Building Envelope Assessment

VR992
Ocean Vista

June 23, 2013

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OVERVIEW

This report details the condition of the building envelope at Ocean Vista, 1279 Nicola Street, Vancouver. It was prepared at the request of the Strata Council. The property is managed by Mark Adams of Pacific Quorum Properties Inc, 430-1200 West 73rd Avenue, Vancouver, BC V6P 6G5.

The complex is comprised of a single building in an 'L' shape configuration with a total of 18 units over 5 levels. There is also parking provided in the basement area. The main entrance faces east and this part of the building houses units 101-103 and 109 on the first floor. These units have east facing patios and entrances on the west face. Units 301- 303 and 309 are located on the third floor and unit 303 has an east facing balcony. Units 301 and 302 have direct access to the roof deck via individual doors. The north side of the building is parallel to the service road with access to the parking area situated in the basement. Entrances to units 304-308 are on the north face on the third floor. These units have direct access to the roof deck via individual doors. Entrances to the remaining units (105-108) are made via the courtyard on the south face. There are two single story units (104 and 106) located in the courtyard. Access to the upper units is provided by an elevator and two stairways.

Fig 1 – East facing front with main entrance (top left), north face with car park entrance (top right), west facing rear profile (bottom left) and central court yard area (bottom right).

Fig 2 – View of two single story units (104,106) and the flat roof above them.

HISTORY

Ocean Vista was built in 1981 and was subject to a full Building Envelope Condition Assessment completed by Morrison Hershfield in 2000. The BECA was authorized by the Strata Council due to reported water leaks and some envelope components reaching the end of their expected lifetime. The report made recommendations to deal with interior water leaks, exterior walls, windows, doors and other penetrations, roof assemblies, balconies and roof decks, parking garage and "at-grade" waterproofing. It also recommended a second stage assessment and leak investigation to give a better indication of the extent of damage. It is not known whether this second stage assessment and leak investigation was completed.

The strata council has recently been completing a series of waterproofing upgrades, including stucco repairs, upgrading chimney finishing to corrugated sheet metal, partial replacement of sealed window units, installing new windows and the repair of concrete cracks in the car park. At the time of the inspection contractors were being consulted about remediating the flat roof above units 104 and 106.

SCOPE OF INSPECTION

The building was initially inspected on June 03, 04, and again on June 13, 2013. The weather on 03 and 04 June was clear with bright sunshine. There had been a period of rainfall the night before the site visit of 13 June.

The strata intend to paint the stucco components on the exterior surfaces of the building during the summer of this year (2013). They requested the assessment to determine if this is the right time to undertake face sealing of the stucco component.

Specifically, the strata wish to identify if there is moisture under the stucco, the reason for bulging stucco at some locations, details of the wall assembly beneath the stucco, the nature of cracks present in the stucco surfaces and the viability of painting the stucco face with a semi-elastomeric product as has been recommended.

The BECA report commissioned in 2000 identified that the exterior stud wall assembly was void of any continuous exterior sheathing and that a moisture probe survey could not be performed. The exact methodology attempted at that time was not detailed in the report.

The moisture readings detailed in this report were taken using a professional grade GE Protimeter set in search mode. This methodology gives relative readings up to a nominal depth of ¾ inch into the material against which it is held. The locations that readings were taken is described in the body of the report and in tables in the appendix. Inaccessibility and safety requirements limited the locations available for measurements. The findings in this report are also derived from visual examination of the building face between grade and roof top elevations.

The following specific areas were examined at the request of the property manager and are also included in this report:

1. Exterior Wall Components – Stucco and Brick
2. Windows, Doors and Other penetrations
3. Balconies and Roof Decks
4. Roof Assemblies
5. Foundation Walls
6. Suspended Slab and Slab On Grade

INSPECTION DATA

1.0 Exterior Wall Components – Stucco and Brick

The exterior components at Ocean vista are a combination of brick veneer, face sealed stucco and a drained cavity system installed in the middle of the east face. The brick veneer areas have adequate number of weep holes at the base to allow any water that penetrates the brick veneer to drain away freely.

Fig 3 – The North face is shown (left). This large area of stucco has no provision to deal with thermal movement. Caulked cracks above a window and at steps in the wall surface (arrows at right).

The stucco finish coat is applied over concrete parging over a concrete structure on the north and west face of the building that house units 104, 105, 107-108 on the 1st floor and units 304-308 on the third floor. These are large areas of stucco and are subjected to thermal expansion and contraction forces. There are no expansion joints, cuts or seams in these stucco faces. A consequence of the lack of expansion joints is that the stucco will crack as it expands and contracts. The usual areas of cracking are where the stucco surface is under increased stress, such as at penetrations at windows and doors and at transition points.

Fig 4 – Cracks run vertically above windows on the parapet wall as well as at the corner of windows.

Fig 5 – Large areas of stucco have no control joints or stress relief mechanisms to prevent cracks caused by thermal movement (left). Caulked cracks are the result of thermal movement in these areas (right).

The base of the walls of both the north and west faces do not have a drip screed or a base flashing such as stucco stop installed. A drip screed is a metal stop which is exposed below the stucco and provides a finished edge. It also allows for the drainage of surface water off the face of the wall and prevents water from being drawn up into the wall between the stucco cladding and the concrete substrate.

The stucco should terminate 6" - 8" above grade to allow for adequate drainage of surface water without encroaching on the stucco cladding. The stucco surface on the north face is in direct contact with grade. There is moss and algae growth near the grade level as a result. The stucco surface on the west face finishes at the required 6" - 8" but the termination is poorly finished and lacking a drip screed.

Fig 6 - There is no drip screed at the base of this wall resulting in moisture penetration as indicated by the presence of moss and algae growth (left). The stucco surface terminates at the asphalt surface of the lane (right).

Fig 7 – Poor stucco termination and finish and the absence of drip screed (left). Downspout discharge and poor drainage arrangement further compounding water ingress potential (right).

The stucco wall surface adjacent to the roof deck of units 304 - 308 on the north face has become detached or ballooned. Cracks have been repaired and the stucco area at unit 306 has been replaced. Moisture readings taken on these walls range from 168 – 189 with an average of 181.25 and are low to mid- range. The wall assembly is fitted with suitable metal flashings at the base and top.

Fig 8 - North facing roof deck with 4 units. The strata has repaired the cracks (at arrows) of the ballooning surface and have also replaced the wall surface of the third unit (306).

The north face stucco on the upper walkway that provides access to units 304 – 308 is fitted with metal base flashings. The flashings are in reasonable condition with some light rust being apparent. The walkway is fitted with a glass roof. Above the glass roof are a series of old style face sealed windows and above these a gutter provides water run-off from a metal roof.

There is ballooning present on the stucco cladding. This is the result of the stucco cladding uncoupling from the substrate. This is a common occurrence for wall assemblies that do not contain sheathing or a suitable surface to attach the stucco screen to securely (see Fig 8).

The south face stucco wall finish has multiple transition points and old style window frames. The south facing wall of units 105-108 and 304-308 have areas of deterioration across the entire stucco surface. The deterioration is a direct result of these conditions.

Fig 9 - Stucco surfaces around units 105- 108 and 304-308. Old style windows and face sealed windows installed in a standard cladding system.

Units 104 and 106 are single level units with stucco cladding on the wall surfaces. The stucco installation has no provision for thermal movement, but is fitted with base flashing.

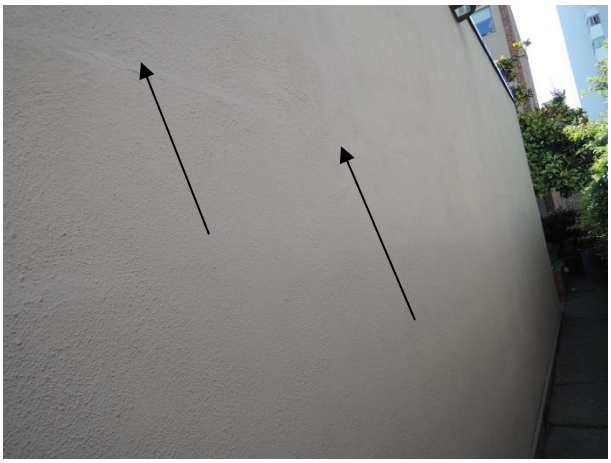

Fig 10 - South facing stucco wall at unit 106 has caulked cracks.

Fig 11 - Upgraded rain screen system and windows (left). Older window and face screened stucco are shown at upper right. Third floor balcony and window upgrades with brick veneer transitions (right).

Fig 12 – Close-up of moss and algae growth on a stucco surface. Notice the rust at the metal base flashing.

The east face of Ocean Vista is comprised of a combination of an updated drained cavity or rain screen system, brick veneer and the original face sealed stucco system.

The brick veneer cladding appears to be performing well and there is adequate provision of weep holes and grade flashing to facilitate the run off of water that penetrates the brick surface. Transitions between the stucco and brick veneer are caulked. It is not known if the caulked joints have been replaced as part of a maintenance schedule, but visible caulked joints (see Fig 15) appear to be deficient.

Fig 13 – Brick veneer and stucco transitions and older windows (left). Weep holes and grade flashing are visible at grade on the south face (right).

The brick veneer extends from the east face around to the south face. The area of brick veneer is large and no provision has been made for thermal movement. No defects were noted on the south face.

Fig 14 - Brick veneer on the south face (left). Transition caulking deficiency and stucco crack (arrows at right).

The cladding on the west face of the building that houses units 101-103 and 109 on the 1st floor and units 301-303 and 309 on the 3rd floor is a combination of stucco and brick veneer. Both wall finishes have base flashings installed and are in reasonably good condition due to the sheltered position.

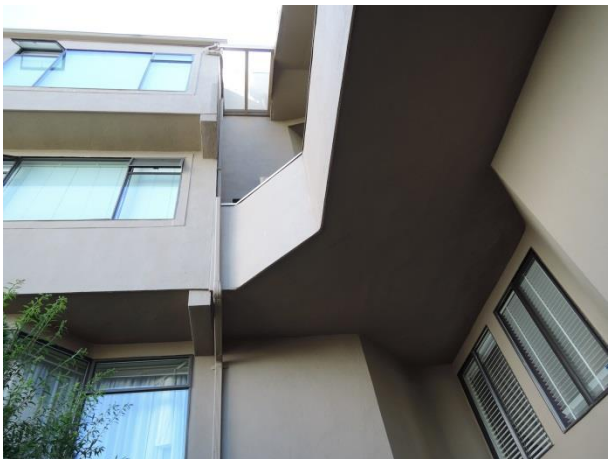


Fig 15 – South face to the left and west face to the right. Stucco terminated at tile and flashing on the west face (right).

2.0 Windows, Doors and Other Penetrations

Some windows at Ocean Vista have been replaced and the remainder appears to be the original windows from 1981. The older window styles do not have adequate flashing protection. The windows are of metal construction and are a combination of awning, horizontal sliders and fixed. The sealed glazing units of the older style windows have "Comfort Seal CMHC 7836" stamped on them between the glass. A stucco accent band or reveal has been installed around windows in stucco clad areas.

North Face

The windows on the north face of the building appear to be recent upgrades with the exception of those above the entrances to units 304 – 308. These windows are recessed from the plane of the cladding. There are some repaired cracks at the window corners. Out of six windows installed on the north face adjacent to the service road two do not have head flashings installed. The head flashing is installed over the cladding and sealed with caulk. They do not have turn ups at the end resulting in some water flowing onto the wall surface. There is some moss/algae growth visible above the flashing on some windows.


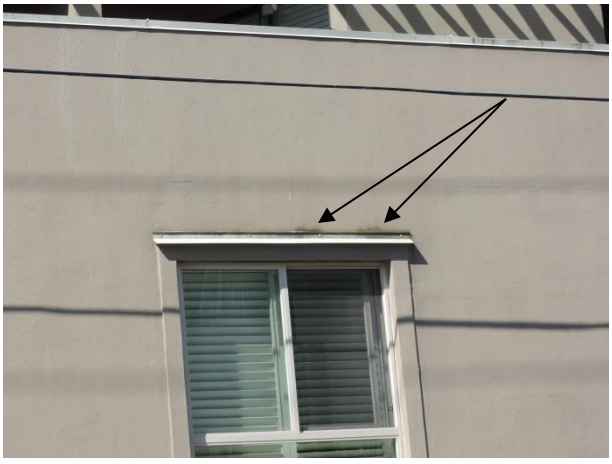

Fig 16 – The old style face sealed windows and wall assembly (left). Algae growth at head flashing over window shown in close-up (arrows at right).

There are cracks in the stucco at the corners of the stucco accent band around windows. These are common deficiency areas that have been repaired with caulking (see Fig 17).

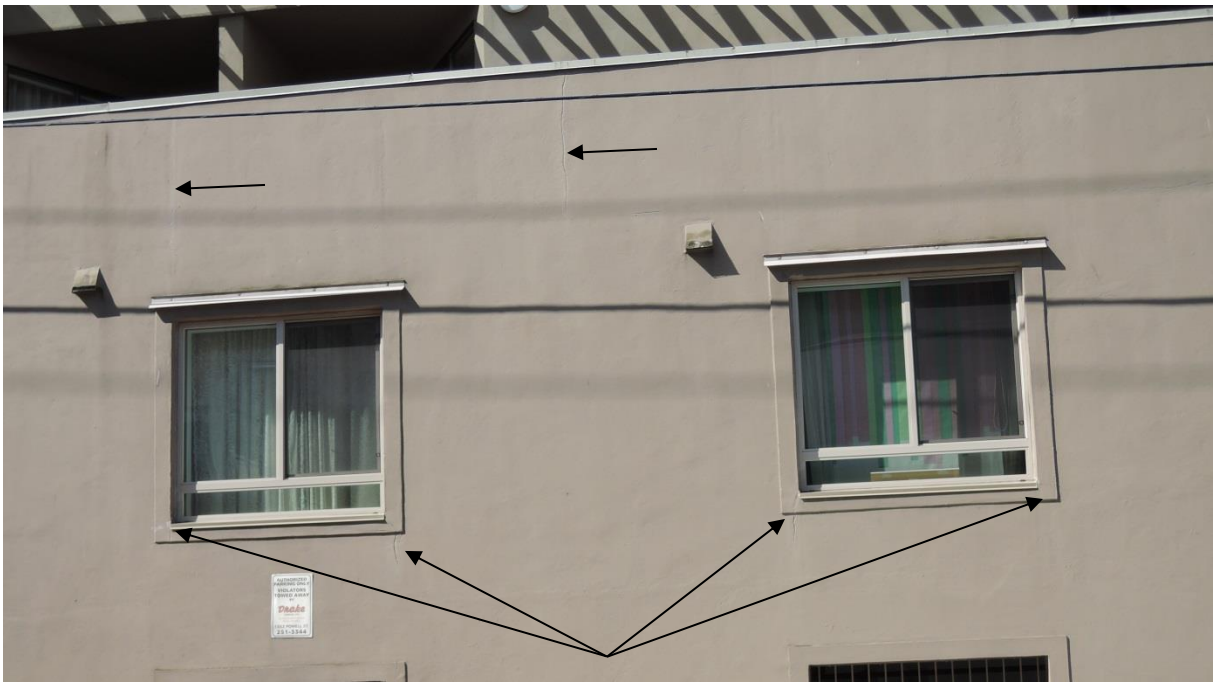

Fig 17 - Cracks in stucco accent or reveals around windows and wall face repaired with caulking above the windows.

There is a glass block window on the north face that is not protected by flashing. The block terminates at grade level. There is the opportunity for water to ingress behind the stucco and interior floor area. There was a high moisture reading (796) above this window indicating moisture penetration.

Fig 18 - Glass block window without flashing detail (left). Grade level delamination of stucco with moss and algae, plant growth – visible signs of water penetration (right).

The entrance doors to units 304 – 308 appear to be in reasonable condition for their age and are protected from the weather. The doors providing access to the roof deck for these units are protected with screens.

Other penetrations on the north face consist of vents that are directly connected to the stucco wall surface. Caulking was absent. The building is equipped with a diesel generator and the exhaust pipe exits through the wall. This penetration is un-caulked and a high moisture reading (858) was detected.

Fig 19 - Diesel generator installation and exhaust pipe penetration (arrow at left). High moisture reading of stucco assembly adjacent to generator exhaust vent (right).

South Face

The south face is a large area of stucco with many large older windows installed. There will be significant thermal movement in this area due to the amount of sunlight and the ability of such a large surface to absorb heat. As indicated previously, there are no expansion joints in this wall.

A repaired exploratory opening from the BECA conducted in 2000 is visible on this wall. The streaking pattern visible on the wall surface is evidence of moisture penetration. There is poor flashing provision of the windows and the sealing arrangements are old.

Fig 20 - South face (Units 105 -108 1st floor and Units 304 -308 3rd floor) showing original windows and stucco wall cladding (left). A patch from the 2000 BECA is shown in close-up (right). Notice the large number of streaks in the stucco face – this is an indication of moisture in the wall assembly.

Fig 21 – South facing window installation - the absence of head and sill flashings and the age of the sealants both reduce the ability of the windows to shed water. The window shown on the right has some overhang protection but this is not preventing deterioration of the wall surface as indicated by the cracks (at arrows).

Fig 22 - Poor condition of the caulking between the window frame and wall (left). Stucco accent or reveal with cracks and old style head flashing detail (right).

There is caulking at the transition between the window frame and the wall assembly. The caulking is deteriorated and no longer serviceable. This is a critical component of any face sealed wall assembly with face sealed windows. The transition between the two is the primary source of water ingress.

The stucco is cracked at the stucco reveal or accent frame around the windows on this face as well. This condition is prevalent across the complex. The primary reason for the cracks is the large amount of thermal expansion and contraction that occurs around windows, particularly those exposed to the south. Most of the cracks appear to have been caulked.

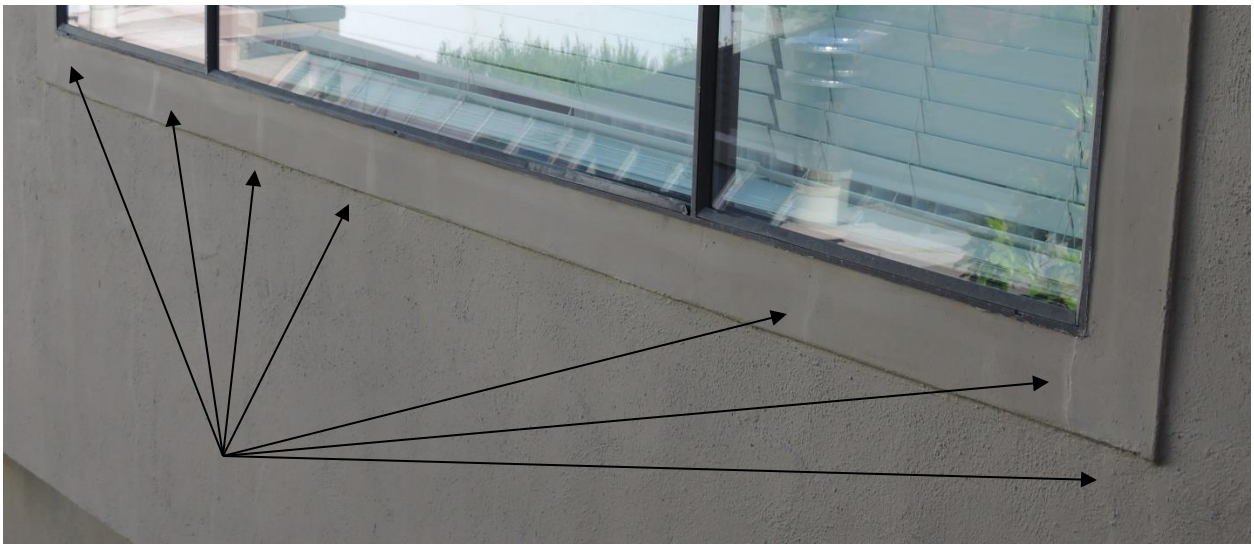

Fig 23 – Typical south facing window installation with cracks in the stucco wall and stucco reveal around the windows.

The brick veneer on the other south face (units 101-103, 109 and 301-303, 309) has vents that were installed without caulking provisions. Moisture readings taken adjacent to these penetrations were not significant.

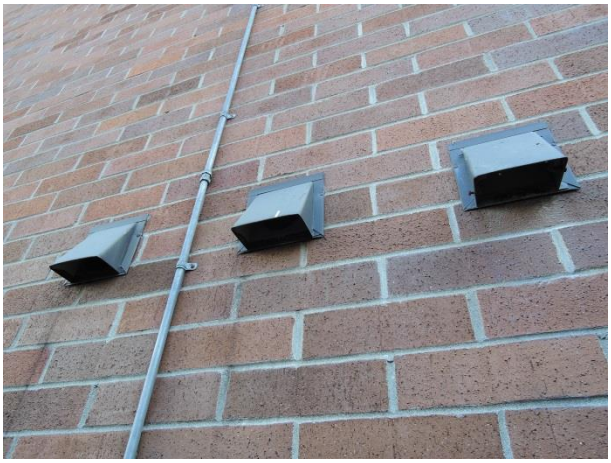

Fig 24 – Brick veneer on the south face at vents.

West Face

Those windows and doors that are sheltered by the stairways above them were in reasonable condition. The windows on a part of the west face at the south end that are exposed to the weather appear to be the original windows. There are similar problems with inadequate flashing and sealing at the wall transitions as reported earlier. There are cracks at the corners of the stucco reveal around these windows as shown in Fig 25.

Water appears to be penetrating these cracks and also is penetrating at the transitions of the windows and frames at the stucco reveal. These windows are similar in design and installation as those previously

reported on other faces of the building. These face seal windows and wall assemblies are prone to moisture penetration.

Fig 25 – Original window installation at the southwest face (left). Lack of caulking at this area is resulting in cracking and water penetration. These windows are of similar design and age of those on the south face of the building and also have extensive areas of stucco.

East Face

The east face of the building has a complex window arrangement with a combination of newer and original windows. The newer windows are installed into a rain screen wall assembly with suitable flashings and transitions to the stucco face.

Fig 26 – Complex window installation and flashing details at rain screen assembly (left). Comparison of older style window configuration (right).

By comparison, the older style windows on the portion of this face that is not rain screened are prone to moisture penetration at transitions and flashings. The stucco finish on the lower edges of the bay windows on the east face shows signs of water retention. The visible signs consist of rust at the drip edge flashings; there is also moss and algae growth.

Moss and algae growth are prevalent at the face assembly system and appear to be located where water is penetrating these assemblies on the east face.

Fig 27 - East face sealed window and wall assembly with moss and algae growth on stucco above bay windows (left). Algae and mildew are clearly visible on window sill flashings (arrow at right).

3.0 Balconies and Roof Decks

Access to some individual balconies was not possible and this report confines itself to visual evidence where there was no access. The roof deck is a common area and there is a concrete stairwell that provides access on the northwest corner. The condition of the stairwell is included in this section of the report.

Fig 28 – Paved roof deck area and stairwell access to a single unit (left). The filter cloth membrane visible under pavers (right).

The installation of the roof deck pavers was a recommendation from the BEA conducted in 2000. Water penetration of the roof deck has occurred on the south west side, above the stairwell as shown in the left side view in Fig 29. It is difficult to determine the cause of the water penetration at this point but there are many planters that are watered by tenants that may be responsible for increased water levels in the wall assembly in this area.

Fig 29 -leachate from roof deck above (left) and surface above the leachate point (right).

The stair case on the northwest face of the building provides access to the roof deck. The concrete block construction of the staircase shows visible signs of efflorescence indicative of water penetration and retention. Efflorescence is caused by moisture dissolving salts from inside the concrete block, migrating to the service through capillary action, evaporating and leaving the salts deposited on the surface.

Fig 30 –NW face stairway (left) and efflorescence in concrete blocks coupled with high moisture readings indicate water is penetrating and migrating through the blocks to the surface (right).

High moisture readings were found in the northwest staircase wall and ceiling. There is an internal drain that allows surface rain water to flow away from the staircase. The water ingress is coming from another source and the exterior water faucet and resident planters are possible causes.

Fig 31 - NW stairway has water ingress (left) and watering of planters may be the cause. Leachate is visible on the underside of this balcony (right).

The balcony on the east face could not be inspected due to restricted access. The drainage provision for the balcony at this point may be failing as indicated by leachate residue that are visible on the underside of the balcony.

4.0 Roof Assemblies

There are several types of roofing at Ocean Vista:

- Sloped roofs clad with sheet metal
- Four areas of flat roofing covered by a 2 Ply SBS roof membrane
- A roof deck area covered with pavers over 2 Ply SBS roof membrane
- Sloped glass roof structures covering an upper walkway area (units 304 -308), living areas in units 104 and 106 and over the roof deck areas (units 301 -302).

The site visit made on June 13 was made after some overnight rainfall. This rain gave a good indication of the drainage performance of the flat roof areas.

The flat roof area covering unit 106 is serviced by a central drain where water from the surface is directed. In the event of severe rainfall where this single drain is unable to deal with the volume of water a single scupper is installed in the parapet wall to drain the excess water off the roof. The roof is not draining correctly and the water ponds in certain locations after rainfall.

Where the flat roof joins the south face of the main building, there is an area where the roofing membrane has deteriorated so much that replacement is recommended. The pattern and condition of the surface indicates a rare deficiency condition not routinely found on flat roof systems. The surface appears corroded and the source of the deficiency could be identified at the time of the inspection.

Fig 32 - Flat roof over units 106 and 104. Note the ponding water at several locations.

Fig 33 - Large area of staining and deterioration of flat roof surface.

The area of flat roof on the north east edge of Ocean Vista is approaching the end of its service life and will require replacement soon. Ridges in the roof system are an indication of age and are potential failure points. These ridges are typical in exposed membrane roof systems using modified bitumen products and are the result of differential thermal expansion of the deck or structure or expansion due to moisture. The protective granules can also migrate and leave the exposed membrane prone to UV

deterioration at a faster rate. This in turn leads to cracking of the membrane resulting in water penetration.

Fig 34 - NE flat roof has poor drainage (left) and long ridges in the membrane (at arrows right).

The flat roof on the east above the roof deck access (units 301 & 302) has an area of poor drainage adjacent to the south east face chimney. The flat roof area above units 101-103, 109 and 304 -308, drains onto a sheet metal roof via scuppers. There was some minor ponding but no other deficiencies were observed.

Fig 35 – Moss and algae growth adjacent to SE chimney (arrow left) and minor ponding on the flat roof (right).

The sheet metal roofing assemblies are in reasonable condition for their age. There is rusting to some surfaces. The sheet metal roofing is fastened onto the supporting structures with bolts and neoprene washers. These washers deteriorate after time and should be replaced as part of a regular annual maintenance schedule to prevent water penetration through the bolt holes.


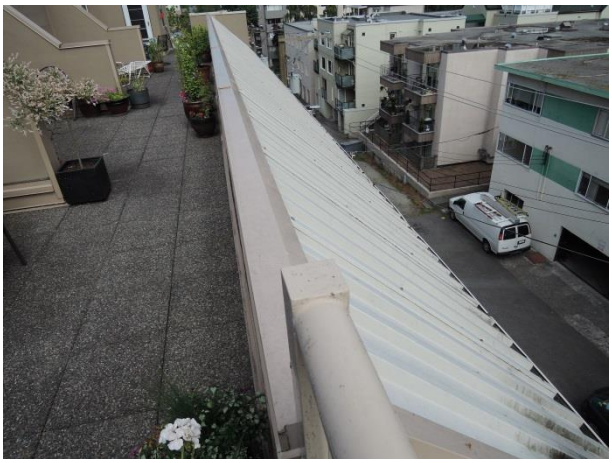

Fig 36 - There are some minor areas of rust on the sheet metal roofing.

5.0 Foundation Walls

The foundation walls are constructed from poured concrete and concrete blocks. There is one small area of spalling concrete that has been repaired. There was no visible evidence of further deficiencies.


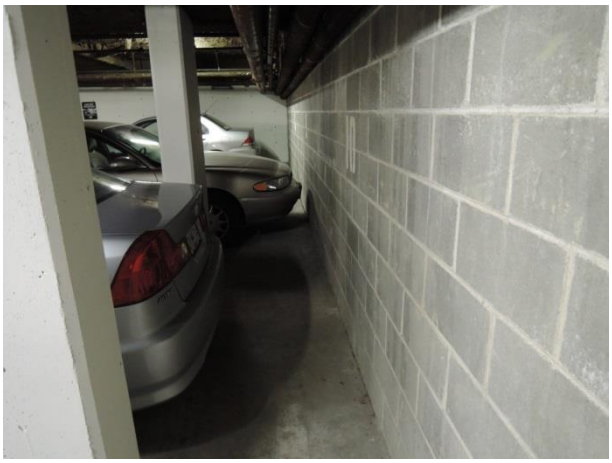

Fig 37 - Foundation wall repair (left at arrows) and the condition of concrete block foundation (right).

6.0 Suspended Slab and Slab On Grade

Only part of the suspended slab surface over the parking area is visible as the majority of the surface is concealed by fire resistant sprayed on insulation. There is a single small area on the slab where the concrete has spalled.

There are some shrinkage cracks present and these are common in poured concrete structures. However, one crack had leachate present which indicates moisture has entered the concrete and migrated through the structure.

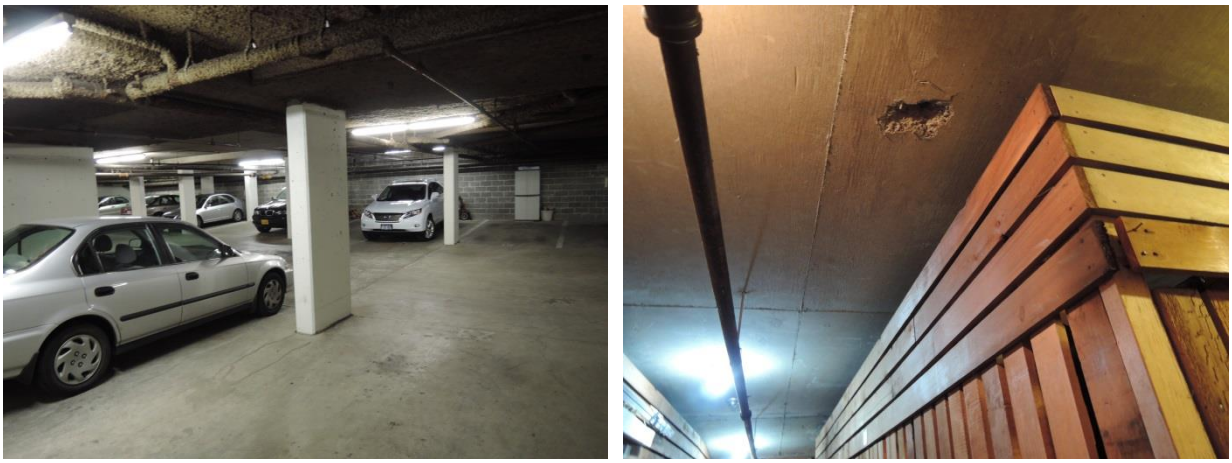

Fig 38 - Roof insulation concealing a large area of the suspended slab (left) and a small area of spalling concrete in the storage area (right).

This moisture penetration can affect the structural integrity of the suspended slab if the reinforcing bar (rebar) corrodes. As the rebar rusts, expansion will occur that can cause the concrete to spall and deteriorate further.

The strata has undertaken a repair to cracks in the slab and this would indicate that water ingress is a continual problem (Fig 39). Landscaping exists above the suspended slab and there is a crack in the walkway and these are both possible sources of water. Action to locate the source of the water penetration is required to prevent further deterioration.

Fig 39 - Epoxy repair to overhead slab (left) and minor shrinkage crack and leachate (arrows, right).

There are two drainage pipes that enter the suspended roofing slab on the south east side of the parking garage. The pipes are rusting as a result of moisture. Measurements were taken to locate the corresponding position on the surface to ascertain if there was a visually observable cause. None was found and monitoring is recommended. At the time of the site inspection the pipes were dry. Condensation may be the cause of the corrosion observed on the exterior of the pipes.


Fig 40 – Crack in walkway (arrows left) and rusting metal drainage pipes (right).

The garage slab on grade has a differential settlement crack running east to west at the base of the car park ramp, starting within parking bay 4 and extending to the opposite foundation wall. The differential height between the crack surfaces is under ½" and the exposed crack surfaces are dirty. This indicates that the crack is not recent. Differential cracks are caused by the movement of grade beneath the floor and the situation should be monitored to assess if the movement is continual or has ceased.


Fig 41 - Differential settlement crack location (left) and close-up view with 6 inch pen to indicate scale (right).

Concern was also expressed by the property management company in regard of the condition of the ramp surface. One section of the ramp has recently been replaced. The remaining areas were examined for deficiencies. There was a very small area of surface deterioration, but no rebar was exposed. This area should be monitored and repairs undertaken if the surface continues to deteriorate, especially if rebar becomes exposed.

Fig 42 - Replaced ramp section and minor surface deterioration (arrows left). Close up of minor surface deterioration (arrows right).

RECOMMENDATIONS

1.0 Exterior Wall Components – Stucco and Brick

This summary is designed to provide specific answers to the questions asked by the strata.

1) What is happening to the stucco finish?

a. There is no drip screed (base flashing) installed at the termination at grade on the north and west face. A 6 inch gap is required between the stucco surface and grade level. High moisture levels were detected.
b. Some other parts of the building envelope also have the older windows – failure of the stucco adjacent to these is also apparent.
c. The head flashing of the newer windows on the north face are failing. This is evidenced by moss and algae growth.
d. Debonding of the stucco (ballooning) is caused by the lack of sheathing behind the stucco cladding. The stucco screen has detached from the substrate and as a result the stucco has sagged. This may have occurred at the time of construction or much later.

2) Why is the stucco cracked in some areas?

a. The large areas of stucco on the north and west face have no provision for thermal movement and are cracking as a result of constant expansion and contraction (thermal forces).
b. There is evidence of water penetration as described in the report.

3) What the level of the moisture content within the walls?

a. High moisture readings were detected at first floor elevations at various locations. Refer to the Appendix for moisture reading locations.
b. The south face of the building is equipped with windows that have no flashing detail and the caulking is failing. This is resulting in cracking of the stucco and water penetration.
c. The north stucco wall has high moisture readings at grade and above the glass block window.

4) What parts of the stucco can be painted?

a. Before the stucco exterior is painted, the caulking at the transition between stucco and all windows, doors and other penetrations must be renewed (refer to Windows, Doors and Other Penetrations below). All stucco cracks should be caulked prior to painting.
b. Painting must not commence until the stucco cladding has completely dried. Since most stucco surfaces are washed before paint, this process exacerbates the moisture issue. Areas where moisture is present in the stucco walls must be allowed to dry first. Then wash the surfaces lightly to remove residue and dirt and allow the surfaces to dry completely again.
c. The paint must permeable and allow any water contained in the stucco to evaporate. The performance of new elastomeric paints is not yet known and there have been premature failures of this type of paint when moisture is present in the stucco cement or behind it.

2.0 Windows, Doors and Other Penetrations

1. Caulk the crack or seam at the stucco transition of all windows, doors and other penetrations within a high grade caulking such as Sonaguard NP1 or WeatherMaster Titebond. This will assist the face seal capability of the exterior wall system by reducing or eliminating water ingress at these locations.
2. Use the same caulking product to seal the ends of head flashings over windows, doors and around other penetrations such as lights, exhaust stacks, etc.

3.0 Balconies and Roof Decks

1. The single balcony floor on the east face (shown in Fig 31) is leaking as evidence by small areas of leachate stains on the underside of the balcony. The cause for the leak has to be investigated further and repaired.
2. The area beneath the roof deck above the entry door to unit 303 has a leachate stain on it. The cause for the leak has to be investigated further and repaired.

4.0 Roof Assemblies

1. At the time of the first site visit, contractors were present to examine the flat roof of unit 106 to repair the deficiencies. This should be completed as soon as possible.
2. The strata is aware of the condition of the flat roof surface on the north east face. This roof drains poorly and has ridges and needs replacement within the next few years.
3. The flat roof above units 301 & 302 on the east face has extensive moss and algae growth indicative of poor drainage and large areas of ponding water. The roof over these areas does not require immediate replacement. When the membrane is replaced, consideration should be given to using water proof roof membranes such as EPDM or TPO.
4. SBS 2 Ply roof membranes have a life span of approximately 15 years. Any flat roof on the building near that age should be scheduled for replacement.

5.0 Foundation Walls

1. The concrete and concrete block foundations appear to be free of cracks or leaks. There are no visible signs of deficiencies present in the foundation walls.

6.0 Suspended Slab and Slab On Grade

1. One previous repair and leachate present on a visible crack in the suspended slab over the parking area indicate that water ingress is a continuing problem. The strata should continue to investigate the source of the water penetration and conduct repairs at the top surface of the suspended slab.
2. Where a water proof membrane over the slab cannot be serviced, crack repairs from the underside should be performed. The epoxy will serve to protect the reinforcement and structural integrity of the suspended slab.
3. There is a single crack on the garage floor slab showing differential settlement of ½ inch. Differential settlement is caused by the settlement of the subgrade and this is caused by poor initial compaction or by erosion of the soils under the slab. This crack will require remediation if it becomes more pronounced as it will pose a tripping hazard. The surface adjacent to the crack could be ground down to eliminate the step in the concrete. A section of the slab could also be replaced although this would be much more expensive.
4. There is very minor deterioration of the concrete ramp surface. The ramp surface condition is to be monitored and repaired if deterioration continues, especially if any rebar becomes exposed.

APPENDIX A

MOISTURE LEVEL DATA

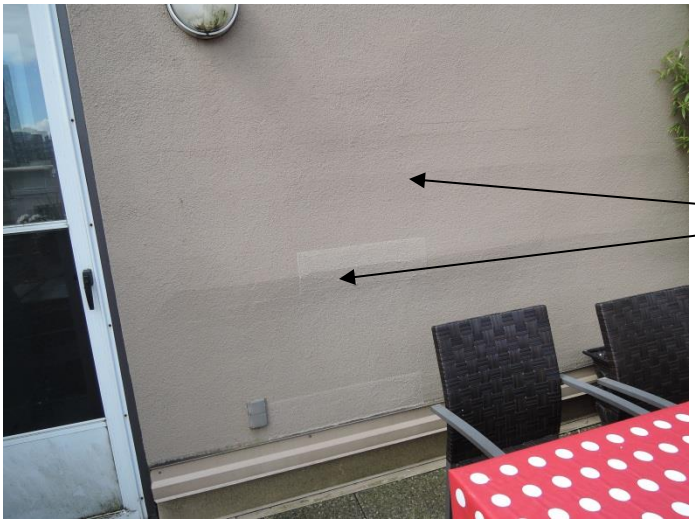

Fig 43 – Area of stucco where ballooning has occurred.

NORTH FACE UPPER ROOF TERRACE WALLS			
Location	**Upper Wall**	**Lower Wall**	**Ballooning**
Unit # 1	185	185	Yes
Unit # 2	189	180	Yes
Unit # 3	176	184	No
Unit # 4	183	168	No

Table 1 - Relatively low readings are present in the stucco behind areas that are ballooning.

Although there were two units that had ballooning of the stucco, repairs had been made and the moisture readings indicated nothing of significance.

Moisture readings were taken in the northwest facing staircase adjacent to unit 304 due to the presence of efflorescence in the concrete block walls and parging above the stairs (as shown in Fig 30).

NORTHWEST STAIRWELL ADJACENT TO UNIT 304		
Location	**1st Level**	**2nd Level**
Block Wall	925	930
Stucco Ceiling	812	800

Table 2 – Very high readings are present in the stairwell.

Fig 44 – Readings were taken at various locations on this north wall.

NORTH WALL												
Location	**Readings At Multiple Locations**											
10'	215	219	210	208	211	-	-	222	-	215	-	209
7'	208	198	208	208	796	243	208	211	180	206	208	191
Grade	**628**	**564**	**554**	**728**	**554**	**531**	**779**	**867**	**810**	**726**	**567**	**-**

Table 3 – High readings are present in the north wall at grade elevations and at the glass block window.

The readings show high levels of moisture being retained in the stucco at the grade level readings. This is due to the absence of a drip screed or stucco stop at the stucco base of the wall. There should be a gap between the termination of the stucco and grade. The high reading of 796 at 7' of height is located above the glass block window where there is no head flashing present.