based on Clause 3.1.14.(1)(b) which specifies two persons per bedroom for dwelling units and Table 3.1.14.A.

|                  |   |                              |
|------------------|---|------------------------------|
| Storage Garage   | - | 46.0 m <sup>2</sup> /person  |
| Commercial Space | - | 3.7 m <sup>2</sup> /person   |
| Restaurant Space | - | 0.95 m <sup>2</sup> /person* |

\* 0.95 m<sup>2</sup> per person based on space with non-fixed seats and tables and at least  $\frac{1}{6}$  of the gross area designated to kitchen and washroom use.

The following Occupant Loads are established:

### Residential Portion

|            |   |                                                  |
|------------|---|--------------------------------------------------|
| Main Floor | - | 2 Persons per suite (exiting direct to exterior) |
| 2nd Floor  | - | 32 Persons                                       |
| 3rd Floor  | - | 32 Persons                                       |
| 4th Floor  | - | 32 Persons                                       |

Commercial Portion

|                         |                                      |   |            |
|-------------------------|--------------------------------------|---|------------|
| Maximum Retail Area     | = 67 m <sup>2</sup> (720 sq. ft.)    | - | 18 Persons |
| Maximum Restaurant Area | = 142 m <sup>2</sup> (1,526 sq. ft.) | - | 99 Persons |

Garage Levels

|         |                                         |   |            |
|---------|-----------------------------------------|---|------------|
| P1 Area | = 1 240 m <sup>2</sup> (13,300 sq. ft.) | - | 27 Persons |
| P2 Area | = 1 240 m <sup>2</sup> (13,300 sq. ft.) | - | 27 Persons |

*A second and separate means of egress will be required from each of the restaurant tenants as the occupant load exceeds 60 persons.*

Exiting from the residential component of the building *on the 2nd through 4th levels* is provided via two exit stairs. One exit stair will discharge directly to the exterior via a corridor system. The second exit stair will discharge through the ground floor exit lobby. The units of exit width and corresponding exit capacity for each floor level are summarized in Table B. *Each of the residential and commercial retail suites on the ground floor have exiting from each suite which discharges directly to the exterior therefore, common exiting is not required. Only the restaurant spaces are required to have a second means of egress as identified above.*

**Table B**  
**Exiting Summary**

| Floor Level | Exit Width Units | Exit Capacity (Persons) | Anticipated Occupant Load (Persons) |
|-------------|------------------|-------------------------|-------------------------------------|
| 2nd         | 3.0              | 90 <sup>(1)</sup>       | 32                                  |
| 3rd         | 3.0              | 90 <sup>(1)</sup>       | 32                                  |
| 4th         | 3.0              | 90 <sup>(1)</sup>       | 32                                  |
| P1          | 4.5              | 270 <sup>(2)</sup>      | 27                                  |
| P2          | 3.0              | 90 <sup>(2)</sup>       | 27                                  |

(1) Based on 30 persons/unit exit width

(2) Based on 90 persons/unit width

Therefore, the exit capacity to be provided will exceed that required for the anticipated occupant loads.

### **PROVISIONS FOR DISABLED PERSONS**

**Residential Requirements** - Barrier Free Access will be provided from the street to the main entrance and from a private parking area to an entrance in conformance with Clauses 3.7.2.28.(1)(a) and (c). Barrier free access will be provided to an elevator on the first parking level and from the street to the main entrance to the building. This will comply with the requirements of *Clause 3.7.2.28.(1)(c)*. Of the 67 parking stalls to be provided, one handicapped stall is required. All exits on the *P2 level*, with the handicapped stall, will be provided with areas of refuge. The elevator will be designed to meet the requirements of Article 3.7.3.13 as required by Sentence 3.7.2.3.(1).

**Retail Requirements** - *All commercial/retail suites exceed 50 m<sup>2</sup> (538 sq. ft) and therefore, will be designed to allow barrier free access into the suites for conformance with Clause 3.7.2.5.(1)(a).*

### **BY-LAW EQUIVALENCIES**

The following issues are not in direct compliance with the literal requirements of the Vancouver Building By-Law. Equivalent fire and life safety measures are discussed in the following text, demonstrating that the intent of the Vancouver Building By-Law will be met. Equivalencies are proposed to address the following issues:

- Equivalency for exposure to property line,
- Equivalency to permit combustible construction of north exterior wall for Suite 2G.

#### **EQUIVALENCY FOR EXPOSURE TO PROPERTY LINE**

*\* This equivalency has already been accepted (on June 12, 1998) by the City of Vancouver. (EQ 400304(1)).*

**Background** - Suite 2G (on the 4th floor) facing the north side of the building is located adjacent to a property line. The spatial separation characteristics of portions of the north exterior building facades are not in strict compliance with the requirements of the Vancouver Building By-Law for a residential occupancy. In order to provide exposure protection, some of the window openings will be protected by a Fire Rated Glazing System (Appendix C).

**By-Law Requirement** - Sentence 3.2.3.1.(1) and Table 3.2.3.A limit the area of unprotected openings in an exterior building facade.

**Intent of By-Law Requirement** - Sentence 3.2.3.1.(1) and Table 3.2.3.A limit the area of unprotected openings in a building facade in order to limit the radiant heat transmitted to an adjacent building and thereby control the spread of fire to the adjacent building.

**Proposed Equivalency** - This proposed equivalency is detailed in Appendix D to this report, in a report issued by the Institute for Research in Construction of the National Research Council of Canada. The report in Appendix D describes a Fire Rated Glazing Sprinkler System that can provide a fire-resistance rating of up to two hours.

The report in Appendix D includes the statement:

“If used in accordance with the limitations and conditions stated in this report, ‘Central Model WS Window Sprinkler System’ provides a fire separation with a fire resistance of up to 2 h, with a level of performance equivalent to that required in:

- National Building Code of Canada 1995, Subsection 3.1.7 Fire-Resistance Ratings.”

It is intended that the glazing and the sprinklers protecting the glazing will comply with the criteria given in Appendix D to this report. On this basis, the proposed window sprinkler system will exceed the requirements for a closure in a 1 h rated fire separation, and should be acceptable (location is indicated in Appendix C).

The Fire Rated Glazing System will reduce the percentage of unprotected openings as shown in the following table:

**Table D: Description of Openings**

| Opening | Exposed Area    | Description                       | Protected | Unprotected |
|---------|-----------------|-----------------------------------|-----------|-------------|
| W1      | 2 ft. x 4 ft.   | Tempered glass, not openable      | yes       | -           |
| W2      | 2 ft. x 4 ft.   | Tempered glass, openable          | -         | yes         |
| W3      | 2.5 ft. x 4 ft. | Tempered glass, openable          | -         | yes         |
| D1      | 6 ft. x 6.5 ft. | Tempered glass, 50 % not openable | half      | half        |

As discussed previously in the Exposure Analysis Section, Unit 2G is permitted a maximum 14.6% unprotected openings where approximately 20% of unprotected openings is provided. By protecting the openings with a Fire Rated Glazing System, the percentage of unprotected opening will be reduced to 10.3%. In this respect, the Fire Rated Glazing System in conjunction with the tempered glazing will provide a greater level of protection than simply reducing the area of openings or wired glass alone.

As the building will be fully sprinklered, a fire initiating within the building should be suppressed or controlled by the floor area sprinklers such that potential of a large fire occurring is minimized.

**Conclusion** - Based on the provision of the Fire Rated Glazing System, the intent of the Vancouver Building By-Law will be met.

### **EQUIVALENCY TO PERMIT COMBUSTIBLE CONSTRUCTION OF NORTH EXTERIOR WALL FOR SUITE 2G**

*\* This equivalency has already been accepted (on June 12, 1998) by the City of Vancouver.  
(EQ 400304(2)).*

**Background** - Suite 2G (on the fourth floor) facing the north side of the building is located adjacent to a property line. A portion of the wall is located 900 mm (3 ft.) from the property line, with the remainder setback 2 m (6 ft. 9 in.) from the property line. The exterior wall will be of wood frame construction with metal cladding (combustible construction with noncombustible cladding). The construction of the exterior wall of Suite 2G is not in strict compliance with the requirements of the Vancouver Building By-Law for a residential occupancy.

**By-Law Requirement** - Sentence 3.2.3.5.(1) addresses the construction of an exposing building face relative to its proximity to other buildings or to a property line. It specifies that where an exposing building face is permitted to have only up to 10% of unprotected openings, the exposing building face must be of noncombustible construction with noncombustible cladding and have a fire-resistance rating of at least 1 h.

Appendix note A-3.2.3.5.(1)(a) states that, for a Part 3 residential building of combustible construction that is similar to a Part 9 building, the relaxation in Article 9.10.14.7 permitting combustible studs in an otherwise required noncombustible exposing face may apply. Article 9.10.14.7 refers to Article 9.10.14.17, among others. Article 9.10.14.17 permits wood studs with certain additional features, where noncombustible construction is otherwise required. However, a condition of this relaxation is that the limiting distance must be 1 m (3.3 ft.) or greater. In this case, the limiting distance varies, and it is less than 3.3 ft. (1 m) in a small area (see Figure A on the following page).

**Intent of By-Law Requirement** - The requirements for the fire-resistance rating of the exterior wall is intended to contain the fire within the building and to prevent the premature failure of the exterior wall. The requirement for noncombustible construction is to prevent ignition of the building face and thus reduce the danger to the adjacent building.

**Proposed Equivalency** - The brick and the metal finish on the exterior wall will provide noncombustible cladding. The north exterior wall of unit 2G will be constructed as follows:

- The wood studs will be protected on the exterior by two layers of 15.9 mm (5/8 in.) Type X gypsum wallboard (exterior grade), and one layer of 15.9 mm (5/8 in.) Type X Gypsum on the inside. This will provide 1 h fire separation rated from both sides,
- All openings in the gypsum will be boxed around using 15.9 mm (5/8 in.) Type X gypsum in order to maintain the continuity of the fire separation,

- Exterior sprinklers will be provided to protect the portion of the exterior wall that is not permitted to be of combustible construction (See Appendix C).
- The void spaces within the wall assembly will be filled with noncombustible insulation and firestopped,
- Some window openings on the north exterior face of Unit 2G will be protected by a Fire Rated Glazing System. (Location is shown in Appendix C).
- The building will be sprinklered using quick response sprinklers,
- The walls will be provided with noncombustible cladding.

Where noncombustible construction is required, Article 9.10.14.17 permits wood studs covered on the exterior with a noncombustible membrane having a 1 h fire-resistance rating and with the stud spaces filled with noncombustible insulation or tightly filled with fibreglass insulation having a flame-spread rating not greater than 25. The exterior wall will be constructed as a 1 h fire-resistance rated separation, rated from both sides when tested in accordance with CAN4-S101, "Standard Methods of Fire Endurance Tests of Building and Construction Materials". The wall will remain in place and be structurally sound for a period of 1 h under the standard fire test conditions. Since the exterior wall will be protected by the noncombustible cladding which will reduce the fire exposure, the exterior face can be expected to remain in place for a period in excess of 1 h.

To maintain the continuity of the fire separation, all openings in the gypsum will be boxed around using 15.9 mm ( $\frac{5}{8}$  in.) Type X gypsum. This will seal the openings, and prevent the passage of flame within the wall assembly. Even if the fire would pass through the layer of gypsum, the void spaces within the wall assembly will be filled with noncombustible insulation which will inhibit the spread of flame.

The adjacent property line is at an angle to the north exterior face of the building. To determine the amount of glazing permitted in the building facade of this unit, a limiting distance of 4 ft. (1.2 m) was used in conformance with Sentence 3.2.3.1.(4). For the permitted construction of the exterior wall, a limiting distance of 900 mm (3 ft.) was used, as required by Sentence 3.2.3.1.(3), which resulted in the requirement for the walls to be of noncombustible construction, providing a 1 h fire-resistance rating and clad with noncombustible cladding. When an exposing building face is permitted to have between 10% to 25% unprotected openings, the wall is permitted to be of combustible construction.

When the exposing face is further from the property line, the requirement becomes less stringent. However, the Building By-Law does not make any provisions for the construction of exterior walls that are set back. If the entire wall was setback 2 m (6 ft. 9 in.) from the property line, the wall would be permitted to be of combustible construction (see Table C). As indicated in Figure A, only a portion (32%) of the exterior wall is required to be of noncombustible construction based on the actual limiting distance.

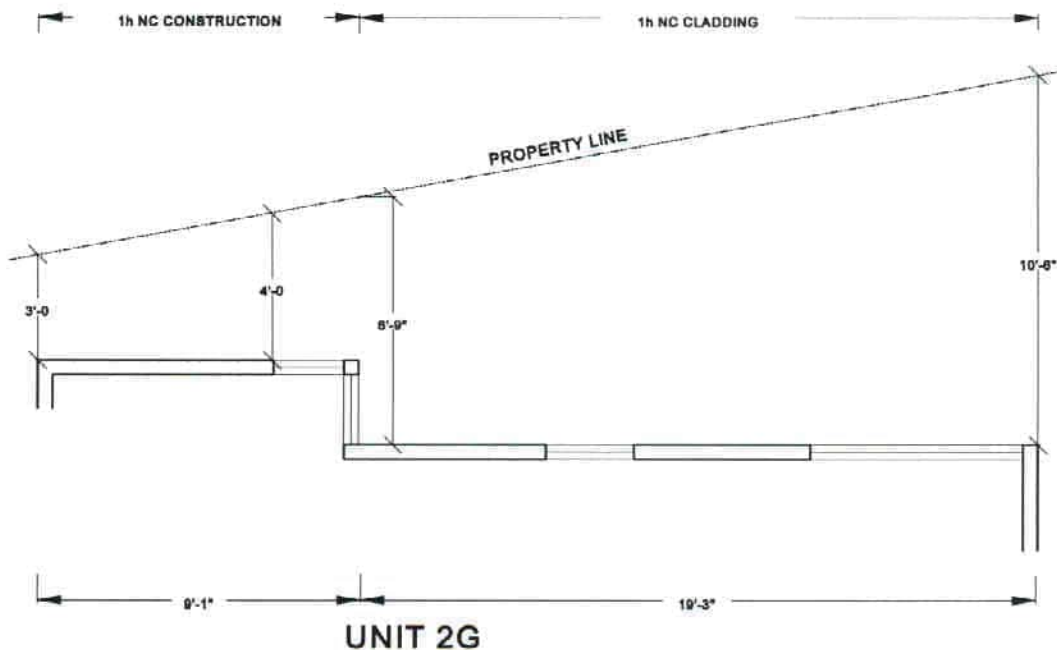


Figure A: Schematic Plan of North Exterior Wall, Unit 2G

Table E: Wall Construction Requirements

| Limiting Distance (ft-in) | U.P. Openings Permitted % | Wall Construction    |
|---------------------------|---------------------------|----------------------|
| 3'-0"                     | 0                         | 1 h, NC Construction |
| 4'-0"                     | 14.6                      | 1 h, NC Construction |
| 6'-9"                     | 25.0                      | 1 h, NC Cladding     |

NC = Noncombustible

The area of unprotected openings in the exterior wall will be slightly greater than that permitted by the By-Law. They will be protected on an equivalency basis by a Fire Rated Glazing System as discussed in the previous equivalency.

The building will be fully sprinklered with quick response sprinklers. Sprinklers are recognized as providing fire protection in lieu of a passive fire-resistance rating. For example, Article 3.2.2.8 waives the required fire-resistance rating of a roof assembly when a building is provided with a supervised and monitored sprinkler system. Further, Subsection 3.2.2 has provision for increased building areas where the building is sprinklered. Quick response sprinklers provide more rapid response than standard sprinklers and will allow for more rapid control and more suppression of a fire situation. Quick response sprinklers are, therefore, provided, in part, to mitigate the proposed use of combustible construction.

Furthermore, a fire alarm system will be provided. The fire alarm system will provide for early warning and permit occupants to evacuate at an earlier stage. In addition, the fire alarm system will be monitored off site which will provide for a faster response time from the Fire Department. As indicated in D.17 of Chapter 4 of the Commentary on Part 3 (Use and Occupancy) of the National Building Code, "It has been found that a time interval of ten to thirty minutes usually elapses between the outbreak of fire and the attainment of high thermal radiation levels." Further, it states "It is recognized that the time for a fire department to respond is important in controlling the spread of fire after high radiation levels have been reached." The requirements governing the construction of exterior wall does not make an allowance for the sprinkling of the building or for off site monitoring of the fire alarm. By notifying the fire department at an early stage, the fire department will arrive earlier and be able to set up operations to prevent the spread of the fire by exterior radiation.

Conclusion - A fire in the building should be contained, controlled or extinguished by the sprinkler system. The sprinkler system in this building will utilize quick response sprinklers which provide earlier detection and suppression of a fire. The fire alarm system will be monitored off site and will provide early warning to occupants and fast response from the Fire Department.

The north exterior wall of unit 2G will be constructed as follows:

- The wood studs will be protected on the exterior by two layers of 15.9 mm ( $\frac{5}{8}$  in.) Type X gypsum wallboard (exterior grade), and one layer of 15.9 mm ( $\frac{5}{8}$  in.) Type X Gypsum on the inside. This will provide 1 h fire separation rated from both sides,
- All openings in the gypsum will be boxed around using 15.9 mm ( $\frac{5}{8}$  in.) Type X gypsum in order to maintain the continuity of the fire separation,
- Exterior sprinklers will be provided to protect the portion of the exterior wall that is not permitted to be of combustible construction (See Appendix D).
- The void spaces within the wall assembly will be filled with noncombustible insulation and firestopped,
- Some window openings on the north exterior face of Unit 2G will be protected by a Fire Rated Glazing System. (Location is shown in Appendix C).
- The building will be sprinklered using quick response sprinklers,
- The walls will be provided with noncombustible cladding.

Therefore, the provision of these additional measures is considered to meet the intent of the Vancouver Building By-Law on an equivalency basis.

### SUMMARY AND CONCLUSIONS

This report has outlined the approach to Building By-Law compliance for this project and developed a number of equivalency approaches to meet the intent of the By-Law. The report has developed equivalency approaches to address;

- Equivalency for exposure to property line,
- Equivalency to permit combustible construction of north exterior wall for Suite 2G.

CFT Engineering Inc. has been retained to provide field review and certification for the equivalencies discussed in this report. Once the equivalencies have been incorporated into the project as intended, a letter of certification will be submitted to the City of Vancouver.

The equivalencies proposed within this report provide the level of life and fire safety intended by the Vancouver Building By-Law.

Prepared by,  
**CFT Engineering Inc.**

s.15(1), s.22(1)

Emilia Mazzonna, E.I.T.

EM/ph

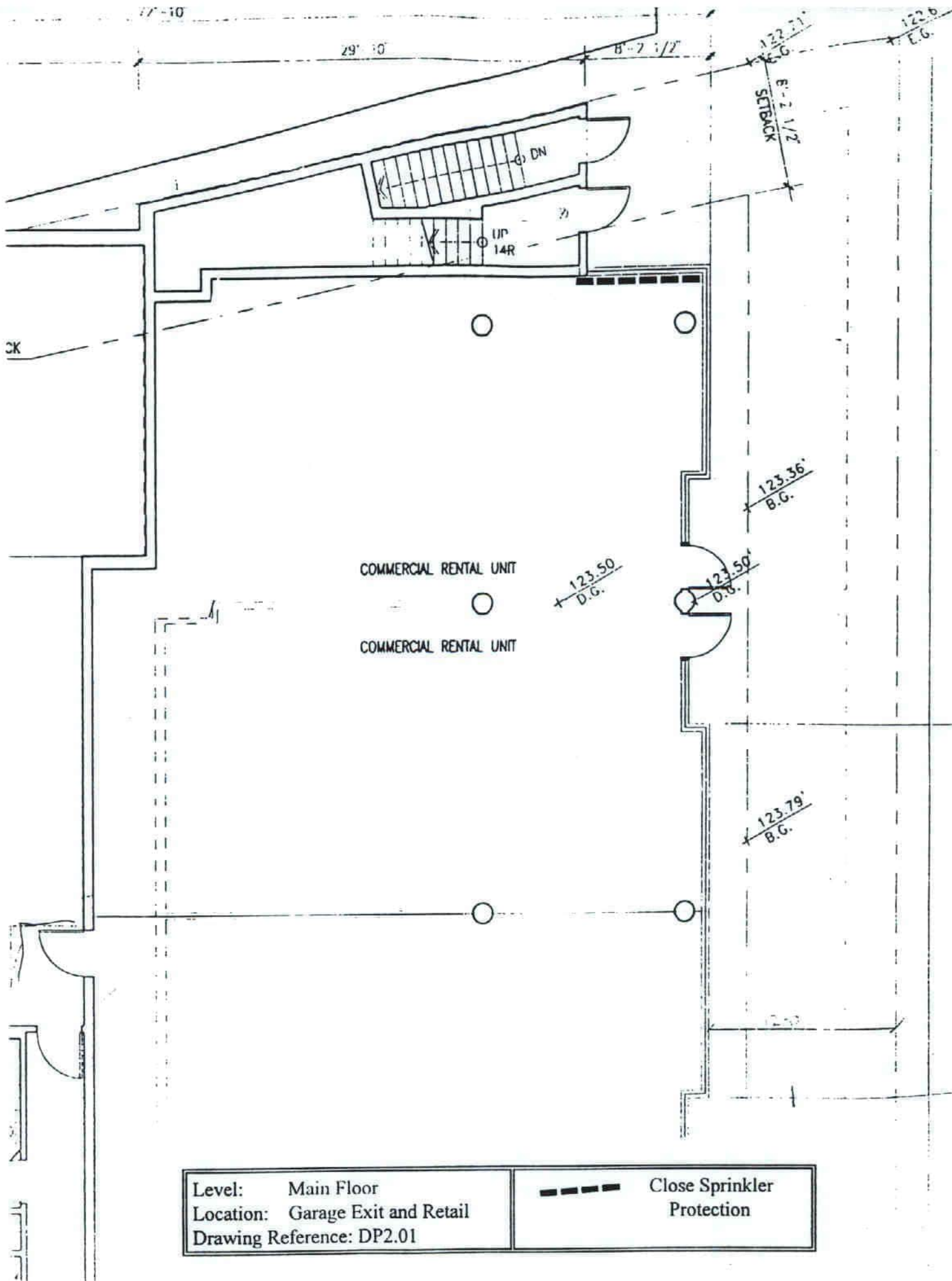
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Reviewed by

s.15(1), s.22(1)

Michael Linton, P.Eng., C.P.

**APPENDIX A**  
**LOCATION OF EXPOSURE TO EXIT**



**APPENDIX B**

**CITY OF VANCOUVER BULLETIN 94-8**



## BULLETIN 94-8

October 13, 1994

### EXPOSURE PROTECTION OF EXITS

Sentences 3.4.4.1.(3), (4) and (5) of the Vancouver Building By-law require protection of exits and exit routes exposed to fire from exterior openings in adjacent fire compartments. This protection may be achieved by means of:

*".... wired glass in fixed steel frames or glass block conforming to Article 3.1.6.10. or, where the building is sprinklered, glazing which is compatible with the adjacent sprinklers, ...."*

The term "*compatible with the adjacent sprinklers*" is intended to define a condition where the glazing will remain in place under fire exposure conditions for a reasonable duration. The purpose of this requirement is to prevent a fire plume from discharging through the opening and to reduce the transmission of radiant energy through the opening.

In order for the glass to reliably remain in place during a fire exposure condition, the following criteria should be met:

1. The glazing shall be laminated or tempered glazing in fixed metal frames or top-hung metal frames that have been fabricated so as to restrict opening to 100 mm.
2. The sprinkler heads shall be designed and positioned to provide continuous wetting of the entire surface of the glass during fire conditions.

In order to achieve continuous wetting of the glass, recent research has indicated that placement of the sprinkler heads is critical and that the system should incorporate the following features:

- The sprinkler heads must be located within two (2) inches vertically and between six (6) to 12 inches horizontally from the glass. For openings wider than six (6) feet, multiple sprinkler heads shall be spaced at a maximum of six (6) feet on centre.
- The sprinkler heads shall be of the quick response type with a minimum flow rate of 18 gpm from each head when all sprinklers are activated. Discharge of "glazing protection" sprinklers shall be additional to the floor sprinkler design flow.

.../over

- The sprinkler heads shall be protected from spray and potential cold solder effects from the adjacent sprinklers by means of baffles, per NFPA 13.
- No horizontal mullions are permitted in the glazing unless protected by a subsequent row of sprinklers.
- The head of such windows shall be designed so that no drapes, blinds or other obstructions can be placed between the sprinklers and the glazing.

Accordingly, the City will require that the above conditions be met when providing exposure protection of exits by means of sprinklers and compatible glazing per Sentences 3.4.4.1.(3), (4) and (5) of the Vancouver Building By-law. When it complies with the above requirements, such protection will be accepted as consistent with the By-law and will not require submission of a request for equivalency. Where it is proposed to depart from the above conditions, a request for equivalency will be required.

s.15(1), s.22(1)

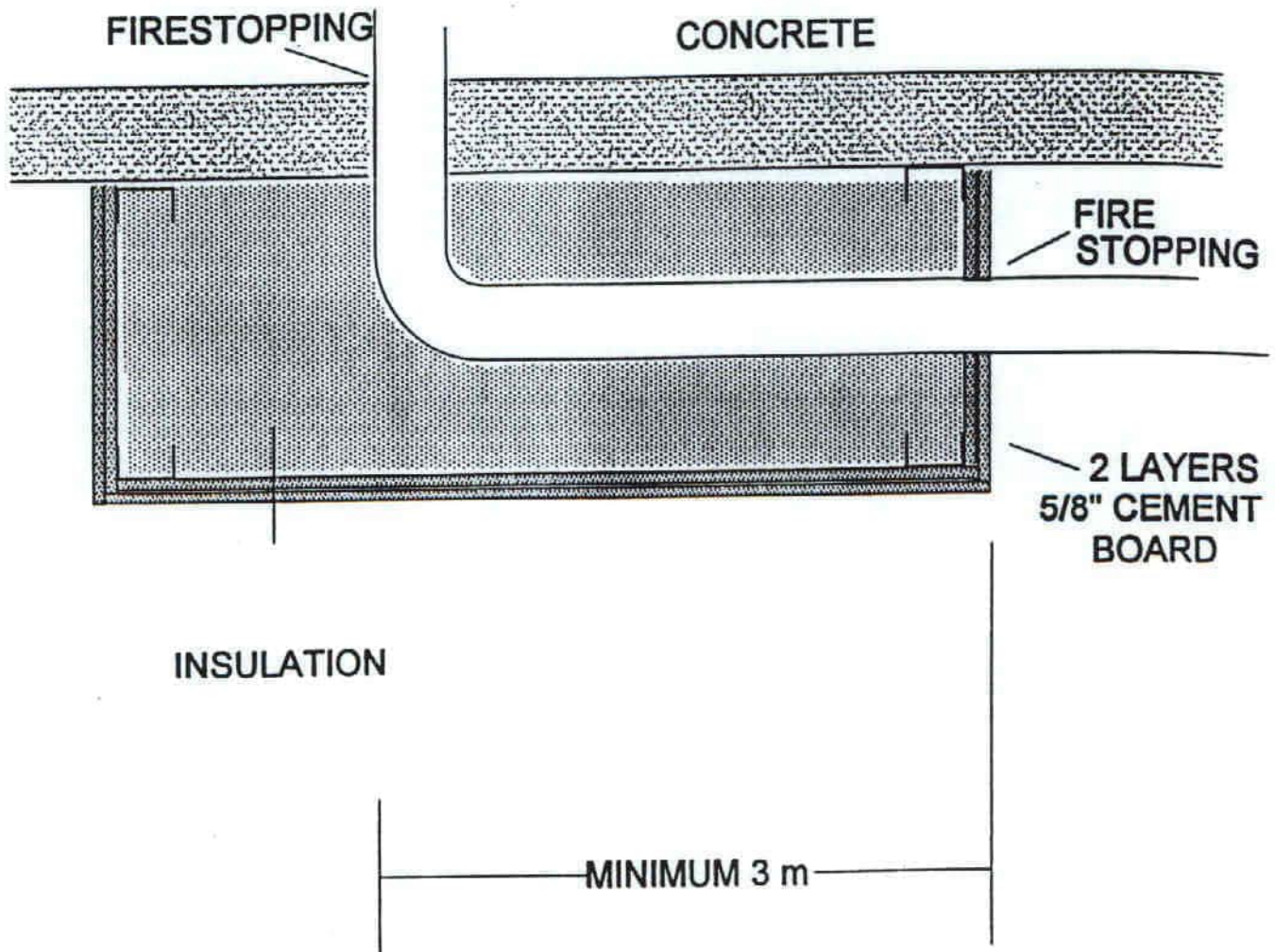
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R. L. Maki, PEng  
CITY BUILDING INSPECTOR

RLM/NR.arbul194-8

**APPENDIX D**

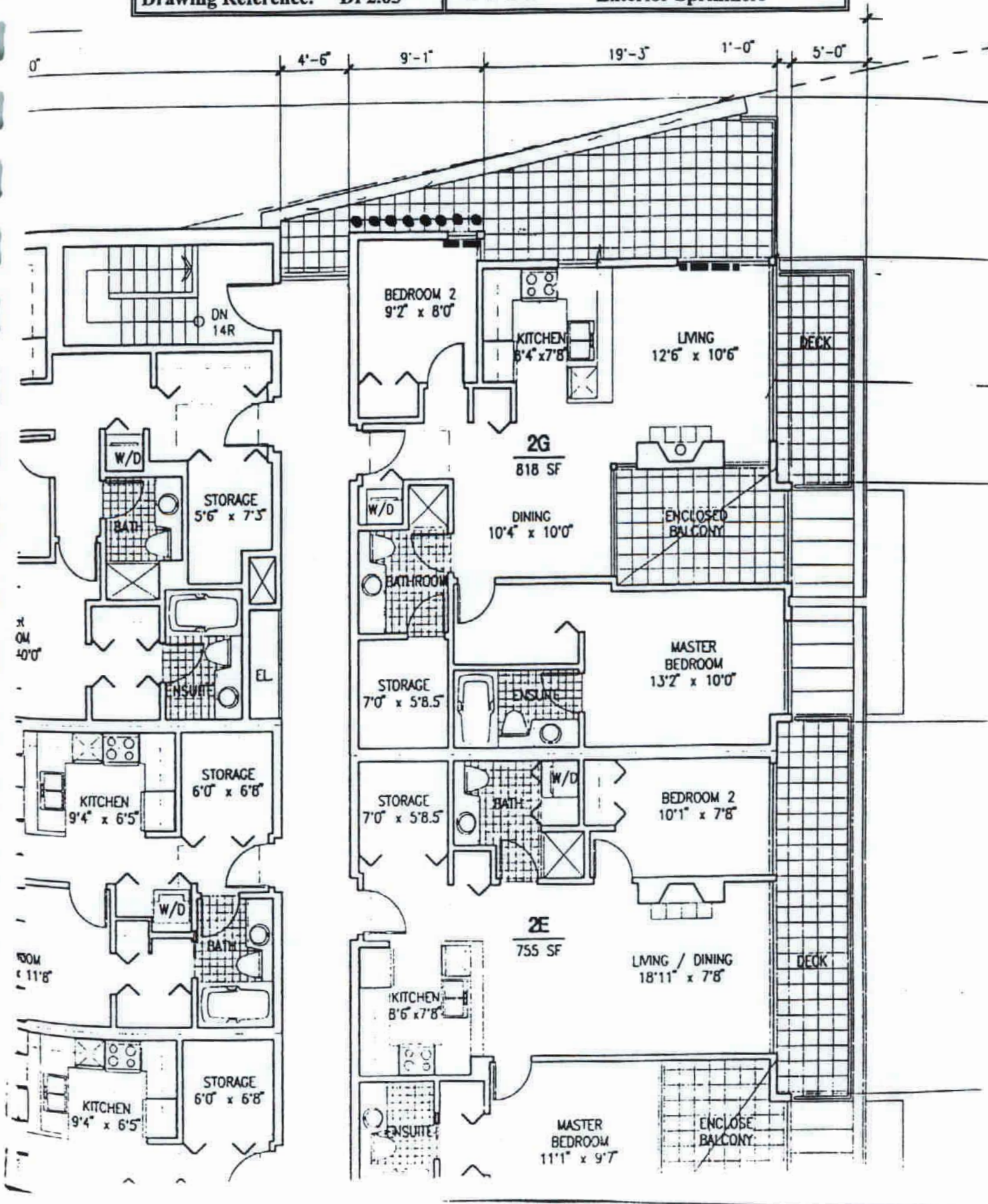
**PROTECTION OF SERVICE PENETRATION DETAIL**



|                           |             |                    |
|---------------------------|-------------|--------------------|
| CFT Engineering Inc.      | Scale nts   | Drawn By B         |
| Title Service Penetration | Date May 96 | Drawing No. 1 of 1 |

## **APPENDIX C**

### **LOCATION OF WATER CURTAIN SPRINKLER SYSTEM AND FIRE RATED GLAZING SYSTEM**



**APPENDIX D**  
**CCMC EVALUATION REPORT**



National Research  
Council Canada

Institute for  
Research in  
Construction

Conseil national  
de recherches Canada

Institut de  
recherche en  
construction

CCMC 12752-R

**CCMC**

## EVALUATION REPORT

DIVISION 15335

Issued 96-06-24

Revised 97-01-07

Re-evaluation due 99-06-24

# Central Model WS Window Sprinkler System

Central Sprinkler Company  
451 North Cannon Avenue  
Lansdale, Pennsylvania  
U.S.A. 19446

Tel.: (215) 362-0700  
Fax: (215) 362-5383

Plant: 451 North Cannon Avenue  
Lansdale, Pennsylvania

### 1. Purpose of Evaluation

The manufacturer sought confirmation that "Central Model WS Window Sprinkler System" provides a 2 h fire resistance rating and can serve as a wall assembly requiring a 2 h fire resistance rating in conformance to the intent of the National Building Code of Canada (NBC).



*This report contains no endorsement, warranty, or guarantee, expressed or implied, on the part of NRC. NRC accepts no responsibility for the performance of any product or system described herein if manufactured and/or used outside the purpose of this evaluation report.*

### 2. Opinion

Test results and assessments provided by the manufacturer show that "Central Model WS Window Sprinkler System" complies with CCMC's Technical Guide for Sprinkler-Protected Glazing System, Masterformat number 15335, dated 94-04-12. If used in accordance with the limitations and conditions stated in this report, "Central Model WS Window Sprinkler System" provides a fire separation with a fire resistance rating of up to 2 h, with a level of performance equivalent to that required in:

- National Building Code of Canada 1995, Subsection 3.1.7. Fire-Resistance Ratings.

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

### 3. Description

"Central Model WS Window Sprinkler System" consists of a window assembly and a sprinkler system designed to protect the window assembly by spraying water on the glazing. The primary factors involved in the successful and safe operation of the Sprinkler Protected Glazing

System are the ability of the sprinkler to operate before critical stresses are formed in the glazing and the ability of the sprinkler to keep the glazing and the frame cool throughout the fire.

The window assembly consists of a standard window with a metal frame and glazing, which is a sheet of fixed non-operable tempered or heat-strengthened glass. The width of the glazing is unlimited in span, but the height is limited to 3050 mm. The minimum thickness of the glazing is 6 mm.

The two models of sprinklers evaluated: a horizontal sidewall and a pendent vertical sidewall, are shown in Figures 1 and 2. The sprinklers incorporate specially designed deflectors that ensure the spray pattern wets the entire surface of the window. The Model WS sprinkler is a quick response pendent or sidewall sprinkler that is available in either 68°C/155°F or 93°C/200°F. It is available in three standard finishes: brass, chrome plated and white painted, and must be installed in accordance with Central's technical literature and installation instructions. The horizontal sidewall is located within the outside edge of the window frame, 12.5 to 100 mm away from the glass and 25 to 50 mm down from the lintel. The vertical sidewall is located 100 to 300 mm from the face of the glass and 50 to 100 mm down from the lintel. Window sprinklers are located as shown in Figures 3 and 4.

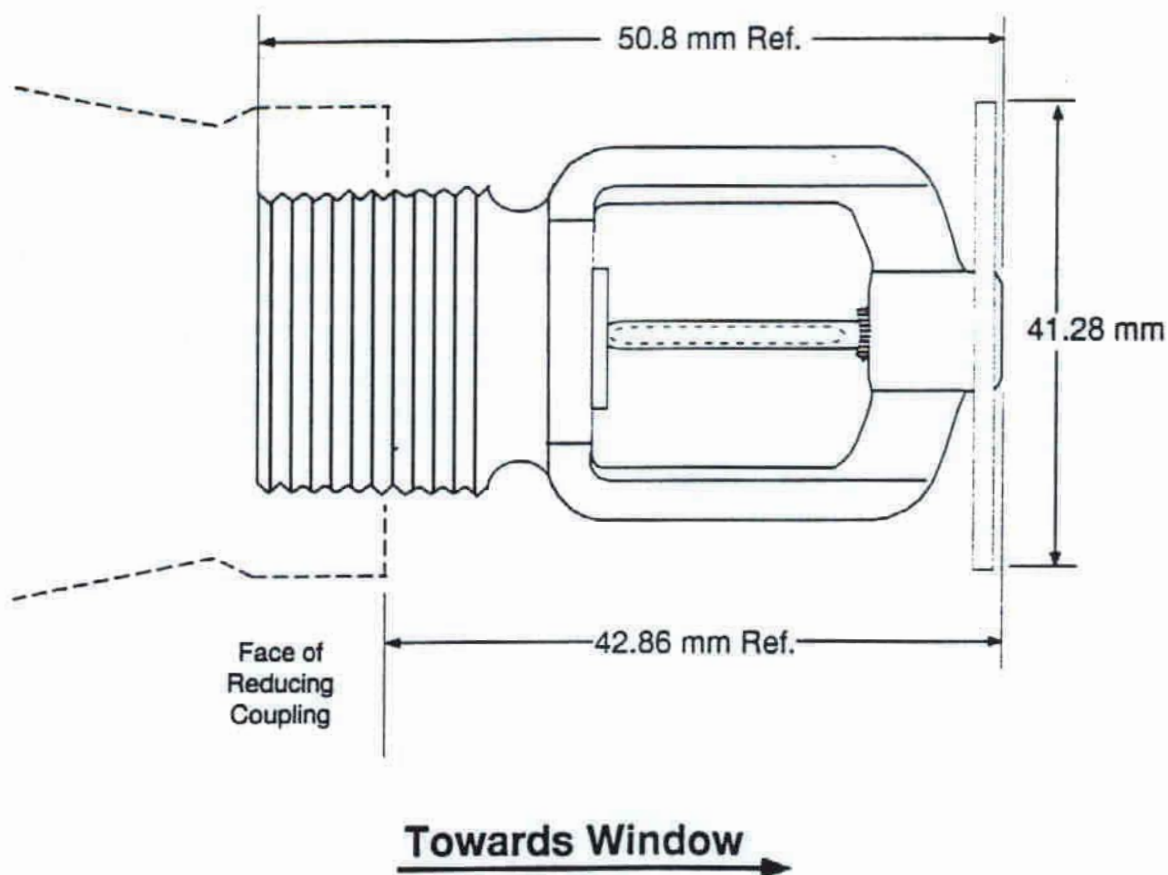


Figure 1. WS Horizontal Sidewall Window Sprinkler

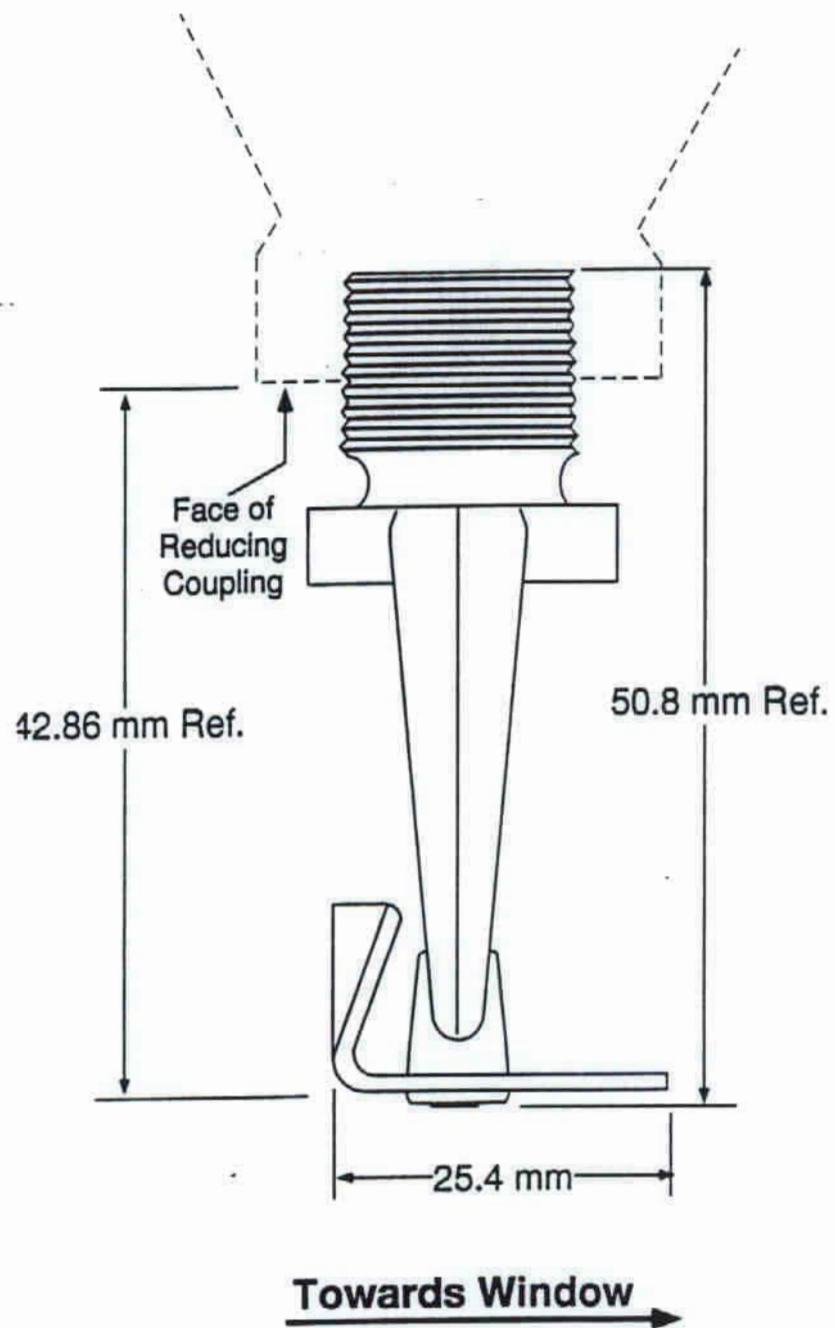


Figure 2. WS Pendent Vertical Sidewall Window Sprinkler

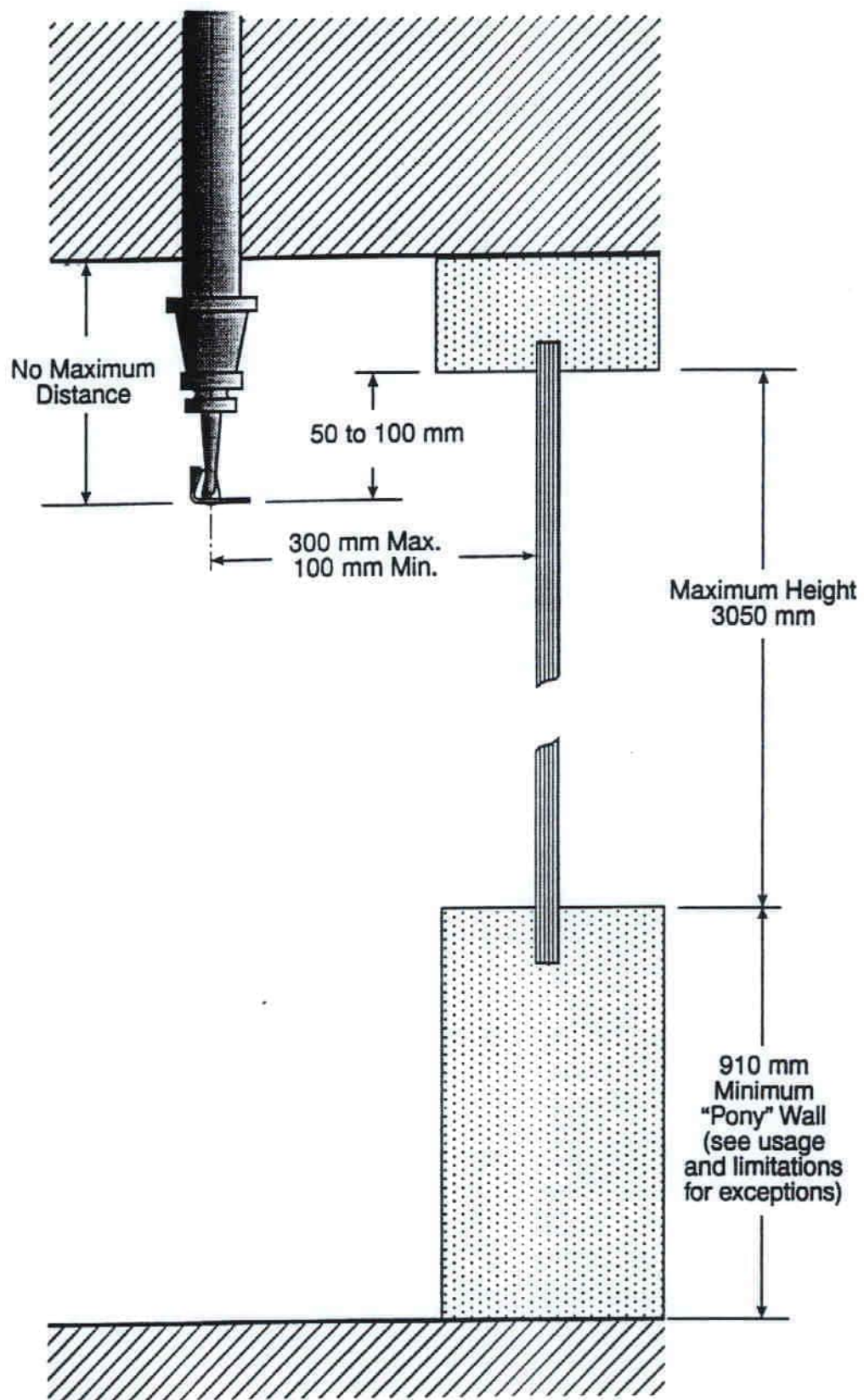


Figure 4. WS Pendent Vertical Sidewall Sprinkler System

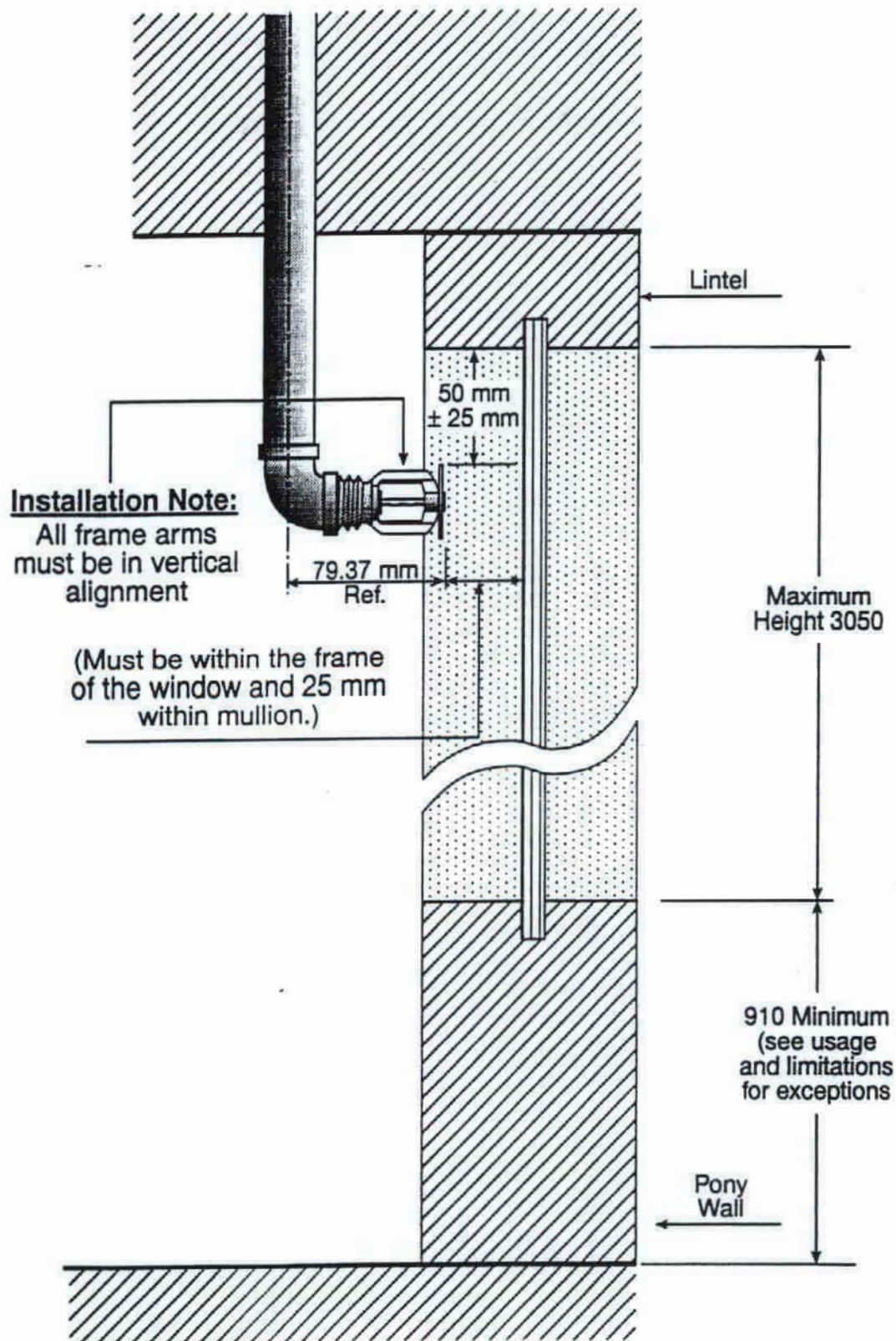


Figure 3. WS Horizontal Sidewall Sprinkler System

#### 4. Usage and Limitations

- The "Central Model WS Window Sprinkler System" may be used as a wall assembly providing a 2 h fire resistance rating, provided it is installed and maintained according to the manufacturer's current instructions.
- The design of the "Central Model WS Window Sprinkler System" must be performed by a professional engineer skilled in such designs and licensed to practice under the appropriate legislation. Except as permitted in Sentences 3.2.5.13.(2), (3), and (4) of the National Building Code of Canada 1995, "Central Model WS Window Sprinkler System" must be designed, constructed, installed and tested in conformance with NFPA 13, "Installation of Sprinkler Systems."
- The maximum distance between the WS Window Sprinklers shall be 2400 mm. The minimum distance between these sprinklers or to any other standard sprinklers is 2000 mm, unless they are separated by a 125 mm mullion. The minimum flow rate is 1.26 L/s at a pressure of 88 kPa.
- The minimum distance between the glass and the floor is 910 mm except where: a) the WS Horizontal Sidewall Sprinkler is located no more than 25 mm from the face of the glass; or b) the WS Horizontal Sidewall Sprinkler is located between 26 mm and 100 mm from the face of the glass and permanent means such as wall features, fixtures, or barriers are provided to prevent combustibles from being within 50 mm of the face of the glass; or c) the WS Pendent Vertical Sidewall Sprinkler is located 100 mm from the face of the glass and permanent means such as wall features, fixtures, or barriers are provided to prevent combustibles from being within 50 mm of the glass.
- Blinds or curtains must not be installed between sprinkler and glass.
- The glazing shall consist of a sheet of fixed non-operable tempered or heat-strengthened glass conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass." The glass is installed in a metal frame of 1.35 mm (16 gauge) minimum thickness. The glazing is unlimited in span, but the overall height, including pony wall (if required) and glazing, is limited to 3960 mm. The minimum thickness of the glazing is 6 mm.
- The "Central Model WS Window Sprinkler System" may be used in either a sprinklered or unsprinklered building to protect non-operable window openings to a maximum of 2-h fire resistance rating, provided,
  - a) in an exposing building face, the window sprinkler is installed on the interior side of the window, or
  - b) in an interior fire separation, the window sprinkler is installed on both sides of the window in the fire separation.
- A sign shall be permanently mounted and maintained beside the main water supply stating, "SPECIAL SPRINKLER HEADS ON THIS SYSTEM ARE AN INTEGRAL PART OF WINDOW FIRE SEPARATION. THIS WATER SUPPLY MAY ONLY BE SHUT OFF AFTER ALL THE PROPER AUTHORITIES HAVE RECEIVED NOTICE IN WRITING."
- The sprinklers shall be served by either a separate riser or a separate cross main that is independent of any regular sprinkler or standpipe system serving the floor area.
- Separate flow switches or alarm check valves, supervised control valves, and each fire compartment on each system, shall be electrically supervised and indicated separately at the fire/sprinkler alarm annunciator panel.
- Where the water supply is from a standpipe system conforming to the NBC, the siamese connection shall be labeled as per the standard, except for this dual purpose, which shall read "Standpipe and Window Sprinklers."
- The deflector of the sprinklers and the engineering drawings must be identified with the phrase "CCMC # 12752-R."

## 5. Performance

Testing was conducted at an independent laboratory recognized by CCMC.

manufacturer's drawings and installation instructions. The test results for the "Central Model WS Window Sprinkler System" are summarized in Table 1.

The samples and installation were examined and found to be in conformance with the

Table 1. Test Results for the "Central Model WS Window Sprinkler System"

| Test                                                                                                                                                                                                                                                                                      | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Result                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Operation-Lodgement Test</b><br>Thirty sprinklers of each model were operated at service pressures of 48, 172, 344, 516, 860 and 1204 kPa.                                                                                                                                             | All sprinklers must operate as intended, with all operating parts clearing the waterway at each service pressure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | passed                            |
| <b>Flow Endurance Test</b><br>One sample of each model was tested at a service pressure of 1376 kPa, which is 172 kPa greater than the rated pressure.                                                                                                                                    | No cracking, deformation or separation of sprinkler body or components.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | passed                            |
| <b>Stress Corrosion Cracking Test</b><br>Five samples were degreased and exposed to an ammonia-air mixture for 10 days. Samples were tested visually and then subjected to a flow endurance test for 30 min at 1204 kPa.                                                                  | No separation of parts during 1204 kPa endurance test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | passed                            |
| <b>Fire Test</b><br>Furnace was calibrated to maintain a standard time-temperature curve. Each test was conducted for 2 h. The interior glass and frame temperature, control thermocouple temperatures, gas flow, water pressure, heat flux, and sprinkler operation times were recorded. | <ol style="list-style-type: none"><li>1) The test assembly shall withstand the fire endurance test without passage of flame or gases hot enough to ignite cotton waste, for a period equal to that for which classification is desired;</li><li>2) Transmission of heat through the wall or partition during the fire endurance test shall not raise the temperature on its unexposed surface more than 140°C above the initial temperature; and</li><li>3) The assembly including anchorage points shall not show signs of any deformation, cracking, melting of the fire-exposed glazing material or any significant change in the shape of the frame.</li></ol> | passed 2 h fire resistance rating |

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For more information contact:

Alphonse Caouette, P.Eng.  
(613) 993-6917

*Issued by the Institute for Research in  
Construction under the authority of the National  
Research Council*

John Berndt, P.Eng.  
Manager, CCMC

*Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC's Registry of Product Evaluations, of which this report is part.*

*Readers are advised to confirm that this report has not been withdrawn or superseded by a later issue by contacting the Canadian Construction Materials Centre, Institute for Research in Construction, National Research Council of Canada, Montreal Road, Ottawa, K1A 0R6; Telephone (613) 993-6189, Fax (613) 952-0268.*

# Window Sprinkler™

## Specific Application

### Model WS™

Horizontal Sidewall

Pendent Vertical Sidewall Automatic Sprinkler

Manufactured by: Central Sprinkler Company  
451 North Cannon Avenue, Lansdale, Pennsylvania 19446



## Product Description

The Central Model WS™ Window Sprinkler is the first sprinkler ever to be specifically Listed to provide protection for heat strengthened or tempered glass windows using closed sprinklers. As part of the testing, the gas flow required to achieve the time/temperature relationship specified in ASTM E119 was maintained for two hours and the window maintained integrity without visible damage or cracking. These sprinklers were tested in accordance with the Canadian Construction Materials Centre Technical Guide for Sprinkler Protected Glazing Systems. The Model WS™ is the only listed option to protect the integrity of an interior window.

The Model WS™ Window Sprinklers incorporate specially designed deflectors that ensure that the spray pattern wets the entire surface of the window.

The Window Sprinkler can be used as interior protection of windows or glazing in a sprinklered building or non sprinklered building. Also, the Model WS™ can be used as an exterior sprinkler for exposure protection.

The Model WS™ is a quick response pendent or sidewall sprinkler that is available in either 155°F (68°C) or 200°F (93°C). As with any specific application sprinkler, follow the installation instructions included in this data sheet.

**Note: If NES and CCMC guidelines apply, consult the specific approval report.**

The Model WS™ is available in three standard finishes, brass, chrome plated and white painted.



## Technical Data

Model: WS™

Style: Horizontal Sidewall &  
Pendent Vertical Sidewall

Wrench: Combination Wrench #1106

Orifice Size: 1/2" (12.7 mm)

K-Factor: 5.6 (80.1 metric)

Thread Size: 1/2" (15mm) N.P.T.

Temperature Rating: 155°F/68°C  
200°F/93°C

Approvals: U.L., cUL, MEA 191-96-E

Additional Approvals and Recognition:

NES (National Evaluation Service  
Representing I.C.B.O., B.O.C.A.  
and S.B.C.C.I); and CCMC (Canadian  
Construction Materials Center  
Representing Canadian Approval)

Maximum Working Pressure:  
175 psi (12.1 bar)

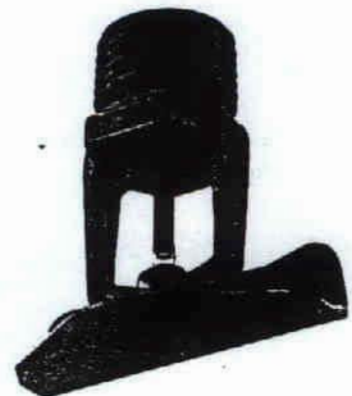
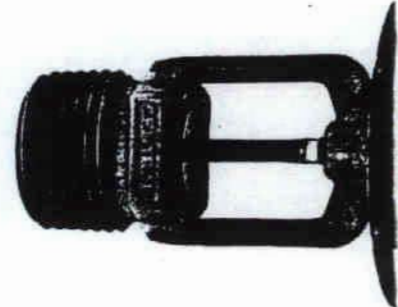
Factory Hydro Test:  
100% at 500 psi (34.5 bar)

Standard Finishes:

Sprinkler: brass, chrome plated,  
white painted

Escutcheon: brass, chrome plated,  
white painted

|           | Horizontal<br>Sidewall | Pend. Vert.<br>Sidewall |
|-----------|------------------------|-------------------------|
| Length:   | 2" (50.8 mm)           | 2" (50.8 mm)            |
| Width:    | 1 5/8" (41.3 mm)       | 2" (50.8 mm)            |
| Weight:   | 3.5 oz. (99 g.)        | 2.0 oz. (56.7 g.)       |
| Patent:   | Pending                |                         |
| Response: | Quick                  |                         |



**1/2" (12.7 mm)**  
**Horizontal  
Sidewall &  
Pendent  
Vertical  
Sidewall  
Sprinkler**



**Area of Use:** At windows that are part of rated walls when acceptable to the Authority Having Jurisdiction, or at windows that need exposure protection.

**Hazard:** Heat-strengthened glass, tempered glass or any stronger glass applicable to any occupancy.

**Maximum Window Span:** Unlimited

**Maximum Window Height:** 13'-0" (3.96 m) See Figure F & G.

**Minimum Clearance From Face of Glass:**

All combustible materials shall be kept 2" (50.8 mm) from the face of the glass. This can be accomplished by a 36" (914 mm) pony wall or any other method acceptable to the Authority Having Jurisdiction.

**Maximum Distance Between Window Sprinklers:** 8'-0" (2.4 m) See Figure C & D.

**Minimum Distance Between Window Sprinklers:** 6'-0" (1.8 m) See Figure C & D, unless separated by a mullion or baffle.

**Minimum Distance from Standard Sprinklers:** 6'-0" (1.8 m) unless separated by a baffle.

**Minimum Flow per Sprinkler:**

|                                 | Flow              | PSI                |
|---------------------------------|-------------------|--------------------|
| 6'-0" to 8'-0" (1.8 m to 2.4 m) | 20 gpm (75.7 Lpm) | 12.7 psi (0.9 bar) |
| Less than 6'-0" (1.8 m)         | 15 gpm (56.8 Lpm) | 7.0 psi (0.5 bar)  |

**Maximum Pressure Per Sprinkler:**

Horizontal Sidewall = 70 psi (4.8 bar)

Vertical Sidewall = 175 psi (12.1 bar)

\* The 70 psi (4.8 bar) is only for cold solder purposes. If there is a baffle or mullion separating the sprinkler, the maximum pressure is 175 psi (12.1 bar).

**Test Pressure:** All sprinklers are factory hydrostatically tested at 500 psi (34.5 bar). System testing per NFPA is done at 200 psi (13.8 bar).

**System Type:** Wet, single interlock preaction or deluge.

**Sprinkler Location:**

**Butt Jointed Glazing Assemblies** - Locate window sprinklers on maximum 8'-0" (2.4 m) centers. See Figure D.

**Mullioned Glazing Assemblies** - Locate window sprinklers

within each mullioned glazing segment. See Figure C.

**Sprinkler Data:** See Page 1

**Hydraulic Requirements:** In all cases, the Authority Having Jurisdiction is to be consulted to determine the hydraulic requirements for each installation. The following are suggested minimum hydraulic requirements.

**Interior Protection Sprinklered Building** - In a sprinklered building, calculate the most demanding window sprinklers along one side of the wall. The length along the wall to be calculated is a minimum of 1.2 x the square root of the system area of operation. For example,  $1.2 \times \sqrt{1500} = 46.5'$  ( $1.2 \times \sqrt{139 \text{ m}^2} = 14.2 \text{ m}$ ). In the event this exceeds the total length of the window sprinklers along the wall, calculate all sprinklers along the most demanding wall.

**Interior Protection Non-Sprinklered** - Calculate all the sprinklers on the most demanding side of the glazing assembly within the enclosure.

**Exposure Protection** - Calculate all sprinklers facing the exposure. If open sprinklers are used, calculate all sprinklers controlled by the deluge valve.

**Maximum Distance from Mullion:** Half the maximum distance between sprinklers. See Figure C.

**Intermediate Horizontal Mullions:** Not tested with and not Listed for. See Figure E.

**Type of Window Frame/Mullion:** Noncombustible.

**Sprinkler Location for Exposure Protection:** One side of glass. See Figure B.

**Sprinkler Location for an Interior Wall:** On both sides of the glass. See Figure A.

**Deflector Location:** Deflectors are located as follows without respect to the ceiling:

**Horizontal Sidewall** - Locate within the outside edge of the window frame from  $\frac{1}{2}"$  to 4" (12.7 mm to 101.6 mm) away from the glass and  $2" \pm 1"$  (50.8 mm  $\pm$  25.4 mm) down from the top of exposed glass. See Figure F.

**Vertical Sidewall** - Locate 4" to 12" (101.6 mm to 304.8 mm) from the face of the glass and  $3" \pm 1"$  (76.2 mm  $\pm$  25.4 mm) down from the top of exposed glass. See Figure G.

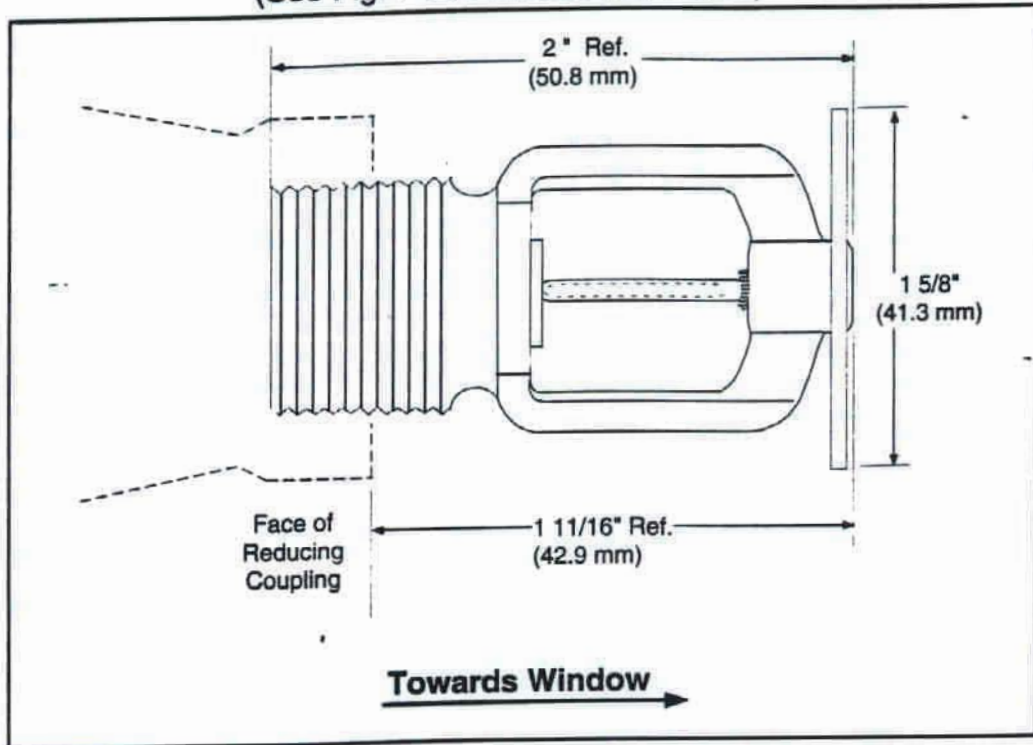


## Testing

The Model WS Window Sprinklers are the first sprinklers ever to be Listed for protecting interior windows. As a part of the testing of these sprinklers, the gas flow required to achieve a time/temperature relationship specified in ASTM E119 was established in the test furnace without sprinkler protection. A window assembly with sprinklers was then installed in the test furnace and the same gas flow conditions maintained for a two hour test period. No cracking or visible damage to the window was permitted during the test period.

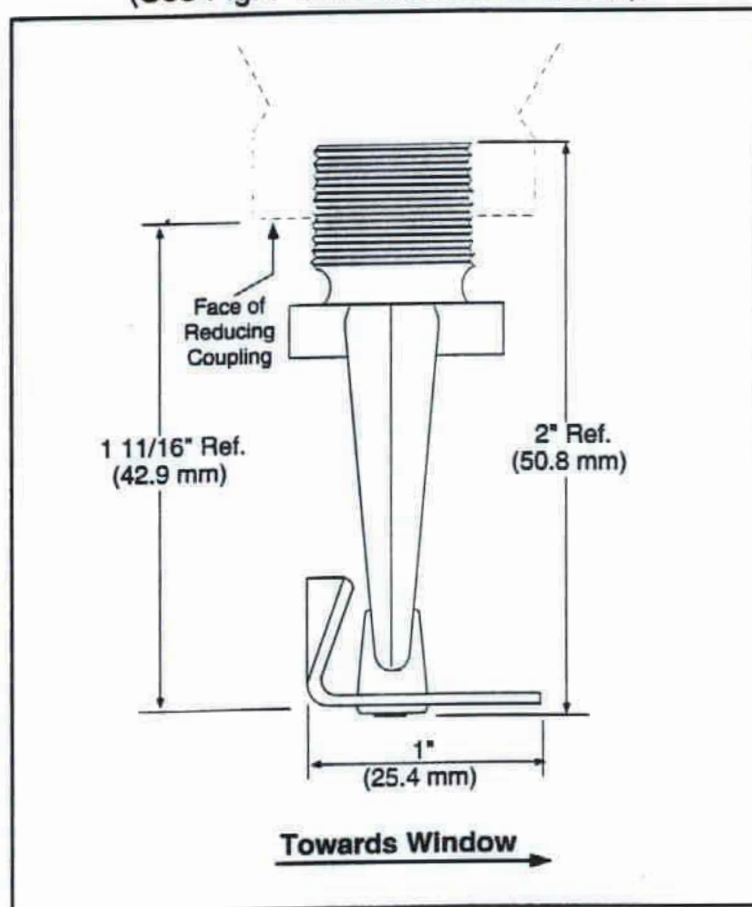
The success of the Window Sprinkler is due to the full wetting of the glass and the quick response element. Test results indicated glass protected by Window Sprinklers maintained the ambient temperature even though the area just beyond the spray pattern was at 1,832°F (1,000°C).

**Figure 1**  
**WS™ Horizontal Sidewall Window Sprinkler**  
 (See Fig. F for Detailed Installation)



Installation Note: Frame arms must be in vertical alignment.

**Figure 2**  
**WS™ Pendent Vertical Sidewall Window Sprinkler**  
 (See Fig. F for Detailed Installation)



**Operation:** The glass bulb capsule operating mechanism contains a heat-sensitive liquid that expands upon application of heat. At the rated temperature, the frangible capsule ruptures, thereby releasing the orifice seal. The sprinkler then discharges water in a pre-designed spray pattern to control or extinguish the fire.

## Design Guidelines

To design the Window Sprinkler into a project, follow these steps:

- Decide which walls have windows that need to be protected.
- Determine if the pendent or sidewall version is to be used. Consider the following in this determination:

How far away from the glass is the sprinkler going to be located?  
If 1"-4" (25.4 mm to 101.6 mm), choose the horizontal sidewall. If over 4" (101.6 mm), choose the pendent vertical sidewall

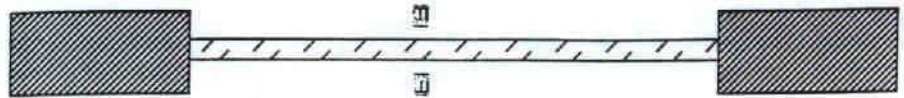
- Determine the location of the sprinkler in relation to the window. Consider the following:

If the window is so wide it requires more than one sprinkler, be sure not to space the sprinklers closer than 6 feet apart.

Is the glass framed into noncombustible mullions or butt jointed together?

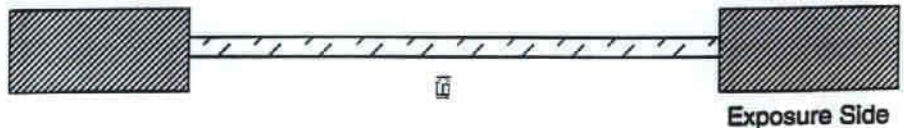
If butt jointed, space sprinklers at the maximum spacing for the hydraulic flow chosen (see hydraulic requirements on page 2. For example, a long window of butt jointed glass could be spaced at 8'-0" (2.4 m) on center.

**Figure A**



In maintaining the integrity of a window, Window Sprinklers need to be installed on both sides of the glass.

**Figure B**



In exposure protection, Window Sprinklers need to be installed on one side protecting against the exposure.

If framed into noncombustible mullions, check to be sure that there are no horizontal mullions (see figure E). If so, window sprinklers cannot be used. If not, consider each mullion as a barrier and locate window sprinklers no more than  $\frac{1}{2}$  the calculated distance from the face of each side of the mullion (see figure D).

### Hydraulic Calculations:

Determine if the window sprinklers are in a fully sprinklered building or unsprinklered building. Calculate accordingly. See Design Data on page 2.



## Installation

All Central Model WS™ Window Sprinklers must be installed according to current NFPA Standards, these installation instructions and the Local Authority Having Jurisdiction. Deviations from these requirements and standards or any alteration to the sprinkler itself will void any warranty made by Central Sprinkler Company. In addition, installation must also meet local government provisions, codes, and standards as applicable.

The system piping must be properly sized to ensure the minimum required flow rate at the sprinkler. Check for the proper model, style, orifice size, and temperature rating prior to installation. Install sprinklers after the piping is in place to avoid mechanical damage; replace any damaged units.

Wet pipe systems must be protected from freezing.

Upon completion of the installation, the system must be tested per recognized standards.

In the event of a thread leak, remove the unit, apply new pipe joint compound or tape, and reinstall.

### Installation Sequence

**Step 1.** The unit must be installed per specified guidelines.

**Step 2.** Use only a non-hardening pipe joint compound or Teflon\* tape. Apply only to the male threads.

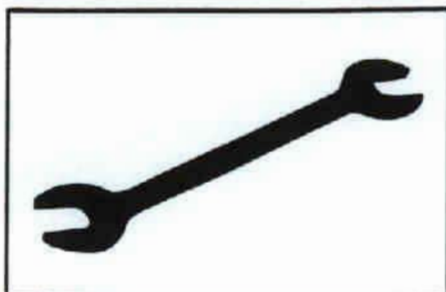
\*Teflon is a trademark of the DuPont Corp.

**Step 3.** Hand tighten the sprinkler into the fitting. Use a Central Sprinkler Wrench, to tighten the unit into the fitting. A leak-tight joint requires only 7 to 14 ft.-lbs. (9.5 to 19.0 Nm) of torque; a tangential force of 14 to 28 lbs. (62.3 to 124.5 N) delivered through a 6" (150 mm) handle will deliver adequate torque. Torque levels over 21 ft.-lbs. (28.6 Nm) may distort the orifice seal, resulting in leakage.

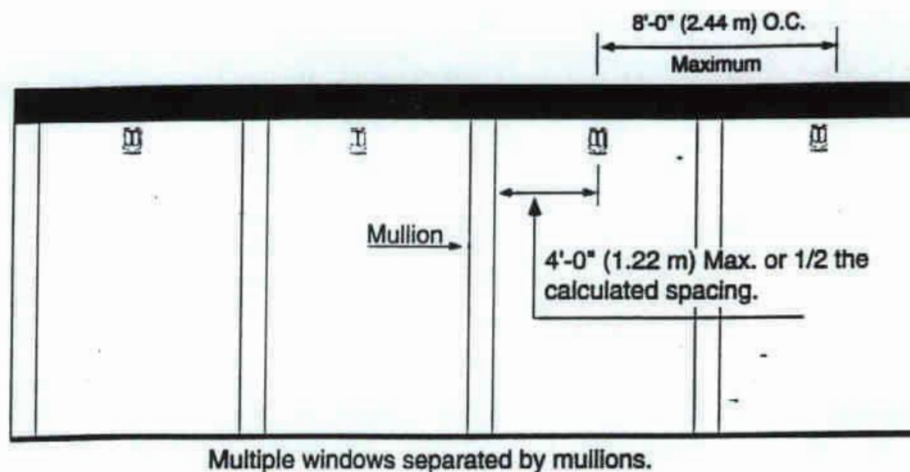
**Caution:** Special care must be taken when installing with a CPVC system. Sprinklers must be installed after the manufacturer's recommended setting time for the primer and cement to ensure that neither accumulate within the sprinkler.

Special care must be taken when installing with a copper system. Sprinklers must be installed only after the inside of the sprinkler drop and associated fittings have been wire brushed to remove any flux. Residual flux can cause corrosion and in extreme cases can impair proper sprinkler operation.

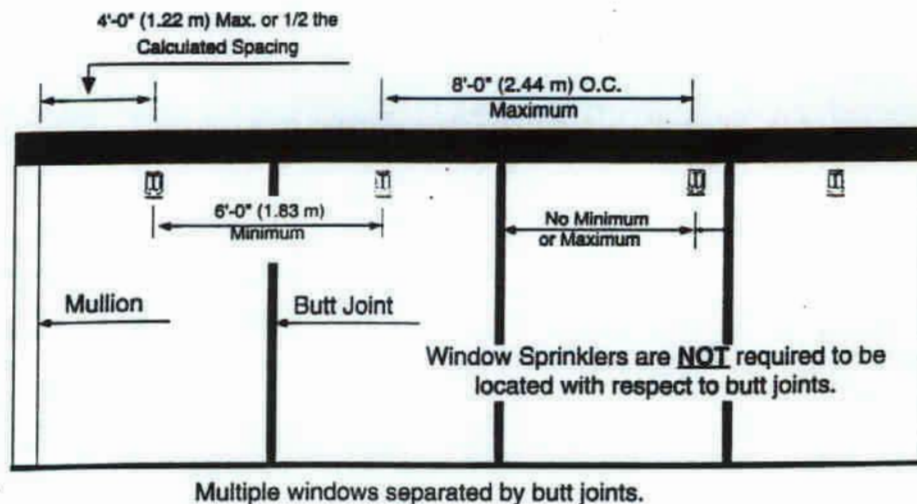
### Combination Wrench (Part #1106)



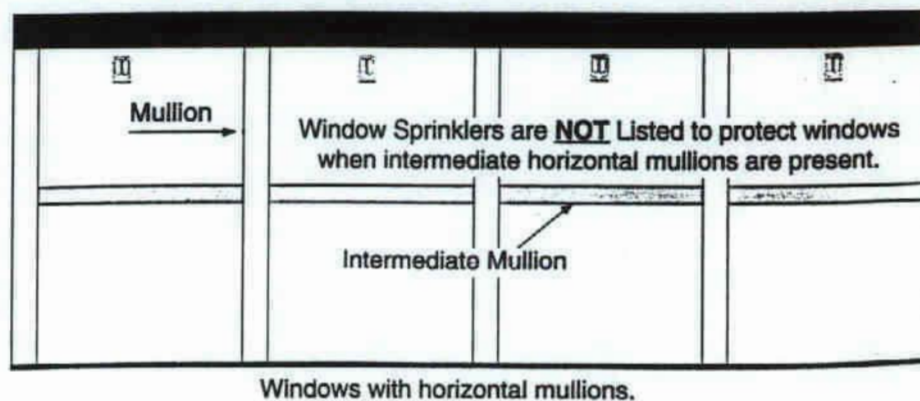
**Figure C**



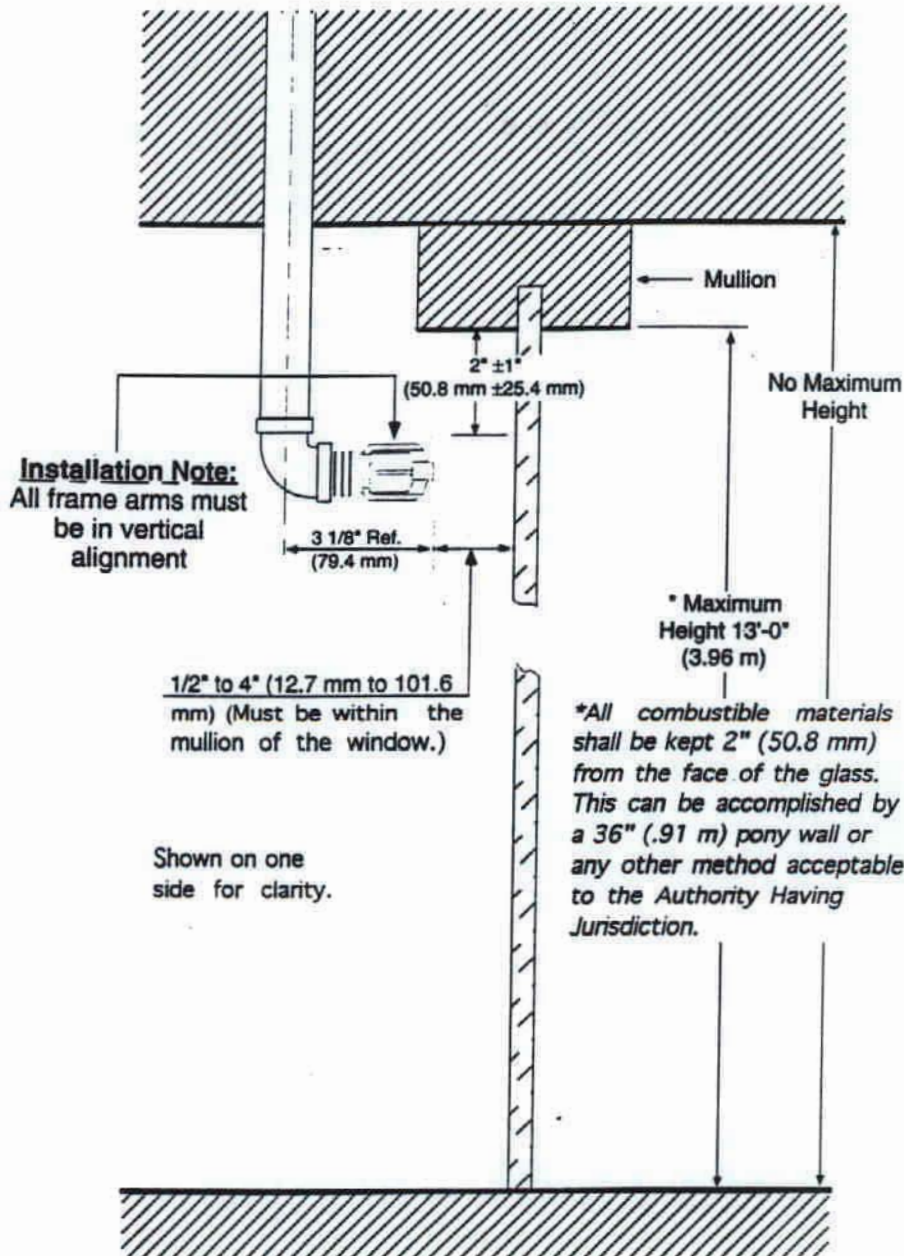
**Figure D**



**Figure E**



**Figure F**  
**WS™ Horizontal Sidewall**



## Care & Maintenance

Sprinklers must be handled carefully. They must not be transported or stored where ambient temperature may exceed recommended NFPA limits. For 155°F/74°C sprinklers, this temperature is 100°F/38°C. For best results, store them in a dry, cool location in the original shipping package.

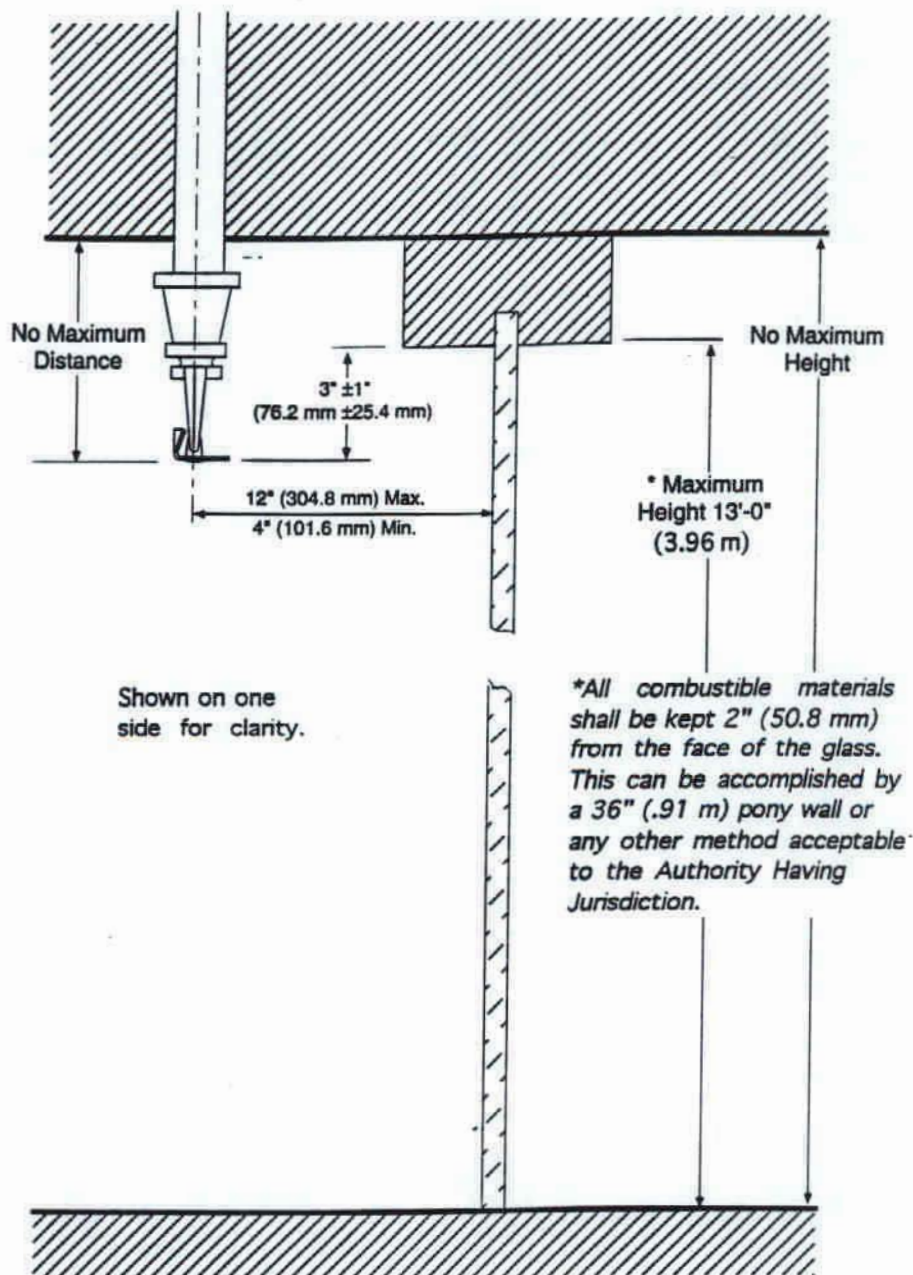
Do not install sprinklers that have been dropped or visibly damaged. Sprinklers must never be painted, coated, plated, or altered in any other way from manufactured condition or they may not function properly. Any sprinklers altered in such manner must be replaced.

The owner is responsible for the proper operating condition of all fire protection devices and accessories. The NFPA standard 25 entitled, "Inspection, Testing and Maintenance of Water-Based Fire Protection Systems", contains guidelines and minimum maintenance requirements. Furthermore, the local Authority Having Jurisdiction may have additional regulations and requirements for maintenance, testing, and inspection that must be obeyed.

It is advisable to have sprinkler systems inspected regularly by a qualified inspection service. Length of time between such inspections can vary due to accessibility, ambient atmosphere, water supply, and site activity.

Do not attempt to reassemble or otherwise reuse a sprinkler that has operated. Replace any sprinkler exhibiting corrosion or damage; always use new sprinklers of the same type and temperature rating as replacements.

**Figure G**  
**WS™ Pendent Vertical Sidewall Sprinkler**



Because the discharge pattern is critical to protection of life and property, nothing should be hung or attached to the sprinkler unit that would disrupt the pattern. Such obstructions must be removed. In the event that construction has altered the original configuration, additional sprinklers should be installed to maintain the protection level.

Do not attempt to replace sprinklers without first removing the fire protection system from service. Be certain to secure permission from the authorities having jurisdiction, and notify all personnel who may be affected during system shutdown. A fire watch during maintenance periods is a wise precaution.

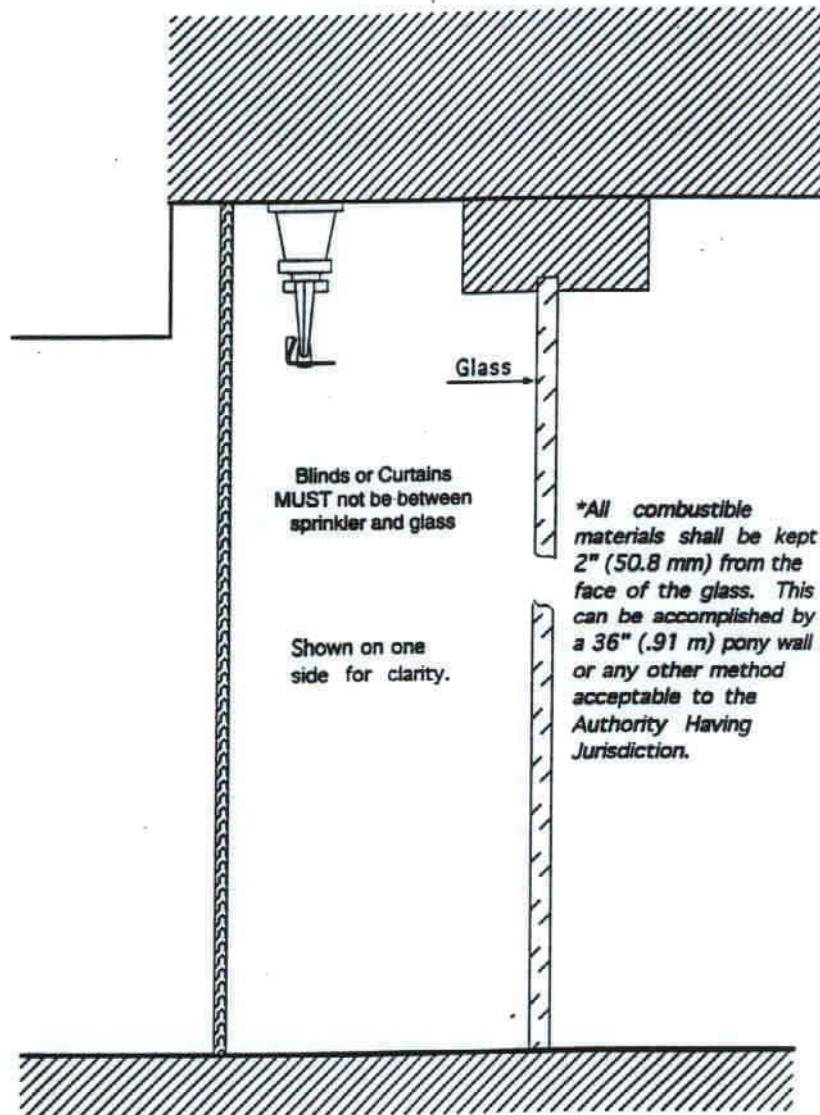
To remove the system from service mode, first refer to the system operating guide and valve instruction. Drain water and relieve pressure in the pipes. Remove the existing unit and install the replacement, using only the special sprinkle wrench. Be certain to match model, style, orifice, and temperature rating.

A fire protection system that has been shut off after an activation should be returned to service immediately. Inspect the entire system for damage and replace or repair as necessary. Sprinklers that did not operate but were subjected to corrosive elements of combustion or excessive temperatures should be inspected, and replaced if need be. The Authority Having Jurisdiction will detail minimum replacement requirements and regulations.

**Guarantee:** Central Sprinkler Company will repair and/or replace any products found to be defective in material or workmanship within a period of one year from the date of shipment. Please refer to the current Price List for further details of the warranty.

**Figure H  
Recessed Ceiling Condition**

Window Sprinklers can be installed into recessed ceiling spaces. Curtains, blinds or other window coverings are **NOT** to be located between the sprinkler and the window.



## Ordering Information

**Ordering Information:** When placing an order, indicate the full product name. Please specify the quantity, model, style, orifice size, temperature rating, type of finish or coating, and sprinkler wrench.

**Availability and Service:** Central sprinklers, valves, accessories, and other products are available throughout the U.S. and Canada, and internationally, through a network of Central Sprinkler distribution centers. You may write directly to Central Sprinkler Company, or call (215) 362-0700 for the distributor nearest you.

**Patents:** Patents are pending.

### Conversion Table:

|               |                             |
|---------------|-----------------------------|
| 1 inch        | = 25.400 mm                 |
| 1 foot        | = 0.3048 m                  |
| 1 pound       | = 0.4536 kg                 |
| 1 foot pound  | = 1.36 Nm                   |
| 1 psi         | = 6.895 kpa                 |
|               | = 0.0689 bar                |
|               | = 0.0703 kg/cm <sup>2</sup> |
| 1 U.S. gallon | = 3.785 dm <sup>3</sup>     |
|               | = 3.785 liters              |

Conversions are approximate.



**Central Sprinkler Company**

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WS.1



Proposed Residential Development  
Arbutus Lands, Sites 1 and 2  
West 11th Avenue and Arbutus Street  
Vancouver, B.C.

Geotechnical Investigation Report

BU411754  
2111 W. 11<sup>th</sup>

Prepared for:  
363027 B.C. Ltd.  
c/o #500 - 1681 Chestnut Street  
Vancouver, B.C.  
V6J 4M6

June, 1997

Prepared by:  
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Our File Number: 2387



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## 1.0 INTRODUCTION

We understand that 363027 B.C. Ltd. intends to develop a site consisting of two lots on West 11th Avenue, west of Arbutus Street in Vancouver, B.C. We further understand that the development is to include two, side-by-side, residential low-rise structures, with two underground parking levels.

We have met with Keystone Environmental to review the existing testhole information which includes previous exploratory drill holes advanced by Thurber Engineering and Keystone Environmental and recent drill hole advanced by Keystone. On the basis of the existing drill holes advanced by others and our testholes on adjacent properties we are of the opinion that additional exploratory testing is not required to complete our foundation and shoring design. In addition, since the site has some contamination, it is preferable that unnecessary testholes are not drilled.

This report was prepared exclusively for 363027 B.C. Ltd. for their use and the use of others in their design team for this particular project. The report presents the results of an investigation of the soil conditions at the site of the proposed development based on existing information as noted and also makes recommendations for the design and construction of building foundations and pavements. The soil classification used herein is based on the "Unified Soil Classification System".

## 2.0 SITE DESCRIPTION

The proposed development site is located on the north side of West 11th Avenue, east of Arbutus Street, in Vancouver, B.C. The two lots have frontages of approximately 110 feet and 200 feet along 11th Avenue for lots 1 and 2 respectively. Lot 1 is approximately 145 feet deep while Lot 2 is approximately 125 feet deep. Both sites are somewhat irregular at the north end. The site is currently occupied by a large warehouse type building with some asphalt-surfaced, at-grade parking on the western half of lot 2.

The site slopes gently from the southeast corner down towards the west property line where the grade levels out. The maximum change in elevation across the site appears to be about 3 metres.

## 3.0 FIELD INVESTIGATION

As indicated, we have assembled a total of eight testholes previously drilled at the site by others (five testholes drilled by Keystone Environmental and three testholes drilled by Thurber Engineering). We understand from notations on the testhole logs that the testholes were drilled using either 6 inch solid-stem auger or 8 inch o.d. hollow-stem auger. Sampling for visual identification and laboratory testing was performed using a 3 inch diameter split-spoon sampler (equipped with a 5 feet long sampling barrel) used with the hollow stem auger and from the auger flights off the solid-stem auger.

The testholes were drilled to depths between 20 and 45 feet below current local grades. Penetration resistance (blows/foot) was recorded when driving the 3 inch diameter split-spoon sampler. The penetration resistance, can be used as a general indicator of soil strength. The sampler was driven with the standard 140 pound hammer free-falling 30 inches.

The locations of these testholes which have been renamed TH-1 through TH-8 are shown on Drawing

2387-1. Detailed testhole logs are presented on Figures 1 through 8 following the text of this report. All depths are referenced to the original ground surface elevations at the location of these testholes.

#### **4.0 SUBSURFACE CONDITIONS**

##### **4.1 Soil Conditions**

At the testhole locations, the site is underlain from the surface downwards by:

###### **Fill Soils**

The natural soils are overlain by up to 6 feet of asphalt and fill soils. The fill soils appear to be mixtures of silt sand and gravel with occasional debris.

###### **near-surface clayey silts, sands and sands and gravels (Capilano Sediments)**

The asphalt and fill at the site are underlain by between 12 and 18 feet of variable clayey to non-plastic silt, sand and sand and gravel of the Capilano Sediments. The Capilano Sediments appear to become thicker from the east to the northwest. Where mainly sand or sand and gravel and below about 11 to 16 feet, the Capilano Sediments were observed to be saturated, producing moderate to heavy seepage into testholes.

###### **silty, gravelly SAND till (Vachon Drift)**

The Capilano Sediments are underlain by a discontinuous layer of dense to very dense silty, gravelly sand till of the Vachon Drift. The till is generally well-graded, grey in colour and significantly less pervious than the overlying and underlying sands and gravels. The till was only encountered in three of the testholes drilled on the west half of Lot 2.

###### **pre-glacial SAND to SAND and GRAVEL (Quadra Formation)**

A very dense pre-glacial sand underlies the sand till between about 16 and 25 feet below current local grades except where the till is absent and the sand underlies the Capilano Sediments directly. The sand is medium-grained with trace to some silt and trace amounts of fine gravel. The sand is underlain by a very dense sand and gravel with trace to some silt in areas. The Quadra Formation is saturated where deeper than about 11 feet below current local grades.

The Quadra Formation is believed to be underlain by sandstone bedrock at variable depths (within 100 feet of the ground surface) with the depth to sandstone decreasing from east to west at the site.

##### **4.2 Groundwater Conditions**

"Free" groundwater was observed between about 11 and 16 feet below current local grades. Based on the testhole information there appears to be two distinct water bearing layers at the site; the Capilano Sediments with a piezometric level at about 15 to 16 feet below grade and the Quadra Formation with

a piezometric level at about 11 to 12 feet below grade, creating an apparent groundwater gradient from the east side of the site (Lot 1 and the eastern half of Lot 2, where the groundwater levels are up to 8 feet higher in elevation compared with the west) to the west. These comparatively large gradients are believed to be sustained by the intervention of the lower permeability sand till which overlies the Quadra Formation at the west side of the site, creating local confinement of the underlying Quadra Formation.

Significant groundwater seepage should be expected in excavations advanced below the ambient groundwater level.

## **5.0 BUILDING FOUNDATIONS**

### **5.1 General**

As indicated, the soil conditions beneath this site generally consist of variable silt, sand and sand and gravel of the Capilano Sediments over sand till of the Vachon Drift over pre-glacial sand and sand and gravel of the Quadra Formation. The Quadra Formation is generally underlain by sandstone. Higher allowable bearing pressures are normally given for local tills than for local pre-glacial sands however we recommend designing on the basis of the lower (sand) bearing pressures due to the discontinuity of the till.

As noted above, we understand that the proposed development will include two levels of below grade parking.

We expect that the proposed buildings can be supported on normal spread footings on a subgrade of either dense till of the Vachon Drift or pre-glacial sand of the Quadra Formation.

### **5.2 Site Preparation**

We expect that the development would be founded below the depths of any unsuitable soils so that we do not envisage the requirement for any special site preparation after excavation.

However:

it is very important that the stripped subgrade be protected to preserve its bearing qualities. The subgrade should remain dry and free of ponded water prior to pouring concrete. Depending on weather conditions and construction schedule, footing subgrades may require "blinding" with lean-mix concrete for protection against disturbance.

We recommend that the stripped site be graded in such a manner that water drains to the perimeter of the building footprint and that ponding of water cannot occur inside the building area. Any water-softened soils should be removed and replaced with well compacted granular fill except in footing areas where concrete should be used.

### 5.3 Spread Footings on Dense to Very Dense Sand or Till

Footings founded on undisturbed dense to very dense sand (Vachon Drift or Quadra Formation) can be designed for a maximum allowable static bearing pressure of 8,000 psf (381 kPa) for pads and 6,000 psf (286 kPa) for long strip footings.

We estimate that the maximum settlement should be less than 1 inch and differential settlements should be less than 0.001 radians for foundations designed as recommended.

We recommend that we should inspect all foundation subgrades to confirm the recommended bearing capacity throughout the site.

### 5.4 Spread Footings on Compacted "Engineered" Fill

If required spread footings can also be founded on methodically placed engineered fill. The engineered fill may be sand, gravel or a sand and gravel mixture.

In the context of this report "engineered fill" for the support of footings is any well-graded granular material having a maximum size of 3 inches and with not more than 6 % by weight passing the #200 sieve, which is systematically compacted in thin layers not exceeding 12 inches loose lifts to a minimum density equivalent to 100% of its "Standard Proctor" maximum dry density, at water contents within 2% of its "optimum" moisture content for compaction, all determined in accordance with ASTM D698.

The compacted fill should extend beyond the edges of the building footings for a distance equal to the thickness of the fill beneath the footings. The fill should be compacted as recommended to the outside edge of the fill.

The subgrade must be dry and free of ponded water before any fill is placed on the subgrade.

Footings founded on sand and gravel or sand engineered fill, compacted as recommended, may be designed on the basis of maximum allowable bearing pressures of 2,000 psf (95 kPa) on sand and 3,000 psf (143 kPa) on sand and gravel or gravel (at least 50% by weight gravel).

In situ density testing should be carried out on each layer of fill during placement to determine the actual degree of compaction achieved. The locations of the tests relative to the building grid lines and the elevations of the tests relative to both the bottom of the structural fill and the proposed floor or footing elevation must be recorded. The testing company should be retained on behalf of the owner and report to the owner or the owner's representative and to the geotechnical engineer.

Both the exposed stripped subgrade and the material to be used as engineered fill, should be approved by the geotechnical engineer prior to placing any of the material.

### 5.5 General Foundation Requirements

Footings should be located a minimum of 18 inches (450 mm) below final exterior grade for frost protection.

Stripped sub-grades for foundations should be inspected by the geotechnical engineer of record to confirm the recommended bearing capacity throughout the site prior to placing concrete.

Irrespective of actual bearing pressures, footings should not be less than 18 inches (450 mm) in width for strip footings and not less than 24 inches (600 mm) in width for square or rectangular footings.

## **5.6 Seismic Response Factor of the Building Code**

The foundation factor,  $F$ , as given in Sentence 4.1.9.1.(11) of the 1992 British Columbia Building Code should be assumed to be 1.0 for this site in accordance with Table 4.1.9.C.

The recommended maximum allowable static bearing pressures can be increased by up to 1/2 for short-term, transient loadings such as are induced by winds and earthquakes.

## **5.7 Building Slab-on-Grade Floors**

We envisage that the proposed lower parking level will have a slab-on-grade floor. In order to provide suitable support for the floor slab-on-grade, we recommend that any fill placed under the floor slab should be granular and essentially "clean" with not more than 5% by weight passing the #200 sieve. In addition, this granular fill must be compacted to a minimum of 98 % of its ASTM D698 (Standard Proctor) maximum dry density within 2 % of the optimum moisture content for compaction.

We suggest that the floor slab should be directly underlain by a moisture barrier to inhibit moisture movement up through the slab (in accordance with the Building Code), which is in turn underlain by a "free draining" granular layer at least 6 inches in thickness to inhibit capillary attraction of moisture.

As noted in Section 8.0 additional drainage will likely be required below the slab-on-grade level.

## **6.0 TEMPORARY EXCAVATION AND EXCAVATION SUPPORT**

We envisage that the depth of excavation for the underground parking basement will be between about 20 and 25 feet below current local grades.

We recommend that the effect of this excavation on all adjacent properties be evaluated. Pre and post construction surveys should be carried out on all adjacent properties to record their current state.

We envisage that the "anchored-shotcrete" support system will be used for temporarily shoring of the basement excavation and underpinning adjacent structures since this is the most economical method in use in the Lower Mainland at this time and has proved to be reliable. We understand that you would prefer to slope the excavation where possible. We expect that sloping should be possible between Lots 1 and 2 and along the lane and proposed park dedication north of Lot 2.

As noted, the sand and sand and gravel layers within the Capilano Sediments and Quadra Formation are unstable where saturated. We expect that well-point de-watering will be required to stabilize temporary vertical cuts required during anchored shotcrete installation. In addition, we expect that sump pumps will be required to maintain safe and dry working conditions in the base of the excavation.

## 7.0 LATERAL EARTH PRESSURES ON BASEMENT WALLS

Earth pressures on retaining walls depend on a number of factors including wall rigidity, the backfill material and required degree of compaction, any surcharge loads, backfill slope, the drainage conditions and method and sequence of construction.

We envisage that the parking basement walls will be generally comparatively rigid. We assume that a free-draining, essentially self-compacting material such as "bird's-eye" gravel or crushed glass would be used as backfill between basement walls adjacent to shored vertical excavations. Otherwise a lightly tamped sand or sand and gravel backfill would be used adjacent to sloped excavations.

### Sloped Excavations

For sloped excavations, backfilled with clean, free-draining sand and gravel with a friction angle of 35 degrees and a unit weight of 125 pcf (19.6 kN/m<sup>3</sup>) and compacted to 95 % of ASTM D698 (Standard Proctor) maximum dry density, we recommend that comparatively rigid basement walls be designed on the basis of an earth pressure equal to 400 psf compaction pressure to a depth of 8 feet increasing, then increasing linearly at 50 psf per foot of depth to the base of the wall. The additional dynamic component of earth pressure can be assumed to be equivalent to an inverted triangular distribution equal to  $20 \times h$  psf, where  $h$  is the height above the base of the wall.

### Vertical Excavations

For vertical excavations, backfilled with free-draining, essentially self-compacting material such as "bird's-eye" gravel or crushed glass, we recommend that basement walls be designed on the basis of an earth pressure equal to zero at the ground surface, increasing linearly to  $35H$  psf at the base of the wall, where  $H$  is the height of retained soil in feet. The additional dynamic component of earth pressure can be assumed to be equivalent to an inverted triangular distribution equal to  $20 \times h$  psf, where  $h$  is the height above the base of the wall.

The earth pressure stresses given are unfactored, and are intended to represent our best estimate of the actual stresses. These stresses should be suitably factored to ensure a sufficient margin of wall strength in excess of our estimated earth pressures.

It should be noted that these earth pressures are for the backfills specified herein. Other types of backfill material will give different earth pressures.

It should be particularly noted that the earth pressures given above make no allowance for water pressures acting on the wall or for any surcharges, other than nominal automobile traffic. Therefore, we recommend that foundation walls should be constructed with a "fully-efficient" heel and back-of-wall drain to ensure that water pressures do not act on the walls or, alternatively, that retaining walls should be designed for the additional water pressures.

We also recommend that foundation walls should be designed for any special surcharge loads, in particular those due to adjacent buildings which are to be temporarily underpinned (for example, Gord's Autobody).

Backfill on City of Vancouver property must comply with the latest edition of their "Manual on Backfilling".

## **8.0 SITE AND FOUNDATION DRAINAGE SYSTEMS**

It should be noted that we do not require a perimeter drainage system specifically to maintain the bearing capacities we have recommended. However as noted in Section 4.2 the groundwater level is about 10 feet below grade and significant amounts of water will flow through the generally granular soils to the basement excavation.

We have noted our opinion that we envisage that well-point dewatering will be required during excavation. It is also our opinion that a permanent underslab drainage control system will be required to maintain the groundwater level below the lower floor slab-on-grade.

At this stage we suggest that this permanent underslab drainage system be preliminarily designed for groundwater inflow of 250 gals/min. This flow rate should then be confirmed at the end of the excavation phase.

We have noted that our recommended earth pressures make no allowance for water pressures and we envisage that the basement walls will be designed with a fully-efficient hell and back of wall perimeter drainage system.

## **9.0 FIELD REVIEWS**

As required by "Letters of Assurance", GeoPacific Consultants Ltd. will carry out sufficient field reviews during construction to ensure that the Geotechnical Design recommendations contained within this report have been adequately communicated to the design team and to the Contractor(s) implementing the Design. These field reviews are not carried out for the benefit of the Contractor(s) and therefore do not in any way effect the Contractor(s) obligations to perform under the terms of their Contracts.

It is the Contractor responsibility to advise GeoPacific Consultants Ltd. (a minimum of 24 hours in advance) that a field review is required. Geotechnical field reviews are normally required at the time of the following activities.

- 1) Excavation - Review of Temporary Slopes/Shoring (see Section 6.0)
- 2) Foundations - Review of Foundation Subgrade (See Sections 5.1, 5.2, 5.3, 5.4 and 5.5)
- 3) Slab-on Grade - Review of Subgrade and Under-Slab Fill (see Section 5.8)
- 4) Backfill - Review of fill to be placed against Basement/Foundation Walls (see Section 7.0).

## **CLOSURE**

We are pleased to be of assistance to you on this project and we trust that our comments and

recommendations are both helpful and sufficient for your current purposes. Please do not hesitate to call if you would like further details or require any clarification.

For:  
GeoPacific Consultants Ltd.

s.15(1), s.22(1)

Matt Kokan, M.A.Sc., P.Eng.  
Project Engineer



reviewed by:

s.15(1), s.22(1)

Ed Harrington, M.Sc., P.Eng.  
Principal



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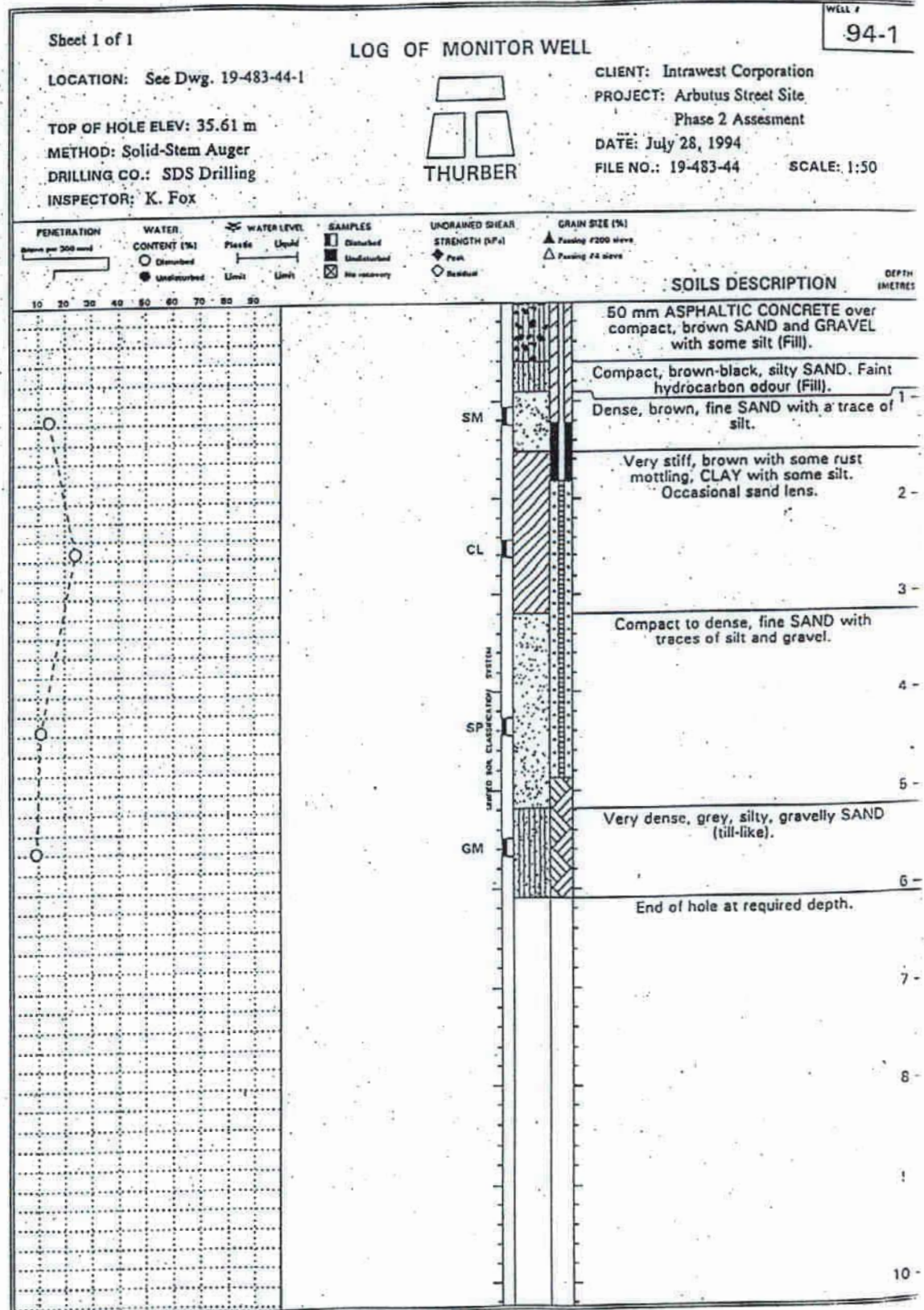


Figure 1

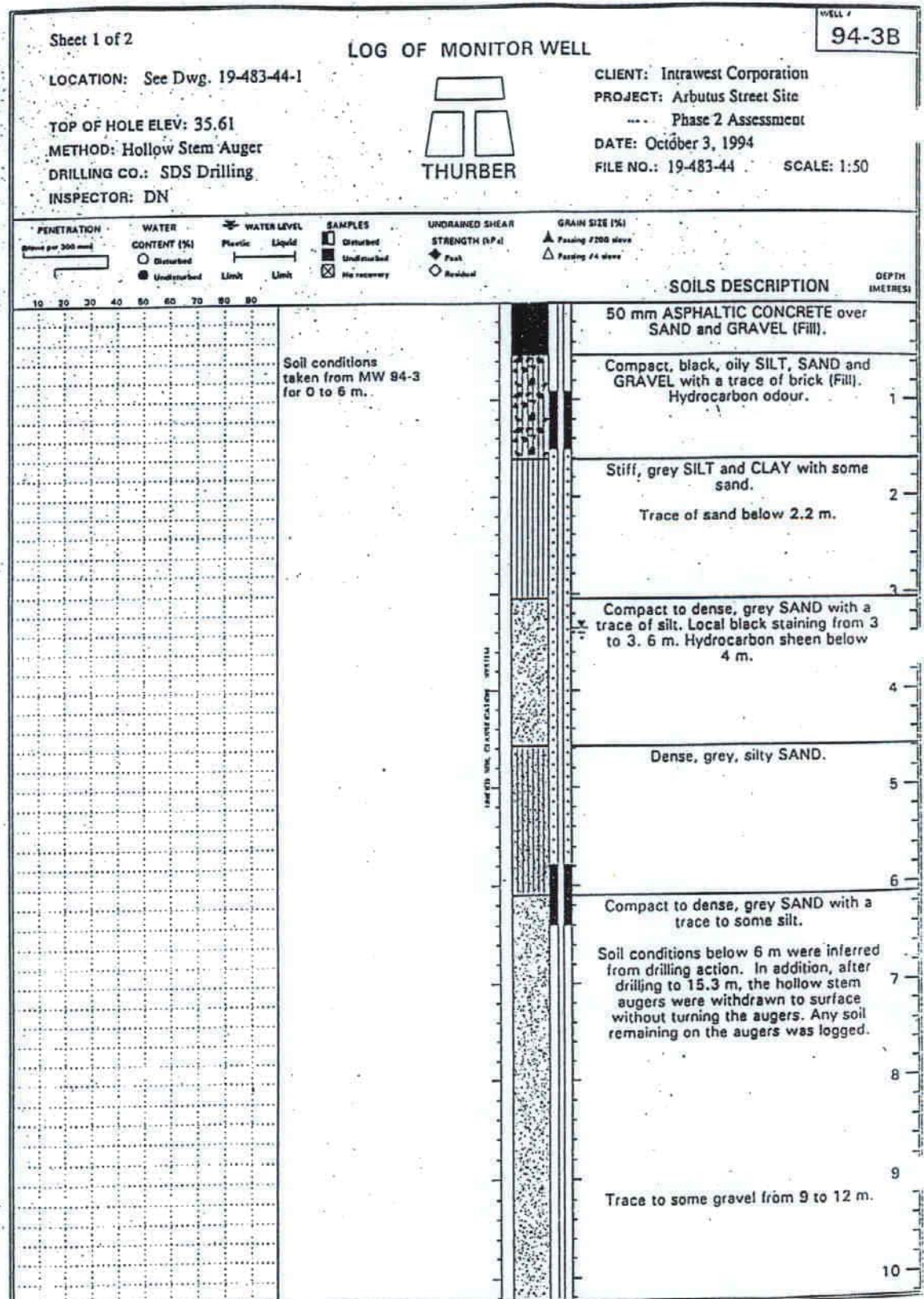


Figure 2

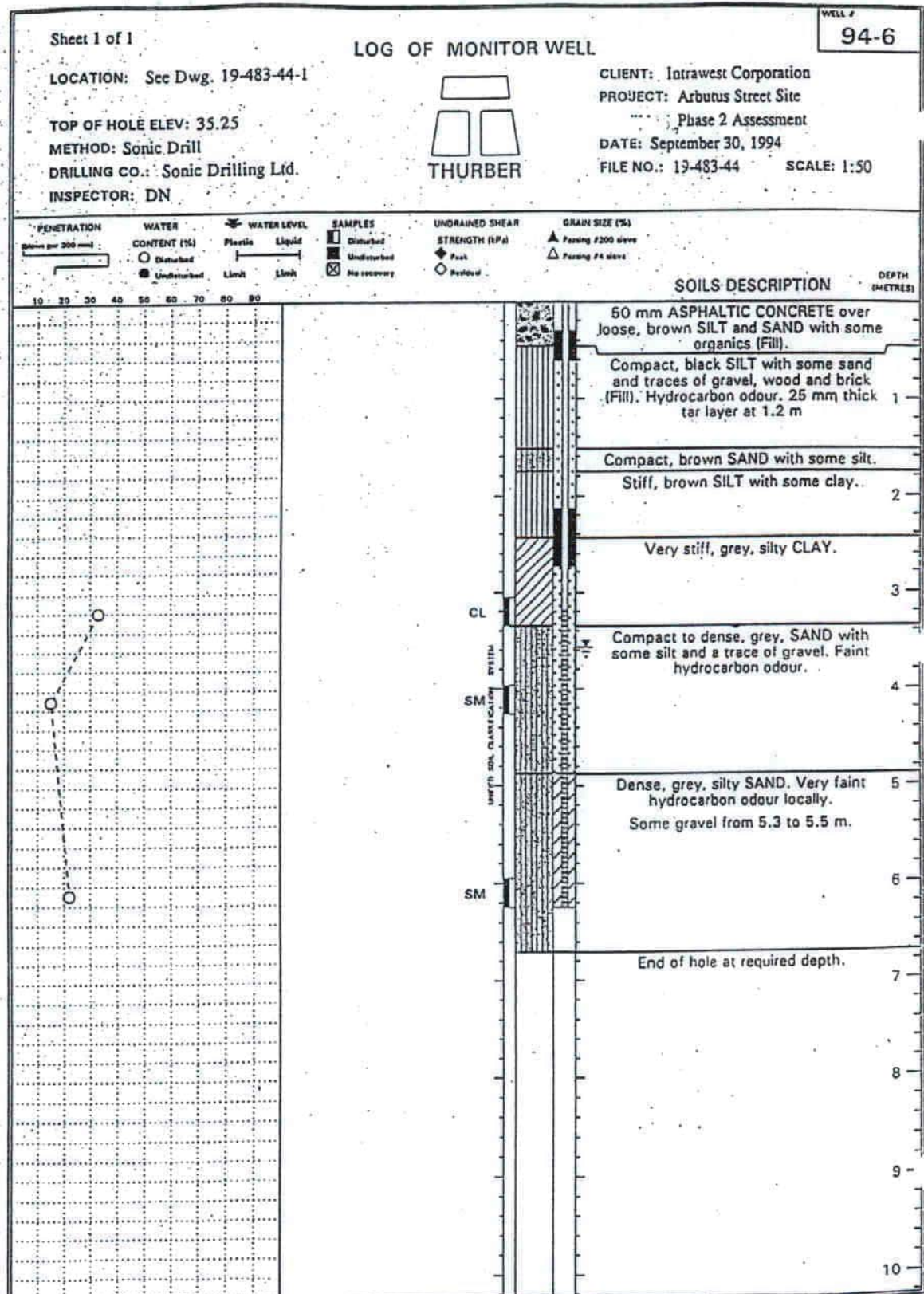


Figure 3

| <div style="display: inline-block; width: 45%;"> <b>KEYSTONE ENVIRONMENTAL</b> </div> <div style="display: inline-block; width: 55%; text-align: right;"> <b>SOIL BORING LOG: BH-8</b> </div> |                              |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                       |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| PROJECT: OLYMPIC DEVELOPMENT SITE                                                                                                                                                             |                              | LOCATION: 2100 Block West 11th Avenue, Vancouver                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                       |              |
| DRILLING METHOD: HOLLOW-STEM AUGER                                                                                                                                                            |                              | <div style="text-align: center; border-bottom: 1px solid black;">Sample Collection</div> <div style="display: flex; justify-content: space-around;"> <span>G-grab</span> <span>T-shelby tube</span> </div> <div style="display: flex; justify-content: space-around;"> <span>S-splitspoon</span> <span>C-rock core</span> </div> |                                                                                                                                                                                                                                                                       |              |
| DRILLER: UNIWIDE DRILLING                                                                                                                                                                     |                              |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                       |              |
| GEOLOGIST: A. Y. Lam                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                       |              |
| DATE: January 22, 1996                                                                                                                                                                        |                              |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                       |              |
| Sample                                                                                                                                                                                        | Blow Count<br>(Per 8 inches) | Depth<br>(feet)                                                                                                                                                                                                                                                                                                                  | Description                                                                                                                                                                                                                                                           | Depth<br>(m) |
|                                                                                                                                                                                               |                              | 5                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                       | 1            |
|                                                                                                                                                                                               |                              | 0                                                                                                                                                                                                                                                                                                                                | 2" of ASPHALT                                                                                                                                                                                                                                                         | 0            |
| G                                                                                                                                                                                             |                              |                                                                                                                                                                                                                                                                                                                                  | brown-orange, fine SAND, dry (SP)<br>no hydrocarbon odours noted, headspace at 0 ppm<br>black-brown stained, fine SAND-SILT, some gravel, dry (SM)<br>no hydrocarbon odours noted, headspace at 0.3 ppm<br>brown, stained fine SAND, grading into grey silt, dry (SP) | 1            |
| S                                                                                                                                                                                             |                              | 5                                                                                                                                                                                                                                                                                                                                | grey-brown, mottled, fine sandy SILT, dry (ML)<br>no hydrocarbon odours noted, headspace at 0 ppm<br>green-grey (with yellow tint), silty CLAY, moist (CL)<br>no hydrocarbon odours noted, headspace at 0.1 ppm                                                       | 2            |
| S                                                                                                                                                                                             |                              | 10                                                                                                                                                                                                                                                                                                                               | gray, CLAY, wet (CL)<br>gray, fine sandy SILT, some roots, wet (ML)<br>hydrocarbon odours noted, headspace at 61 ppm                                                                                                                                                  | 3            |
| S                                                                                                                                                                                             |                              | 15                                                                                                                                                                                                                                                                                                                               | brown, silty SAND, moist-wet (SM)<br>slight hydrocarbon odours noted, headspace at 0.3 ppm                                                                                                                                                                            | 5            |
| S                                                                                                                                                                                             |                              | 20                                                                                                                                                                                                                                                                                                                               | grey, dense, fine sandy SILT, some cobbles (ML)<br>no hydrocarbon odours noted, headspace at 0 ppm                                                                                                                                                                    | 6            |
|                                                                                                                                                                                               |                              |                                                                                                                                                                                                                                                                                                                                  | (Bottom of boring 6.25 metres)                                                                                                                                                                                                                                        | 7            |
|                                                                                                                                                                                               |                              | 25                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       | 8            |
|                                                                                                                                                                                               |                              |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                       | 9            |

Figure 4

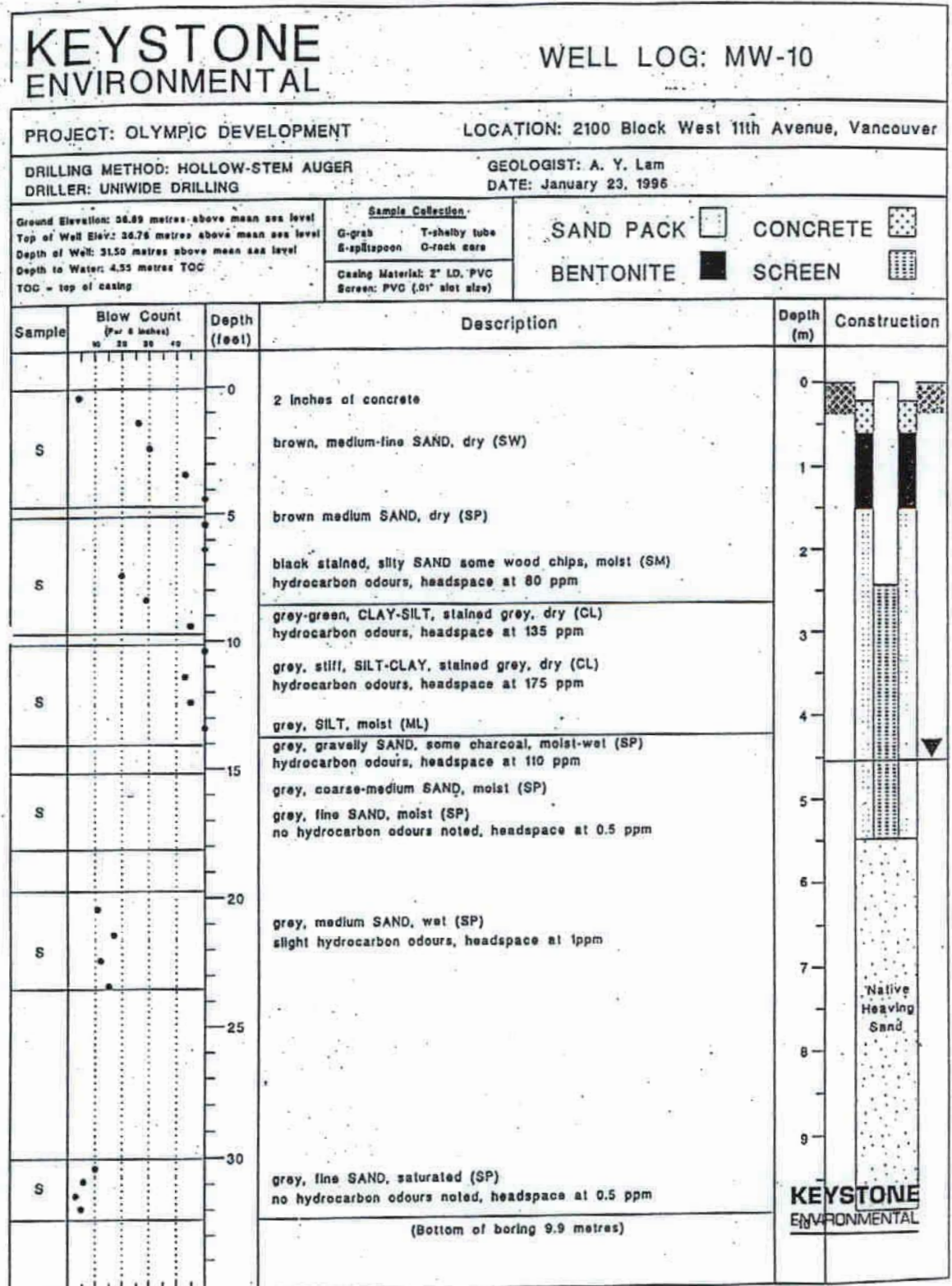


Figure 5

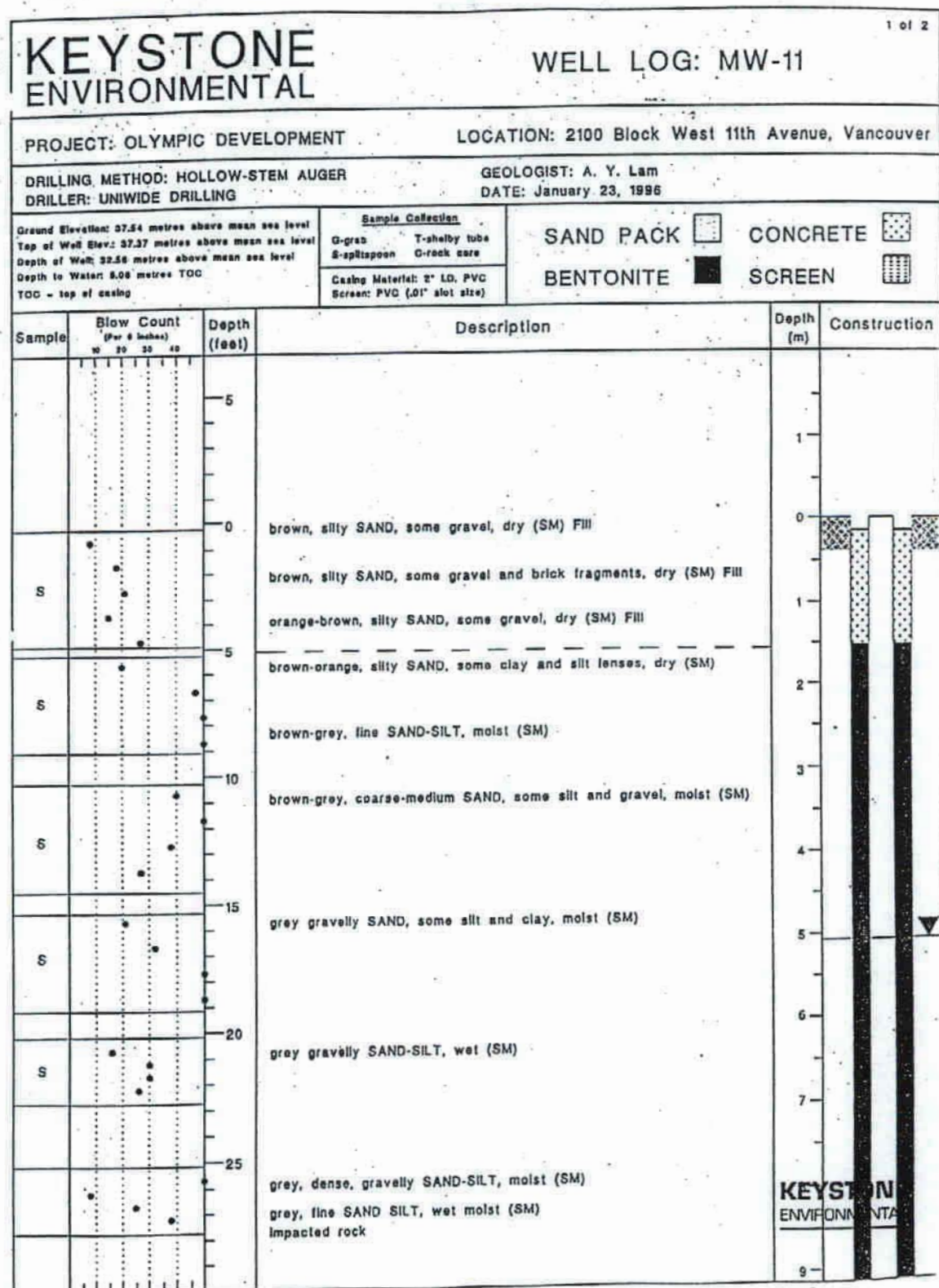


Figure 6

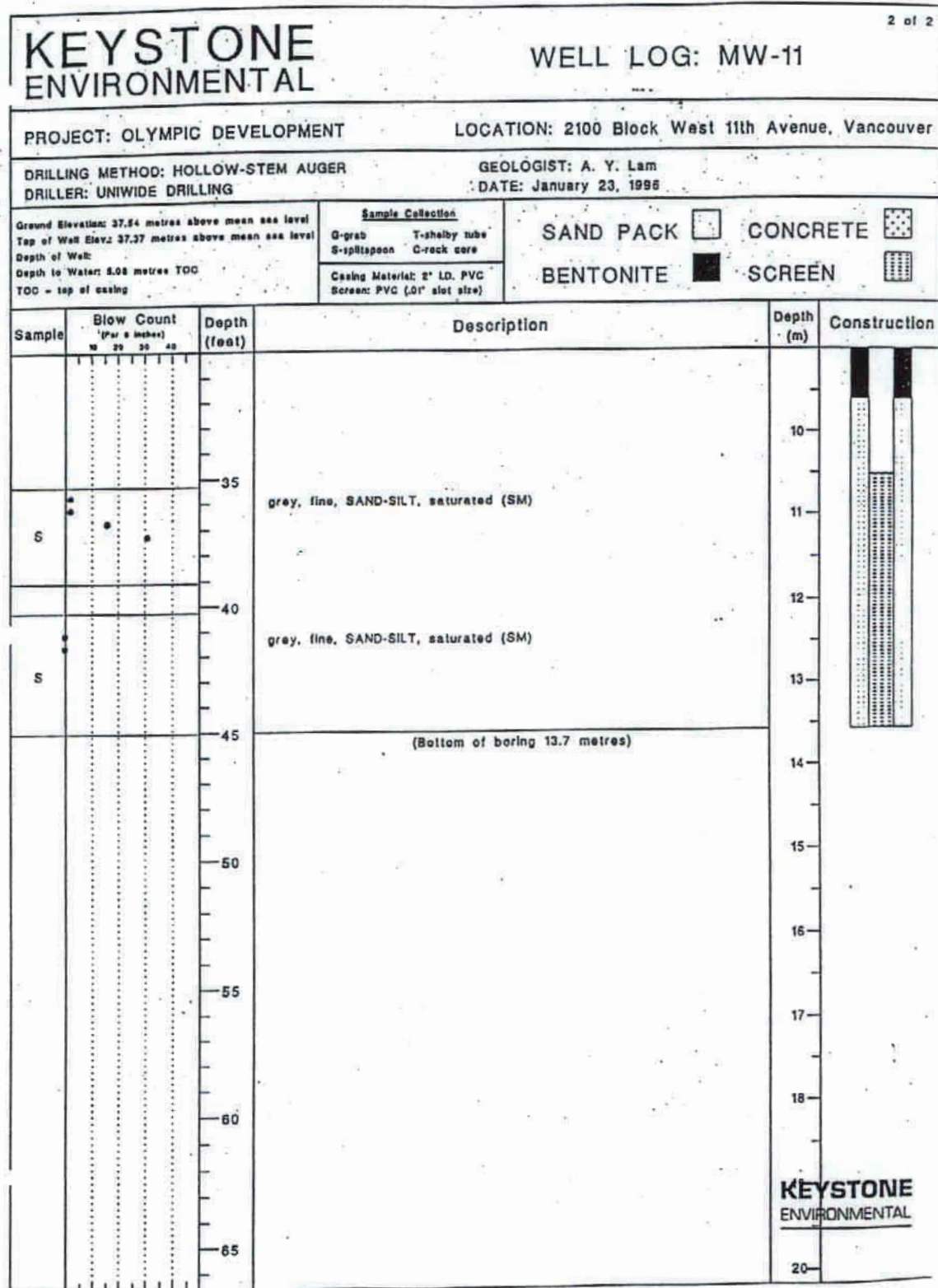


Figure 6 (cont.)

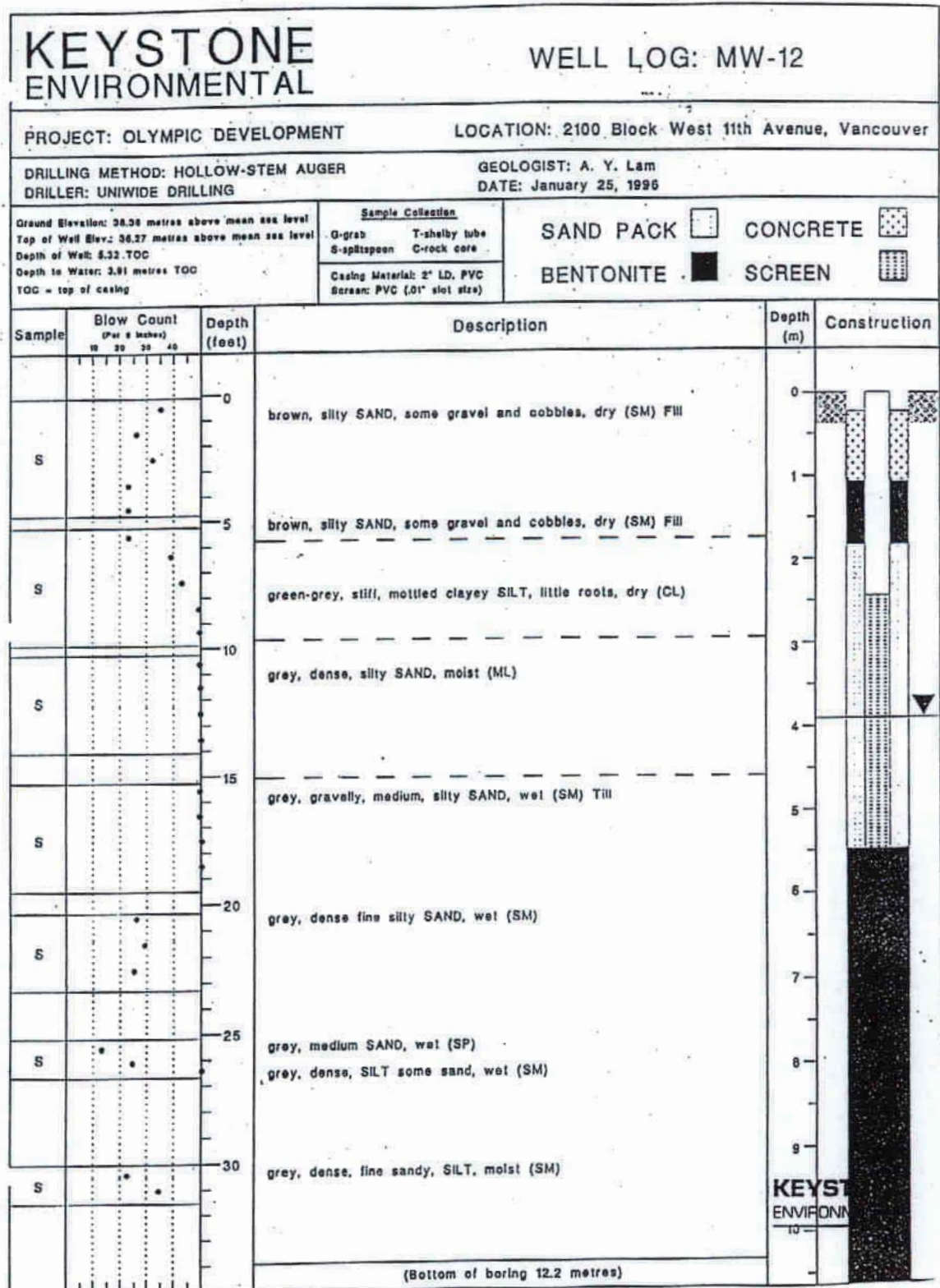


Figure 7

Additional Investigation to

| KEYSTONE<br>ENVIRONMENTAL RESOURCES, INC.  |                                                                        |                            | WELL LOG                                                                                                    |              |
|--------------------------------------------|------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------|--------------|
| PROJECT: BASTION                           |                                                                        | LOCATION: BH 16 (20-97)    |                                                                                                             |              |
| DRILLING METHOD: AUGER<br>DRILLER: UNIMIDE |                                                                        | GEOLOGIST: DMF<br>DATE:    |                                                                                                             |              |
| Ground Elevation:                          | Sample Collection<br>G-grab T-shelby tube<br>S-split spoon C-rock core | GRAVEL PACK                | SCREEN                                                                                                      |              |
| Top of Well Elev.:                         | Casing Material:<br>Screen:                                            | BENTONITE                  | CAVE-IN                                                                                                     |              |
| Depth of Well:                             |                                                                        | GROUT                      |                                                                                                             |              |
| Depth<br>VMD                               | Sample<br>No.                                                          | SPT<br>Blow<br>Counts      | Description                                                                                                 | Construction |
| AUGER                                      | 1-2                                                                    |                            | 0-3" Asphalt                                                                                                |              |
|                                            | 3-3 3/8                                                                |                            | Black sand, <sup>med</sup> silty some<br>gravel, organics<br>moist                                          |              |
| 5' Spoon                                   | 3 3/8 - 4                                                              | 12<br>13<br>18<br>24<br>28 | Brown sand, fine silty<br>some gravel                                                                       |              |
|                                            | 4 - 4 1/2                                                              | 52<br>100 (52)             | grey sand fine, some silt.                                                                                  |              |
| Solid.                                     | 4 1/2 - 9                                                              | 7 1/2<br>8                 | grey silt, clayey moist<br>dense                                                                            |              |
|                                            | 9 - 10                                                                 |                            | grey silt, sandy wet                                                                                        |              |
|                                            | 10 - 11                                                                |                            | wet sand seam ~ 9 1/2 - 9<br>medium coarse sand, trace silt, trace<br>gravel, grey moist                    |              |
|                                            | 11 - 13 1/2                                                            | 10-11<br>12-13             | grey till, fine sand, silty, damp<br>trace gravel (rounded) not stationary<br>(VERY DENSE @ 11 1/2) refusal |              |
|                                            | 13 1/2 - 15                                                            |                            | grey silt, sandy <del>Wet</del> DENSE                                                                       |              |
|                                            | 15 - 17 1/2                                                            | 14-15<br>18-19             | sand gray, fine - wet                                                                                       |              |
|                                            | 17 1/2 -                                                               |                            | Cobbles 17 1/2 peat seam<br>till like, gravel wet, gray.                                                    |              |
|                                            | 22-24                                                                  |                            | trace gravel, very wet below 22                                                                             |              |
|                                            | 24-26                                                                  |                            | Not recorded                                                                                                |              |
|                                            | 26-29                                                                  |                            | 30' EOH.                                                                                                    |              |

Sheet: of

Figure 8

## LOG OF MONITOR WELL

94-1

LOCATION: See Dwg. 19-483-44-1

TOP OF HOLE ELEV: 35.61 m

METHOD: Solid-Stem Auger

DRILLING CO.: SDS Drilling

INSPECTOR: K. Fox



CLIENT: Intrawest Corporation

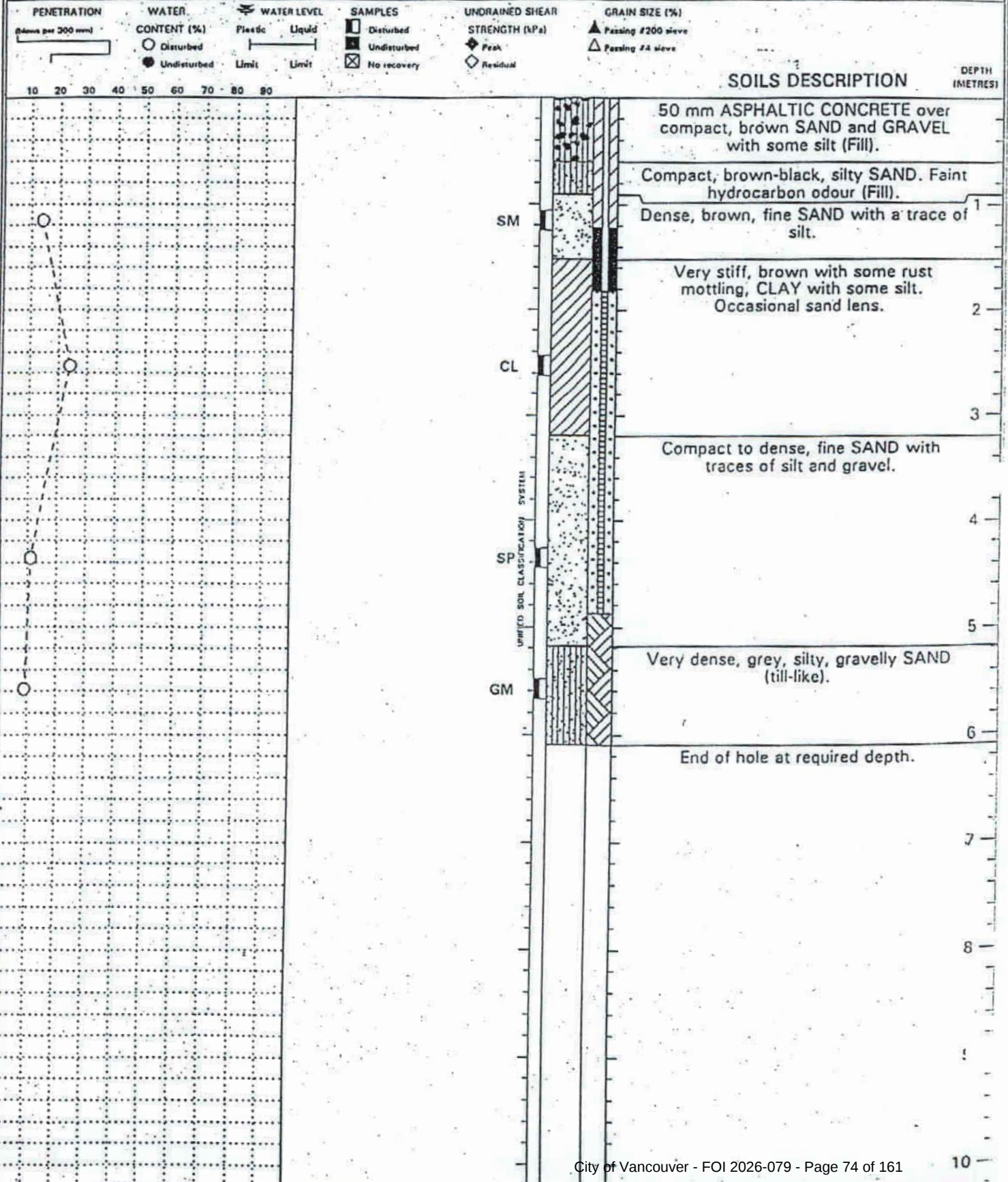
PROJECT: Arbutus Street Site

Phase 2 Assessment

DATE: July 28, 1994

FILE NO.: 19-483-44

SCALE: 1:50



# LOG OF MONITOR WELL

WELL #  
**94-3B**

LOCATION: See Dwg. 19-483-44-1

TOP OF HOLE ELEV: 35.61

METHOD: Hollow Stem Auger

DRILLING CO.: SDS Drilling

INSPECTOR: DN



CLIENT: Intrawest Corporation

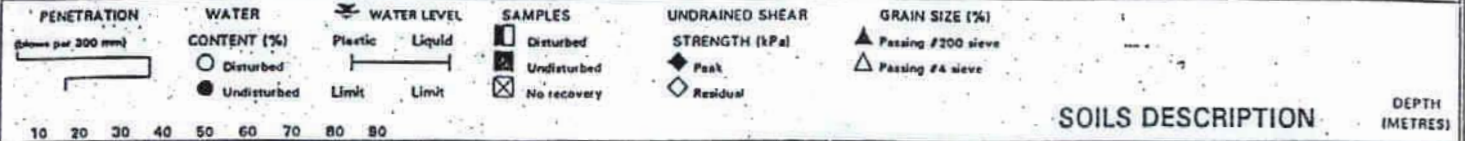
PROJECT: Arbutus Street Site

Phase 2 Assessment

DATE: October 3, 1994

FILE NO.: 19-483-44

SCALE: 1:50



## SOILS DESCRIPTION

Soil conditions  
taken from MW 94-3  
for 0 to 6 m.

50 mm ASPHALTIC CONCRETE over  
SAND and GRAVEL (Fill).

Compact, black, oily SILT, SAND and  
GRAVEL with a trace of brick (Fill).  
Hydrocarbon odour.

Stiff, grey SILT and CLAY with some  
sand.

Trace of sand below 2.2 m.

Compact to dense, grey SAND with a  
trace of silt. Local black staining from 3  
to 3.6 m. Hydrocarbon sheen below  
4 m.

Dense, grey, silty SAND.

Compact to dense, grey SAND with a  
trace to some silt.

Soil conditions below 6 m were inferred  
from drilling action. In addition, after  
drilling to 15.3 m, the hollow stem  
augers were withdrawn to surface  
without turning the augers. Any soil  
remaining on the augers was logged.

Trace to some gravel from 9 to 12 m.

# LOG OF MONITOR WELL

WELL #  
**94-6**

LOCATION: See Dwg. 19-483-44-1

TOP OF HOLE ELEV: 35.25

METHOD: Sonic Drill

DRILLING CO.: Sonic Drilling Ltd.

INSPECTOR: DN



**THURBER**

CLIENT: Intrawest Corporation

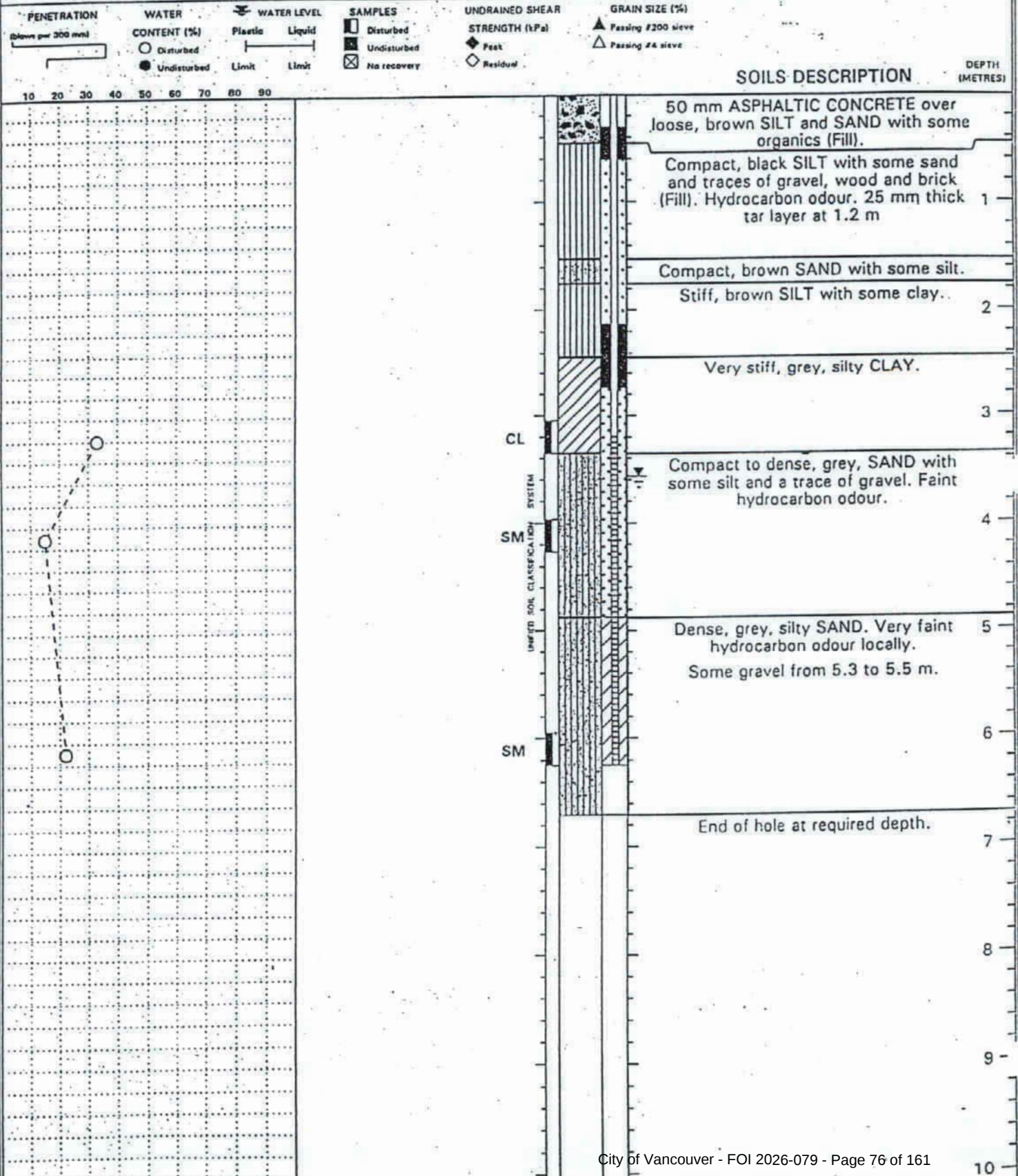
PROJECT: Arbutus Street Site

Phase 2 Assessment

DATE: September 30, 1994

FILE NO.: 19-483-44

SCALE: 1:50



# KEYSTONE ENVIRONMENTAL

## SOIL BORING LOG: BH-8

PROJECT: OLYMPIC DEVELOPMENT SITE

LOCATION: 2100 Block West 11th Avenue, Vancouver

DRILLING METHOD: HOLLOW-STEM AUGER

DRILLER: UNIWIDE DRILLING

GEOLOGIST: A. Y. Lam

DATE: January 22, 1996

### Sample Collection

G-grab T-shelby tube  
S-splitspoon C-rock core

| Sample | Blow Count<br>(Per 6 inches)<br>10 20 30 40 | Depth<br>(feet) | Description                                                                                                     | Depth<br>(m) |
|--------|---------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------|--------------|
|        |                                             | 5               |                                                                                                                 | 1            |
|        |                                             | 0               | 2" of ASPHALT                                                                                                   | 0            |
| G      |                                             |                 | brown-orange, fine SAND, dry (SP)<br>no hydrocarbon odours noted, headspace at 0 ppm                            |              |
|        |                                             |                 | black-brown stained, fine SAND-SILT, some gravel, dry (SM)<br>no hydrocarbon odours noted, headspace at 0.3 ppm | 1            |
|        |                                             |                 | brown, stained fine SAND, grading into grey silt, dry (SP)                                                      |              |
| S      |                                             | 5               | grey-brown, mottled, fine sandy SILT, dry (ML)<br>no hydrocarbon odours noted, headspace at 0 ppm               | 2            |
|        |                                             |                 | green-grey (with yellow tint), silty CLAY, moist (CL)<br>no hydrocarbon odours noted, headspace at 0.1 ppm      |              |
| S      |                                             | 10              | grey, CLAY, wet (CL)                                                                                            | 3            |
|        |                                             |                 | grey, fine sandy SILT, some roots, wet (ML)<br>hydrocarbon odours noted, headspace at 61 ppm                    | 4            |
| S      |                                             | 15              | brown, silty SAND, moist-wet (SM)<br>slight hydrocarbon odours noted, headspace at 0.3 ppm                      | 5            |
|        |                                             |                 |                                                                                                                 | 6            |
| S      |                                             | 20              | grey, dense, fine sandy SILT, some cobbles (ML)<br>no hydrocarbon odours noted, headspace at 0 ppm              |              |
|        |                                             |                 | (Bottom of boring 6.25 metres)                                                                                  | 7            |
|        |                                             | 25              |                                                                                                                 | 8            |
|        |                                             |                 |                                                                                                                 | 9            |

KEYSTONE  
ENVIRONMENTAL

# KEYSTONE ENVIRONMENTAL

## WELL LOG: MW-10

PROJECT: OLYMPIC DEVELOPMENT

LOCATION: 2100 Block West 11th Avenue, Vancouver

DRILLING METHOD: HOLLOW-STEM AUGER  
DRILLER: UNIWIDE DRILLING

GEOLOGIST: A. Y. Lam  
DATE: January 23, 1996

Ground Elevation: 36.89 metres above mean sea level  
Top of Well Elev.: 36.76 metres above mean sea level  
Depth of Well: 31.50 metres above mean sea level  
Depth to Water: 4.55 metres TOC  
TOC = top of casing

### Sample Collection

G-grab T-shelby tube  
S-splitspoon C-rock core

Casing Material: 2" I.D. PVC  
Screen: PVC (.01" slot size)

SAND PACK

CONCRETE

BENTONITE

SCREEN

| Sample | Blow Count<br>(Per 5 inches) | Depth<br>(feet) | Description                                                                                                              | Depth<br>(m) | Construction |
|--------|------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------|--------------|--------------|
|        |                              | 0               | 2 inches of concrete                                                                                                     | 0            |              |
| S      |                              |                 | brown, medium-fine SAND, dry (SW)                                                                                        | 1            |              |
|        |                              | 5               | brown medium SAND, dry (SP)                                                                                              | 2            |              |
| S      |                              |                 | black stained, silty SAND some wood chips, moist (SM)<br>hydrocarbon odours, headspace at 80 ppm                         | 3            |              |
|        |                              | 10              | grey-green, CLAY-SILT, stained grey, dry (CL)<br>hydrocarbon odours, headspace at 135 ppm                                | 4            |              |
| S      |                              |                 | grey, stiff, SILT-CLAY, stained grey, dry (CL)<br>hydrocarbon odours, headspace at 175 ppm                               | 5            |              |
|        |                              | 15              | grey, SILT, moist (ML)<br>grey, gravelly SAND, some charcoal, moist-wet (SP)<br>hydrocarbon odours, headspace at 110 ppm | 6            |              |
| S      |                              |                 | grey, coarse-medium SAND, moist (SP)<br>grey, fine SAND, moist (SP)<br>no hydrocarbon odours noted, headspace at 0.5 ppm | 7            |              |
|        |                              | 20              | grey, medium SAND, wet (SP)<br>slight hydrocarbon odours, headspace at 1ppm                                              | 8            |              |
|        |                              | 25              |                                                                                                                          | 9            |              |
| S      |                              | 30              | grey, fine SAND, saturated (SP)<br>no hydrocarbon odours noted, headspace at 0.5 ppm                                     |              |              |
|        |                              |                 | (Bottom of boring 9.9 metres)                                                                                            |              |              |

KEYSTONE ENVIRONMENTAL

# KEYSTONE ENVIRONMENTAL

1 of 2

## WELL LOG: MW-11

PROJECT: OLYMPIC DEVELOPMENT

LOCATION: 2100 Block West 11th Avenue, Vancouver

DRILLING METHOD: HOLLOW-STEM AUGER  
DRILLER: UNIWIDE DRILLING

GEOLOGIST: A. Y. Lam  
DATE: January 23, 1996

Ground Elevation: 37.54 metres above mean sea level  
Top of Well Elev.: 37.37 metres above mean sea level  
Depth of Well: 32.56 metres above mean sea level  
Depth to Water: 5.08 metres TOC  
TOC - top of casing

**Sample Collection**  
G-grab T-shelby tube  
S-spillspoon C-rock core  
  
Casing Material: 2" I.D. PVC  
Screen: PVC (.01" slot size)

SAND PACK

CONCRETE

BENTONITE

SCREEN

| Sample | Blow Count<br>(Per 5 inches)<br>10 20 30 40 | Depth<br>(feet) | Description                                                       | Depth<br>(m) | Construction |
|--------|---------------------------------------------|-----------------|-------------------------------------------------------------------|--------------|--------------|
|        |                                             | 5               |                                                                   |              |              |
|        |                                             | 0               | brown, silty SAND, some gravel, dry (SM) Fill                     | 0            |              |
| S      |                                             |                 | brown, silty SAND, some gravel and brick fragments, dry (SM) Fill |              |              |
|        |                                             |                 | orange-brown, silty SAND, some gravel, dry (SM) Fill              |              |              |
|        |                                             | 5               | brown-orange, silty SAND, some clay and silt lenses, dry (SM)     |              |              |
| S      |                                             |                 | brown-grey, fine SAND-SILT, moist (SM)                            |              |              |
|        |                                             | 10              | brown-grey, coarse-medium SAND, some silt and gravel, moist (SM)  |              |              |
| S      |                                             |                 |                                                                   |              |              |
|        |                                             | 15              | grey gravelly SAND, some silt and clay, moist (SM)                |              |              |
| S      |                                             |                 |                                                                   |              |              |
|        |                                             | 20              | grey gravelly SAND-SILT, wet (SM)                                 |              |              |
| S      |                                             |                 |                                                                   |              |              |
|        |                                             | 25              | grey, dense, gravelly SAND-SILT, moist (SM)                       |              |              |
|        |                                             |                 | grey, fine SAND SILT, wet moist (SM)                              |              |              |
|        |                                             |                 | Impacted rock                                                     |              |              |

KEYSTONE  
ENVIRONMENTAL

# KEYSTONE ENVIRONMENTAL

## WELL LOG: MW-11

PROJECT: OLYMPIC DEVELOPMENT

LOCATION: 2100 Block West 11th Avenue, Vancouver

DRILLING METHOD: HOLLOW-STEM AUGER  
DRILLER: UNIWIDE DRILLING

GEOLOGIST: A. Y. Lam

DATE: January 23, 1996

Ground Elevation: 37.54 metres above mean sea level  
Top of Well Elev.: 37.37 metres above mean sea level  
Depth of Well:  
Depth to Water: 5.08 metres TOC  
TOC = top of casing

## Sample Collection

G-grab T-shelby tube  
S-splittspoon C-rock coreCasing Material: 2" I.D. PVC  
Screen: PVC (.01" slot size)SAND PACK ☐CONCRETE ☐BENTONITE ☒SCREEN ☐

| Sample | Blow Count<br>(Per 6 inches)<br>10 20 30 40 | Depth<br>(feet) | Description                           | Depth<br>(m) | Construction |
|--------|---------------------------------------------|-----------------|---------------------------------------|--------------|--------------|
|        |                                             | 35              | grey, fine, SAND-SILT, saturated (SM) | 11           |              |
| S      |                                             | 40              | grey, fine, SAND-SILT, saturated (SM) | 12           |              |
| S      |                                             | 45              | (Bottom of boring 13.7 metres)        | 13           |              |
|        |                                             | 50              |                                       | 14           |              |
|        |                                             | 55              |                                       | 15           |              |
|        |                                             | 60              |                                       | 16           |              |
|        |                                             | 65              |                                       | 17           |              |
|        |                                             |                 |                                       | 18           |              |

**KEYSTONE**  
ENVIRONMENTAL

## WELL LOG: MW-12

LOCATION: 2100 Block West 11th Avenue, Vancouver

DATE: January 25, 1996

SCREEN

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# KEYSTONE

ENVIRONMENTAL RESOURCES, INC.

## WELL LOG

PROJECT: BASTION

LOCATION: BH 16 (20-97)

DRILLING METHOD: AUGER 3" 5" →  
DRILLER: UNIMIDE 6358-02GEOLOGIST: DMF  
DATE:

Ground Elevation:

Top of Well Elev.:

Depth of Well:

## Sample Collection

G-grab T-shelby tube  
S-splitspoon C-rock coreCasing Material:  
Screen:

GRAVEL PACK.

BENTONITE

GROUT

SCREEN

CAVE-IN

| Depth<br>V.M.W. | Sample            | SPT<br>Blow<br>Counts      | Description                                                                                                                                   | Construction |
|-----------------|-------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| AUGER           | 1-2               |                            | 0-3" Asphalt                                                                                                                                  |              |
|                 | (2)               |                            | 3"-3 7/8' Black sand; <sup>med</sup> silty some<br>gravel, organics<br>moist                                                                  |              |
| 5' spoon        | (3 1/2)           | 12<br>13<br>18<br>24<br>28 | 3 7/8' - 4' Brown sand, fine silty<br>some gravel                                                                                             |              |
|                 | (5 1/2)           | 100 (5 1/2)                | 4 - 4 1/2' grey sand fine, some silt.                                                                                                         |              |
| Solid.          | (7 1/2)           |                            | 4 1/2 - 9' grey silt, clayey moist<br>dense                                                                                                   |              |
|                 | (8)               |                            | 9' - 10' grey silt, sandy wet                                                                                                                 |              |
|                 |                   |                            | wet sand seam ~ 9 1/2 - 9'                                                                                                                    |              |
|                 |                   |                            | 10' - 11' medium <sup>coarse</sup> sand, trace silt, trace<br>gravel, gray moist                                                              |              |
|                 | (10-11)           |                            | 11 - 13 1/2' grey till, fine sand, silty, damp<br>Gravel trace gravel (rounded) <del>not stationary</del><br>(VERY DENSE @ 11 1/2') ← refusal |              |
|                 | (12-13)           |                            | 13 1/2 - 15' grey <u>silt</u> , sandy <del>point</del> <sup>Wet</sup> DENSE                                                                   |              |
|                 | (14-15)           |                            | 15 - 17 1/2' - sand gray. fine - wet                                                                                                          |              |
|                 | (17 1/2 - 19 1/2) |                            | 17 1/2' - Cobbles 17 1/2' peat seam<br>till like, gravel wet. gray.                                                                           |              |
|                 | (22-24)           |                            | trace gravel, very wet below 2 7/8'                                                                                                           |              |
|                 | (26-27)           |                            | 30' EOH.                                                                                                                                      |              |

Sheet of

**COPY**

**ORIGINAL**

**CONFIDENTIAL**

**LICENSE AGREEMENT**

THIS AGREEMENT, made as of the 10<sup>th</sup> day of February, 1998.

BETWEEN:

s.22(1)

s.22(1)

s.22(1)

Michael Linton

, of

(hereinafter together called the "Licensors")

OF THE FIRST PART

AND:

**BU411754**  
*(2111 W. 11<sup>th</sup>)*

**363027 B.C. LIMITED**, (Inc. No. 363027),  
having an office at 500 - 1681 Chestnut Street,  
Vancouver, B.C. V6J 4M6

(hereinafter called the "Licensee")

OF THE SECOND PART

**WHEREAS:**

A. The Licensors are registered owners of certain lands in the City of Vancouver, located at Arbutus Street and West 10<sup>th</sup> Avenue, legally described as Lots 8, 9 and 10, Block 364, District Lot 526, Plan 4905 (the "Gordon Lands");

B. The Licensee is the registered owner of, inter alia, certain lands adjacent to the southern boundary of the Gordon Lands;

C. A subdivision of the block bounded by West 10<sup>th</sup> Avenue, Arbutus Street, West 11<sup>th</sup> Avenue and Yew Street, other than Gordon Lands, generally described as depicted on the proposed subdivision plan attached as Schedule "A" will result, inter alia, in a lot ("Lot 1") of which the Licensee will be the registered owner;

D. The Licensee intends to remediate the soils of Lot 1 and construct a commercial/residential building with underground parking (the "Lot 1 Building");

E. In conjunction with the excavation and development of Lot 1, the Licensee proposes the temporary excavation and installation of underpinning works, shotcrete wall and anchors and to the extent of 22 feet north of the southern boundary of the Gordon Lands (the "Encroachment

Area") generally as shown on drawings numbered GS1, GS2, GS3, GS4 and G2 of the GeoPacific Consultants Ltd. drawings and general notes attached as Schedule "B" (the "Support Works");

F. The Licensee has requested permission to carry out the installation of and leave the Support Works under the Gordon Lands and the Licensors are prepared to provide a license to permit the installation and maintenance of the Support Works, subject to the terms and conditions hereof.

**NOW THEREFORE**, in consideration of the matters referred to in the foregoing recitals, the covenants and agreements herein contained, and other good and valuable consideration (the receipt and sufficiency of which is hereby acknowledged and agreed to by the Parties), the parties hereto covenant and agree as follows:

1. **Grant:** The Licensors hereby grant to the Licensee a non-exclusive license to enter and be on, with or without equipment, the Encroachment Area and to install the Support Works (the "License"), provided however that notwithstanding anything contained in this Agreement:
  - (a) the Support Works shall only be installed underground below the foundations of the existing structure situated on the Gordon Land;
  - (b) the Licensee and its servants, agents, invitees and licensees shall only use the Encroachment Area for the purposes set out in this paragraph 1.; and
  - (c) the Licensee and its servants, agents, invitees and licensees shall not do anything which might damage, prejudice or adversely affect the foundations or any other part of any structure situated on the Gordon Lands.
2. **Term:** The term of this Agreement shall be for twelve (12) months from the date of this Agreement, provided that:
  - (a) if the installation out of the Support Works has commenced but has not been completed by the expiry of the term, the Licensors shall grant the Licensee a reasonable extension of the term to enable completion of the Support Works and the underground portion of the structure of the Lot 1 Building and if construction does not proceed the Licensee shall backfill to a level sufficient to provide adequate support to the Gordon Lands; and
  - (b) the Licensors will allow excavation support anchors to be left in place after they are no longer required for support of the Support Works, provided such anchors are fully grouted to the hole collars and are not attached to the improvements on the Gordon Lands. The grouting of the anchor rods will be verified by a certificate of GeoPacific Consultants Ltd. (the "Licensee's Engineer") which will be delivered to Terra Engineering Ltd. (the

"Licensors' Engineer") with final "as constructed" drawings showing the locations and lengths of all anchors and other Support Works left in place.

3. **License Fee:** In consideration of the rights and benefits to be derived from this Agreement, the Licensee covenants and agrees to pay to the Licensors a fee of [REDACTED] payable upon execution of this Agreement.
4. **Licensee's Covenants:** The Licensee covenants, represents and warrants as follows:
  - (a) in the course of the excavation of Lot 1 the Licensee will ensure adequate support of the Gordon Lands and the structures situate thereon. The Licensee covenants to ensure that the foundation of the Lot 1 Building, once the backfilling around the perimeter thereof has been completed, will be sufficient to support the Gordon Lands and the existing structures thereon;
  - (b) the excavation of Lot 1 and the Support Works shall be supervised by the Licensee's Engineers and shall be carried out expeditiously, with reasonable diligence and in a good and workmanlike manner in accordance with all applicable bylaws, laws and regulations. The Licensee will use all reasonable efforts to minimize any disturbance to the Licensors and its tenants, licensees and their employees;
  - (c) The Licensee shall be responsible for all fees, permits and construction expenses relating to the Support Works and commissioned by the Licensee or its consultants and shall make a contribution of [REDACTED] towards the Licensors' legal, engineering and other consulting costs. Subject to paragraph 6, this contribution shall represent the extent of the Licensee's obligations for those legal, engineering and other consulting costs provided the Licensee observes the agreements set forth in sub-paragraph (a) hereof;
  - (d) the Licensors and Licensors' Engineer and any employee or agent appointed by the Licensor may, at all reasonable times, inspect the excavation on Lot 1 as well as the Support Works and the other measures taken by the Licensee to ensure the support of the Gordon Lands, provided that such inspections shall not unreasonably interfere with the excavation of Lot 1 and the construction of the Support Works;
  - (e) in the event the Licensee shall fail to observe the agreements set forth in subparagraph (a) hereof, the Licensors shall be at liberty but under no obligation, to enter onto Lot 1 and to construct or install thereon or under the structures located on the Gordon Lands such works and structures as may be

necessary to support the soil of the Gordon Lands either on a temporary or a permanent basis as the Licensors' Engineer shall deem necessary and any costs and charges so incurred shall be paid to the Licensors by the Licensee;

- (f) After the Support Works have been installed the Licensee shall cause the Licensee's Engineers to advise the Licensee and the Licensors of the Support Works which are to be removed, grouted or detensioned;
- (g) The Licensee assumes all risk of personal injury and death and property damage arising out of, in any way connected with the excavation or the Support Works or which would not have occurred but for the existence of the Support Works or any part thereof, damage to or destruction of the said Works or any part thereof, or repair, restoration, replacement and construction work on the Gordon Lands;
- (h) The Licensee will, on request, provide the Licensor with evidence of Worker's Compensation Board coverage in respect of any work commissioned by the Licensee or its consultants on the Gordon Lands to repair damage or for restoration, replacement and construction, and will indemnify and hold harmless the Licensor from any liens filed in respect of such work;
- (i) The Licensee covenants, represents and warrants that the Licensee's Engineers and other professionals retained by the Licensee to design and to review and certify construction of the excavation, foundations, drainage and site work on Lot 1 are professionals in good standing with relevant professional organizations and are insured against professional liability in amounts not less than ONE MILLION (\$1,000,000.00) DOLLARS arising from errors and omissions occurring in the performance of services rendered in relation to the Support Works and on Lot 1 and the Gordon Lands;
- (j) The Licensee agrees to completely restore and replace and make good, any damage to or disturbance of landscaping, drainage, buildings, patios, driveways, planting, electrical and telephone services and other improvements on the Gordon Lands to a standard mutually acceptable to the Licensors' Engineer and the Licensee's Engineers within six (6) months of completion of the Lot 1 Building on Lot 1 or of abandonment of the project, or in the event that the Licensee does not so replace, restore and make good, or construct as the case may be, to pay the Licensor a sum which, in the mutual opinion of the Licensors' Engineer and the Licensee's Engineers, will be sufficient to so restore, replace, construct or make good any such items provided however that the Licensee's obligations shall only extend to damage and disturbance caused by the Licensee.

5. **Insurance:** The Licensee and its contractors and sub-contractors will carry builders' risk insurance and irrevocable comprehensive general liability insurance for personal injury, including death and property damage, to a minimum aggregate limit of FIVE MILLION (\$5,000,000.00) DOLLARS with an insurer reasonably acceptable to the Licensors. During the currency of this Agreement:
- (a) the insurance policies will contain a cross liability clause substantially in this form;  
  
"Except with respect to the limits of insurance and any rights or duties specifically assigned to the first Named Insured, this insurance applies:
    - i) As if each Named Insured were the only Named Insured; and
    - ii) Separately to each insured against whom claim is made or "action" is brought."
  - (b) all deductibles under the insurance policies shall be paid by the Licensee.
6. **Indemnity:** The Licensee shall indemnify and save harmless the Licensors from and against any and all liabilities (statutorily imposed or otherwise), losses, damages, costs, suits, actions and expenses suffered or payable by the Licensors and arising out of, either directly or indirectly or in any way related to the use or occupation of the Support Works or the Encroachment Area by the Licensee including but not limited to:
- (a) any breach, violation or non-performance by the Licensee of any covenant, condition or agreement on the part of the Licensee contained in this Agreement;
  - (b) any damage of whatever kind to the structures located on the Gordon Lands caused by the exercise of the rights hereunder, the excavation and construction on Lot 1 or by the failure to support such structures as provided in paragraph 4 hereof;
  - (c) any damage to the property of the Licensors, any tenant, invitee, guest, employee, agent, licensee and all persons claiming through or under them or any of them, or damage to other property howsoever occasioned due to the excavation and the construction of the Lot 1 Building;
  - (d) any injury to person or persons, including death resulting in any time therefrom, occurring in or about the Gordon Lands or areas adjacent to the same occasioned by the excavation and the construction of the foundation of the Lot 1 Building.

The Licensee hereby acknowledges and agrees that any exclusions, limitations or policy limits in any insurance policy, or any liability for which insurance was not provided, shall in no way limit, diminish or effect the indemnities herein.

7. **No Interference:** The Licensors shall not grant any license or other right to permit the Gordon Lands to be used by any person for any purposes that may prevent or hinder carrying out the Support Works and leaving them in place during the term or any extension.
8. **The Support Works:** The Licensee will:
  - (a) on execution of this agreement by the Licensors pay to the Licensors the License Fee referenced in paragraph 3. and the contribution referenced in paragraph 4. (c) hereof;
  - (b) prior to commencing the Support Works or the Lot 1 Building:
    - (i) permit the Licensors' Engineer, to survey and inspect the structures on the Gordon Lands and prepare written reports and photographs of the general condition of each such area (including identification of any existing cracks), for approval by the Licensors; and
    - (ii) permit Licensors' Engineer, to review, report and comment in regard to all architectural, structural, soils and mechanical drawings, specifications, reports and surveys relating to the design and construction of excavations, foundations and drainage on or adjacent to the Licensor's property for the potential effect of the Support Works on the Licensors' property; from time to time to review and observe construction work at the site; and to do such other tasks as in the mutual opinion of the Licensors' Engineer and the Licensee's Engineers are necessary to protect and maintain the Licensors' property and buildings; and
  - (c) after anchor rods have been fully grouted and after completion of the Lot 1 Building or its abandonment, repair any cracks, caused, worsened or aggravated and other damage, including without limitation, to landscaping and driveways of, to and on the Gordon Lands which were not previously noted in the approved report by the Licensors' Engineer and which may be reasonably presumed to have resulted from the Support Works or the construction of the Lot 1 Building, all such repairs to be subject to a one (1) year construction warranty and all such repair work to be done to the standard mutually acceptable to the Licensors' Engineer and the Licensee's Engineers and in compliance with applicable permits, laws and bylaws; and

- (d) have all service lines visually checked by appropriate professionals and restore the Gordon Lands or any portion thereof disturbed as a result of the Support Works or the construction of the Lot 1 Building to its condition prior to installation of the Support Works and backfill areas behind retaining walls to their final rough grade to a standard mutually acceptable to the Licensors' Engineer and the Licensee's Engineers and in compliance with applicable permits, laws and bylaws, as soon as reasonably possible following the completion of the Support Works or the Lot 1 Building as the case may be.
- 9. **Sale or Lease of Gordon Lands:** In the event of any sale or lease of the Gordon Lands during the term or any extension, the Licensors shall cause the purchaser or tenant to acknowledge and agree to also comply with this Agreement.
- 10. The Licensee covenants and agrees that if the Licensors should at any time reconstruct the building on the Gordon Lands and be required or desire to excavate the land below the existing building level, the Licensors would be entitled to remove the anchors placed on the Gordon Lands by the Licensee and that the Licensee or their assigns will execute an encroachment agreement in favour of the Licensors or its assigns to permit the placement of anchors and other underpinning structures under Lot 1 at no fee or cost to the Licensors.
- 11. The Licensee agrees that the Gordon Lands will be kept clean and neat at all times during the course of construction and free of debris.
- 12. In addition to any remedy provided for herein or at law or in equity, all of which remedies shall be cumulative and not exclusive, the Licensors shall be entitled to apply to restrain by injunction any violation or attempted or threatened violation by the Licensee of the covenants and agreements on the part of the Licensee contained.
- 13. No waiver by the Licensors of any breach by the Licensee of the terms hereof shall be effective unless made in writing and no waiver of any breach shall be effective in respect of any further or future breach of the covenants or agreement which has been waived.

IN WITNESS WHEREOF the parties hereto have executed this Agreement as of the day and year first above written.

**SIGNED, SEALED AND DELIVERED** by  
the Licensors in the presence of:

s.15(1), s.22(1)

Name

Address **RON EZEKIEL**  
Barrister & Solicitor  
2100 1075 West Georgia Street  
Vancouver, B.C. V6E 3G2  
Ph (604) 631-4708

Occupation

s.15(1), s.22(1)

s.15(1), s.22(1)

PHY

**363027 B.C. LIMITED**

s.15(1), s.22(1)

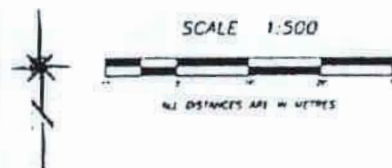
Authorized Signatory

SUBDIVISION PLAN OF LOT A,  
LOT 1 TO 7 INCLUSIVE AND  
LOT 11 TO 20 INCLUSIVE,  
BLOCK 364, D.L. 526, PLAN 4905

B.C.S. 926 C25

PLAN LMP

REGISTERED IN THE LAND REGISTRY  
AT NEW WESTMINSTER B.C.  
THIS DAY OF 1987



INTEGRATED SURVEY FILE NO. 1  
(VANCOUVER) NAD-83

THIS PLAN SHOWS THE LOT, METRE, CHAIN  
AND CHAIN SURVEY DATA OF THE SURVEY

LEGEND

THE BOUNDARIES ARE SET OUT BY THE  
BOUNDARY CONTROL MONUMENTS AND MARKERS

- ▲ BOUNDARY MONUMENT
- BOUNDARY MARKER
- BOUNDARY MONUMENT
- BOUNDARY MONUMENT
- BOUNDARY MONUMENT

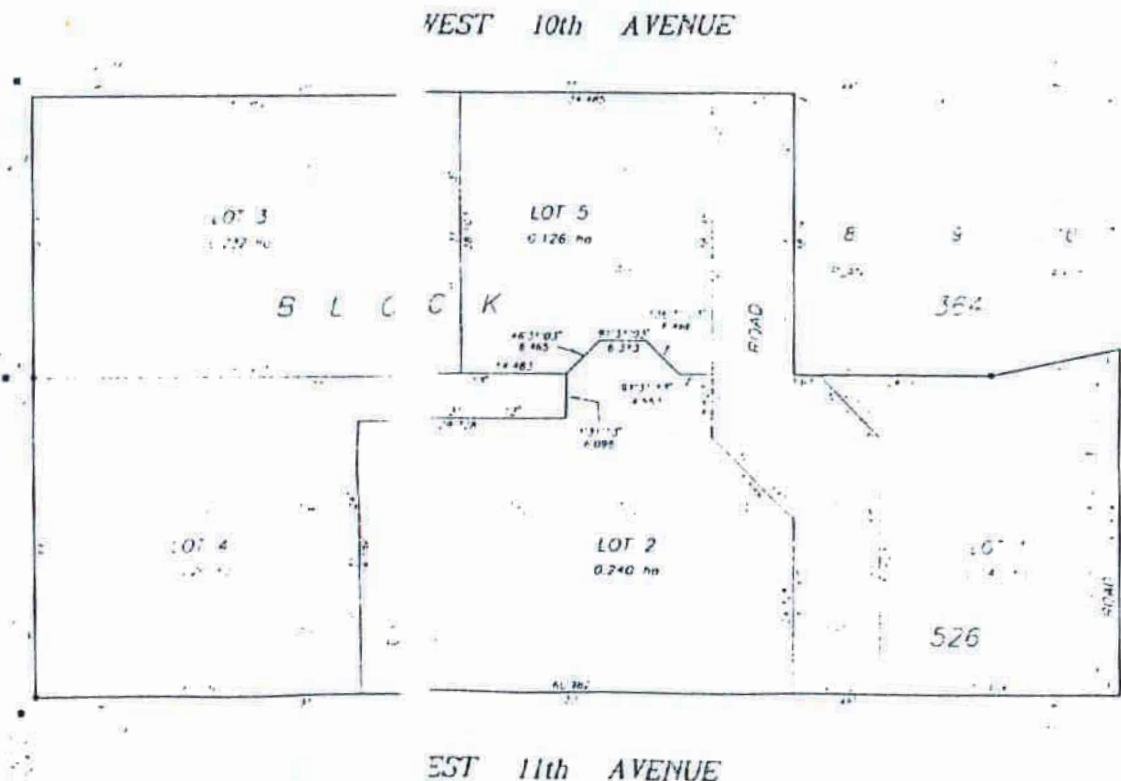
APPROVED UNDER THE LAND ACT

THIS DAY OF 1987

APPROVING OFFICER FOR THE  
CITY OF VANCOUVER

I, JANE E. SHAW, A BRITISH COLUMBIA LAND SURVEYOR  
OF LANDS IN BRITISH COLUMBIA, CERTIFY THAT I  
WAS PRESENT AT AND PERSONALLY SUPERINTENDED THE  
SURVEY REPRESENTED BY THIS PLAN AND THAT THE SURVEY  
AND PLAN ARE CORRECT. THE SURVEY WAS COMPLETED ON  
THE DAY OF 1987

VIEW STREET



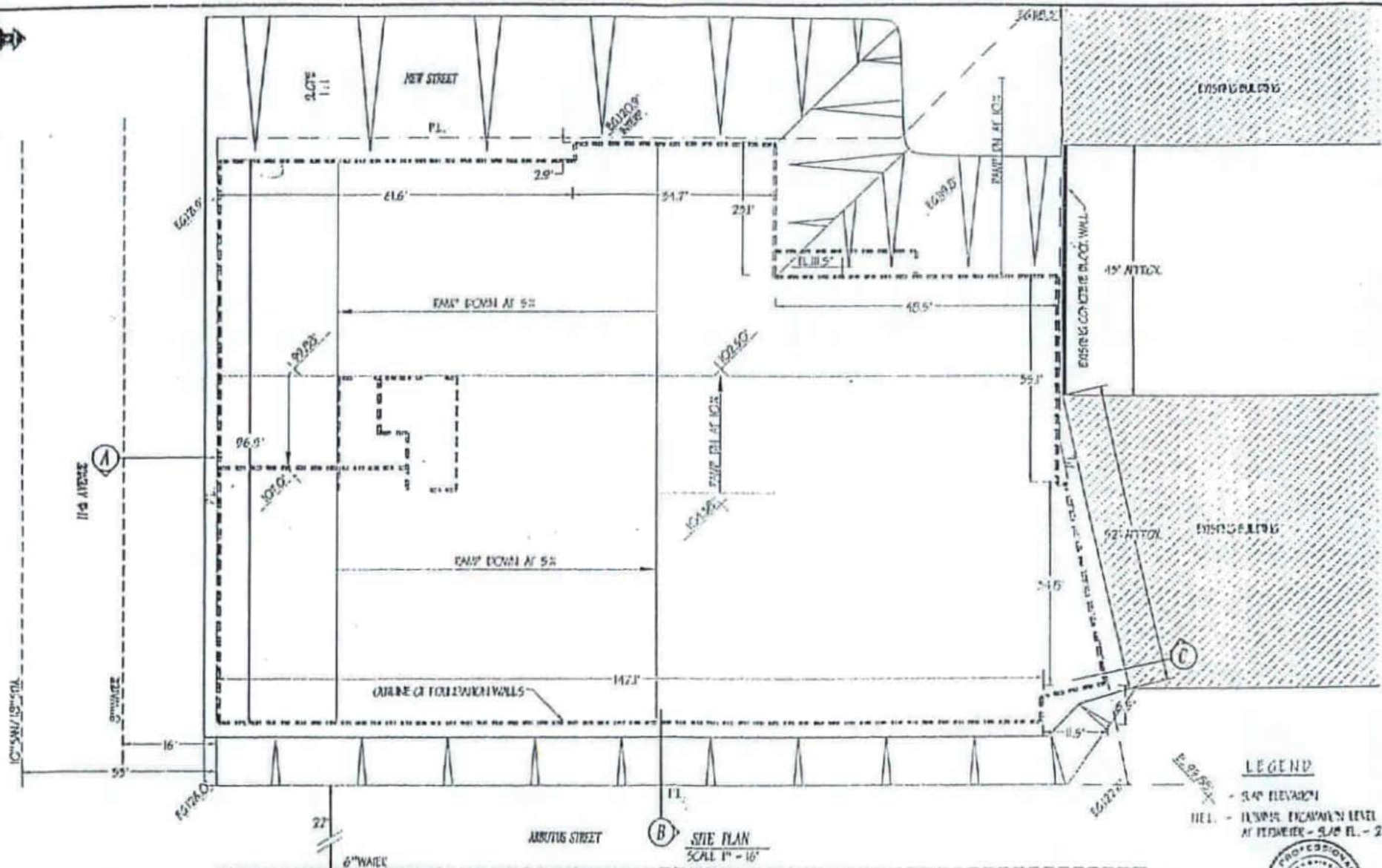
DIVISION  
CITY OF VANCOUVER

DATE

OWNER  
383027 B.C. LIMITED  
(INCORPORATION No. 383027)

AUTHORIZED SIGNATORY

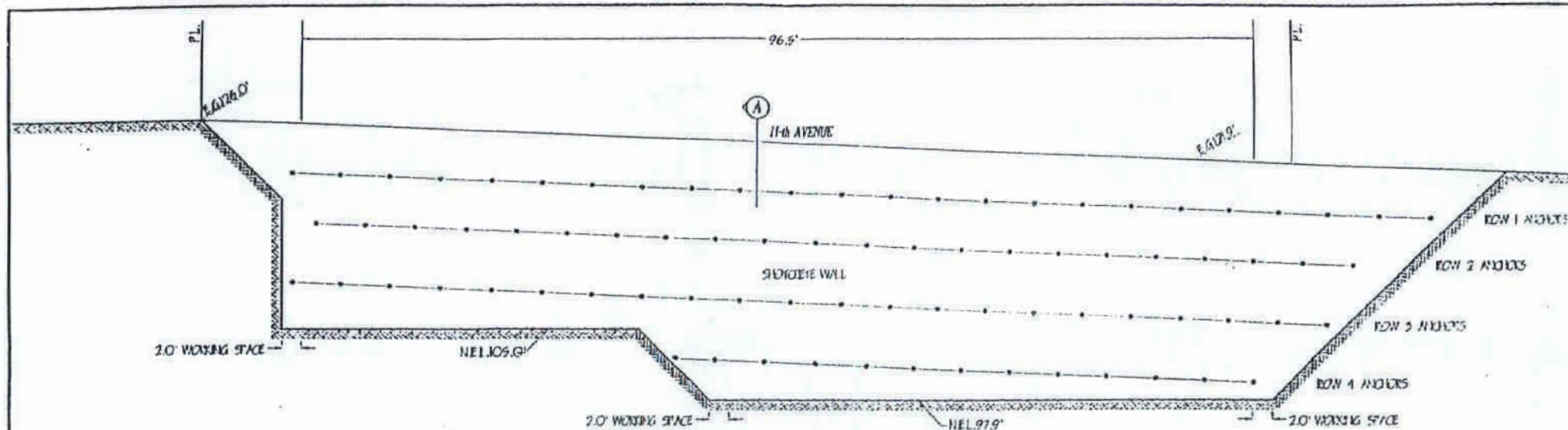
MURICAULT  
BANK OF AMERICA, N.A.



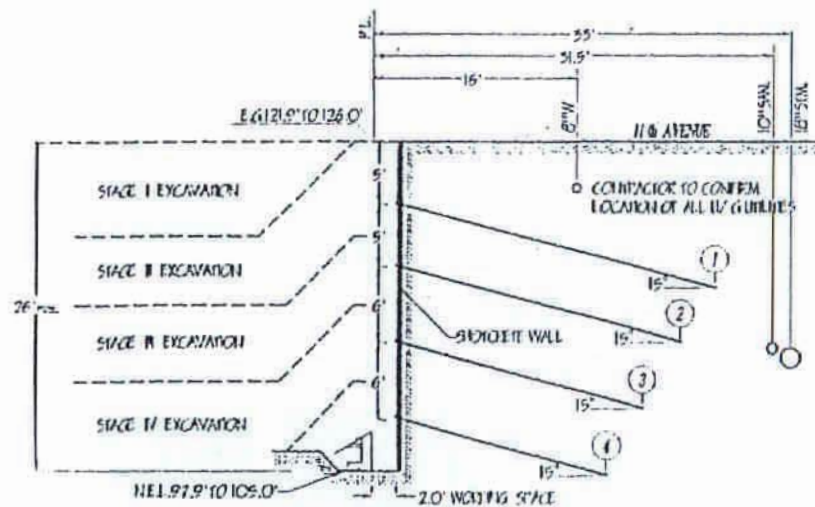
**LEGEND**  
 - 9.4' ELEVATION  
 H.E.L. - HIGHER ELEVATION LEVEL  
 AT ELEVATION - 9.4' E.L. - 20'



|                                             |                                                                  |                                                                       |                                                                                                  |                                     |                             |                  |
|---------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------|
| REFERENCE:<br>1871 UNDA-AD-10015<br>JUE '97 | <br><b>Geotechnical Engineers Ltd.</b><br>GEOTECHNICAL ENGINEERS | DATE: JUE 25, 1997<br>DRN. BY: L.J.H. APP. D. J.H.<br>SCALE: AS SHOWN | <b>PROPOSED RESIDENTIAL DEVELOPMENT</b><br>AMBIOUS LANE - LOT 1, VANCOUVER, B.C.<br>SLOPING PLAN | FILE NO: 2387-1071<br>D.C. NO: G-S1 | REVIEWED:<br>A.<br>B.<br>C. | s.15(1), s.22(1) |
|---------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------|



SOUTH ELEVATION  
SCALE 1" = 10"



SECTION A  
SCALE 1" = 10"

| ROW | LENGTH<br>(ft) | GROUTED<br>(ft) | LOC. OFF<br>(ft) | STAGING<br>(ft) |
|-----|----------------|-----------------|------------------|-----------------|
| 1   | 26             | 15              | 25               | 5               |
| 2   | 25             | 15              | 25               | 5               |
| 3   | 20             | 15              | 25               | 5               |
| 4   | 17             | 15              | 25               | 5               |

REFERENCE:

GeoFrac

Consultants Ltd.  
GEOTECHNICAL ENGINEERS

DATE: JUL 25, 1991  
DES. BY: LAZ. APP'D: E.JUL  
SCALE: AS SHOWN

PROPOSED RESIDENTIAL DEVELOPMENT  
ARBUS LANE - LOT 1, VANCOUVER, B.C.

FILE NO.: 2387-LOT 1  
Dwg. NO.: G-S2

REVISIONS:  
A.  
B.  
C.



## 1.0 GENERAL

- 1.1 In these Notes, the Engineer is GeoPacific Consultants Ltd.
  - 1.2 These Notes must be read in conjunction with the design Drawings.
  - 1.3 The work described and shown involves temporarily supporting near-vertical excavated slopes or structures using a combination of shotcrete and ground anchors.
  - 1.4 The anchor will be installed in ground around the site and the actual soil and groundwater conditions must be assumed.
  - 1.5 The grouted anchor lengths required to resist the design loads are based on the assumed conditions. The capacity of the anchors will be confirmed at the beginning of the contract and may be lengthened or shortened.
  - 1.6 Some utilities, foundations and structures which may affect the installation procedures and techniques are noted on the Drawings. The Contractor shall confirm the locations and condition of ALL man-made elements which may be damaged because of the anchored shotcrete operations. It is the Contractor's responsibility to install the anchored shotcrete in the actual site conditions encountered.
- Elements which may, in the opinion of the Contractor, be damaged by the anchored shotcrete operations must be reported to the Engineer well in advance of the work to take place.
- 1.7 These documents are based on architectural, structural and survey Drawings provided. It is the Contractor's responsibility to verify all dimensions and report discrepancies to the Engineer.
  - 1.8 The Contractor shall schedule and co-ordinate the work to satisfy the reasonable requirements of adjacent Owners and Tenants who shall be given sufficient Notice before carrying out work which may affect their property.
  - 1.9 The Contractor shall erect and maintain a secure closed hoarding around the site for the safety of all persons in the vicinity of the site.
  - 1.10 The Contractor shall inspect the slopes and the support to the slopes and structures daily and shall immediately report any potentially damaging movement or deterioration to the Engineer by telephoning 439-0922.

## 2.0 MATERIALS

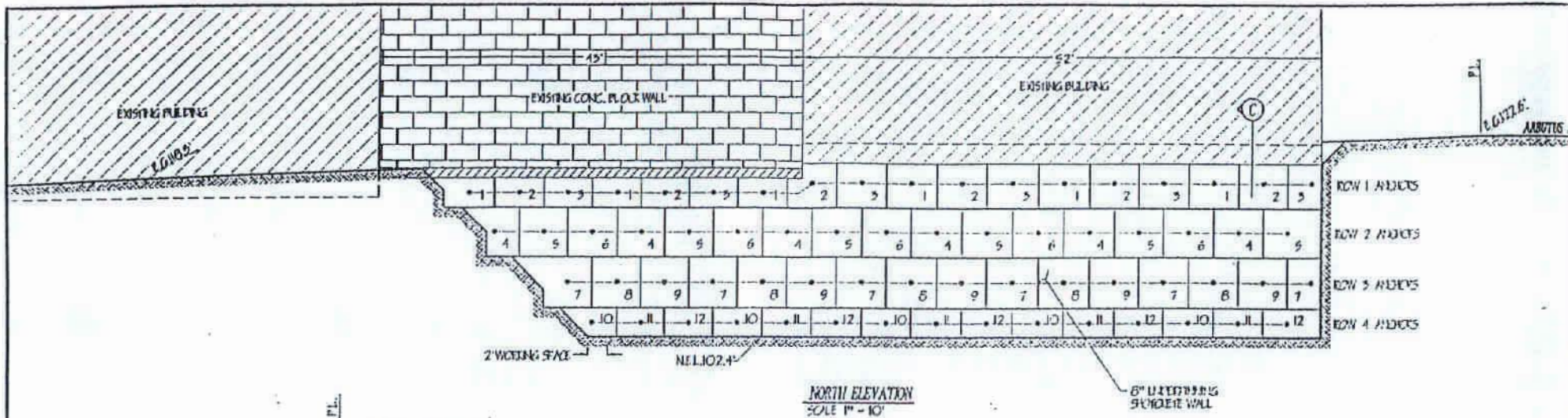
- 2.1 The anchors shall be installed in minimum 75 mm (3 inch) diameter holes which shall be drilled, unless otherwise approved in advance by the Engineer. Anchor capacity is dependant upon installation techniques and the drilling equipment and methods shall be subject to the Engineer's approval.
- Drilling techniques shall produce a hole which is free of debris and ensure continuous support of the hole and shall not erode or disturb soil around the hole.
- 2.2 Anchor tendons shall be Dywidaq threadbar with a minimum nominal diameter of 15 mm (5/8 inches) and minimum ultimate tensile strength of 1100 MPa (160 kips/inch X inch) or other similar materials with prior approval.
- Anchors with design loads higher than 120 kN (26 kips) require larger diameter bars and the Contractor shall ensure that the appropriate diameter and grade of steel are used.
- Anchorage equipment couplings and any necessary wedges washers and plates shall be in accordance with the tendon manufacturer's specifications and requirements.
- Minimum anchorage length ("fixed" length) and stressing length ("free" length) are shown on the Drawings.
- 2.3 Grout in the anchorage shall be a prior-approved non-shrink cementitious material with a minimum compressive strength of 21 MPa in 24 hours and 35 MPa in 28 days.
  - 2.4 Shotcrete shall be reinforced with 4" / 4" 8/8 welded wire mesh as shown on the Drawings. Steel shall have a minimum yield strength of 60 ksi and shall be in accordance with CSA G30.5.
- Alternatively steel fibre reinforced shotcrete may be used with prior approval.
- 2.5 All shotcreting shall be carried out in accordance with ACI 506: "Specifications for Materials Proportioning and Application of Shotcrete."
  - 2.6 Shotcrete shall have a minimum compressive strength of 21 MPa in 24 hours and 30 MPa in 28 days. The Engineer may require test panels to be prepared by the Contractor so they can be cored by others to confirm the shotcrete strength. The Contractor shall co-operate with the independent testing laboratory appointed by the Owner for this purpose.
- The charge of the independent testing laboratory shall be borne by the Owner but the Contractor shall be responsible for the cost of any work required to assist the laboratory.

## 3.0 INSTALLATION

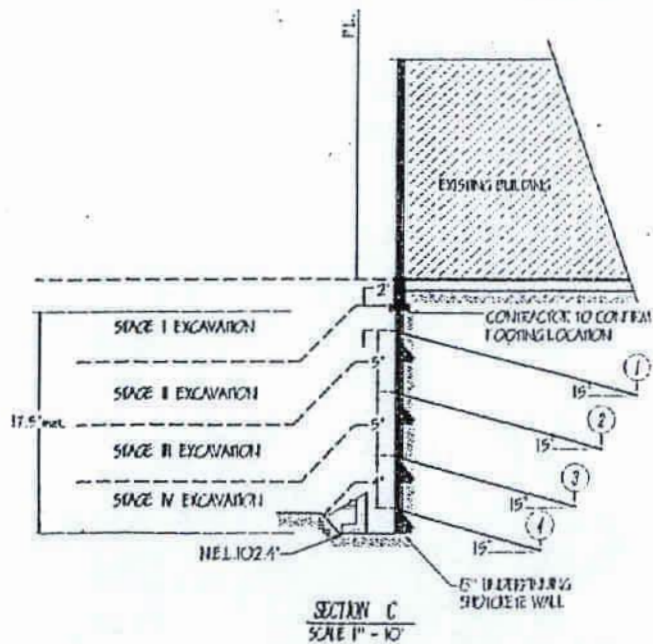
- 3.1 Anchors and shotcrete shall be installed in sequence and Stages 1- maintain stability of the excavation. Excavation of soil from the site shall also take place in stages as shown on the Drawings.
- The Contractor may remove all soil within any mass excavation. Stages before anchors in that Stage are installed but further excavation shall not take place until all anchored shotcrete in that Stage is installed, tested and approved by the Engineer.
- The mass excavation for any Stage does not include a perimeter berm with a minimum top width of one metre and a side slope of 1 horizontal to 1 vertical.
- Ground conditions may locally require a wider berm, flatter slopes and/or other slope protection measures including covering or short-term temporary support.
- The perimeter berms in any stage shall be excavated in staggered panels. THE MAXIMUM WIDTH OF A PANEL SHALL BE THE HORIZONTAL SPACING OF THE ANCHORS PLUS 0.6 METRES. This panel width may be INCREASED OR DECREASED by the Engineer to suit the ground conditions. The Contractor shall obtain the Engineer's agreement, in writing, BEFORE increasing the panel width.
- No adjacent panels shall be excavated concurrently and no more than 1/3 of the panels shall be excavated concurrently. In addition no panel shall be excavated into the berm until at least 24 hours after that panel anchor has been grouted.
- Anchors and shotcrete may be installed concurrently in different panels. Anchors shall be installed at right angles to the property lines on plan and within 2.5 degrees of the declination shown on the Drawings except with the prior approval of the Engineer.
- 3.2 The grout shall be introduced into the anchored zone by tremie methods starting at the base of the hole to ensure that any groundwater or soil debris is flushed from the hole and the tendon is located centrally within a homogeneous cementitious mass having intimate contact with the drill hole perimeter. Excess grout shall be flushed out of the stressing zone (free anchor length) or a suitable prior-approved bond breaker shall be used.
  - 3.3 Immediately following excavation of the soil berm in a panel the excavated face shall be trimmed back to the required line and mesh reinforcement shall be fixed to the soil to ensure the minimum specified shotcrete cover. Shotcrete shall be applied without delay to produce a dense homogeneous concrete having the minimum thicknesses shown on the Drawings.
- Shotcrete panels shall be kept moist to aid curing by spraying with water and covering with sack or polyethylene sheeting.

|            |                                                                                     |          |       |  |               |                                 |           |
|------------|-------------------------------------------------------------------------------------|----------|-------|--|---------------|---------------------------------|-----------|
| REFERENCE: |  | DATE:    |       |  | GENERAL NOTES | FILE NO:                        | REVISION: |
|            |                                                                                     | DATE BY: | APPD: |  |               | A                               |           |
|            |                                                                                     | SCALE:   |       |  |               | B                               |           |
|            |                                                                                     |          |       |  |               | Dwg. No: G2 (SHEET 1 OF 2)<br>C |           |





NOTE:  
NUMBERS 01 TO 48  
INDICATE SEQUENCE OF DRILLS



| ROW | LENGTH (ft) | GRouted (ft) | LOCKOFF (ft) | SPACING (ft) |
|-----|-------------|--------------|--------------|--------------|
| 1   | 20          | 10           | 15           | 5            |
| 2   | 17          | 10           | 15           | 5            |
| 3   | 15          | 10           | 15           | 5            |
| 4   | 12          | 10           | 15           | 5            |

3120 LF  
289 LF  
2460 LF  
180 LF  
1069 LF

REFERENCE:

**GeoPacific Consultants Ltd.**  
GEOTECHNICAL ENGINEERS

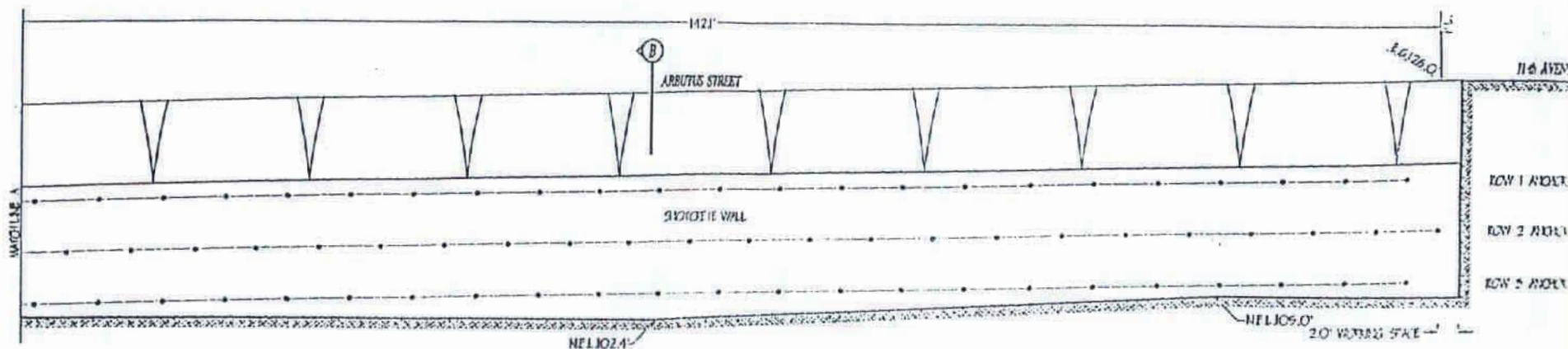
DATE: JUNE 25, 1997  
DES. BY: LAZ. APP'D: E.J.H.  
SCALE: AS SHOWN

**PROPOSED RESIDENTIAL DEVELOPMENT**  
ARBUTUS LANE - LOT 1, VANCOUVER B.C.

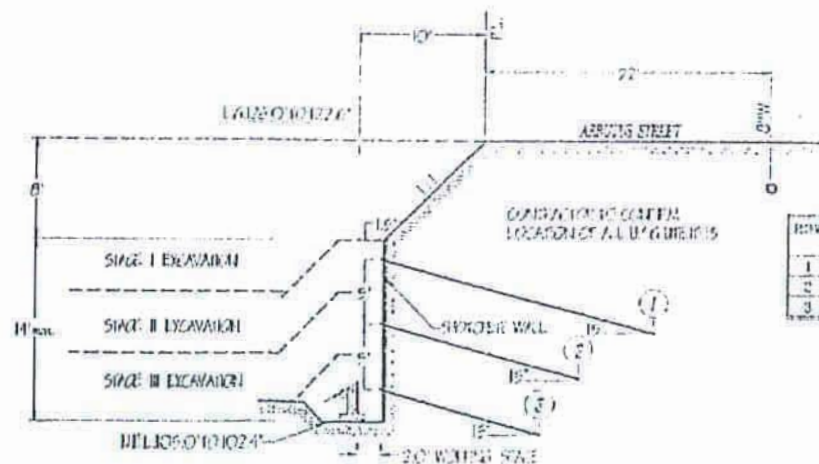
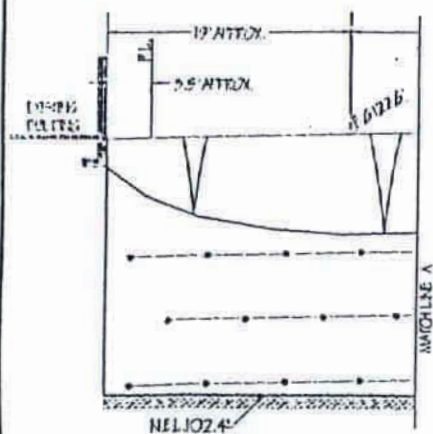
FILE NO: 2387-LOT 1  
B-6 NO: G-54

REVISIONS:  
A.  
B.  
C.





EAST ELEVATION  
SCALE 1" = 10'



SECTION B  
SCALE 1" = 10'

| ROW | LENGTH (ft) | DEPTH (ft) | SPACING (ft) |
|-----|-------------|------------|--------------|
| 1   | 22          | 13         | 6            |
| 2   | 16          | 12         | 6            |
| 3   | 15          | 10         | 6            |

REFERENCE:

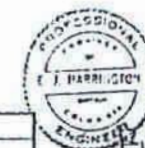
**GeoPac** Consultants Ltd.  
GEOTECHNICAL ENGINEERS

DATE: JUNE 25, 1991  
DESIGN BY: LAZ. APP'D: E.J.L.  
SCALE: AS SHOWN

PROPOSED RESIDENTIAL DEVELOPMENT  
ARBUTUS LANE-LOT 1, VANCOUVER B.C.

FILE NO: 2387-LOT 1  
PAGE NO: G-S3

REVISIONS:  
A.  
B.  
C.



Sufficient wire mesh reinforcement shall be installed to provide a full strength overlap with adjacent panels. This overlap shall not be less than 2 squares (8 inches).

The end surfaces of panels shall be thoroughly cleaned with compressed air to ensure a full strength bond when adjacent panels are shotcreted.

- 3.4 Drains to relieve groundwater pressure shall be installed through the shotcrete. Drains shall be a minimum of 50 mm (2 inches) diameter and at nominal 2.5 metres (8 feet) centres horizontally and 1.5 metres (5 feet) centres vertically. The Contractor shall install filters in drains from which fines are being removed with the water.

Additional special drains may be required where water seeps are noted. This special drains shall consist of minimum 50 mm (2 inches) diameter perforated ABS pipe installed within 75 mm (3 inches) diameter holes drilled 5 degrees UPWARDS from the horizontal. These special drains shall be a minimum length of 3 metres measured from the face of the shotcrete. These special drains may be required to be filtered with fine sand or gravel or filter fabrics.

- 3.5 Anchors shall be tensioned as soon as practicable but no sooner than 24 hours after the construction of the applicable shotcrete panel. Anchors shall be tensioned and tested as follows:

- 3.5.1 Apply a proof load of 1.25 times the working load (lock-off load) for two minutes. Monitor the load in the anchor. If the reduction in load is less than 2.5 percent of proof load reduce the load to working load and lock the working load into the anchor.

- 3.5.2 If the anchor does not hold at least 122.5 percent of working load for two minutes the Engineer must be informed. Further testing in the presence of the Engineer will be required as follows:

Load the anchor in 5 kip increments to 125 percent of working load. Hold each increment for 5 minutes except at maximum load when the load shall be maintained for 100 minutes. The increase in length of the anchor shall be measured at the start and end of each load increment except at maximum load when the extension shall be measured at 5 minute intervals.

This information shall be utilized by the Engineer to deduce the utilized anchor length and to assess the creep characteristics.

Anchors which creep more than 2 mm per log cycle of time will not be accepted. The Contractor shall install replacement anchors at the Contractor's expense.

#### 4.0 MUNICIPAL OR CITY REQUIREMENTS

- 4.1 All excavation and support works within the CITY OF VANCOUVER shall be in strict accordance with the City's requirements.

- 4.2 No part of the anchor system shall remain in place within 1.5 metres (5 feet) of final grade.  
Anchors 1.5 metres (5 feet) below final grade shall be detensioned or fully grouted when no longer required in the opinion of the Engineer.

- 4.3 No shotcrete shall remain in place within 1.3 metres (4 feet) of final grade.

#### 5.0 BACKFILLING ADJACENT TO EXCAVATED SLOPES

- 5.1 Backfilling on end adjacent to both City and Private properties shall be with pre-approved, clean, well graded, granular materials with a maximum size of 75 mm. (3 inches) and not more than 5% passing the #200 sieve (smaller than 0.074 mm).

- 5.2 Backfilling shall be carried out systematically in this layers. Each layer shall be compacted as specified and tested to confirm, that the specified density has been achieved. Adjacent to excavated slopes which are supported with anchored shotcrete or other means, backfill shall be compacted up to each level of support BEFORE that support is removed.

- 5.3 The pre-approved backfills shall be systematically compacted to the following minimums:

90% - from the base of the excavation up to 1.2 metres (4 feet) from final ground levels,

95% - from 1.2 metres (4 feet) to final ground levels,

of their "Modified Proctor" maximum densities, at water contents within 2% (+ to -) of their "optimum" moisture contents, determined in accordance with ASTM D1557.

#### 6.0 REQUIRED INSPECTIONS

- 6.1 The following are the MINIMUM inspections which are required by the Geotechnical Engineer in order to prepare the required Municipal Assurances. The Contractor is responsible for informing the Geotechnical Engineer that the Work is ready for these inspections. The Contractor shall be liable for any losses caused by failure to inform the Geotechnical Engineer that the Work is ready for inspection.

1. 2 days before work commences on site.
2. 1 day before the excavation is 1.2 metres (4 feet) deep.
3. 1 day before the anchors are detensioned.
4. 2 days before backfilling commences.

#### NOTES

1. The excavation support design is based on the locations of adjacent structures and utilities which have been supplied. The Contractor shall confirm the locations and elevations of all foundations and utilities which may be affected by the work and report any discrepancies. GeoPacific Consultants Ltd. (Tel.: 439-0922)
2. All slopes shall be covered with secured polyethylene sheeting to prevent erosion.
3. The extent of the excavation shall be based on the Architectural Structural Drawings. The Contractor shall confirm the size of the excavation required by the basement and report any discrepancy. These Drawings to GeoPacific Consultants Ltd.
4. The Contractor must obtain prior permission in writing to carry out any work on adjacent private property.
5. The Contractor shall inform GeoPacific Consultants Ltd. of any surcharge loads which will be within half the height of the excavation from the top of the excavation so that the support system can be modified to support the additional loads. The Contractor shall also inform GeoPacific if and when any groundwater seepage occurs which may require additional special drains as outlined in Note 3.4, Drawing G-2.
6. The ground conditions must be confirmed by GeoPacific Consultant when the excavation is 4 feet deep. The Contractor is responsible ensuring that GeoPacific personnel inspect the site.

#### DRAWING LIST

SITE PLAN-----G-9  
ELEVATIONS, SECTIONS-----G-52, G-53, G-54  
GENERAL SHOTCRETE/UNDERPINNING  
AND ANCHOR DETAILS-----G-1  
GENERAL NOTES-----G-2 (SEE TITLES)  
SPECIAL REQUIREMENTS-----

|            |                                                              |                                         |                  |               |                                                 |                           |                                                                                       |
|------------|--------------------------------------------------------------|-----------------------------------------|------------------|---------------|-------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------|
| REFERENCE: | <b>GeoPacific Consultants Ltd.</b><br>GEOTECHNICAL ENGINEERS | DATE: JUL 25, 1997<br>BY: [ ]<br>SCALE: | APPROVED: E. JUI | GENERAL NOTES | FILE NO: 287-1071<br>DRAWING NO: 02 (SHEET 022) | REVISIONS:<br>A<br>B<br>C |  |
|------------|--------------------------------------------------------------|-----------------------------------------|------------------|---------------|-------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------|

Note: To be submitted prior to issuance of a Building Permit

ASSURANCE OF "GEOTECHNICAL DESIGN" AND  
COMMITMENT FOR "FIELD REVIEW"

UNION OF  
BRITISH  
COLUMBIA  
MUNICIPALITIES

s.3(5)(a)











# CFT Engineering Inc.

#203 - 1104 Hornby Street  
Vancouver, B.C. V6Z 1V8  
Office: (604) 684-2384 (CFTI)  
Fax: (604) 684-2402  
cft@cftengineering.com

March 29, 1999

Mr. John Robertson, P.Eng.  
Manager, Plan Checking Branch  
Certified Professional Program Coordinator  
Permits & Licences Department  
City of Vancouver, City Hall  
453 West 12th Avenue  
Vancouver, B.C.  
V5Y 1V4

BU411754



Dear Mr. Robertson:

**Re: Arbutus Lands Project,  
2111 West 11th Avenue  
Application for Excavation Permit**

Please find attached the necessary documents in support of a Certified Professional Program submission for 2111 West 11th Avenue.

The shoring / excavation drawings for this project have been forwarded, along with other required information, to the Engineering Department. Engineering Department approval has not yet been obtained.

The following is a list of items which have been included with this submission.

| Item | Full Building Permit Application                                                             | Enclosed | Out-standing |
|------|----------------------------------------------------------------------------------------------|----------|--------------|
| 1    | Completed C.P. Building Permit Application                                                   | x        |              |
| 2    | Building Permit fees, as required by municipality<br>- Building Permit fees                  | x        |              |
| 3    | Staged Building Permit                                                                       | x        |              |
| 4    | Excavation shoring drawings, signed and sealed (3 sets)                                      | x        |              |
| 5    | Three signed and sealed copies of architectural drawings<br>with C.P.'s stamp and signature. | x        |              |
| 6    | One set of Code Compliance Drawings                                                          | x        |              |
| 7    | Partial code compliance checklist.                                                           | x        |              |
| 8    | Completed DP checklist                                                                       | x        |              |
| 9    | Confirmation of commitment by owner, CP-1                                                    | x        |              |

| Item | Full Building Permit Application                                                                  | Enclosed | Out-standing |
|------|---------------------------------------------------------------------------------------------------|----------|--------------|
| 10   | Proof of insurance - C.P.                                                                         | x        |              |
| 11   | Certification of design and compliance, CP-2                                                      | x        |              |
| 12   | Project directory - consulting team form                                                          | x        |              |
| 13   | Owners Undertaking Form                                                                           | x        |              |
| 14   | Letters of assurance including<br>PA-1, PA-2, PA-2a to PA-2f                                      | x        |              |
| 15   | Commitment letter from envelope consultant                                                        | x        |              |
| 16   | Preliminary consolidation Survey Plan                                                             | x        |              |
| 17   | Building Grade Elevations (As provided by City<br>Engineers)                                      | x        |              |
| 18   | Letter to adjacent owner regarding construction and snow<br>loads                                 | x        |              |
| 19   | Encroachment agreements with private property owners re<br>shoring, underpinning, air rights etc. | x        |              |

We trust that you have all the necessary information to issue an Excavation Permit. If you have any questions or if we may be of assistance please contact our office.

Yours truly,  
**CFT Engineering Inc.**

s.15(1), s.22(1)

Michael A. Linton, P.Eng., C.P.

ML

C412401.L2



Called 99-10-19

HOLD see below

# BUILDING PERMIT AUTHORIZATION

Application No.

BU 411754

Address:

2111 W. 11<sup>th</sup>

PHASE 1 - EXCAVATION ONLY.

Address Specifics:

Partial Permit ☒ Yes ☐ No

Partial Permit No.

Reviewed By:

J. Lau.

## Instructions

ENL. Dept.  
(Damage Deposit)

ELECT. BRANCH.

FIRE Dept. - OK EXCAV. ONLY - ✓

TREE PROTECTION

DRAIN TILE PERMIT

D.C.C.

SOILS REPORT

OK, FOUNDATION ONLY (D. Amy. 991015)

OK D. A. Lau. 991019, OK FOR EXCAV. ONLY

OK

OK

OK PERM. 991015.

OK

DT 403374 TO BE ISSUED

ADDRESSING

s.15(1), s.22(1)

Permit Authorized By:

Date:

Oct 19 99

# CP CHECKLIST

## LIMITED REVIEW OF CODE COMPLIANCE DRAWINGS

Vancouver Building By-law #6134 Permit Type \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

Property Address 2111 W. 11th Reviewed by J. LAU

Application No. BV411754 Staff No. 10405 Date MAR '99

|     | COMMENTS                                                                          | ACC   | ACTION                                                   | CLR                             |
|-----|-----------------------------------------------------------------------------------|-------|----------------------------------------------------------|---------------------------------|
|     | New Building <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> |       |                                                          |                                 |
| 1.  | <u>Staged Permit</u> Full Permit                                                  |       |                                                          |                                 |
| 2.  | DP Checklist & DP Issued                                                          | ✓ ✓   |                                                          |                                 |
| 3.  | File Check                                                                        |       |                                                          |                                 |
| 4.  | Project Directory                                                                 | ✓     |                                                          |                                 |
| 5.  | Insurance Certification & CP Endorsement                                          | ✓ ✓   |                                                          |                                 |
| 6.  | Owners Undertaking                                                                | ✓     |                                                          |                                 |
| 7.  | CP Letters of Assurance CP1 & CP2                                                 | ✓ ✓   |                                                          |                                 |
| 8.  | Coordinating Registered Professionals Letters PA1/PA2                             | ✓ ✓   |                                                          |                                 |
| 9.  | PA2a Architectural Letter                                                         | ✓     |                                                          |                                 |
| 10. | PA2b Structural Letter                                                            | ✓     |                                                          |                                 |
| 11. | PA2c Mechanical Letter                                                            | ✓     |                                                          |                                 |
| 12. | PA2d Plumbing Letter                                                              | ✓     |                                                          |                                 |
| 13. | PA2e Electrical Letter                                                            | ✓     |                                                          |                                 |
| 14. | PA2f Geotechnical Letter                                                          | ✓     |                                                          |                                 |
| 15. | Adj. Owners Excavation/Snow                                                       | ✓     |                                                          |                                 |
| 16. | <u>Soils Report</u>                                                               | (R)   |                                                          |                                 |
| 17. | <u>BULD. ENVELOPE SPEC.</u>                                                       | (R)   | GORDON SPART - NOT IN THE LIST<br>REPLACEMENT REQD - (R) | See JOHN AETZ<br>is responsible |
| 18. |                                                                                   |       |                                                          |                                 |
| 19. | <u>DP Levy / E-UTEE / DCC</u>                                                     | ✓ (R) |                                                          |                                 |
| 20. | Survey Drawings/Bldg Grades                                                       | ✓     |                                                          |                                 |

|          | COMMENTS                            | ACC | ACTION                                          | CLR |
|----------|-------------------------------------|-----|-------------------------------------------------|-----|
| 21.      | Code Compliance Drawings            |     |                                                 |     |
| 22.      | Grade and Building Height           |     |                                                 |     |
| 23.      | Building Area & Classification      |     |                                                 |     |
| 24.      | Bldg Construction/Fire Ratings      |     |                                                 |     |
| 25.      | Separations Between Occup'y         |     |                                                 |     |
| 26.      | Spatial Separations                 |     |                                                 |     |
| 27.      | Fire Fighting Access                |     |                                                 |     |
| 28.      | Exiting                             |     |                                                 |     |
| 29.      | Sprinklers & Standpipes             |     |                                                 |     |
| 30.      | High Rise Provisions                |     |                                                 |     |
| 31.      | Persons with Disabilities           | (R) |                                                 |     |
| 32.      |                                     |     |                                                 |     |
| 33.      |                                     |     |                                                 |     |
| 34.      | CP Checklist                        | ✓   | PARTIAL ONLY FOR EXCAV.<br>FINAL RECD. - (R)    | ✓   |
| 35.      | Excavation & Shoring / SOILS REPORT | ✓   |                                                 |     |
| 36.      | Health Department                   | ✓   |                                                 |     |
| 37.      | Energy Utilization                  | ✓   | SEE COMMENT IN BP.                              |     |
| 38.      | Fire Warden / ALERT.                | ✓   | EXCAV. ONLY.<br>CLERK. RECD. FOR NOT 7/1/00 (R) | ✓   |
| 39.      | Mechanical & Plumbing               |     |                                                 |     |
| 40.      | Engineering Department              | (R) |                                                 |     |
| 41.      | Estimate & Permit Fee               |     |                                                 |     |
| 42.      | Environmental Protection            | ✓   |                                                 |     |
| 43.      | Equivalencies/Code Report           | ✓   |                                                 |     |
| Comments |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |
|          |                                     |     |                                                 |     |

## CITY OF VANCOUVER

PERMITS & LICENSES DEPARTMENT  
City Hall, East Wing  
453 West 12th Avenue  
Vancouver, British Columbia  
Canada V5Y 1V4  
Phone (604) 873-7611  
FAX (604) 873-7100



DIRECTOR:  
J.A. Perri

DEPUTY DIRECTOR:  
R.L. Maki, PEng  
Permits & Inspection Division

## CERTIFIED PROFESSIONAL PROGRAM

## STAGED BUILDING PERMIT

PHASE 1.

Address: 2111 West 11<sup>th</sup>

Permit Number: BU 411754

Building Code Reviewer: J. LAU

Building Unit: \_\_\_\_\_

The above building permit has been issued as a staged permit under the Certified Professional Program. Construction is authorized to proceed only for the extent of the work as described below. All work shall be carried out in accordance with the drawings and specifications submitted and accepted for building permit as itemised overleaf.

Extent of Work: \_\_\_\_\_

Excavation Permit

s.15(1), s.22(1)

Authorised By \_\_\_\_\_

Date: Oct 19 99

## Commitment by Certified Professional

"I acknowledge that this permit is issued as a staged permit under the Certified Professional Program. I undertake to ensure that all drawings and documents issued for construction of the various stages of the work are reviewed and accepted by the City prior to commencement of construction. The reviewed construction drawings shall be maintained on site for reference and review by the District Building Inspector. I shall not authorize work to proceed ahead of review and acceptance by the City of the relevant construction drawings and documents, and I undertake to inform the City promptly if work proceeds on site without my authorization."

s.15(1), s.22(1)

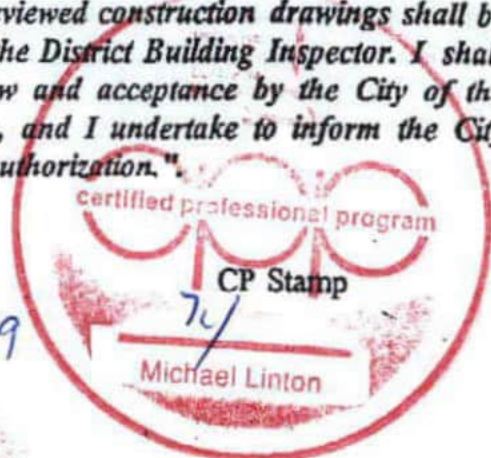
Signed: \_\_\_\_\_

Date: \_\_\_\_\_

Certified Professional

c.s. NIGEL BALDWIN, M.A.I.C., C.R.P.  
MICHAEL LINTON, P.Eng., C.P.  
SOREN AGREN, D.B.I.  
FILE.

March 30/99

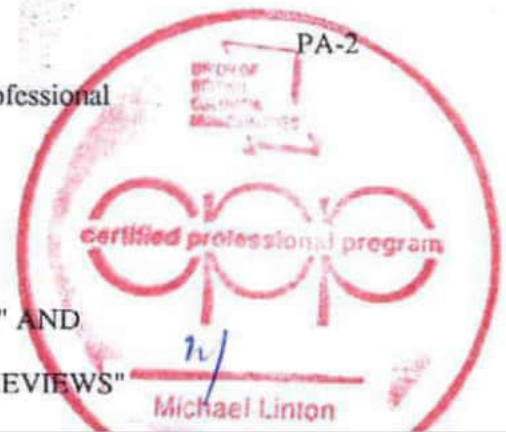


## STAGED BUILDING PERMIT

SCHEDULE C

Note: To be submitted by the Coordinating Registered Professional  
prior to issuance of a Building Permit

ASSURANCE OF "COORDINATION OF DESIGN" AND  
COMMITMENT FOR "COORDINATION OF FIELD REVIEWS"



s.3(5)(a)







Note: To be submitted prior to issuance of a Building Permit

CONFIRMATION OF "COMMITMENT BY OWNER"

Coordination of Design and Field Review of Construction

by a COORDINATING REGISTERED PROFESSIONAL



s.3(5)(a)



U

CITY OF VANCOUVER

21  
No. SC 970209



## WASTE DISCHARGE PERMIT

Issued by the Environmental Protection Branch,  
Permits and Licenses Department, City of Vancouver,  
under the provisions of the Greater Vancouver Sewerage  
& Drainage District Sewer Use By-law No. 164

s.3(5)(a)

# BEECHINOR BAKER HALL

Barristers & Solicitors

Thomas J. Beechinor  
Richard C. Baker  
Ian D. Hall  
Maria T. Holman

Telephone: (604) 714-5150  
Fax: (604) 714-5151  
Direct Line: (604) 714-5156  
email: hall@bbh.bc.ca

File No. 12067

June 30, 1998

City of Vancouver  
Correspondence Branch - Permits & Licences  
453 West 12th Avenue  
Vancouver, British Columbia V5Y 1V4

Attention: Environmental Protection Branch

2625 Arbutus St.

|                               |              |
|-------------------------------|--------------|
| PERMITS & LICENSES DEPARTMENT |              |
| Reg. No.:                     |              |
| JUL 03 1998                   |              |
| ORIGINAL TO:                  | EP           |
| COPY TO:                      | \$ 100 # 742 |

**Re: 11 - 20, Block 364, District Lot 526, Group 1, New Westminster District Plan 4905; (sometimes known as 2627 Arbutus Street, Vancouver, B.C.), the "Property";**

1615 11-15

We are counsel acting on behalf of 363027 B.C. Limited. Our client is, or until recently has been, the registered owner of the Property.

We understand that between approximately 1918 and 1920 the Property was owned by the Paterson Manufacturing Company (later known as the Barrett Company Ltd.). We understand that a coal tar emulsion plant was operated on the Property.

In 1929 The Canada Roof Products Co. Ltd. purchased Lots 11 - 14 of the Property.

In June of 1941 Dominion Tar & Chemical Co. Ltd. purchased lots 11 - 17 and later purchased the remaining lots that comprise the Property.

The Canada Roof Products Co. Ltd. and Dominion Tar & Chemical Co. Ltd. are related entities.

Canada Roof Products operated a roof covering manufacturing plant on the Property between 1941 and approximately 1961. We know that Canada Roof Products had a number of above ground storage tanks on the Property.

The Property has been the subject of extensive, and expensive, environmental remediation by our client.

Please consider this our request for a search of the files of the City of Vancouver for information that may pertain to the activities of any of the aforementioned companies on the Property. In particular, without limiting the generality of the foregoing, we are interested in any permits, licenses, or inspection reports that relate to the installation or demolition of the storage tanks on the Property.

Please find enclosed our cheque in the amount of \$100.00 which we understand is your fee for this service.

Thank you for your assistance.

Yours truly,

BEECHINOR BAKER HALL

By: s.15(1), s.22(1)

Ian D. Hall

IDH: C:\My Documents\Letters\12067-35.ltr.doc

NO RECORDS FOUND PERTAINING TO THE INSTALLATION  
OR DEMOLITION OF THE STORAGE TANKS ON THE  
ABOVE NOTED PROPERTY. s.15(1), s.22(1)

July 10/98



# CFT Engineering Inc.

#203 - 1104 Hornby Street  
Vancouver, B.C.  
V6Z 1V8  
Tel: (604) 684-2384  
Fax: (604) 684-2402

|                           |                  |
|---------------------------|------------------|
| <b>COMMUNITY SERVICES</b> |                  |
| Reg. No. ....             |                  |
| <b>DEC 15 1999</b>        |                  |
| ORIGINAL TO:              | s.15(1), s.22(1) |
| COPY TO:                  |                  |

## MONTHLY PROGRESS REPORT Certified Professional Program

TO: Mr. Soren Agren  
District Building Inspector  
City of Vancouver, City Hall  
East Wing, 2nd Floor  
2675 Yukon Street  
Vancouver, B.C.  
V5Y 3P9

An Alternative Program for the Building Permit Process

**Project:** Arbutus Lands

**Report No:** 2

**Address:** 2111 West 11th Avenue (Lot 1)

**Date:** December 10, 1999

**Owner:** Arbutus Development Ltd.

**Project No:** C4124.01/S1

**Contractor:** Bastion Construction

**Job Progress:** Foundation work underway.

### Number of Inspections this Month (November 1999):

☒ Architect      ☒ Mechanical Engineer  
☒ Structural Engineer      ☒ Electrical Engineer

☒ Envelope Consultant  
☒ Geotechnical Engineer (Site 1 & 2) (none received)  
☐ Other C.P.

**Any changes to Contract Documents:**

☐ Yes      ☒ No

**Application for amendment to Development Permit Required?**

☐ Yes      ☒ No

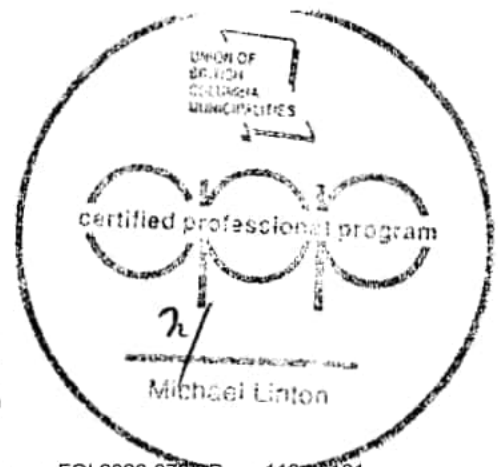
**Shop Drawings Reviewed:** None

**Comments:**

**Report by:**

s.15(1), s.22(1)  
Michael Linton, P.Eng., C.P.

SEAL VERIFIED



U

CITY OF VANCOUVER

21  
No. SC 970209



## WASTE DISCHARGE PERMIT

Issued by the Environmental Protection Branch,  
Permits and Licenses Department, City of Vancouver,  
under the provisions of the Greater Vancouver Sewerage  
& Drainage District Sewer Use By-law No. 164

s.3(5)(a)

# CITY OF VANCOUVER

## PERMITS & LICENSES DEPARTMENT

City Hall, East Wing  
453 West 12th Avenue  
Vancouver, British Columbia  
Canada V5Y 1V4  
Phone (604) 873-7611  
FAX (604) 873-7100



## DIRECTOR:

J.A. Perri

## DEPUTY DIRECTOR:

R.L. Maki, PEng  
Permits & Inspection Division

## PLEASE REFER TO:

Mr. D. Roberts  
at 873-7567

1997 November 24

Terra Environmental Consultants Ltd.  
1245 East 7th Avenue  
Vancouver, BC  
V5T 1R1

Attention: Eden Bard

Dear Sir/Madam:

Re: 2120 West 10th Avenue  
Lot 9 & 10, Block 364, District Lot 526, Plan 4905  
Your File No. 978-078

On November 12, 1997, your request for an environmental search was received by this department. Receipt No. 139571 for the fee of \$100.00 was issued at that time.

We have searched the files in the Environmental Protection Branch and have found the following information with respect to this property:

per  
D. Roberts: Environmental Assessment has been carried out on properties which border the west and south property boundaries of 2120 West 10th Avenue. Contaminants were found in these areas which would indicate a likelihood that there is probable contamination on these lands. The above assessment reports are on file with the Ministry of Environment.

We do not warrant that the above information is complete or accurate nor that we have assessed the extent or implications of the problem.

Our search was of files held in this Branch only. Please refer to other City Departments (including City Archives) for any information they might hold. Further, in that matters of the environment and contamination are subject to Provincial and Federal authority, we refer you also to those authorities for such further information, if any, as they might possess.

Please note that we have not researched the central property file for this address and have not checked for outstanding orders under any of the City By-laws.

Neither the City of Vancouver, nor the party signing below warrants or guarantees the accuracy or completeness of the above information. The information is provided on the following conditions:

- (a) that neither the City nor the party signing below shall be liable for any damage or expense should, for any reason including negligence on the part of the City or the party signing below, the information be inaccurate, incomplete or misleading; and

.../2

HD.

.../2

- (b) that should any or all of the information be inaccurate, incomplete or misleading, for any reason including negligence on the part of the City or the party signing below, the City shall, as against any person or corporation who may rely on the contents of this letter, be able to assert and enforce its full legal rights as if this letter had not been signed and as if any and all persons and corporations who may rely on the contents of this letter had not relied on the contents of this letter.

I trust this is the information you require.

Yours truly,

s.15(1), s.22(1)

P. Hayes for  
T. Droettboom  
DIRECTOR

HD/tg2



**Terra  
Environmental  
Consultants  
Ltd.**

1245 East 7th Avenue  
Vancouver, British Columbia  
Canada V5T 1R1  
Phone: (604) 874-1245  
Fax: (604) 874-2358

A Terra Group Company

Geotechnical  
Environmental  
and Materials  
Engineering  
Consultants

CITY OF VANCOUVER MUNICIPAL HALL  
Permits and Licences  
File Research  
453 West 12th Avenue  
Vancouver, B.C.  
V5Y 1V4

Attention: File Research Personnel

Dear Sir/Madam:

**RE: REQUEST FOR ENVIRONMENTAL INFORMATION, 2120 W 10TH AVE.  
STAGE 1 ENVIRONMENTAL ASSESSMENT PURPOSES**

As part of the Phase I Environmental Assessment process, Terra Environmental Consultants Ltd. is requesting environmental information on a property in Vancouver, B.C. We are interested in any records of complaints, or environmental/permit infractions or violations that may have been filed against the site; and, if there is any information about the former or current use of an underground storage tank (tanks) on the site before (from old building plans?).

The property of interest is: 2120 West 10th Avenue in Vancouver, B.C.

The legal description of the site is:

Lots 8, 9, and 10, Block 364, Plan 229, District Lot 526, Plan 4905

The study lot is presently occupied by Gordon's Autobody shop. The current property owner is Mr. Ron Murphy. A cheque for \$100 has been enclosed for the search. If you have any information or file on this site, please let us know as soon as possible. We appreciate your assistance and look forward to your response.

Yours truly,

**TERRA ENVIRONMENTAL  
CONSULTANTS LTD.**

s.15(1), s.22(1)

Eden Bard  
Project Scientist

wp51/vts/ph1a.eba

**PERMITS & LICENSES DEPARTMENT**  
Reg. No.: \_\_\_\_\_  
**NOV 13 1997**  
ORIGINAL TO: F.R.  
COPY TO: \_\_\_\_\_



pd - 139571  
m1401047



# CP CHECKLIST

LIMITED REVIEW OF CODE COMPLIANCE DRAWINGS

**BU412689**

Vancouver Building By-law #6134 Permit Type \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

Property Address 2655 CRANBERRY DRIVE Reviewed by \_\_\_\_\_

Application No. BU 412689 Staff No. 10385 Date July 7/99

|     | COMMENTS                                                                          | ACC | ACTION                           | CLR |
|-----|-----------------------------------------------------------------------------------|-----|----------------------------------|-----|
|     | New Building <input checked="" type="checkbox"/> Upgrade <input type="checkbox"/> |     |                                  |     |
| 1.  | Staged Permit/Full Permit                                                         | 5   |                                  |     |
| 2.  | DP Checklist & DP Issued                                                          | ✓✓  | file: July 7/99<br>DEC 8) 402489 |     |
| 3.  | File Check                                                                        | ✓   |                                  |     |
| 4.  | Project Directory                                                                 | ✓   | file July 7/99                   |     |
| 5.  | Insurance Certification & CP Endorsement                                          | ✓✓  | file: July 7/99                  |     |
| 6.  | Owners Undertaking                                                                | ✓   | file: July 7/99                  |     |
| 7.  | CP Letters of Assurance CP1 & CP2                                                 | ✓✓  | file/file July 7/99              |     |
| 8.  | Coordinating Registered Professionals Letters PA1/PA2                             | ✓✓  | file/file: July 7/99             |     |
| 9.  | PA2a Architectural Letter                                                         | ✓   | file: July 7/99                  |     |
| 10. | PA2b Structural Letter                                                            | ✓   | file: July 7/99                  |     |
| 11. | PA2c Mechanical Letter                                                            | ✓   | file: July 7/99                  |     |
| 12. | PA2d Plumbing Letter                                                              | ✓   | file: July 7/99                  |     |
| 13. | PA2e Electrical Letter                                                            | ✓   | file: July 7/99                  |     |
| 14. | PA2f Geotechnical Letter                                                          | ✓   | file: July 7/99                  |     |
| 15. | Adj. Owners Excavation/Snow                                                       |     |                                  |     |
| 16. | GVRD                                                                              |     |                                  |     |
| 17. | Body Code Summary                                                                 | ✓   |                                  |     |
| 18. | Envelope Specialist                                                               | ✓   | file: July 7/99                  |     |
| 19. |                                                                                   |     |                                  |     |
| 20. | Survey Drawings/Bldg Grades                                                       | ✓✓  |                                  |     |

|     | COMMENTS                       | ACC | ACTION                     | CLR |
|-----|--------------------------------|-----|----------------------------|-----|
| 21. | Code Compliance Drawings       | ✓   |                            |     |
| 22. | Grade and Building Height      | ✓   |                            |     |
| 23. | Building Area & Classification |     |                            |     |
| 24. | Bldg Construction/Fire Ratings |     |                            |     |
| 25. | Separations Between Occup'y    |     |                            |     |
| 26. | Spatial Separations            | ?   |                            |     |
| 27. | Fire Fighting Access           |     |                            |     |
| 28. | Exiting                        |     |                            |     |
| 29. | Sprinklers & Standpipes        |     |                            |     |
| 30. | High Rise Provisions           |     |                            |     |
| 31. | Persons with Disabilities      |     |                            |     |
| 32. |                                |     |                            |     |
| 33. |                                |     |                            |     |
| 34. | CP Checklist                   | ✓   |                            |     |
| 35. | Excavation & Shoring           | ✓   |                            |     |
| 36. | Health Department              |     |                            |     |
| 37. | Energy Utilization             |     |                            |     |
| 38. | Fire Warden / etc.             | R   | F/O exc. only elec full Bu |     |
| 39. | Mechanical & Plumbing          | R   | excav. & shoring only      |     |
| 40. | Engineering Department         | R   | to grade only              |     |
| 41. | Estimate & Permit Fee          |     |                            |     |
| 42. | Environmental Protection       |     |                            |     |
| 43. | Equivalencies/Code Report      | R   |                            |     |

Comments

BU412689

(CONSERVER CETTE COPIE POUR VOTRE CONTRÔLE - RETAIN THIS COPY FOR FOLLOW-UP)

BU 412689

2

FILE  
TO - FROM  
G. SHAN

DÉPARTEMENT - DEPARTMENT

Electrical

DATE

Oct 29/99

SUJET - SUBJECT

BU 412689

2655 Cromwell Drive

MESSAGE

1 set of 6000 bugs  
1 Copy Contractor Clearance Checklist  
1 Copy Elect. Plan Examiners Transmittal form  
Please review & clear for GRC/sharing  
Turn in

s.15(1), s.22(1)

CONDITIONAL / CLEAR FOR EXAMINATION & SHARING  
"ONLY"

s.15(1), s.22(1)

PARTIE DU BAS POUR RÉPONDRE - USE LOWER PORTION FOR REPLY

99/11/02  
DATE

POUR RÉPONDRE: CONSERVEZ LA COPIE UN ET RETOURNEZ LA COPIE TROIS  
TO REPLY: RETAIN FIRST COPY - RETURN THIRD COPY

BlueLine

A 20-B Memo Inter-Bureau - Inter-Office Memo



# CFT Engineering Inc.

#203 - 1104 Hornby Street  
Vancouver, B.C.  
V6Z 1V8  
Tel: (604) 684-2384  
Fax: (604) 684-2402

|                           |  |
|---------------------------|--|
| <b>COMMUNITY SERVICES</b> |  |
| Reg. No. ....             |  |
| <b>DEC 15 1999</b>        |  |
| s.15(1), s.22(1)          |  |
| ORIGINAL TO: .....        |  |
| COPY TO: .....            |  |

## MONTHLY PROGRESS REPORT Certified Professional Program

TO: Mr. Soren Agren  
District Building Inspector  
City of Vancouver, City Hall  
East Wing, 2nd Floor  
2675 Yukon Street  
Vancouver, B.C.  
V5Y 3P9

An Alternative Program for the Building Permit Process

|                    |                                                  |                    |                   |
|--------------------|--------------------------------------------------|--------------------|-------------------|
| <b>Project:</b>    | Arbutus Lands                                    | <b>Report No:</b>  | 1                 |
| <b>Address:</b>    | 2197 West 11th Avenue (Lot 2)<br>(2655 Camberry) | <b>Date:</b>       | December 10, 1999 |
| <b>Owner:</b>      | Arbutus Development Ltd.                         | <b>Project No:</b> | C4124.01/S2       |
| <b>Contractor:</b> | Bastion Construction                             |                    |                   |

**Job Progress:** Foundation work underway.

### Number of Inspections this Month (November 1999):

|                                                         |                                                         |                                                                                      |
|---------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Architect           | <input checked="" type="checkbox"/> Mechanical Engineer | <input checked="" type="checkbox"/> Envelope Consultant                              |
| <input checked="" type="checkbox"/> Structural Engineer | <input checked="" type="checkbox"/> Electrical Engineer | <input checked="" type="checkbox"/> Geotechnical Engineer (Site 132) (None Received) |
|                                                         |                                                         | <input type="checkbox"/> Other _____                                                 |

**Any changes to Contract Documents:** ☐ Yes ☒ No

**Application for amendment to Development Permit Required?** ☐ Yes ☒ No

**Shop Drawings Reviewed:** None

**Comments:**

**Report by:** s.15(1), s.22(1)  
Michael Linton, P.Eng., C.P.

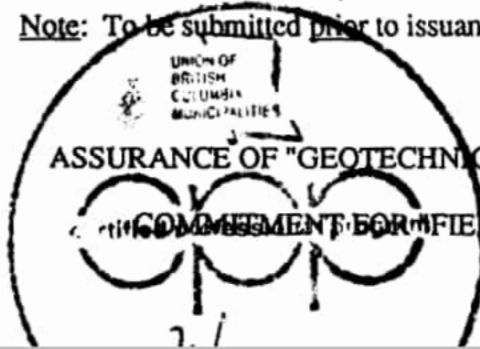
**SEAL VERIFIED**



File: BU 412689 for July 7/99

File # 2387 PA-2f

Note: To be submitted prior to issuance of a Building Permit



1999-03-29  
DATE (YY MM DD)

s.3(5)(a)







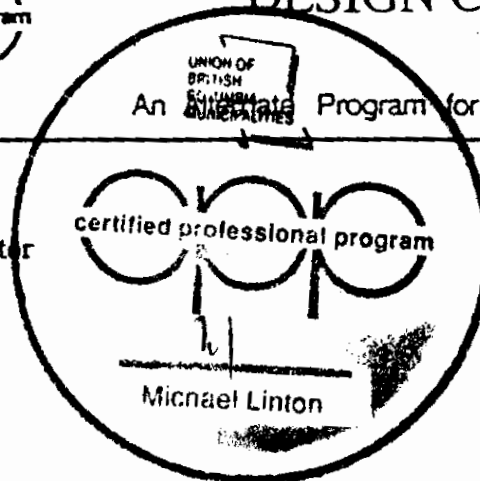
File: 00412689 J.E. July 1/99

CP-2



## CERTIFICATION OF DESIGN COMPLIANCE

The City Building Inspector  
City of Vancouver  
453 West 12th Avenue  
Vancouver, B.C.  
V5Y 1V4



09-30-03  
DATE (YY MM DD)

Dear Sir:

RE: 2655 Cranberry Dr.  
Print Address  
Building Permit Application No. \_\_\_\_\_

This is to advise that I am the Certified Professional authorized by the Owner to provide "code coordination" of the design and "field reviews" required with respect to the above referenced project. I have obtained letters of Confirmation of Professional Design Assurance and Commitment of Field Review from others, as required, for the issuance of the Building Permit such as Assurance of Architectural Design, Structural Design, Mechanical Design, Plumbing and Fire Suppression System Design, Electrical Design, and Geotechnical Design and others as required by the City Building Inspector.

I hereby certify that I have provided "code coordination" of the design and will provide "code coordination" for the review of all shop drawings through the applicable Registered Professionals and their "field reviews", as defined herein, of the following aspects of the project as shown on the plans and supporting documents prepared by the Registered Professionals, including also compliance with the requirements of Section 2.3 of the Vancouver Building By-law for sufficient information concerning the following areas:

[CROSS OUT AND INITIAL NON-APPLICABLE ITEMS]

### ARCHITECTURAL

- 1.1 Fire resisting assemblies
- 1.2 Fire separations and their continuity
- 1.3 Closures, including tightness and operation
- 1.4 Interior and exterior Finishes
- 1.5 Egress systems, including "Access to Exit", within "suites" and "floor areas"
- 1.6 Physical safety features (guardrails, handrails, etc.)
- 1.7 Structural capacity of architectural components, including anchorage and seismic restraint
- 1.8 Roofing and flashings
- 1.9 Wall cladding systems
- 1.10 Dampproofing and/or waterproofing of walls and slabs below grade
- 1.11 Thermal insulation systems, including condensation control and cavity ventilation
- 1.12 Sound insulation systems

## CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

RE:

2655 Cranberry Drive

Print Address

Building Permit Application No. \_\_\_\_\_

99-03-30  
DATE (YY MM DD)

- 1.13 Landscaping, screening and site grading
- 1.14 Requirements for fire fighting access
- 1.15 Requirements for persons with disabilities
- 1.16 Elevating devices
- 1.17 Coordination of testing of fire emergency systems and maintenance programs
- 1.18 Development Permit and conditions therein
- 1.19 Exterior glazing
- 1.20 Interior signage, including acceptable materials, dimensions and locations
- 1.21 Review of all applicable shop drawings

## STRUCTURAL

- 2.1 Structural capacity of structural components, including anchorage and seismic restraint
- 2.2 Structural aspects of deep foundations
- 2.3 Review of all applicable shop drawings

## MECHANICAL

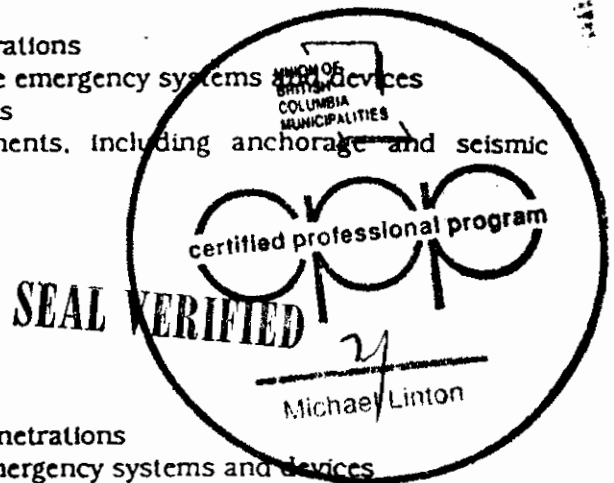
- 3.1 HVAC systems and devices, including high-rise requirements where applicable
- 3.2 Fire dampers at required fire separations
- 3.3 Continuity of fire separations at HVAC penetrations
- 3.4 Functional testing of mechanically related fire emergency systems and devices
- 3.5 Maintenance manuals for mechanical systems
- 3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
- 3.7 Review of all applicable shop drawings

## PLUMBING

- 4.1 Roof drainage systems
- 4.2 Site and foundation drainage systems
- 4.3 Plumbing systems and devices
- 4.4 Continuity of fire separations at plumbing penetrations
- 4.5 Functional testing of plumbing related fire emergency systems and devices
- 4.6 Maintenance manuals for plumbing systems
- 4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
- 4.8 Review of all applicable shop drawings

## FIRE SUPPRESSION SYSTEMS

- 5.1 Suppression system classification for type of occupancy
- 5.2 Design coverage, including concealed or special areas
- 5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
- 5.4 Evaluation of the capacity of City water supply versus system demands and domestic demand, including pumping devices where necessary
- 5.5 Qualification of welder, quality of welds and materials



## CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

RE:

2655 Cranberry Dr.

Print Address

Building Permit Application No. \_\_\_\_\_

99-03-30  
DATE (YY MM DD)

- 5.6 Review of all applicable shop drawings
- 5.7 Acceptance testing for "Contractor's Material and Test Certificate" as per NFPA standards
- 5.8 Maintenance program and manual for suppression systems
- 5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
- 5.10 For partial systems - confirm sprinklers are installed in all areas where required
- 5.11 Fire Department connections and hydrant locations
- 5.12 Fire hose standpipes
- 5.13 Functional testing of fire suppression system and devices

## ELECTRICAL

- 6.1 Electrical systems and devices, including high-rise systems where applicable
- 6.2 Continuity of fire separations at electrical penetrations
- 6.3 Functional testing of electrical related fire emergency systems and devices
- 6.4 Electrical systems and devices maintenance manuals.
- 6.5 Structural capacity of electrical components, including anchorage and seismic restraint
- 6.6 Clearances from buildings of all electrical utility equipment
- 6.7 Fire protection of wiring for emergency systems
- 6.8 Review of all applicable shop drawings

## GEOTECHNICAL - Temporary

- 7.1 Excavation
- 7.2 Shoring
- 7.3 ~~Underpinning~~
- 7.4 Temporary construction dewatering

## GEOTECHNICAL - Permanent

- 8.1 Bearing capacity of the soil
- 8.2 ~~Geotechnical aspects of deep foundations~~
- 8.3 Compaction of engineered fill
- 8.4 Backfill
- 8.5 ~~Permanent underpinning~~
- 8.6 ~~Permanent dewatering~~
- 8.7 Structural considerations relating to local soil conditions including slope stability and seismic effects



SEAL VERIFIED

As used herein, "code coordination" shall mean the activities necessary to ascertain that the Registered Professionals of record for the various components of the project

- have reasonably interpreted the applicable code requirements governing the design of such components.
- have incorporated such applicable code requirements in their designs.
- have interfaced the design of such code requirements so that they are compatible with the code requirements of other disciplines.
- have fulfilled the applicable code requirements as outlined in the CP checklist submitted for permit, and
- shall provide "field reviews" of code related aspects.

Further to the above, all Tenant Improvement designs shall be monitored and officially indicated by the Certified Professional on the CP-4 letter to determine substantial compatibility with the original concepts, where application for Building Permits for such improvements is made prior to the date when the final Occupancy Permit is issued for the base building.

## CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

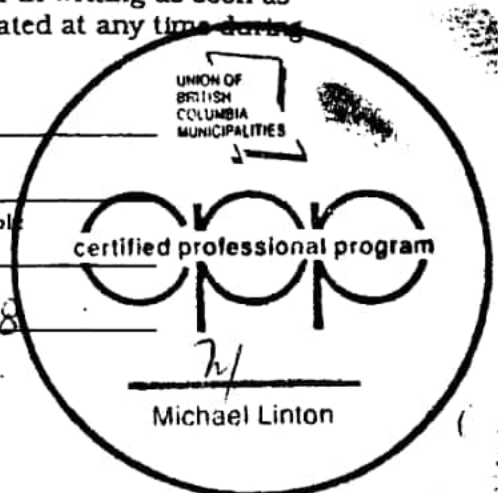
RE: 2655 Cranberry Dr.  
 Print Address  
 Building Permit Application No. \_\_\_\_\_

99-03-30  
 DATE (YY MM DD)

As used herein, "field reviews" shall mean such reviews of the work at the project site and at fabrication locations, where applicable, as the Registered Professionals in their professional discretion consider to be necessary in order to ascertain that the work substantially conforms in all material respects to the plans and supporting documents prepared by the Registered Professionals and accepted by the City of Vancouver for the project. This includes keeping a record of all site visits and any corrective action taken as a result thereof.

The undersigned also undertakes to notify the City Building Inspector in writing as soon as practical if his contract for code coordination of field review is terminated at any time during construction.

MICHAEL LINTON, P. ENG. C.P.  
 Print Name s.15(1), s.22(1)  
 Signature \_\_\_\_\_ Initials Sample ML  
203-1104 Hornby St.  
 Print Address  
Vancouver, BC  
 Print City V6Z 1V8  
 Telephone (604) 684-2384  
 Postal Code



If the Certified Professional is a member of a firm, complete the following:

I am a member of the firm

CF1 ENGINEERING INC.  
 Print Name of Firm  
203-1104 Hornby St.  
 Print Address  
Vancouver, BC  
 Print City V6Z 1V8  
 Postal Code

**SEAL VERIFIED**

and I sign this letter on behalf of myself and the firm.

Note: The above letter must be signed by a Certified Professional who is registered as an Architect in good standing in the Architectural Institute of British Columbia or a Professional Engineer in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.

BU412689

6.1.8 CHECKLIST FOR PART 3 NEW BUILDINGS

CITY OF VANCOUVER

BUILDING BY-LAW #6134

UP TO AND INCLUDING #7086 AMENDMENT

PASSED ON MARCH 9, 1993



June 22, 1999 - Partial Checklist submitted  
with excavation permit application.

PROJECT: "Arbutus Lands" - Lot 2  
2655 Cranberry Drive.

6.1.8 CHECKLIST FOR PART 3 NEW BUILDINGS

CITY OF VANCOUVER

BUILDING BY-LAW #6134

UP TO AND INCLUDING #7086 AMENDMENT

PASSED ON MARCH 9, 1993

Partial C.P. Checklist Submitted for  
Excavation Permit.

## SUMMARY

The design for 2655 Cranberry Drive  
(description of building)

has been checked and found

to comply with the Vancouver Building By-law

the following items require further clarification under the Vancouver Building By-law.

### Item

- A 3.2. The building height is presently 18.4m.  
The building height will be reduced to 18 m.
- B.4.1 Dead end corridors to be reduced to 9m

## NOTES REGARDING USE OF CHECKLIST

### USE OF CHECK BOXES:

|             |                                                                                             |
|-------------|---------------------------------------------------------------------------------------------|
| [ A ] [ ]   | Item Applicable, design not complete                                                        |
| [ A ] [ X ] | Item Applicable, checked and in compliance                                                  |
| [ X ] [ ]   | Item is not applicable to this project                                                      |
| [ ? ] [ ]   | Item may be applicable to project but interpretation is not known at time of this submittal |

Of the above, items unchecked ( [ A ] [ ] ), and items requiring interpretation by the authority ( [ ? ] [ ] ) should be itemized on the Summary (page6-).

### SYMBOLS IN LEFT MARGIN:

M = Mechanical consultant may be involved also  
E = Electrical consultant may be involved also  
C = Check during construction

### BUILDING BY-LAW REFERENCES:

Notes regarding application of the Certified Professional Checklist in Vancouver:

1. Development Permits and any "Minor Amendments" shall be issued prior to issuance of Building Permit.
2. All Provincial and Federal requirements shall be pre-cleared prior to this submission.
3. Fire Department Access requirements shall be pre-cleared by the Fire Chief prior to this submission.
4. Engineering Department requirements, including Construction Safety Plan, shall be pre-cleared prior to issuance of Permit.
5. Health Department requirements shall be pre-cleared prior to issuance of Permit.
6. All Environmental Protection pre-clearance shall be carried out prior to this submission.
7. Any Fire-safety and Life-safety Equivalency Reports shall be pre-cleared in principle prior to this submission.
8. Due to potential conflicts between Fire, Health and Building Safety where they affect weather protection, including vapour and air leakage control, full coordination of all design work for the Building Envelope shall be included with this submission.
9. Due to potential conflicts between Fire Safety, Building Envelope protection and Energy Utilization, full coordination of design work for the Building Envelope shall be complete and Energy Checklist shall be included with this submission.
10. It must be fully understood that all regular Trades Permits shall be applied for in the normal manner.

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EXCAVATION OR FOUNDATION PHASE**  
NOTE: USAGE OF CHECK BOXES AND SYMBOLS ARE EXPLAINED ON PAGE 6.1.8-ii.

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## F ENERGY UTILIZATION REQUIREMENTS

A

**BUILDING DATA****6.3 CHECKLIST FOR VANCOUVER BUILDING BY-LAW**

A.1

Occupancies:

| Floor | Subsidiary Occupancies | Minor Occupancies | List Any Prohibited Occupancy Combination [3.1.3.2.(2) & (4)] | Separations Required (Table 3.1.3.A.) | Drawings | Remarks |
|-------|------------------------|-------------------|---------------------------------------------------------------|---------------------------------------|----------|---------|
| L1    | C                      | —                 |                                                               |                                       |          |         |
| L2    | C                      | —                 |                                                               |                                       |          |         |
| L3    | C                      | —                 |                                                               |                                       |          |         |
| L4    | C                      | —                 |                                                               |                                       |          |         |
| L5    | C                      | —                 |                                                               |                                       |          |         |
| L6    | C                      | —                 |                                                               |                                       |          |         |
| L7    | C                      | —                 |                                                               |                                       |          |         |
| P1    | F3                     | —                 |                                                               |                                       |          |         |
| P2    | F3                     | —                 |                                                               |                                       |          |         |

See 3.1.2.1.(1) to (3), 3.1.3.1.(1) to (5) & Table 3.1.2.A. for occupancy classification

Definition of major occupancy

Arena-type buildings/trade shows as Group A3

Artist live-in studio suite building

Police station with detention quarters as Group B2 if building height is not more than 1 storey, building area 600 m<sup>2</sup> or less

Special-needs residential facility as Group C

Small child daycare as one-family dwelling

Underground garage with 2 hr. fire separation to rest of building as separate building

Special structures fire protection

Application of lesser restrictions

By-law ReferenceRemarks

3.1.3.1.(6)

Group C and Group F, div. 3

3.1.2.1.(4)

3.1.3.2.(6)

3.1.2.1.(5)

3.1.2.1.(6)

3.1.2.1.(7)

3.2.1.2.(1)

3.2.2.1.(2)

3.2.2.2.

it applies

Note: Duplicate any applicable page if more space is required and number such pages 6.1.8-1(a), 6.1.8-1(b) [for example only]

# By-law Reference

# Remarks

## A.2 Building Height And Area:

A.2.1 Building Height = 7 storeys

Notes:

Establish grade on low side of site = elevation 116.9 Ft

Establish first storey

Stepping up a hillside exception

If a mezzanine, is it a storey for building height? Yes      No     

Roof top enclosure for elevator machinery not considered as storey

Space under seats not added to building height

A.2.2 Building Area = 1600 m<sup>2</sup>

Note: Areas divided by firewalls considered as separate buildings

## A.3 Building Classification:

A.3.1 Part 9 building? If so, redesign to Part 3. The C.P. Program cannot be used for Part 9 buildings. (Vancouver City Council Policy)

## By-law Reference

## Remarks

[Definition]

[Definition]

[Definition]

2.1.6.2.

3.2.1.1

3.2.1.1.(1)

3.2.1.1.(2)

[Definition]

2.1.6.1.

3.2.4.2.(1)

Height of uppermost floor level  
will be reduced to meet the 18m  
height above grade.  
(18 < 18m)

Level 1

NO

NA

NA

NA.

NA

## By-law Reference

## Remarks

A.3.2

## Highrise Building

Complete the following:

Height of building from grade to floor level of top storey = 18.4 m (will be reduced to 18 m)

This is a highrise building if:

- (i) Any occupancy over 18 m to floor of top storey See Note\* Yes No ✓  
 (ii) Group B for patients in bed above 3rd storey Yes No ✓  
 (iii) Group A Division 2 nonresidential school or college above 3rd storey Yes No ✓

Which highrise "Measure" is proposed? \_\_\_\_\_

## By-law Reference

## Remarks

3.2.6.1.

\* The building height is presently 18.4 m. The uppermost floor level will be reduced to meet the 18 m height above grade

3.2.6.1.(1)(a)

3.2.6.1.(1)(b)

3.2.6.1.(1)(c)

NA

A.3.3

Type of Construction - combustible noncombustible

A.3.4

Divided by Firewalls

Yes No

A.3.5

Identify Basements Parking Garage

Crawl spaces basements? \_\_\_\_\_

[Definition]

3.2.2.3.(1) &amp; (2)

A.3.6

Identify Details of Size and Occupancy Requirements

Occupancy 3.2.2.29 Group C, Any Height, Any Area  
3.2.2.53 Group F, Div. 3, Any Height, Any Area

If group C, 4-levels, wood frame, is uppermost storey 9 m or less above adjacent ground level?

Yes No

3.2.2.9. to 3.2.2.53.

3.2.2.27.(4)(b)

By-law Reference

Remarks

No. of streets faced 1

Is the building sprinklered?

Yes No

Code/By-law Reference  
(within 3.2.2.9 to 3.2.2.53)

3.2.2.29

If 3.2.2.27.(4), have Sentences 3.2.2.27.(5) & (6) also been complied with?

Yes No

NA

Construction type(s)

Concrete structure  
(noncombustible)

Access for disabled  
persons, to  
principal entrance?

[Ref. 3.7.2.5.(1)(a) & (b)]

Yes No

By-law Reference

Remarks

3.2.2.4.(1) to (5)

Cranberry

B

LAYOUT

B.1

Spatial Separation (3.2.3.1. to 3.2.3.9.)

Refer to Drawing DP4.01

North Building Face - using

☒ Table 3.2.3.A.  
☐ Table 3.2.3.B.

(sprinklered)

| Compartment | Occupancy Classification | Limiting Distance | Area Exposing Building face | L/H Ratio | % Opening Actual | % Opening Allowed | Cladding | Type of Construction | Fire Rating | Remarks          |
|-------------|--------------------------|-------------------|-----------------------------|-----------|------------------|-------------------|----------|----------------------|-------------|------------------|
| UNIT A1     | C                        | 33'               | 25 x 10.7'                  |           | 42%              | 100%              | —        | —                    | —           | Cranberry street |
| UNIT A2-A6  | C                        | 33'               | 25 x 9.7'                   |           | 59%              | 10.0%             | —        | —                    | —           | Cranberry street |
|             |                          |                   |                             |           |                  |                   |          |                      |             |                  |
|             |                          |                   |                             |           |                  |                   |          |                      |             |                  |
|             |                          |                   |                             |           |                  |                   |          |                      |             |                  |
|             |                          |                   |                             |           |                  |                   |          |                      |             |                  |
|             |                          |                   |                             |           |                  |                   |          |                      |             |                  |

{ All remaining units have sufficient limiting distance to permit 100% unprotected openings }

B

## LAYOUT

B.1 Spatial Separation (3.2.3.1. to 3.2.3.9.) Refer to Elevation Drawing "DP 4.02"

South Building Face - using

[ ☒ ] Table 3.2.3.A.  
[ ] Table 3.2.3.B.

| Compartment   | Occupancy Classification | Limiting Distance | Area Exposing Building face | L/H Ratio | % Opening Actual | % Opening Allowed | Cladding | Type of Construction | Fire Rating | Remarks |
|---------------|--------------------------|-------------------|-----------------------------|-----------|------------------|-------------------|----------|----------------------|-------------|---------|
| L1("F")       | C                        | 8.5'              | 48x10.7'                    |           | 41%              | 30%               | NC       | -                    | 1h          | 3/4h    |
| L1("EDCBA")   | C                        | 8.5'              | 22x10.7'                    |           | 50%              | 43.7%             | NC       | -                    | 1h          | 3/4h    |
| L2("F")       | C                        | 8.5'              | 48x9.7'                     |           | 48%              | 31.3%             | NC       | -                    | 1h          | 3/4h    |
| L2("EDCBA")   | C                        | 8.5'              | 22x9.7'                     |           | 52%              | 46%               | NC       | -                    | 1h          | 3/4h    |
| L3-6("F")     | C                        | 8.5'              | 48x9.7'                     |           | 45%              | 31.3%             | NC       | -                    | 1h          | 3/4h    |
| L3-6("EDCBA") | C                        | 8.5'              | 22x9.7'                     |           | 52%              | 46%               | NC       | -                    | 1h          | 3/4h    |
| L7(PH)        | C                        | 19.5'             | 41x12.1'                    |           | 23%              | 100%              | -        | -                    | -           | -       |

Area of UPO to be addressed on an equivalency basis

B

**LAYOUT**

B.1

**Spatial Separation** (3.2.3.1. to 3.2.3.9.)

Refer to elevation Drawing "DP4.09"

East Building Face - using

☒ Table 3.2.3.A.  
☐ Table 3.2.3.B.

| Compartment | Occupancy Classification | Limiting Distance | Area Exposing Building face | L/H Ratio | % Opening Actual | % Opening Allowed | Cladding | Type of Construction | Fire Rating | Remarks |
|-------------|--------------------------|-------------------|-----------------------------|-----------|------------------|-------------------|----------|----------------------|-------------|---------|
| L1          | C                        | 33'               | 77.7' x 10.7'               |           | <100%            | 100%              | —        | —                    | —           |         |
| L2-         | C                        | 33'               | 76 x 9.7'                   |           | <100%            | 100%              | —        | —                    | —           |         |
| L3-6        | C                        | 33                | 74.3 x 9.7'                 |           |                  | 100%              | —        | —                    | —           |         |
| L7          | C                        | 33                | 55.7 x 12.1'                |           | <100%            | 100%              | —        | —                    | —           |         |
|             |                          |                   |                             |           |                  |                   |          |                      |             |         |
|             |                          |                   |                             |           |                  |                   |          |                      |             |         |

B

## LAYOUT

B.1

## Spatial Separation (3.2.3.1. to 3.2.3.9.)

Refer to elevation drawing  
"DP 4.03"

West Building Face - using

☐ Table 3.2.3.A.  
☐ Table 3.2.3.B.
"CURRENT"  
VBBL"New"  
VBBL

| Compartment | Occupancy Classification | Limiting Distance | Area Exposing Building face | L/H Ratio | % Opening Actual | % Opening Allowed | Cladding | Type of Construction | Fire Rating | Remarks |
|-------------|--------------------------|-------------------|-----------------------------|-----------|------------------|-------------------|----------|----------------------|-------------|---------|
| L1-"G"      | C                        | 9'                | 32x10.7                     |           | 49%              | 38%               | NC       | —                    | 1h          | 3/4 h   |
| L1-"H,F"    | C                        | 9'                | 20x10.7                     |           | 45%              | 49%               | NC       | —                    | 1h          | 3/4 h   |
| L2-"G"      | C                        | 9'                | 32x9.7'                     |           | 67%              | 40%               | NC       | —                    | 1h          | 3/4 h   |
| L2-"H,F"    | C                        | 9'                | 20x9.7'                     |           | 59%              | 53.4%             | NC       | —                    | 1h          | 3/4 h   |
| L7-PH       | C                        | 9'                | 28x12.1'                    |           | 27%              | 38%               | NC       | —                    | 1h          | 3/4 h   |

Area of UPO to be addressed  
on an equivalency basis

Exposing building face = total projected area from ground to ceiling or as divided by separation as follows:

- (a) Groups A, B, C, D, F3, greater of 3/4 hr or as floor assembly  
 (b) Groups E, F1, F2, 2 hr.

% opening allowed in Tables 3.2.3.A. & B.; double % opening allowed if sprinklered, or

Double % opening allowed if opening glazed with wired glass in steel frames

Quadruple % opening allowed in residential occupancy if both sprinklered & safety glass, and limiting distance exceeds 2 m

Unlimited openings if foregoing exceeds 3 m

Actual % opening to be increased if temperature higher than standard fire test

3.2.3.2.(1)

1h floor assembly

3.2.3.8.(1)

double % opening

3.2.3.8.(2)

NA

3.2.3.8.(3)

NA

NA

3.2.3.9.

NA

#### B.1.1 Unlimited Unprotected Openings Permitted In

- [X] [ ] (i) Storage garage with limiting distance 3 m or greater

Yes\_\_No\_\_

3.2.3.6.(1)

parkade underground

- [A] [X] (ii) 1st storey of building facing a street and limiting distance 9 m or greater

Yes\_\_No\_\_

3.2.3.6.(2)

East Face

- [X] [ ] (iii) Residential occupancies with limiting distance of 3 m and all openings safety glass

Yes\_\_No\_\_

3.2.3.8.(3)

## By-law Reference

## Remarks

B.2

## Fire Fighting Provisions

|     |        |                                                                 |                      |                              |
|-----|--------|-----------------------------------------------------------------|----------------------|------------------------------|
|     | [A][X] | Exterior access to storeys above grade                          | 3.2.5.1.(1) to (3)   |                              |
|     | [X][ ] | Access through bedroom windows for unsprinklered buildings only | 9.7.1.3              |                              |
|     | [X][ ] | Fire fighting access below grade                                | 3.6.2.1              |                              |
|     | [A][X] | Exception for sprinklered building                              | 3.2.5.1.(4)          | sprinklered                  |
|     | [A][ ] | Access through locked doors                                     | 3.2.5.1.(5)          |                              |
|     | [A][X] | Access for fire department vehicles                             | 3.2.5.1.(6)          | location of lock box to be   |
|     | [A][X] | Access from vehicles to buildings                               | 3.2.5.2.(1)(2)(3)(6) |                              |
|     | [A][X] | Access within building                                          | 3.2.5.2.(3)(4)(5)(8) |                              |
|     |        |                                                                 | 3.2.5.2.(7)          |                              |
|     |        |                                                                 | 3.3.4.9.             |                              |
| M   | [A][ ] | Water supply for fire fighting                                  | 3.2.5.3.             | See M-1                      |
| M   | [A][ ] | Standpipes and hose system in buildings                         | 3.2.5.4.             | to be provided in exits      |
| M   | [A][ ] | Maximum reach for standpipe hose                                | NFPA 14, Article 3-2 |                              |
| M   | [A][X] | Location of Fire Department connections                         | 3.2.5.4.(15)         | near main entrance (See M-1) |
|     |        |                                                                 | 3.2.5.5.(4)          |                              |
| M,E | [A][ ] | Electrical supervision of valves                                | 3.2.5.4.(16)         |                              |
| M   | [X][ ] | Standpipes in 4-level residential buildings                     | 3.2.5.4.(17)         |                              |
|     | [X][ ] | Protection of horizontal standpipe runs                         | 3.2.5.4.(6)          |                              |
|     | [A][ ] | Portable extinguishers                                          | 3.2.5.6.             | to be provided               |
| M,E | [A][ ] | Protection from freezing                                        | 3.2.5.7.             | dry pipe system              |
| M   | [X][ ] | Standpipe provisions in storage garages                         | 3.3.7.6.(7)          |                              |

## B.4

## Egress Within Floor Areas

## B.4.1

## General

[A][X]

Calculate occupant load for each  
fire compartment/floor

TOTAL = 329 persons

3.1.14.1(1) to (4)

See page 12-A

Table 3.1.14.A.

[X][ ]

Access to exit from roof or terraces

3.3.1.2(1)

[A][ ]

Access to exit design requirements

3.3.1.2(2)

[A][ ]

Egress from suites in 2 directions

3.3.1.3(1) &amp; (2)

Dead end corridors to be  
resolved

[A][X]

Number of egress doors required

3.3.1.4(5) to (7)

Table 3.3.1.A.

<150m<sup>2</sup> <15m T.D

[A][X]

Travel distance within suite

3.3.1.4(2)

[X][ ]

Egress from roofs or terraces

3.3.1.4(3) &amp; (4)

[A][ ]

Headroom in access to exit

3.3.1.6(1)

[A][ ]

Reduction in width in access to exit

3.3.1.6(2)

[A][X]

Width of public corridors

3.3.1.7.

Minimum 1100mm

[A][X]

Egress doors to corridors

3.3.1.8.

providing access to exit, and to

3.3.1.9.

public corridors and glass therein

3.3.1.13(1) to (4)

[A][ ]

Design of ramps, passageways

3.3.1.10(1) &amp; (2)

[A][ ]

Design of stairways

3.3.1.10(1)

[A][ ]

Design of stairs

3.3.1.11

[A][X]

Capacity of access to exits

3.3.1.11.

See page 12A

[A][ ]

Flame-spread rating in corridors

3.1.1.15.

[X][ ]

Egress from small mezzanines

3.4.2.1(3)

[A][X]

Travel distance from suite doors

3.4.2.3(2) &amp; (3)

max 45m

[X][ ]

Panic hardware for Group A

3.3.2.6.

## **Lot 2:**

### **OCCUPANT LOAD & EXIT CAPACITY**

The anticipated occupant loads for this building are based on the following:

|                |   |                             |
|----------------|---|-----------------------------|
| Storage Garage | - | 46.0 m <sup>2</sup> /person |
| Residential    | - | 2 persons/bedroom           |

The following occupant loads are established:

#### **Residential Portion**

|         |   |            |
|---------|---|------------|
| Level 1 | - | 32 Persons |
| Level 2 | - | 34 Persons |
| Level 3 | - | 34 Persons |
| Level 4 | - | 34 Persons |
| Level 5 | - | 34 Persons |
| Level 6 | - | 34 Persons |
| Level 7 | - | 32 Persons |

#### **Garage Levels**

|    |                      |   |            |
|----|----------------------|---|------------|
| P1 | 2,208 m <sup>2</sup> | - | 48 Persons |
| P2 | 2,172 m <sup>2</sup> | - | 47 Persons |

**TOTAL OCCUPANT LOAD - 329 PERSONS**

#### **Exiting Summary**

| <b>Floor Level</b> | <b>Exit Width Units</b> | <b>Exit Capacity<br/>(Persons)</b> | <b>Anticipated Occupant Load<br/>(Persons)</b> |
|--------------------|-------------------------|------------------------------------|------------------------------------------------|
| Level 1            | 4.5                     | 135 <sup>(1)</sup>                 | 32                                             |
| Levels 2,3,4,5 & 6 | 3.0                     | 90 <sup>(1)</sup>                  | 34                                             |
| Level 7            | 3.0                     | 90 <sup>(1)</sup>                  | 32                                             |
| P1                 | 3.0                     | 90 <sup>(2)</sup>                  | 48                                             |
| P2                 | 3.0                     | 90 <sup>(2)</sup>                  | 47                                             |

(1) Based on 30 persons/unit width

(2) Based on 60 persons/unit width

|       |                                                                                       |                                              | By-law Reference     | Remarks |
|-------|---------------------------------------------------------------------------------------|----------------------------------------------|----------------------|---------|
| B.6   | <u>Service Spaces (Continued)</u>                                                     |                                              |                      |         |
| M.E   | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Ceiling spaces used as plenums               | 3.5.4.3.             |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Access to roof over 3 storeys                | 3.5.4.4.(1)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Access to attic over 600 mm high             | 3.5.4.4.(2)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Access to horizontal service spaces          | 3.5.4.4.(3)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Access to crawl space                        | 3.5.4.4.(4)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Ventilation of crawl and attic spaces        | 3.5.4.5.             |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Elevating devices to meet CAN 3-B44 standard | 3.5.5.1.             |         |
| B.7   | <u>Interconnected Floor Spaces</u>                                                    |                                              |                      |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Mezzanine without fire separations           | 3.2.8.1.(4)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Openings in floor for vehicular ramps        | 3.2.8.1.(5)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Openings in floor for manufacturing          | 3.2.8.1.(6)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Openings in floor for escalators             | 3.2.8.1.(7)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Openings in floor at first storey only       | 3.2.8.1.(8)          |         |
|       | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>            | Interconnected floor space                   | 3.2.8.2. to 3.2.8.9. |         |
| B.8   | <u>Building Requirements For Persons With Disabilities</u>                            |                                              |                      |         |
| B.8.1 | <u>General</u>                                                                        |                                              |                      |         |
|       | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Scope                                        | Section 3.7          |         |
|       | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Definitions                                  | 3.7.1.1 & 2          |         |
|       | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Professional design and field review         | 3.7.1.3              |         |
|       |                                                                                       |                                              | 3.7.1.4.             |         |

## By-law Reference

## Remarks

## B.8.2 Application

- ☒ ☐ Are disabled provisions required ☒ Yes ☐ No  
☒ ☐ Access to all storeys  
☒ ☐ Exemptions to certain buildings  
☒ ☐ Access to small shops  
☒ ☐ Existing buildings  
☒ ☐ Stairs and handrails  
☒ ☐ Passenger elevators

3.7.2.1.(1)

3.7.2.1.(1)

3.7.2.1.(2)

3.7.2.1.(2)(d)

3.7.2.1.(3)

3.7.2.2.

3.7.2.3.

## B.8.3 General Requirements

- ☒ ☐ Entrances from street  
☒ ☐ Entrances from parking  
☒ ☐ Work areas  
☒ ☐ Washrooms  
☒ ☐ Areas of refuge

3.7.2.5.(1)(a)

3.7.2.5.(1)(b)

3.7.2.5.(1)(c)

3.7.2.5.(1)(d)

3.7.2.5.(1)(e)

## B.8.4 Specific Requirements for Group A, Division 1

- ☐ Applicable  
☐ Not Applicable

- ☐ ☐ All Group A1 occupancies  
☐ ☐ Motion picture theatres

3.7.2.6.(1)

3.7.2.6.(2)

File: BS 412689 jc July 7/99



**PROJECT DIRECTORY  
(CONSULTING TEAM)**

An Alternate Program for the Building Permit Process

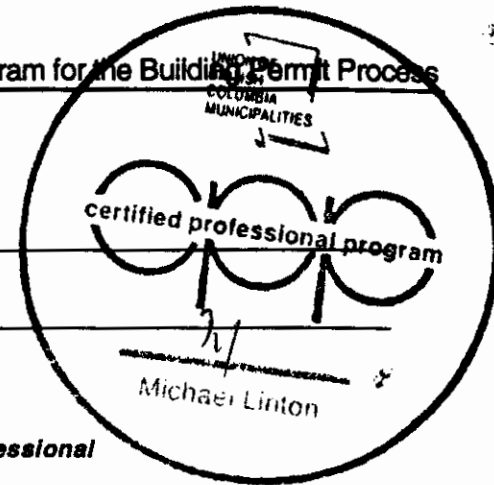
Note: This form must be submitted before issuance of a *building* permit.

Re: 2655 CRANBERRY DRIVE

Address of Project (Print)

LOT 2, BLOCK 364, D.L. 526, LMP 37612

Legal Description of Project (Print)



↓ - Please indicate who is the **Coordinating Registered Professional**

☐ **Certified Professional** Name CFT Engineering Inc.  
Address #203 - 1104 Hornby Street  
Vancouver, B.C. V6Z 1V8  
Telephone 684-2384 FAX 684-2402

☒ **Architect** Firm Name Nigel Baldwin Architects Ltd.  
Project Architect Nigel Baldwin  
Address 1447 Hornby Street  
Vancouver, B.C. V6Z 1W8  
Telephone 488-8840 FAX 488-8850

☐ **Structural Engineer** Firm Name Weiler Smith Bowers  
Project Engineer Greg I Smith, P.Eng.  
Address #118 - 3855 Henning Drive  
Burnaby, B.C. V5C 6N3  
Telephone 294-3753 FAX 294-3754

☐ **Mechanical Engineer** Firm Name MCW Consultants Ltd.  
Engineer  
Project Architect Steve Bruskiewich  
Address #200 - 740 Nicola Street  
Vancouver, B.C. V6G 2C1  
Telephone 687-1821 FAX 683-5681

**Plumbing Engineer**Firm Name same as mechanical engineerProject Architect Engineer

Address \_\_\_\_\_

Telephone \_\_\_\_\_ FAX \_\_\_\_\_

**Fire Protection Engineer**Firm Name same as mechanical engineerProject Architect Engineer

Address \_\_\_\_\_

Telephone \_\_\_\_\_ FAX \_\_\_\_\_

**Electrical Engineer**Firm Name Arnold Nemetz & Associates Ltd.Project Architect Steven Nemetz, P.Eng.Address 2083 West 4th AvenueVancouver, B.C. V6J 1N3Telephone 736-6562 FAX 736-9805**Geotechnical Engineer**Firm Name Geopacific Consultants Ltd.Project Architect Ed HarringtonAddress #102 - 6968 Russell AvenueBurnaby, B.C. V5J 4R9Telephone 439-0922 FAX 439-9198

(Affix Certified Professional's Stamp here)

**SEAL VERIFIED**

s.15(1), s.22(1)

Certified Professional's Stamp

Date

June 22/99



# CERTIFICATION OF DESIGN COMPLIANCE

An Alternate Program for the Building Permit Process

The City Building Inspector  
City of Vancouver  
453 West 12th Avenue  
Vancouver, B.C.  
V5Y 1V4

99-03-10  
DATE (YY MM DD)

Dear Sir:

RE:

2111 WEST 4<sup>th</sup> AVENUE

Print Address

Building Permit Application No.

BU411754



This is to advise that I am the Certified Professional authorized by the Owner to provide "code coordination" of the design and "field reviews" required with respect to the above referenced project. I have obtained letters of Confirmation of Professional Design Assurance and Commitment of Field Review from others, as required, for the issuance of the Building Permit such as Assurance of Architectural Design, Structural Design, Mechanical Design, Plumbing and Fire Suppression System Design, Electrical Design, and Geotechnical Design and others as required by the City Building Inspector.

I hereby certify that I have provided "code coordination" of the design and will provide "code coordination" for the review of all shop drawings through the applicable Registered Professionals and their "field reviews", as defined herein, of the following aspects of the project as shown on the plans and supporting documents prepared by the Registered Professionals, including also compliance with the requirements of Section 2.3 of the Vancouver Building By-law for sufficient information concerning the following areas:

[CROSS OUT AND INITIAL NON-APPLICABLE ITEMS]

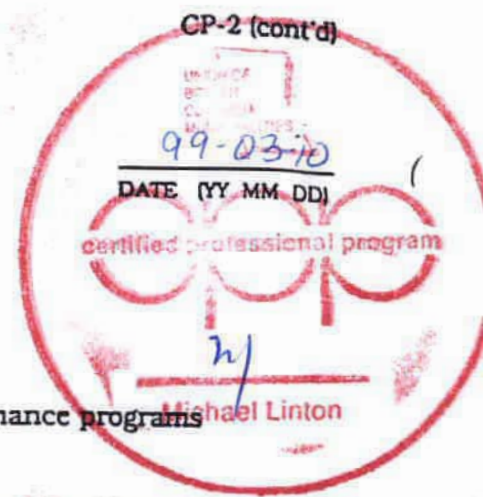
## ARCHITECTURAL

- 1.1 Fire resisting assemblies
- 1.2 Fire separations and their continuity
- 1.3 Closures, including tightness and operation
- 1.4 Interior and exterior Finishes
- 1.5 Egress systems, including "Access to Exit", within "suites" and "floor areas"
- 1.6 Physical safety features (guardrails, handrails, etc.)
- 1.7 Structural capacity of architectural components, including anchorage and seismic restraint
- 1.8 Roofing and flashings
- 1.9 Wall cladding systems
- 1.10 Dampproofing and/or waterproofing of walls and slabs below grade
- 1.11 Thermal insulation systems, including condensation control and cavity ventilation
- 1.12 Sound insulation systems

CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

RE:

2111 WEST 4<sup>th</sup> AVENUE  
Print Address  
Building Permit Application No. BU411754



- 1.13 Landscaping, screening and site grading
- 1.14 Requirements for fire fighting access
- 1.15 Requirements for persons with disabilities
- 1.16 Elevating devices
- 1.17 Coordination of testing of fire emergency systems and maintenance programs
- 1.18 Development Permit and conditions therein
- 1.19 Exterior glazing
- 1.20 Interior signage, including acceptable materials, dimensions and locations
- 1.21 Review of all applicable shop drawings

STRUCTURAL

- 2.1 Structural capacity of structural components, including anchorage and seismic restraint
- 2.2 Structural aspects of deep foundations
- 2.3 Review of all applicable shop drawings

MECHANICAL

- 3.1 HVAC systems and devices, including high-rise requirements where applicable
- 3.2 Fire dampers at required fire separations
- 3.3 Continuity of fire separations at HVAC penetrations
- 3.4 Functional testing of mechanically related fire emergency systems and devices
- 3.5 Maintenance manuals for mechanical systems
- 3.6 Structural capacity of mechanical components, including anchorage and seismic restraint
- 3.7 Review of all applicable shop drawings

PLUMBING

- 4.1 Roof drainage systems
- 4.2 Site and foundation drainage systems
- 4.3 Plumbing systems and devices
- 4.4 Continuity of fire separations at plumbing penetrations
- 4.5 Functional testing of plumbing related fire emergency systems and devices
- 4.6 Maintenance manuals for plumbing systems
- 4.7 Structural capacity of plumbing components, including anchorage and seismic restraint
- 4.8 Review of all applicable shop drawings

FIRE SUPPRESSION SYSTEMS

- 5.1 Suppression system classification for type of occupancy
- 5.2 Design coverage, including concealed or special areas
- 5.3 Compatibility and location of electrical supervision, ancillary alarm and control devices
- 5.4 Evaluation of the capacity of City water supply versus system demands and domestic demand, including pumping devices where necessary
- 5.5 Qualification of welder, quality of welds and materials

## CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

RE:

2111 WEST 4<sup>th</sup> AVENUE  
 Print Address  
 Building Permit Application No. BU411754

99-03-10  
 DATE (YY MM DD)

- 5.6 Review of all applicable shop drawings
- 5.7 Acceptance testing for: "Contractor's Material and Test Certificate" as per NFPA standards
- 5.8 Maintenance program and manual for suppression systems
- 5.9 Structural capacity of sprinkler components, including anchorage and seismic restraint
- 5.10 For partial systems - confirm sprinklers are installed in all areas where required
- 5.11 Fire Department connections and hydrant locations
- 5.12 Fire hose standpipes
- 5.13 Functional testing of fire suppression system and devices

## ELECTRICAL

- 6.1 Electrical systems and devices, including high-rise systems where applicable
- 6.2 Continuity of fire separations at electrical penetrations
- 6.3 Functional testing of electrical related fire emergency systems and devices
- 6.4 Electrical systems and devices maintenance manuals.
- 6.5 Structural capacity of electrical components, including anchorage and seismic restraint
- 6.6 Clearances from buildings of all electrical utility equipment
- 6.7 Fire protection of wiring for emergency systems
- 6.8 Review of all applicable shop drawings

## GEOTECHNICAL - Temporary

- 7.1 Excavation
- 7.2 Shoring
- 7.3 Underpinning
- 7.4 Temporary construction dewatering

## GEOTECHNICAL - Permanent

- 8.1 Bearing capacity of the soil
- ~~8.2 Geotechnical aspects of deep foundations~~
- 8.3 Compaction of engineered fill
- 8.4 Backfill
- 8.5 Permanent underpinning
- ~~8.6 Permanent dewatering~~
- 8.7 Structural considerations relating to local soil conditions including slope stability and seismic effects



As used herein, "code coordination" shall mean the activities necessary to ascertain that the Registered Professionals of record for the various components of the project

- have reasonably interpreted the applicable code requirements governing the design of such components.
- have incorporated such applicable code requirements in their designs.
- have interfaced the design of such code requirements so that they are compatible with the code requirements of other disciplines.
- have fulfilled the applicable code requirements as outlined in the CP checklist submitted for permit, and
- shall provide "field reviews" of code related aspects.

Further to the above, all Tenant Improvement designs shall be monitored and officially indicated by the Certified Professional on the CP-4 letter to determine substantial compatibility with the original concepts, where application for Building Permits for such improvements is made prior to the date when the final Occupancy Permit is issued for the base building.

## CERTIFICATION OF DESIGN COMPLIANCE (cont'd.)

RE:

2111 WEST 4<sup>th</sup> AVENUE  
 Print Address  
 Building Permit Application No. BU411754

99-03-10  
 DATE (YY MM DD)

As used herein, "field reviews" shall mean such reviews of the work at the project site and at fabrication locations, where applicable, as the Registered Professionals in their professional discretion consider to be necessary in order to ascertain that the work substantially conforms in all material respects to the plans and supporting documents prepared by the Registered Professionals and accepted by the City of Vancouver for the project. This includes keeping a record of all site visits and any corrective action taken as a result thereof.

The undersigned also undertakes to notify the City Building Inspector in writing as soon as practical if his contract for code coordination of field review is terminated at any time during construction.

MICHAEL LINTON, P.ENG., C.P.  
 Print Name s.15(1), s.22(1)  
 Signature [Redacted] Initials Sample 71/  
 203-1109 HORNBY ST.  
 Print Address  
 VANCOUVER BC V6Z 1V8  
 Print City Postal Code  
 Telephone (604) 684-2389

If the Certified Professional is a member of a firm, complete the following:

I am a member of the firm

CFT ENGINEERING INC.  
 Print Name of Firm  
 203-1109 HORNBY ST.  
 Print Address  
 VANCOUVER BC V6Z 1V8  
 Print City Postal Code

and I sign this letter on behalf of myself and the firm.

Note: The above letter must be signed by a Certified Professional who is registered as an Architect in good standing in the Architectural Institute of British Columbia or a Professional Engineer in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.

