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Making Buildings Better™

TO **The Owners, Strata Plan NW2050**
C/O **Audrey Montero**
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Strata Plan NW2050
7651 Minoru Boulevard
Richmond BC V6Y 1Z3

R-02574.062
Cypress Point | Roof Assessment

DATE September 1, 2022

REGARDING **Roof Assessment**

Dear Audrey Montero,

As requested by the Owners, Strata Plan NW2050 (Owners), RDH Building Science Inc. (RDH) is pleased to provide you with this report for a roof assessment for the complex known as Cypress Point, located at 7511, 7531, and 7651 Minoru Boulevard, Richmond, BC.

1 Background

RDH is familiar with Cypress Point having provided the Owners with various engineering services dating back to approximately 2010. Most recently, RDH provided the Owners with a Depreciation Report Update, which was completed in December 2021. The Depreciation Report Update indicated the possible renewal of various roof assemblies within the 10-year tactical planning horizon.

It is our understanding that the Owners wish to obtain more information regarding the current condition of the roof assemblies throughout the complex. A past report recently completed by others (Atlas-Apex Roofing – Contractor) indicated there was buckling in the low-slope roof membrane. RDH was retained to review the roofs in more detail to assist with planning and prioritization of possible roof maintenance, repairs, and renewals.

1.1 Scope of Services

The scope of services for this review was defined in our proposal, dated May 9, 2022, and is summarized as follows:

1) Review available documentation pertaining to the original design and construction of the sloped (concrete tile) and low-sloped roof assemblies.
2) Review any additional documentation relevant to roof-related problems, including relevant documentation from Management and Council, previous reports, photographs, and information related to previous roof repair work undertaken.
3) Field investigation services:
    a) An exterior visual review of the roofs throughout the complex. This visual review will be conducted from the ground, ladders, and the accessible low-sloped roofs.
    b) An interior visual review within various suites to survey ceiling finishes for any additional staining or potential signs of water ingress.

4) Develop conceptual renewals and repair work recommendations based on the results of our investigation. These will include a discussion of alternative approaches, including phasing of potential work, where appropriate.

5) Prepare and submit a report summarizing our findings and conceptual recommendations. If desired, we are also available to meet with Management and Council to present the results and findings of the assessment; however, we have not accounted for this specific task in our budget

1.2 Description of Complex

Cypress Point consists of three residential low-rise buildings (Buildings A, B, and C) of wood-framed construction, all situated over single-level, above-grade concrete parkades. There are 106 residential suites, and construction was completed in approximately 1983. Refer to Figure 1.1 for an aerial imagery of the complex.

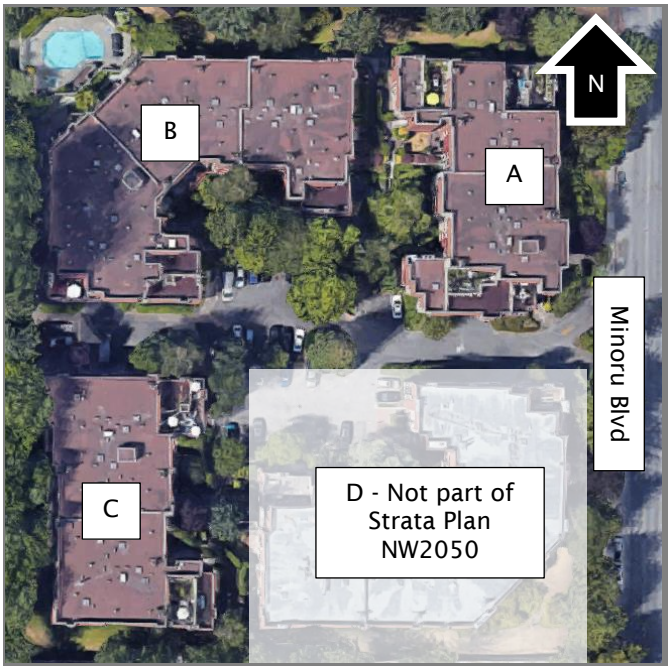


Figure 1.1

Aerial imagery of Cypress Point (© 2022 Google).

Buildings are identified for reference.

There are two principal roof assemblies at the buildings: low-slope roofs protected by 2-ply styrene-butadiene-styrene roof membranes (SBS membrane, Figure 1.2) and sloped roofs protected by concrete tiles (Figure 1.3).

Figure 1.2

Example of low-slope roof protected by an SBS membrane.

Building C.

Figure 1.3

Example of a sloped roof protected by concrete tiles.

Building B.

1.2.1 Low-Slope Roofs Protected by SBS Membranes

The original architectural drawings indicate that the low-slope roofs were originally constructed with tar and gravel membranes (page A31). It is our understanding that these low-slope roof membranes were replaced with SBS membranes in approximately 2000. The current assembly, as noted on site and from architectural drawing A31, is listed in Figure 1.4.

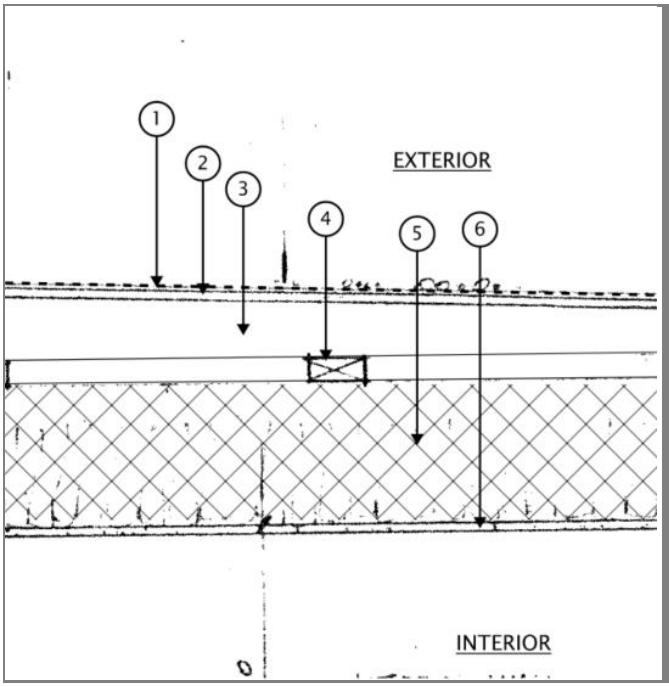


Figure 1.4

Low-slope roof assembly:

1 – 2-ply SBS membrane

2 – 5/8" plywood sheathing

3 – 2x sloped wood sleepers

4 – 2"x4" wood strapping

5 – 2"x10" wood roof joists c/w batt insulation in between

6 – Gypsum wall board (GWB) c/w polyethylene vapour barrier between the GWB and joists

As the name implies, a 2-ply SBS membrane is composed of two plies of membrane: a base sheet and a cap sheet. The low-slope roof is sloped to roof drains, located in sumps or depressions, which are connected to internal drain pipes. In addition, there are overflow scupper drains at the perimeter parapets. There are unit skylights throughout the roofs. Vent hoods (sometimes referred to as dog houses) protect exhaust vents, such as for laundry dryers. In addition, there are plumbing stacks and fireplace flues throughout the roofs. Refer to Figure 1.5 for examples of various low-slope roof components.

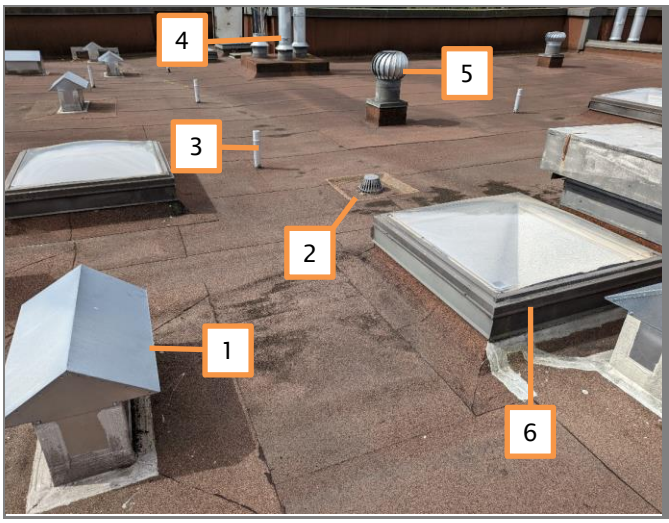


Figure 1.5

Various components of a typical low-slope roof:

1 – Vent hood

2 – Roof drain in a sump

3 – Plumbing stack

4 – Fireplace flue

5 – Turbine vent

6 – Skylight

The low-slope roof is a vented assembly, meaning there is a vented space between the batt insulation and the underside of the wood sheathing. Venting is provided by perforated strips at the perimeter parapets and by the turbine vents. Note that the original architectural drawings do not indicate the requirements for turbine vents. The Roof Replacement and Repairs Tender Documents, prepared by Inter-Coast Consultants Ltd., dated November 12, 1998, indicate that turbine vents were to be added, suggesting that these vents were not part of original construction.

1.2.2 Sloped Roofs Protected by Concrete Tiles

The concrete tiles at sloped roofs appeared to date from original construction. The assembly, taken from architectural drawing A31, is listed in Figure 1.6.

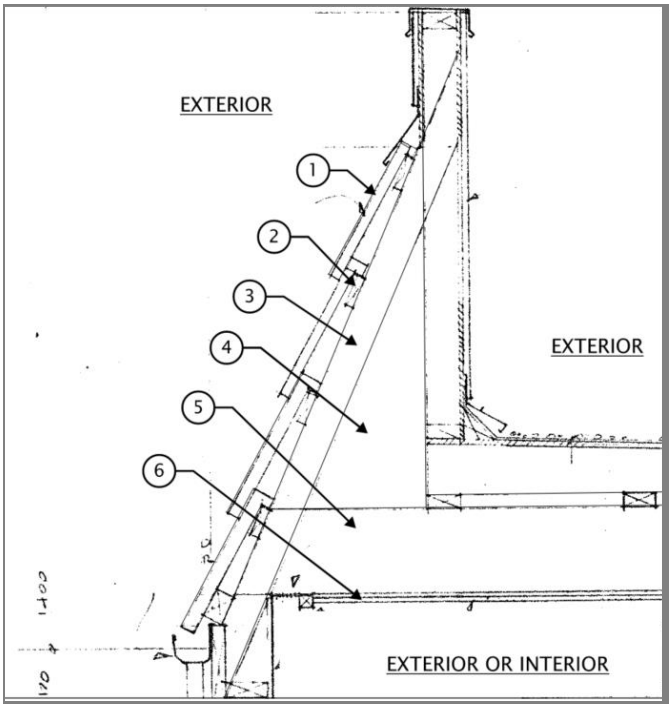


Figure 1.6

Sloped roof assembly:

1 – Concrete tiles

2 – 1"x4" wood strapping

3 – 2"x4" wood framing

4 – Vented attic space

5 – 2"x10" roof joists c/w batt insulation over interior space only

6 – Stucco soffit on exterior wall board (exterior space), or GWB (interior space)

Typically, there are gutters at the eaves, connected to rainwater leaders, to manage water runoff from precipitation.

Venting of the attic space is provided by perforated vent strips along the edge of the stucco soffit. During the site review, it was noted that some of the soffits above balconies were clad with perforated panels. It is our understanding that some of the soffits above balconies were replaced as part of the 2001 building enclosure renewal, which included renewal of some of the original wall cladding, windows, and balcony membranes.

2 Field Review and Observations

RDH attended site on June 28, 2022. The weather at the time was overcast with an ambient exterior temperature of approximately 19°C. The weather for several days prior was similar with minimal precipitation.

During the visit, RDH accessed two suites that had reported stains on their ceiling: Suites 312 and 322, both in Building B.

The exterior review was generally completed from the low-slope roofs at Buildings A, B, and C. The sloped roofs were also reviewed from at grade to note if conditions were consistent throughout the complex.

2.1 Interior Review

As previously indicated, RDH accessed Suites 312 and 322 in Building B. These suites had reported stains on the ceiling, located on the underside of the low-slope roof assembly. It is our understanding that no other suites had reported stains or concerns with regards to the low-slope roof assembly at the time of our review.

At Suite 312, there was some staining on the ceiling light fixture in the laundry room (Figure 2.1). It is our understanding that water ingress had occurred a few times during rain events beginning in late 2021. The area was dry at the time of the review.

Figure 2.1

Staining on the laundry room light fixture at Suite 312.

At Suite 322, the suite owner indicated that there was staining on the living room ceiling that appeared in approximately 2015. The owner indicated that the stain grew in size until repairs were reported to have been implemented in late 2021. The ceiling was also repainted in 2021. At the time of the review, there was minimal evidence of staining (Figure 2.2).

Figure 2.2

Approximate area of reported stain in Suite 322. The stain had been painted over by others prior to the site visit.

Our reviews of the roofs above Suites 312 and 322 are discussed in Section 2.2.

In the hallway of Building C, adjacent to Suite 332, a localized section of ceiling drywall (GWB) was removed by others prior to the site visit, exposing the underside of a roof drain assembly (Figure 2.3). We were informed by the Strata Office Administrator that the drain pipe connected to a roof drain had leaked at a plumbing joint. It is our understanding that a plumbing contractor was retained to repair the leak. The area was dry at the time of the review. It is our understanding that the issue was unrelated to water ingress through the roof assembly.

Figure 2.3

Opening in the hallway ceiling at Building C, adjacent to Suite 332.

2.2 Exterior Review – Low-Slope Roofs

RDH accessed the low-slope roofs at Buildings A, B, and C through access hatches at the stairwells. Our observations are discussed in the following sections.

2.2.1 Common Observations at all Low-Slope Roofs

The following items were noted at the low-slope roofs of Buildings A, B, and C:

→ There were numerous localized areas of buckling in the SBS membrane (Figure 2.4 to Figure 2.6). At the areas reviewed, the buckling appeared to be caused by displacement of the substrate.

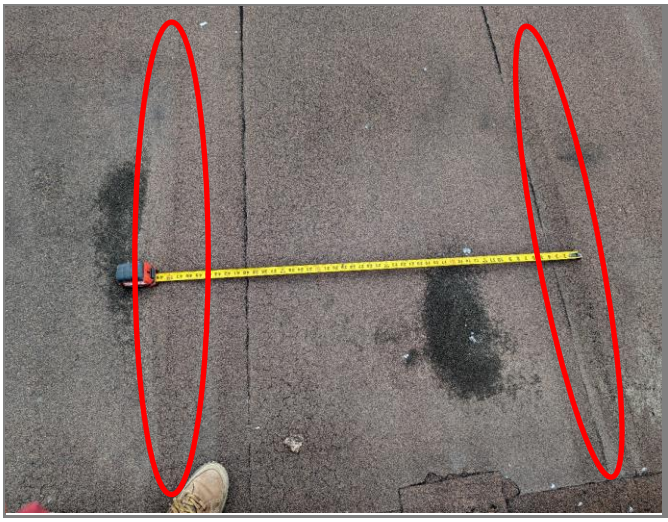


Figure 2.4

Example of buckling in the SBS membrane.

Building A.

Figure 2.5

Example of buckling in the SBS membrane.

Building B.

Figure 2.6

Example of buckling in the SBS membrane.

Building C.

→ There was localized unadhered SBS cap sheet membrane at some locations (Figure 2.7 to Figure 2.9).

Figure 2.7

Example of locally unadhered SBS membrane.

Building A.

Figure 2.8

Example of locally unadhered SBS membrane.

Building B.

Figure 2.9

Example of locally unadhered SBS membrane.

Building C.

→ There was alligatoring on the top surface of the SBS membrane throughout the low-slope roof (Figure 2.10 to Figure 2.12). Alligatoring refers to cracking on the surface of a bituminous membrane, which produces a pattern of cracks similar to an alligator's hide.

Figure 2.10

Example of alligatoring in the SBS membrane.

Building A.

Figure 2.11

Example of alligatoring in the SBS membrane.

Building B.

Figure 2.12

Example of alligatoring in the SBS membrane.

Building C.

→ There were a few blisters in the SBS membrane at Buildings B and C (Figure 2.13 and Figure 2.14).

Figure 2.13

Example of a blister in the SBS membrane.

Building B.

Figure 2.14

Example of a blister in the SBS membrane.

Building C.

→ There was localized sealant failure at several areas of the metal flashing joints (Figure 2.15 to Figure 2.17).

Figure 2.15

Example of failed sealant at a metal flashing joint.

Building A.

Figure 2.16

Example of failed sealant at a metal flashing joint.

Building B.

Figure 2.17

Example of failed sealant at a metal flashing joint.

Building C.

→ There was debris buildup in the sumps adjacent to several of the roof drains (Figure 2.18 to Figure 2.20).

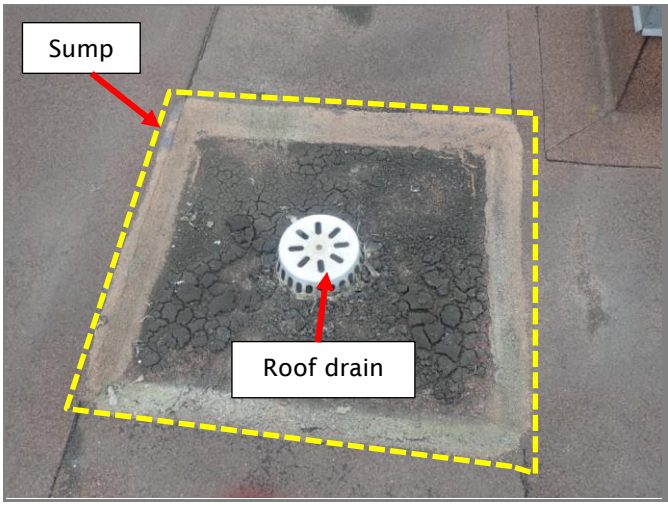


Figure 2.18

Example of debris buildup in the sump adjacent to a roof drain.

Building A.

Figure 2.19

Example of debris buildup in the sump adjacent to a roof drain.

Building B.

Figure 2.20

Example of debris buildup in the sump adjacent to a roof drain.

Building C.

→ There was localized staining and debris buildup on the SBS membranes at several locations, evidence of ponding water on the SBS membranes (Figure 2.21 to Figure 2.23).

Figure 2.21

Example of staining and debris buildup, evidence of ponding water.

Building A.

Figure 2.22

Example of staining and debris buildup, evidence of ponding water.

Building B.

Figure 2.23

Example of staining and debris buildup, evidence of ponding water.

Building C.

→ A skylight at Building A and one at Building C were partially opened by others at the time of our site visit, likely by the suite residents for ventilation purposes. The underlying assemblies were poorly detailed, partially exposing the wood framing. The exposed wood was stained (Figure 2.24 and Figure 2.25). We were not aware of any water ingress concerns related to the skylights. We did not review a skylight at Building B as there were no skylights opened at the time of the review.

Figure 2.24

Stained wood framing at a skylight.

Building A.

Figure 2.25

Stained wood framing at a skylight.

Building C.

→ There was evidence of localized repairs in the SBS membrane at some locations (Figure 2.26 to Figure 2.28).

Figure 2.26

Example of a localized repair in the SBS membrane.

Building A.

Figure 2.27

Example of a localized repair in the SBS membrane.

Building B.

Figure 2.28

Example of a localized repair in the SBS membrane.

Building C.

→ There were unsealed cracks in the stucco cladding on the elevator shaft overruns, particularly at Building A (Figure 2.29). Unsealed cracks could allow water to penetrate through the cladding and into the interior, bypassing the SBS membrane.

Figure 2.29

Cracks in the stucco cladding at the elevator shaft overrun of Building A.

2.2.2 Additional Observations at Low-Slope Roof of Building B

Additional items were noted at the low-slope roof of Building B:

→ The vent hoods at the east section of the low-slope roof appeared to be newer and made of sheet metal (Figure 2.30 and Figure 2.31). This was confirmed by the Strata Office Administrator who indicated that they were replaced in approximately 2019 to address concerns with the exhaust vents. The concerns were not reported to be water ingress related.

Figure 2.30

Example of renewed sheet metal vent hoods at the east section of the low-slope roof at Building B.

Figure 2.31

Example of original vent hoods.

Building B.

→ There was liquid-applied membrane installed adjacent to the renewed vent hoods. At several areas reviewed, the liquid-applied membrane was delaminating from the substrate (Figure 2.32 and Figure 2.33). At one location, there was water between the liquid membrane and the vertical metal surface of the vent hood (Figure 2.34).

Figure 2.32

Example of delaminated liquid-applied membrane on the SBS membrane.

Building B.

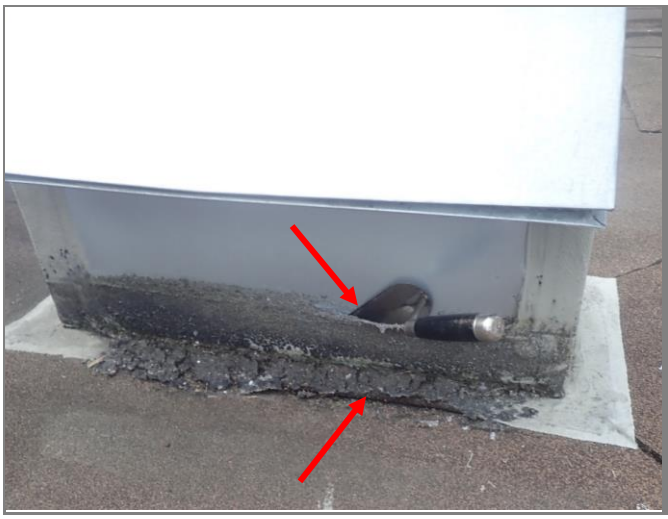


Figure 2.33

Example of delaminated liquid-applied membrane on the SBS membrane and the vent hood.

Building B.

Figure 2.34

Water behind the liquid-applied membrane at a vent hood.

Building B.

→ RDH reviewed the roof area above the reported leak at Suite 312 (Section 2.1). There was liquid-applied membrane installed at the newer vent hoods in the vicinity above the reported leak at the ceiling light fixture (Figure 2.35). As mentioned above, at several areas reviewed, the liquid-applied membrane was locally delaminated; however, we could not confirm if any of the liquid-applied membrane deficiencies resulted in water ingress.

Figure 2.35

Approximate roof area above the reported water ingress in Suite 312.

→ RDH reviewed the roof area above the reported leak at Suite 322 (Section 2.1). We did not note roof deficiencies above the reported stain on the living room ceiling (Figure 2.36). In addition, there were no obvious signs of recent repairs as was reported by the owner at Suite 322.

Figure 2.36

Approximate roof area above the reported stain on the ceiling of Suite 322.

→ A turbine vent was temporarily removed to review concealed conditions. The observed components were consistent with the assembly listed in Section 1.2.1. Note that there was what appeared to be animal debris, such as mouse droppings, within the batt insulation and on the polyethylene vapour barrier (Figure 2.37).

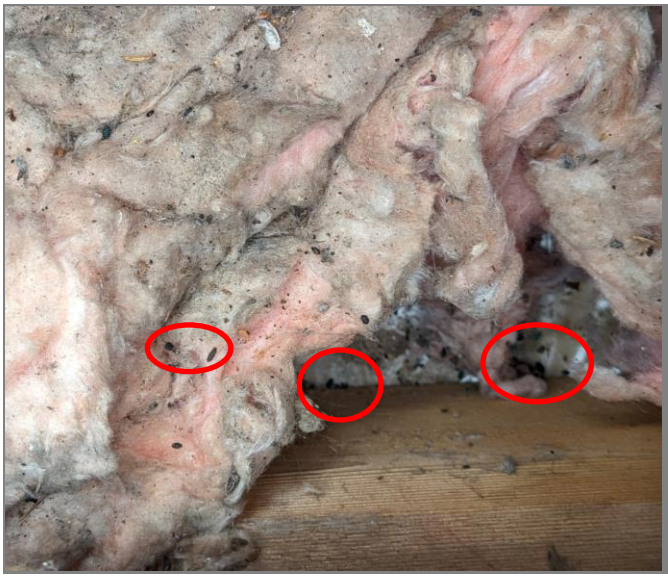


Figure 2.37

Looking down into the low-slope roof assembly where the turbine vent was temporarily removed at Building B.

The batt insulation was temporarily displaced for the photo.

Note the animal feces.

2.3 Exterior Review – Sloped Roofs

At the time of the review, we were not aware of any reported concerns related to the sloped roofs. Our review of the sloped roofs noted minor issues, such as some staining on the concrete tiles. However, we did note concrete tiles that were displaced and misaligned (Figure 2.38 and Figure 2.39).

Figure 2.38

Displaced and misaligned concrete tile at Building B, on the south elevation above Suite 325.

Figure 2.39

Displaced and misaligned concrete tile at Building B, on the east elevation above the deck adjacent to Suite 325.

3 Discussion and Recommendations

3.1 Low-Slope Roofs Protected by SBS Membranes

The low-slope roof SBS membranes at Cypress Point are approximately 22 years old (as of this report). The 2021 Depreciation Report prepared by RDH suggests that the Owners should plan for low-slope roof renewal in approximately 2025. This recommendation is generally consistent with the conditions observed on site at the time of this report.

It is our understanding that the Owners have been implementing low-slope roof repairs to address targeted issues. With time, as the SBS membrane further approaches the end of its expected service life, localized SBS membrane failures requiring targeted repairs are likely to increase in frequency. These targeted failures may result in localized water ingress, which could damage interior finishes. Eventually, systemic failures in the SBS membrane may begin to occur, resulting in increased interior damages and associated costs to repair. Localized water ingress may also lead to damage to underlying assemblies that would only be noticeable at the time of a full SBS membrane renewal.

The existing low-slope roof SBS membranes are approaching the end of their useful service lives. We recommend that the Owners begin planning in the near future for a low-slope roof renewal to occur in approximately three to five years with continued monitoring of the roofs throughout that time. At the time of this renewal, the Owners should consider improving drainage provisions to help address ponding water and replace the low-slope roof skylights. An increase in reported stains and/or water ingress related to the roofs may accelerate the renewal timeline.

There were numerous areas of localized buckling in the SBS membrane. The buckling appeared to originate from the underlying substrate; however, the cause could not be confirmed without exploratory openings, which would involve removing sections of the

SBS membrane to review underlying conditions. According to Atlas-Apex, who have been maintaining the roofs at Cypress Point, the SBS membrane buckling was first noticed in approximately 2017 and has become more prevalent since then. At the time of the low-slope roof renewal, the cause of the buckling should be reviewed, and appropriate measures implemented to address the issue.

There may also be an opportunity for the Owners to improve the thermal performance of the low-slope roof assembly at the time of renewal, which could improve occupant comfort on warmer days. This would require further review and discussion to determine feasibility and possible benefits. Replacing the batt insulation and removing animal feces would likely be included if thermal performance upgrades are implemented.

In the meantime, and until the low-slope roof renewal is implemented, we recommend that the Owners continue to implement targeted repairs to address failed sealant; localized unadhered SBS membrane; unsealed cracks in the stucco cladding at elevator shaft overruns; and blisters in the SBS membrane. In addition, we recommend that the Owners repair the delaminated liquid-applied membrane at Building B. The Owners should ensure that any repairs are completed in accordance with good roofing practices as outlined by the Roofing Contractors Association of BC (RCABC).

To maximize drainage efficiency, the Owners should clean and remove any debris adjacent to the drains as part of regular strata maintenance activities.

The owners/residents at Suites 312 and 322 should continue to monitor for water ingress, document, and report any changes.

3.2 Sloped Roofs Protected by Concrete Tiles

The concrete tiles at the sloped roofs appear to be generally from original construction and appear to be performing as expected. However, there were concrete tiles that were noted to be displaced and misaligned. We recommend that the Owners implement repairs in the near future to minimize the possibility of concrete tiles falling off the buildings, which could result in injury to people below. In addition to repairs, the Owners should implement regular maintenance, and document any issues with the sloped roofs. The Owners should also plan for an updated review of the sloped roofs in approximately three to five years; sooner if issues become more frequent.

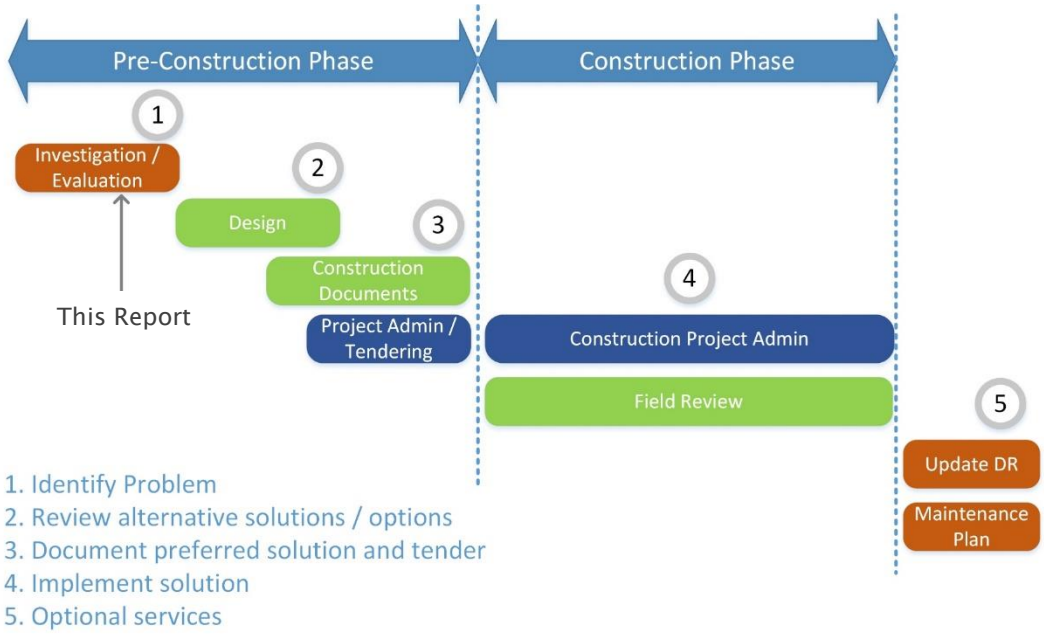
4 Next Steps and Closure

In the near future, the Owners should implement targeted repairs to address the localized issues, such as delaminated membrane, failed sealant, and dropped concrete tiles. Furthermore, the Owners should continue to implement maintenance activities to address debris buildup on the low-slope roofs, such as near drains. These items can be completed by a competent roofing contractor. Given the financial impacts associated with future renewals, the Owners should also begin to plan for a low-slope roof and slope roof renewal project.

This roof assessment report presents conceptual-level recommendations with respect to renewal activities. It is important to understand that these recommendations do not provide a basis for implementing remedial work. Conceptual recommendations need to be developed, refined, and documented in detail before the construction work can be tendered to contractors or a building permit obtained.

The next step for a roof renewal typically begins with the design process where the consultant considers alternative ways of addressing existing problems and assists you in making decisions with respect to specifics of the renewal program. Once decisions are made, the selected design is developed and documented in greater detail in the form of drawings and specifications. These documents indicate the exact extent and nature of the remedial work, materials to be used, etc.

The drawings and specifications are used to obtain bids from pre-qualified contractors, obtain a building permit, and as the basis to carry out the renewal and repair work. Once a contractor has been selected, usually on the basis of the lowest submitted bid, the project can move into the construction stage. During this stage, the remedial work program that has been designed by the consultant (with the owners' involvement and agreement) is implemented, and repair and reconstruction takes place on site. The consultant administers the construction contract and undertakes periodic field review of construction as the work proceeds. It is also common for the consultant to provide a maintenance and renewals plan (or update an existing plan) for the renewed enclosure assemblies upon completion of the construction.



We trust this report meets your needs at this time. Please do not hesitate to contact the undersigned should you wish to discuss any aspect of this report, or should the Owners require any assistance with the recommendations or proposed next steps in this report.

Yours truly,

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