



CCI GROUP

SCIENCE • ENGINEERING • SOLUTIONS

1003 BRUNETTE AVE. COQUITLAM BC V3K 6Z5

REVIEW OF LANDSCAPE RETAINING WALL



at

1190 Falcon Drive, Coquitlam

Prepared for

First Service Residential

CCIG Project No: V1610407CA

CCIG Contact: Kathleen Narbonne

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March 28th, 2016

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V1610407CA
March 28th, 2016

Strata Plan NW2548
c/o First Service Residential
Suite 700 - 200 Granville Street
Vancouver, BC V6C 1S4
gerry.mcrobert@fsresidential.com

Attention: Mr. Gerry McRobert,

**Re: Strata Plan NW2548 – Falcon Terrace
1190 Falcon Drive, Coquitlam**

INTRODUCTIONS

CCI Group Inc. (CCIG) conducted a general review of the existing landscape retaining wall at the Falcon Terrace Townhouses complex. The complex is located at 1190 Falcon Drive, Coquitlam, BC. Our scope of work was to assess, evaluate and comment on the present condition of the wall, and provide necessary solutions for remedial action. The investigation consisted of visual observations, with no destructive testing. Colour photographs were taken and are annotated in this report for your reference.

OBSERVATIONS

The site is located in Coquitlam, on the west side of Falcon Drive. The topography of the site naturally slopes down from west to east. A system of retaining walls is used to hold the earth as the grade slopes downward. The walls are constructed of 6"x6" pressure-treated lumber stacked horizontally, with tiebacks (deadmen) secured at every other row of lumber. Only the retaining wall along the west side of the complex was documented. This retaining wall shows signs of excessive weathering due to exposure to the elements (rain, sun, wind, frost).

West Retaining Wall

During our site visit it was observed that some deficiencies in the west retaining wall consist of significant structural movement, decay, high moisture content, deterioration and openings in the walls. The conditions observed and our comments are depicted below.

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Photograph No. 1

Typical view of the west wood retaining wall.



Photograph No. 2

Decay and wetness of the exposed tiebacks was observed.



Photograph No. 3

Landscape ground cover grown over the top lumber of the retaining wall causing weather damage and wetness of the lumber.

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Photograph No. 4

Decay due to weather damage of the lumber was noted throughout the retaining wall.



Photograph No. 5

Some areas of the retaining wall were not accessible/ visible due to overgrown foliage.



Photograph No. 6

Structural movement and rot/moisture was found at the retaining wall southwest connection to adjacent property.

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Photograph No. 7

Algae growth was found throughout the west retaining wall.



Photograph No. 8

Evidence of significant deteriorated lumber on the west retaining wall especially the mid-section adjacent to unit 44, was observed.



Photograph No. 9

A section of the retaining wall, adjacent to units 40/41, was completely deteriorated and sections of lumber were missing.

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Photograph No. 10

Structural issues were observed, particularly at the mid-section of the wall where deterioration/decay of the tieback lumber is currently supporting the wall.



Photograph No. 11

Evidence of recent repair work appears to have been completed.



Photograph No. 12

Due to the weight and deterioration of the lumber some tiebacks have collapsed and were protruding from the face of the retaining wall.

COMMENTS

The west wood retaining wall reviewed shows major signs of rot, decay and deterioration posing a structural issue at some areas documented.

The area of Coquitlam receives approximately 1200 mm of precipitation annually. With the amount of rainfall, the lumber retaining walls are in constant contact with the moist soil and oxygen, which provides favourable conditions for mould growth and decay. Since the ground is constantly moist, the heavy, saturated soil can push against the retaining wall and cause it to bow outwards. Wood with a moisture content of 20% or more provides enough water for decay to occur. Therefore it is imperative that action be taken to eliminate contact with the ground soil, and ensure proper drainage.

Removal and upkeep of landscaping would discourage roots from overgrowing and reduce the amount of force applied to the retaining wall.

RECOMMENDATIONS

In order to preserve the life of the retaining walls and prevent total decay and structural failure, it is recommended that the areas of the west retaining wall which have experienced structural movement and excessive rot and moisture content be corrected.

Option 1: Minimum Recommended Emergency Repairs

Localized repair of the retaining wall. The following actions are recommended:

- 1) Replace sections of the retaining wall that have experienced severe rot/decay. Prior to installation of new lumber, treat wood with wood preservative to prolong the life of the retaining wall.
- 2) Reinforce parts of the retaining wall that have experienced structural movement by anchoring lumber with screws or bolts, where possible. Where the structural integrity of the retaining wall is severely compromised, replacement is recommended.
- 3) Investigate weeping tiles and weep holes to ensure they are functioning as required.

Option 2: Recommended Repairs for Complete Replacement

Replacement of the west retaining wall. The following actions are recommended:

- 1) Replace the west retaining wall. Replacement of the wall will include:
 - a. Remove soil and gravel, and cover ground with tarpaulin.
 - b. Check weeping tiles to ensure proper drainage, and replace if damaged.

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- c. Support wall sections of lumber. Remove damaged support post. Install helical, metal pile foundations at the locations of the new support posts. Install new support posts on metal piles.
 - d. Remove damaged lumber wall sections. Replace with new pressure-treated and preserved 6" x 6" lumber sections and anchor with washers and bolts.
 - e. Replace gravel in the trench. Ensure there is 6"-8" of gravel, filled to 2" below surface.
 - f. Replace the soil and compact every foot.
- 2) Reinforce parts of the retaining wall that have experienced severe structural movement by anchoring lumber with screws or bolts.
 - 3) Replace sections of the retaining wall that have experienced severe rot/decay damages.

COST ESTIMATES

Option 1 - Emergency localized repairs of west retaining wall, reinforcement of remaining retaining walls, and further investigation. The estimated repair cost is:

Construction Costs: **\$35,000 + GST**

Engineering Costs: included

Landscaping Costs: additional

Option 2 - Total replacement of west retaining wall. The estimated repair cost is:

Construction Costs: **\$110,000.00 + GST**

Engineering Costs: included

Landscaping Costs: additional

LIMITS OF LIABILITY

The costs provided in this report are estimations only and are subject to confirmation and adjustment when tenders from suitably qualified contractors are obtained.

The information presented in this report is based on direct visual observation made by personnel with CCI Group Inc. (CCIG) and in some instances as noted within the report on information provided by others. Recommendations contained within our report reflect our informed opinion based on the information gathered during our investigation. The findings cannot be extended to components of the building or portions of the site that were not reviewed or that were concealed or unavailable for direct observation at the time of our visit. There is a possibility for additional deficiencies being present in the building which have not been identified during our visit, given the limited nature of this review.

No legal survey, soil test, detailed structural engineering investigation, or quantity survey compilation have been made. No responsibility, therefore, is assumed concerning these matters, or for any failure to carry out those technical or engineering procedures required to discover any inherent or hidden condition of this property since such investigation work was not included in the terms of reference governing this study.

The conclusions and recommendations detailed in this report are based upon the information available at the time of preparation of the report. No investigative method eliminates the possibility of obtaining imprecise or incomplete information. Professional judgement was exercised in gathering and analyzing the information obtained and in the formulation of our conclusions and recommendations. The recommendations are not intended to be utilized as a detailed specification for any remedial work that may be required. CCIG accepts no responsibility for interpretation of our recommendations, or actions taken based on them without our consultation and supervision.

Information provided by CCIG is intended for the exclusive use of **First Service Residential**. CCIG will not provide results or information to any party other than the client, unless the client, in writing, requests that information be provided to a third party or unless disclosure by CCIG is required by law. Any use by a third party, of reports or documents authored by CCIG, or any reliance by a third party, or decisions made by a third party, on the findings described in reports or documents authored by CCIG, is the sole responsibility of such third parties. CCIG accepts no responsibility for damages suffered by any third party as a result of decisions made or work carried out based on reports or documents authored by CCIG.

CCIG makes no representations concerning the legal and medical significance of our findings. With respect to regulatory compliance requirements, regulations change from time to time, and interpretation of their meaning and intent may also change. CCIG accepts no responsibility for

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any legal interpretation of the Regulations, or the consequent financial effect on transactions, property values, or requirements for follow-up actions and costs.

The liability of CCIG or its staff is limited to the fees paid or actual damages incurred by the client, whichever is less. CCIG is not responsible for consequential or indirect damages. All claims by the client shall be deemed relinquished if not made within two years after last date of services provided.

The client expressly agrees that it has entered into this agreement with CCI Group Inc., both on its own behalf and as agent on behalf of its employees and principals.

The client expressly agrees that CCIG's employees and principals shall have no personal liability to the client in respect of a claim, whether in contract, or tort, or in any other cause of action in law. Accordingly, the client expressly agrees that it will bring no proceedings and will take no action in any court of law against any of CCIG's employees or principals.

We trust that the foregoing information is sufficient for your present needs and will be pleased to review the contents of this report in greater detail should you so require.

CCI GROUP INC.



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