Garland Canada Inc.

Roof Asset Management Program

City of Prince Albert

City of Prince Albert Library Roof Inspection

Prepared By

Brett Foote

Prepared For

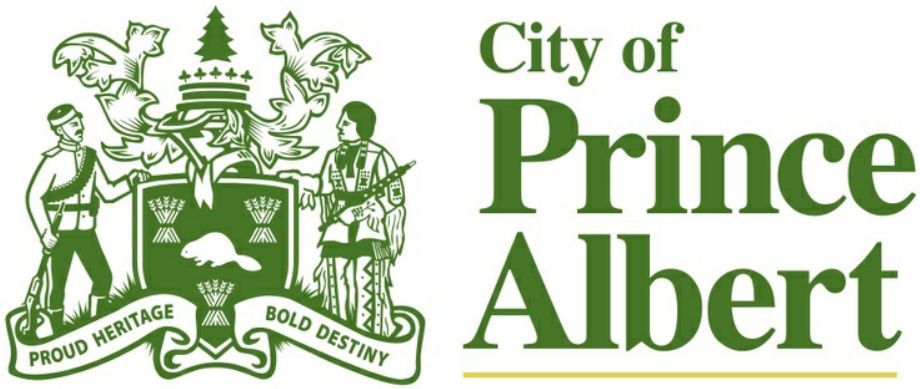
Don Cheeseman

May 26, 2022

Table of Contents

Client Data

Client: City of Prince Albert



Client Data

Name	City of Prince Albert		
Address 1	1084 Central Avenue		
City	Prince Albert	**Province**	Saskatchewan
Postal	S6V 7P3	**Country**	Canada

Contact Info

Contact Person	Don Cheeseman	**Title**	Facilities Project Coordinator
Mobile Phone:	-	**Office Phone:**	(306) 953-4800
Email:	dcheeseman@citypa.com		

Facility Summary

Client: City of Prince Albert

Facility: Library

Facility Data

Address 1	125 12 St E, Prince Albert, SK S6V 1B7
City	Prince Albert
Province	Saskatchewan
Postal	S6V 1B7
Type of Facility	Municipal
Square Footage	14,200
Contact Person	Don Cheeseman

Asset Information

Name	Date Installed	Square Footage	Roof Access
Entire Roof	-	14,200	Attached Ladder

ROOF MEASUREMENT REPORT

125 12 St E, Prince Albert, SK S6V1B7

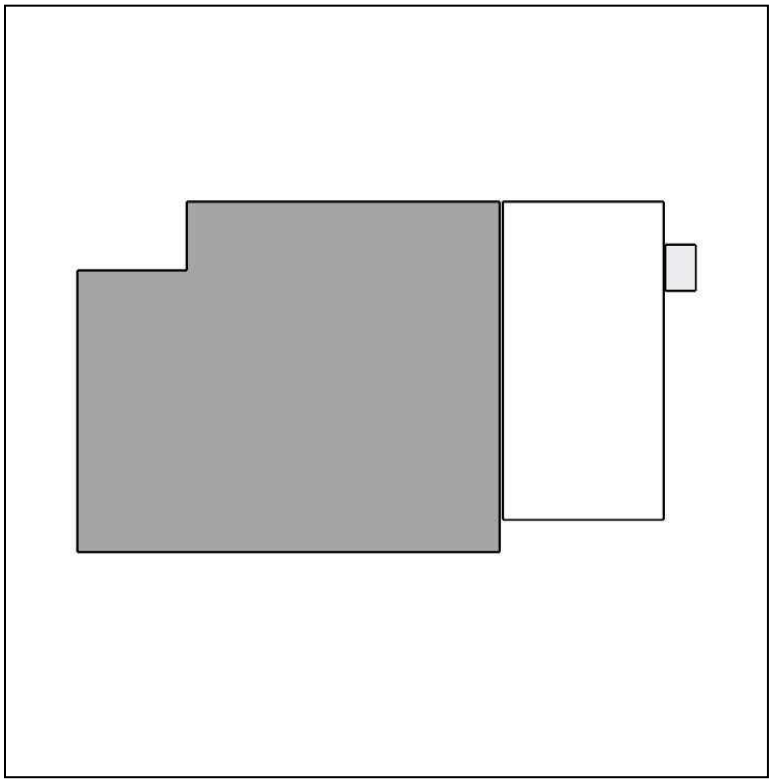
Report Contents

Report Details

Date:	05/26/2022
Report:	46278617

Roof Details

Total Area:	19,013 sq ft
Total Roof Facets:	3
Predominant Pitch:	0/12
Number of Stories:	<=1
Total Ridges/Hips:	0 ft
Total Valleys:	0 ft
Total Rakes:	20 ft
Total Eaves:	15 ft
Total Penetrations:	45
Total Penetrations Perimeter:	374 ft
Total Penetrations Area:	462 sq ft



In this 3D model, facets appear as semi-transparent to reveal overhangs.

Contact Us

Contact: Brett Foote

Company: Garland Company Inc.

Address: 3800 East 91St
Cleveland OH 44105

Phone: 306-914-3514

Measurements provided by www.eagleview.com

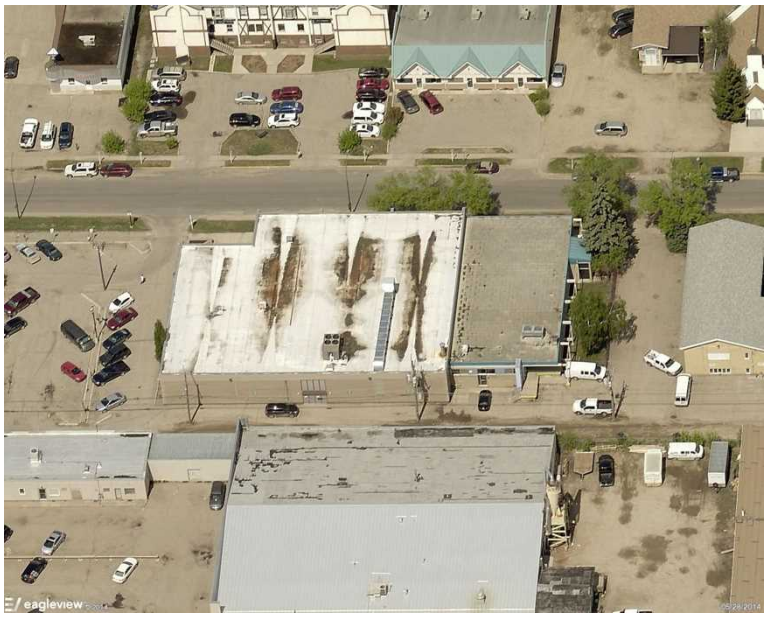
Certified Accurate
www.eagleview.com/Guarantee.aspx

REPORT IMAGES

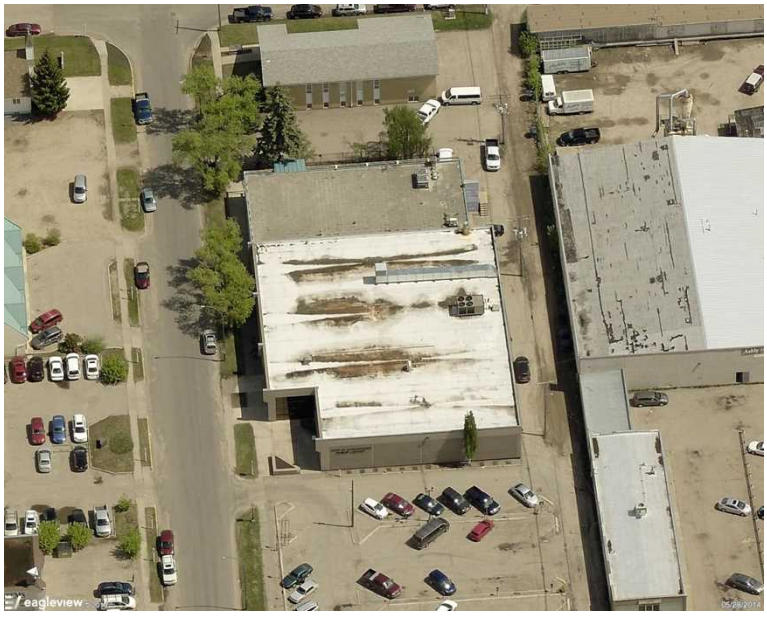
The following aerial images show different angles of this structure for your reference.

Top View

REPORT IMAGES

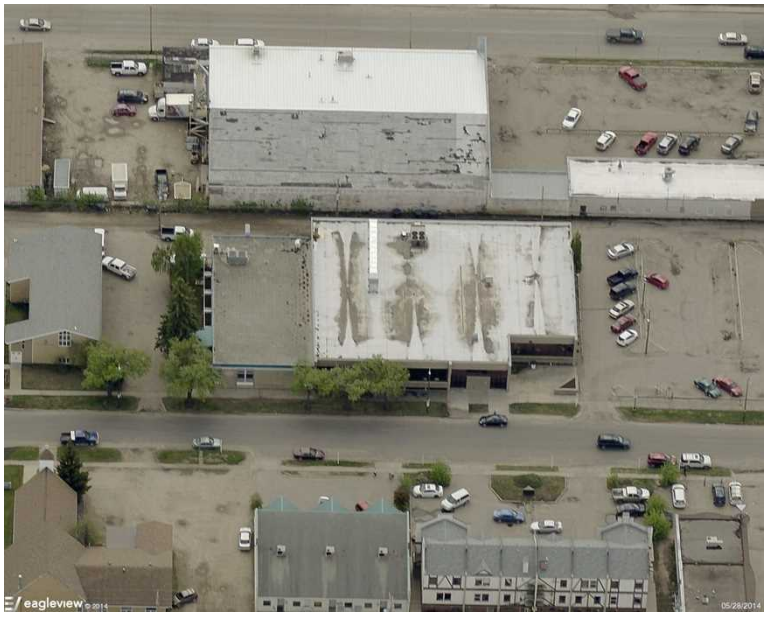


North View



East View

REPORT IMAGES

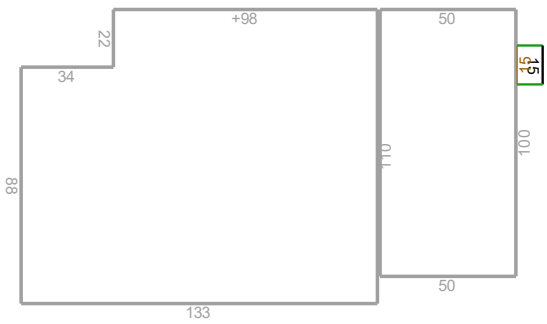


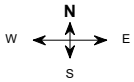
South View

West View

LENGTH DIAGRAM

Total Line Lengths:	Ridges = 0 ft	Valleys = 0 ft	Flashing = 15 ft	Eaves = 15 ft
	Hips = 0 ft	Rakes = 20 ft	Step flashing = 0 ft	Parapets = 787 ft

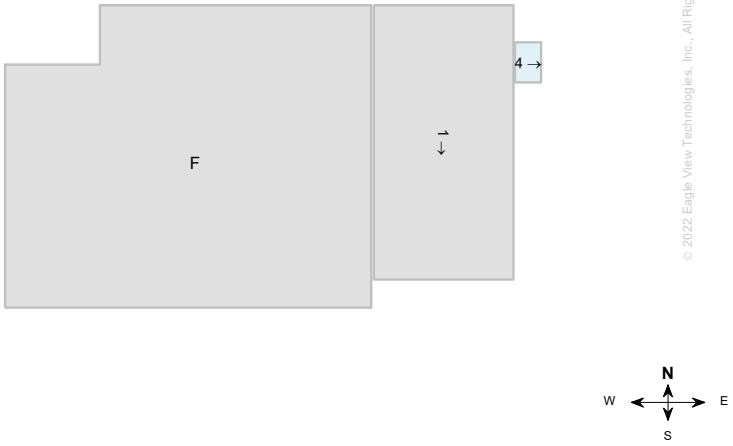




Note: This diagram contains segment lengths (rounded to the nearest whole number) over 5 feet. In some cases, segment labels have been removed for readability. Plus signs preface some numbers to avoid confusion when rotated (e.g. +6 and +9).

PITCH DIAGRAM

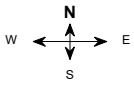
Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 0/12.



Note: This diagram contains labeled pitches for facet areas larger than 20 square feet. In some cases, pitch labels have been removed for readability. Gray shading indicates flat, 1/12 or 2/12 pitches. If present, a value of "F" indicates a flat facet (no pitch).

AREA DIAGRAM

Total Area = 19,013 sq ft, with 3 facets.



Note: This diagram shows the square feet of each roof facet (rounded to the nearest foot). The total area in square feet, at the top of this page, is based on the non-rounded values of each roof facet (rounded to the nearest square foot after being totaled).

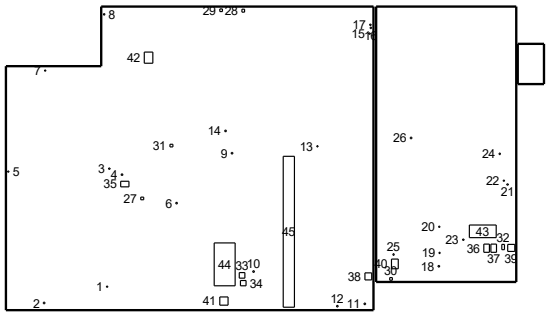
PENETRATIONS

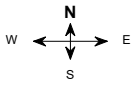
Penetrations Notes Diagram

Penetrations are labeled from smallest to largest for easy reference.

Total Penetrations: 45
Total Penetrations Perimeter = 374 ft

Total Penetrations Area: 462 sq ft
Total Roof Area Less Penetrations = 18,551 sq ft

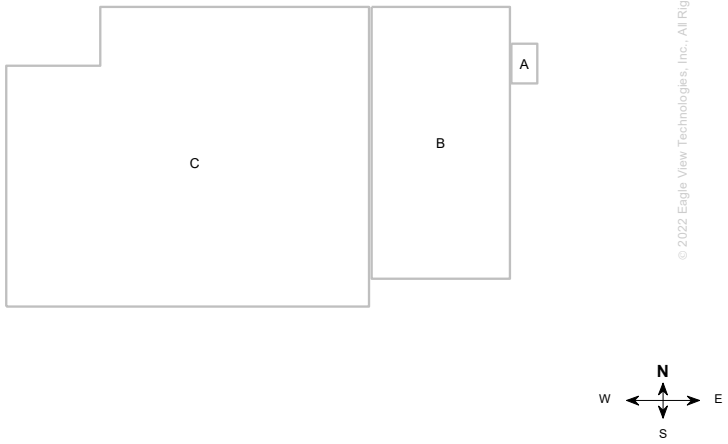




Note: Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

NOTES DIAGRAM

Roof facets are labeled from smallest to largest (A to Z) for easy reference.



Property Info

Property Location

Longitude = -105.7501981 Latitude = 53.2018859

Online map of property:
http://maps.google.com/maps?f=g&source=s_q&hl=en&geocode=&q=125+12+St+E,Prince+Albert,SK,S6V1B7

Property Info

Year Built:

Effective Year Built: *

*.

Notes

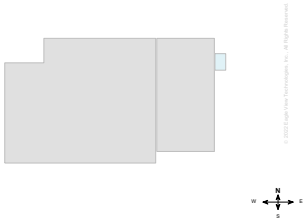
This was ordered as a commercial property. There were no changes to the structure in the past four years.

REPORT SUMMARY

Below is a measurement summary using the values presented in this report.

Lengths, Areas and Pitches

Ridge .....0 ft (0 Ridges)
Hips.....0 ft (0 Hips)
Valleys .....0 ft (0 Valleys)
Rakes* .....20 ft (2 Rakes)
Eaves/Starter** .....15 ft (1 Eaves)
Drip Edge (Eaves + Rakes).....35 ft (3 Lengths)
Parapet Walls.....787 ft (10 Lengths)
Flashing .....15 ft (1 Lengths)
Step Flashing .....0 ft (0 Lengths)
Total Area .....19,013 sq ft
Total Penetrations Area.....462 sq ft
Total Roof Area Less Penetrations.....18,551 sq ft
Total Penetrations Perimeter.....374 ft
Predominant Pitch.....0/12



Total Roof Facets = 3

**Rakes are defined as roof edges that are sloped (not level).*
*** Eaves are defined as roof edges that are not sloped and level.*

Areas per Pitch

Roof Pitches	0/12	1/12	4/12
Area (sq ft)	13827.9	5039.6	145.2
% of Squares	72.7%	26.5%	0.8%

The table above lists each pitch on this roof and the total area and percent (both rounded) of the roof with that pitch.

Waste Calculation Table

Waste %	0%	10%	12%	15%	17%	20%	22%
Area (sq ft)	19,013	20914.3	21294.6	21865.0	22245.2	22815.6	23195.9
Squares	190.1	209.1	212.9	218.6	222.5	228.2	232.0

This table shows the total roof area and squares (rounded up to the nearest decimal) based upon different waste percentages. The waste factor is subject to the complexity of the roof, individual roofing techniques and your experience. Please consider this when calculating appropriate waste percentages. Note that only roof area is included in these waste calculations. Additional materials needed for ridge, hip, valley, and starter lengths are not included.

Parapet Calculation Table

Wall Height (ft)	1	2	3	4	5	6	7
Vertical Wall Area (sq ft)	787	1574	2361	3148	3935	4722	5509

This table provides common parapet wall heights to aid you in calculating the total vertical area of these walls. Note that these values assume a 90 degree angle at the base of the wall. Allow for extra materials to cover cant strips and tapered edges.

Penetration Table	1-26	27-31	32	33-34	35-37	38-39	40	41	42	43
Area (sq ft)	0.3	1	2	4	6	6.3	8.8	9	12	43.6
Perimeter (ft)	2	4	6	8	10	10	12	12	14	28.4

	44	45
Area (sq ft)	116.7	218.5
Perimeter (ft)	46.2	117.2

Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

Photo Report

Client: City of Prince Albert
Facility: Library
Roof Section: Entire Roof

Report Date: 05/25/2022
Title: Initial Inspection

Photo 1

Library Roof - TPO

Overall Condition: Poor

Photo 2

Previously reinforced seams, approximately 10 years old.

Photo 3

Previously reinforced seams, approximately 10 years old.

Photo 4

Fastener Back-Out: This condition can occur on mechanically fastened roof systems depending upon the location of the fastener. Typically this condition is found where the system configuration has the fastener immediately below the surface membrane. In these conditions thermal bridging and condensation from the thermal bridge creates a situation whereby the fastener begins to back out. Additionally, wind loads, incorrect fastener type for the substrate and dimensional instability of the insulation also contributes to this condition. In some cases, what appears to be fastener back out is actually insulation dimension loss typically due to the use of low density insulation and/or moisture contamination. Roof traffic can also create conditions that appear to be fastener back out as well. With fastener back out comes the high probability of the fastener puncturing the waterproofing surface membrane and eventually causing a leak. Proper design reduces or eliminates fasteners having direct contact with the surface membrane.

Photo 5

Ponding: Ponding water occurs when moisture collects in large pools on the surface of a roof system. These pools begin to form due to the following: 1) roof drains are blocked or clogged with debris, 2) the insulation package has lost dimensional stability and has reduced in thickness, 3) poor slope to drain design via overbuilt crickets or tapered insulation system, 4) roof drains are

built along side building support columns which maintain a consistent height under load while the balance of the roof system is applied over a live deck which tends to move and deflect under normal seasonal load. In all cases, roof depressions that collect and hold water will tend to grow in size as the added weight of the ponding water will continue to deflect the roof deck even further.

This condition can damage the roof in a number of ways. Additional structural loads create more movement of the roof assembly creating more tear stress and of course a potential for structural failure. UV intensity also increases under ponding conditions as the sun's rays are increased to the point where it accelerates deterioration in most all roof systems. In asphalt based assemblies the natural waterproofing oils in the asphalt will separate from the membrane if the system remains submerged under water for sustained periods. Single ply roof system rot and burn out when the ponding area is exposed to sunlight. The added weight can crush insulation increasing the ponding condition and creating a condition where the insulation becomes a useless thermal barrier. This condition then affects the mechanical system and the cost of heating and cooling the building. In the winter ponding water will expand as it freezes. This expansion will weaken small imperfections in the roof system. Small cracks and tears will widen until they rupture to allow

water into the building. And finally, a negatively deflected deck becomes a structural concern.

Photo 6

Previously reinforced seams, approximately 10 years old.

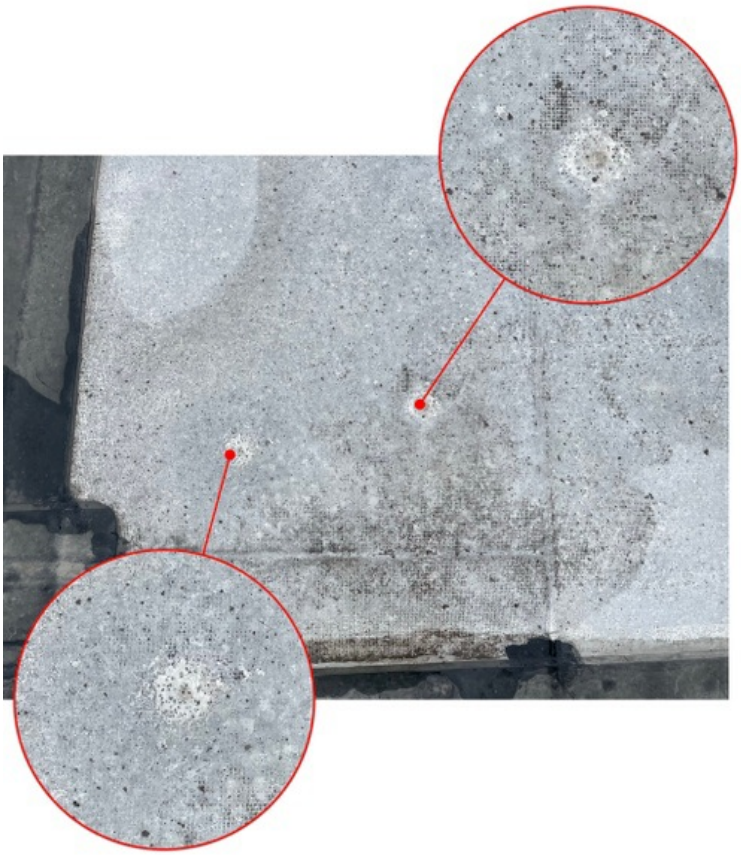


Photo 7

Fastener Back-Out: This condition can occur on mechanically fastened roof systems depending upon the location of the fastener.

Photo 8

Previously reinforced seams, approximately 10 years old.

Photo 9

Fastener Back-Out: This condition can occur on mechanically fastened roof systems depending upon the location of the fastener.

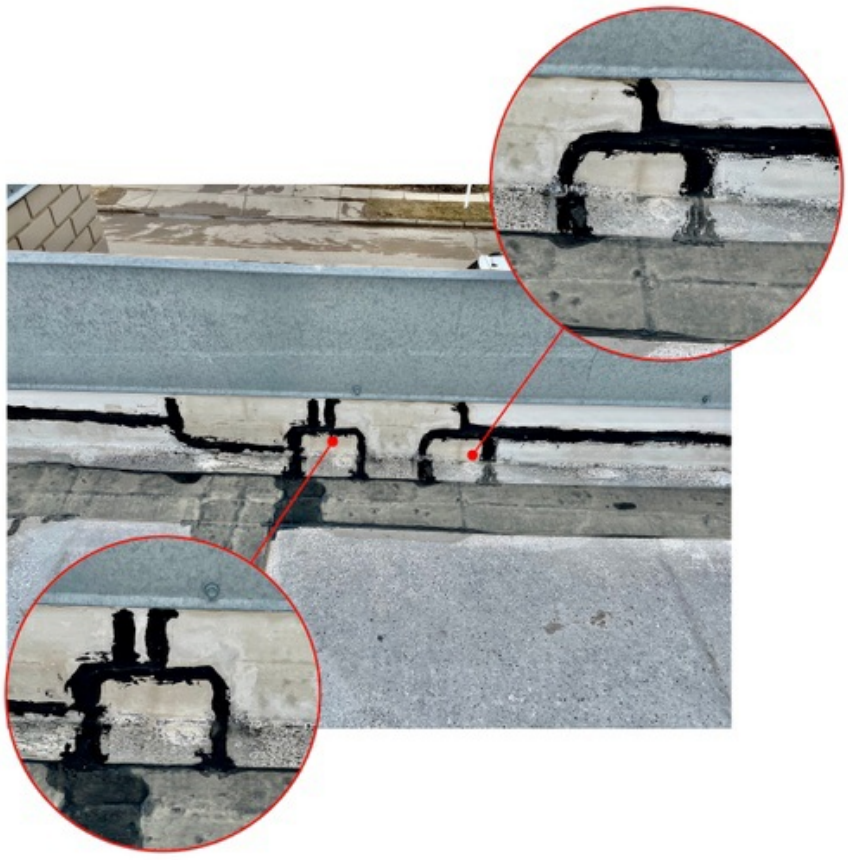


Photo 10

Previously reinforced seams, approximately 10 years old.

Photo 11

Previously reinforced seams, beginning to fail in spots.

Photo 12

Drain Screen: Missing

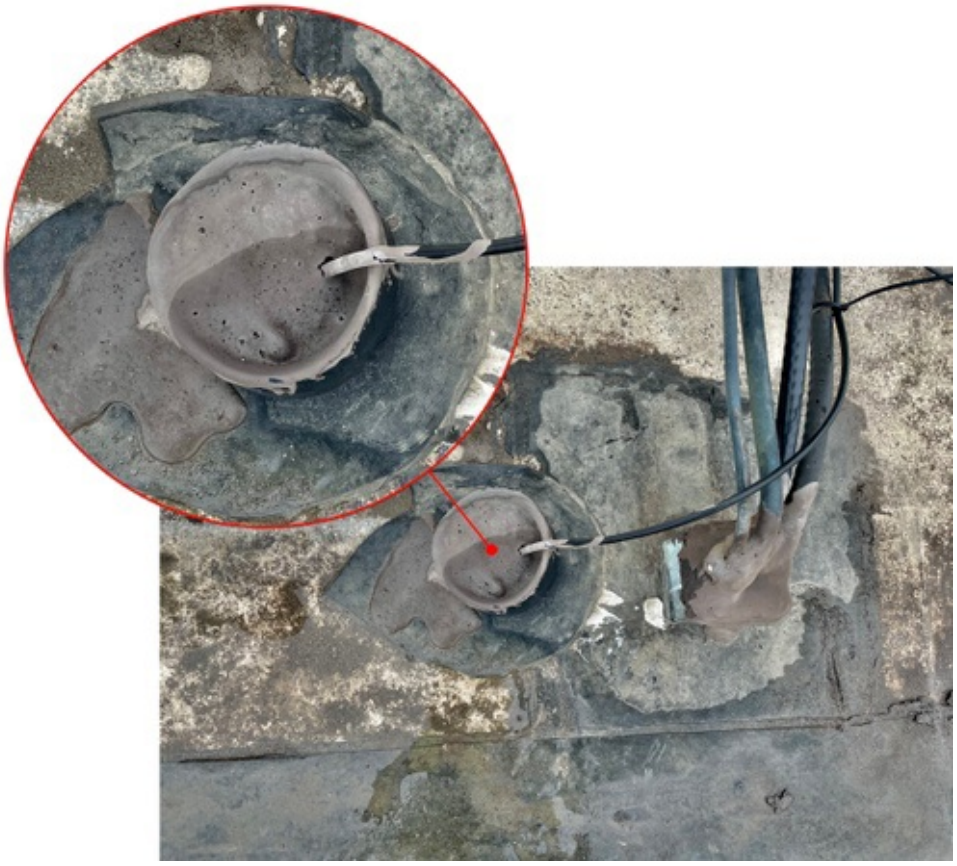


Photo 13

Pitch Pocket Deterioration:
Metal protrusions that penetrate the roof system to allow conduits to run from the rooftop into the building. Movement from the protrusion can break the waterproofing compound, creating cracks. Over time, the release of solvents from the compound can cause the material to shrink, leaving gaps along the edges of the pan and around structural support. Water can enter through a defective pitch pan and find its way into the interior of the building. Moisture can also penetrate into the roof system leading to premature failure.

Photo 14

Penetrations:
Waterproofing around some penetrations beginning to deteriorate.

Photo 15

Ponding: Ponding water occurs when moisture collects in large pools on the surface of a roof system

Photo 16

Ponding: Ponding water occurs when moisture collects in large pools on the surface of a roof system

Photo 17

Previously reinforced seams, approximately 10 years old.

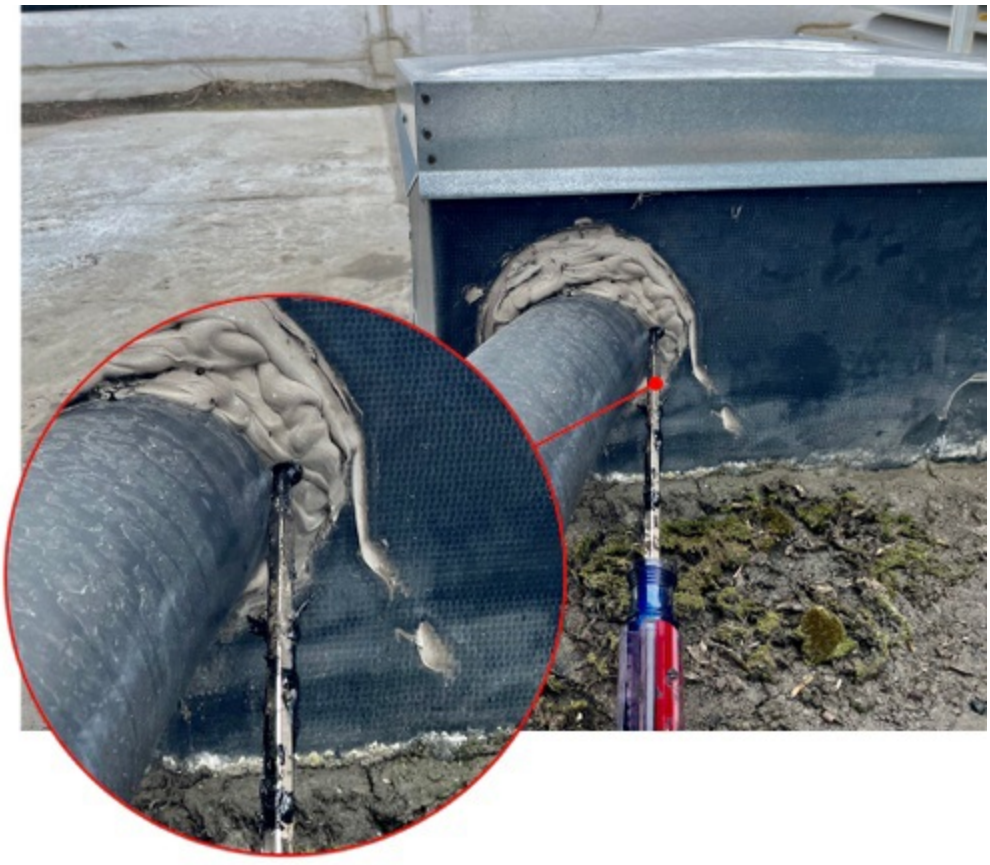


Photo 18

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

Photo 19

Previously reinforced seams, approximately 10 years old.

Photo 20

Previous patches.

Photo 21

Fastener Back-Out: This is a common condition with through fastened metal roof systems. Metal expands and contracts at a higher rate than other building components. Seasonal expansion on a one foot section of metal typically exceeds 1,000 lb per foot. As most of the fasteners used with this system have about 300 lbs per foot shear resistance you would need more than three of these fasteners per foot to control the movement. Spacing typically is 8” – 12” on center in this application. This extra stress leads to two conditions 1) fastener back-out and 2) fastener shear or panel damage. The fasteners used are called cap screws and feature a neoprene grommet as the primary seal at the fastener penetration through the panel. Unfortunately these grommets typically dry out after 5-7 years creating a leak source at the fastener. Additionally there is an element of thermal bridging with the fastener that helps to exacerbate the condition. In this case water can then enter the building and walls leading to structural element damage.

Solution Options

Client: City of Prince Albert

Facility: Library

Roof Section: Entire Roof

Maintenance Options

Solution Option:	Maintenance	**Action Year:**	2022
Square Footage:	14,200	**Expected Life (Years):**	3
Budget Range:	$12,500.00 - $25,000.00		

Scope of Work: Roof Maintenance - Deteriorated Seams, stacks and pitch pockets

- Powerwash/clean most deteriorated seams
- Apply Base Coat over identified seams at 32 wet mils
- Allow to dry for 24-48 hours
- Apply Top Coat over most deteriorated seams at 32 wet mils
- Reinforce around most effected plumbing stacks using same process
- Reinforce around any deteriorated previous repairs using same process
- Fill deteriorated pitch pockets using Garla-Flex mastic
- Ensure all drains are free of debris and allowed to drain properly

Maintenance Options			
Solution Option:	Maintenance	**Action Year:**	2022
Square Footage:	14,200	**Expected Life (Years):**	3
Budget Range:	$90,000.00 - $100,000.00		

Scope of Work: Full Scale Maintenance Scope

- Powerwash/clean all applicable areas
- Apply White Stallion Base Coat over all previously reinforced seams at 32 wet mils
- Allow to dry for 24-48 hours
- Apply White Stallion Top Coat over seams at 32 wet mils
- Reinforce around plumbing stacks using same process
- Reinforce all previous patch repairs using same process
- Fill all pitch pockets using Garla-Flex mastic
- Remove all backed out fasteners from top of coping cap, fill holes with Tuff-Stuff caulking
- Re-fasten coping cap from side, rather than top
- Coat any fasteners starting to back out through the TPO using the same White Stallion Process.
- Ensure all drains are free of debris and allowed to drain properly

Solution Options

Client: City of Prince Albert

Facility: Library

Roof Section: Entire Roof

Replace Options			
Solution Option:	Replace	**Action Year:**	2025
Square Footage:	14,200	**Expected Life (Years):**	30
Budget Range:	$525,000.00 - $660,000.00		

Scope of Work: Roof Replacement

1. Remove all roof components to roof deck;
2. Install new vapour barrier, cold applied with adhesive;
3. Install new polyisocyanurate insulation, set in hot asphalt;
4. Install new wood fiberboard, set in hot asphalt;
5. Install new SBS modified bitumen generic base sheet, set in hot asphalt;
6. Install new SBS modified bitumen cap sheet, set in hot asphalt;
7. Install new surfacing of gravel adhered in hot asphalt;
8. Install new drains, vents, and steel flashings.