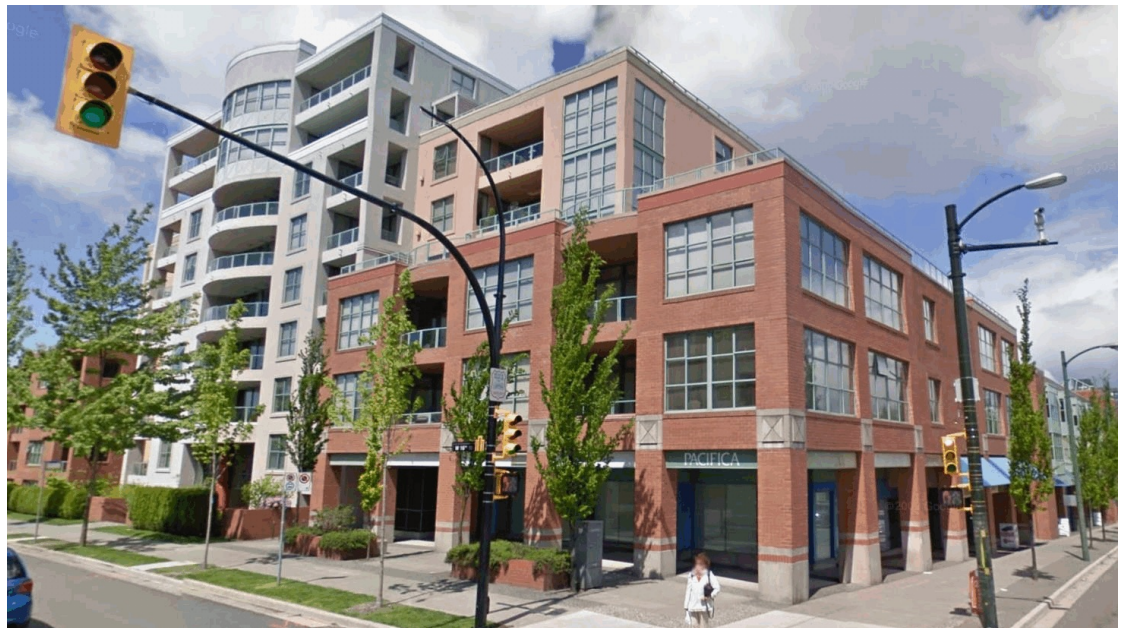




Maintenance Review & Roofing Condition Assessment

Pacifica

Strata Plan LMS 597
503 West 16th Avenue
Vancouver, BC



prepared for:

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TABLE OF CONTENTS

1.0	INTRODUCTION..	1
1.1	Terms of Reference..	1
1.2	Program Description..	1
1.3	Building Description..	2
2.0	GENERAL OBSERVATIONS..	3
2.1	Roof Systems..	3
2.2	Cladding..	7
2.3	Painted Wood Features	7
2.4	Vinyl Siding	7
2.5	EIFS..	8
2.6	Stucco..	9
2.7	Aluminum Frame Windows & Doors..	9
2.8	Brick Veneer..	10
2.9	Suspended Balconies..	11
2.10	Fireplace Exhaust Shields..	11
2.11	Sealant..	11
3.0	RECOMMENDATIONS..	12
4.0	CLOSING COMMENTS..	13

APPENDICES

Appendix A	Compendium of Photographs	11 pages
Appendix B	“Openings” Compendium	12 pages
	Roof Plans & Drawings	6 pages

1.1 Terms of Reference

In June of 2014, the Owners of Pacifica engaged CSA Building Sciences Western Ltd. to conduct a maintenance review and roof membrane condition assessment of the complex located at 503 W. 16th Ave., in Vancouver, British Columbia. The Pacifica is a multi-family mixed use development comprising 207 units in seven buildings each building has its own address. CSA was also engaged to review and provide comments on a recently completed depreciation report submitted by RDH Building Engineering Ltd. The depreciation report recommends exposed roof membrane replacement of all buildings to commence in 2014. The depreciation report also recommends that membrane replacement should be based upon actual condition of the membrane and underlying component after an assessment of the roof membrane is completed.

The Strata has requested CSA to carry out this study and prioritize roof membrane replacement and provide budget information based upon the results of the membrane condition study. The report will also make follow up comments on recently completed maintenance tasks and membrane replacement.

The purpose of the maintenance review is to document the overall condition of the exterior cladding, roofing and weather resisting components (building envelope) of the structure, as well as to comment generally, on associated items that typically require maintenance (ie. pavement, fencing, decking landscaping features and site drainage). Where specific concerns were observed the photograph is referenced thusly [X] indicating the photograph number in parenthesis should be referred to.

The strata corporation has also requested budget forecasting for imminent roof membrane replacement.

1.2 Program Description

During the review of the complex, CSA Building Sciences Western Ltd. examined representative areas of the building envelope, with the following tasks performed on site:

- Visual review of main roofs of all buildings.
- Completion of 12 membrane assembly cut tests including five roof decks
- Visual review of exterior cladding, windows, and site drainage elements.
- Visual review of a representative number of balconies which were accessed through the interior.
- Extensive photographs were taken to document conditions at all observed areas. A compendium of colour photographs, with captions, appears in Appendix A.

The on-site portion of the maintenance and membrane condition assessment was completed on July 15th and September 12th, 2014. The review is intended to report on exterior weather resisting assemblies and specific components requiring repair and or replacement.

1.3 Building Description

Complex Address	503 W. 16 th Avenue, Vancouver
Legal Description	n/a
Owner	Strata Plan LMS 597 “Pacifica”
Property Manager	Pacific Quorum Properties Inc.
Building Type	Multi-family residential
Principal Occupancy	Residential
Other Occupancy	Commercial/Retail
Designer	n/a
Date of Construction	1992
Applicable Building Code	British Columbia Building Code 1988
Number of Suites	189 residential, 18 commercial
Type of Construction	Steel stud and wood frame construction (varies)
Number of Storeys	3- 8 (varies)
Building Footprint	n/a
Parking	2 storey underground.

2.1 Roof Systems

Pacifica has flat roof membrane systems consisting of two ply SBS torch applied to either wood deck or concrete substrates. Similar membrane provides waterproofing on most of the terraced decks and open air decks on various buildings.

Generally, the exposed roofing is in fair to marginal condition, with the quality of the original work workmanship noted to be consistent with currently accepted standards.

12 cut tests were performed and holes patched by a journeyman roofer. The photographs and assemblies are depicted in Appendix “B” openings photo compendium and results are tabled below.

Building & Unit Number	Appendix “B” Photo Compendium number	Square footage	Observations
Main Gate Bldg “A” main roof	1	5625 sq. ft	Compact roofing with insulation above deck but under exposed membrane. There is severe alligating, patches and repairs, rusted flashing and air filled blisters.
South Gate Bldg “B” main roof	2	5625 sq. ft.	Compact roofing with insulation above deck but under exposed membrane. There is severe alligating, patches and repairs, air filled blisters and failed sealant at penetrations.
South Gate Bldg “B” #804B	3	750 sq. ft.	Compact roofing with membrane and insulation above deck insulation is saturated with water, there is visible damage to membrane in the drain grate.
Northgate Bldg “C” main roof	4	6300 sq. ft	Compact roofing with membrane and insulation above deck. There is severe alligating, patches and repairs, rusted flashing, air filled blisters, loose stripping plies, failed and missing sealant at penetrations.
Northgate Bldg “C” #801C	5	2270 sq. ft	Compact roofing with insulation and membrane above deck. Membrane is overlaid with gravel although this is not a ballasted system, there is large repair area along the east side of deck with membrane installed directly onto concrete with loos insulation and paver ballast(ballasted system).

Northgate Bldg “C” #803C	6	1440 sq. ft.	Compact roofing with insulation and membrane above deck. Membrane is overlaid with gravel. although this is not a ballasted system, loose stripping plies, seam and lap failures, severe alligating.
Promenade Mews Bldg “D”	7	2400 sq. ft.	A compact roofing system with insulation and membrane above plywood deck on main roof, but there is no vapour barrier present in the assembly. There are many, many repair patches, severe alligating and bare spots.
Promenade Mews Bldg “E” main roof	8	2400 sq. ft.	Insulation is above plywood deck on main roof, but there is no vapour barrier present in the assembly. There are many, many repair patches, severe alligating and bare spots.
Promenade Mews Bldg “E” 3150 deck	9	180 sq. ft.	Pavers and metal drain grate on membrane. A cut through the deck reveals there is no vapour barrier or insulation in the assembly.
Promenade Mews Bldg “E” 3150 lower roof	10	64 sq. ft	A small roof deck over kitchen. A cut test reveals that there is no vapour barrier or insulation in the assembly.
Cityhomes South Bldg “F”	11	5000 sq. ft	Insulation is above plywood deck on main roof, but there is no vapour barrier present in the assembly. There are many, many repair patches, severe alligating and bare spots.
Cityhomes North Bldg “G”	12	5000 sq. ft	Insulation is above plywood deck on main roof, but there is no vapour barrier present in the assembly. There are many, many repair patches, severe alligating, air filled blisters and bare spots.

The exposed membrane on the main roofs of all buildings are of similar age and construction with consistent detailing throughout all the buildings. On concrete substrates an oxidized asphalt pour coat on the deck is acting as vapour retarder as well as adhesive for the insulation layers.

Alligating (visible cracking pattern) of the cap sheet, blisters, loose seams and de-bonded stripping plies were evident throughout all the main roofs and only the extent of the aging is different. Many patches and repair seams are evident throughout buildings “D” & “E” (Promenade Mews) and “F” & “G” (Cityhomes) which are both wood frame buildings both of which do not have a vapour retarder in the assembly. Of the three main buildings “A” (Maingate), “B” (Southgate) & “C” (Northgate) it is building “C” that is showing the most age related deterioration [24].

When Pacifica was first constructed it can be seen that the roofing assemblies were installed with good attention to detail, using the best available materials and with generally good workmanship. Although original roofing installation was of good quality and is presently being well maintained, exposure to the elements and finite life expectancy of roofing material has brought the exposed roofing membrane near its expected service life. Even with adequate maintenance roof membrane in an exposed condition is not expected to be trouble free after 25 years. The exposed membrane at Pacifica is reaching the end of its service life and major replacements are imminent.

It is evident from historical records that there are some consistently problematic details with respect to membrane interface at roof deck membrane & wall base. Leaks typically occur at door openings and curbs adjacent to EIFS clad walls. The leaks can usually be attributed to wall details and not necessarily roof membrane failure. During the original construction EPS insulation was installed vertically against the concrete curb of the exterior wall with roofing membrane upturned onto the exterior side of the insulation. A flashing was installed above the upturn but it is not installed in a manner that directs water out if water were to enter the wall assembly at a higher point. Sealant failure at joints, penetrations and windows within EIFS allows water to bypass the waterproofing membrane by running down the sheathing behind the insulation and manifest itself as a leak into a unit. Historical records indicate these conditions which can be represented by photographs [47, 50].

In Vancouver, it is documented fact that the greater amount of damage related to rain penetration occurs to the east elevation of buildings as the greatest amount of rain and wind pressures come from the east. Eastern exposures typically fail first in Vancouver and this may be the case at Pacifica.

The roofing assemblies include phenolic resin insulation and taper slope EPS insulation that create slope to drains in these assemblies. Rapid drainage from roof surfaces leaving no residual pools of water after rain has stopped contributes greatly to life expectancy of roof membrane. The slope to drain at Pacifica is good and no significant pools of water ever collect[26]. Main roof assemblies at Pacifica are exposed membrane wherein the protective mineral granules provide all protection from UV. Once the bitumen is exposed deterioration is accelerated, more cracking becomes evident, exposing more bitumen, and the cycle continues until failure.

Another good feature in place at Pacifica is the use of pavers and gravel (whether by accident or design) loosely termed “protected” systems completely eliminates UV exposure which results in a longer life expectancy of bituminous membrane(s). It can be seen from observations and photographs taken from the site that exposed, granule covered cap sheet and stripping plies are failing even on roof decks with protected membrane systems. Conditions at units # 804B and # 803C demonstrate this condition[32, 33, 43].

Membrane cut tests were taken from both of these units with water saturation found in all layers of the assembly at unit #804B. Leaks were reported below units #801B and #804B in January of this year and cut tests confirm waterproofing and insulation has been compromised.

Large decks on Maingate, Southgate, Northgate and Promenade Mews all have two ply SBS membrane for waterproofing. Most have concrete pavers on pedestals for pedestrian surfacing which allows rain to flow to the drains underneath the pavers. Most of the decks are relatively clean and free of organic buildup, but a number of decks should be cleaned of moss and dirt to allow the paver surface to drain properly. Exposed roofing membrane is showing some alligating of the cap sheet and appears to be in fair condition with adequate maintenance being performed. Drain sumps were clear in areas reviewed [16,18, 23].

12 cut tests were performed as indicated in the summary table and openings photo compendium. Although aged water saturation was only observed at one location #804B. This does not mean that all membrane is performing adequately it is just an indicator of the severity of the failure. An unforeseen condition was discovered at Promenade Mews Bldg. "D" and "E". The absence of insulation and vapour barrier at lower roofs and decks was brought to light by an owner at 3150 Promenade Mews whom was renovating the interior of the unit. Further investigation at the interior of the unit and membrane cut tests have revealed that this condition exists at all units in both buildings. The existence of insulation at main roofs has been confirmed by membrane cut tests. Results of cut tests appear in Appendix "B" Openings photo compendium [openings photo 11,12].

The main roofing membrane at Promenade Mews is in marginal condition and ranked as a priority replacement compared to the balance of buildings at Pacifica. It is therefore that membrane replacement at all decks and main roofs of both buildings at Promenade Mews become a priority. The main roof at 3060 has had at least the cap sheet replaced but there is no information on date of completion or the scope of components replaced. It is also recommended that membrane replacement at units #801B and #804B be replaced within one year.

Based upon our observations, membrane cut tests and historical records, it is our opinion that the main roofs of all buildings will at least meet their expected service life of 25 years and that immediate replacement of exposed membrane on main roofs (except for Promenade Mews) is not necessary at this time. Main roof membrane replacement at all buildings except Promenade Mews may be deferred by 3 to 5 years. Roof membrane replacement should be considered deferred but imminent, and budget forecasting should account for staged replacement beginning in 2018. On a priority ranking system Bldg. "C" Northgate main roof should be replaced in 2018.

The depreciation report does not include a time frame for membrane replacement at balcony decks but it is assumed that the membrane will perform adequately for a longer time period than the exposed roof membrane. The expected service life of "protected" membrane is 30 years as opposed to 25 years for

exposed roofing membrane Unfortunately, the mode of failure at balcony decks appears to be detailing issues at wall interfaces and not the membrane itself. The costs for replacement of balcony membranes will require a revision when the depreciation report is updated.

Recommendation	Category/schedule	Opinion of probable cost
1. Replace membrane and insulation at units #804B and #801B.	Priority replacement within one year. (2015)	\$95,000 + GST
2. Replace membrane and insulation on main roofs of Bldgs. "D" & "E". (3060 excluded) Replace membrane and install insulation on all lower roofs and decks.	Priority replacement within two years. (2016)	\$147,500 + GST
3. Replace membrane at main roof of Bldg "C".	Depreciation replacement (2018)	\$270,000 + GST

2.3 Cladding

Pacifica has many different claddings installed on the building , including; brick veneer, EIFS horizontal vinyl siding, stucco and painted wood features such as timber trellises. Various painted metal flashings as well as aluminum windows are considered cladding. Many of the windows include cross broken metal panels at the bottom in various areas of the building. Each type of cladding has different performance characteristics and are briefly described below.

2.3 Painted Wood Features

Painted wood trellises and associated columns have been installed at some upper deck areas at most of the buildings. The lattices were originally designed as a type of sun shade to allow some shade on an open deck. Although attractive and easy to install, any type of wood is susceptible to deterioration if the conditions are constantly wet as is on the west coast. The best protection for wood and painted wood trim is a properly applied, unblemished coat of paint, consistently applied at regular intervals.

A major repair program was initiated and all deteriorated trellises were repaired and repainted in 2010/2011. During our maintenance review trellises on all buildings were reviewed and no further deterioration was observed.

Recommendation	Category/schedule	Unit # location [photo]
4. Review painted wood surfaces and repair/replace/repaint as necessary	Maintenance 2018	All buildings

2.4 Vinyl Siding

There are two buildings with vinyl siding installed at Pacifica (Promenade Mews). The vinyl siding is approximately eleven years old and in good physical condition. The siding has been installed over capillary break (“rainscreen”) according to accepted construction practices. Vinyl siding is maintenance friendly but subject to physical damage from wind blow off, and physical impact. Vinyl siding does not require painting but occasional cleaning must take place to remove carbon, dust, and algae. Panels that are loose or blow off may be easily replaced or repaired. The loose siding panel noted for repair in 2010 has been re-fastened. Algae and dirt buildup is beginning to show in areas and some cleaning will be required in the future. There were no further defects noted with respect to the vinyl siding material or installation.

Recommendation	Category/schedule	Unit # location [photo]
5. Low pressure cleaning	Maintenance	Promenade Mews

2.5 EIFS

Exterior Insulating Finish System (EIFS) is a wall cladding system that simulates a stucco look and incorporates expanded foam insulation as a base layer. The surfaces are easily shaped with tools and coated with acrylic latex lamina and reinforcing mesh. An acrylic finish adds colour and texture. Although robust looking, EIFS is fragile, particularly to impact and high heat. EIFS is not waterproof and should only be used on vertical surfaces in our rainforest climate. Because of the high expansion contraction rates of foam insulation, junctions with other components must be well thought out and properly installed. Expansion joints may split open or sealant beads become de-bonded from constant thermal cycling.

Recent roof membrane replacement and sealant renewal at #609C revealed that there is no continuous waterproofing layer behind the EIFS and it is spot adhered with adhesive directly to gypsum sheathing[50]. The EIFS is a face sealed system with no drainage provisions behind the cladding. Detailing defects at wall bases also revealed that membrane is upturned onto the exterior face of the cladding [47]and there is no through wall or cutoff flashing installed to direct water to the exterior if it were to enter the cladding at a higher point. The penetrations, window openings and architectural features are almost entirely dependent on sealant to keep rain out[50]. Although a comprehensive sealant renewal and painting program was initiated by the Strata Corporation it is evident that moisture ingress is still occurring. Trapped water was discovered in the sealant joints and at the wall base during the repair. The repair did involve modification of the wall base detail. A close-up of a painted over EIFS finish is included in the photo compendium[49]. As discussed previously extraordinary rain penetration on east elevations of buildings is a well documented on the west coast of BC. The depreciation report recommends EIFS removal and replacement starting in 2018, and it goes on to state replacement should be based upon results of a condition assessment. CSA recommends replacement of the EIFS cladding on the east elevation of

Bldg “C” Northgate between 6th and 8th floor in the near future, and that it should coincide with roof deck membrane replacement at the main roof and 8th floor. EIFS cladding replacement should also coincide with window and door replacement and penetration detailing in the targeted area. Bundling together of roof and cladding replacement will result in cost saving and allow effective flashing and tie-in details between roofing and cladding at the affected areas on all levels. Condition assessments for the balance of EIFS cladding should occur within two years.

Recommendation	Category/Schedule	Opinion of Probable Cost
6. Replace EIFS cladding, moisture barrier, windows and doors at east elevation of building “C” between 6 th and 8 th floor. Replacement should coincide with 8 th floor roof deck and main roof membrane replacement. 3500 sq ft includes glazing area.	Depreciation replacement 2018	\$227,500
7. Commission EIFS Condition Assessment	2016	
8. Replace membrane on roof decks of 801C & 802C to coincide with main roof replacement Bldg “C” and EIFS replacement. 4400 sq. ft.	Targeted replacement and bundling of wall cladding and roof replacement in the same area. 2018	\$ 242,500
9. Replace membrane and insulation on main roofs of Bldgs. “F & G Cityhomes. Include membrane under aluminum canopies.	Depreciation replacement. (2019)	\$260,000

2.6 Stucco

Portland cement stucco has been applied to various areas of the complex. Acrylic finish is also applied for the colour coat units in what is called a stucco finish. Promenade Mews has stucco installed over PT furring strips, known as vented cavity construction or “rainscreen”. The stucco has been finished with acrylic and is in good condition. Stucco is an attractive, non combustible non deteriorating product. No significant problems were noted with stucco application. Areas other than Promenade Mews are face sealed stucco (without capillary break or vented cavity) and can be problematic if water is to get past the outer layer of stucco to the sheathing paper layer wherein it may become trapped and cannot dry. Particular attention must be paid to these types stucco penetrations, joints and interfaces with other components to be sure the face sealed system is as water resistant as possible, by constant monitoring, sealant renewal and painting/refinishing.

2.7 Aluminum Framed Windows and Doors

The windows are aluminum frame, double glazed insulated glass units installed into framed openings. The windows are fastened with screws through the perimeter frame and sealed into the opening with membrane or caulking at the perimeter. Condensation is an issue with aluminum frame window units because the cold is transferred to the interior of the window frame by thermal conductance and warmer moisture laden air contacts the window where it condenses into liquid water. Aluminum frame windows and doors are in fair to marginal condition. Aluminum framed windows typically under perform with respect to heat loss, thermal transfer, condensation and moisture resistance. Aluminum frames are cut to fit in a factory and joined together with screws. After many years moisture leakage at mitres may be occurring long with failure of operating mechanisms. Glass panels seals fail and windows fog up. Window and door replacement cannot be achieved without substantial work in removing and replacing surrounding cladding and sealants and therefore should only be carried out during cladding upgrade. Depreciation report suggests aluminum frame windows, doors and aluminum frame window walls should be replaced between 2018 and 2022 and again should be replaced based upon actual conditions after a detailed condition assessment of aluminum framed windows and doors and surrounding cladding.

Exterior maintenance to window frames/glazing and renewing sealant at cladding interfaces is ongoing and should continue. Sealant at perimeters should be renewed where it has failed on a continuous basis to prevent moisture ingress at joints between window and cladding.

Failed window operating hardware was observed at #709C east elevation which will not allow the window to close properly.

Recommendation	Category/Schedule	
11. Maintain sealants and operating hardware at windows and repair non-operating units.	Maintenance	
12. Complete a detailed study of window and door condition.	2016	

2.08 Brick Veneer

Brick veneer is in use at all buildings except for Promenade Mews. Brick cladding is an attractive durable cladding that has a long life expectancy[11, 12]. Brick veneer is normally installed with a cavity between the masonry and the backup wall. Openings such as windows and balcony openings are supported at the top by a steel angle. A program of cleaning and sealant renewal has been completed. Sealant is in good condition and brick surfaces are clean. Review did not reveal any failed mortar joints. Expansion joints have been cleaned out and sealed with sealant. A complete sealant rehabilitation has been undertaken at Cityhomes and included joints, penetrations, hood vents and door and window openings. Polyurethane sealant has been installed and it is in good condition.

At window sills a slightly sloped soldier course of bricks has been used with the window frame caulked to the bricks. Mortar joints are porous and water can easily by pass the mortar joints and if not directed away from the building problems can occur.

2.09 Suspended Balconies

Balconies are defined as a suspended exterior platform over another suspended platform (open air space) such as a patio or another balcony below and not over interior living spaces. Open air spaces over interior spaces are defined as decks. Decks are considered an extension of the roofing system and are therefore considered a higher priority for repair than balconies. A leak from a deck could enter a living unit below and a balcony leak would normally only leak onto another balcony or patio below.

It was discovered during previous visits to the site that suspended concrete slabs were not waterproofed during original construction. A number of those balconies had cracks in the suspended concrete slab and were leaking into units below. The problematic balconies were put on a priority repair list. A contractor installed liquid applied membrane at the balconies and the leaks were resolved.

Rain does enter the balconies, albeit in a limited fashion, and if there are any cracks water can enter the unit below.

It is believed that the original issues have been resolved and no further leaks have been reported or observed during our recent visit.

Recommendation		Category/Schedule	
13.	Install waterproof membrane at balconies showing cracks in the floor on a priority basis.	Maintenance as needed	NG, SG, MG

2.10 Fireplace Direct Exhaust Shields

It was observed that many of the direct exhaust fireplace heat shields are rusting and corroded. Painting is most likely not an option and if the Owners choose a heating professional should be consulted for repair/replacement options[14,15]. One heat shield was replaced as a demonstration at the first floor east elevation of building “A” in 2011. Replacement of all the rusting heat shields would be considered optional maintenance.

2.13 Sealant

A scheduled sealant replacement program has been completed over the years t various locations and on various cladding throughout the complex. Sealant renewal is required maintenance to maintain the integrity of the various cladding junctions. Window perimeters, brick expansion joints, EIFS and stucco expansion joints, interfaces between differing claddings and any other areas where cladding projections occur. In

face sealed systems cladding and sealant at joints is the primary layer of resistance to rain penetration and should be checked and repaired or replaced occasionally.

Recommendation	Category	
14. Monitor sealant condition and replace as necessary.	Maintenance	

Maintenance:

After review of the complex as a whole it can be observed that various large scale and preventive maintenance projects have been commissioned and completed. The Owners should continue with the ongoing preventive maintenance. Other than constant checking, adjusting and cleaning there does not appear to be any major maintenance projects left to complete except to continue on the cycles of painting, sealant renewal, hardware adjustment etc. The age of the complex dictates major replacement of components in an organized fashion and as always should be based on actual condition.

There are a number of things that should be added as outlined in the report. Repairs or replacement of components to areas of the buildings that have resulted with water entering a unit should be given priority with a focus on unresolved problems and current leaks.

Liquid applied membrane should be installed at balconies with cracks in the deck that may allow moisture migration to the interior of the unit below.

Maintenance Recommendations made in the report are as follows:

Recommendation	Category/Schedule	Unit # location [photo]
4. Review painted wood surfaces and repair/replace/repaint as necessary	Maintenance 2018	All buildings
5. Low pressure cleaning	Maintenance	Promenade Mews
10. Commission EIFS Condition Assessment	2016	Bldgs. A, B, C
11. Maintain sealants and operating hardware at windows and repair non-operating units.	Maintenance	All buildings
12. Complete a detailed study of window and door condition.	2016	All buildings
13. Install waterproof membrane at balconies showing cracks in the floor on a priority basis.	Maintenance as needed	Bldgs. A, B, C.
14. Monitor sealant condition and replace as necessary.	Maintenance	

Roofing and Cladding Replacement:

After review of all roofs and representatives samples of roof decks CSA has the following recommendations. It is evident that most of exposed roof membranes are aging but will reach there expected service life of 25 years and some will likely last a bit longer with adequate maintenance and care.

Promenade Mews is prematurely aged, and has other deficiencies that place it on a priority list for replacement. The decks of #801B and #804 B should be replaced immediately because confirmed moisture saturation that may result in further leaks into units.

Roof membrane repairs have already taken place at #801C and #802C, there are a number of problems with the units below and EIFS condition as well as window and door details are suspect. Therefore it is recommended that 3 or more imminent projects be bundled together which will result in substantial savings in hard to access areas. Bundling projects in this way results in all new roofing and flashing above and below the replaced cladding and new doors and windows adjacent to new roof membrane. As the performance of EIFS walls, doors and windows, and adjacent roofing are dependent on each other they should be completed at the same time to avoid repeating work and adding to the cost. The timing and schedule of this work is not well defined but our five year plan shows they should commence in 2018 or sooner.

Cityhomes roof membrane is considered a priority replacement as it is a wood frame building and the condition of the cap sheet shows the most defects. Our five year plan shows City homes replacement to start in 2019 after major upgrades to other buildings. It would be considered prudent to reassess roofing and cladding condition every five years and base major replacements on actual condition rather than age alone. This recommendation is also mentioned in the depreciation report.

The balance of exposed roof membrane replacement may be deferred 3 to 5 years.

1.	Replace membrane and insulation at units #804B and #801B.	Priority replacement within one year. (2015)	\$95,000 + GST
2.	Replace membrane and insulation on main roofs of Bldgs. "D" & "E". (3060 excluded) Replace membrane and install insulation on all lower roofs and decks.	Priority replacement within two years. (2016)	\$147,500 + GST
3.	Replace membrane at main roof of Bldg "C".	Depreciation replacement (2018)	\$270,000 + GST

6.	Replace EIFS cladding, moisture barrier, windows and doors at east elevation of building "C" between 6 th and 8 th floor. Replacement should coincide with 8 th floor roof deck and main roof membrane replacement. 3500 sq ft includes glazing area.	Depreciation replacement 2018	\$227,500 + GST
7.	Commission EIFS Condition Assessment	2016	
8.	Replace membrane on roof decks of 801C & 802C to coincide with main roof replacement Bldg "C" and EIFS replacement. 4400 sq. ft.	Targeted replacement and bundling of wall cladding and roof replacement in the same area. 2018/2019	\$ 242,500 + GST
9.	Replace membrane and insulation on main roofs of Bldgs. "F & G Cityhomes. Include membrane under aluminum canopies.	Depreciation replacement. (2019)	\$260,000 + GST
Proposed five year plan total (2015-2019)			\$1,242,500.00 + GST

Should any comments or portions of this report require clarification or additional information, contact the undersigned.

Yours truly,

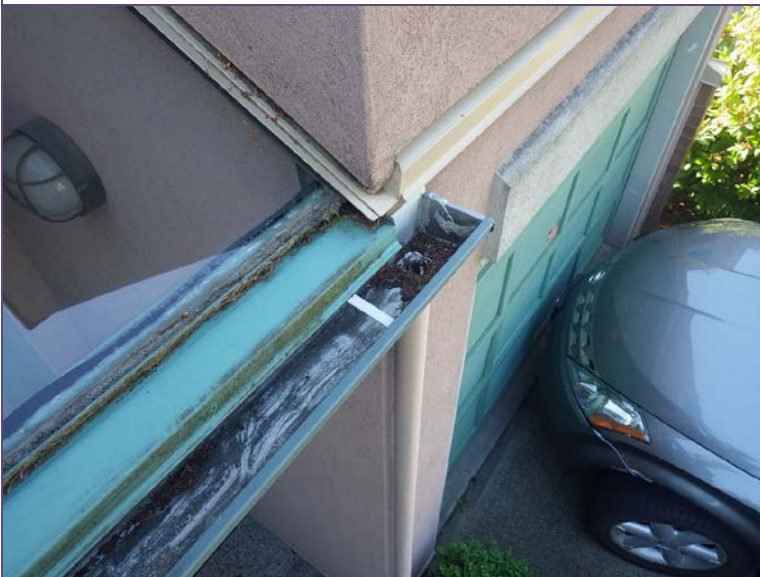
CSA BUILDING SCIENCES WESTERN LTD.
Consulting Engineers & Project Managers



Paul Surgeson AScT, RRO



1. Promenade Mews: Stucco and vinyl is in good condition. Algae and carbon staining are starting to become visible.



2. Promenade Mews: Gutters are relatively clean. Gutters should be cleared once per year minimum.



3. Promenade Mews: Leaf screens are performing their intended function. Drain clearing should coincide with gutter cleaning, and be performed once per year minimum.



4. Promenade Mews: looking down at lower roofs.



5. Promenade Mews: West elevation decks have gravel and paver covering. Flashing and siding are in good condition.



6. Promenade Mews: Wood trellises have been repaired and painted.



7. Promenade Mews:
Window sealants and
stucco trim are in good
condition.



8. Promenade Mews: looking
down onto a typical
balcony deck. This
particular deck is clean
and trellis is in sound
condition.



9. Bldg. "A" (Maingate):
A view of the north
elevation of showing
various claddings,
flashing, metal panels,
railings and windows.



10. Bldg. "C" Northgate:
A view of the south elevation of showing various claddings, flashing, metal panels, railings and windows.



11. Bldg "D" (Cityhomes):
north elevation. Bricks are in good condition, trellise are in fair condition. Sealant renewal has been completed on this building.



12. Bldg "E" (Cityhomes):
north elevation. Bricks are in good condition, trellises are in fair condition. Sealant renewal has been completed on this building as well.



13. A view north from the main roof of Bldg. "E". Circle indicates an area that was repaired during maintenance work recently. Arrows indicate rusting fireplace exhausts.



14. Bldg. "A" Maingate: East elevation showing EIFS cladding. EIFS appears to be in fair condition. Sealant joints have been replaced in areas. Fireplace exhaust housings are badly rusted in areas as indicated by arrows.



15. Front entrance to Bldg. "A" Maingate. Arrows indicate rusting fireplace exhaust housings. Fireplace exhaust housings are badly rusted in areas as indicated by arrows.



16. Bldg. "E" Cityhomes
Decorative aluminum frame has a flat roof below, with some roof top equipment.



17. Bldg. "E" Cityhomes:
Curb and parapet flashing are in good condition.



18. Bldg. "D": Roof surface is clean. There are many repair patches and cap sheet is heavily "alligatored" which indicates stress cracks in the top surface of the membrane caused by UV degradation.



19. Cap sheet showing “alligatoring” as more and more bitumen is exposed the top surface dries out and shrinks causing small splits in the surface which exposes more bitumen. This is one of the typical failure mechanisms of granulated cap sheets.



20. Bldg. “E” Cityhomes: A view down onto a typical balcony deck reveals heavy dirt and organic debris buildup on paver surface. Trellises at this building will require paint touchups and repair.



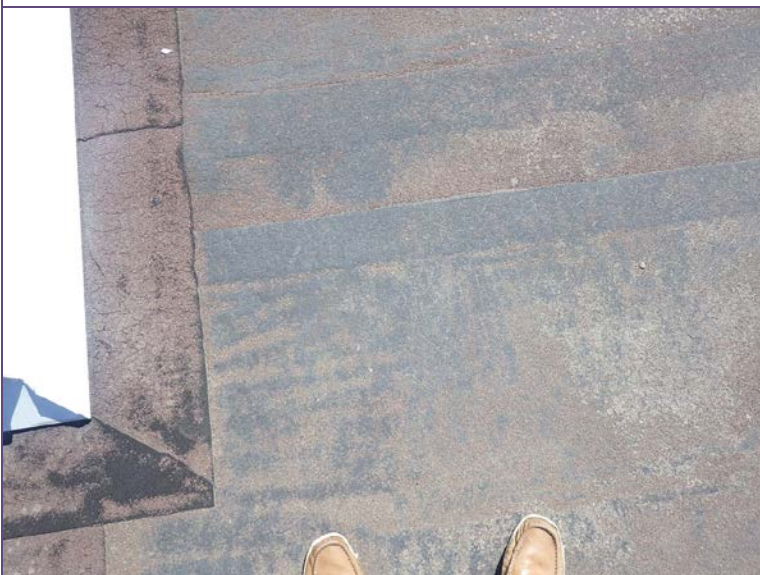
21. Bldg “E” Cityhomes: This particular balcony is clean.



22. Bldg “E” Cityhomes: most of the balconies are being kept clean.



23. Bldg “C” Northgate: roof surface is clean. Severe granule loss, alligating, and general deterioration of the cap sheet was noted throughout this roof.



24. Bldg “C” Northgate: There are many bare spots.



25.



26. Bldg "C" Northgate: A view west over main roof. All roofs have good slope to drain. Roof anchor curbs and B- vents are in good condition.



27. Bldg "C" Northgate: Some loose lap seams were noted. Bitumen loss from UV degradation was observed throughout this roof.



28. Overlooking 8th floor roof decks on Bldg “C”. Investigation of the area circled at unit 801C reveals a substantial roof repair which has converted the roof assembly into a “ballasted system”. More information is contained in “openings” photo compendium.



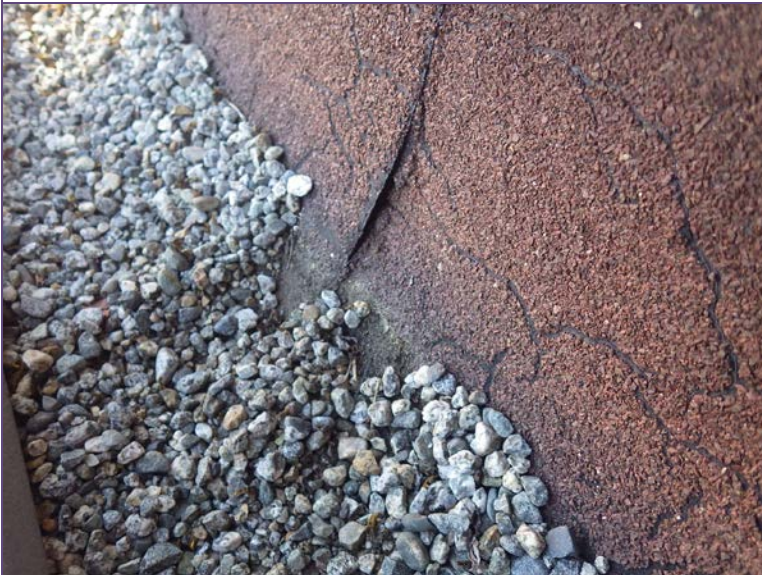
29. #801C showing new vs repaired roof area. Repair area has converted assembly to “ballasted” system wherein insulation is independent of the membrane and sits on top of waterproofing membrane.



30. Bldg. “C” 8th floor roof decks. Trellis, railings pavers is in good condition. Roof decks are generally tidy and well kept. Membrane at the perimeter of these decks is in marginal condition.



31. Bldg. "C" 8th floor roof decks.



32. #803C: loose stripping plies at parapet wall.



33. #803C loose stripping plies at trellis support.



34. Bldg “A” Maingate: facing south across main roof. Membrane is in fair condition.



35. Bldg “F” Cityhomes: Looking down on main roof. Different shades of cap sheet indicate areas where the roof had additional plies of membrane installed under a warranty claim.



36. Bldg “G” Cityhomes: Looking down on main roof. Different shades of cap sheet indicate areas where the roof had additional plies of membrane installed under a warranty claim. There is an exposed roof below the aluminum structure indicated by arrow. Inside view is shown in the phot below.



37. The walls supporting the aluminum frame and flat roof below that are exposed to the elements.



38. Bldg "B" Southgate: Skylights glazing and flashing are in fair condition.



39. Bldg "B" Southgate: roof accessories and penetrations.



40. Bldg "B" 801B: roof decks are in a clean and tidy condition. Trellis, railings and pavers are in good condition. Roof leaks have been reported coming from this deck. Repairs have been made.



41. #804B: Roof deck is clean and tidy. Waterproofing has failed and cut tests reveal complete saturation. Previous leaks have been reported at this deck.



42. #804B Membrane cut test. All layers of insulation are saturated.



43. #804B: Membrane has completely de-bonded from emergency overflow drain flange. Flange has also split apart.



44. #804 B membrane inside the drain grate appears to be damaged.



45. Looking down on 6th and 7th floor balconies.



46. #609C A typical wall base detail at all Pacifica roof decks has membrane turned up onto EIFS cladding without a separation flashing. If sealant or flashing fail water can enter behind the membrane and into the building.



47. Another view with wall base membrane removed.



48. #709C EIFS Cladding window trim details. (historical file photo). Showing water runoff and wetting patterns.



49. A macro close-up of EIFS wall cladding that has been painted. Surface is still very porous. This photo was taken at an area just below the area in photo #48.



50. A view behind the membrane at #609C. EIFS is spot adhered to the gypsum sheathing and without a moisture barrier. Moisture ingress at penetrations is represented by stains on the gypsum face.

OPENING #01



Opening Type:	Membrane cut test
Date of Opening:	July 15, 2014
Location:	Bldg "A" Maingate main roof
Observations:	Alligatoring, bare spots, and many patches on the roof surface.

Close-Up View of Opening #01:



Assembly:

2 ply SBS
 2 layers ½" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 ½" EPS insulation (taperslope varies)
 Asphalt Flood coat on concrete deck

Substrate Condition: Good No water present in the system

OPENING #02



Opening Type:	Membrane cut test.
Date of Opening:	July 15, 2014
Location:	Bldg "B" Southgate main roof
Observations:	Alligatoring, bare patches, failed penetration sealant.

Close-Up View of Opening #02:

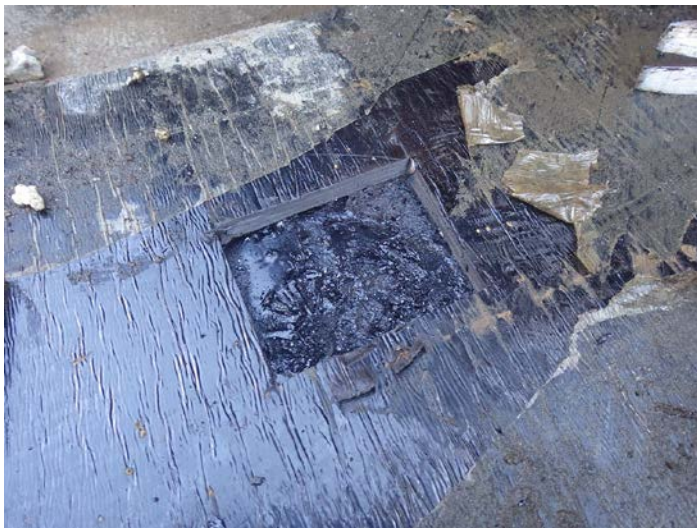


Assembly:

2 ply SBS
 2 layers ½" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 1" EPS insulation (taperslope varies)
 Asphalt Flood coat on concrete deck

Substrate Condition: Good

OPENING #03



Opening Type:	Membrane cut test
Date of Opening:	Sept. 12, 2014
Location:	Bldg "B" 804B
Observations:	Roof deck has pavers. Membrane looks almost new and still has thermo-fusible plastic film at the cut test location Cut reveals total saturation of the insulation plies. There appears to be some damage to the membrane in the drain location.

Close-Up View of Opening #03:



All layers of insulation are saturated with water.

Assembly:

2 ply SBS
 2 layers 1/2" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 1-1/2" EPS insulation (taperslope varies)
 Asphalt Flood coat on concrete deck

Substrate Condition: Substrate is concrete and in good condition.

OPENING #04



Opening Type:	Membrane cut test
Date of Opening:	July 15, 2014
Location:	Bldg "C" Northgate NG main roof.
Observations:	Bare patches, exposed bitumen, alligatoring, a few repairs.

Close-Up View of Opening #04:



Assembly:

2 ply SBS
 ½" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 1- ½" EPS insulation
 Asphalt Flood coat on concrete deck

Substrate Condition: Concrete

OPENING #05



Opening Type:	Membrane cut test
Date of Opening:	Sept. 12, 2014
Location:	Bldg "C" Northgate 801C
Observations:	Gravel is covering membrane and adjacent repair is a ballasted system which is holding water.

Close-Up View of Opening #05:



Assembly:

Light gravel cover
 2 ply SBS
 2 layers ½" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 1" EPS insulation (taperslope varies)
 Asphalt Flood coat on concrete deck

Substrate Condition: Good

OPENING #06



Opening Type:	Membrane cut test.
Date of Opening:	Sept. 12, 2014
Location:	Bldg "C" Northgate 803C
Observations:	Parts of the deck are covered with gravel and board walkway. Some areas have pavers. There are many open laps, failed seams and stripping plies on this deck.

Close-Up View of Opening #06:



Assembly:

Light gravel cover
 2 ply SBS
 2 layers ½" fibreboard (mopped)
 2" phenolic Resin Insulation(mopped)
 ½ " EPS insulation (taperslope varies)
 Asphalt Flood coat on concrete deck

Substrate Condition: Good

OPENING #07



Opening Type:	Membrane cut test
Date of Opening:	July 15, 2014
Location:	Bldg "D" Promenade Mews
Observations:	Many patches, Alligatoring, a few blisters. There is no vapour barrier in the assembly.

Close-Up View of Opening #07:



Assembly:

2ply SBS membrane
 ½" fibreboard (mopped)
 2" Phenolic Resin Insulation
 1" EPS Foam (taper slope varies in thickness)
 Plywood deck

Substrate Condition: Good

OPENING #08



Opening Type:	Membrane cut test
Date of Opening:	July 15,
Location:	Building "E" Promenade Mews
Observations:	There are some blisters, alligating and many patches. There is no vapour barrier in the assembly.

Close-Up View of Opening #08:



Assembly:

2ply SBS membrane
 ½" fibreboard (mopped)
 1-½" Phenolic Resin Insulation
 3" EPS Foam
 Plywood deck

Substrate Condition: Good

OPENING #09



Deck area pictured is similar to 3150

Opening Type:	Membrane and substrate cut test
Date of Opening:	Sept. 12, 2014
Location:	Deck of 3150 (west side)
Observations:	No insulation or vapour barrier

Close-Up View of Opening #09:



Assembly:

2 ply SBS membrane
Plywood over wood joists
Gypsum ceiling

Substrate Condition:

OPENING #10

Lower roof shown is similar to 3150



Opening Type:	Membrane and substrate cut test
Date of Opening:	Sept. 12, 2014
Location:	Lower roof 3150 (east side)
Observations:	There is no insulation or vapour barrier in the assembly.

Close-Up View of Opening #10:



2 ply SBS membrane
Plywood over wood joists
Gypsum ceiling

Substrate Condition: good

OPENING #11



Opening Type:	Membrane cut test
Date of Opening:	July 15, 2014
Location:	Bldg "F" Cityhomes
Observations:	Membrane has been overlaid with additional membrane during warranty claim. There is alligatoring of the cap sheet, and a few blisters.

Close-Up View of Opening #10:



Assembly:

2 ply SBS + 2Ply repair (4 ply)
 ½" fibreboard (mopped)
 2" Phenolic Foam Insulation (mopped)
 1" EPS
 Plywood deck (no vapour barrier)

Substrate Condition: Good

OPENING #12



Opening Type:	Membrane cut test
Date of Opening:	July 15, 2014
Location:	Bldg "G" Cityhomes
Observations:	Alligatoring, repair patches, some blisters.

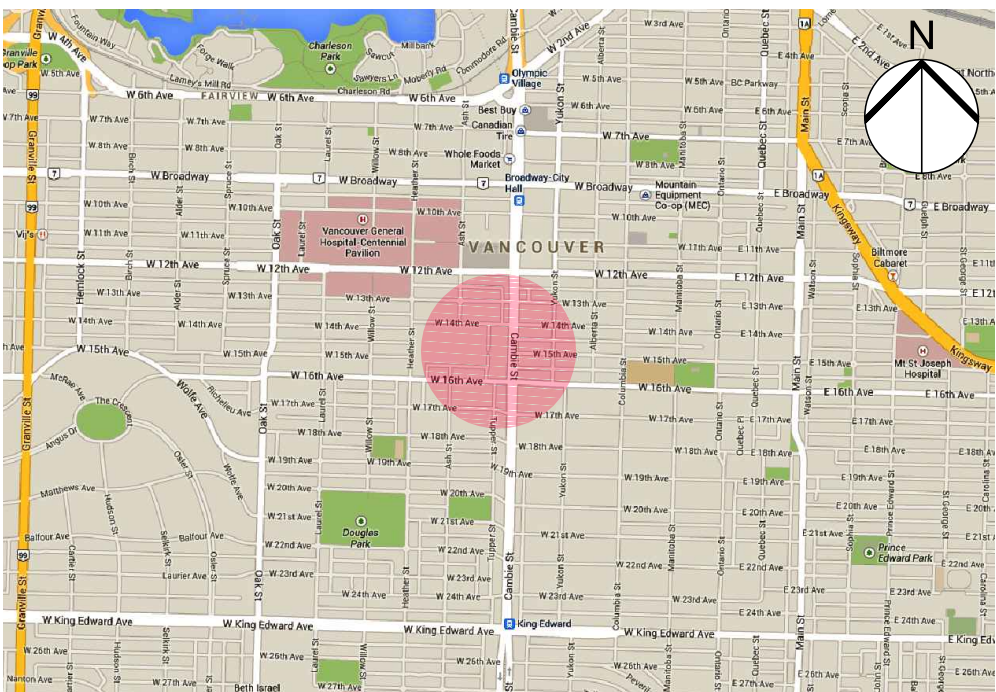
Close-Up View of Opening #12:



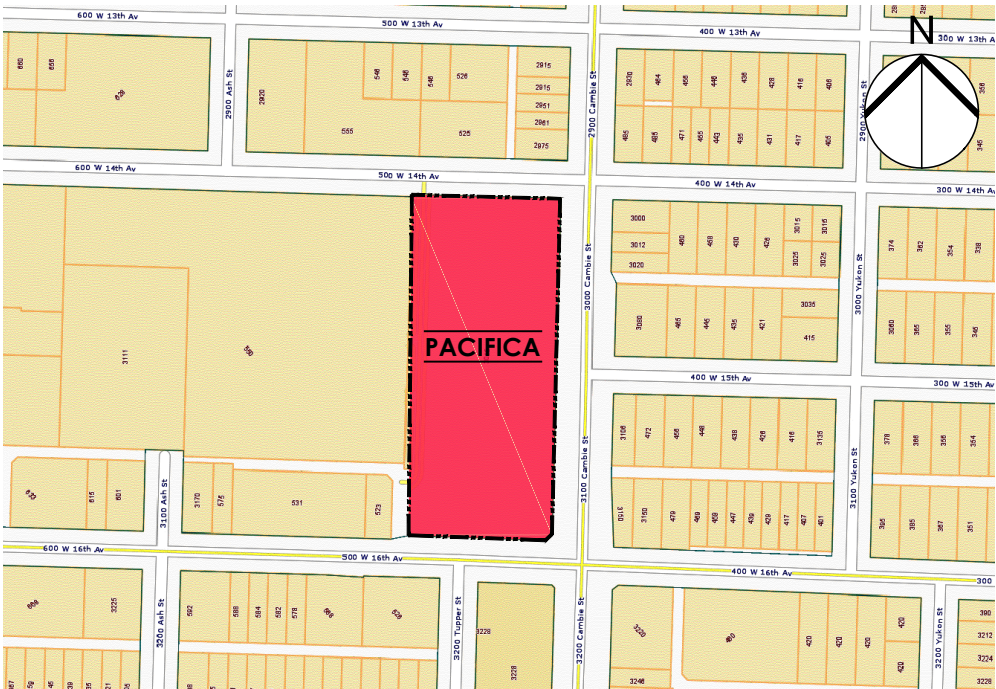
Assembly:

2 ply SBS + 1Ply repair in select areas.(3 ply)
 ½" fibreboard (mopped)
 2" Phenolic Foam Insulation (mopped)
 1" EPS
 Plywood deck (no vapour barrier)

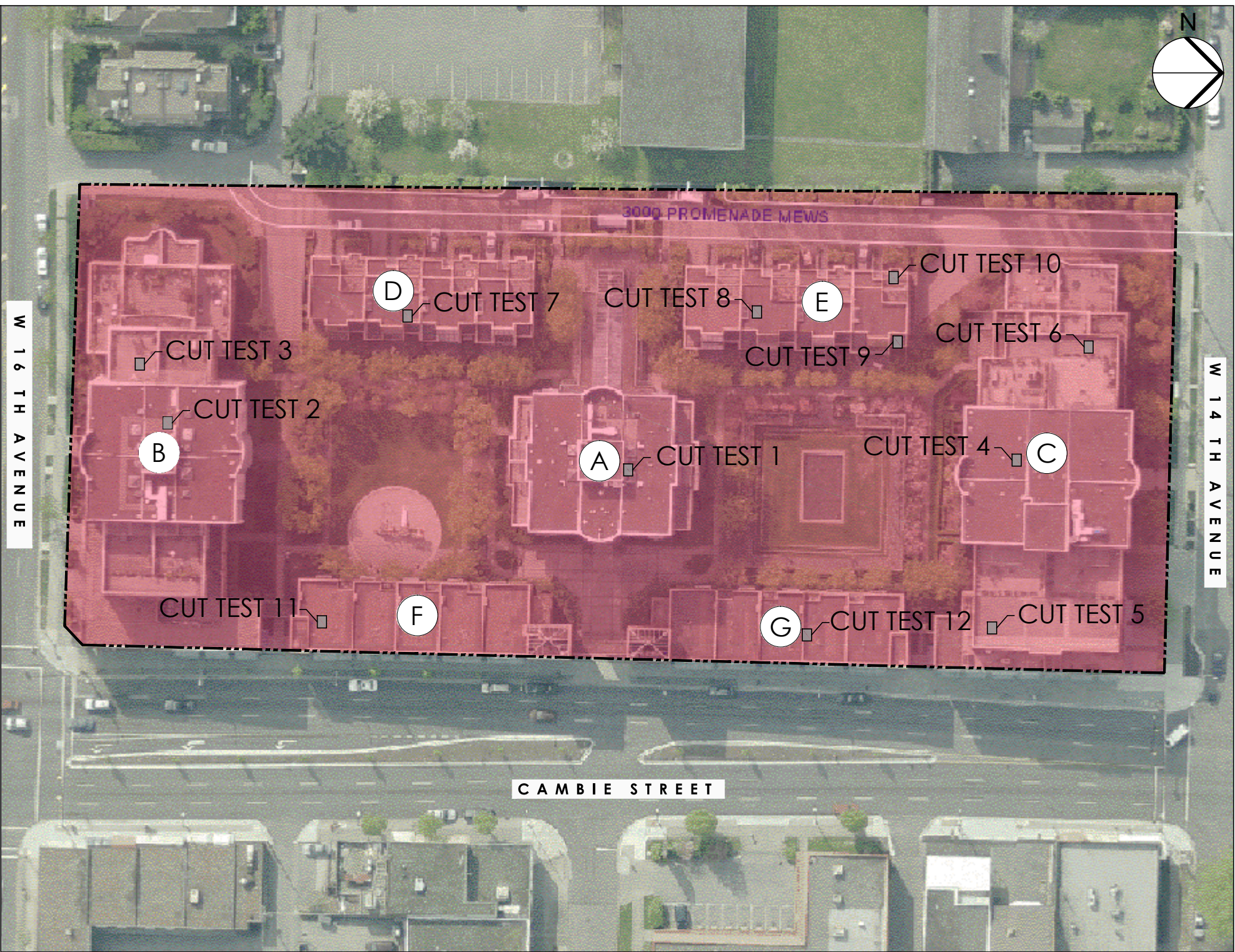
Substrate Condition: Good.



1 LOCATION MAP
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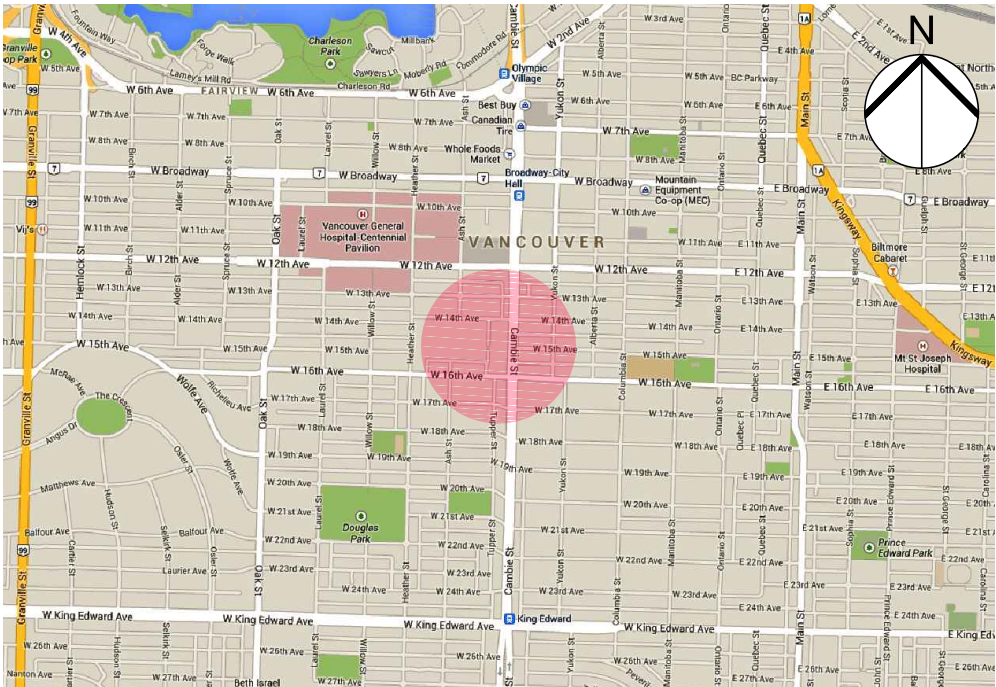
2 SITE MAP
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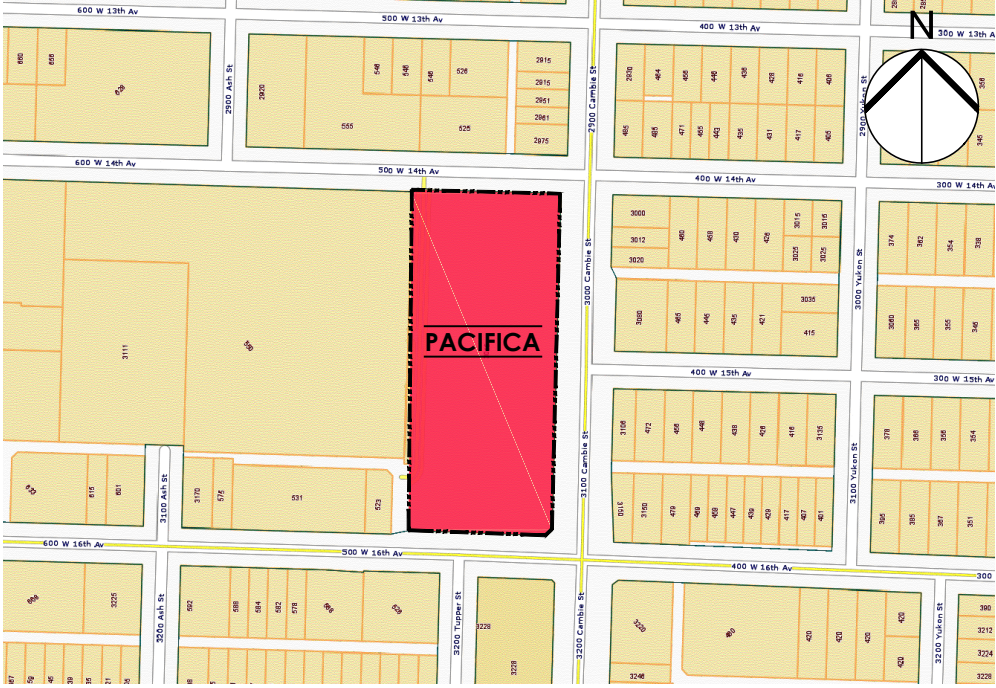
3 SITE PLAN
A0.00 1/64" = 1'00"

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 <div>CSA BUILDING SCIENCES WESTERN LTD. <i>Consulting Engineers & Project Managers</i> #12 - 62 Fawcett Road, Coquitlam, BC V3K 6V5</div>	PROJECT TITLE: PACIFICA, STRATA LMS 597 MAINTENANCE REVIEW & ROOF MEMBRANE CONDITION ASSESSMENT	DRAWING TITLE: LOCATION MAP SITE MAP SITE PLAN	REVISION:			SCALE: AS SHOWN	PLOT DATE: June 23, 2014	DRAWING NO.: A0.00	SEAL:
						DRAWN BY: SC	PM/CHECKED BY: PS		
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						NO.	REVISION	DATE	



1 LOCATION MAP
A0.00 NTS

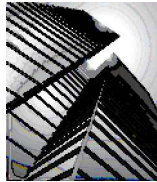


2 SITE MAP
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3 SITE PLAN
A0.00 1/64" = 1'00"

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MAINTENANCE REVIEW & ROOF MEMBRANE
CONDITION ASSESSMENT

DRAWING TITLE:

LOCATION MAP
SITE MAP
SITE PLAN

REVISION:

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SC

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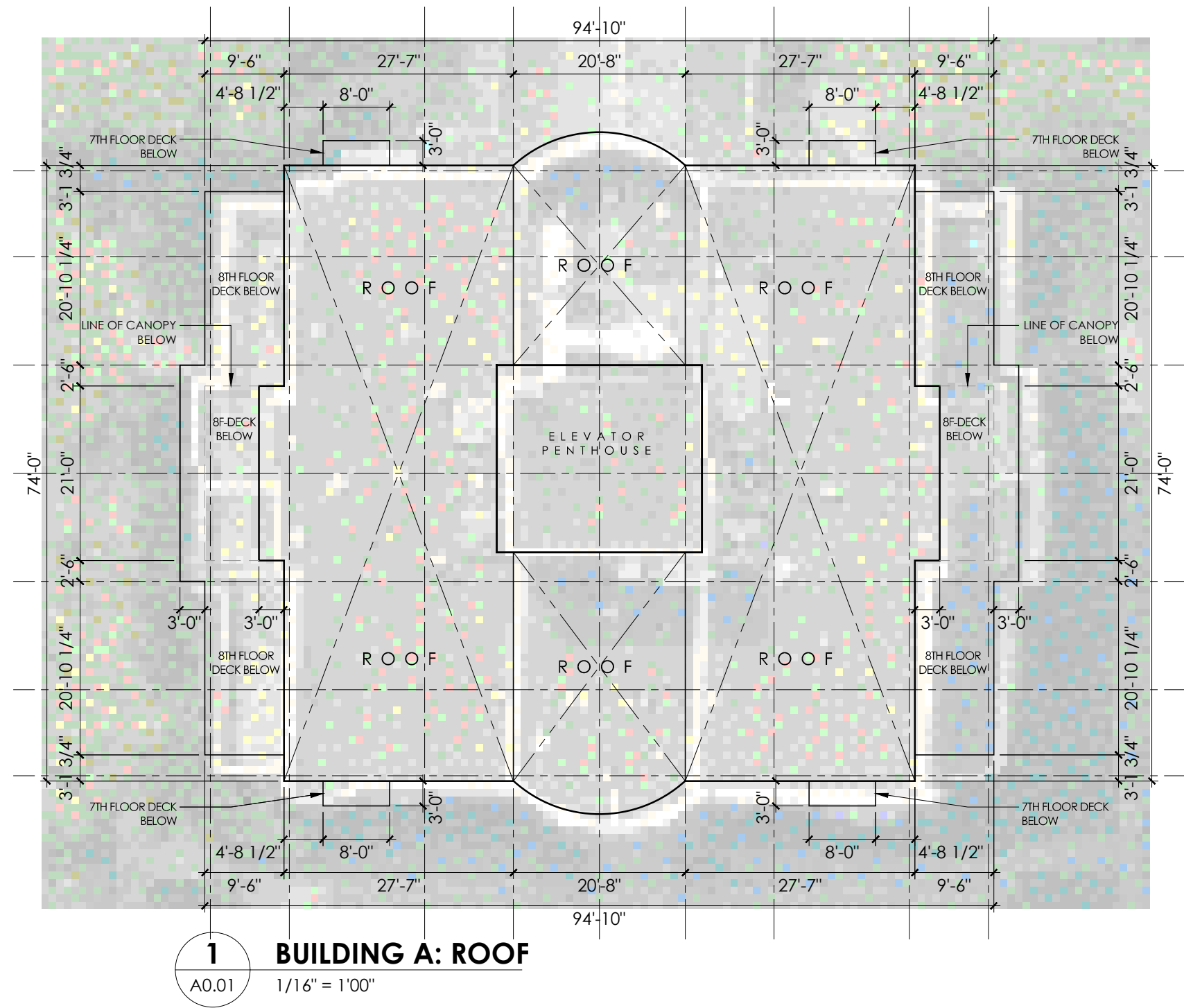
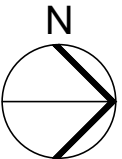
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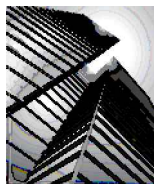
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MAINTENANCE REVIEW & ROOF MEMBRANE
CONDITION ASSESSMENT

DRAWING TITLE:

BUILDING A: ROOF

REVISION:

NO.	REVISION	DATE

SCALE:

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PLOT DATE:

June 23, 2014

DRAWN BY:

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PROJECT NO.

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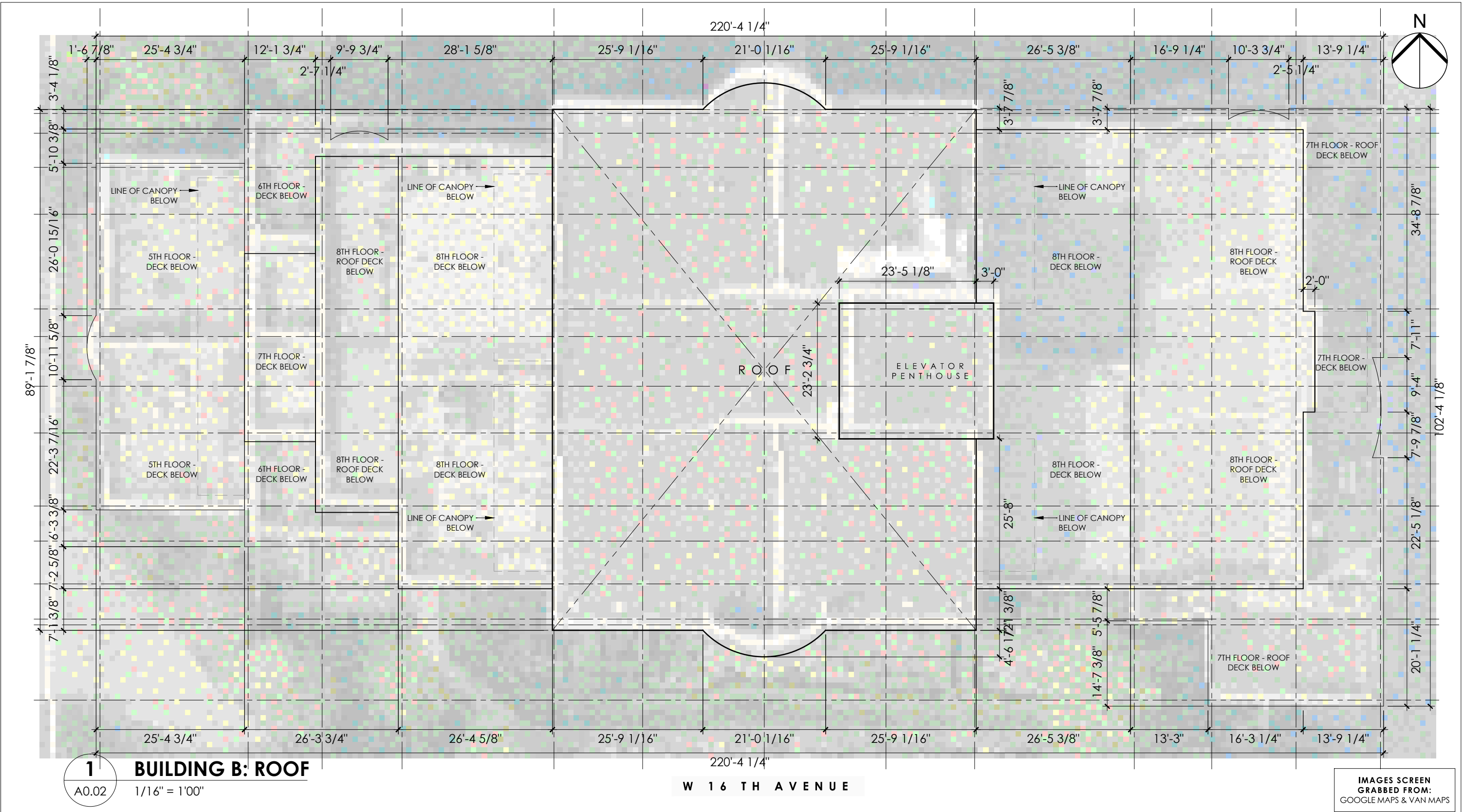
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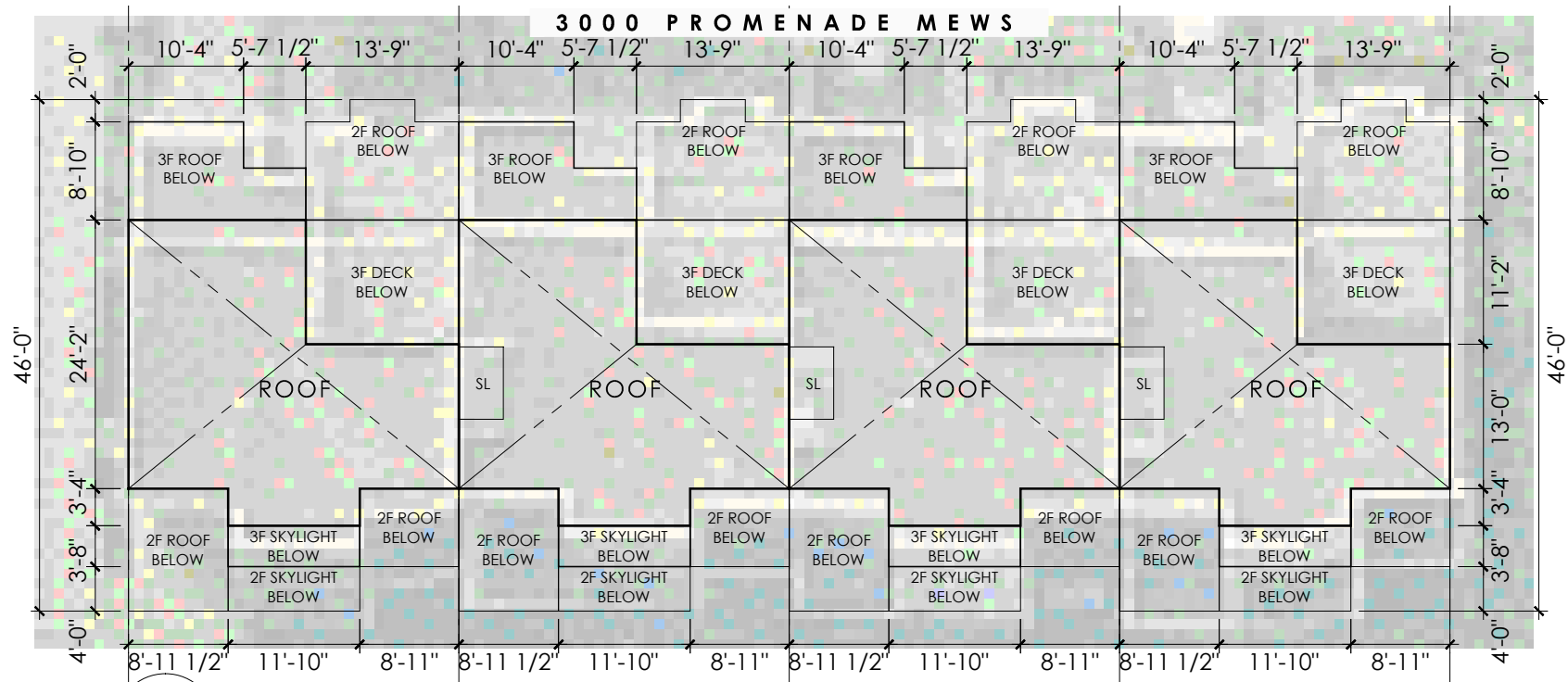
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MAINTENANCE REVIEW & ROOF MEMBRANE
CONDITION ASSESSMENT

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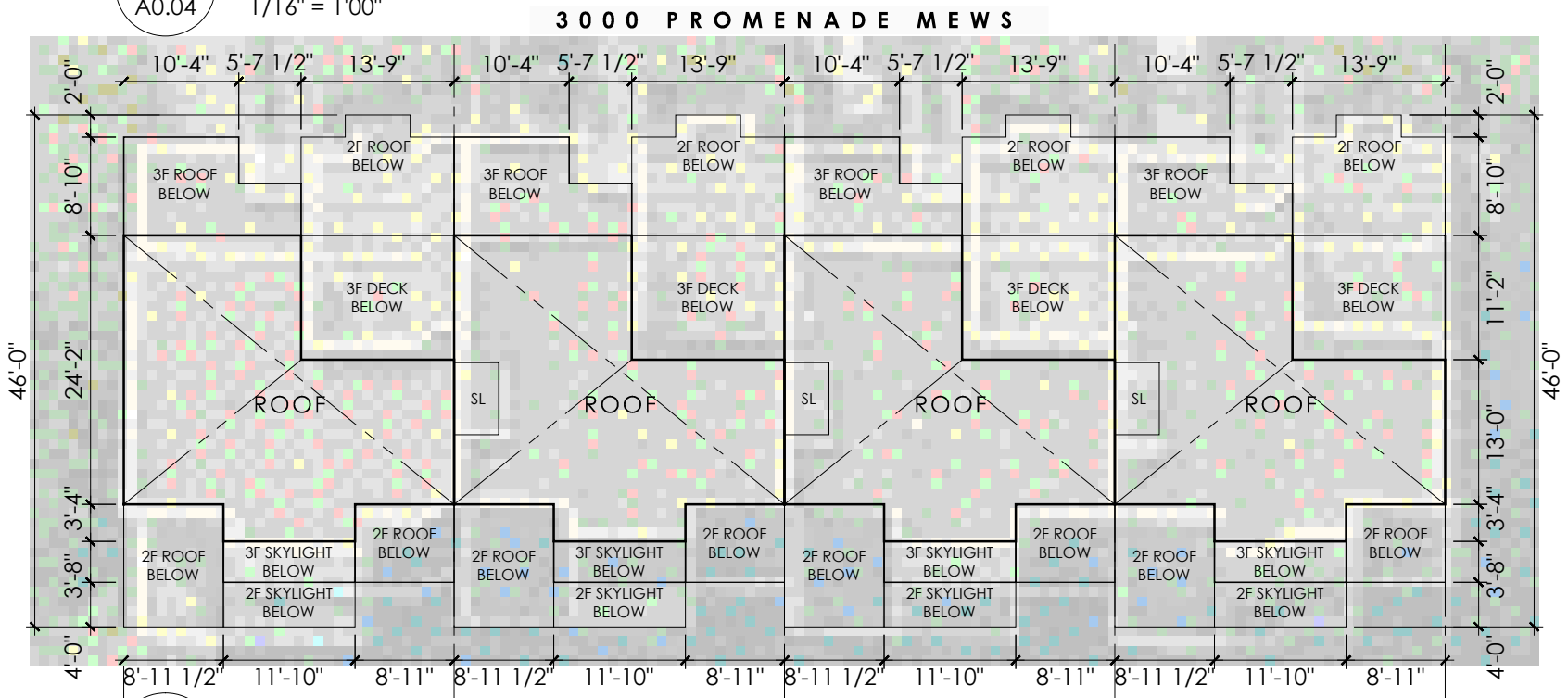
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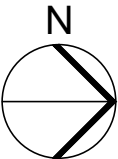
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1 BUILDING D: ROOF
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2 BUILDING E: ROOF
A0.04 1/16" = 1'00"



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**BUILDING D: ROOF
BUILDING E: ROOF**

REVISION:

NO.	REVISION	DATE

SCALE:

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PROJECT NO.

FILE LOCATION:

PLOT DATE:

June 23, 2014

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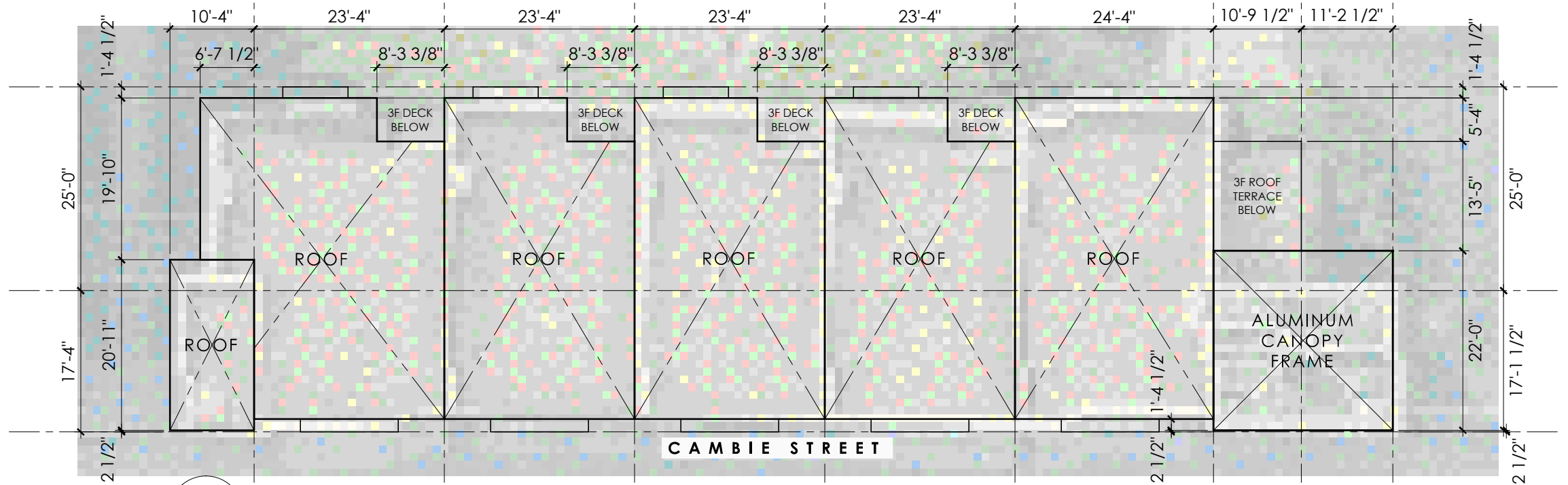
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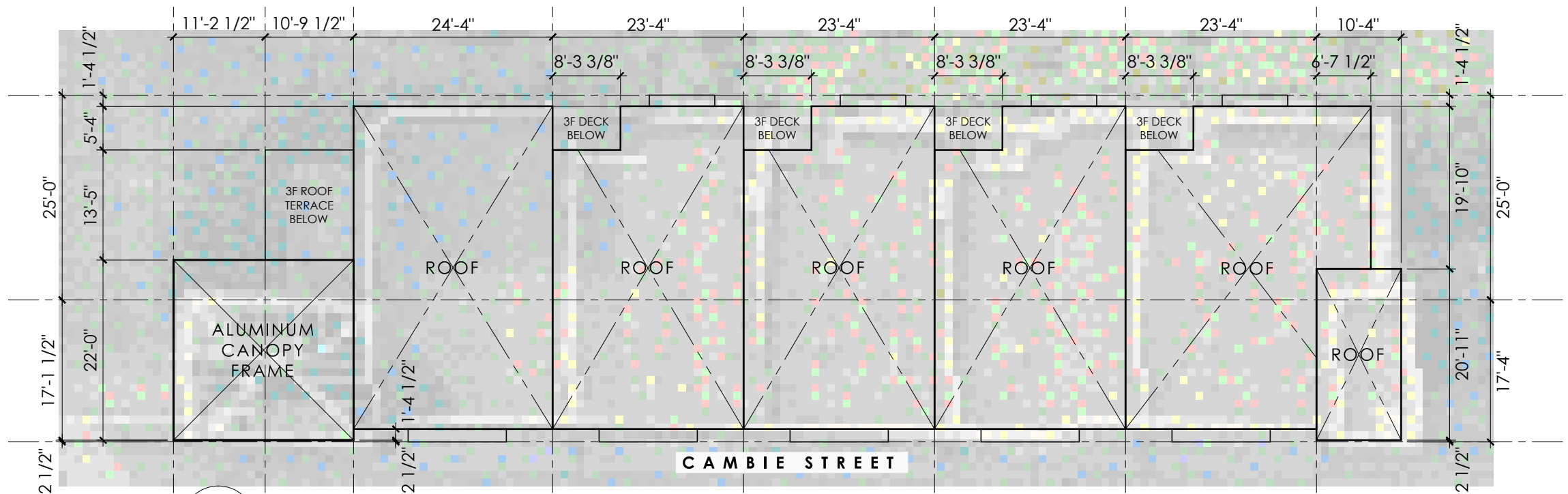
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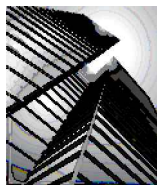
1 BUILDING F: ROOF
A0.05 1/16" = 1'00"



2 BUILDING G: ROOF
A0.05 1/16" = 1'00"

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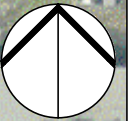
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W 14 TH AVENUE

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3000 PROMENADE MEWS

CAMBIE STREET

W 16 TH AVENUE