# Appendix A - Contingency Reserve Fund Study For

**Heatherstone**
3218 - 3278 Heather Street
Vancouver, BC

October 21, 2008

Prepared For:

**The Owners of Strata Plan LMS 3462**
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Project Number: 208vA019A

# 1. STRUCTURE

## 1.1 Structural Frame

**Description:**

The superstructure from the 1st floor (grade) and below (P1 and P2 Levels) is constructed of reinforced concrete slabs, columns, and shear walls. The superstructure above the 1st floor (grade) is wood framed.

Drawings indicate that the structure is as follows:

- Foundations: Combination of reinforced concrete strip and pad footings. Lagging and soil anchors are installed at the perimeter of the P1 and P2 level excavation and perimeter concrete foundation walls are placed up against the lagging.
- Slab-on-grade: 4" concrete cast on grade, over 6mil polyethylene sheeting on 6" compacted granular fill. There are "Zip Strip" control joints.
- Superstructure (1st Floor, P1 and P2 Levels): Conventionally reinforced concrete slabs and slab bands, supported on concrete columns.
- Superstructure (above 1st Floor): Predominantly wood framed floors, walls and roof, with reinforced concrete masonry at north and south end walls, elevator core and south stairwell core.

Lateral resistance appears to be provided by connections between the floors and roof to the exterior walls and elevator and stairwell cores. These connection details, including between the roof structure and mansard roofs, are concealed and cannot be checked without destructive investigation.

**Repair History:**

Refer to Parking Garage section for discussion.

**Condition:**

2008 Halsall: We did not observe any signs of settlement or structural cracking that would indicate a problem with major structural distress. We did note a noticeable fall in elevation from the elevator thresholds to the corridors, which is common in wood framed buildings where the wood framing tends to shrink and somewhat shorten while the concrete masonry elevator core remains in place. This is not a cause for concern at this time; however, should be monitored. Should conditions progressively worsen, further investigation would be required to assess need for repairs, or otherwise.

The drawings appear to indicate that the lagging and soil anchors are temporary (not permanent) works and therefore no need to investigate. However, should documentation indicate that lagging and anchors is a part of permanent works, additional investigations would be required to assess whether the systems installed at the time of construction are still capable of providing the required lateral restraint.

This building is located in an area with relatively high risk of strong seismic activity. We have not completed any structural analyses to check the ability of this building to comply with current Codes regarding earthquake resistance. While upgrading to meet current Codes is not required at this time, this could be necessary in conjunction with major retrofitting that requires a building permit.

The interior portions of the structural frame are protected from the weather and are not expected to require major repair within the life of the building. For expected repairs to the balconies and parking structure, see their respective report sections. Exposed concrete elements on the exterior walls (concrete masonry end walls) are covered under the "Walls" section of this report.

## 1.2 Balconies

**Description:**

Structural drawings indicate that the balcony framing is separate of the floor framing. Drawings do not show connection details. Architectural drawings detail the balconies as being constructed as follows (top down):

- Traffic durable waterproof membrane
- 5/8" exterior plywood sheathing
- 2x6 wood strapping to slope minimum 2% to drain
- 2x8 floor joist
- 2x2 cross blocking
- perforated vented aluminum soffit

Water sheds off the balconies at the front face.

The balcony guards consist of pre-finished extruded aluminum rails, posts and pickets. Guards are secured to end and divider walls, and with intermediate supports secured through balcony decks.

There are terraces over the front and garage entrances, which are similarly constructed to the balconies. These terraces have area drains with internal drainage piping.

**Repair History:**

2003: Applied additional top coat of waterproof membrane to all balconies, including re-detailing at interfaces and installation of water diverters (at a cost of $29,425 as indicated in EPS Westcoast invoice); we understand that the balcony guards were re-secured to the end and divider walls versus through the balcony decks, where possible, as part of the program of work in 2003 (as indicated by Peter Winstanley)

Dates Unknown (since 2003): Applied additional top coat of waterproof membrane to some balconies (as indicated by Peter Winstanley)

**Condition:**

2008 Halsall: No leakage problems reported or evident through the balconies; however, the following problem conditions were identified:

- 2nd top coat of waterproofing peeling at a few locations
- waterproofing split over joints in metal edge flashing along the front of balconies
- raised joint parallel to the exterior walls between plywood deck sheathing, resulting in minor ponding and staining
- perimeter of guard baseplates and fasteners at posts top mounted to the balcony decks are not well sealed
- debris around drain at balcony over front entrance

Concealed elements were not reviewed. There is no evidence of problems associated with the concealed means of construction; however, no visual evidence from the exterior would be expected based on the age of the building. Connection of balcony framing to the building should be confirmed to ensure adequacy of design and construction. This can be carried out as part of the further investigation recommended below.

The membrane on the balconies should have a serviceable life expectancy of 7 to 12 years in this environment, depending on the level of maintenance carried out. Assuming routine maintenance is

carried out when required (including maintenance to address problem conditions noted above), we expect that replacement of the membranes can be deferred for another few years. Should the waterproofing membrane not be replaced when required, leakage below the membrane can result in unnoticed deterioration of the wood framing, resulting in higher costs to repair. The plan allows for a further investigation of the balconies, including deck and soffit openings to assess concealed conditions, prior to proceeding with membrane replacement. Pending results of the further investigation, the plan allows for replacement of the membranes and local replacement of deck sheathing and framing (this work could likely be phased over 2 years, or more, if required). Costs include replacement of the terrace membranes and are based on a liquid applied membrane similar to exisiting; however, consideration could be given to installing a more robust (durable) membrane system at higher costs.

The balcony guards, where measured, meet the current Code requirements for minimum height, and allowable openings and climbable elements. While we did not conduct any testing or analysis to check the adequacy of the guards to resist the specified loads, the guards appeared to be reasonably secure.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 1.2.1 Balcony Condition Survey | $12,600 | $12,978 | 2010 | 10 yrs | recurring | 3 | Forecasted |
| 1.2.2 Replace Balcony Membranes - Incl. Local Sheathing and Framing Repairs | $98,176 | $104,155 | 2011 | 10 yrs | recurring | 3 | Forecasted |
| 1.2.3 Replace Balcony Guard Railings | $27,893 | $71,827 | 2041 | 40 yrs | recurring | 3 | Forecasted |

## 1.3 Parking Garage

**Description:**

There is a 2-level underground garage with a total of about 77 stalls. The suspended slab (P1 level) is protected by a thin waterproofing system. The access ramp is located at the northeast corner of the garage. The ramp is waterproofed with a material similar to that installed at the P1 level.

The northwest corner of the P1 level of the garage is sectioned off to provide a shared area with the adjacent property. Shared property includes the entrance ramp and drive aisle at the northwest corner of the garage. The 6 parking spaces within this shared area are for the sole use of the owners of the property to the north (Note: The 6 stalls are counted within the total 77 number of stalls). The bicycle locker within the shared area is for the sole use of the Strata. A prefinished aluminum, picket, overhead gate and man door at the drive aisle, and full height chain link fencing in the parking areas, sections the "Strata Only" area from the "Shared Area". There is a reciprocal agreement in place between the Strata and the owners of the adjacent property defining the use, maintenance and repair of this area. We understand that the Agreement is such that the adjacent property shares in costs including to maintain, repair and replace the garage entrance door, membrane and concrete structure, where shared, as required.

The garage extends beyond the building footprint on the east and west sides; the buried roof slab is covered by patios and landscaping.

Refer to Structural Frame section for further description of the Garage components.

**Repair History:**

Date Unknown (possible shortly after construction): Repaired leaking crack in north stairwell wall at garage level.

~2006: Replaced/overcoated membrane at P1 level intermediate slab (as reported by Peter Winstanley)

2006: Replaced/overcoated membrane at garage entrance ramp in response to leakage through the slab (at a cost of $5,300 as indicated in EPS Westcoast invoice)

**Condition:**

2008 Halsall: Concerns noted include:

- diagonal crack with evidence of past leakage at exterior wall adjacent parking space # 68
- diagonal crack with evidence of past leakage at exterior walls (corner) opposite the garage entrance ramp
- cracks with evidence of past leakage at underside of the P1 level suspended slab above drive aisle opposite parking spaces # 47 and # 50
- diagonal crack with evidence of past leakage in the wall opposite the south side of the entrance ramp (crack follows the line of the ramp)
- ponding water outside water room adjacent parking space #11 (water is leaking into the water room)

Peter Winstanley was not aware of any of the cracks listed above as actively leaking. The cracks in the P1 level suspended slab should be checked for leakage after washing/cleaning of the garage, and local repairs or re-waterproofing carried out as required on an as-needed basis.

Consideration should be given to installing a floor drain at the low point outside the water room to address ponding and leakage into the water room. The slab could be cored, a drain installed and drain

piping connected to nearby drain piping at a cost below the capital threshold of this study.

The plan includes a periodic allowance for local repairs, including minor concrete repairs and injection sealing of leaking wall cracks. Re-waterproofing of the P1 level suspended slab and entrance ramp, and repainting of the garage, is also included in the plan.

The service life of buried membranes, such as over the garage roof slab where extending beyond the footprint of the building, varies depending on original installation details, materials, and loading during use. There was no indication of leakage through the roof slab at the time of our visit. The plan allows for eventual re-waterproofing of the slab, including minor concrete repairs.

Concrete quantities included in the budgeted costs are rough estimates only. A more detailed condition evaluation will be needed just prior to each major repair program to better evaluate repair needs.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 1.3.1 Garage Local Repairs | $8,400 | $8,912 | 2011 | 5 yrs | recurring | 3 | Forecasted |
| 1.3.2 Garage Re-Painting | $8,400 | $9,738 | 2014 | 15 yrs | recurring | 3 | Forecasted |
| 1.3.3 Re-Waterproofing Garage P1 Level and Entrance Ramp - Incl. Local Concrete Repairs | $50,208 | $61,750 | 2016 | 10 yrs | recurring | 3 | Forecasted |
| 1.3.4 Parking Garage Condition Evaluation | $9,765 | $16,140 | 2026 | 10 yrs | recurring | 3 | Forecasted |
| 1.3.5 Replace Garage Waterproofing Membrane | $180,237 | $316,047 | 2028 | 30 yrs | recurring | 3 | Forecasted |

# 2. BUILDING ENVELOPE

## 2.1 Walls

**Description:**

The exterior walls are clad with a combination horizontal wood siding (west elevation), wood shingles (west elevation), horizontal vinyl siding (east elevation), asphalt shingles at mansard roofs (east and west elevations), and painted concrete block masonry (north and south end walls).

Drawings indicate that the exterior walls are typically constructed as follows (from the exterior to the interior):

Horizontal Wood Siding:
- Narrow profile horizontal wood siding (painted)
- 1x3 vertical wood strapping
- 2 layers of 30min. building paper
- 3/8" plywood sheathing (plus 1/2" type X DensGlass Gold sheathing exterior of the plywood at 1hour fire rated assemblies)
- 2X4 studs
- R12 batt insulation
- 6ml polyethylene vapour retarder
- 1/2" type X interior gypsum board

Wood Shingles:
- solid stained wood shingles
- 1x3 wood strapping
- 2 layers of 30min. building paper
- 3/8" plywood sheathing
- 2x4 studs
- R12 batt insulation
- 6mil polyethylene vapour retarder
- 1/2" type X interior gypsum board

Horizontal Vinyl Siding:
- Vinyl siding
- 1x3 vertical wood strapping
- Two layers of 30min. building paper
- 3/8" plywood sheathing
- 2x4 studs
- R12 batt insulation
- 6mil polyethylene vapour retarder
- 1/2" type X interior gypsum board

Asphalt Shingles (Mansard Roofs):
- Heavy profile (laminated) asphalt shingles
- Two layers of 30min. building paper
- 3/8" plywood sheathing
- 2x4 studs
- R12 batt insulation
- 6mil polyethylene vapour retarder
- 1/2" type X interior gypsum board

Concrete Block Masonry:
- 8" concrete block (painted; reinforced)
- 2x4 studs

- R12 batt insulation
- vapour retarder
- 1/2" type X interior gypsum board

There are also accent areas at the front of the building that are clad with cultured stone. Drawings indicate that these exterior walls are typically constructed as follows (from the exterior to the interior):

- Cultured stone masonry veneer with wire mesh
- 1x3 wood vertical strapping
- Two layers of 30min. building paper
- 3/8" plywood sheathing
- 2x4 studs
- R12 batt insulation
- 6mil polyethylene vapour retarder
- 1/2" type X interior gypsum board

There are also glass block infill wall areas at the south end of the building.

Divider walls between balconies are clad with either horizontal wood or vinyl siding.

There is wood trim at the perimeter of windows, floor slab bands and accent areas on the east and west walls. There are also prefinished metal flashings at window heads, window sills and floor slab bands.

There are prefinished metal closure flashings between end walls and adjacent buildings.

Joints between cladding sections and around windows and doors are sealed with caulking.

**Repair History:**

2002: Repaired construction deficiencies, including installation of sealants at wall penetrations and joints, installation of sealant end dams, repairs to buckled asphalt shingles at mandsard roofs, repairs associated with gaps in vinyl siding, etc. (at a cost of $27,820, including roof downspout and roof perimeter cap flashing repairs, as indicated in EPS Westcoast Construction invoice)

2004: Installed metal flashings at all window sills (at a cost of $61,513, as indicated in EPS Westcoast Construction invoice)

2006: Repainted all wood cladding and trim (as indicated by Management)

2008: Repainted wood clad wall areas above roof areas (as indicated by Peter Winstanley)

**Condition:**

2008 Halsall: The wall east and west wall systems are designed as a drained, or rain-screen system meaning that the outer surface is not intended to be perfectly watertight, but rather that membranes and barriers have been incorporated to drain water, which penetrates through the face, back to the exterior. There are no reports or evidence of leakage, other than into suite 416 (see Doors item for further discussion). The Strata has been proactive in correcting original construction deficiencies and maintaining the exterior walls of the building.

The bottom of the walls are stained, where water splashes from an adjacent horizontal surface (such as a balcony) onto the walls. Drip extensions at window sills are marginal, in that they do not extend enough to sufficiently shed shed water away from the exterior walls; however, staining below windows was not excessive at the time of our visit. These conditions should be monitored.

Drawings indicate that subsill membrane flashings are installed at windows and doors; however, there appears to be no upstand at the interior side of the flashings. Should the windows or doors leak, water would not leak into the wall cavity below; however, without an upstand on the interior side, water

would either travel to the exterior or to the interior of the suite. This should be noted with respect to any future locations of leakage into the building.

Prior to the next program of re-painting of the wood clad walls, the plan allows for a detailed evaluation of the condition of the exterior walls. This evaluation would include removal of small areas of cladding and/or openings in the exterior walls to assess the condition of the concealed components. Pending findings of the wall evaluation, the plan allows for repainting, including local repairs and re-caulking at both wood and vinyl clad walls. The plan also allows for ultimate replacement of wall cladding systems, including mansard roofs. Local repairs and/or cleaning may be required at some locations, between periods of repainting, which we assume will be carried out as part of operating budgets.

Unlike most of the walls, the south and north end walls are "face sealed" and not a drained or "rain screen" wall assembly. Although vertically and horizontally reinforced (i.e the voids within the block wall have reinforcing steel bars and concrete grout at roughly 4 foot on centre both vertically and horizontally) most of the block is "hollow". This means that any water able to get past an imperfection (i.e. crack) in the exterior coating can be absorbed by the block and/or can drain (travel) through the block voids. Once in the wall, there is no provision to collect the incidental water and re-direct it to the exterior. This water then can either stay absorbed within the block, or if there is sufficient volume, be absorbed by the interior wood framing, collect in the glass batt insulation in the stud spaces and/or end up on the floor slab.

This wall is south facing and therefore is subjected to large variations in temperature due to solar heating. The wall does not appear to have movement joints which are generally used to help accommodate some of the expansion and contraction of the masonry as it is heated and cooled. There is a long-term risk of localized coating failure (cracking) and resulting water penetration if the cracks become large and / or concentrated.

Diligent maintenance of the exterior wall coating and interface sealants on this wall is critical to reducing the risk of water penetration and concealed deterioration of the interior wall components. We recommend reviewing this wall from the exterior and completing investigation openings on the interior, adjacent to potential water penetration locations to assess the current performance of the coating and to plan needed coating maintenance and renewals. Costs to further investigate are included in the investigation of the wood clad walls detailed above. Pending results of this investigations, the plan also allows for re-painting of the concrete masonry walls, including local repairs.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 2.1.1 Wall Condition Evaluation | $15,750 | $17,210 | 2012 | 7 yrs | recurring | 3 | Forecasted |
| 2.1.2 Re-paint Wood Clad Walls - Including Local Repairs and Some Re-Caulking | $59,890 | $67,407 | 2013 | 7 yrs | recurring | 3 | Forecasted |
| 2.1.3 Re-paint Concrete Masonry Walls - Including Local Repairs | $31,458 | $36,468 | 2014 | 15 yrs | recurring | 3 | Forecasted |
| 2.1.4 Replace Asphalt Shingles to Mansard Roofs | $90,216 | $121,243 | 2019 | 20 yrs | recurring | 3 | Forecasted |
| 2.1.5 Replace Wood Siding and Wood Shingles | $363,562 | $618,940 | 2027 | 28 yrs | recurring | 3 | Forecasted |
| 2.1.6 Replace Vinyl Siding | $319,594 | $775,739 | 2039 | 40 yrs | recurring | 3 | Forecasted |

## 2.2 Windows

**Description:**

The windows are installed in a punched configuration, typically with horizontal sliding over fixed glazing units. Both the fixed and sliding windows consist of double glazed insulating glass units (IGU) marked "1998", in aluminum frames. There are also curved fixed IGUs with interior muntins over sliding units at 4th floor mansard roof/wall areas. Sliders have fibrous weatherstripping and some have exterior screens. There are sheet metal sill flashings under the windows intended to shed water away from the wall cladding below.

A few of the windows have been replaced with fixed over awning type operable glazing units (see below). Awning operables have interior screens.

**Repair History:**

2008: Replaced 7 windows (within 4 east facing suites) due to water leakage problems with a cost of $12,000 (as reported by Peter Winstanley)

**Condition:**

2008: The only reported water leakage through the windows was at the 4 suites, where the windows were recently replaced. These windows were all on the east elevation of the building, where the building will typically experience the worst weather conditions. Since the building is now nine years old and having experienced several years of weather, we assume that any problem windows, such as the windows in the four east facing suites, would have been identified and now have been replaced. Pending further information on the state of the remaining original windows, we assume that the the majority of the remaining windows will reach their expected full service life. The plan allows for about 8 more windows to be prematurely replaced and the remaining original windows to be replaced and the end of their expected full service life.

In the 4 suites visited, we observed no failed sealed units. We understand that there has not been a general problem with failing IGUs. Based on the size of the building, we assume that failed IGUs will be replaced on an annual basis, as and when required, as part of the Operating Budget.

Weatherstripping generally appeared consistent with age.

The plan allows for the following:

- a program of general rehabilitation from the interior, including weatherstripping replacement, internal joint sealing, and hardware repairs
- full replacement of the windows and balcony doors, including frames.

Although replacement of the windows is scheduled one year after cladding replacement. We assume these project will occur concurrently to reduce overall project costs (access, mobilization etc.).

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 2.2.1 Local Replacement of Leaking Windows | $16,632 | $17,645 | 2011 | N/A | One time | 3 | Forecasted |
| 2.2.2 Replace Weatherstripping and Repair Window Hardware | $42,656 | $57,326 | 2019 | 40 yrs | recurring | 3 | Forecasted |
| 2.2.3 Replace Windows - West Elevation, incl Balcony and Patio Doors | $236,363 | $414,464 | 2028 | 40 yrs | recurring | 3 | Forecasted |
| 2.2.4 Replace Windows - East Elevation, incl. Balcony and Patio Doors | $225,430 | $563,593 | 2040 | 40 yrs | recurring | 3 | Forecasted |

## 2.3 Exterior Doors

**Description:**

Exterior doors include the following:

- Main Entrance Lobby Doors (West Elevation): Glass and wood double doors with transom above, double glazed (marked 1999), in a vestibule configuration.
- Service Room Doors: Typically steel doors in steel frames.
- Garage Main Entrance Door: Prefinished aluminum, picket style, sectional overhead door with mechanical operator.
- Garage Doors (from Shared Area to Strata Only Area): Prefinished aluminum, picket style, sectional overhead door with mechanical operator. Adjacent swing door of prefinished aluminum, picket style construction.
- Balcony and Patio Doors: Vinyl sliding doors with screens and pile and fin weatherstripping.

**Condition:**

2008 Halsall: No reports or evidence of problems with the doors other than at suite 416 (see below for further discussion).

Automatic door operators are expected to be replaced on an as-needed basis from the operating budget, as are the hollow metal service room and exit doors. Balcony and patio door replacement is budgeted within the window replacement projects. The plan allows to replace the garage overhead doors, and the main entrance lobby doors.

The sliding door to the terrace of suite 416 has been leaking for a number of years. Water enters the suite at the bottom of the door and damages the door stool and wall finishes below the door. Stool and wall finishes were recently restored and again were stained and deteriorated at the time of our visit. The pile weatherstripping was damp along the bottom of the door frame at the time of our visit (it was raining at the time of our visit).

The Owner of suite 416 and Strata reported that there have been attempts to alleviate the leakage in the past; however, leakage has continued. The sliding door at suite 416 is highly exposed to the elements, more so than most sliding doors at the building, with being on the east elevation (most weathered side of the building), top floor (tops of buildings are wetted to a greater extent than lower down the building), and no roof overhang or balcony above to help shelter the door from the weather. The door is somewhat loose within its frame and could be adjusted (risen within the frame) to provide greater contact with the weatherstripping. Weatherstripping could also be replaced as it is showing evidence of wear. These measures would tighten the door and provide a certain degree of increased water resistance; however, we suspect the door will continue to leak under the given high exposure conditions. There is a high possibility that the subsill flashings below the door is not properly detailed (see Windows discussion) to direct water to the exterior, and as leakage through the door is inevitable, any defects in the subsill flashing can result in leakage into the suite. Based on past attempts to remedy the door being unsuccessful, we recommend that the door be removed and a properly detailed subsill flashing installed. The original door could be reinstalled with new weatherstripping materials. Alternatively, the door could be replaced with a new door assembly with a higher water resistance rating for a higher degree of success against continued leakage and/or consideration could be given to installing a canopy above the door. Pending discussions with the Strata, the plan allows for replacement of the door with a new higher performance door, including the installation of a subsill flashing. The cost in the plan includes for wall framing and interior finish repairs that will likely be required as part of the door replacement work.

Costs related to replacement of balcony and patio doors are included in the "Window" replacement programs, excluding the sliding door to suite 416.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 2.3.1 Replace Suite 416 Balcony Door | $14,700 | $15,141 | 2010 | N/A | One time | 3 | Forecasted |
| 2.3.2 Replace Overhead Door(s) | $15,750 | $21,167 | 2019 | 20 yrs | recurring | 3 | Forecasted |
| 2.3.3 Replace Main Entrance Doors | $8,400 | $14,300 | 2027 | 30 yrs | recurring | 3 | Forecasted |

## 2.4 Flat Roofing

**Description:**

There is one main roof level. The main roof includes raised sections at the elevator penthouse, stairwell and at mansard roof/wall areas. Drawings indicate that the roofs are constructed as follows (from top to down):

- 2ply SBS roof membrane
- 5/8" fir plywood sheathing (tongue and groove)
- Tapered 2x8 joists to slope 2% minimum to drains
- 2x4 cross strapping to provide venting
- 5/8" fir plywood sheathing (tongue and groove) with 2" dia vent holes at 16" o.c. (holes to be kept 8" away from edges)
- Roof joists
- R28 batt insulation
- 6mil polyethylene vapour retarder
- 5/8" type X interior gypsum board, all joints taped and filled

The modified bitumen membrane and slope of the roof appears to be is consistent with the drawings. No test cuts were made to establish the actual construction of the roof.

Perimeter flashings are protected by prefinished sheet metal counterflashings.

Drainage is provided by sumped area drains (level of roof lowered at immediate perimeter of drains), which are provided with debris guards. Overflow scupper drains are connected to rainwater leaders, which discharge onto the 4th floor balconies (see History of Repairs below).

The roof is vented through raised/covered doghouses in the field of the roof (no perimetyer venting).

There are a few acrylic domed, aluminum framed skylights. The skylights are mounted to wood framed curbs.

**Repair History:**

2002: Repaired construction deficiencies, including installation of downspouts from roof overflow scupper drains to 4th floor balconies and installation of membrane under roof cap flashings (at a cost of $27,820, including wall repairs, as indicated in EPS Westcoast Construction invoice)

2007: Re-installed a 40' piece of metal flashing at the roof, which became loose, and added additional fasteners to secure the flashings (at a cost of $2,000 as indicated in Villa Roofing & Sheet Metal invoice)

**Condition:**

2008 Halsall: No reports or evidence of leakage. There appears to be good slope to drains. There Strata was proactive in correcting originally construction deficiencies.

Problem conditions at the time of our visit were limited to granulate loss at a few small areas, wood debris on the roof and some debris around roof drains. We assume that wood and any debris on the roofs will be removed as maintenance.

The main roof is wood framed. There is insulation above the interior ceilings, with the air space above the insulation vented to the exterior by rectangular (in plan), hooded vents. Only the central areas of the roof has ventilation (i.e. the roof perimeter does not have inlet /outlet vents). This venting approach can lead to concealed roof sheathing deterioration, especially above kitchen and washroom

areas that have imperfections in the air barrier components. During roof renewal, additional vents can be provided at the roof perimeter to promote better attic ventilation. We recommend completing roof membrane test cuts and coring of the roof sheathing at the end of 15 years, prior to planned re-roofing. This will provide additional information needed for re-roofing, including a better estimate of the amount of roof sheathing that will likely need to be replaced. This investigation might need to occur sooner, if in the interim, problems with roof sheathing and /or interior ceiling staining becomes apparent.

We have assumed that local repairs will be completed when necessary out of the operating budget. The plan allows for ultimate replacement of the roof membrane.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 2.4.1 Investigate Condition of Roof | $9,975 | $11,564 | 2014 | 10 yrs | recurring | 3 | Forecasted |
| 2.4.2 Replace Flat Roofing | $339,066 | $455,676 | 2019 | 20 yrs | recurring | 3 | Forecasted |

# 3. FIRE SAFETY

## 3.1 Egress

**Description:**

Two stairwells provide egress from the building. One exit stair discharges through the lobby. The other exit stair discharges directly to the exterior.

Exits are marked by illuminated exit signs. Emergency lighting is provided in the egress paths.

**Condition:**

2008 Besant/Halsall: No analysis has been carried out to determine the adequacy of the exit facilities with respect to Code requirements. They appear to have been maintained as originally designed and constructed and seem reasonable. We understand that there were some issues with egress from the parking garage, as indicated by Peter Winstanley; however, a variance was issued and the local authorities now accept the exisitng means of egress at the building.

There is carpet in the stairwells. Carpets are typically not allowed in stairwells by Code, unless they have low flame spread ratings. We assume that the carpeting has been approved by the local authorities; however, we recommend that the flame spread rating of the carpet be confirmed. We have not allowed for removal of the carpet should this be required.

Exit signs and battery-operated emergency light heads are expected to be replaced on an as-needed basis from the operating budget.

## 3.2 Detection/Alarm

**Description:**

The fire alarm system is controlled with an Mircom Series 100 non-addressable fire alarm control panel ("FACP") located in foyer of the Building. The system is supervised. It provides automatic detection with the smoke and heat detectors, zone indication, manual activation with pull stations and sprinkler flow detection.

Heat detectors are installed in the service areas such as the mechanical rooms and the suites, all of which are connected to the fire alarm control panel. There are smoke detectors in the electrical closets and electrical rooms. In addition, smoke detectors are installed in the corridors, stairwells and garbage room. Pull stations are located at exists. The in-suite smoke detectors are not connected to the fire alarm panel and provide local alarms only.

There are alarms that monitor the air pressure in the dry sprinkler system, heat tracing on the incoming water lines, water flow, and tamper switches on the various shut-off valves.

**Condition:**

2008 Besant: The fire alarm system had tags indicating that the annual inspections were conducted by Royal City Fire Supplies Ltd., as required by the BC Building Code and NFPA 25. The fire alarm system was last tested in April 2008 and no deficiencies were noted.

Annual testing and minor associated repairs are expected to be paid from the operating budget.

The equipment is properly installed and free of mechanical damage, where reviewed. Based on our visual review, there appears to be adequate coverage of annunciation devices such as smoke detectors and pull stations.

ASHRAE gives a median service life for this type of equipment of 15 years. However, we frequently see fire alarm control panels remain in service for over 30 years. It should be noted that with semi-conductor based devices failure of particular components can occur at any time. We have budgeted for the panel and for some of the annunciation devices to be replaced after 20 years of service.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| **3.2.1 Replace Fire Alarm Panel and Some Devices** | **$26,250** | **$35,278** | **2019** | **20 yrs** | **recurring** | **3** | **Forecasted** |

## 3.3 Suppression

**Description:**

The building is fully sprinklered. The fire suppression system consists of a wet sprinkler system protecting the occupied areas of the building and a dry system protecting the parking garage. The heads were standard response with fusible links. The dry valves, the alarm valves and the fire pump are located in a mechanical room on the main level of the building. The fire pump motor is rated at 40 horsepower. The sprinkler room houses the water service entrance for the building and the domestic hot water heat exchangers and pumps. There is also a stand-pipe system that extends to the roof of the building.

There are spare sprinkler heads, as required by Code, in the sprinkler room.

There are fire extinguishers in cabinets in the corridors.

The Siamese connection for the fire department is north of the front entrance to the building and there is a fire hydrant across the street.

**Condition:**

2008 Besant: The system is inspected annually as required by Code. The sprinkler system was last tested in April 2008 and no deficiencies were noted. These system tend to require very little maintenance because they are rarely used.

Valves tend to require replacement as a result of seizing or developing leakage as seals age. Sprinkler heads have occasionally been recalled by certain manufacturers. However, since this cannot be predicted with any certainty, we have not included repair budgets associated with potential recalls. If such costs are incurred, they likely can be paid from the reserve fund and would be addressed as part of future updates of the study.

We have provided an allowance to cover repairs to valves and components such as piping and fittings of the sprinkler system after 25 years of operation.

Compressor pumps act to maintain pressure within a sprinkler system. Pumps eventually require replacement due to impeller erosion, bearing and/or seal failure. While maintenance repairs might defer replacement, this is eventually becomes impractical. We have assumed that compressor pumps can be managed out of operating budgets.

Fire extinguishers are assumed to be repaired or replaced as an operating expense.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| **3.3.1 Suppression Systems Repair Allowance** | **$15,750** | **$24,538** | **2024** | **25 yrs** | **recurring** | **3** | **Forecasted** |

## 3.4 Emergency Power

**Description:**

The fire alarm control panel and emergency lighting have battery backup packs.

**Condition:**

2008 Besant: We assume that battery packs will be tested annually as part of fire safety system testing,

and battery packs will be replaced on an as-needed basis as an operating expense.

# 4. FINISHES, FURNITURE AND EQUIPMENT

## 4.1 Common Areas

**Description:**

Common areas include front entrance lobby, corridors, stairwells, locker rooms, elevator cab and service rooms. Finishes include:

- Front Entrance Lobby: Ceramic flooring, painted walls and ceiling. Mail boxes in lobby area.
- Corridors: Carpet, painted walls and ceilings.
- Stairwells: Carpet, painted walls and ceilings.
- Locker and Service Rooms: Typically unfinished. 50x50mm wire storage lockers.
- Elevator Cab: Ceramic flooring, laminate walls and suspended ceiling

**Repair History:**

2004: Replaced carpet with tile in front entrance lobby (as reported by Peter Winstanley)

**Condition:**

2008 Halsall: Conditions are consistent with age. There are cracks in some drywall finishes, which appear normal for wood framed construction.

The plan allows for refurbishments.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 4.1.1 Refurbish Corridors | $30,611 | $32,475 | 2011 | 12 yrs | recurring | 3 | Forecasted |
| 4.1.2 Refurbish Front Entrance Lobby | $8,400 | $8,912 | 2011 | 12 yrs | recurring | 3 | Forecasted |
| 4.1.3 Refurbish Elevator Cab | $12,600 | $16,933 | 2019 | 20 yrs | recurring | 3 | Forecasted |

# 5. SITE

## 5.1 Site Features

**Description:**

Site features include the following:

- Patio Areas: Exposed aggregate concrete paving stones.
- Planter Walls: Wood.
- Perimeter Walls:
  - East Side of Property: Cast in place concrete guards with precast concrete caps and prefinished aluminum picket railings on top with individual gates.
  - West Side of Property: Stone clad (adhered; dry set) concrete guards with precast concrete caps and prefinished aluminum picket railings on top.
- West Side Entrances: Precast concrete stairs and prefinished aluminum guards and railings.
- Patio Dividers (West Side): Painted wood divider panels.
- Garbage/Recycling House: Wood framed, concrete masonry clad structure. The flat roof is protected by a modified bitumen waterproofing membrane. There is a metal roll-up garage and swing entrance door.

The majority of the site features are located on top of the garage roof slab.

There is a sprinkler system in the landscaped areas.

Internal area drains provide drainage. Finishes are generally sloped to drain.

The asphalt paved lane way adjacent the east side and concrete side walk and treed boulevard adjacent the west side of the property is City owned, and assumed to be their responsibility to maintain and repair.

**Condition:**

2008 Halsall: Problems conditions include:

- loose cap stones and top mounted metal guards at perimeter walls
- cracked mortar filled joints between cap stones at perimeter walls
- some stones loose, others broken off, at west perimeter walls

Site features and landscaping are typically managed from the operating budget, and then fully replaced at the time of garage roof deck re-waterproofing (see "Parking Garage"). The allowance included in this section is intended to cover a more major renewal and/or repair of landscape features, but not full replacement. Than plan allows for the first cycle of renewal within the next year top address the above concerns.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 5.1.1 Landscaping Allowance | $7,350 | $7,571 | 2010 | 5 yrs | recurring | 3 | Forecasted |

## 5.2 Site Services

**Description:**

Buried piping provides storm and sanitary water discharge, and potable water supply.

**Condition:**

2008 Besant: The building services are buried underground where they extend from the edge of the building to the property line (where they typically become the responsibility of the municipality). They are not visible for us to evaluate their condition. The plan includes a periodic allowance to excavate and repair buried services.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 5.2.1 Repair Allowance for Buried Services | $8,400 | $11,976 | 2021 | 7 yrs | recurring | 3 | Forecasted |

# 6. HVAC

## 6.1 Make-up Air Unit(s)

**Description:**

Outside air is provided by a natural gas fired, roof mounted make-up air unit (Engineered Air Model no. DJ, maximum rated input of 300,000 BTUH, an efficiency of 80% and flow rate of 5,300 cubic feet per minute (CFM)). The make-up unit is simple devices that consist of filters, dampers and a heat exchanger. It delivers conditioned outside air to the public areas of the building.

The make-up unit uses a simple thermostat controller that fires the burner whenever the discharge temperature drops below the setpoint.

The air is delivered to the public corridors through a single supply duct running through the centre core and delivered to each suite via planned air leakage under each suite entrance door (i.e. door undercuts). The air is then exhausted through the exhaust fans in the bathrooms and kitchens of the individual suites.

**Condition:**

2008 Besant: The make-up air unit appears to have been installed when the building was constructed.

ASHRAE gives the median service life for this kind of equipment as 20 years. This make-up air unit is not showing any signs of metal fatigue or structural damage because of rust; however, there is some minor surface corrosion on the exterior of the unit. There was also some minor surface corrosion on the gas supply line. The filters were clean. Because the unit is mounted outdoors we have budgeted for the replacement of this unit within the timeframe of this report.

No repairs are suggested for the distribution ductwork. However, we do recommend that the diffusers and ductwork be cleaned on regular basis (there was some dirt built up on the around the diffusers at the time of our visit). The frequency of cleaning can be done on an as-needed but we would suggest every 3 to 5 years. The cost of the cleaning would be below the threshold of this report.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 6.1.1 Replace Make-up Air Unit | $22,680 | $30,480 | 2019 | 20 yrs | recurring | 3 | Forecasted |

## 6.2 Baseboard Heaters

**Description:**

The suites are heated by electric baseboard heaters. Gas fireplaces provide supplemental heating.

**Condition:**

2008 Besant: No reported problems with the supply or operation of the heaters or fireplaces.

We assume that these in-suite systems are the responsibility of the individual owners to maintain, repair and replace, including the fireplace flues. However, it would be prudent for the Strata to ensure that measures are taken to ensure that these components are properly constructed, inspected, maintained and repaired when needed, including the fireplace flues which can be of particular cause for concern.

## 6.3 Exhaust Fan(s)

**Description:**

There are three exhaust fans used to maintain the air quality in the parking garage (Greenheck model # SP250). The fans are controlled by CO and propane sensors (5 stations in total) manufactured by Critical Environment Technologies.

There are fractional horsepower supply and exhaust fans in: Garbage room (located east of the building), bicycle storage room, locker rooms, elevator room, and main electrical room.

The suites have individual fans for the bathrooms and kitchens that discharge directly to the outside (most at roof level).

**Condition:**

2008 Besant: All of the fans visible for our review were noted to be properly installed and free of physical damage. The fans in the suites are somewhat noisy and not very effective (typical for the time of construction).

ASHRAE gives a median service life of 20 years for the parking garage exhaust fans, although we often see the fans remaining in service much longer because they are relatively simple devices than can be easily maintained. We have included an allowance for a replacement of the garage exhaust fans in our budgets. The CO sensors can be replaced as they fail for approximately $1000 each and therefore below the threshold of this report.

The remaining fractional horsepower supply and exhaust fans can be replaced as they fail as part of the maintenance program.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| **6.3.1 Replace Garage Exhaust Fans** | **$15,750** | **$24,538** | **2024** | **20 yrs** | **recurring** | **3** | **Forecasted** |

# 7. PLUMBING

## 7.1 Domestic Water Boilers

**Description:**

There are two Lochinvar atmospheric hot water boilers used to generate the domestic hot water for the building (model # RWN399PM) rated input of 399,000 BTUH. There are two AO Smith glass lined 120 US gallon storage tanks. The boilers and storage tanks are located in a P1 level service room.

There is a Bell & Gosset fractional horsepower recirculation pump on the hot water system. The pump appeared to set to run continuously. The water supply temperature was noted to be 60ºC.

**Condition:**

2008 Besant: The domestic water heating equipment was properly installed, supported and free of physical damage in the areas visible for our review.

Boiler and storage tank systems such as installed, tend to be more robust than direct-fired water heaters. With domestic water systems there are many factors that contribute to the failure of the equipment and piping that it is difficult to predict when the system will fail. There are many things that the building managers can do to prolong the life of the existing system. One of the most important steps is to ensure that the water temperature is kept as low as practical. Care should be taken to protect against the development of conditions that would promote the growth of microbes because some of these organisms can destroy piping faster than almost any other means. The recommended operating water temperature range is between 54ºC and 64ºC. Consideration should be gioven to using a water treatment system to protect the equipment and piping from corrosion that is a common problem in the Lower Mainland.

We have budgeted for the replacement of the boilers and storage tanks after about 20 years of service.

Fractional horsepower recirculation pumps have median service lives of less than five years. They are relatively inexpensive to replace and not critical to the operation of the domestic hot water system and therefore costs for replacing the pump are assumed to be an operating expense. Consideration should be given to adding an aquastat to the domestic water recirculation system to reduce the amount of time that the recirculation system operates, thereby reducing the wear on the domestic water piping.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 7.1.1 Replace Domestic Hot Water Boilers and Storage Tanks | $31,500 | $43,603 | 2020 | 20 yrs | recurring | 3 | Forecasted |

## 7.2 Domestic Water Piping, Valves and Pumps

**Description:**

The main water service entrance piping is seamless schedule 40 steel pipe with rolled groove connections. There is a dual 6 inch combined incoming service that supplies the sprinkler system through a 6 inch line and the domestic water system through a 4 inch line. There is a 1 inch Watts backflow preventer for the sprinkler system.

What was visible of the domestic water distribution piping was ASTM 88, type “L” copper. The domestic water system was protected from the sprinkler system by a Watts M10TRP back-flow preventer.

**Condition:**

2008 Besant: The piping was properly installed, supported and free of physical damage in the areas visible for our review.

In the lower mainland, primarily because of the softness of our water, the median service life of copper piping is 20 years. We often see systems that last much longer and when we look into these systems there are factors inherent in the design or operation of the system that have made this possible (we mentioned some mitigating factors under the Domestic Water Boilers item above).

There was a recent pin hole leak in the distribution piping above the 2nd floor hallway ceiling near a coupler. We understand that there have been a few occurrences of pin hole leaks in the past. We assume that repair of pin hole leaks will be managed out of operating budgets. We have budgeted for phased replacement of the domestic water system after about 20 years of service. This may prove to be conservative if the system is properly maintained.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 7.2.1 Replace Domestic Water Distribution System -Phase 1 of 2 (50%) | $336,000 | $465,103 | 2020 | 20 yrs | recurring | 3 | Forecasted |
| 7.2.2 Replace Domestic Water Distribution System -Phase 2 of 2 (50%) | $288,000 | $422,938 | 2022 | 20 yrs | recurring | 3 | Forecasted |

## 7.3 Drainage Systems

**Description:**

The drainage piping visible during our review consisted of a cast iron piping with mechanical joints. What piping that was visible was properly supported and showed no signs of leaks, mechanical damage or corrosion.

There is a duplex storm sump pump system (Myers pumps rated at 2 horsepower and a Northwest Tech-Con Systems Ltd. control panel). The 3 phase, 208 Volt sump pumps were noted to draw 5.8 Amps (P1) and 6.7 Amps (P2).

There is a trench drain at garage entrance door ramp and area drains in the patio areas.

**Repair History:**

2007: Replaced pump P2 (as reported by Peter Winstanley).

**Condition:**

2008 Beasant: The trench drain at the garage entrance ramp was blocked and overflowing. We assume that the drain requires cleaning as a part of maintenance and not significant repairs.

In general, drainage systems require very little in the way of maintenance capital expenditures and should remain in service for the life of the building. However, to be conservative, we have provided an allowance for the repair of some portions of the drainage system piping within the next 30 years.

Sump pumps are more maitenance intensive and tend to require annual servicing. In addition, the median service life for this kind of equipment is 10 years. The fact that one pump was recently replaced appears to be consistent with our median service life estimate. We assume that the sump pumps will be replaced on an as-needed basis. The cost of replacing the sump pumps on and individual basis is less than the capital threshold.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 7.3.1 Replace Drainage Piping/Drains | $21,000 | $43,969 | 2034 | 35 yrs | recurring | 3 | Forecasted |

# 8. ELECTRICAL

## 8.1 Electric Supply and Distribution

**Description:**

Electrical power is brought in underground from a BC Hydro owned pad mounted transformer to a 208 Volt, 3 phase, 1,200 Amp Federal Pioneer main disconnect switch. This switch feeds the central distribution panel board that houses disconnect breakers that feed the metering panels (3 x 400 Amps) situated in electrical closets and the house loads (1 x 400 Amps). The electrical closets in turn feed the individual distribution panels located in the suites. Each suite has a 100 Amp, single-phase panel.

The house loads consist of lights, heaters, pumps, fans and receptacles situated throughout the building.

**Condition:**

2008 Besant: The electrical equipment was properly installed and free of mechanical damage. All of the panels and breakers had labels.

The electrical room should be kept free of storage materials (items are presently being stored in the room), a single line diagram should be prepared and displayed on the wall, and the electrical equipment should cleaned, tested and infrared scanned on a regular basis (typically every 3 to 5 years).

None of the breakers felt warm to the touch. The cables were properly supported and appeared to be properly terminated in the panel. There was no record of the building having the panel cleaned, tested or infrared scanned.

We would expect that the electrical equipment and distribution wiring will remain in service for at least 45 years if not longer if properly maintained. However, breakers, disconnects and other safety devices may not function reliably after decades of not being used. We have therefore included an allowance for a renewal of the components of the electrical distribution system after 35 years of operation.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| **8.1.1 Electrical Distribution System Repair Allowance** | **$26,250** | **$54,962** | **2034** | **35 yrs** | **recurring** | **3** | **Forecasted** |

## 8.2 Lighting

**Description:**

In general, the lighting is comprised of surface mounted T8 style fluorescent and compact fluorescent fixtures.

Corridors: Wall mounted compact fluorescent.
Service Rooms: Single lamp, 4 foot, T8 style surface mounted fluorescent fixtures with wire guards.
Parking Garage: Single lamp, 4 foot, T8 style surface mounted fluorescent fixtures with wire guards above drive aisles and parking bays.
Exterior: The exterior lights are compact fluorescent service mounted weatherproof fixtures. There are surface mounted fixtures at the front entrance and on patios and balconies.

**Condition:**

2008 Besant: The light systems are efficient and appear to be functioning properly. Virtually all of the lights were properly mounted and free of physical damage. We did note during our visual review that one or two lamps were burnt out and there was one instance of a compact fluorescent fixture missing a lense cover in the southern stair well.

In general lamps, ballasts and fixtures are replaced as they fail as part of routine maintenance. However, it is often more economical to re-lamp entire floors or the entire building all at once. Further, there may also be incentives provided by BC Hydro for lighting retrofits. We have provided budgets for replacing light fixtures after 20 to 25 years of operation. Exterior lighting costs have been carried under the Walls budgets. Common corridor and foyer area lighting costs have been carried under the FF&E budgets.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 8.2.1 Replace Parking Garage and Sevice Lighting - Incl. Stairwells and Service Areas | $22,869 | $29,839 | 2018 | 20 yrs | recurring | 3 | Forecasted |
| 8.2.2 Replace Stairwell/Service Area Lighting | $3,465 | $5,088 | 2022 | 20 yrs | recurring | 3 | Forecasted |

# 9. CONVEYANCE

## 9.1 Elevators

**Description:**

There is a "Richmond", 6 stop, hydraulic passenger elevator rated at 2,500 pounds and 125 feet per minute speed capacity. The elevator door has a mechanical/push bar safety edge.

**Condition:**

2008 Halsall: We were not provided access to the elevator equipment room during our review. Richmond (maintenance contractor) had not returned our calls at the time of writing this report. However, Peter Winstanley indicated that there have been no significant issues with the elevator.

There is an in-ground hydraulic elevator cylinder. Such in-ground cylinders (as well as piping) may corrode and develop oil leaks. If oil leaks develop in the hydraulic elevator cylinders (or piping), and insufficient steps are taken to correct the problem, total failure of the cylinder may occur causing the car to overspeed in the down direction or free-fall. However, based on the age of the building, the hydraulic cylinder is likely lined, which lessens the possibility of oil leakage and resultant failure. Oil pressure should however be monitored, as a drop in pressure indicating oil loss is the only warning of impending failure. We have not allowed replacement budgets, give the unpredictable nature of this work, if even needed in this particular installation. Cylinder replacement typically ranges in cost from $25,000 to $50,000 per cylinder, but depends on the extent of soil contamination, if any, and access.

The plan allows for modernization of the elevator controls, including replacement of the hydraulic pump.

Consideration should be given to upgrading the door detector protection system to an infrared electronic detector. The cost of this upgrade would be below the threshold of this report.

We have budgeted for the cab to be refurbished in the FF&E section of this report.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 9.1.1 Elevator Control Moderization | $100,800 | $157,043 | 2024 | 25 yrs | recurring | 3 | Forecasted |

# 10. MISCELLANEOUS

## 10.1 Waste Disposal/Collection

**Description:**

Waste is collected in a bin in a separate building adjacent to the parking garage entrance. There are bins for recycling and for garbage.

**Condition:**

2008 Halsall: Maintenance and replacement costs associated with the bins will be below the threshold of this report.

## 10.2 Security Systems

**Description:**

The front entrance has a key pad connected to a "Mircom" enterphone system that is used to control access to the building. This system connects to the phone system to give residents notification that someone is at the front entrance and at the entrance to the parking garage.

There are magnetic locks controlled by key fobs at the various entrances to the building from the parking garage and at grade level. The controller for the system is situated in the telecommunications room on the P1 level.

**Condition:**

2008 Besant: The equipment was properly mounted and free of physical damage at the time of our review.

This kind of equipment typically has a median service life of 15 years, although we often see the equipment remain in service much longer. However, semi-conductor based equipment can fail at almost any time for a variety of reasons. We have budgeted for the intercom system and access key controller to be replaced (not including wiring) after 15 years of service.

Mag locks on doors are usually replaced as they fail and their service life is very much a function of the service conditions (i.e. the amount of traffic).

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| 10.2.1 Replace Enterphone System | $23,100 | $28,410 | 2016 | 15 yrs | recurring | 3 | Forecasted |
| 10.2.2 Replace Card Access System | $11,550 | $14,631 | 2017 | 15 yrs | recurring | 3 | Forecasted |

## 10.3 Consulting Services

**Description:**

**Condition:**

The plan allows to update the Reserve Fund Study every 3 years, alternating with and without site visits.

| Project Name | Present Cost | Inflated Cost | First Occur. | Cycle | # Occurrences | Class. | Status |
|---|---|---|---|---|---|---|---|
| **10.3.1 Reserve Fund Study without Site Visit** | **$5,250** | **$5,570** | **2011** | **6 yrs** | **recurring** | **3** | **Forecasted** |
| **10.3.2 Reserve Fund Study with Site Visit** | **$7,350** | **$8,521** | **2014** | **6 yrs** | **recurring** | **3** | **Forecasted** |


Photo No. 1: Front Entrance, West Elevation


Photo No. 2: East Elevation, Garage Entrance

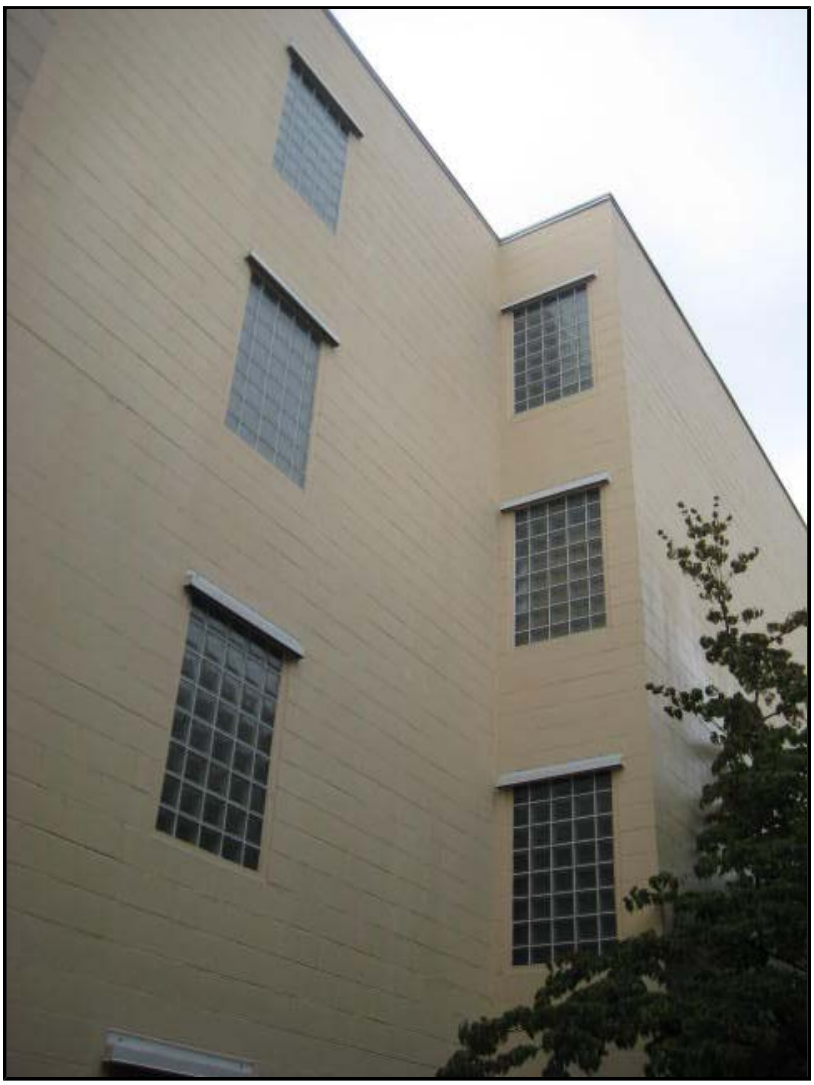

Photo No. 3: South End Wall

Photo No. 4: Parking Garage

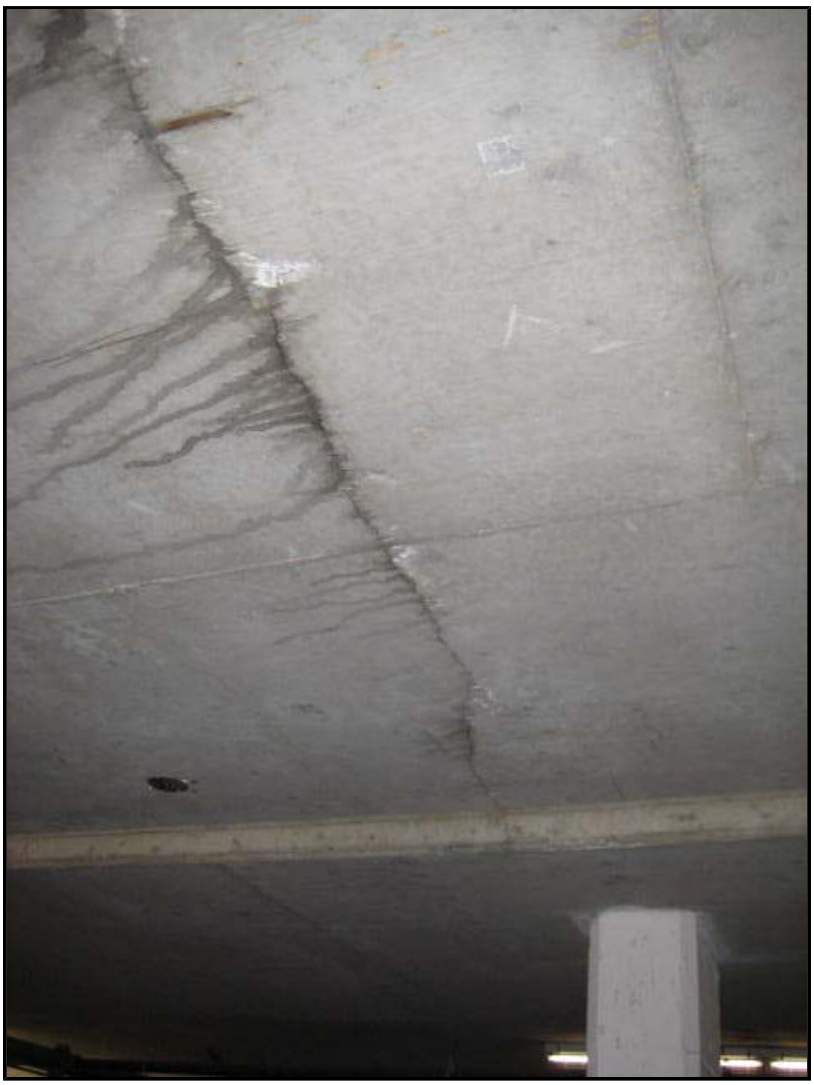

Photo No. 5: Underside of P! Level Suspended Floor Slab
Note: Crack in concrete with evidence of leakage.

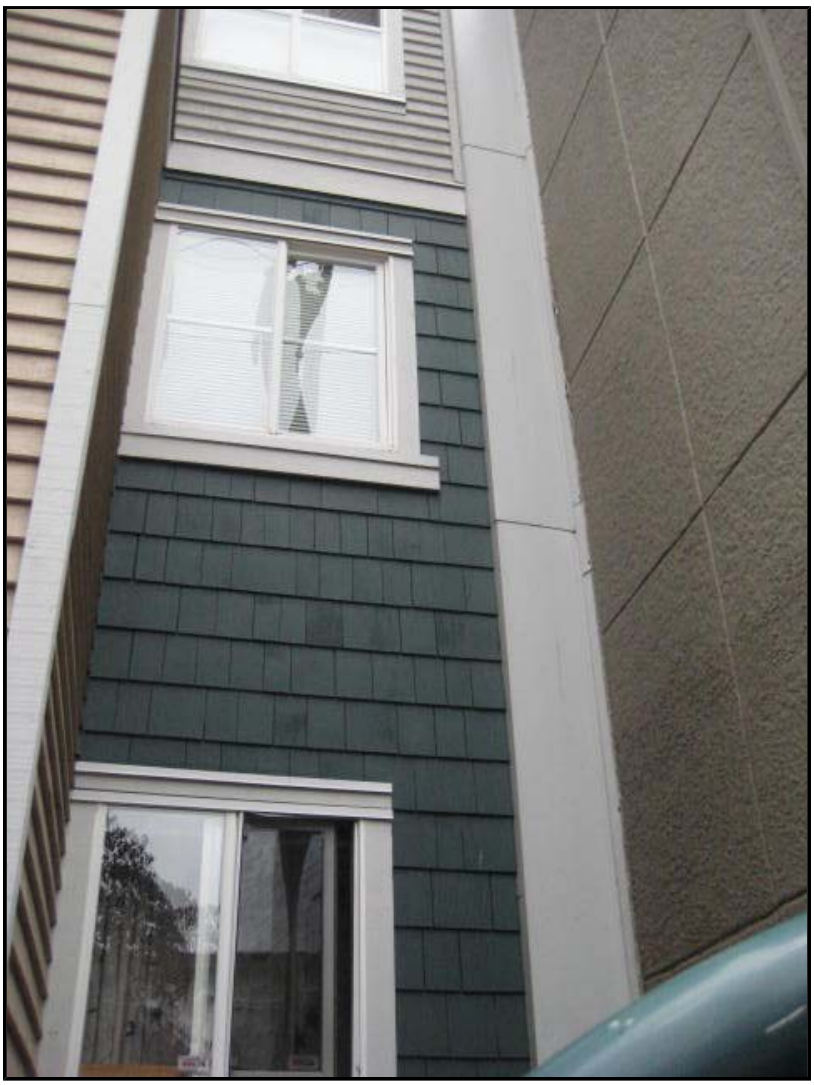

Photo No. 6: West Elevation, Painted Wood Shingles

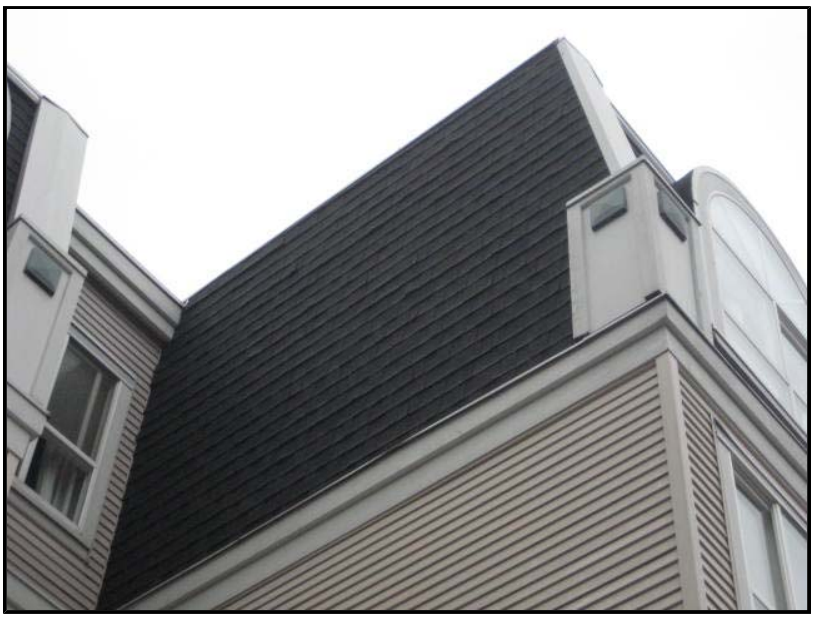

Photo No. 7: Typical Mansard Roof

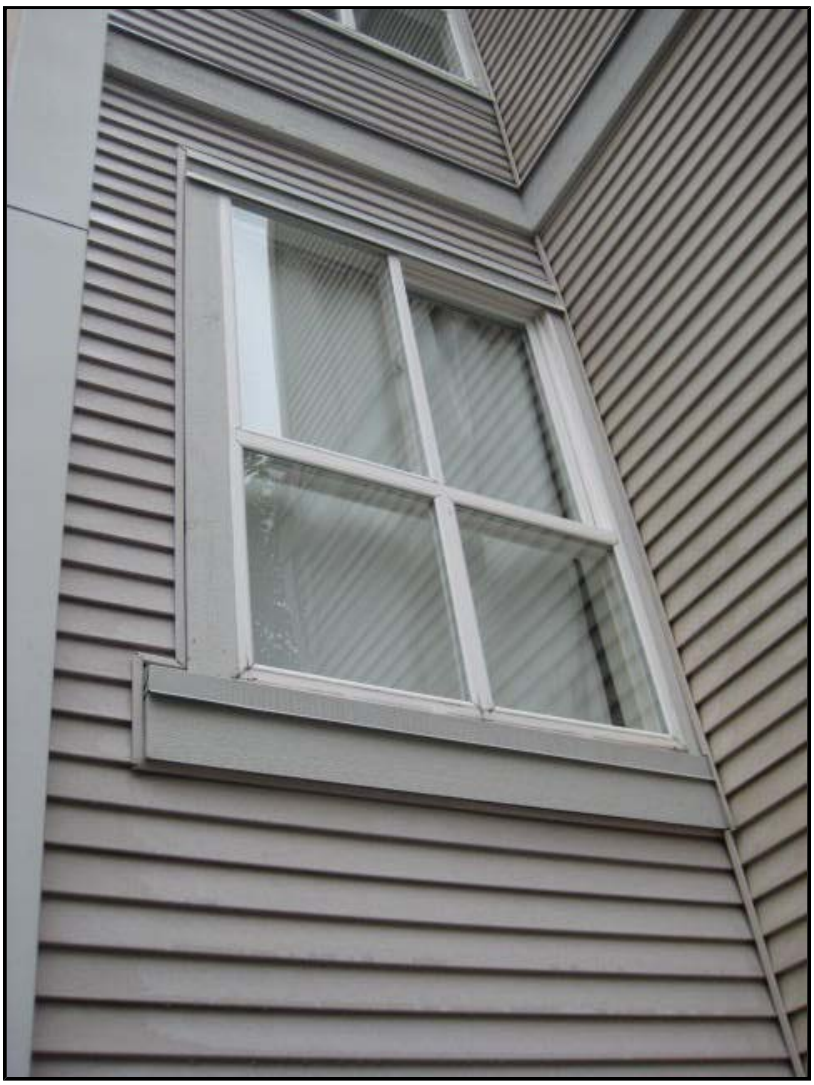

Photo No. 8: Typical Window
Note: Wood trim and metal drip flashings.

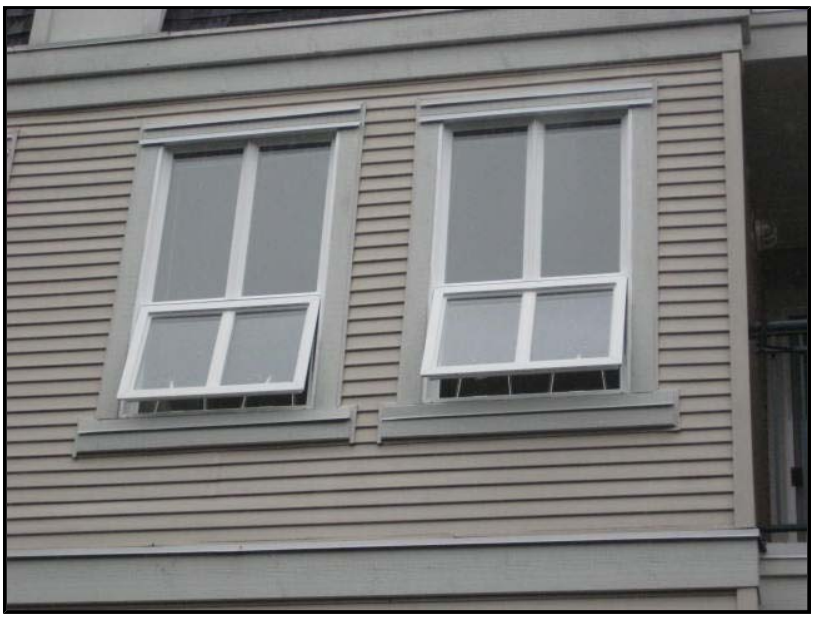

Photo No. 9: Replacement Fixed Over Awning Style Windows

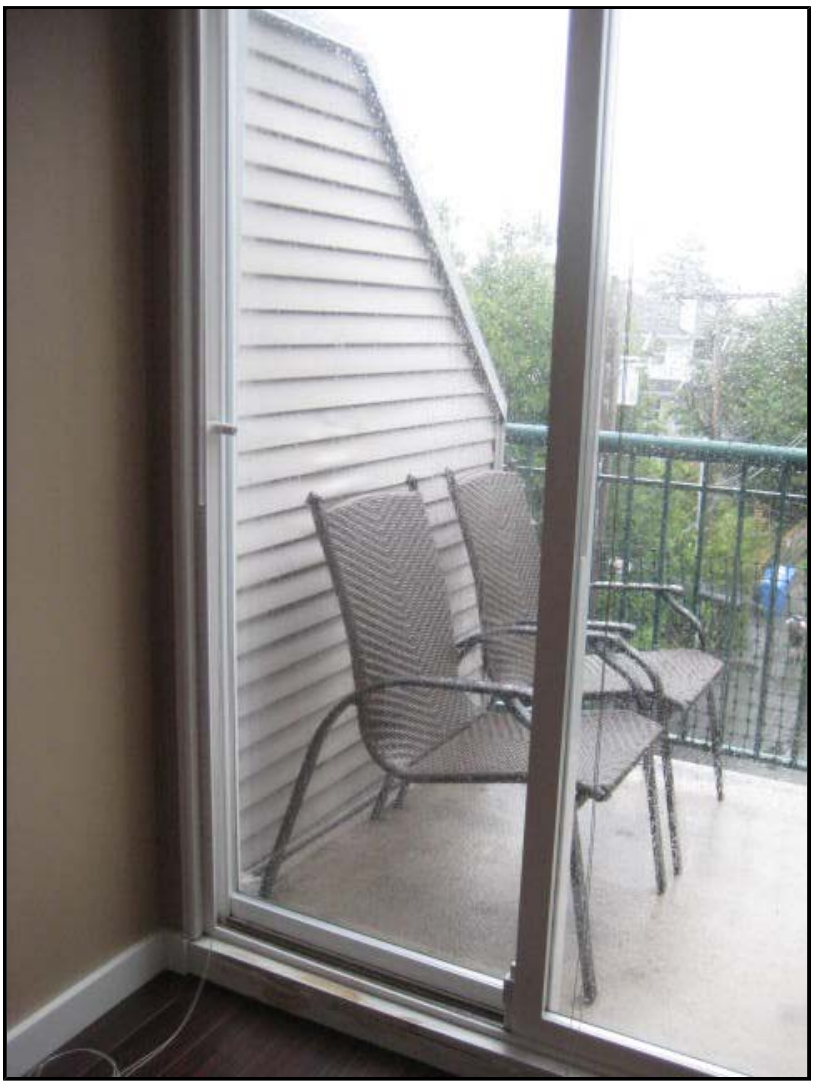

Photo No. 10: Suite 416 Sliding Door
Note: Stained interior finishes below door.

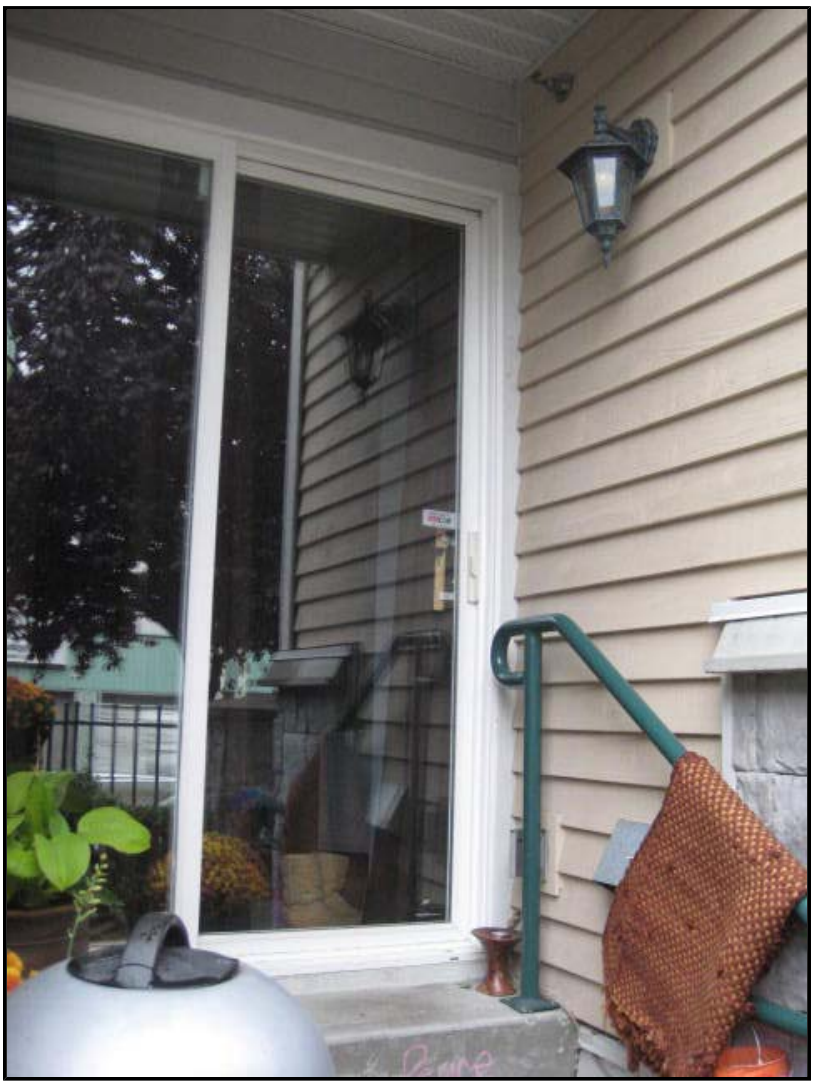

Photo No. 11: Typical Patio Entrance at West Elevation

Photo No. 12: Roof

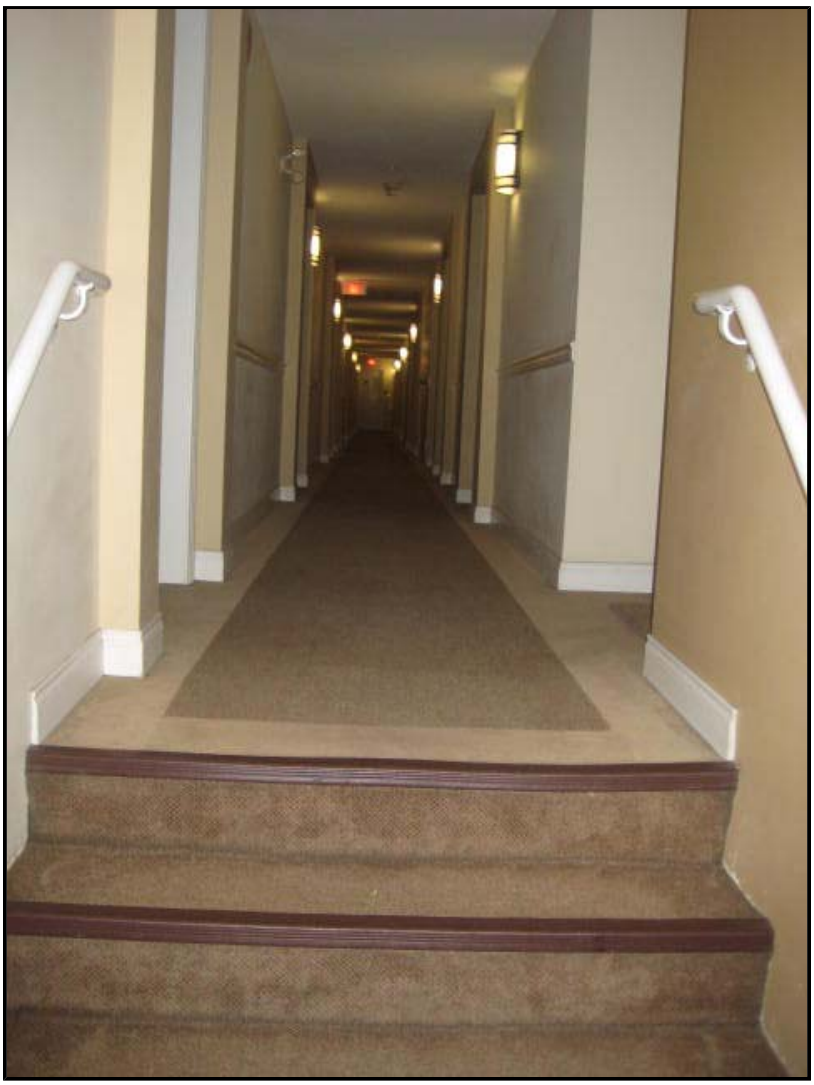

Photo No. 13: Typical Corridor

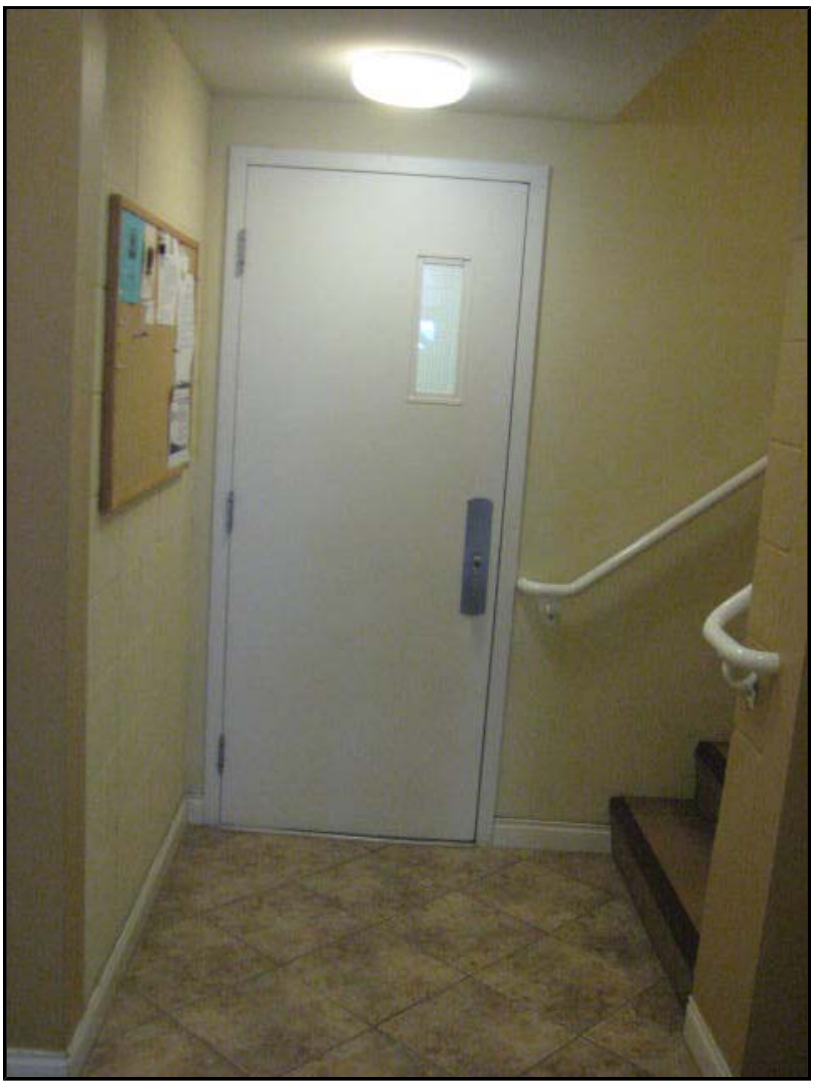

Photo No. 14: Typical Stairwell

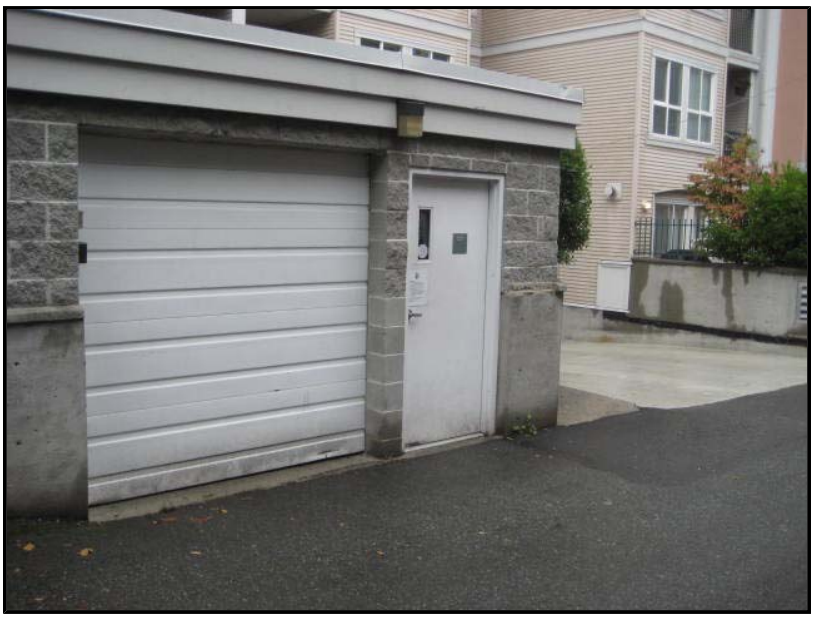

Photo No. 15: Garbage/Recycling House

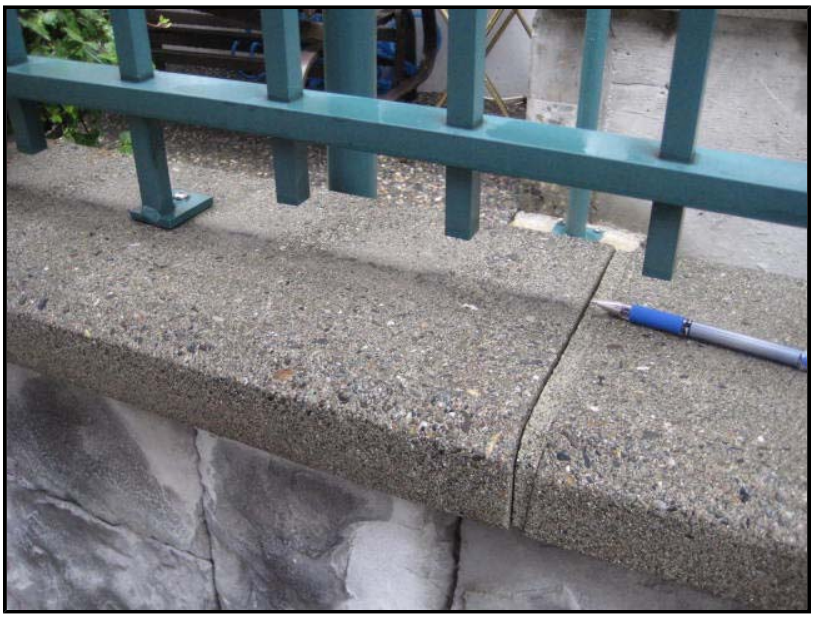

Photo No. 16: Perimeter Site Wall
Note: Guard secured to precast concrete cap and debonded mortar between cap stones.

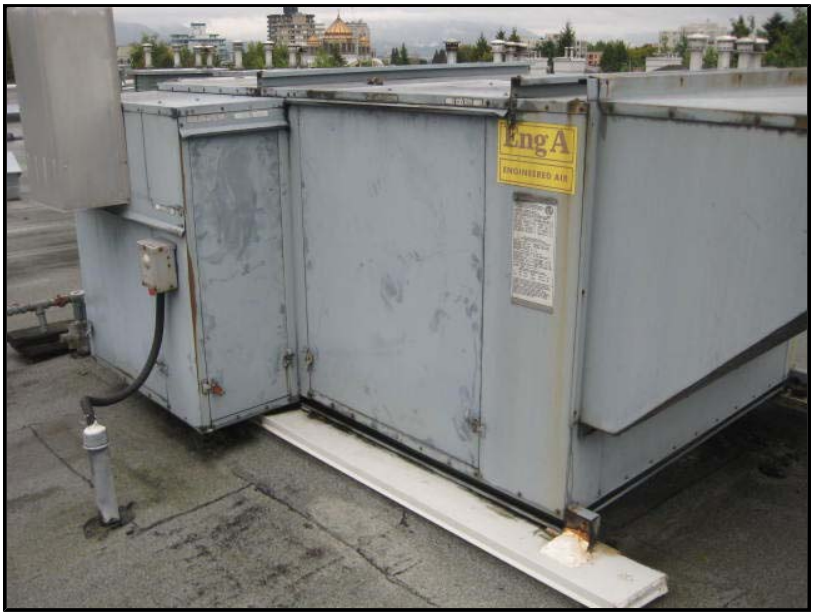


Photo No. 17: Roof Top Makeup Air Unit