



This is the 1<sup>st</sup> Affidavit of Paul Good  
in this case and was made on February 5, 2025

NO. S-246230  
VANCOUVER REGISTRY

**IN THE SUPREME COURT OF BRITISH COLUMBIA**

BETWEEN:

INTRACORP VANNESS LIMITED PARTNERSHIP

PLAINTIFF

AND:

THE OWNERS, STRATA PLAN LMS992 AND CROWE MACKAY &  
COMPANY LTD., AS LIQUIDATOR OF THE OWNERS, STRATA PLAN LMS992

DEFENDANTS

AND:

INTRACORP VANNESS LIMITED PARTNERSHIP

DEFENDANT BY WAY OF COUNTERCLAIM

**AFFIDAVIT**

I, Paul Good, Professional Engineer, care of 1600 – 925 West Georgia Street, in the City of Vancouver, in the Province of British Columbia, SWEAR THAT:

1. I am a senior project engineer employed by RDH Building Science Inc. (“RDH”) and as such have personal knowledge of the facts and matters hereinafter deposed to, save and except where the same are stated to be made upon information and belief, and, as to such facts, I verily believe the same to be true.

2. Beginning in 2020, RDH was engaged on various occasions by the strata council of The Owners, Strata Plan LMS992 ("**Joyce Place**"), and later Crowe Mackay & Company Ltd. as the liquidator of Joyce Place, (the "**Liquidator**") to provide enclosure and structural condition assessments of an eight-unit townhouse building located at Joyce Place (the "**Townhomes**").
3. As I understand it, the owners of Joyce Place entered into a contract for the purchase and sale of Joyce Place with the plaintiff dated January 7, 2021 (the "**Closing Date**").
4. At various times between June of 2020 and December of 2024, I performed visual inspections and structural assessments of the Townhouses in my capacity as a professional engineer with RDH.
5. I first visited Joyce Place on June 17, 2020, and observed significant structural deterioration caused by active water ingress and recommended to the Joyce Place strata council that they install temporary shoring units to reduce safety risks posed by the condition of the Townhomes.
6. Over the next five years, I visited Joyce Place on several other occasions to investigate the extent of the water damage and ensure the temporary shoring units were properly installed and maintained. Between June 17, 2020 and January 17, 2025, I prepared and reviewed eight investigation reports regarding the condition of the Townhomes.
7. Attached hereto and marked as **Exhibit "A"** to this affidavit is a true copy of a targeted structural assessment I prepared and issued following a site visit on June 17, 2020 to assess the structural deterioration of the Townhomes, dated June 25, 2020.
8. Attached hereto and marked as **Exhibit "B"** to this affidavit is a true copy of structural drawings I prepared and issued for the installation of temporary shoring requirements in the Townhomes, dated April 22, 2021.
9. Attached hereto and marked as **Exhibit "C"** to this affidavit is a true copy of a design report prepared by Trevor Vilac, an intern architect employed by RDH, and reviewed by me to address building enclosure failures at Joyce Place, dated April 30, 2021.

10. Attached hereto and marked as **Exhibit “D”** to this affidavit is a true copy of a final shoring report I prepared and issued, dated July 14, 2021.

11. Attached hereto and marked as **Exhibit “E”** to this affidavit is a true copy of a temporary shoring review prepared by Matthew Cheong, a structural engineer employed by RDH, and reviewed by me following a site visit to Joyce Place on November 25, 2022, dated December 2, 2022.

12. Attached hereto and marked as **Exhibit “F”** to this affidavit is a true copy of a review of the third-floor decks of the Townhomes prepared by Daniel Song, a building science engineer employed by RDH, and reviewed by me following a site visit on May 19, 2023, dated May 26, 2023.

13. Attached hereto and marked as **Exhibit “G”** to this affidavit is a true copy of a site visit report prepared by Daniel Song and reviewed by me following site visits on June 14, 2023, August 25, 2023, and August 28, 2023, dated September 28, 2023.

14. In late 2024, I was engaged by the Liquidator to conduct a visual inspection of the Townhouses and provide an opinion as to whether, as of September 9, 2024, Joyce Place had been kept, repaired, and maintained to substantially the same condition and state of repair as it had been on the Closing Date.

15. Attached hereto and marked as **Exhibit “H”** to this affidavit is a true copy of the resulting investigation report dated January 17, 2025 that I prepared and issued to the Liquidator comparing my previous condition assessments of the Townhomes to the Townhomes’ condition observed during a site visit on December 4, 2024. As set out in my report, my opinion on the condition of the Townhouses is that:

. . . with the exception of the localized interior structural damage noted in 3376, and the apparent shrinkage of temporary wood shoring, we are of the opinion that the building has been kept, repaired, and maintained to substantially the same condition and state of repair as of March 16, 2021. Furthermore, the advanced extent of moisture related damage that was observed on March 16, 2021 suggest that significant water ingress through exterior walls and third floor decks had been occurring for dozens of months prior to March 16, 2021.

16. I made the conclusions in my January 17, 2025 report against my March 16, 2021 site inspection because that inspection was done closest to the Closing Date, and therefore most accurately reflected the changes to the condition and state of repair of the Townhomes between the Closing Date and December, 2024.

SWORN BEFORE ME at Vancouver, British  
Columbia on February 5, 2025.



A Commissioner for taking Affidavits for  
British Columbia.



PAUL GOOD

Sonal Kaur  
Articled Student  
1600-925 WEST GEORGIA ST.  
VANCOUVER, B.C. V6C 3L2  
(604) 685-3456



This is Exhibit "A" referred to in the affidavit  
of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.

TO The Owners, Strata Plan LMS992  
C/O Leo Chan, Property Manager  
EMAIL leo.chan@mypropertymanager.ca  
Dwell Property Management  
#170 - 4311 Viking Way  
Richmond, BC V6V 2K9

**R-02565.012**  
**Joyce Place**  
**Targeted Structural**  
**Assessment**

DATE June 25, 2020

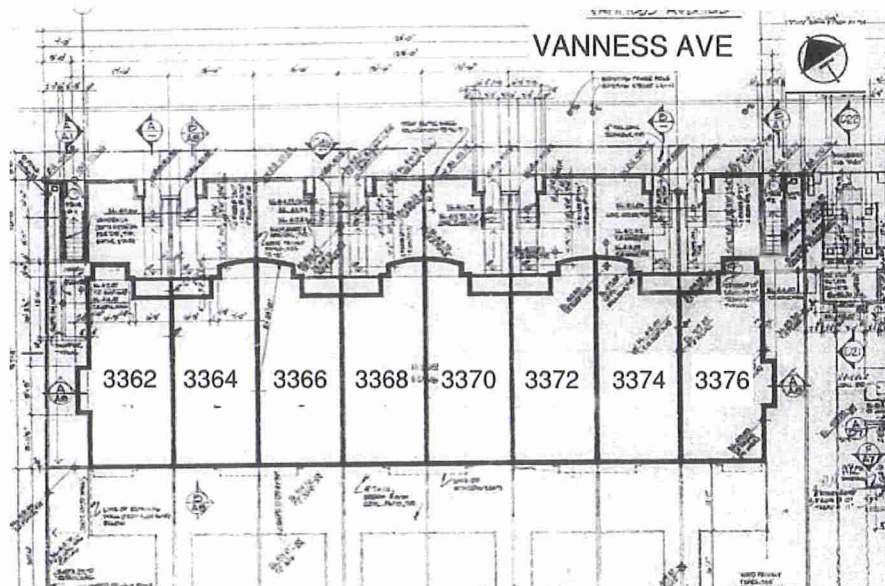
REGARDING **Targeted Structural Assessment**

Dear Leo,

As requested by The Owners, Strata Plan LMS992 (The Owners), RDH conducted a visual review of the eight townhouse units located at 3362 to 3376 Vanness Avenue, Vancouver, BC. The townhouse units are part of the complex known as Joyce Place.

Our site review took place on June 17, 2020. RDH was accompanied by two council members, Mr. Brian Yan Muk and Mr. Ferdie Aquino.

Figure 1 is a partial site plan which identifies each of the units for reference.



*Figure 1 - Site Plan Showing Townhouse Unit Numbers*

The primary purpose of the site visit was to review, where possible, the condition of the units' structural elements and evaluate the potential for life-safety issues associated with the existing deterioration of wood-framed structural members. Other objectives were for RDH to gain familiarity with the townhouse units and to develop a conceptual plan to address deficient structural and building enclosure issues.

Areas reviewed included all four exterior elevations and the interiors of Units 3362, 3368, 3370 and 3372. To augment the data obtained from the site review, RDH was provided with the documents that are listed in Table 1. Only relevant portions of applicable documents were reviewed.

TABLE 1 – DOCUMENTS REVIEWED	
Building Envelope Condition Assessment Report	Prepared by MGH Consulting Inc. January 3, 2017
Town Homes – Structural Assessment Report	Prepared by: MGH Consulting Inc. October 31, 2018
Structural Opinion Review - Joyce Place Townhomes	Prepared by: Apex Building Sciences Inc. April 27, 2019
Structural Drawings	Prepared by: C.Y. Loh Associates Ltd. May 17, 1989 Issued for: Pricing – Not for Construction
Architectural Drawings	Prepared by: William Rhone Architects June 22, 1989 Issued for: Not legible

## Background Information

### Typical Wall Assembly Components

Based on our general review of the architectural drawings and our experience with similar buildings, it appears that a face-sealed stucco clad wall assembly has been incorporated at the townhouses of Joyce Place, and consists of the following components, listed exterior to interior:

- Stucco cladding
- Sheathing paper
- Plywood sheathing
- Wood framing/batt insulation
- Polyethylene vapour barrier
- Interior Gypsum Wall Board (drywall or GWB)

Face-sealed walls are designed to resist exterior moisture only at the outermost surface of the wall system. This type of wall system relies on the continuity of the exterior cladding (stucco) and sealants at joints and penetrations (windows, intersecting walls/roofs, lighting, etc.) to prevent water ingress. Face-sealed wall systems have historically performed poorly with respect to rain penetration control in moderate and high exposure applications in the Lower Mainland of British Columbia.

### Enclosed and Unenclosed Balconies

The architectural floor plans refer to two types of balconies (exterior limited common property space not located above living space) – enclosed balconies and unenclosed balconies. Enclosed balconies are located on the first and second floors of each unit. One unenclosed balcony is also located on the second floor of each unit and each unit also contains a third-floor deck (exterior limited common property space located above living space), which is unenclosed.

Figure 2, which was reproduced from the architectural drawings, shows typical townhouse floor plans and indicates the locations of the various balconies and decks. Note that some of the units have been constructed as mirror images of the floor plans indicated in Figure 2. For the remainder of this report, references to enclosed and unenclosed balconies will be as indicated in Figure 2 and unenclosed balconies will simply be referred to as balconies.

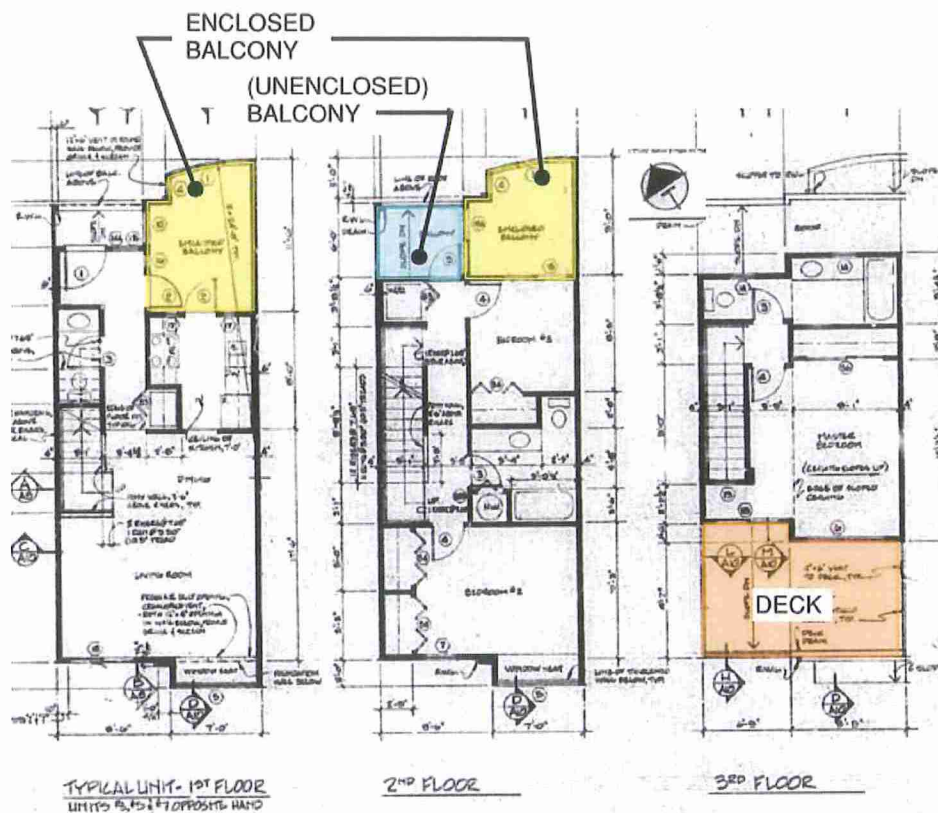


Figure 2 - Typical Townhouse Floor Plans

### Site Observations and Comments

#### Units - 3362 and 3376

In Unit 3362 interior GWB and ceiling finishes had been removed from the first-floor enclosed balcony prior to our site visit. Temporary wood framing was installed to support



the second-floor faming which is above the first-floor enclosed balcony. The installed temporary shoring generally appeared to be adequate for its intended purpose.

We understand that similar conditions are present in the Unit 3376 first-floor enclosed balcony. RDH did not have access to Unit 3376, therefore we cannot comment on the adequacy of the installed temporary shoring.

#### Units - 3364 to 3374

The observations that we recorded from the interior of Units 3368, 3370 and 3372 are similar and are described below. Although we did not enter Units 3364, 3366, or 3374, we expect that conditions at these three units are similar to the three units that were entered.

Prior to RDH's site visit, small areas of GWB had been removed and temporarily reinstalled at the base of the walls that enclose the first-floor enclosed balconies. Similar GWB openings were located at the second-floor enclosed balconies (which are located directly above the first-floor enclosed balconies). The GWB openings are referred to as exploratory openings (EOs). All EOs are on the inside face of north exterior walls.

RDH removed the GWB at selected EOs to review underlying conditions.

Findings were similar at all reviewed EOs: the plywood sheathing was deteriorated such that the interior face of the sheathing paper was visible and the bottoms of visible wood studs and the wood plates that they bear on were also deteriorated. Sheathing and framing deterioration was more advanced at the ground floor than the second floor. Figures 3 and 4 illustrate typical EOs.

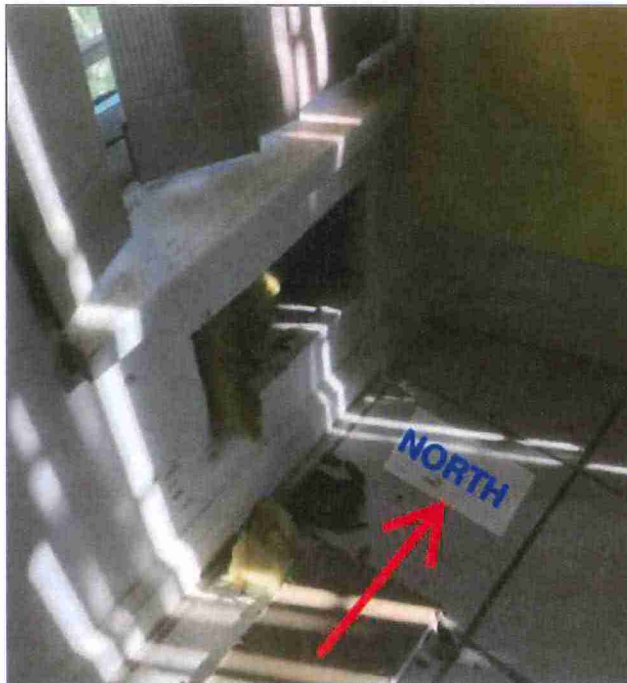


Figure 3

*Typical Exploratory Opening, main floor, Unit 3368, first-floor enclosed balcony.*

*Deteriorated sheathing, which was removed from the EO, is visible on the floor.*

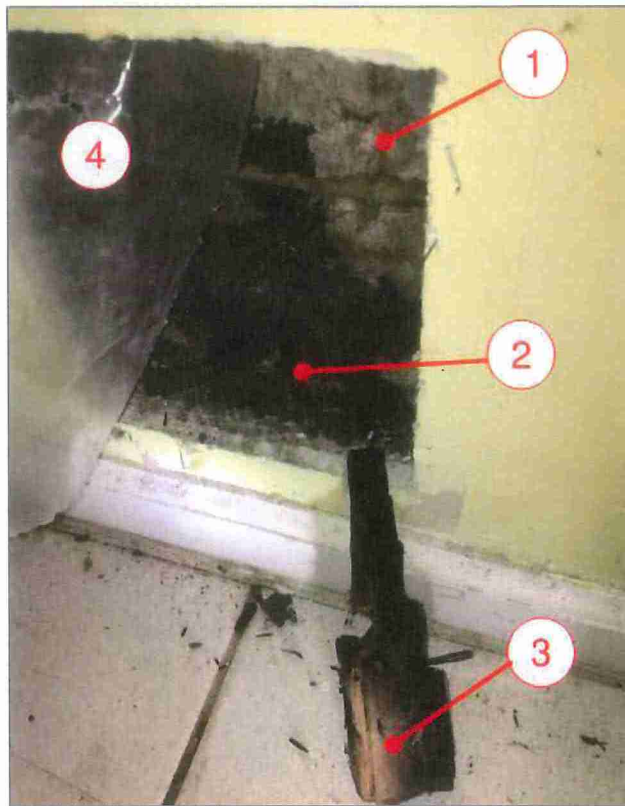


Figure 4

*Typical Exploratory Opening. This photo shows the EO at the first-floor enclosed balcony, Unit 3370.*

- 1) Interior surface of sheathing paper. The sheathing paper, which is on the exterior surface of the plywood sheathing, is visible because the plywood sheathing has deteriorated.
- 2) Deteriorated plywood sheathing.
- 3) A section of deteriorated wood stud that was pulled out of the EO.
- 4) Polyethylene vapour barrier

Existing windows are aluminum framed assemblies. Interior observations near window assemblies (south and north elevations) included organic growth and soft or deteriorated GWB, which likely suggests that water ingress and/or condensation occurs on a regular basis. Water ingress may be due to a failure of the windows, a failure of the window-to-wall interfaces, or a combination of the two.

Subsequent to the complex's original construction, the second-floor balcony at Unit 3370 has been enclosed. The unit's dryer exhausts directly into the enclosed balcony space, which is a contravention of the Vancouver Building By-Law. The second-floor balconies at Units 3366 and 3372 have also been enclosed. Building permits are required for balcony enclosures and these types of enclosure modifications. It is not known if permits were obtained for the three post-original construction balcony enclosures and this will require further review and likely discussions with the municipality.

At all of the reviewed third-floor deck membranes, discontinuities at membrane seams were observed – refer to Figure 5 for example. The deck membrane at Unit 3370 has been patched, and it was apparent that the sheathing beneath the patch has deteriorated to the point that it can no longer support pedestrian traffic – refer to Figure 6. It is worthy of note that the architectural drawings indicate that each deck assembly includes a polyethylene vapour barrier, which is located on the top (hidden) surface of the GWB that forms the master bedroom ceilings. The vapour barrier may be protecting the ceiling GWB from water damage even if water is accumulating within the deck/ceiling assembly.

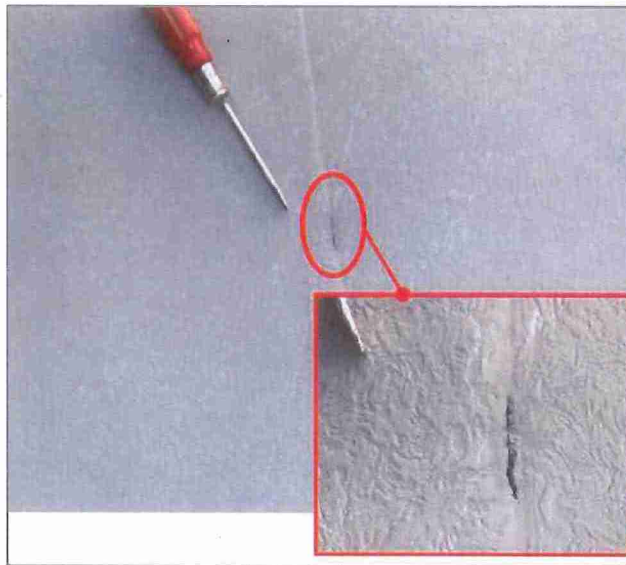


Figure 5

Third-floor deck at Unit 3368 with membrane discontinuity at seam. Similar observations were recorded at other third-floor decks.



Figure 6

Third floor deck membrane patch at Unit 3370. The sheathing beneath the patch had deteriorated to the point that it can no longer support pedestrian traffic.

Access to this deck should be prohibited until permanent repairs have been completed due to potential life safety concerns.

## Exterior Observations

### North Elevation Walls

Our interior observations at EOs indicate that the north exterior wall assemblies have failed from a water management point of view, and, for the context of this section of the report, no further comments are warranted.

### South Elevation Walls

Similar to the north walls, the south walls are considered a face-sealed assembly. As noted, face sealed assemblies are highly dependant on the continuity of the exterior cladding (stucco) and sealant joints (which are generally located at material interfaces) to remain watertight. At the time of the site visit, reviewed stucco areas appeared to be in reasonable condition. Observed sealant joints also appeared to be in reasonable



condition. It appears that the stucco surfaces have been recently re-coated and sealant joints have been recently renewed, thus we cannot comment on their pre-renewed condition.

We noted numerous horizontal surfaces that are protected by metal cap flashings, which have been spliced. The splices rely on sealant to remain watertight – refer to Figure 7 for example. Our experience indicates that this type of sealant joint is generally not reliable.



*Figure 7*

*Typical horizontal surface protected by cap flashing and sealant joint. This type of sealant joint is typically not reliable.*

*This configuration and other similar ones are repeated at all of the townhouse units.*

Contrary to current best practices, guardrail posts are top mounted to the horizontal deck surfaces, as shown in Figure 8. Current practice is to side-mount guardrail posts because top mounted posts are susceptible to water ingress through the penetrations.



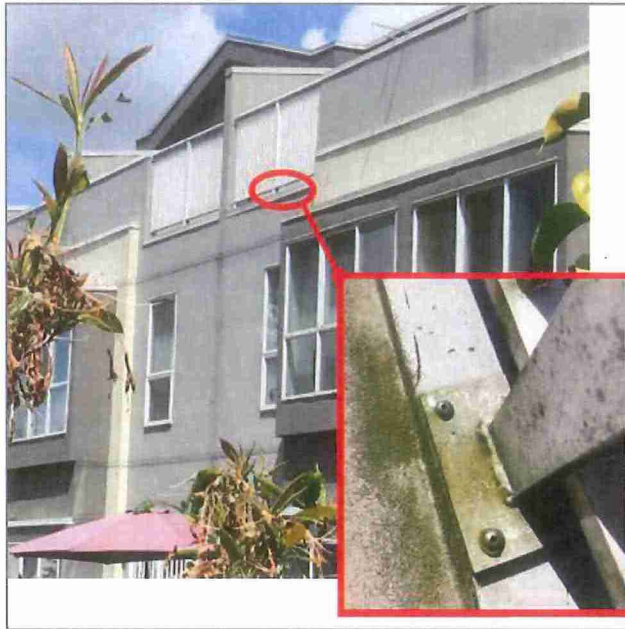


Figure 8

Typical deck guardrail top mounted post. Top mounted posts are more susceptible to water ingress than side mounted posts.

## Recommendations

Two categories of recommendations are presented in this section: Recommendations that, in our opinion, require immediate attention due to potential life safety issues (Immediate Recommendations), and; recommendations that, due to their costs, incomplete data, and required planning, will take more time to implement (Additional Recommendations).

### Immediate Recommendations

Due to the uncertainty associated with viewing structural framing members through the small EOs, we recommend that the Owners retain a structural engineer and contractor to remove GWB from the first and second floor enclosed balcony walls as required to permit an evaluation of the underlying wood framing. After the condition of the framing has been evaluated, a temporary shoring or repair procedure can be developed. This recommendation pertains to Units 3364 to 3374 (six units).

A structural engineer should be retained to review the existing shoring that has been installed in Unit 3376.

Access to the third-floor deck at Unit 3370 should be prohibited until structural repairs have been completed.

### Additional Recommendations

Based on the observations that were obtained from our recent site visit, it is clear that the north wall and the third-floor decks can no longer effectively resist water ingress. To address known moisture related issues, exterior finishes on the north wall will need to be completely removed so that underlying wood framing can be evaluated and replaced as necessary. Reconstruction of the north wall, with a new rainscreen wall assembly, should also include renewal of all existing windows and sliding doors.

All third-floor deck membranes should also be renewed. It is likely that once the existing membranes have been removed, damage to underlying wood framing will become apparent and will need to be addressed.

The south, east and west walls should be assessed for water management and structural issues by the same engineering firm that completes the immediate recommendations to maintain consistency. The assessment should involve a detailed site review of wall assemblies including creation of additional EOs. In addition to assessing the walls, the condition of the various roof assemblies should also be assessed.

After the south, east and west walls and the roofs have been assessed, a comprehensive repair and renewal plan can be developed. Considering the historically poor performance of face sealed wall assemblies, it is likely that the south wall will need to be repaired in a manner which is similar to the north wall repairs. It may be possible to avoid reconstructing the east and west walls due to their lack of openings and reduced exposure.

We understand that the existing roof membranes have been in place since the complex's original construction. Considering their age (approximately 30 years) it is important to have these components reviewed as part of the additional assessment.

## Concluding Remarks

The immediate recommendations should be implemented as soon as possible to reduce life-safety risks.

Implementation of the additional recommendations will provide The Owners with the opportunity to change the townhouse building's aesthetics and upgrade the performance of the wall/window assemblies from water management, energy efficiency, sound insulation, and interior comfort points of view.

If requested, RDH would be pleased to assist The Owners with the recommendations that are presented in report and help plan the required upgrades.

I trust this report addresses The Owners' current requirements, however if any questions or comments arise, please do not hesitate to contact the writer.

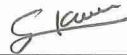
Yours truly,



**Paul Good | P.Eng.**  
Senior Project Engineer  
pgood@rdh.com  
T 604-873-1181 x189  
RDH Building Science Inc.

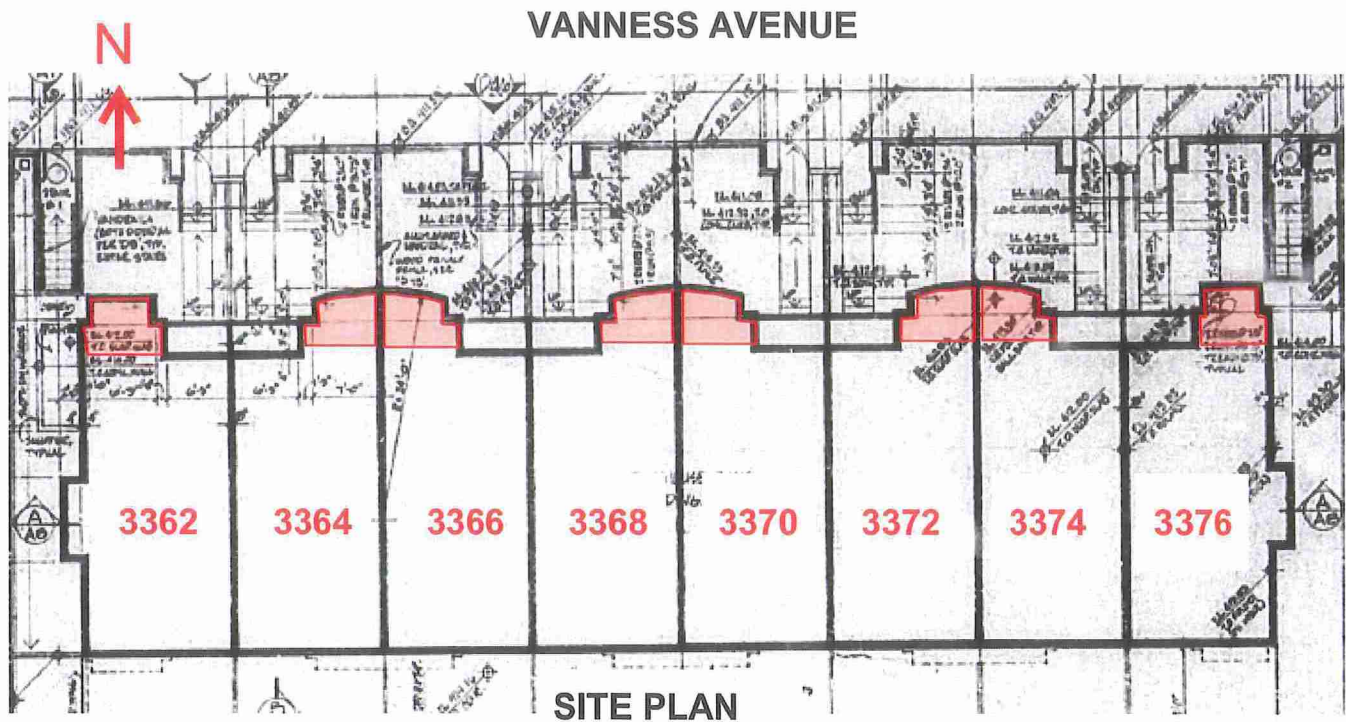
Reviewed by  
**Jason Dunn | B.Arch.Sc.**  
Principal, Senior Project Manager

This is Exhibit "B" referred to in the affidavit  
of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.





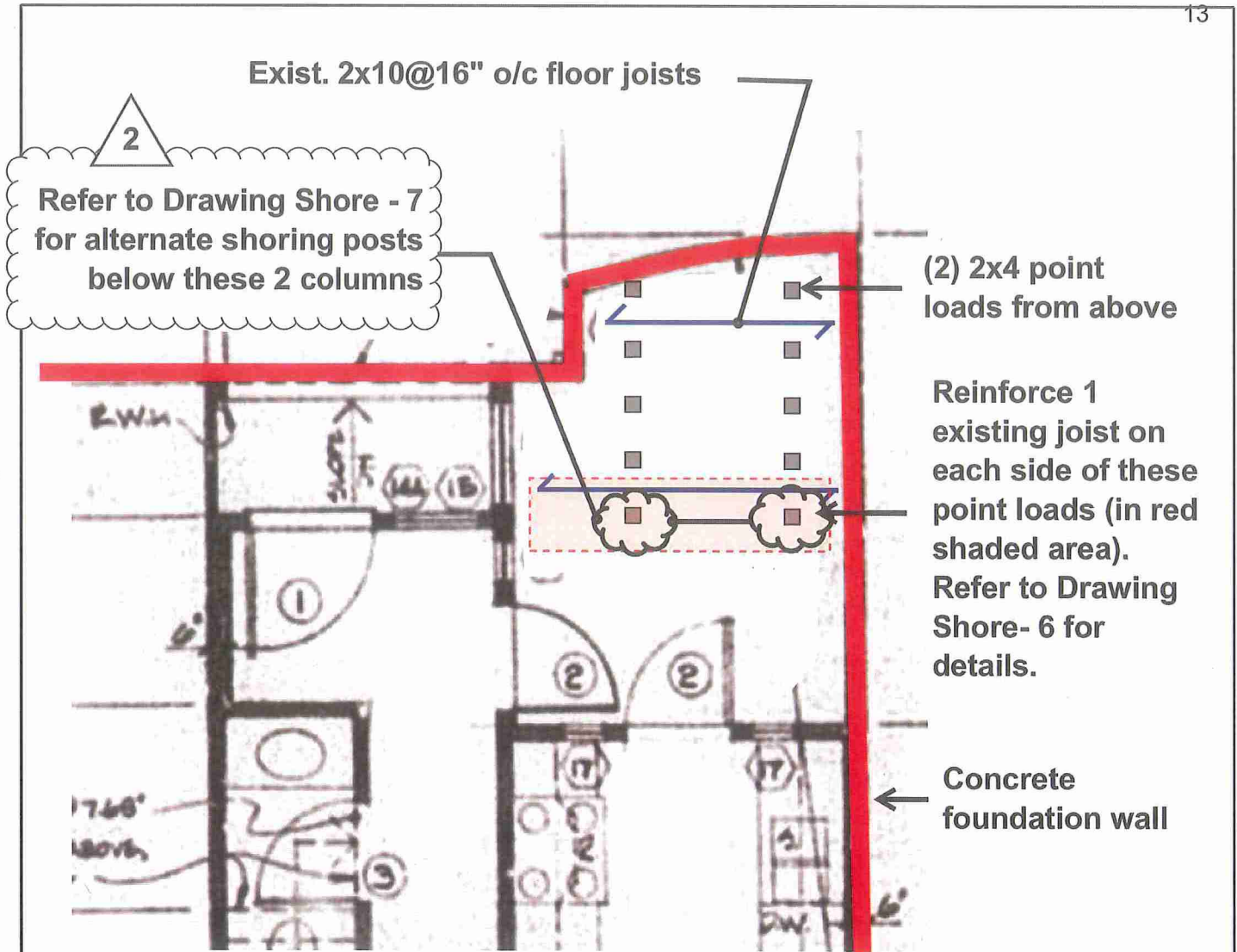
Approx. extent of shoring

### Project Notes:

1. In general, existing interior finishes have been removed as required to accommodate shoring.
2. Units 3362 & 3376:  
Shoring between main floor and 2<sup>nd</sup> floor has already been installed. Install shoring as indicated, 2<sup>nd</sup> floor to roof. Reinforce first floor framing (from crawl space) as indicated. Upgrade existing main floor to 2<sup>nd</sup> floor shoring as directed on site. In general, this will involve installing additional fasteners to existing members.
3. Units 3364 to 3374:  
Install shoring between main floor and 2<sup>nd</sup> floor and between 2<sup>nd</sup> floor and roof as indicated. Reinforce first floor framing (from crawl space) as indicated.
4. All new lumber to be kiln dried Hem-Fir No. 2, S-P-F No. 2 or D.Fir-L No.2.
5. Where nails are specified, they may be replaced with #8 wood screws of equal length.

<div><div>RDH</div><div>400 - 4333 Still Creek Dr. Burnaby, BC</div><div>www.rdh.com 604 873-1181</div><div>ALL DIMENSIONS NOT SHOWN ARE TO BE CHECKED AGAINST SITE CONDITIONS. DRAWING IS NOT TO BE SCALED TO OBTAIN DIMENSIONS. THE DRAWING IS THE SOLE PROPERTY OF RDH BUILDING SCIENCE INC. AND CANNOT BE USED OR DUPLICATED IN ANY WAY WITHOUT EXPRESSED WRITTEN PERMISSION.</div></div>		<div><div><div><div>PROFESSIONAL ENGINEER OF THE PROVINCE OF BRITISH COLUMBIA</div><div>P.A. GOOD # 20055</div><div>2021-04-22</div></div></div></div>	<table><tr><td colspan="2">PROJECT NAME:</td><td colspan="2">JOYCE PLACE - STRATA LMS 992 - SHORING 3362 - 3376 Vanness Ave, Vancouver, BC</td><td colspan="2">DRAWING NO.: Shore - 1/7</td></tr><tr><td colspan="2">DRAWING TITLE:</td><td colspan="2">SITE PLAN AND NOTES</td><td colspan="2">PROJECT NO.: 2565.013</td></tr><tr><td>ISSUE</td><td>DESCRIPTION</td><td>DATE</td><td colspan="3">SCALE: NTS</td></tr><tr><td>1</td><td>Issued for pricing</td><td>Jan 20/21</td><td colspan="3">DATE: Jan 20/21</td></tr><tr><td>2</td><td>Issue for Construction</td><td>April 22/21</td><td colspan="3">DRAWN BY: Pgood</td></tr><tr><td></td><td></td><td></td><td colspan="3">CHECKED BY: ET</td></tr></table>	PROJECT NAME:		JOYCE PLACE - STRATA LMS 992 - SHORING 3362 - 3376 Vanness Ave, Vancouver, BC		DRAWING NO.: Shore - 1/7		DRAWING TITLE:		SITE PLAN AND NOTES		PROJECT NO.: 2565.013		ISSUE	DESCRIPTION	DATE	SCALE: NTS			1	Issued for pricing	Jan 20/21	DATE: Jan 20/21			2	Issue for Construction	April 22/21	DRAWN BY: Pgood						CHECKED BY: ET		
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**PART MAIN FLOOR PLAN SHOWING MAIN FLOOR FRAMING BELOW (IN CRAWL SPACE)**

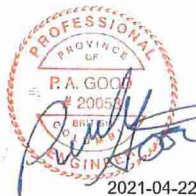
**NOTES:**

- 1) Some units are mirror image.
- 2) Refer to Drawing Shore - 3 for shoring above.

**RDH**

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**PROJECT NAME:**

JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

**DRAWING TITLE:**

PART MAIN FLOOR FRAMING PLAN

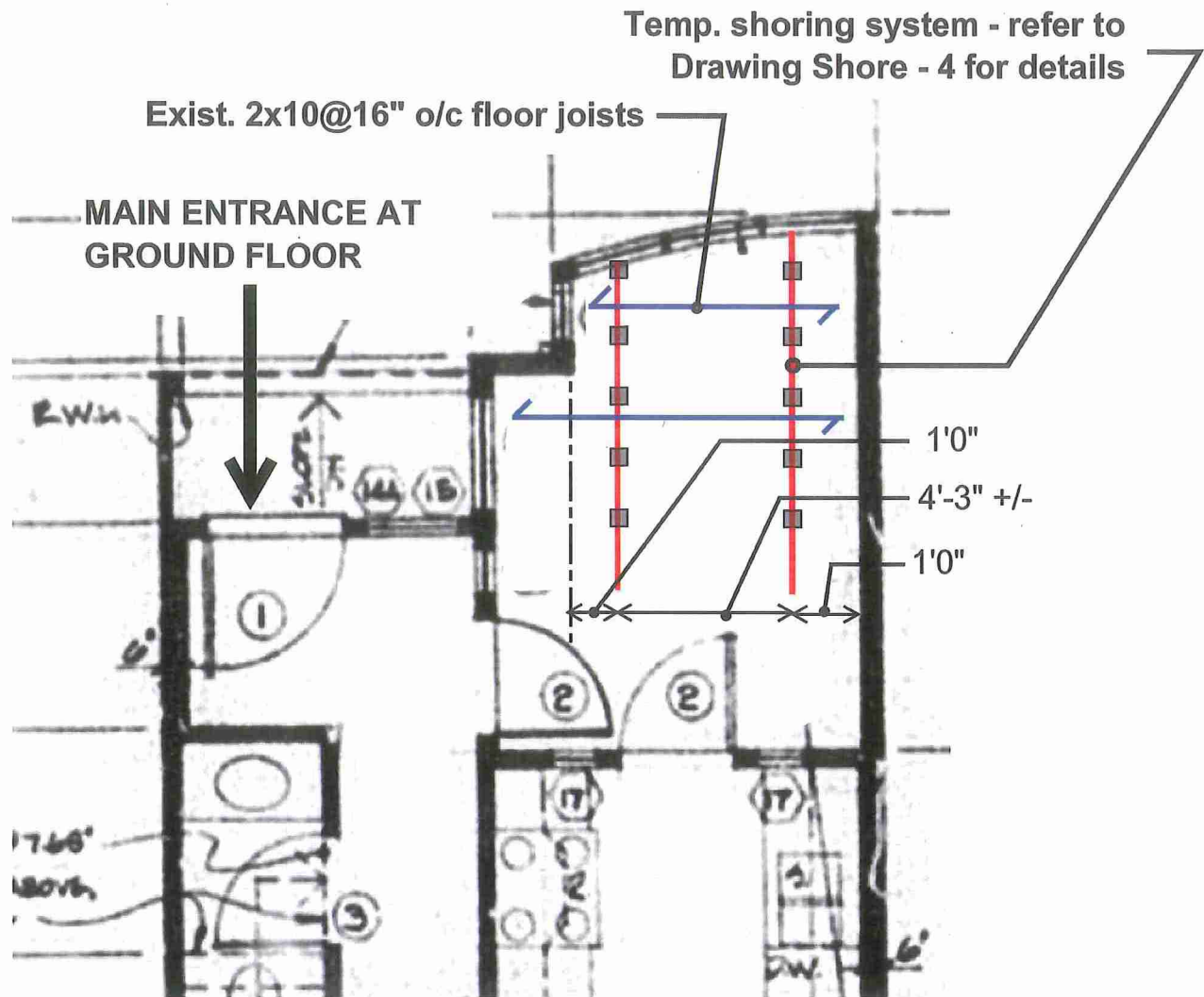
**DRAWING NO.:**

Shore - 2/7

**PROJECT NO.:**

2565.013

ISSUE	DESCRIPTION	DATE	SCALE: NTS
1	Issued for pricing	Jan 20/21	DATE: Jan 20/21
2	Issued for Construction	April 22/21	DRAWN BY: Pgood
			CHECKED BY:



**PART MAIN FLOOR PLAN SHOWING 2ND FLOOR FRAMING AND 2ND FLOOR SHORING ABOVE.**

**NOTES:**

- 1) Main floor plan with 2nd floor framing above shown.
- 2) 2nd floor plan with roof framing above is similar.
- 3) Some units are mirror image.

**RDH**

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2021-04-22

**PROJECT NAME:**

JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

**DRAWING TITLE:**

2ND FLOOR & ROOF EXIST. FRAMING AND NEW SHORING PLAN

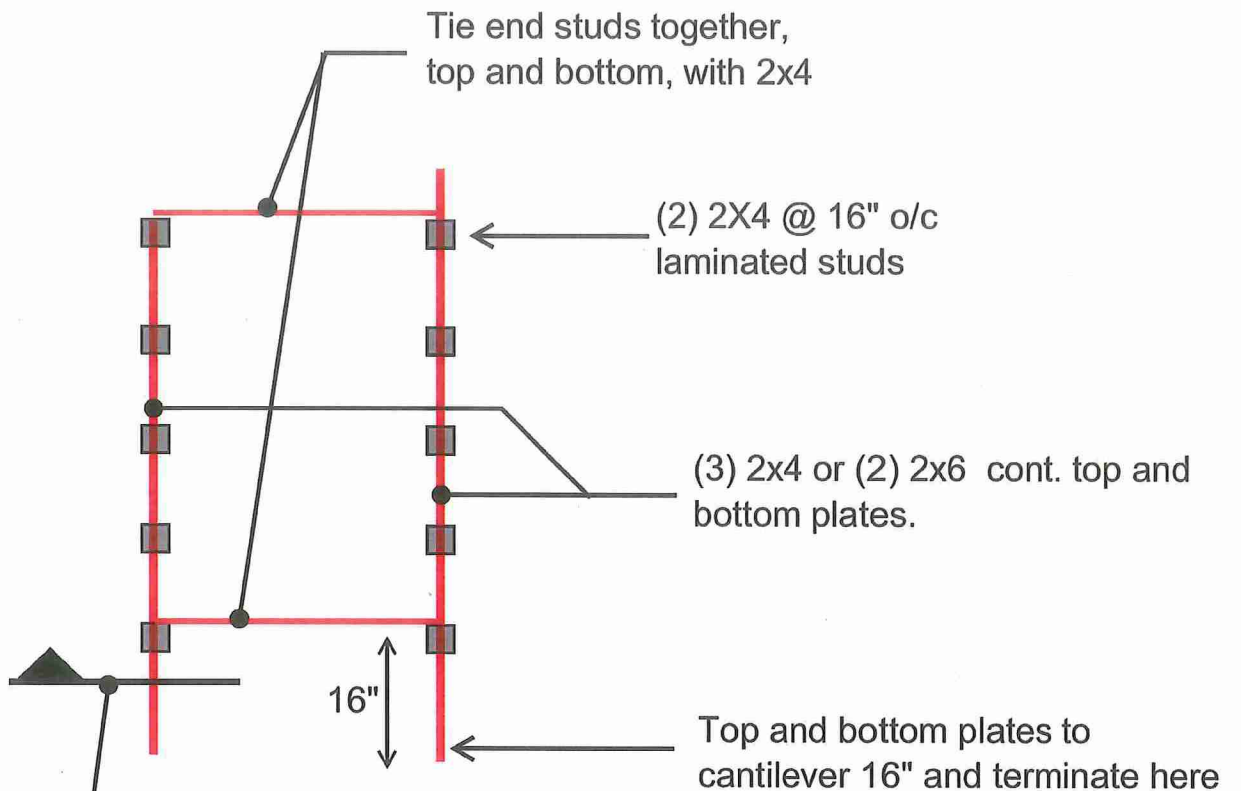
**DRAWING NO.:**

Shore - 3/7

**PROJECT NO.:**

2565.013

ISSUE	DESCRIPTION	DATE	SCALE: NTS
1	Issued for pricing	Jan 20/21	DATE: Jan 20/21
2	Issued for construction	April 22/21	DRAWN BY: Pgood
			CHECKED BY: ET



### PLAN VIEW - TEMPORARY SHORING MAIN TO 2<sup>ND</sup> & 2<sup>ND</sup> TO ROOF

Refer to Drawing Shore - 5 for section view

# RDH

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PROJECT NAME:

JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

DRAWING NO.:

Shore - 4/7

DRAWING TITLE:

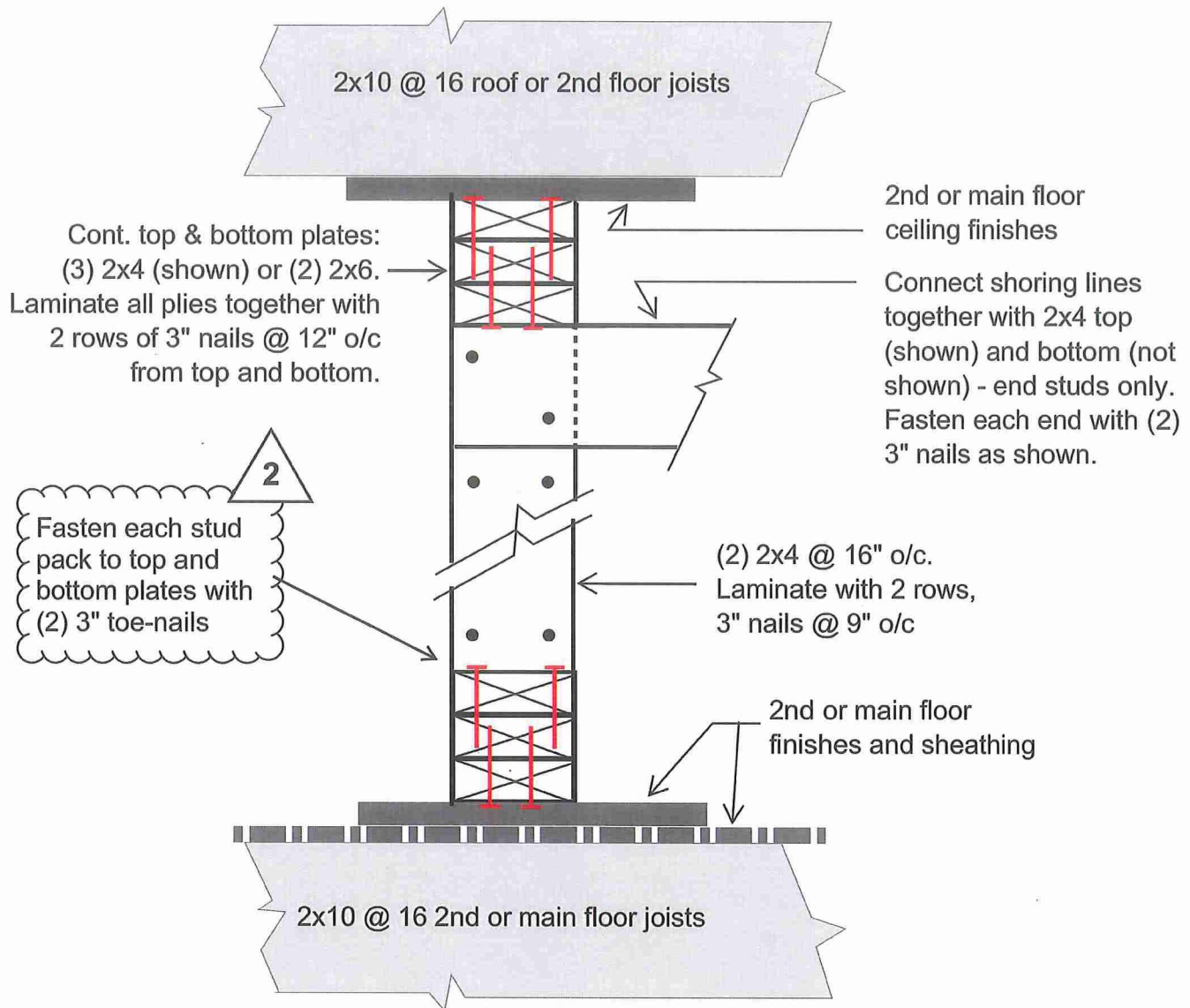
TEMPORARY SHORING DETAILS

PROJECT NO.:

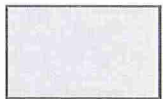
2565.013

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			CHECKED BY: ET





**TYPICAL SHORING SECTION MAIN TO 2<sup>ND</sup> & 2<sup>ND</sup> TO ROOF**



Existing components  
to remain

**Note:**

Refer to Drawings Shore-1  
and Shore-3 for required  
shoring extents.

**RDH**

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JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

DRAWING TITLE:

SECTION THROUGH SHORING

DRAWING NO.:

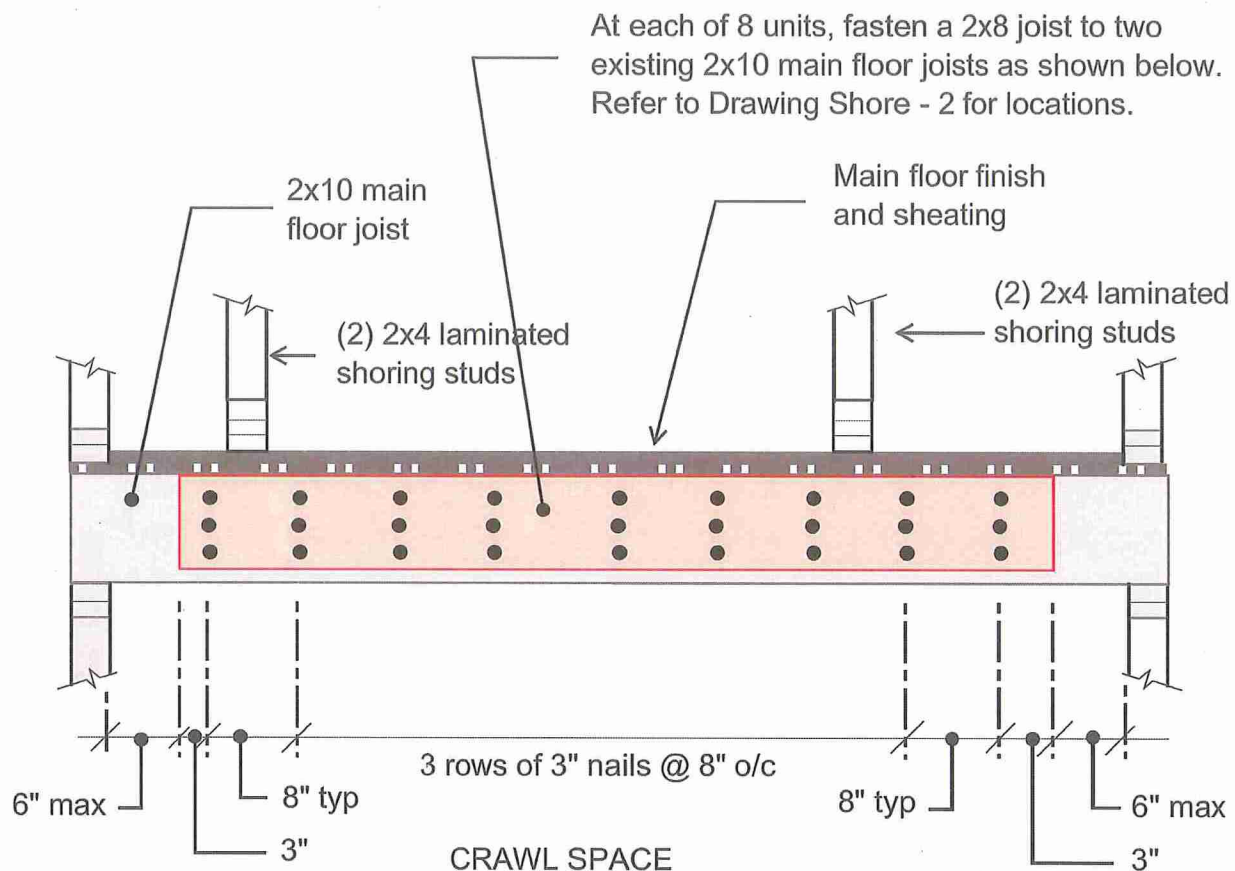
Shore - 5/7

PROJECT NO.:

2565.013

ISSUE	DESCRIPTION	DATE	SCALE: NTS
1	Issued for pricing	Jan 20/21	DATE: Jan 20/21
2	Issued for Construction	April 22/21	DRAWN BY: Pgood
			CHECKED BY: ET





## TYPICAL MAIN FLOOR JOIST REINFORCING

2

**Note:** Refer to Drawing Shore - 7 for alternative

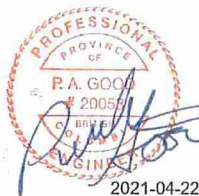


Existing components  
to remain

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PROJECT NAME:

JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

DRAWING TITLE:

MAIN FLOOR JOIST REINFORCING

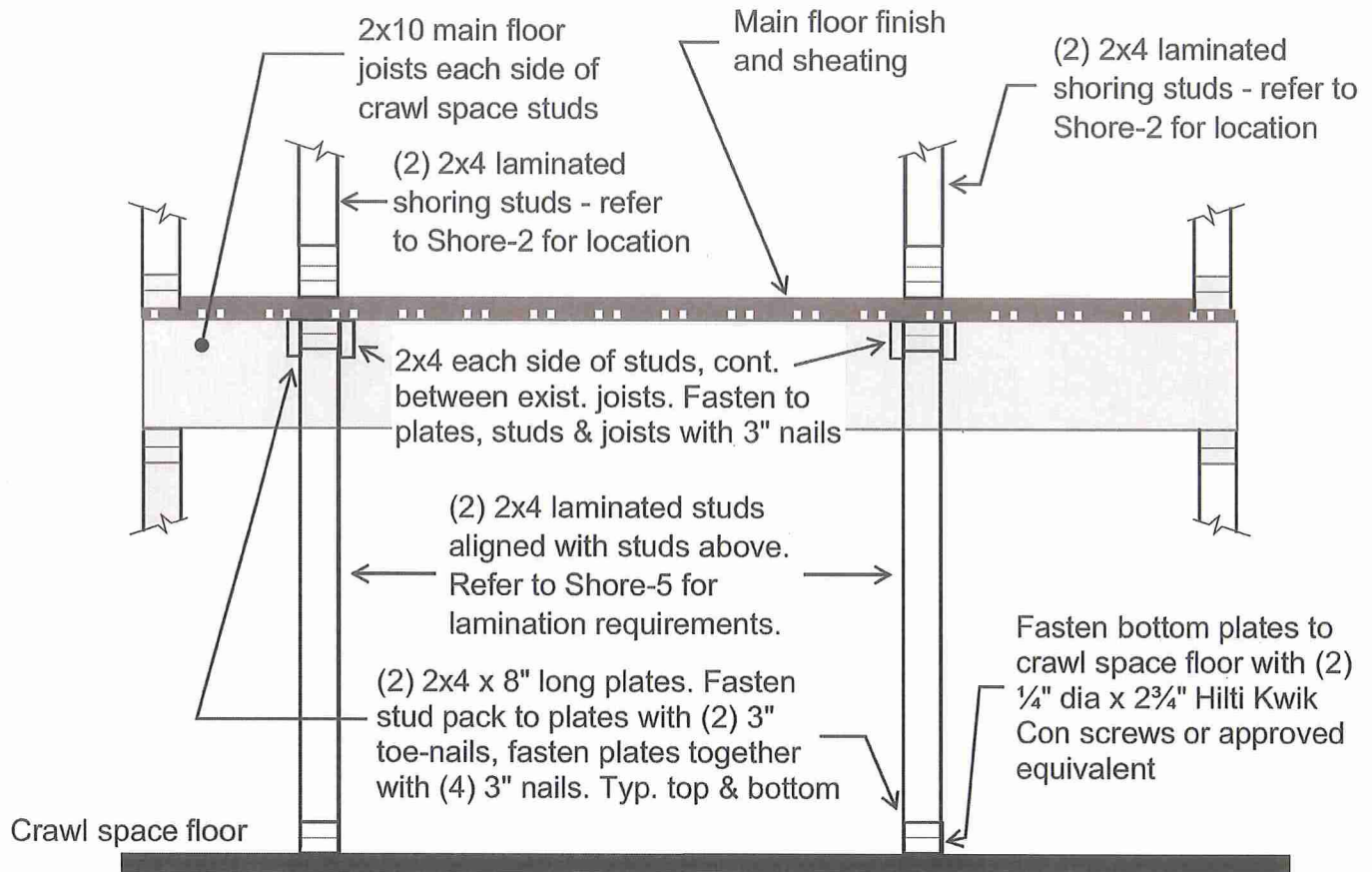
DRAWING NO.:

Shore - 6/7

PROJECT NO.:

2565.013

ISSUE	DESCRIPTION	DATE	SCALE: NTS
1	Issued for pricing	Jan 20/21	DATE: Jan 20/21
2	Issued for Construction	April 22/21	DRAWN BY: Pgood
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### TYPICAL CRAWL SPACE SHORING

**Note:** Refer to Drawing Shore - 6 for alternative



Existing components  
to remain

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PROJECT NAME:

JOYCE PLACE - STRATA LMS 992 - SHORING  
3362 - 3376 Vanness Ave, Vancouver, BC

DRAWING NO.:

Shore - 7/7

DRAWING TITLE:

MAIN FLOOR JOIST REINFORCING

PROJECT NO.:

2565.013

ISSUE	DESCRIPTION	DATE	SCALE: NTS
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This is Exhibit "C" referred to in the  
affidavit of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.

*Skam*

A Commissioner for taking Affidavits  
within British Columbia.



To The Owners, Strata Plan LMS992  
c/o Leo Chan, Property Manager  
Dwell Property Management  
#170 - 4311 Viking Way  
Richmond BC V6V 2K9

Submitted April 30, 2021 by  
RDH Building Science Inc.  
4333 Still Creek Drive #400  
Burnaby BC V5C 6S6





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# 1 Introduction

## 1.1 Terms of Reference

RDH Building Science Inc. (RDH) was retained by Strata Plan LMS992 (Owners) to complete design services in connection with the proposed rehabilitation of the building known as Joyce Place Townhouses, located at 3362 to 3376 Vanness Avenue, Vancouver, BC.

This report has been undertaken for the Owners and is not to be relied on by others.

## 1.2 Scope of Services

The scope of services for this review were defined in our proposal, dated July 13, 2020, and are as follows:

- 1) Undertake additional investigative work to better confirm the original construction arrangements, conditions, and feasibility of possible options and details. This work will include further on-site investigation as appropriate to confirm and augment the earlier findings and gather additional information that may be required for the design development of project. We anticipate that this further investigation work will include the following:
  - a) A review of existing roof assemblies and balcony assemblies.
  - b) Additional exploratory openings with emphasis on the south, east, and west walls.
- 2) Develop conceptual design alternatives based on the results of previous investigative work and our additional investigative work. We will use a 3D model of the townhouse building to help illustrate design alternatives.
- 3) Work with the Strata Council and/or building committee to more precisely determine the extent of work required at the building enclosure assemblies, identify possible areas to be retained, and identify logical break lines between these areas.
- 4) Field check some of the building dimensions to obtain a more accurate estimate of the wall and window areas and to evaluate the accuracy of existing architectural drawings.
- 5) Receive input from our project and construction managers regarding constructability and cost effectiveness of the proposed conceptual design. We have full-time, in-house construction cost estimators and project managers to facilitate this process.
- 6) Review different construction implementation approaches. The work could be tendered to general contractors or directly to trade contractors. There are advantages and disadvantages to each approach, which we will discuss in detail.
- 7) Prepare and refine preliminary construction and project budgets for conceptual design alternatives.
- 8) Prepare a presentation that summarizes the design alternatives and construction cost estimates. The presentation will include supportive sketches and images of the 3D model, where appropriate.

- 9) Provide a design brief that will document design options and associated costs; provide details of construction implementation options; and provide details of construction and project costs along with a proposal for next steps.
- 10) Assist Strata Council in presenting the design alternatives and cost estimates at a meeting with the Owners.
- 11) Assist the Owners in making decisions with respect to various design alternatives.

### **1.3 Organization of Report**

This report is organized into six sections:

- 1) Introduction – Information relevant to the initiation, scope, and structure of this report.
- 2) Background – A description of the building and history relevant to our previous involvement with the building to date. Additionally, Section 2 also documents the findings of our additional investigations and the associated implications on the rehabilitation program for the townhouse building.
- 3) Rehabilitation Program – A discussion of the design options and alternatives with respect to implementing the proposed rehabilitation program. This section also includes images of conceptual design alternatives based on the 3D model developed for the townhouse building. Building renderings are also included.
- 4) Project Implementation – A discussion of options for implementing the proposed rehabilitation program.
- 5) Preliminary Cost Estimates – A discussion of the preliminary cost estimates to complete the proposed rehabilitation program, and factors that may impact the costs.
- 6) Next Steps and Closure – A discussion of the next steps required to proceed with implementing the proposed rehabilitation program.

### **1.4 Purpose of Report**

The purpose of this report is to develop and document a design strategy for the proposed building enclosure rehabilitation program. Current information regarding the condition of the building enclosure is summarized, and each of the components of the building enclosure is discussed and options for rehabilitation are reviewed.

### **1.5 Assumptions and Limitations**

The drawings provided contained floor plans, building elevations, building sections, and wall sections. The original building drawings were used as the basis of the evaluation of design alternatives discussed in this report.

## 2 Background

### 2.1 Description of Building

Joyce Place is comprised of a 12-storey tower and adjacent three-storey, wood-framed townhouses, with a total of 62 residential strata lots. The eight townhouse units consist of a single building, which has been constructed separately from the tower. The tower and townhouses were constructed above a common, single-level, below-grade parking structure.

This report for design services focuses on the townhouse units only.

### 2.2 Previous Reports

RDH is familiar with Joyce Place, having recently completed a targeted review of existing deteriorated structural components within the townhouse units and a preliminary review of the townhouses' building enclosure assemblies. Findings and recommendations from the initial review are described in our report dated June 25, 2020 (the Previous Report). Immediate Recommendations and Additional Recommendations were presented in the Previous Report.

A re-cap of our Additional Recommendations is presented below for reference:

#### *Targeted Structural Assessment Report*

*Based on the observations that were obtained from our recent site visit, it is clear that the north wall and the third-floor decks can no longer effectively resist water ingress. To address known moisture related issues, exterior finishes on the north wall will need to be completely removed so that underlying wood framing can be evaluated and replaced as necessary. Reconstruction of the north wall, with a new rainscreen wall assembly, should also include renewal of all existing windows and sliding doors.*

*All third-floor deck membranes should also be renewed. It is likely that once the existing membranes have been removed, damage to underlying wood framing will become apparent and will need to be addressed.*

*The south, east and west walls should be assessed for water management and structural issues by the same engineering firm that completes the immediate recommendations to maintain consistency. The assessment should involve a detailed site review of wall assemblies including creation of additional EOs. In addition to assessing the walls, the condition of the various roof assemblies should also be assessed.*

*After the south, east and west walls and the roofs have been assessed, a comprehensive repair and renewal plan can be developed. Considering the historically poor performance of face-sealed wall assemblies, it is likely that the south wall will need to be repaired in a manner which is similar to the north wall repairs. It may be possible to avoid reconstructing the east and west walls due to their lack of openings and reduced exposure.*

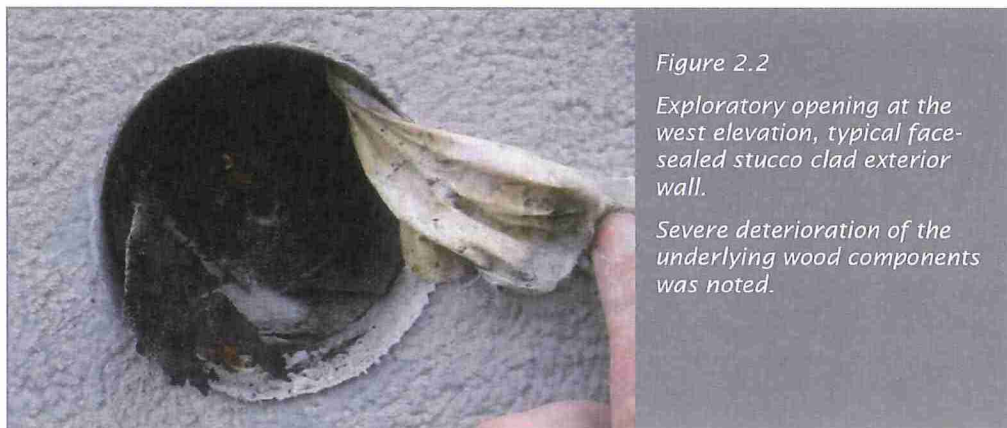
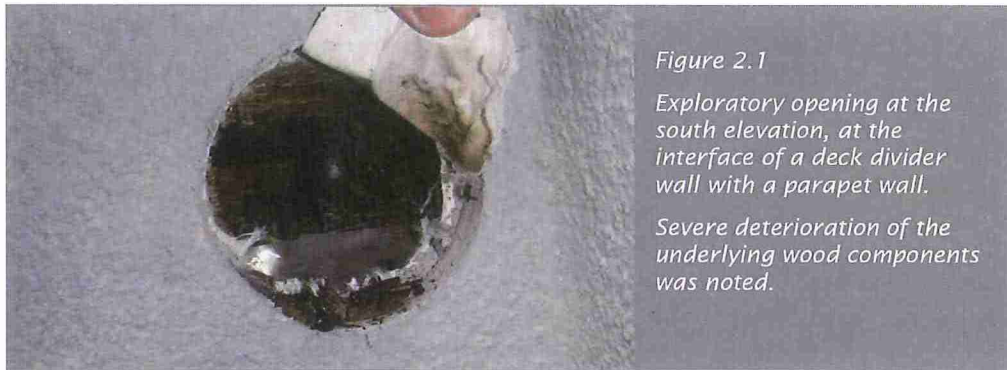
*We understand that the existing roof membranes have been in place since the complex's original construction. Considering their age (approximately 30 years) it is important to have these components reviewed as part of the additional assessment.*



## 2.3 Additional Investigation

In order to obtain additional information and to confirm the viability of repair strategies, RDH conducted an additional investigation. The additional investigation consisted of visual review at the exterior of the building, exploratory openings at the east, south, and west elevations, and confirmation of typical building assemblies against the original drawings provided for the complex. The additional investigation was carried out on March 16, 2021 by RDH.

Exploratory openings were made to confirm the underlying condition of concealed framing components at the townhouse building. Deterioration of the underlying components was noted at the east, south, and west elevations. RDH made 15 exploratory openings at exterior walls as part of the additional investigation. Evidence of moisture and/or water ingress was noted at all 15 openings. Additionally, severe deterioration of the wood sheathing and/or underlying framing was noted at 14 of the 15 exploratory openings. Photographs of the exploratory openings are included in Appendix A.



### 3 Rehabilitation Program

The building enclosure problems experienced at the Joyce Place townhouses are primarily related to moisture ingress due to rain. The building enclosure rehabilitation program is intended to repair existing damage resulting from moisture ingress, and to minimize the risk of future moisture ingress related problems. Construction carried out during the rehabilitation process will differ from the original construction in two fundamental ways:

- The use of rainscreen technology for the new wall and window assemblies.
- Significantly improved details at interfaces between assemblies (at window to wall interfaces, for example) and at penetrations through the wall assemblies.

Rehabilitating the exterior enclosure of a building results in a number of unavoidable changes in appearance and provides opportunities for additional optional design changes. Changes can be characterized as follows:

- Changes resulting from the application of new rainscreen wall assemblies. For example, new rainscreen walls will have cross-cavity flashings at each floor level.
- Other optional changes, such as cladding material changes and colour changes. Cladding material and colour changes would be subject to approval at the City of Vancouver.

Major changes to the existing design will have to be reviewed by the Municipal Planning Department. The Municipal Planning Department typically exercises a high degree of control over the original design of prominent buildings and may expect to have a similar level of input in the case of building enclosure rehabilitation projects.

#### 3.1 Design Considerations

This section provides a detailed review of the nature and scope of the proposed rehabilitation program. It is divided into sub-sections based on the principal building enclosure assemblies and elements:

- Exterior Walls
- Windows and Doors
- Balconies, Enclosed Balconies, and Decks
- Roofs
- At- and Below-Grade Assemblies

**As noted in Section 2 of this report, a comprehensive rehabilitation of the exterior walls (including windows and sliding glass doors), balconies, and third floor decks/flat roofs is recommended.**

Preliminary cost estimates relating to the design considerations presented below are provided in Section 5 of this report.

##### 3.1.1 Design Considerations: Exterior Walls

Based on the findings from the previously issued targeted structural assessment report, and the additional investigation, a comprehensive rehabilitation of the fully exposed exterior walls (including replacement of windows and sliding glass doors), balconies, and

third floor decks/flat roofs is recommended. Walls classed as protected walls that are located underneath a large overhang, such as the wall areas adjacent to the townhouse entry doors, may potentially be omitted from the rehabilitation.

The primary wall assembly at the Joyce Place townhouses is a stucco clad wall assembly. The stucco clad walls currently installed at the Joyce Place townhouses are classed as a face-sealed assembly.

Face-seal wall assemblies are intended to deal with exterior moisture in the form of rain by sealing the exterior of the wall and preventing any water from penetrating past the outer seal. The intention is to stop water at the outer face of the cladding. If water does penetrate past the cladding, it cannot readily drain out of the wall. Water trapped in the assembly can damage moisture-sensitive materials, such as the wood framing; it is therefore essential to ensure that water does not penetrate the outer cladding.



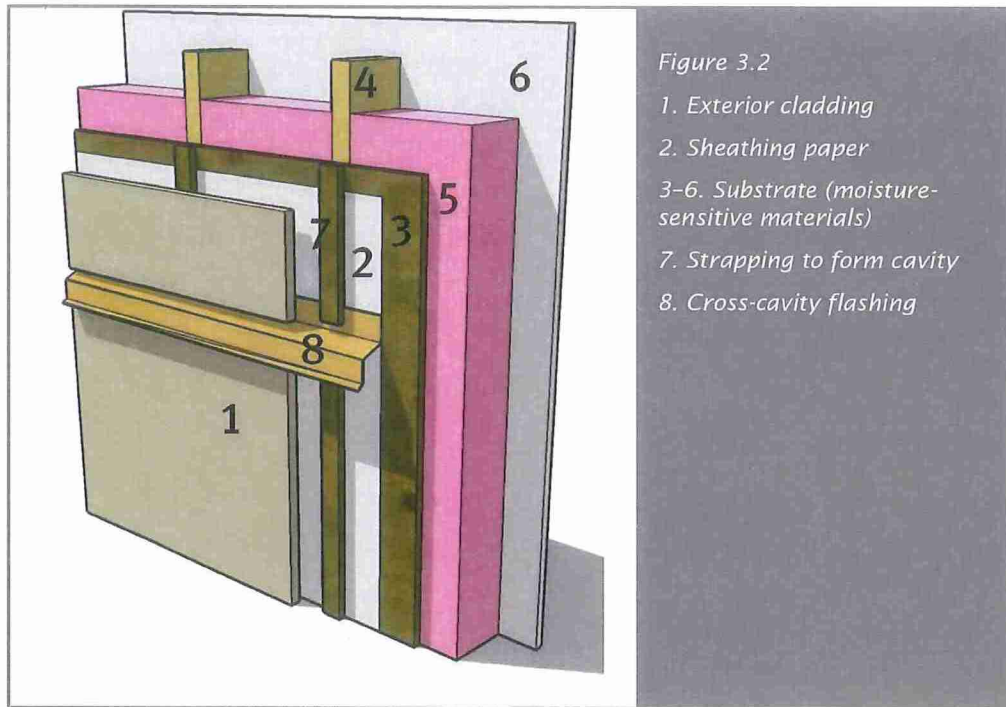
*Figure 3.1*

*Typical exterior walls at Joyce Place townhouses are classed as face-sealed assemblies.*

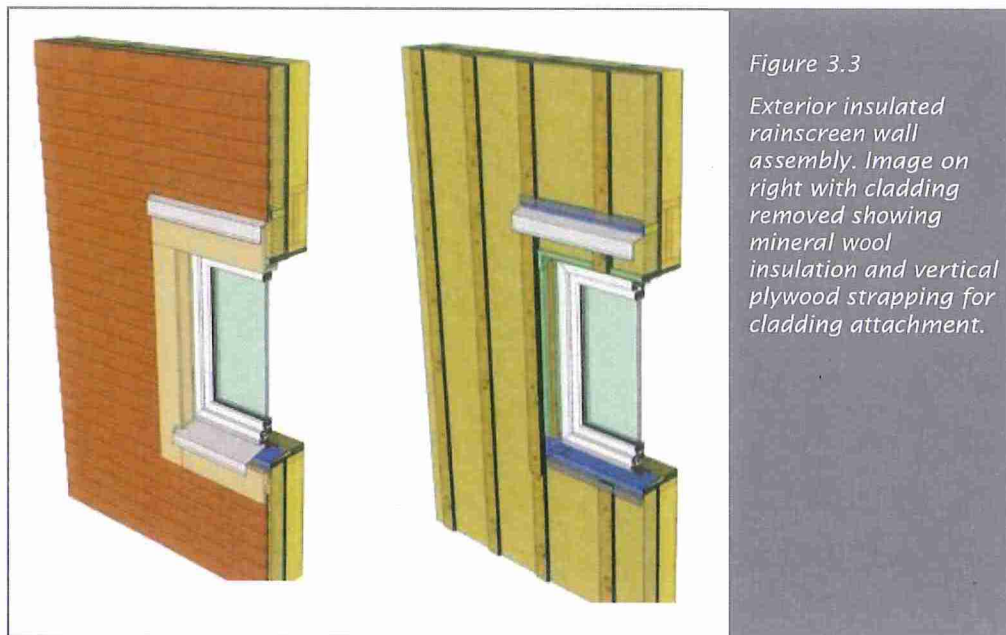
This water management strategy can work in certain conditions where the wall is in a protected location and receives little exposure to wetting. However, in most situations, face-sealed walls do not perform well in our climate. This is primarily because it is extremely difficult to effectively seal the exterior cladding and ensure that no water will enter.

Traditional rainscreen clad wall assemblies (Figure 3.2) incorporates a cavity behind the cladding with pressure-treated wood strapping. If water does penetrate the cladding and reaches the cavity, it cannot move further into the wall assembly. Instead, water will drain down the cavity on the inside face of the cladding or on the sheathing paper at the other side of the cavity and will be deflected out of the wall assembly at a cross-cavity flashing. With a rainscreen wall, it is not essential that the outer cladding be completely sealed; some imperfection is acceptable. The cavity between the cladding and the sheathing paper is vented so it will also facilitate drying of the wall assembly.





Recent changes to building codes and the Vancouver Building By-law necessitate higher thermal resistance values for building assemblies. In response to more stringent energy performance requirements, a more recent version of the strapped cavity rainscreen wall is an exterior insulated rainscreen wall. An exterior insulated assembly is a more energy-efficient design that increases the width of the cavity and adds continuous exterior insulation behind the new cladding, while maintaining the drainage space (Figure 3.3).



An exterior insulated wall assembly is beneficial for several reasons, including:

→ It is considerably more energy efficient than a strapped cavity assembly.

- Exterior insulated walls have become the current standard for new residential buildings, in part as a result of code requirements for energy efficiency.
- The additional cost of an exterior insulated assembly compared to a strapped cavity wall is not significant in the overall project context (less than approximately 5% of total project cost).

Based on the current municipal framework at the City of Vancouver, an exterior insulated rainscreen wall assembly is required as part of the rehabilitation program in order to satisfy the energy performance requirements of the building permit submission to the Municipality.

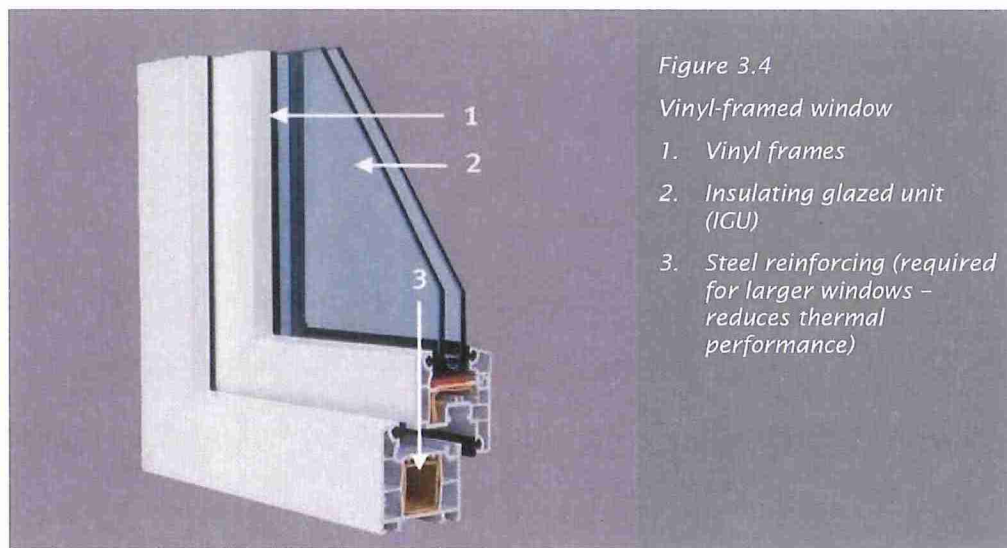
**Based on the ratio of exterior wall area to windows at the Joyce Place townhouses, it is anticipated that a minimum of 3" of exterior insulation will be required at the exterior walls as part of the rehabilitation program. The existing batt insulation within the stud-framed walls would be retained.**

### 3.1.2 Design Considerations: Windows and Doors

Replacement of all windows and sliding glass doors at the wall areas included in the building enclosure rehabilitation is recommended.

The existing typical windows and doors at the Joyce Place townhouses are aluminum framed. Windows and sliding doors with aluminum frames are of high conductance and are thermally inefficient. Given the age of the windows and doors at Joyce Place, they are likely not thermally broken. Non-thermally broken window frames are very conductive, resulting in high levels of heat loss or heat gains through the assembly. Consequently, this increases the demand on the building space heating systems in the heating seasons and space cooling systems in the cooling seasons. Replacement units will therefore have low conductance frame material such as vinyl or fibreglass.

The most common window frame material for windows in low-rise, combustible construction (wood framed), residential buildings is vinyl (Figure 3.4). Fibreglass-framed windows are also a low-conductance window frame that can also be considered as part of the rehabilitation.



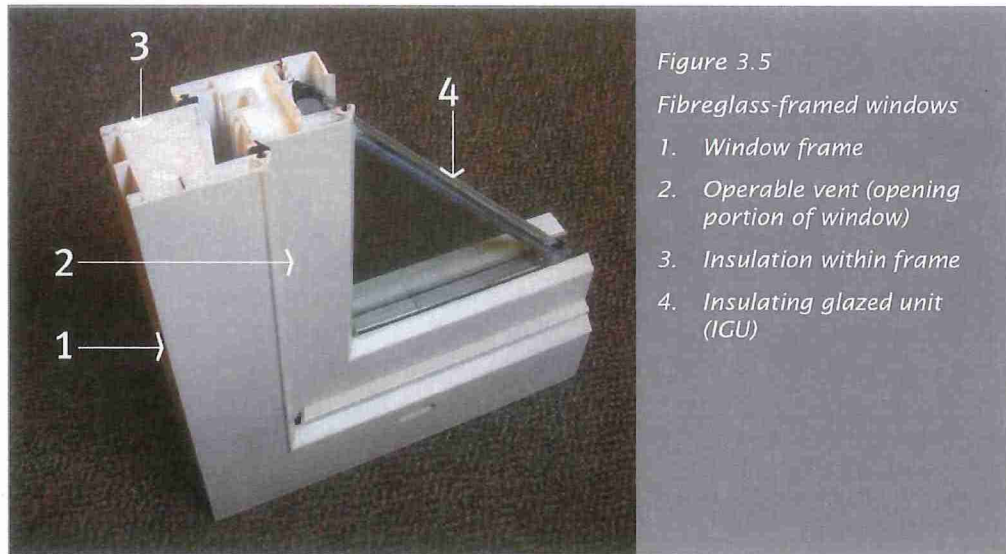


Figure 3.5

*Fibreglass-framed windows*

1. Window frame
2. Operable vent (opening portion of window)
3. Insulation within frame
4. Insulating glazed unit (IGU)

The glass components, referred to as insulating glazed units (IGUs), are typically double-glazed, although more energy-efficient, triple-glazed units are also becoming more common.

It is important to note that frame colour choices in vinyl-framed windows are limited, essentially white or beige. In comparison, fibreglass-framed windows have a wider range of colours available. Additionally, fibreglass-framed windows can also have different colours on the exterior and interior portions of the frame.

Both vinyl-framed windows and fibreglass-framed windows will provide a satisfactory level of performance for the proposed rehabilitation. However, fibreglass is generally regarded as a more rigid and dimensionally stable material when compared to vinyl. Additionally, fibreglass-framed windows will provide improved thermal resistance and overall improved energy performance when compared to vinyl-framed windows.

Fibreglass-framed windows and doors are typically more expensive than vinyl-framed units. Given the size of the proposed rehabilitation at the Joyce Place townhouses, it is likely that fibreglass-framed windows will be a more costly option when compared to vinyl-framed windows.

**Based on the ratio of exterior wall area to window area at the Joyce Place townhouses, double-glazed IGUs with a low-conductance frame will likely be satisfactory to meet the prescriptive energy performance requirements of the City of Vancouver. The cost estimates presented in Section 5 of this report assume the use of a double-glazed, vinyl-framed window assembly.**

### 3.1.3 Design Considerations: Balconies, Enclosed Balconies, and Decks

Balconies and decks may initially appear to be similar, but for reasons of function and performance, are different:

- 'Balcony' refers to a horizontal surface exposed to the outdoors and intended for pedestrian use but projecting from the building so that it is not located over a living space.



→ 'Deck' refers to a horizontal surface exposed to the outdoors, located over a living space, and intended for pedestrian use in addition to performing the function of a roof.

Based on the terminology above, there are both balconies and decks at the Joyce Place townhouses. Additionally, there are also enclosed balconies at the Joyce Place townhouses.

### *Balconies*

Based on the findings from the earlier RDH targeted structural investigation, there are areas of deterioration at/or adjacent to wood-framed balconies at the north elevation of the Joyce Place townhouses.



*Figure 3.6*

*Balconies at the north elevation of the Joyce Place townhouses are marked with arrows.*

The balconies are currently protected with a vinyl membrane. In order to access the underlying wood components, removal of the membrane and the balcony sheathing will be required to implement structural repairs. Following the implementation of structural repairs and installation of new plywood balcony sheathing, new vinyl membranes should be installed.

Vinyl membrane can expand and contract in conjunction with the underlying wood sheathing making it suitable for application on a wood substrate (Figure 3.7) in a protected application. Vinyl membranes are formed by thermally fusing individual sheets together to form a continuous membrane with seams.





*Figure 3.7*

*Example of a vinyl membrane on a wood substrate.*

*Note: This photo is not from Joyce Place.*

Additionally, the existing balconies have a combination of stucco clad guard walls and aluminum-framed guardrails at the edges. This condition could be reproduced when balconies are rehabilitated (Figure 3.8). However, an alternative approach of omitting the guard walls and replacing them and the existing guardrails with new face-mounted guardrails should be considered (Figure 3.9).



*Figure 3.8*

*The existing condition with a combination of guardrails and stucco clad guard walls could be reproduced during rehabilitation; however, there are benefits to other approaches.*



*Figure 3.9*

*An approach of omitting the guard walls and replacing them with new face-mounted guardrails should be considered.*

There are a number of advantages to using full height face-mounted aluminum guardrails:

- As part of the rehabilitation process, guard walls will have to be rebuilt. Water ingress has occurred at these locations and has resulted in damage to underlying sheathing and wood framing. The repair process is expensive as is the application of new rainscreen stucco cladding and new flashings.
- Structural upgrading of balconies may require the full removal and rebuilding of the guard walls adding an additional expense.
- Use of new aluminum-framed guardrails is more cost effective and will result in an additional 6" to 8" of balcony space at the edge.
- Visually, new guardrails could enhance the appearance of the building, particularly on the north elevation, by reducing the extent of stucco cladding.

New aluminum-framed guardrails will be face mounted to the edge of the balconies to avoid the need to attach through the waterproof membrane. The guardrails could be picket type to match the existing style or could have glass panels. Glass panels could be clear or opaque to give more privacy, or a combination of clear and opaque (Figure 3.10 and Figure 3.11).



*Figure 3.10  
Aluminum-framed guardrail  
with opaque glass.*



*Figure 3.11  
Aluminum-framed guardrail  
with clear and opaque glass  
panels.*

Additionally, in a scheme with a mix of clear and opaque glass panels, the bottom edge termination of the opaque panel can be extended to the underside of the balcony edge. This will visually conceal the guardrail mounting brackets and could enhance the appearance of the building (Figure 3.12).





*Figure 3.12*

*A guardrail scheme with a mix of clear and opaque glass panels that extend to the underside of the balcony edge could enhance the appearance of the building.*

**Given the level of deterioration previously observed at balconies and the wall areas adjacent to balconies, rehabilitation of the balcony assemblies is required.**

### *Enclosed Balconies*

According to the original architectural drawings, the typical and end units have enclosed balconies at the first and second floors. Additionally, three of the eight townhouse units have installed glazing at the exterior edge of their second floor balcony (adjacent to the guard wall and guard rail), effectively forming a retrofit enclosed balcony.

Enclosed balconies are common in many residential buildings in the City of Vancouver and are regulated by by-laws and guidelines. The original intent was to improve on conventional balcony design by providing outdoor space that could be used year-round regardless of weather conditions. Essentially the enclosed balcony would be the same as a conventional balcony, but with the open portions glazed providing a more tempered environment protected from rain. The space was not intended to be heated, and for this reason, the walls between the enclosed balcony and the remainder of the unit were to be treated as conventional exterior walls and insulated. An exterior door was intended to be provided between the enclosed balcony and the unit.





or ground floor kitchen. The adjacent bedroom or kitchen (second floor and ground floor, respectively) are not designed with separate window openings to the exterior. Additionally, the ground floor enclosed balconies have a second access from the foyer of the townhouse.

With respect to the enclosed balconies shown on the original architectural drawings, aluminum-framed windows at the exterior walls that in part form the enclosed balconies shown on the architectural drawings (refer to Figure 3.14 and Figure 3.15) should be replaced as part of the proposed building enclosure retrofit project.

### Decks

There are decks at the third floor of the Joyce Place townhouses, typically located along the south elevation of the building. The existing deck assemblies are currently protected with vinyl membranes. Vinyl membrane may be suitable for use on a less exposed balcony assembly; however, a more robust roofing type membrane is required for use on a fully exposed deck.

The existing deck assembly is a vented assembly. Ventilation for the existing deck assembly is provided by means of cross-ventilation between the wood joist framing of the current assembly, formed by tapered pieces of wood installed across the top of the joists. The outlet for this natural ventilation configuration is typically located at the vent grilles visible at the privacy walls between deck assemblies (Figure 3.16 and Figure 3.17).

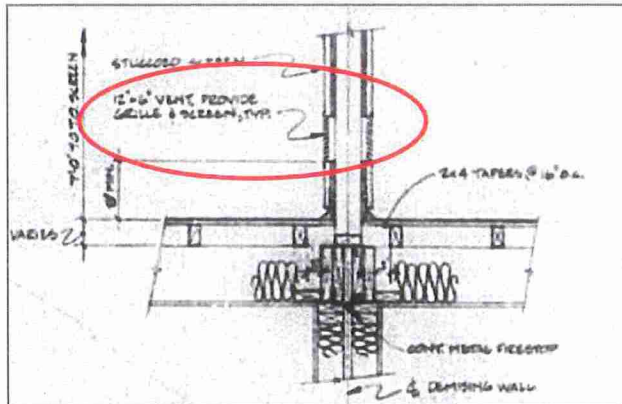


Figure 3.16

Partial view of section detail L on sheet A10 of the architectural drawings.

Exhaust grille for the ventilation system of the existing deck assembly is circled.



Figure 3.17

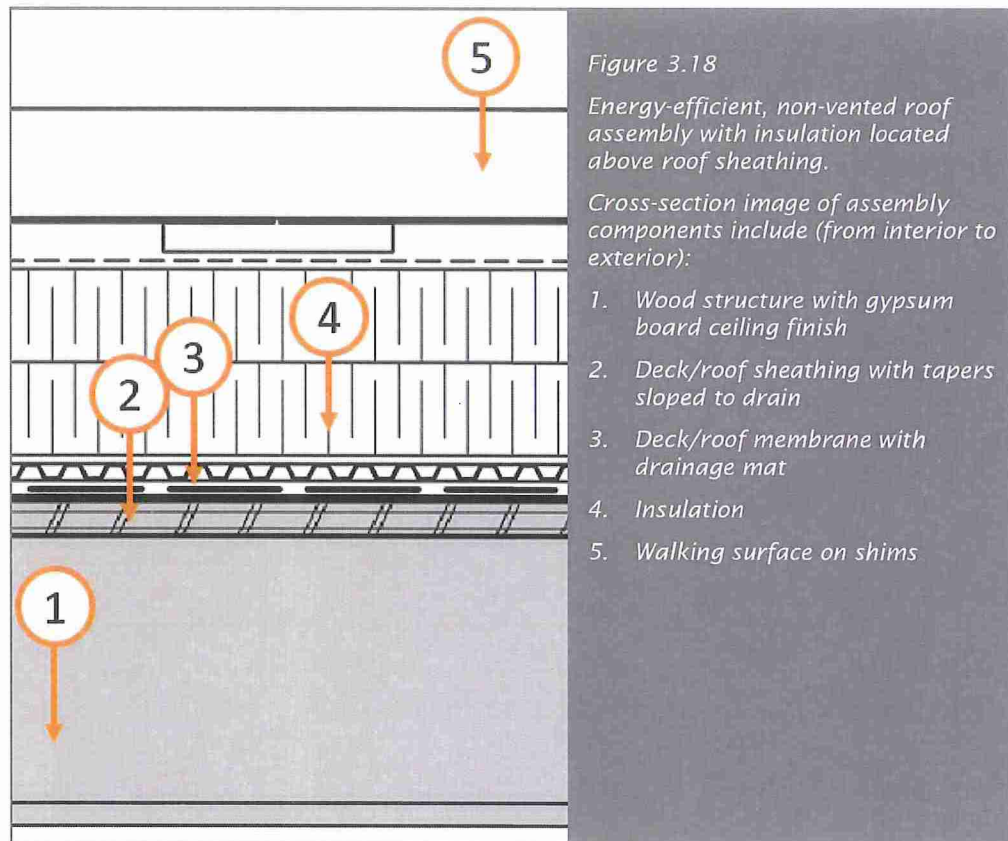
Decks and divider walls at the south elevation of Joyce Place townhouses.

Exhaust grille for the ventilation system of the existing deck assembly is circled.

A consideration for the long-term durability of the decks is to rehabilitate the decks with a non-vented assembly.

While a non-vented deck would provide improved energy performance, it is thicker than the current deck assembly and may require an increase in height of the guard walls at the deck perimeter. Due to tightening energy performance standards in the City of Vancouver, decks will typically require a layer of continuous insulation above the deck/roof membrane to meet the requirements of the Vancouver Building By-law.

Additionally, non-vented deck assemblies reduce the likelihood of condensation occurring within the framing cavities of a traditional vented assembly. Ventilation of deck/roof assemblies requires careful consideration of air barrier detailing, ventilation intake, and outtake placement to properly mitigate the risk. Taken together, the benefits of renewing the deck assembly with a non-vented type assembly is a prudent approach to improve the long-term durability of the assembly, while meeting the energy performance requirements of the Vancouver Building By-law.



Additionally, changing the deck assembly from a vented to non-vented assembly would allow for the elimination of the framed privacy wall between decks that also serves as the ventilation outlet for the deck assemblies. There are benefits to eliminating the framed privacy wall between decks and replacing the privacy wall with an aluminum-framed privacy wall (Figure 3.19):

- Eliminates a number of interface details that can be problematic to detail from air and moisture management.
- Allows for an opportunity to enhance the appearance of the building.

- Allows for potentially an extra 3" to 4" of deck space along the length of the privacy wall by installing a thinner privacy wall between decks.
- Potential cost savings in using aluminum-framed privacy walls with infill panels instead of rehabilitating wood-framed stucco clad privacy walls.



*Figure 3.19*

*Example of privacy wall integrated with guardrail system instead of a framed divider wall.*

Rehabilitation of decks will involve replacing the existing waterproof membrane and repairing any damage to the concealed wood material. The existing vinyl membrane will be replaced with a modified bitumen membrane more suitable for a deck application. Use of this type of membrane requires that a separate walking surface, such as wood decking, be added (Figure 3.20).



*Figure 3.20*

*Example of wood deck boards used to provide a walking surface above a deck membrane.*

*Note: This photo is not from Joyce Place.*

**Based on the requirements identified in the Vancouver Building By-law, it is likely that 4" to 6" of exterior insulation at the deck assemblies will be required to meet the energy performance requirements of the City of Vancouver. The finalized insulation thickness will depend on interface details that are developed as part of a cohesive construction document package.**



### 3.1.4 Design Considerations: Roofs

There are several roof assemblies at the Joyce Place townhouses:

- Low-slope membrane roof (flat roof): level 3 at the north, east and west elevations of the building, and main roof area (above level 3)
- Sloped roof assembly with asphalt shingles: main roof area (above level 3)
- Metal roof assembly: level 3 at the south elevation of the building

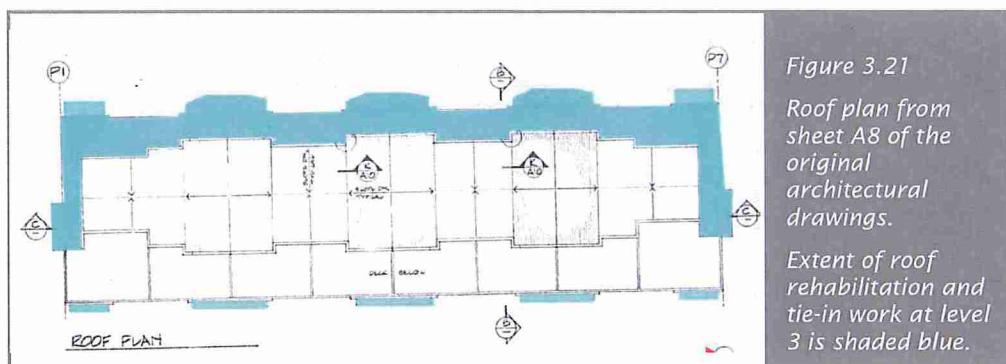
Based on our findings, the various roof assemblies at Joyce Place are providing varying levels of performance. RDH was not made aware of active leaks below the main roof area at the time of the additional investigation.

Roof areas at level 3 are typically narrow and/or small. Roofs at level 3 will be impacted by the rehabilitation work at the adjacent exterior walls due to tie-in work between the exterior walls and the flat roof or metal roof areas. In order to ensure satisfactory performance of the roofs and the adjacent wall assemblies, rehabilitation of the flat roof areas at level 3 and the metal roof assemblies at level 3 are proposed as part of the overall building enclosure rehabilitation program.

Similar to the discussion in the decks section of this report, flat roofs would be rehabilitated with a continuous insulation/non-vented type roof assembly.

Metal roof assemblies at the south elevation of level 3 are proposed to be rehabilitated with an exterior insulated standing seam metal roof assembly. Standing seam metal roof assemblies are considered very durable roof assemblies and will allow for the installation of continuous exterior insulation below the metal roofs to achieve the energy performance requirements in the Vancouver Building By-law.

Preliminary cost estimates presented later in this report only include the costs associated with rehabilitation of the flat roof area at the third floor level, third floor base of wall and top of wall tie-ins to roof area, and rehabilitation of metal roofs at the south elevation. Costs associated with renewal of the townhouse main roof area are presented as an optional item for consideration by the Owners due to economies of scale savings if the work is carried out in conjunction with the required rehabilitation work.







*Figure 3.22*

*View of existing low-slope membrane roof (flat roof) and sloped roof assembly at the main roof area above level 3.*



*Figure 3.23*

*Partial view of flat roof at level 3, west elevation. Approximate extent of tie-ins of the level 3 flat roof to the level 3 base of wall are marked with dashed lines.*



*Figure 3.24*

*Approximate extent of perimeter tie-in of main roof to be rehabilitated at level 3 top of wall areas is marked with a dashed outline on snapshot of 3D model.*



*Figure 3.25*

*Partial view of south elevation with locations of metal roof assemblies outlined.*



Figure 3.26

Close-up photo of an existing metal roof assembly at the south elevation.

### 3.1.5 Design Considerations: At- and Below-Grade Assemblies

A tie-in detail between the base of wall weather resistive barrier (WRB) at the joint at the transition between wood framing to the crawl space concrete wall is proposed. Existing ventilation within the crawl space is to be maintained. The base of wall will typically be protected with a prefinished metal flashing (Figure 3.27).

Additionally, the placement of the vapour barrier for the typical floor assembly above the crawl space should be verified at the time of the rehabilitation project. The original architectural drawings indicate the vapour barrier for the typical floor assembly for the crawl space is to be installed between the plywood subfloor and the joist framing.

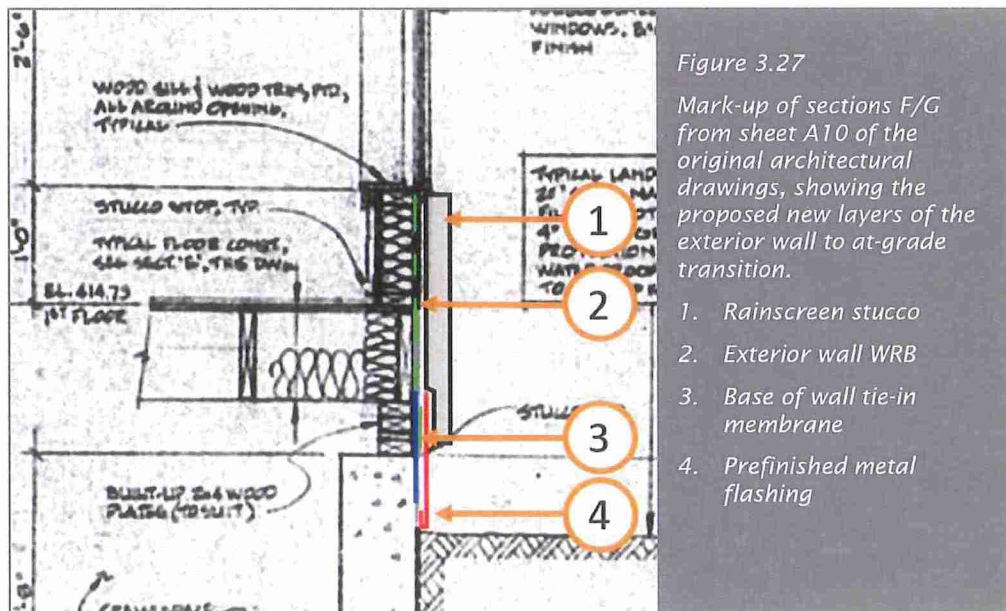


Figure 3.27

Mark-up of sections F/G from sheet A10 of the original architectural drawings, showing the proposed new layers of the exterior wall to at-grade transition.

1. Rainscreen stucco
2. Exterior wall WRB
3. Base of wall tie-in membrane
4. Prefinished metal flashing

## 3.2 Building Renderings

The design phase provides an opportunity to evaluate changes in the appearance of the building. Significant improvements in the overall appearance of the building can be achieved during the building enclosure rehabilitation project with consideration to colours of exterior finishes and colours of new elements that will be introduced on the building, such as new metal cross-cavity flashing.



The colour schemes in the renderings below are presented for visualization purposes. Substantial changes to the building colours may require Development approval by the City of Vancouver prior to obtaining a Building Permit.



*Figure 3.28 Existing colour scheme is renewed, new cross-cavity flashing and metal cap flashings match the colour of the existing metal flashings. Balconies incorporate full height guardrails with privacy glass and clear glass panel guardrails.*



*Figure 3.29 Existing colour scheme is renewed, new cross-cavity flashing and metal cap flashings are installed with a contrasting charcoal colour. Balcony guardrails match the colour of metal flashings and incorporate full height guardrails with privacy glass and clear glass panel guardrails.*



*Figure 3.30 Burnt Sienna colour scheme with charcoal accents. New cross-cavity flashing and metal cap flashings are installed with a charcoal colour. Balcony guardrails match the colour of metal flashings and incorporate full height guardrails with privacy glass and clear glass panel guardrails.*



*Figure 3.31 Pastel Green colour scheme with charcoal accents. New cross-cavity flashing and metal cap flashings are installed with a charcoal colour. Balcony guardrails match the colour of metal flashings and incorporate full height guardrails with privacy glass and clear glass panel guardrails.*

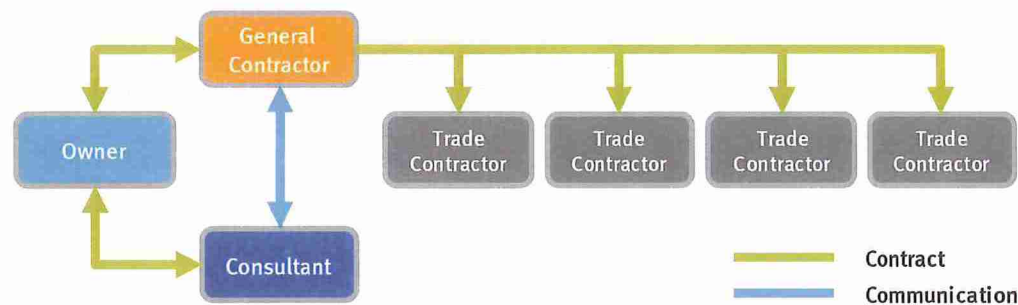


## 4 Project Implementation

### 4.1 Management

Rehabilitation projects are typically implemented using one of two approaches: a general contractor approach, or a construction management approach.

The general contractor approach has traditionally been one of the common implementation approaches for construction projects. In this approach, a general contractor (GC) is selected from a competitive bidding process to complete the work. The Owners have a contract directly with the GC, and the GC in turn has contracts directly with the various sub-trades who the GC retains independently to complete portions of the work. The Owners also have a contract directly with the consultant (RDH) to perform contract administration duties, complete field review of the construction, and act as the Owners' representative throughout the construction project.



*Figure 4.1 Traditional general contractor approach.*

In this scenario, RDH offers two levels of service: basic Contract Administration, or Project Management. The level of service that best suits the Owners' requirements depends on the size and scope of the project, and the Owners' desired level of control.

The second method of project implementation is a construction management (CM) approach. In this scenario, the Owners can retain a construction manager to act as their agent in the coordination and management of the rehabilitation process. CM services also typically include tendering the work directly to trade contractors and managing construction activities on site instead of tendering the work to general contractors.

In this scenario, the Owners have a contract directly with the construction manager and consultant, and the consultant has contracts directly with various contractors selected through a competitive bidding process to complete portions of the work.

In contrast to a GC tender approach, a construction management approach represents the highest level of control and involvement the consultant has during the project. It incorporates the basic Contract Administration duties and combines it with active management and control of the construction project. Over the past several years, this approach to project implementation has been very successful, and it has quickly become preferred by our many clients.

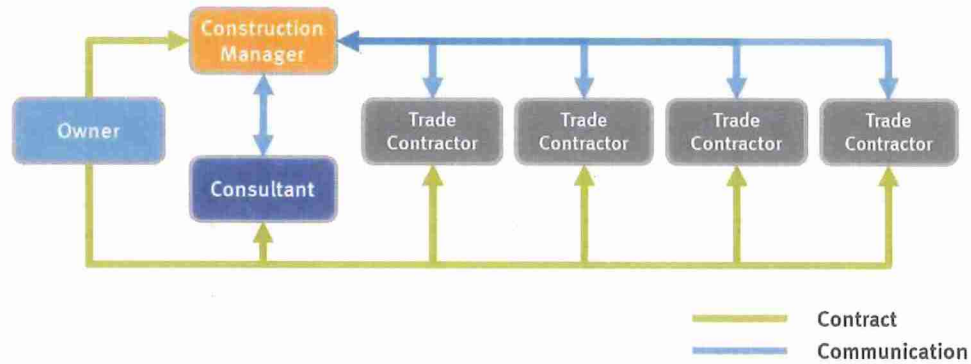


Figure 4.2 Construction management approach.

Many people are familiar with the GC approach since it is a traditional approach and is often used in purchasing construction services for homes and businesses. However, many sophisticated purchasers of construction services prefer the construction-managed approach.

For the proposed rehabilitation at the Joyce Place townhouses, either a General Contractor or Construction Management approach would be appropriate.

## 4.2 Phasing

A construction project can be implemented as a single, coordinated project, or the work can be split into phases and completed as a series of smaller projects. There are advantages and disadvantages to phasing the work and depending on the size and scope of the project, phasing is not always practical.

The rehabilitation program discussed in Section 3 of this report would be ideally implemented as a single project in the near future, considering the state of deterioration of the wood framing at the face-sealed stucco walls and the previously noted structural concerns.

Some general advantages and disadvantages of phasing a construction a project include:

TABLE 4.1 PHASING: ADVANTAGES AND DISADVANTAGES	
ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> <li>→ Lower initial project costs.</li> <li>→ Shorter construction period for each phase.</li> </ul>	<ul style="list-style-type: none"> <li>→ Total project costs are often higher than implementing work as a single project.</li> <li>→ Total construction duration and inconveniences are often longer than implementing work as a single project.</li> <li>→ General perception that the building is constantly “under repairs”.</li> </ul>

## 5 Preliminary Cost Estimates

In addition to understanding the nature and extent of required rehabilitation, it is also essential that the Owners have an indication of likely costs associated with the rehabilitation project. This report provides preliminary cost estimates of both construction costs and project costs based on a general contractor approach to project implementation.

### 5.1 Types of Costs

The total project cost for a construction project consists of the construction costs and the soft costs. Construction costs and soft costs generally consist of the following:

- Construction Costs:
  - General conditions
  - Sub-trade fees
- Soft Costs:
  - Contingency allowance
  - Engineering fees
  - Building permit fee
  - Landscaping allowance
  - Taxes (GST)

#### 5.1.1 Construction Costs

Construction costs are monies paid to the various trade contractors who will undertake the work. They include the cost of the labour and materials for each specific portion of the work, for example, to supply and install stucco cladding or roofing membranes. These costs also include the profit and overhead costs of each trade contractor. In addition, there are general conditions costs. These are project-specific site and overhead costs and include insurance, supervision, weather protection, and temporary facilities.

#### 5.1.2 Soft Costs and Contingencies

Soft costs are costs that are not directly related to the construction work but are required to implement and complete the project. Soft costs include engineering fees to design the repair program; produce the necessary documents for the contractor to bid on the work and complete the work, including drawings and technical specifications; and complete field review during the construction process.

Construction costs also include a project contingency amount of typically 10% to 15% of the construction cost. The contingency amount is intended to cover any cost changes that occur throughout the course of the project, including cost escalation during the pre-construction phase; unanticipated municipal costs or fees; unforeseen conditions arising during the construction phase; or the need for increased engineering fees during construction. Building a contingency into the budget guards against the need for the Owners to raise additional funds during the course of the project. Unused portions of the



contingency are returned to the Owners at the end of the project. **Given the extent of the structural deterioration of wood framing previously observed at the Joyce Place townhouses, a project contingency of 15% to 20% may be appropriate.**

## 5.2 Estimating Construction Costs

In preparing preliminary construction estimates, we use global costs based on a unit of measure. Our unit costs are based on actual tender results from previous projects, and discussions with various industry sources about market trends and conditions. Using standard spreadsheets that break the project down into individual parts based on the different trades involved, the value of each component is calculated. This is typically done by measuring the amount of each material or assembly in the project and multiplying by a unit cost. In the case of materials, such as stucco cladding, the area of cladding is measured. In other cases, for example, metal flashing, a linear measurement is calculated. Once the quantity of each element is measured, a unit cost is applied. An example of a unit rate would be \$25 per square foot to install a wall cladding type. The trade contractor's profit and overhead costs are also included in the unit rate cost.

The accuracy of these costs depends, in the first instance, on the measurement of the quantities. Quantities are measured from the original architectural drawing of the building. In our experience, these drawings can sometimes be incomplete, and do not always reflect the *as-built* condition of the building. Discrepancies are often subtle, and often do not become apparent until the construction documents for the rehabilitation project are developed.

Accuracy also depends on applying appropriate unit costs. These unit costs are estimated based on our experience of actual costs on other projects. The large number of projects RDH is involved with provides a database of costs that are updated on a regular basis. However, it is important to understand that the process is attempting to estimate what a trade contractor will charge for the work at some point in the future. The future cost may change as a result of increases in labour and material costs, and also as a result of industry demand for trade contractors. With increases in the volume of construction, there is a greater demand for trade contractors, which has the effect of increasing costs. The potential for cost increases will depend on volatility in the bidding environment, and also on the time period between completing of the estimate and the actual tendering of the project. At times, there can be a 10% to 15% fluctuation the particular sub-trade costs over the course of a year.

The Owners should be aware that final costs may vary from estimated costs as a result of the factors discussed above. It is not uncommon for the Owners to set aside additional contingency funds to accommodate possible escalations in construction costs.

There are certain unknown variables at this time that can impact the actual construction schedule and final costs, such as the extent of concealed wood rot at the existing wood framing and the time associated with rot repairs.

**At the time of writing of this report, the current trade pricing environment is particularly variable due to direct and indirect effects of COVID-19. We have seen a general escalation in trade pricing over the past calendar year due to labour shortages, construction material shortages due to reduced manufacturing capacity, and shipping delays.**

### 5.3 Preliminary Cost Estimate: Proposed Building Enclosure Rehabilitation

The preliminary cost estimate provided in Table 5.1 is based on an estimated 6-month construction schedule; however, the actual construction schedule can only be established at the time of tender.

TABLE 5.1 PRELIMINARY COST ESTIMATE (ROUNDED)	
<b>Construction Costs</b>	
General Condition Costs and Rehabilitation Costs	\$1,600,000
Project Contingency (20%)	\$320,000
<b>Total - Construction Costs</b>	<b>\$1,920,000</b>
<b>Total Construction Costs (from above)</b>	<b>\$1,920,000</b>
Landscaping, Security, and Legal Allowance	\$10,000
Engineering, Design, and Field Review - Allowance	\$220,000
GST (5%)	\$105,000
Building Permit Fee	\$10,000
<b>Project Costs Requiring Funding (rounded)</b>	<b>\$2,265,000</b>

For planning purposes and consideration by the Owners, we have provided a preliminary cost estimate to add an optional item to the work described above. The Owners can elect to include renewal of the townhouse main roof area at their discretion. There may be economies of scale type savings realized with the addition of the main roof area of the townhouse building during the rehabilitation project.

Please note the option to include the main roof area will require further discussion regarding the implementation with the proposed rehabilitation. The cost estimate for the optional item relating to the renewal of the main roof area includes contingencies, taxes, and allowances for engineering fees.

TABLE 5.2 OPTIONAL COST ESTIMATES (ROUNDED)	
Optional Item - Renew townhouse building main roof area (existing sloped roofs and low-sloped roofs above third floor townhouses).	\$290,000

The addition of the roof renewal scope of work will extend the project duration beyond the anticipated 6-month construction schedule. We estimate an additional one month would be added to the estimated 6-month construction schedule.

As previously noted, there are a number of variables that could impact the actual construction and project costs. Furthermore, it is important to remember that the construction industry is volatile, and that the actual project cost can only be established when the contractors bid on the project and when a contract is awarded. The construction industry pricing environment can vary significantly and is dependant, to a certain extent, on factors external to the actual project.

## 6 Next Steps and Closure

### 6.1 Next Steps

The basic steps of implementing a rehabilitation project involve documenting the repair solution in the form of drawings and specifications; tendering the work to several contractors in order to receive competitive pricing; selection of the preferred contractor; and implementation of the work by the selected contractor (Figure 6.1).

In our experience, projects that have the most successful outcomes are those in which careful planning and documentation have been completed prior to tendering and obtaining bids. This involves documenting the work with detailed drawings and specifications. This gives the Owners a higher level of control over the cost and completion of the project.

We recommend the Owners work with a professional consulting firm to complete the remaining project stages and phases. RDH would be pleased to provide a proposal for post-design engineering services.

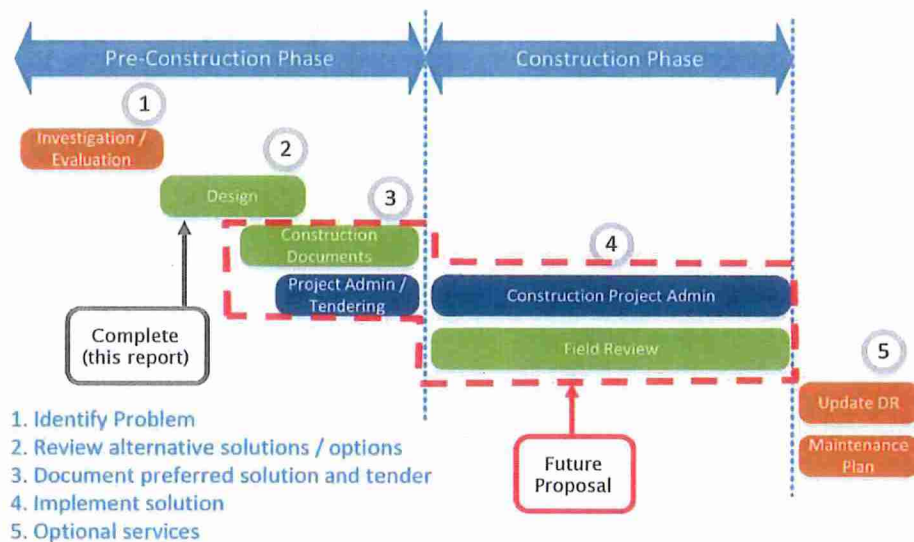


Figure 6.1 Stages of a Rehabilitation Project.



## 6.2 Closure

We trust this report meets the Owners' requirements at this time. Please do not hesitate to contact the undersigned to discuss this report, or if we can be of any further assistance.

Yours truly,



**Trevor Vilac** | Intern Architect AIBC  
Intern Architect (IA)  
tvilac@rdh.com  
T 604-873-1181  
**RDH Building Science Inc.**



**Reviewed by**  
**Paul Good** | P.Eng  
Senior Project Engineer  
**RDH Building Science Inc.**



# Appendix A

## Exploratory Openings







SOUTH ELEVATION, EAST END





EAST ELEVATION





SOUTH ELEVATION, WEST END





WEST ELEVATION

FROM **Trevor Vilac**  
TOTAL PAGES **8**

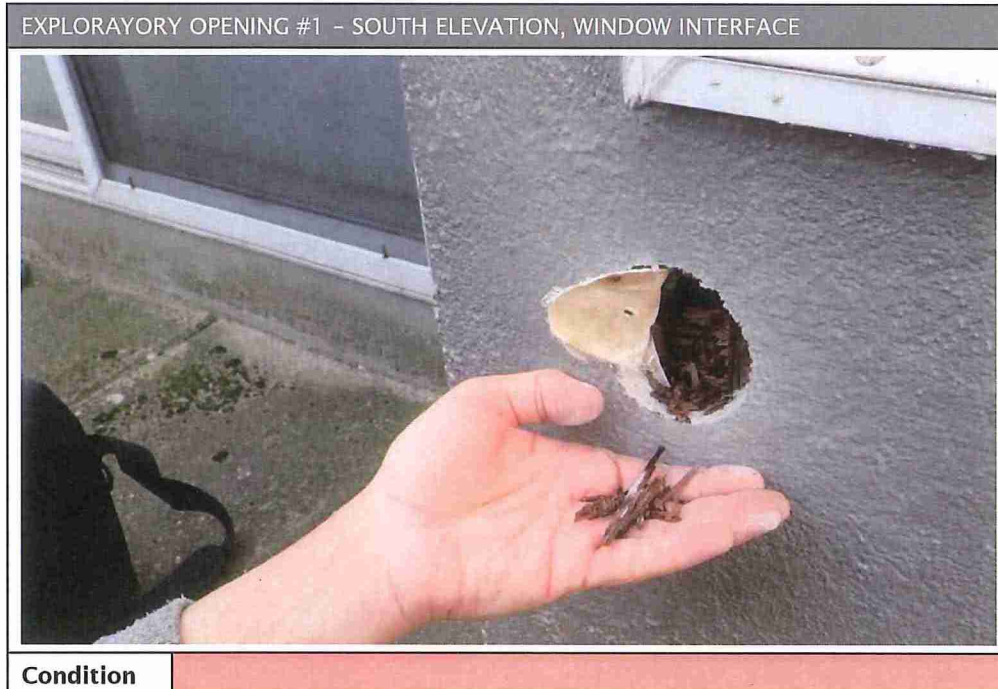
**R-02565.014**  
**Joyce Place**  
**Design Services - Townhouses**

Exploratory openings were used to assess the condition of underlying materials, which provide qualitative information based on the visual condition of the material.

Exploratory openings in exterior walls are typically made by cutting, coring, or removing sections of exterior cladding or interior finishes to review the condition of the concealed materials. The visual observations at each opening are classified based on the condition of the components reviewed. The table below shows the colour-based classification system for conditions at exploratory openings.

CLASSIFICATION OF CONDITIONS AT EXPLORATORY OPENINGS	
Green	Normal conditions with minimal or no evidence of moisture ingress.
Yellow	Some evidence of moisture ingress, including, but not limited to, staining, corrosion, and/or minor deterioration of assembly components.
Red	Significant evidence of moisture ingress, including, but not limited to, staining and/or deterioration of assembly components.

At Joyce Place Townhouses, 14 of the 15 exploratory openings were classed as red and 1 opening was classed as yellow.





EXPLORAYORY OPENING #2 - EAST ELEVATION, WINDOW INTERFACE

**Condition**

EXPLORAYORY OPENING #3 - EAST ELEVATION, WINDOW INTERFACE

**Condition**

EXPLORAYORY OPENING #4 - SOUTH ELEVATION, PARAPET INTERFACE

**Condition**

EXPLORAYORY OPENING #5 - SOUTH ELEVATION, DECK DIVIDER WALL

**Condition**

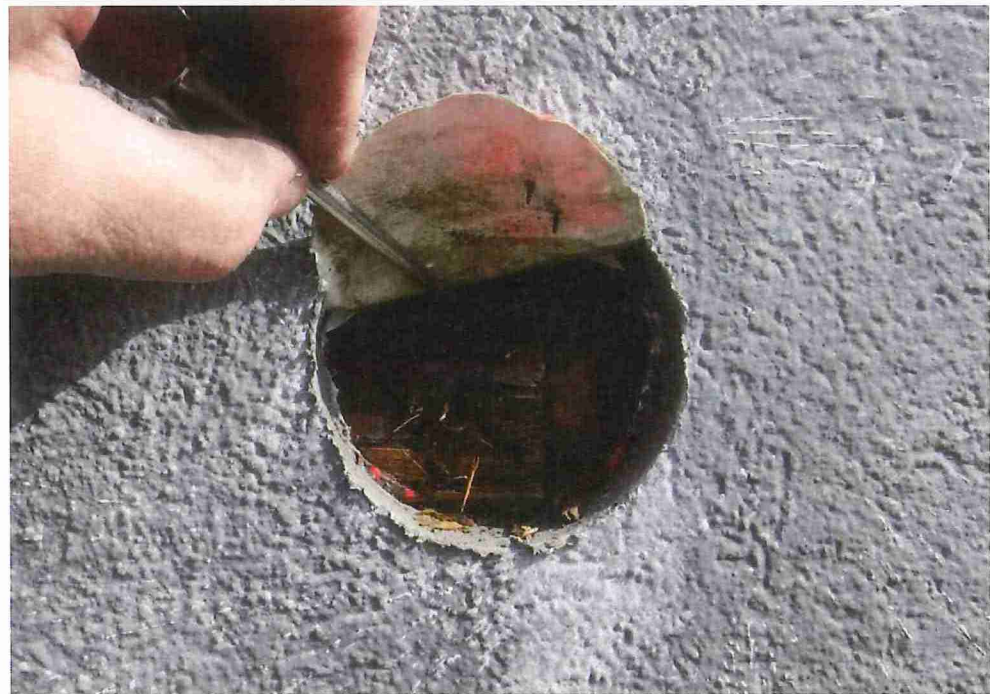


EXPLORAYORY OPENING #6 – SOUTH ELEVATION, WINDOW INTERFACE



Condition

EXPLORAYORY OPENING #7 – SOUTH ELEVATION, WINDOW INTERFACE



Condition



EXPLORAYORY OPENING #8 - SOUTH ELEVATION, WINDOW INTERFACE



**Condition**

EXPLORAYORY OPENING #9 - SOUTH ELEVATION, WINDOW INTERFACE



**Condition**

EXPLORAYORY OPENING #10 - WEST ELEVATION, WINDOW INTERFACE

**Condition**

EXPLORAYORY OPENING #11 - WEST ELEVATION, WINDOW INTERFACE

**Condition**



EXPLORAYORY OPENING #12 - WEST ELEVATION, WINDOW INTERFACE



**Condition**

EXPLORAYORY OPENING #13 - EAST ELEVATION, WINDOW INTERFACE



**Condition**



EXPLORAYORY OPENING #14 – SOUTH ELEVATION, WINDOW INTERFACE



Condition

EXPLORAYORY OPENING #15 – SOUTH ELEVATION, WINDOW INTERFACE



Condition

# <sup>67</sup>Appendix B

## Colours

















TO The Owners, Strata Plan LMS992  
C/O Leo Chan, Property Manager  
EMAIL leo.chan@mypropertymanager.ca  
Dwell Property Management  
#170 - 4311 Viking Way  
Richmond BC V6V 2K9

**R-02565.013**  
**Joyce Place | Temporary**  
**Structural Shoring - Townhouses**

DATE July 14, 2021

REGARDING **Final Site Visit Report**

Dear Leo,

Steelhead Contracting has informed RDH that they completed installation of the shoring in the crawlspace at Unit 3376. Steelhead has indicated the Unit 3376 crawl space shoring was installed in accordance with Project Drawing Shore 7/7. Steelhead emailed two photos of the installed shoring to RDH on July 9, 2021. Based on our review of Steelhead's submitted photos and precedence set by RDH's previous reviews of similar details associated with the Joyce Place Temporary Structural shoring project, we are of the opinion that installation of the crawl space shoring in Unit 3376 is in general conformance with project documents.

All specified temporary townhouse shoring has now been installed in general accordance with project documents - no more site visits are planned. We now consider this project to be complete.

Yours truly,



**Paul Good | P. Eng.**  
Senior Project Engineer  
pgood@rdh.com  
T 778 370-6935  
RDH Building Science Inc.

This is Exhibit "D" referred to in the affidavit of Paul Good sworn before me at Vancouver, British Columbia, this 5 day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.

cc: Donald Tatham - SHC  
Brian Yan Muk - Strata Plan LMS992

TO **The Owners, Strata Plan LMS992**  
C/O **Leo Chan, Property Manager**  
EMAIL **leo.chan@mypropertymanager.ca**  
**Dwell Property Management**  
**#170 - 4311 Viking Way**  
**Richmond BC V6V 2K9**

**R-02565.015**  
**Joyce Place | Temporary**  
**Structural Shoring - Townhouses**

DATE **December 2, 2022**

REGARDING **Temporary Shoring Review**

Dear Leo,

As requested, on November 25, 2022, RDH completed a review of temporary shoring that was installed early in 2021 at the eight townhouse units located at 3364-3376 Vanness Avenue, Vancouver, BC. It was raining with a temperature of approximately 7°C on the day of our site visit.

The purpose of our review was to ensure that the shoring has performed as intended, the shoring has not been damaged, and to determine if, due to ongoing water ingress, additional shoring is required. Our approved scope of work is described in our email proposal dated June 14, 2022 which has been partially reproduced below.

1. *In each of the eight townhouse units we will conduct visual reviews of the existing shoring to determine if it is functioning as intended. We will also conduct visual reviews of areas within each townhouse unit that are not currently shored to observe for indications of structural distress or deterioration. Our intention is to conduct non-invasive visual reviews; therefore, we do not intend to remove any finishes during our site visit.*
2. *Following our site visit, we will prepare a summary letter which will:*
  - a. *Describe our findings with respect to the condition of the existing shoring.*
  - b. *If applicable, provide recommendations for additional, possible invasive reviews where structural distress or deterioration, at areas that are not currently shored, is suspected.*
  - c. *Provide an estimated budget for RDH to conduct additional site work, if applicable.*

For reference, Drawings Shore-1 to Shore-7, Issued for Construction dated April 22, 2021, have been appended to this report. These drawings formed the basis of our review.

## Observations and Recommendations

Except as noted in Table 1, the shoring was found to be in acceptable condition and appears to have performed as expected. Furthermore, except as noted in Table 1, our visual review did not indicate requirements for additional shoring or structural review.

This is Exhibit "E" referred to in the affidavit  
of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.

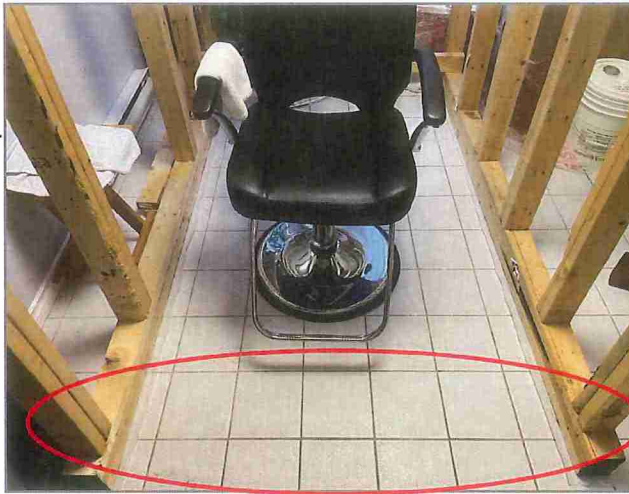


Table 1 – SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS	
Unit 3362 Main floor shoring supporting 2 <sup>nd</sup> floor	<p>The 2x4 brace at the top of the ground floor shoring is loose – refer to Figure 1.</p> <p><b>Recommendation:</b> Remove and re-attach the 2x4 brace as indicated on Drawing Shore -5</p>
Unit 3372 South Deck	<p>The occupant reported ongoing water ingress through the second floor ceiling at the south end of the unit. There is noticeable displacement of the ceiling at the leak location.</p> <p>There is a 3<sup>rd</sup> floor deck above the location of the reported leak.</p> <p>RDH visually reviewed the deck from its top surface. The deck is covered by a membrane, thus concealing the majority of the deck assembly's components. The deck's membrane is no longer effective, and the deck's floor is soft.</p> <p>It is likely that the structural framing that supports the 3<sup>rd</sup> floor deck is structurally compromised, however, without direct observations, it is not possible to determine the extent of the structural deterioration. If the framing deterioration is severe enough, snow, which may accumulate on the third floor deck, may cause a portion of the third floor to collapse.</p> <p><b>Recommendation:</b> Access to the third floor deck should be prohibited until the structural framing can be evaluated. If an appreciable amount of snowfall occurs, the unit's occupants should be instructed to avoid the second floor area that is beneath the third floor deck until framing issues have been resolved.</p> <p>To resolve the framing issues the following action is recommended:</p> <ol style="list-style-type: none"> <li>1. Retain a qualified professional to conduct a hazardous material (hazmat) analysis of the second floor ceiling assembly. This step may not be necessary if the Owners are already in possession of a suitable hazmat report.</li> <li>2. Carefully remove drywall from the 2<sup>nd</sup> floor ceiling, being mindful of the fact that a large volume of water may be retained within the ceiling assembly. Drywall and other material removal will need to follow hazmat precautions (if any) that are indicated in the hazmat report.</li> <li>3. Retain a structural engineer to review the exposed framing and take appropriate action.</li> </ol>

Table 1 – SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS	
Unit 3374 Main floor shoring supporting 2 <sup>nd</sup> floor	<p>A 2x4 bottom brace is missing from the bottom of the shoring – refer to Figure 2.</p> <p><b>Recommendation:</b> Install the missing brace as indicated on Drawing Shore – 5.</p>
Unit 3376 North exterior wall	<p>Significant deterioration of the wall's wood framing, between the main floor and the second floor, has resulted in a risk of the windows detaching from the building in the event of a significant wind storm. Wind may be blowing towards or sucking away from the building. The wood framing deterioration is shown in Figure 3.</p> <p><b>Recommendation:</b> To mitigate the risk of the main floor windows detaching from the building, cover both the interior and exterior sides of the main floor windows with plywood. The plywood should be adequately fastened to sound framing around the windows' perimeters.</p>
Unit 3376 Crawlspace Shoring supporting main floor	<p>One of the shoring posts appears to have moved and is no longer plumb or fully bearing on its supporting plate – refer to Figure 4.</p> <p><b>Recommendation:</b> Remove and reattach the affected shoring post as per drawing Shore – 7</p>



*Figure 1*  
Unit 3362 – Main floor shoring  
The arrow indicates the location of a loose brace.



*Figure 2*  
Unit 3374 - Main floor shoring  
The red ellipse indicates the  
location of a missing brace.



*Figure 3*  
Unit 3376 - Deteriorated  
exterior wall - main floor



*Figure 4*  
Unit 3376 - Crawl space.  
Out of plumb post not fully  
bearing on the supporting  
plate (red arrow).

Our June 25, 2020 report indicated the following with respect to third floor decks:



*At all of the reviewed third-floor deck membranes, discontinuities at membrane seams were observed... The deck membrane at Unit 3370 has been patched, and it was apparent that the sheathing beneath the patch has deteriorated to the point that it can no longer support pedestrian traffic.*

#### **Recommendation:**

Considering that structural framing at the third-floor deck at Unit 3370 is known to be compromised (although the extent of the structural deterioration is not known), it would be prudent to implement the recommendations at Unit 3370 that have been recommended for Unit 3372 as described in Table 1. Furthermore, additional, invasive review of third floor structural framing (beneath third floor decks) is recommended.

#### **Project Budget**

To date, we have expended approximately \$3,500 in consulting fees. Our estimated of additional costs to implement the recommendations contained in this report is summarized in Table 2.

TABLE 2 – ESTIMATED BUDGET TO IMPLIMENT RECOMMENDATIONS		
ITEM	ESTIMATED COST	COMMENTS
Hazmat Report	\$1,000	Third party contractor, retained by the owners, but taking direction from RDH.
General Contractor	\$3,000	<p>Third party contractor, retained by the owners, but taking direction from RDH.</p> <p>Contractor will be retained to install missing bracing, address the misaligned post in Unit 3376 and remove ceiling finishes and dispose of waste from approximately four units. Estimated contractor fees are based on the assumption that special hazmat precautions will not be required. Contractor costs could increase significantly if hazmat precautions are required.</p> <p>The estimated cost does not include an allowance to reinstate 2<sup>nd</sup> floor ceiling assemblies.</p>
RDH Consulting Fees	\$3,500	<p>Allowance for:</p> <ol style="list-style-type: none"> <li>1. Providing direction for a Hazmat consultant, including one site visit.</li> <li>2. Providing direction for a general contractor, including one initial site visit.</li> <li>3. Review exposed third floor framing at approximately four units – one site visit planned.</li> <li>4. Prepare a written report which will:               <ol style="list-style-type: none"> <li>a. Describe site visit observations</li> </ol> </li> </ol>

TABLE 2 – ESTIMATED BUDGET TO IMPLIMENT RECOMMENDATIONS		
		<ul style="list-style-type: none"> <li>b. Provide recommendations for additional remedial work, as applicable</li> <li>c. Update project budget.</li> </ul>

#### Notes to Table 2:

RDH fees will be invoiced based on time and expense in accordance with General Terms and Conditions that were issued with our June 14, 2022 proposal. Estimated costs have been developed based on currently available information and are subject to change as more information becomes available. RDH will apprise the Owners if increases to the above cost estimates become apparent.

Cost estimates are exclusive of applicable taxes and expenses.

#### Concluding Remarks

We trust this report addresses the Owners' current requirements. Please indicate by return email if the Owners would like RDH to assist with implementing the recommendations contained in this report.

Yours truly,



**Matthew Cheong | EIT.**  
Structural Engineer (EIT)  
mcheong@rdh.com  
T 778-370-6937  
RDH Building Science Inc.


Practice Permit: 1003380



Reviewed by  
Paul Good | P.Eng.  
Senior Project Engineer  
pgood@rdh.com  
T 604-873-1181 x189  
RDH Building Science Inc.

cc: Tetsu Takagaki – Crown Mackay & Company Ltd.

This is Exhibit "F" referred to in the affidavit  
of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.



TO **The Owners, Strata Plan LMS992**  
 C/O **Leo Chan**  
 EMAIL **leo.chan@dwelldproperty.ca**  
 Dwell Property Management  
 #170 - 4311 Viking Way  
 Richmond BC V6V 2K9

**R-02565.015**  
**Joyce Place | 2022 Townhouse**  
**Shoring Review**

DATE May 26, 2023

REGARDING **Review of the Third-Floor Decks at Townhouses**

Dear Leo,

As requested, RDH completed a visual review on May 19, 2023, assessing the third-floor decks as well as the condition of the ceilings below the decks at the eight townhouse units located at 3364-3376 Vanness Avenue, Vancouver, BC. The weather conditions during our site visit were mostly sunny, with a temperature of approximately 22°C.

The purpose of our review was to identify any visual indications of potential moisture damage to the deck framing and determine where further invasive investigation would be necessary. We were able to access seven out of the eight requested units. Unit 3362 was not available at the time of our review. It would be prudent to arrange for RDH to review Unit 3362.

#### **Observations and Analysis**

We observed several deficiencies in the PVC deck membranes of all seven reviewed townhouse units. Observed deficiencies included: membrane delamination, debonded membrane joints, discontinuities at fastener penetrations and areas of mechanical damage. These deficiencies have likely resulted in water ingress into the concealed joist space. Some decks have received localized patch repairs to address water ingress issues, which involved the use of unknown types of tapes to seal openings or covering membrane holes with sealant and metal plates. It is important to note that proper patch repairs for PVC membranes typically involve gluing and welding a compatible PVC membrane patch to the affected areas.

In addition, we noted soft floor areas on multiple decks. This represents a concern from a structural perspective as the underlying framing at those locations may be compromised.

Furthermore, we observed staining on the ceilings below several decks. This suggests that water ingress has occurred, and the deck framing has been exposed to moisture damage. Notably, at Unit 3372, the drywall ceiling below the deck has bulged down between the light fixture and the closet wall.

#### **Recommendations and Next Steps**

Based on findings during our site visit, we recommend the following actions for the Owners to address the identified issues:

1. Complete targeted PVC membrane patch repairs at all eight decks as a temporary measure to prevent further water ingress. It is essential to address this promptly, ideally before the start of the rainy season. The contractor engaged for this task

should conduct a comprehensive review of the deck membrane and ensure that all deficiencies are appropriately repaired.

2. Remove sections of the drywall ceiling below the decks in Units 3368, 3370, and 3372 to allow for a review of the concealed structural framing. The quote provided by Steelhead Contracting Ltd. for the removal of the interior drywall ceiling has been approved by the owners, and a copy of it is attached to this letter for your reference. RDH will coordinate a site visit with Steelhead at which time Steelhead will remove drywall finishes at the three aforementioned units. As noted in Steelhead's quote, access to other units is also required to address previously noted issues with respect to existing shoring. Once Steelhead has exposed the deck framing, RDH will revisit the site to review and provide guidance for additional shoring installation or other work as appropriate.
3. As mentioned in our previous report dated December 2, 2022, access to each of the third-floor decks should be prohibited until structural framing issues have been resolved.

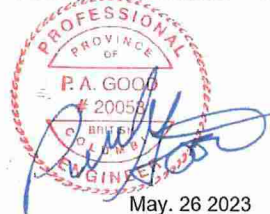
In the coming days we will reach out to you and Steelhead to coordinate Steelhead's next site visit. Should you have any questions regarding this project, please do not hesitate to contact either myself or Paul Good.

Yours truly,



**Daniel Song** | P.Eng. PMP  
Building Science Engineer  
dsong@rdh.com  
RDH Building Science Inc.

Practice Permit: 1003380



May. 26 2023

**Reviewed by**  
**Paul Good** | P.Eng.  
Senior Project Engineer  
pgood@rdh.com  
RDH Building Science Inc.

cc: Tetsu Takagaki – Crowe Mackay | Tetsu.Takagaki@crowemackay.ca  
Derek Lai – Crowe Mackay | Derek.Lai@crowemackay.ca



# STEELHEAD CONTRACTING LTD.

83

4179 McConnell Drive, Burnaby, BC V5A 3J7 Phone 604-420-9368 Fax 604-420-9378  
www.steelheadcontracting.com

## Quotation

**RDH Building Science Inc**  
**#400, 4333 Still Creek Drive**

**Date:** 03/01/2023

**Burnaby, BC V5C 6S6**

**Quotation 12091**

**Cust ID: 2767**

**Attention:** Paul Good

**Building Address:** Joyce Place, 3362-3376 Vanness Avenue, Vancouver

**Strata Plan #:**

**Scope of Work:** Temporary shoring/sheathing  
Drywall removal for inspection

### Recommendation #1

- Use low level hazmat procedures to remove and dispose of 8' x 8' of ceiling drywall
- Install new drywall after engineering inspection and fire tape only - no finishing

### Labour and materials:

- 3 units ... \$ 7,925.00 plus GST
- 8 units ... \$ 21,150.00 plus GST

### Recommendation #2:

- Install 1/2" plywood over the inside and outside of the second floor windows - north elevation

Labour and materials ... \$2,750.00 plus GST

### NOTE:

- Adjust minor existing shoring as required while on site

**Quotations are valid for 30 days. Prices quoted are subject to applicable tax.**

**Invoices are payable upon receipt. 2% per month service charge on all overdue accounts.**

**Please sign and return if all terms of the above quotation are acceptable, including our Terms and Conditions, attached.**

per

  
Steelhead Contracting

\_\_\_\_\_  
Owner or Representative

\_\_\_\_\_  
Date

E. & O.E.

<b>Subtotal</b>	<b>\$0.00</b>
<b>GST @ 5%</b>	<b>\$0.00</b>
<b>Quotation Total</b>	<b>\$0.00</b>

### All work covered by:

Commercial General Liability Insurance

WorkSafeBC Insurance



**HAVAN**  
Homebuilders Association Vancouver





This is Exhibit "G" referred to in the  
affidavit of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.

TO **The Owners, Strata Plan LMS992**  
C/O **Leo Chan**  
EMAIL **leo.chan@dwelldproperty.ca**  
Dwell Property Management  
#170 – 4311 Viking Way  
Richmond BC V6V 2K9

**R-02565.015**  
**Joyce Place | 2022 Townhouse**  
**Shoring Review**

DATE September 28, 2023

REGARDING **Site Visit Report**

Dear Leo Chan,

As requested by The Owners, Strata Plan LMS992 (Owners), RDH Building Science Inc. (RDH) completed a risk evaluation pertaining to potential structural decay of the wood framing that supports third-floor decks at the rear of eight townhouse units, located at 3362-3376 Vanness Avenue, Vancouver, BC.

## 1 Background

RDH completed a site visit on May 19, 2023, to evaluate the risks associated with water ingress through the third-floor townhouse decks and to review the condition of temporary shoring that had been previously installed at each of the eight townhouse units. RDH was provided access to seven of the eight townhouse units. Access to Unit 3362 was not granted in 2023. Following our review, we identified three units (3368, 3370 and 3372) as being the highest risk (high-risk units) of structural damage due to water ingress.

Steelhead Contracting (Steelhead) was engaged by the Owners to remove sufficient areas of ceiling drywall from the three high-risk units to permit RDH to evaluate the condition of the concealed structural components. In addition to making exploratory openings, Steelhead was also requested to install plywood sheathing over the north windows of Unit 3376, and complete minor adjustments to the existing shoring installed at Unit 3362 and Unit 3376. Refer to RDH's email correspondence, dated May 29, 2023, for a breakdown of the planned activities.

We understand that the Owners are in the process of winding down the Strata Corporation and that the townhouse units are not expected to be occupied for more than five years. Recommendations contained in this report are based on this understanding.

## 2 Field Review

Representatives from RDH completed three site visits at the townhouse units on June 14, August 25, and August 28, 2023. Shirley Yim from EPS Building Maintenance Inc. (EPS) accompanied RDH during each field review and provided translation service for the Owners and residents. The weather conditions during our site visits were:

- June 14, 2023: Cloudy, with a temperature of approximately 15°C.
- August 25, 2023: Cloudy, with a temperature of approximately 22°C.
- August 28, 2023: Sunny, with a temperature of approximately 21°C.

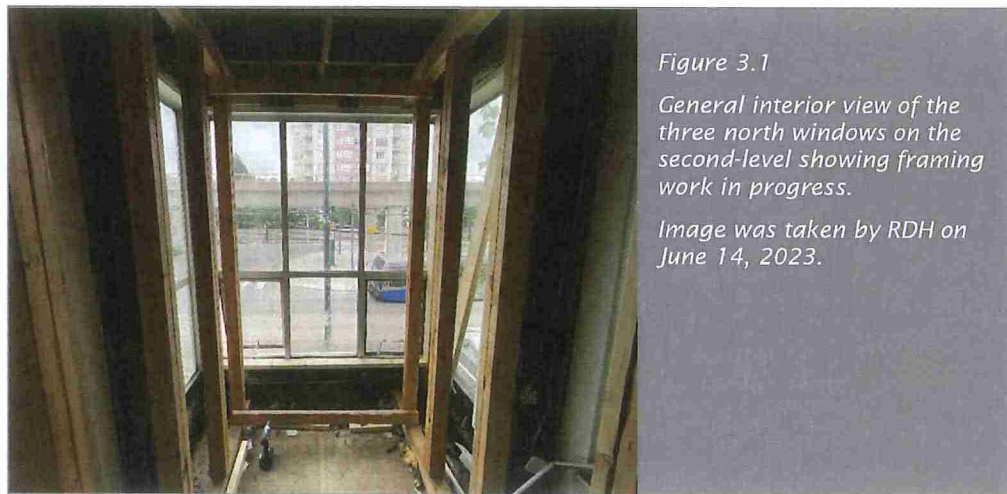
The purposes of RDH's site visits were to review the existing third-floor deck framing at the selected units, advise of any immediate structural concerns, and provide recommendations for next steps. Two of the three high-risk units, (Units 3368 and Unit 3370), declined to provide access to their units. Access to Unit 3362 also remained unavailable. Despite several coordination attempts by property management between June and September, only Units 3376, 3372, 3366, and 3364 granted access.

### 3 Observations and Analysis

#### 3.1 Unit 3376

The three north windows on the second-level of Unit 3376 were no longer supported by the wall framing due to significant wood deterioration around the window openings. Steelhead was instructed to install plywood sheathing covering both the interior and exterior sides of the windows to prevent the windows from detaching from the building in the event of a significant windstorm.

On June 14, 2023, RDH attended Unit 3376 to review the work progress. At the time of our visit, Steelhead was in the process of constructing a new 2x4 frame on the interior side of the window to support the interior plywood sheathing. The 2x4 frame was fastened to the adjacent floor joists and top plates. The installation ongoing at the time of RDH's site visit was proceeding satisfactorily. RDH requested photo documentation of the completed work for review purposes.



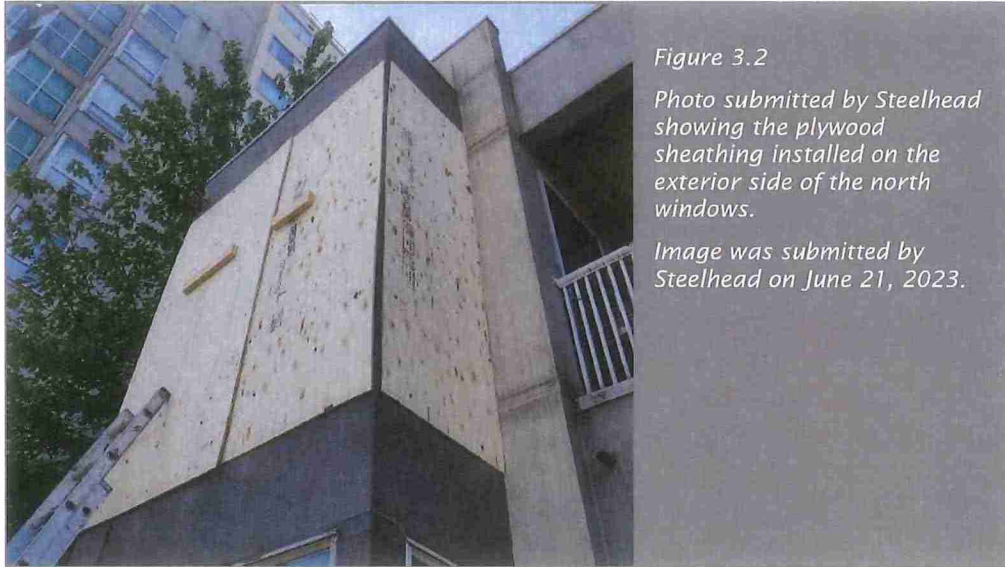
*Figure 3.1*

*General interior view of the three north windows on the second-level showing framing work in progress.*

*Image was taken by RDH on June 14, 2023.*

Steelhead submitted photos of the completed work on June 21, 2023, for RDH's review. Refer to Figure 3.2 below for example. Based on our site review and a review of Steelhead's photo, we are in the opinion that the window reinforcing was satisfactorily completed.





*Figure 3.2*

*Photo submitted by Steelhead showing the plywood sheathing installed on the exterior side of the north windows.*

*Image was submitted by Steelhead on June 21, 2023.*

On August 25, 2023, Steelhead returned to Unit 3376 to prepare an exploratory opening in the room below the third-floor deck. Steelhead removed a section of the drywall ceiling (approximately 8 feet by 8 feet) and the insulation to expose the wood framing for review (Figure 3.3). RDH observed staining, organic growth, and localized deterioration of the plywood deck floor sheathing. The existing plywood sheathing was compromised and should not be relied on to support resident's use of the deck.

Localized staining and organic growth were observed on the 2x10 wood joists that support the third-floor deck (Figure 3.4). However, the existing 2x10 wood joists were generally free from significant deterioration and their structural integrity was not significantly compromised.



*Figure 3.3*

*General view of the third-floor deck framing (underside) from the room below.*

*Unit 3376.*



*Figure 3.4*

*Close up view of the underside of plywood sheathing showing localized staining and deterioration.*

*Unit 3376.*

Following our review, Steelhead was instructed to reinstate the insulation, vapour barrier, and reinstate the drywall. In accordance with Steelhead's service proposal, mudding and painting was not completed.

### **3.2 Unit 3372**

On June 14, 2023, RDH attended Unit 3372 to review the exploratory opening prepared by Steelhead in the room below the third-floor deck. Steelhead removed a section of the drywall ceiling (approximately 8 feet by 8 feet) and the insulation to expose the wood framing for review (Figure 3.5). RDH observed staining, organic growth, and significant deterioration of the existing plywood sheathing at several locations (Figure 3.6). The existing plywood sheathing was compromised and should not be relied on to support resident's use of the deck.

Localized staining and organic growth were observed on the 2x10 wood joists that support the third-floor deck. However, the existing 2x10 wood joists were generally free from significant deterioration and their structural integrity was not significantly compromised.



*Figure 3.5*

*General view of the third-floor deck framing (underside) from the room below.*

*Unit 3372.*



*Figure 3.6*

*Close up view of the underside of plywood sheathing with significant deterioration.*

*Unit 3372.*

Following our review, Steelhead was instructed to reinstate the insulation, vapour barrier, and reinstate the drywall. In accordance with Steelhead's service proposal, mudding and painting was not completed.

### **3.3 Unit 3366**

On August 25, 2023, RDH attended Unit 3366 to review the exploratory opening prepared by Steelhead in the room below the third-floor deck (Figure 3.7). RDH's observations at this exploratory opening were generally consistent with our observations at Unit 3372 and Unit 3376. The existing plywood sheathing showed evidence of deterioration and should not be relied on to support resident's use of the deck (Figure 3.8). However, the existing 2x10 wood joists were generally free from significant deterioration and their structural integrity was not significantly compromised.



*Figure 3.7*

*General view of the third-floor deck framing (underside) from the room below.*

*Unit 3366.*





*Figure 3.8*

*Close up view of the underside of plywood sheathing showing staining and deterioration.*

*Unit 3366.*

Similar to the previous exploratory openings, Steelhead was instructed to reinstate the insulation, vapour barrier, and reinstate the drywall. In accordance with Steelhead's service proposal, mudding and painting was not completed.

### **3.4 Unit 3364**

On August 28, 2023. RDH attended Unit 3364 to review the exploratory opening prepared by Steelhead in the room below the third-floor deck (Figure 3.9). RDH observed staining, organic growth, and significant deterioration of the existing plywood sheathing (Figure 3.10). The existing plywood sheathing was compromised and should not be relied on to support resident's use of the deck.



*Figure 3.9*

*General view of the third-floor deck framing (underside) from the room below.*

*Unit 3364.*



*Figure 3.10*

*Close up view of the underside of plywood sheathing showing staining and deterioration.*

*Unit 3364.*

Localized staining, organic growth, and deterioration was observed on one of the double 2x10 wood joists that support the third-floor deck (Figure 3.11). The structural capacity of this damaged double 2x10 joist had been reduced which necessitated repairs. RDH provided repair instructions to Steelhead in the form of site sketches and verbal instructions. The repair involved applying preservative treatment to the existing damaged wood joist and sistering a new pressure treated 2x10 to the side of the damaged joist.



*Figure 3.11*

*Close up view of the underside of plywood sheathing showing staining and deterioration.*

*Unit 3364.*

Steelhead completed a structural repair the following day, August 29, 2023. Photos of the completed work were submitted to RDH on September 6, 2023, for review. Refer to Figure 3.12 below for example. Steelhead's photos indicated that the repair was completed in general accordance with site instructions.



*Figure 3.12*

*Close up view of the pressure treated 2x10 sistered to the side of the damaged joist.*

*Unit 3364. Image was submitted by Steelhead on September 6, 2023.*



While performing the joist repair at Unit 3364, Steelhead reported active water ingress at the third-floor deck during a rainy event (Figure 3.13). This was attributed to membrane deficiencies on the deck and tripod fasteners penetrating the deck membrane. Steelhead installed a temporary tarp to help protect the deck area; however, this measure will not address the water ingress issues.



*Figure 3.13*

*General view of the third-floor deck above the exploratory opening.*

*Unit 3364. Image was submitted by Steelhead on September 6, 2023.*

Following the joist repair at Unit 3364, Steelhead reinstated the insulation, vapour barrier, and reinstated the drywall. In accordance with Steelhead's service proposal, mudding and painting was not completed.

## 4 Recommendations and Next Steps

Our observations at Units 3376, 3372, 3366, and 3364 confirmed that the existing third-floor deck plywood sheathing is no longer capable of supporting pedestrian traffic. It is likely that similar conditions exist at the four townhouse units that were not accessed during this investigation. Our previous recommendation to the Owners to refrain from accessing the third-floor decks (all eight units) remains valid.

We are of the opinion that, at the time of our observations, the joists below the third-floor decks at Units 3376, 3372, 3366, and 3364 (after repairs were completed) are capable of supporting expected snow loading that may accumulate on the third-floor decks; however, if the third-floor deck water ingress issues are not addressed, the joists will eventually deteriorate to the point where they will no longer be capable of supporting expected snow loading. If joist deterioration progresses to this level, a risk of partial collapse of the third-floor decks would be incurred.

To mitigate the risk of continued structural deterioration, the Owners should complete membrane repairs, as noted in our previous report.

Since we were unable to access Units 3362, 3368 (high-risk), 3370 (high-risk), and 3374 to complete exploratory openings and structural reviews, we cannot comment on the condition of the third-floor deck framing at these units. The Owners/residents of these four units should be advised of the significant property and life-safety risks associated with condition of the third-floor decks. Furthermore, the Owners/occupants of these four



units should be advised to prohibit access to their third-floor decks and to avoid the second-floor bedrooms below the decks if snow accumulation occurs.

Considering that permanent measures to address water ingress issues are not expected to be implemented, we recommend that annual reviews by a qualified structural engineer be implemented at each of the eight townhouse units until they are no longer occupied. Ideally the reviews should occur in the summer after the rainy season.

Should you have any questions regarding this project, please do not hesitate to contact Paul Good.

Yours truly,



**Daniel Song** | P.Eng. PMP  
Building Science Engineer  
dsong@rdh.com  
**RDH Building Science Inc.**

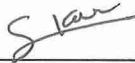
EGBC Permit: 1003380



**Reviewed by**  
**Paul Good** | P.Eng.  
Senior Project Engineer  
**RDH Building Science Inc.**

cc: Tetsu Takagaki – Crowe Mackay | Tetsu.Takagaki@crowemackay.ca  
Derek Lai – Crowe Mackay | Derek.Lai@crowemackay.ca

This is Exhibit "H" referred to in the  
affidavit of Paul Good sworn before me at  
Vancouver, British Columbia, this 5  
day of February 2025.



A Commissioner for taking Affidavits  
within British Columbia.

TO **Tetsu Takagaki**  
EMAIL **Tetsu.takagaki@crowemackay.ca**  
Crowe MacKay & Company Ltd.  
1100 – 1177 W. Hastings Street  
Vancouver, BC V6E 4T5

**2565.017**  
**Joyce Place**  
**2024 Townhouse Review**

DATE January 17, 2025

REGARDING **2024 Townhouse Review**

Dear Tetsu,

As requested by Crowe MacKay & Company Ltd. (CMC), RDH Building Science Inc. (RDH) is pleased to provide you with this report for which describes findings from our recent visual review of the eight-unit townhouse building, which forms part of the complex known as Joyce Place, located at 3362 to 3376 Vanness Avenue, Vancouver, British Columbia.

All eight units share common party walls with adjacent units and are thus contained within a single building. For the remainder of this report, the term building shall be used to refer to all eight units collectively, and each unit will be referred to by its municipal address i.e. the 3362 will be used in lieu of 3362 Vanness.

## 1 Background Information

### 1.1 Ownership history

Prior to January 7, 2021 (the Agreement Date) the building was collectively owned by the Owners, Strata Plan LMS2992 (Vendor). We understand that the building is now owned by Intracorp (Purchaser).

### 1.2 Building description

Figure 1.1 is an aerial view of the building, obtained from Google Maps, which identifies some of the elements that will be discussed in this report.

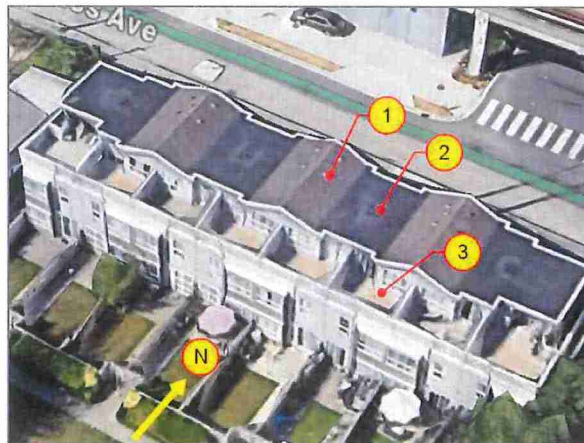


Figure 1.1

Aerial view from Google Maps

1 – Shingled roof

2 – Low slope roof

3 – Typical south third-floor deck



### 1.3 Intent of this report

The intent of this report is to provide an opinion as to whether, after the Agreement Date, the Vendor has maintained the building in substantially the same condition and state of repair, subject to reasonable wear and tear.

This report is limited to a visual assessment of a representative sample of the structural and building enclosure systems.

### 1.4 Relevant RDH history

Table 1.1 summarizes the various relevant investigations and reports that RDH has completed.

TABLE 1.1 SUMMARY OF RELEVANT PREVIOUS INVESTIGATIONS/REPORTS COMPLETED BY RDH		
Site visit date: June 17, 2020  Report date: June 25, 2020	Targeted Structural Assessment	This report describes serious structural deterioration in all eight units and provides recommendations for temporary structural shoring. See below for additional comments.
April 22, 2021	Temporary shoring drawings – Issued for Construction	Structural drawings which depict temporary shoring requirements for all eight townhouse units were produced.
April 30, 2021	Design Report	This report describes RDH's evaluation of the building's enclosure assemblies, recommendations for addressing building enclosure failures, and lists a preliminary budget estimate to implement the report's recommendations. The report's findings are summarized below.
July 14, 2021	Final Shoring Report	Report indicating that temporary shoring was installed in accordance with issued for construction drawings.
Dec 12, 2022 to September 27, 2023	General structural review	Several site visits were completed to review previously installed temporary shoring and to conduct general reviews of the building's structural framing. Our findings and recommendations were described in three site visit reports. A summary of the reports' findings is summarized below.

#### 1.4.1 Targeted Structural Assessment – June 17, 2020

The primary purpose of the site visit was to review, where possible, the condition of the units' structural elements and evaluate the potential for life-safety issues associated with the existing deterioration of wood-framed structural members. Considering that the purpose of the assessment was structural in nature, there was limited focus on water ingress issues. One component of the structural assessment involved localized removal of areas of drywall from the interior surfaces of exterior walls (referred to as observation openings). The observation openings provided an opportunity to review the condition of normally concealed wall assembly components. For reference, the wall assembly components are listed below, exterior to interior:

- Stucco cladding
- Sheathing paper
- Plywood sheathing
- Wood framing/batt insulation
- Polyethylene vapour barrier
- Interior drywall

At many of the observation openings, particularly at the north walls, wall cavity components were very wet, and structural components were deteriorated to the point where their ability to support structural loads was questionable. Localized areas of plywood sheathing were completely deteriorated.

Figure 1.2 shows the observed conditions of a typical north wall exploratory opening.



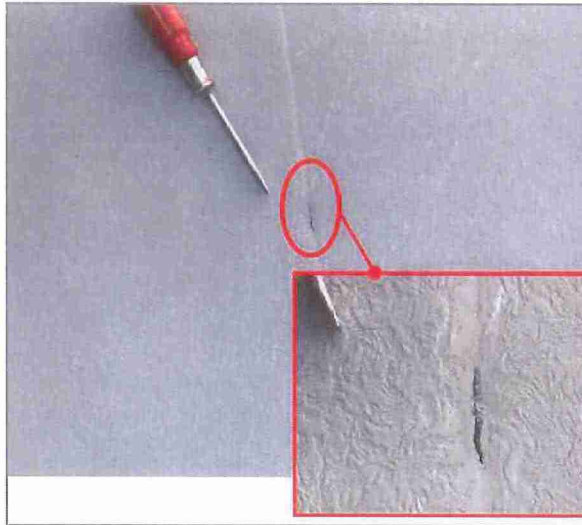
*Figure 1.2*

*Photo taken on June 17, 2020.*

*Typical Exploratory Opening. This photo shows the EO at the first-floor enclosed balcony, Unit 3370.*

- 1) Interior surface of sheathing paper. The sheathing paper, which is on the exterior surface of the plywood sheathing, is visible because the plywood sheathing has deteriorated.*
- 2) Deteriorated plywood sheathing.*
- 3) A section of deteriorated wood stud that removed from the EO.*
- 4) Polyethylene vapour barrier*

At all of the reviewed third-floor deck membranes, discontinuities at membrane seams were observed – refer to Figure 1.3 for example. The deck membrane at 3370 had been patched, and it was apparent that the sheathing beneath the patch had deteriorated to the point that it could no longer support pedestrian traffic – refer to Figure 1.4.



*Figure 1.3*

*Photo taken on June 17, 2020.*

*Third-floor deck at 3368 with membrane discontinuity at seam. Similar observations were recorded at other third-floor decks.*



*Figure 1.4*

*Photo taken on June 17, 2020.*

*Third floor deck membrane patch at 3370. The sheathing beneath the patch had deteriorated to the point that it could no longer support pedestrian traffic.*

The wet wall components, the deteriorated structural framing and the deteriorated plywood sheathing that were observed on June 17, 2020 were a result of long-term unmitigated water ingress.

#### **1.4.2 Design Report – Issued July 14, 2021**

Field review for the design report occurred on March 16, 2021 which is approximately two months after the Agreement Date. A general overview of the design report findings is summarized below. We suggest that our previous reports be reviewed to obtain a more comprehensive understanding of our observations and recommendations.

Water ingress through the building's north walls, balconies, and decks was confirmed. The level of damage and deterioration corroborated our conclusion from our previous site visit that water ingress had been occurring for dozens of months. Suspected leakage paths appeared primarily at material interfaces, window to wall interfaces, and balcony/deck membrane discontinuities.



The water ingress had caused:

- i. Wood framed structural components within exterior walls to deteriorate.
- ii. Wood framed structural components that support third floor decks at the building's south elevation to deteriorate.
- iii. Organic growth and staining within interior spaces and concealed cavities.
- iv. Corrosion of window components such that many of the building's windows could not operate as intended.

The report's recommendations included:

- i. Demolition and re-construction of all of the building's exterior walls, which would also include replacement of all exterior doors and windows.
- ii. Removal and replacement of all membranes that protect balconies, decks, and low sloped roofs.
- iii. Wall, balcony, deck, and roof re-construction would also include replacement of an unknown quantity of deteriorated wood frame structural members.
- iv. Building occupants were advised not to access third floor south decks.
- v. The Owners (Vendor) were advised that sloped shingled roofs appeared to have some remaining service life and therefore did not require replacement at the same time as the walls were to be replaced, however, economies of scale could be realized if shingled roofs were replaced in conjunction with the other required building enclosure assets.

#### **1.4.3 General Structural Review - December 2022 to September 2023**

The condition of temporary shoring was generally reviewed at a sample of locations, and minor adjustments were completed.

Third floor decks (Item 3 - Figure 1.1), at seven of eight units were assessed for structural damage caused by ongoing leakage of deck membranes. Access to 3362 was not available at the time of our site visit. Membrane discontinuities and indications of water damage were observed at all seven accessed units. Occupants of all units were reminded not to access their third-floor decks.

Drywall from the ceilings below the third-floor decks at 3364, 3366, 3372, and 3376 was locally removed so that concealed structural framing members could be visually reviewed and assessed. At all locations where third-floor deck framing members were exposed, decay, organic growth, and staining was observed, however, except for 3364, the observed damage was not significant enough to be of concern provided occupants did not access the third-floor decks and steps were taken to mitigate continued water ingress. The framing that supported the third-floor deck at 3364 was structurally compromised due to water related deterioration. This framing was augmented with new framing members. Ceiling drywall at all four units was reinstated but not repainted following the framing review/repairs.

RDH recommended repairs to the third-floor deck membranes to control water ingress.

The structural integrity of north elevation window frames at 3376 was a concern. To reduce the risk of window detachment, plywood sheathing was installed over at-risk window assemblies.

## 2 December 2024 Observations

RDH conducted a site visit on December 4, 2024. The weather on that day was sunny with temperature of approximately 4°C. The weather was similar for the week that preceded the site visit.

RDH accessed all eight units. All units were vacant except for 3362 and 3370. RDH was accompanied by two Intracorp representatives and a representative of RJC Engineers, who we understand was retained by Intracorp.

The site visit consisted of visual reviews, from building interiors and exteriors, of various building enclosure and structural systems. Only exposed items were visually reviewed – no architectural finishes were removed or dismantled.

General observations included the following:

- i. Ponded water was observed at many low slope roof locations, however, when viewed from interior spaces below the ponded water, no visual indication of water ingress was noted.
- ii. The condition of the shingled roofs was consistent for their age. Where ceilings were reviewed below shingled roofs, there was no observed evidence of water ingress. We are of the opinion that the shingled roofs will provide adequate performance for approximately two to three more years; however, ongoing monitoring should occur during this timeframe.
- iii. At the majority of units, there generally appeared to be limited indications of ongoing water ingress at the ceilings below third-floor decks (some exceptions are noted below). Localized vinyl patches had been installed at various locations at most of the third-floor decks. Many of the patches were poorly bonded and were peeling off or easily peeled off when a marginal manual force was applied at leading edges. These patches cannot be relied on to control water ingress.
- iv. Previously installed temporary shoring was no longer snug – likely due to shrinkage of wood components.
- v. At 3364:
  - a) The living room carpet was wet, and the kitchen counter was water damaged. Considering that these water damaged areas are not adjacent to exterior walls, it is unlikely that moisture encountered within this unit is a result of water ingress from the exterior. The interior water damage is more likely due to a plumbing leak; Intracorp may want to review these conditions further.
  - b) Recall that the drywall ceiling below the third-floor deck was replaced in 2023. The reinstated drywall was not painted. A small water stain (approximately 6" x 6") was observed on the drywall, which suggests that the third-floor deck has leaked since the drywall was replaced in 2023.

vi. At 3374:

- a) A small water stain (approximately 6" x 6") was observed on the drywall below the third-floor deck. Notwithstanding the stain, there appeared to be no other observed indications of water damage at reviewed locations.

vii. At 3376:

- a) At the first floor, an approximately 6" x 6" hole was observed in the floor sheathing at the north end of the unit in the enclosed balcony. The floor sheathing decay is to be related to water ingress through the building's exterior – very likely through the north exterior wall.

### 3 Discussion and Recommendations

The recommendations provided below have been developed based on our most recent observations, our ongoing involvement with this townhouse building, our assumption that currently vacant units will remain vacant, and that there is no desire on the part of the Vendor or Purchaser to implement long-term, permanent repairs.

The localized vinyl patches that have been installed at the third-floor south decks are not effective. To reduce the likelihood of structural deterioration due to water ingress, a more robust membrane repair approach at the third-floor decks is recommended.

RECOMMENDATION	
<b>1</b>	To reduce the likelihood of water ingress through third-floor decks, new membrane repairs should be implemented. Ideally, new membranes should cover each deck in its entirety.

The condition of the temporary shoring suggests that it is not actively supporting gravity loads. This condition is subject to change if existing additional stored items are placed in the rooms that are shored (unlikely in the vacant units) or if snow accumulates on the roof. Snow accumulation on the roof may cause the roof to deflect which could engage the shoring. When the shoring was installed, it was installed tight to the ceilings and relied on friction between the ceiling and the shoring to remain laterally stable. To avoid damages to ceiling finishes, no fasteners were installed between shoring top plates and ceiling drywall. If the shoring engages due to a change in loading conditions, it may not be laterally stable.

RECOMMENDATION	
<b>2</b>	To ensure that temporary shoring remains laterally stable, gaps between shoring top plates and ceiling finishes should be infilled with plywood or similar material and shoring top plates should be fastened to roof/floor framing, through ceiling drywall. Fasteners should be spaced 6 inches on center and should engage concealed wood framing. This recommendation also applies to shoring that has been installed in crawlspaces.



## RECOMMENDATION

3

The framing that supports the deteriorated floor sheathing in 3376 should be exposed and reinforced, as necessary. As a minimum, a 4'x8' sheet of  $\frac{3}{4}$  inch plywood should be placed over the hole.

## 4 Conclusions

Our initial assessment of the building in June 2020 (approximately six months before the Agreement Date) confirmed that ongoing water ingress had caused significant structural damage. The level of structural damage that was observed indicated that unmitigated water ingress had been occurring for dozens of months.

Our design report describes the townhouse building's condition approximate two months after the Agreement Date. A general comparison of observed conditions from our various site visits beginning from March 16, 2021 and most recent December 4, 2024 site visit is itemized below:

- i. In 2021, water ingress at multiple locations at the building's north wall was observed. The water ingress caused deterioration of concealed structural components, rendered various windows inoperable, and caused organic growth. The level of observed structural damage, damaged windows and organic growth corroborated our conclusion that unmitigated water ingress had been occurring for dozens of months prior to our June 2020 initial site visit. Our December 2024 observations suggest the wood frame deterioration has locally progressed to the building's interior framing at at least one location (refer to Recommendation 3).
- ii. Observations from our December 4, 2024 site visit did not indicate that water ingress through the building's east, south and west walls has occurred.
- iii. Water ingress and associated damage in the vicinity of third-floor decks was documented, and, where necessary, locally addressed to reduce the likelihood of localized structural collapse. Minor localized water ingress at these decks still appears to be occurring in some locations. Our most recent observations suggest that, provided occupants do not access third-floor south decks, the risk of localized collapse remains unchanged since our initial observations, provided Recommendation 1 is implemented.
- iv. The low slope and shingled roofs have continued to provide reasonable performance.

In conclusion, with the exception of the localized interior structural damage noted in 3376, and the apparent shrinkage of temporary wood shoring, we are of the opinion that the building has been kept, repaired, and maintained to substantially the same condition and state of repair as of March 16, 2021. Furthermore, the advanced extent of moisture related damage that was observed on March 16, 2021 suggest that significant water ingress through exterior walls and third floor decks had been occurring for dozens of months prior to March 16, 2021.

## 5 Final Remarks

We trust this report addresses your current requirements, however if have any questions or comments, please do not hesitate to contact the writer.

Yours truly,

PP: 1003380



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**Paul Good | P.Eng.**  
 Senior Engineer  
 pgood@rdh.com  
 T 778-370-6935  
**RDH Building Science Inc.**

Reviewed by  
 Jason Dunn | B.Arch.Sc.  
 Principal, Senior Specialist  
 jdunn@rdh.com  
 T 778-370-6877  
**RDH Building Science Inc.**

cc: Peter Roberts - Lawson Lundell LLP      proberts@lawsonlundell.com  
 Derek Lai - Crowe MacKay & Company Ltd.      Derek.Lai@crowemackay.ca