Garland Canada Inc.

Roof Asset Management Program

City of Prince Albert

City of Prince Albert - Alfred Jenkins Initial Roof Inspection

Prepared By

Brett Foote

Prepared For

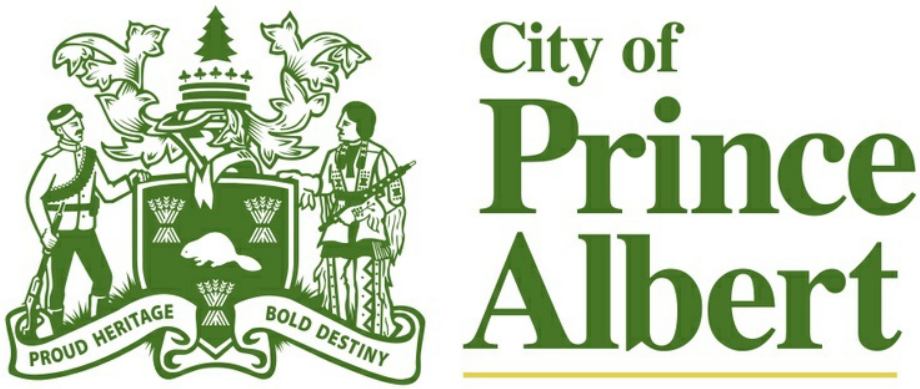
Don Cheeseman

June 10, 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

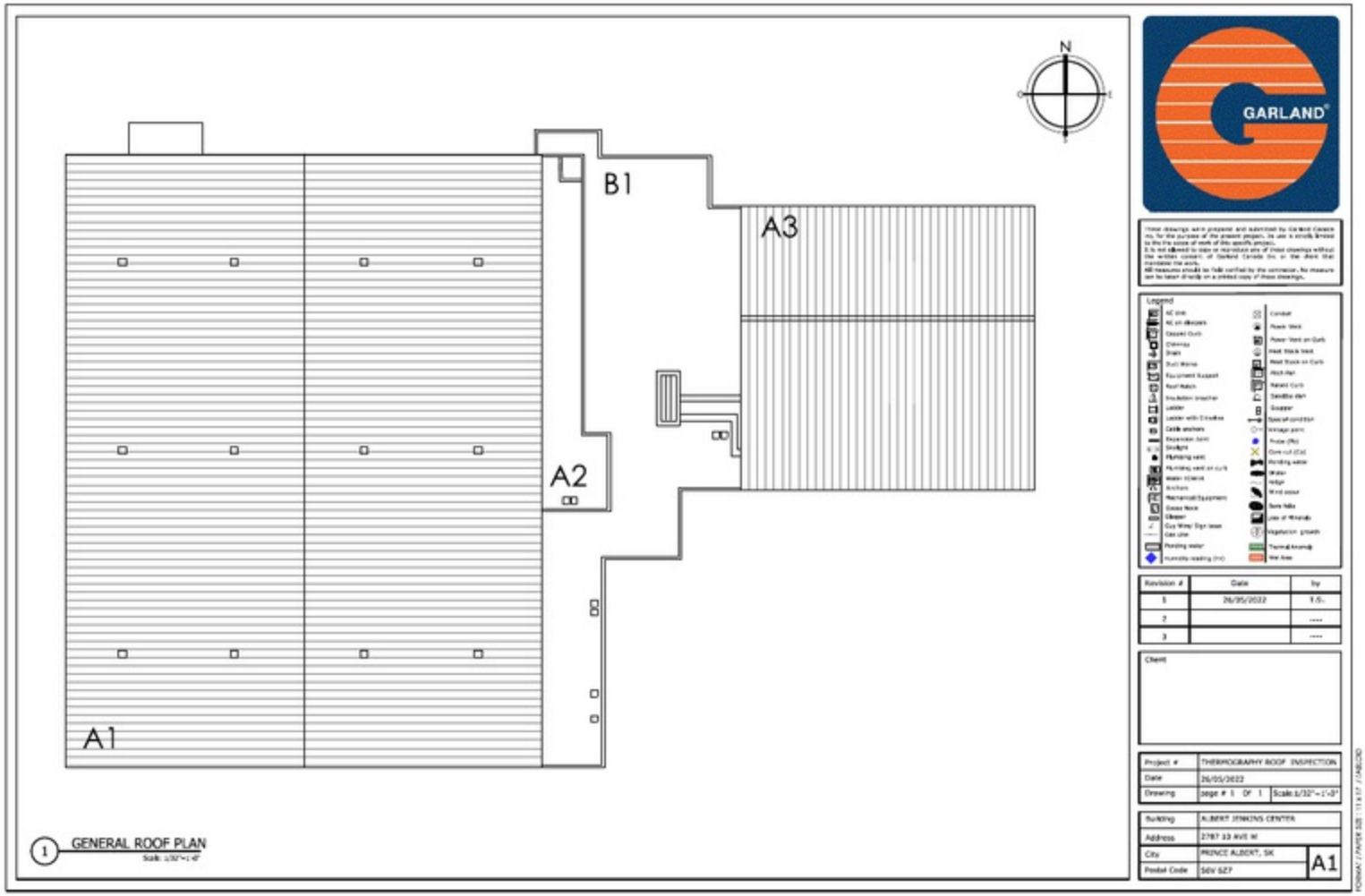
Facility: Alfred Jenkins Field House

Facility Data

Address 1	2787 10 Ave W
City	Prince Albert
Province	Saskatchewan
Postal	S6V 6Z7
Type of Facility	Local Authority
Square Footage	71,000
Contact Person	Don Cheeseman

Asset Information

Name	Date Installed	Square Footage	Roof Access
Roof Section 1	2010	13,850	Walkable
Roof Section 2	2010	56,490	Walkable


N
B1
A3
A2
A1
GARLAND
Legend
Revision #
Date
by
Client
Project #
THERMOGRAPHY ROOF INSPECTION
Date
26/05/2022
Drawing
page # 1 OF 1
Scale:1/32"=1'-0"
Building
ALBERT JENKINS CENTER
Address
2787 10 AVE W
City
PRINCE ALBERT, SK
Postal Code
S6V 5Z7
A1
1 GENERAL ROOF PLAN

ROOF MEASUREMENT REPORT

2787 10 Ave W, Prince Albert, SK S6V6Z7

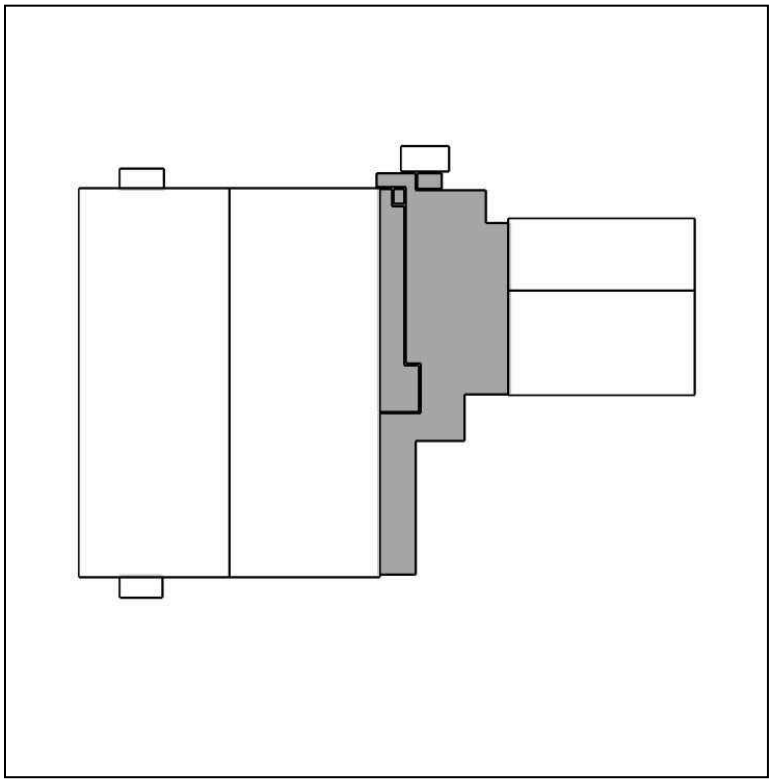
Report Contents

Report Details

Date:	04/26/2022
Report:	45752067

Roof Details

Total Area:	71,044 sq ft
Total Roof Facets:	11
Predominant Pitch:	1/12
Number of Stories:	>1
Total Ridges/Hips:	353 ft
Total Valleys:	0 ft
Total Rakes:	673 ft
Total Eaves:	791 ft
Total Penetrations:	56
Total Penetrations Perimeter:	288 ft
Total Penetrations Area:	263 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

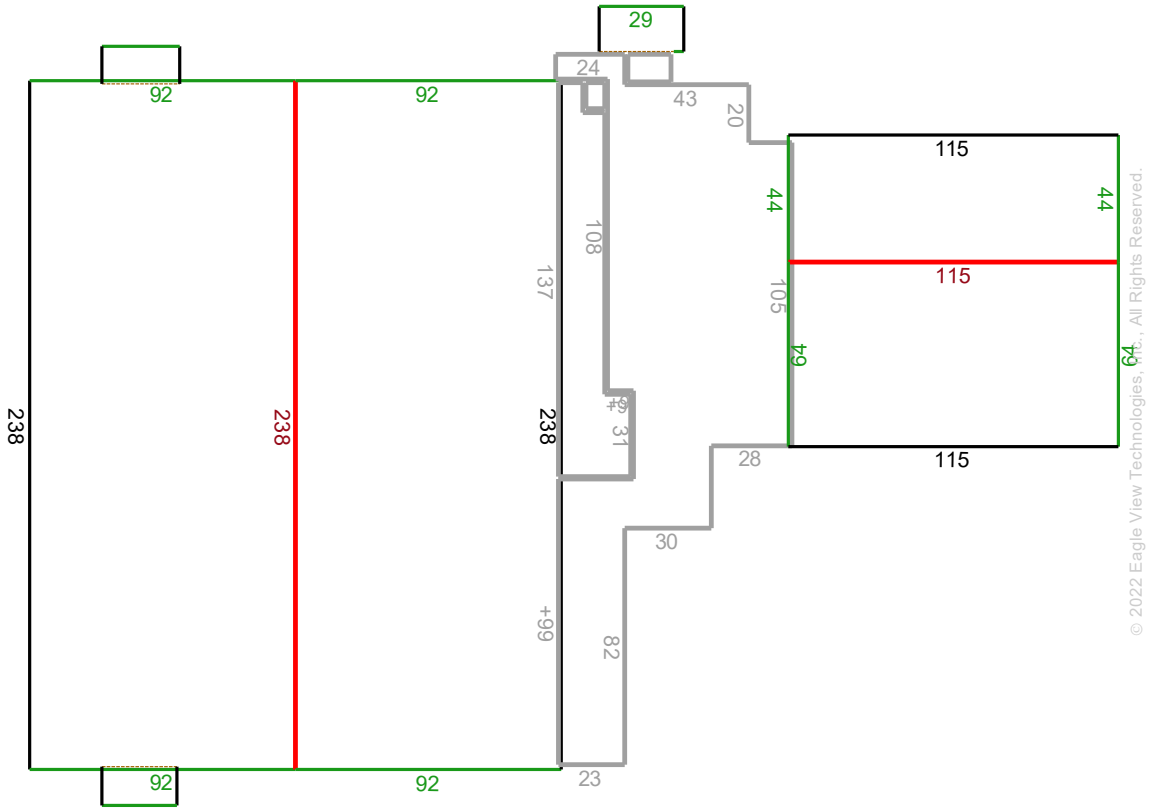
REPORT IMAGES

South View

West View

LENGTH DIAGRAM

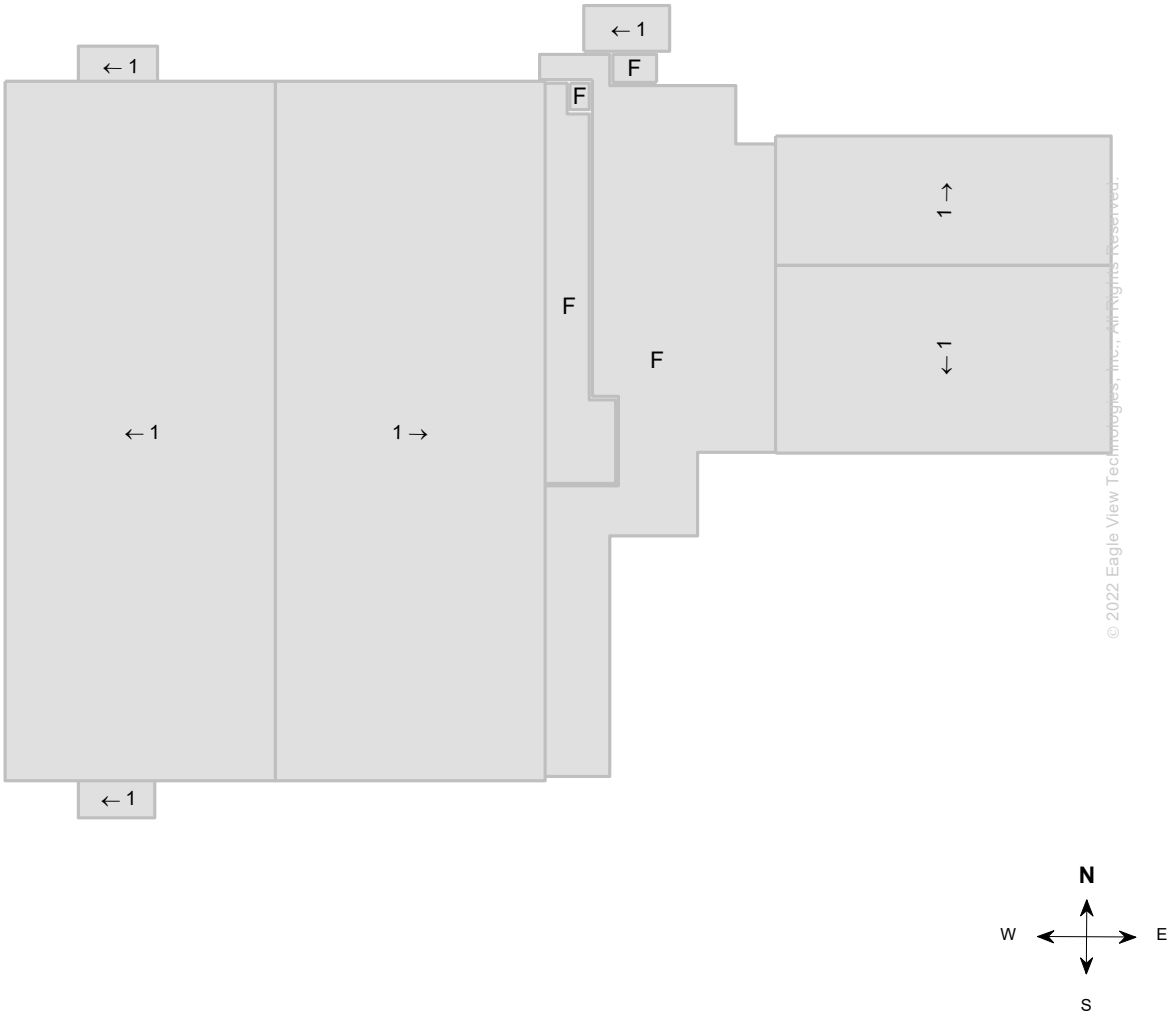
Total Line Lengths: Ridges = 353 ft | Hips = 0 ft | Valleys = 0 ft | Rakes = 673 ft | Flashing = 0 ft | Step flashing = 79 ft | Eaves = 791 ft | Parapets = 1,111 ft



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

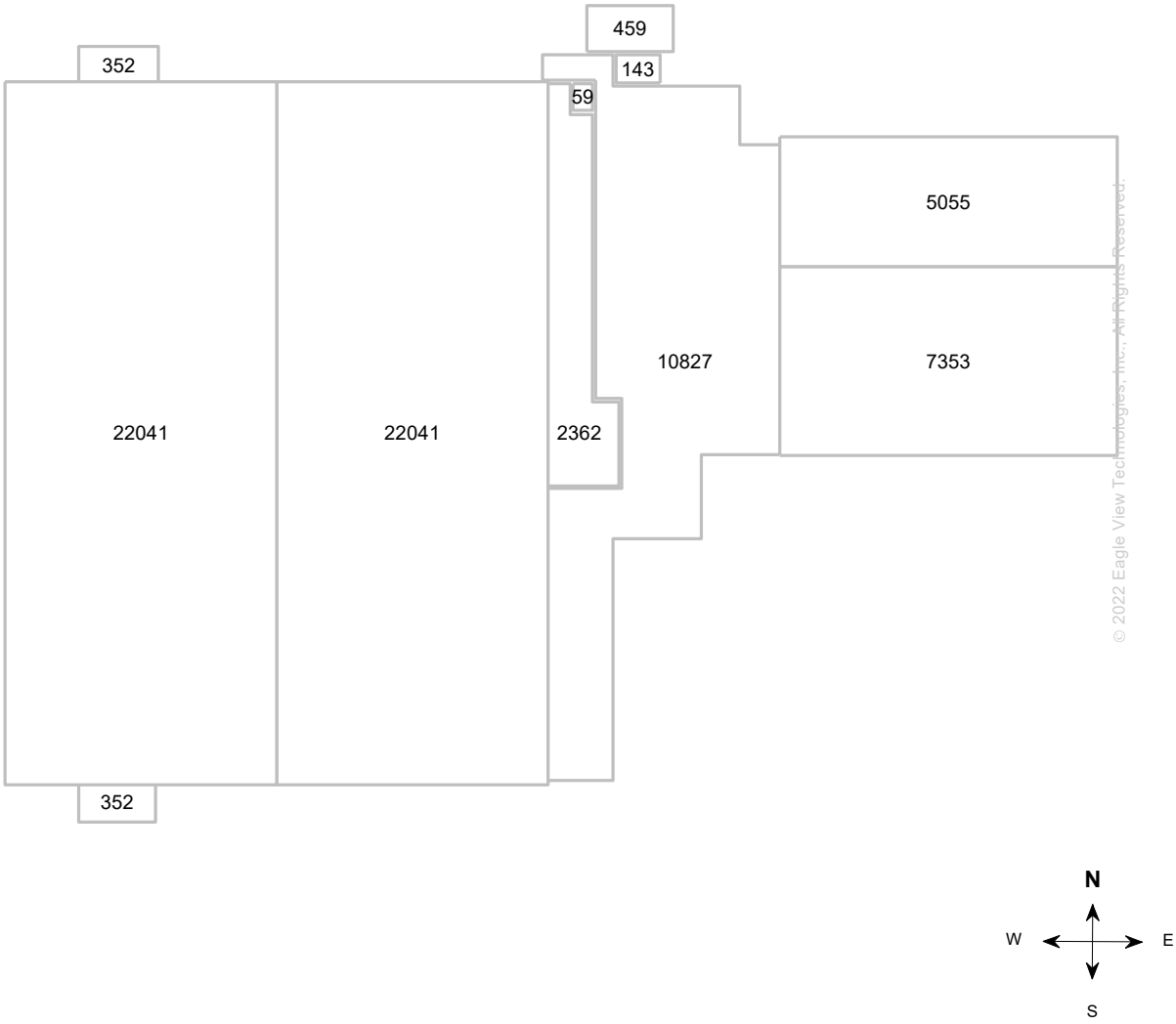
Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 1/12.



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 = 71,044 sq ft, with 11 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.

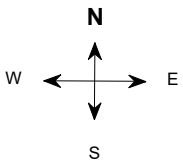
Total Penetrations: 56
Total Penetrations Perimeter = 288 ft

Total Penetrations Area: 263 sq ft
Total Roof Area Less Penetrations = 70,781 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 = -105.7819050 Latitude = 53.1884973

Online map of property:
http://maps.google.com/maps?f=g&source=s_q&hl=en&geocode=&q=2787+10+Ave+W,Prince+Albert,SK,S6V6Z7

Property Info

Year Built:

Effective Year Built: *

*.

Notes

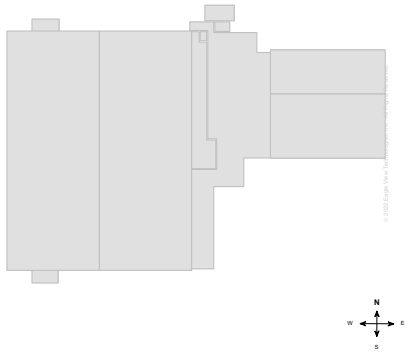
This was ordered as a commercial property. There were no changes to the structure in the past four years.

REPORT SUMMARY

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

Lengths, Areas and Pitches

Ridge.....353 ft (2 Ridges)
Hips.....0 ft (0 Hips)
Valleys.....0 ft (0 Valleys)
Rakes*.....673 ft (12 Rakes)
Eaves/Starter**.....791 ft (10 Eaves)
Drip Edge (Eaves + Rakes).....1,464 ft (22 Lengths)
Parapet Walls.....1,111 ft (34 Lengths)
Flashing.....0 ft (0 Lengths)
Step Flashing.....79 ft (3 Lengths)
Total Area.....71,044 sq ft
Total Penetrations Area.....263 sq ft
Total Roof Area Less Penetrations.....70,781 sq ft
Total Penetrations Perimeter.....288 ft
Predominant Pitch.....1/12



Total Roof Facets = 11

**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
Area (sq ft)	13390.1	57653.4
% of Squares	18.8%	81.2%

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)	71,044	78148.4	79569.3	81700.6	83121.5	85252.8	86673.7
Squares	710.4	781.5	795.7	817.0	831.2	852.5	866.7

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)	1111	2222	3333	4444	5555	6666	7777

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	1-28	29-43	44	45-51	52-54	55	56
Area (sq ft)	0.2	1	2.2	4	6.2	28	164.8
Perimeter (ft)	2	4	6	8	10	22	57.2

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.

5/27/2022

Re: CLEAR Program Test Results
Project: RD-414-417

Dear Brett,

Thank you for sending your roof core samples for testing through the CLEAR program. We have completed comprehensive testing of your sample and the results are included with this package. Your test results may include the analysis of the items requested, such as:

- Tensile Strength
- Inter-ply/Surface Bitumen Softening Point/Penetration
- Ply/Bitumen and Scrim Type
- Number of Plies
- Bitumen Weight/Application Rate
- Flexural Strength

Now that you have the results, as a reminder, some objectives of this program are to help you to answer questions like:

- Is the roof failing? Why?
- Expected remaining useful life, approximately?
- Does this sample indicate that this roof needs replaced? Or is this a possible restoration candidate?
- Were there application errors during installation?

If you are looking to restore the roof and these results show this to be a potential candidate, but you need to truly determine if this is a good option for the client, the next steps are:

- Reference the Restoration warranty System Overview document on the Garland HQ.
- Full visual inspection of the rest of the roof and if conditions are suitable
- A quality moisture survey (Infrared or Nuclear) to determine whether the roof is dry enough and what areas of the roof need to be replaced
    - Less than 30% moisture contained within the system is a good benchmark for a cost-effective option versus a replacement
    - A stamped engineering report is best, if possible
- Determine whether the flashings and penetration points need to be replaced, rather than only coated to make the desired restoration warranty period
- Consider which Garland restoration systems make sense. If you are unsure, reach out to the Product Management Team for assistance.

If you have questions about these test results, feel free to call Derek Scavuzzo at 216-430-3520.

Sincerely,
The Garland Laboratory Team

since 1895

The Garland Company, Inc.
www.garlandco.com
Toll Free: 800-321-9336

Garland Canada Inc.
www.garlandcanada.com
Toll Free: 800-387-5991

The Garland Company UK, LTD
www.garlandukltd.co.uk
Toll Free: 0800 328 5560

Alfred Jenkins

Property	*Core Sample*	*Test Method*	*Notes*
Core Size	12.25” x 12.5”	ASTM D2829	N/A
Core Weight	2.16 lbs	ASTM D2829	N/A
Surfacing Type	Mineral	Visual	N/A
Ply Type	Fiberglass Felt Fiberglass Felt	ASTM D2829	N/A
Number of Plies	2	ASTM D2829	N/A
Bitumen Type	Asphalt	Solvent Test	N/A
Softening Point	259.0 °F	ASTM D3461	Out of range per type IV asphalt
Pen	10 dmm/5 sec	ASTM D5	Out of range per type IV asphalt
Flexural Strength	Pass	NBS	Above recommended 30 lb minimum
Puncture	76.2 lbs	NBS	Exceeded recommended 5 lb minimum
Tensile Strength	111.57 lbf	ASTM D2523	Fell below recommended 200 lbf minimum
Elongation	1.8 %	ASTM D2523	Fell below recommended 2.5% minimum

Alfred Jenkins Conclusion

The 12 year old core sample is from a 2 ply modified roof system with fiberglass felt interplies in an asphalt adhesive. The lower interplies of the core are hard and brittle, and easily crumble by hand (Figure 6). The interplies could not be easily delaminated by hand. The mineral surfacing on this core has maintained good coverage. The softening point and pen tests show that the asphalt adhesive responsible for keeping the system intact has lost its oils over time, causing the system to become more brittle. The cores tested below the recommended tensile strength and elongation recommendations. The sample performed well when undergoing puncture testing, implying that the system can withstand foot traffic and most weather phenomena.

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Figure 4: Alfred Jenkins top view.	

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Toll Free: 0800 328 5560

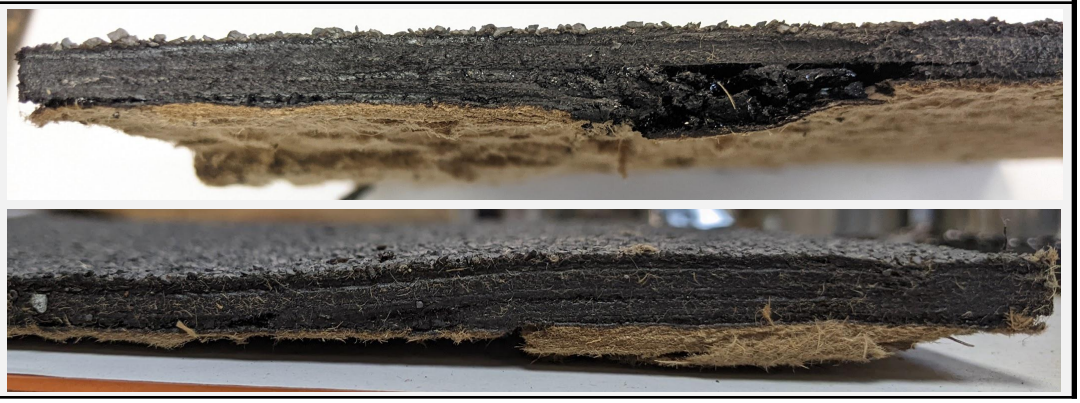
Figure 5: Alfred Jenkins bottom view.	
Figure 6: Alfred Jenkins side profile.	

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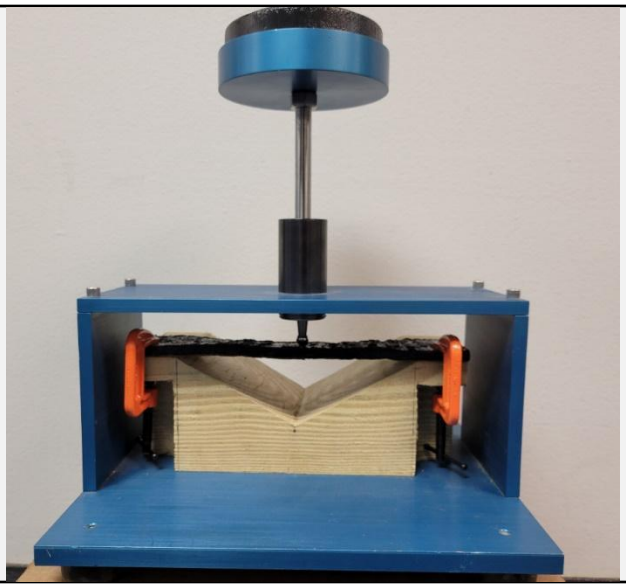
Figure 17: Sample image of the flexural strength testing apparatus.	

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Construction Details

Client: City of Prince Albert

Facility: Alfred Jenkins Field House

Roof Section: Roof Section 1

Information

Year Installed	2010	**Square Footage**	13,850
Slope Dimension	0	**Eave Height**	>20
Roof Access	Walkable	**System Type**	Mineral Modified Bitumen

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Membrane	Mod Bit - 2 ply mineral surfaced	Torch applied	-	-
1	Cover Board	Wood Fiber	Adhesive	4,5	1.5''
1	Insulation	Expanded polystyrene	Adhesive	20	5''
1	Vapor Retarder		Adhesive	-	-
1	Deck	Steel	Mechanically attached	-	-

Details

Perimeter Detail	Parapet Wall
Flashing Material	Modified Membrane
Drain System	Internal Roof Drains
Parapet Wall	Wood
Coping Cap	Metal

Notes

This part of the roof consists of two flat roof sections with a modified bitumen membrane system. The upper section is called A2 and the lower section B2.

Inspection Report

Client: City of Prince Albert

Facility: Alfred Jenkins Field House

Report Date: 05/17/2022

Roof Section: Roof Section 1

Inspection Information

Inspection Date	05/17/2022	**Core Data**	No
Inspection Type	Infrared Scan	**Leakage**	No

Field

Rating	Poor
Condition	No thermal anomaly related to wet areas was found on the field membrane. It is likely that the blisters observed visually are localized only on the cap sheet and the base sheet is still intact. However, the base sheet of a modified bitumen system is much thinner than the cap sheet and is not designed to be in contact with water. The water that infiltrates between the plies can wear the base sheet. It is then likely that the water will contaminate the roofing assembly at short-term.

Penetrations

Rating	Fair
Condition	No thermal anomaly related to wet areas was found around the penetration.

Drainage

Rating	Fair
Condition	No thermal anomaly related to wet areas was found around the drains.

Overall

Rating	Poor
Condition	Although the membrane is in poor condition, no thermal anomaly related to wet areas was found on this roof. However, it is likely that wet areas will appear in short-term considering the condition of the membrane and the blisters.

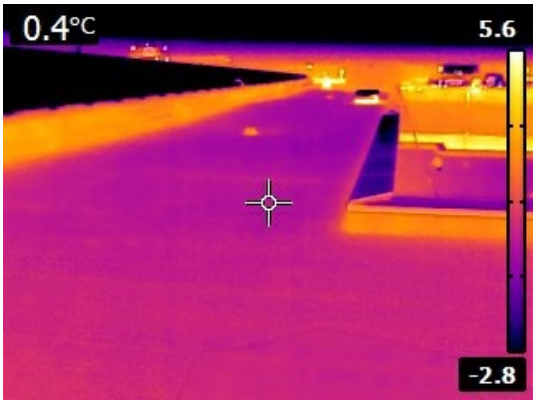

Photo 1

General view of section A2 (upper section)

No thermal anomaly was found on this section.

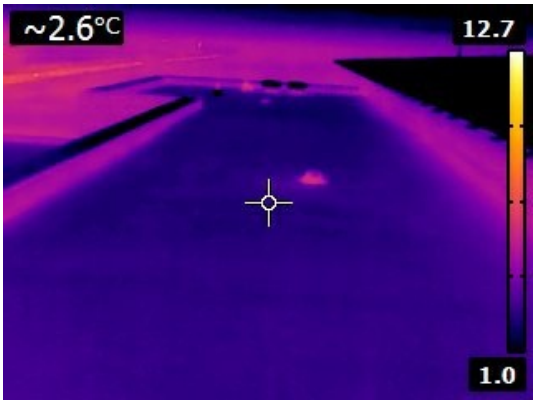

Photo 2

General view of section A2 (upper section)

No thermal anomaly was found on this section.

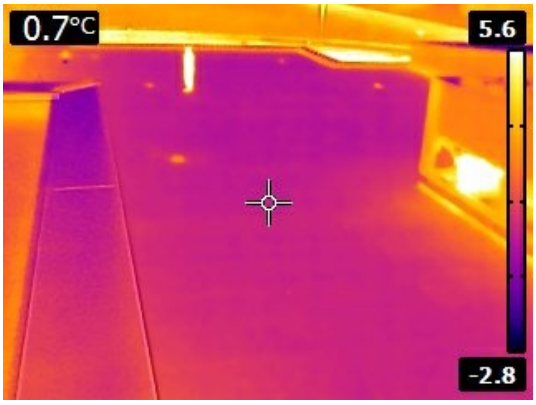

Photo 3

General view of section B1 (lower section) - from above

No thermal anomaly related to wet areas was found on this section.

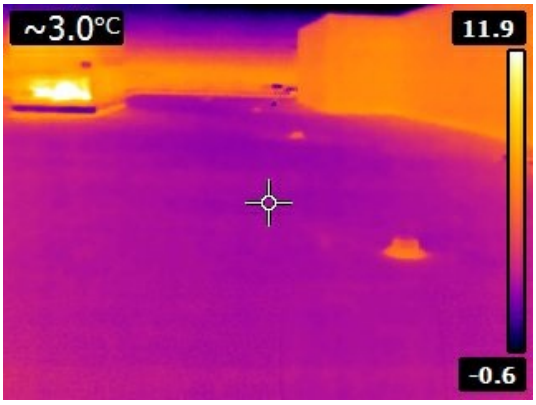

Photo 4

General view of section B1 (lower section) - from the roof surface

No thermal anomaly related to wet areas was found on this section.

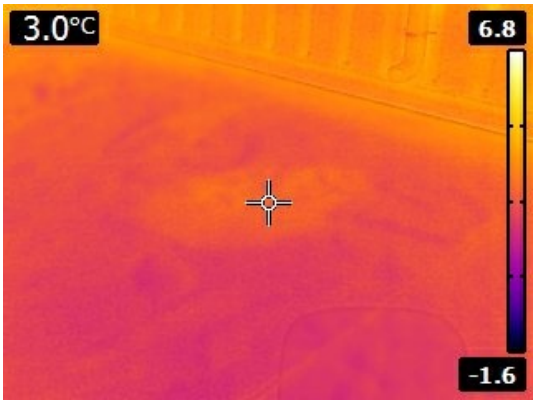

Photo 5

General view of a blister on the membrane with the infrared camera.

A humidity meter was used to confirm that the roofing assembly around the blister is still dry.

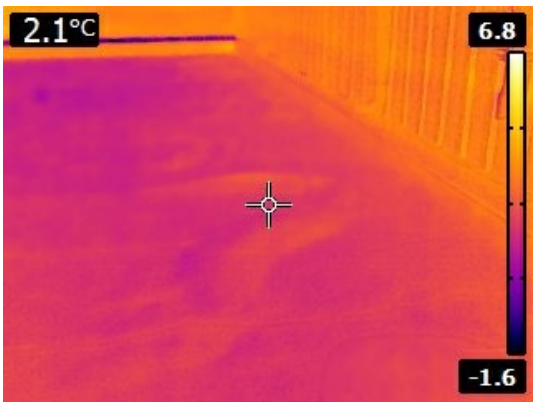

Photo 6

General view of ridges on the membrane with the infrared camera.

A humidity meter was used to confirm that the roofing assembly around the ridges is still dry.

Photo Report

Client: City of Prince Albert
Facility: Alfred Jenkins Field House
Roof Section: Roof Section 1

Report Date: 04/26/2022
Title: Section 1 Initial Inspection

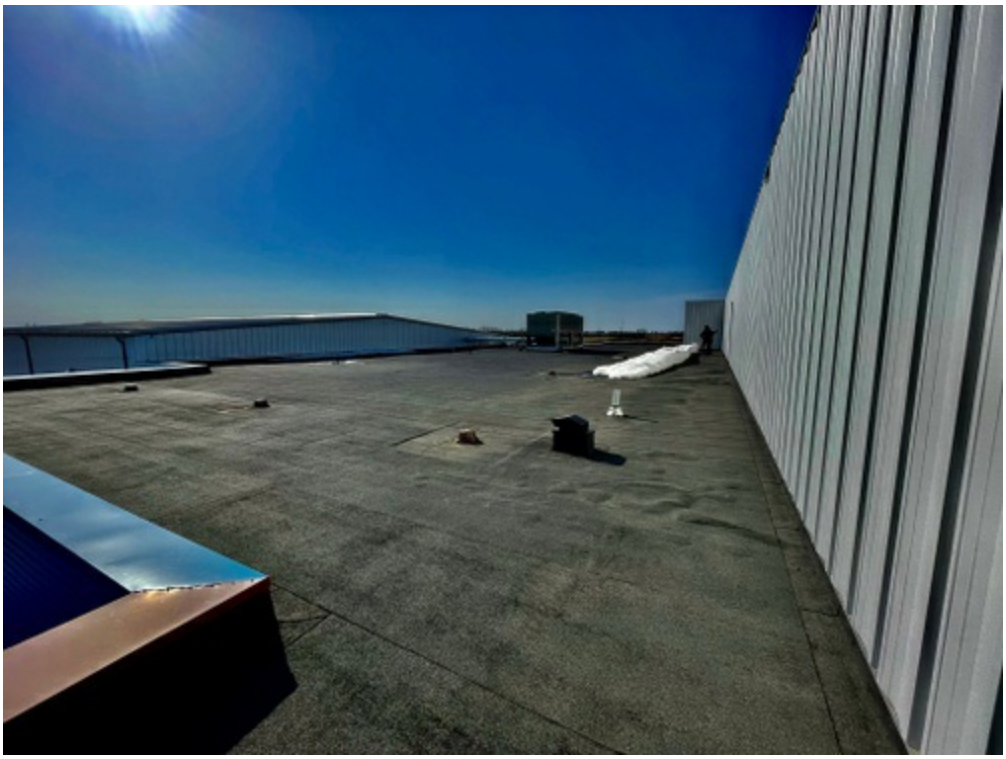

Photo 1

Section 1 - 2 ply Modified Bitumen

Overall Condition: Failed

CLEAR Analysis: The 12 year old core sample is from a 2 ply modified roof system with fiberglass felt interplies in an asphalt adhesive. The lower interplies of the core are hard and brittle, and easily crumble by hand (Figure 6). The interplies could not be easily delaminated by hand. The mineral surfacing on this core has maintained good coverage. The softening point and pen tests show that the asphalt adhesive responsible for keeping the system intact has lost its oils over time, causing the system to become more brittle. The cores tested below the recommended tensile strength and elongation recommendations. The sample performed well when undergoing puncture testing, implying that the system can withstand foot traffic and most weather phenomena.

IR Scan: 0% Wet

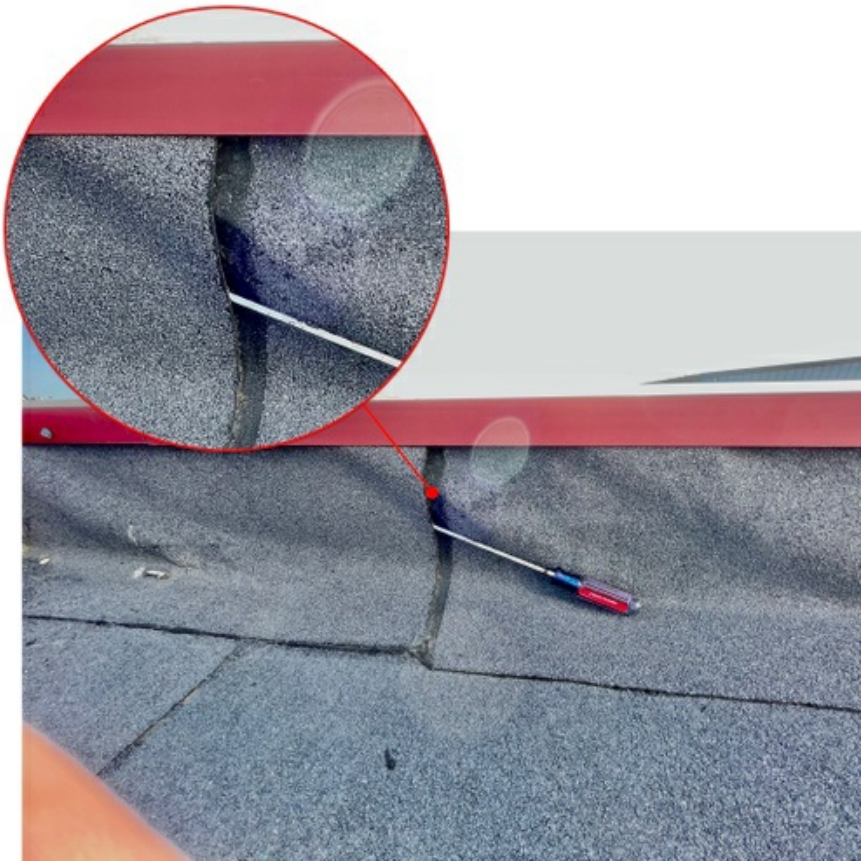

Photo 2

Fish mouths: Wrinkles or openings at the edge of the membrane caused by poor adhesion or installation. Fish mouths are a common cause of early failure on 2-ply torch down and single ply roof systems. These systems are prone to workmanship error due to two factors (1) the manual heating/welding of the adhesive, which is very unpredictable for constant heat, and (2) the roof system only consists of 1 to 2 plies, which translates in to a very thin layer of water protection.

Perimeter Flashing Deterioration: Most roof failures start at perimeter and penetration locations. Metal edge conditions that are poorly designed and improperly installed fail due to the extreme expansion and contraction that is typical with metal. Perimeter wall flashings can also be damaged due to normal seasonal building movement and thermal shock. Additional damage can also be see from UV degradation as well. At all of these deteriorated or failed points, moisture can gain direct access to the roof system insulation and the buildings interior.

Photo 3

Fish mouths: Wrinkles or openings at the edge of the membrane caused by poor adhesion or installation.

Perimeter Flashing Deterioration: Most roof failures start at perimeter and penetration locations.

Photo 4

Blisters: Soft spongy pockets or swellings in the roofing material. They occur between layers of felt or between the roof membrane and substrate. Air or moisture vapor entrapped within a blister expands as the roof and outside air temperatures rise. This results in sufficient pressure to push the roofing felts upwards and apart. Blisters may be ruptured by roof traffic, expanding frozen water, or hail (especially during colder weather). Some blisters may become so large as to affect drainage, which may then cause ponding water. Laps could also be pulled apart, resulting in leakage. A ruptured blister will immediately allow water to penetrate and damage the roof system.

Photo 5

Blisters: Soft spongy pockets or swellings in the roofing material. They occur between layers of felt or between the roof membrane and substrate. Air or moisture vapor entrapped within a blister expands as the roof and outside air temperatures rise.

Photo 6

Blisters: Soft spongy pockets or swellings in the roofing material. They occur between layers of felt or between the roof membrane and substrate. Air or moisture vapor entrapped within a blister expands as the roof and outside air temperatures rise.

Photo 7

Membrane Puncture: Large puncture hole in waterproofing membrane allowing for moisture access the building.

Photo 8

Seams: As the membrane blisters, this puts added stress on the seams. They are starting to split in many places allowing for moisture access into the building.

Blisters: Soft spongy pockets or swellings in the roofing material.

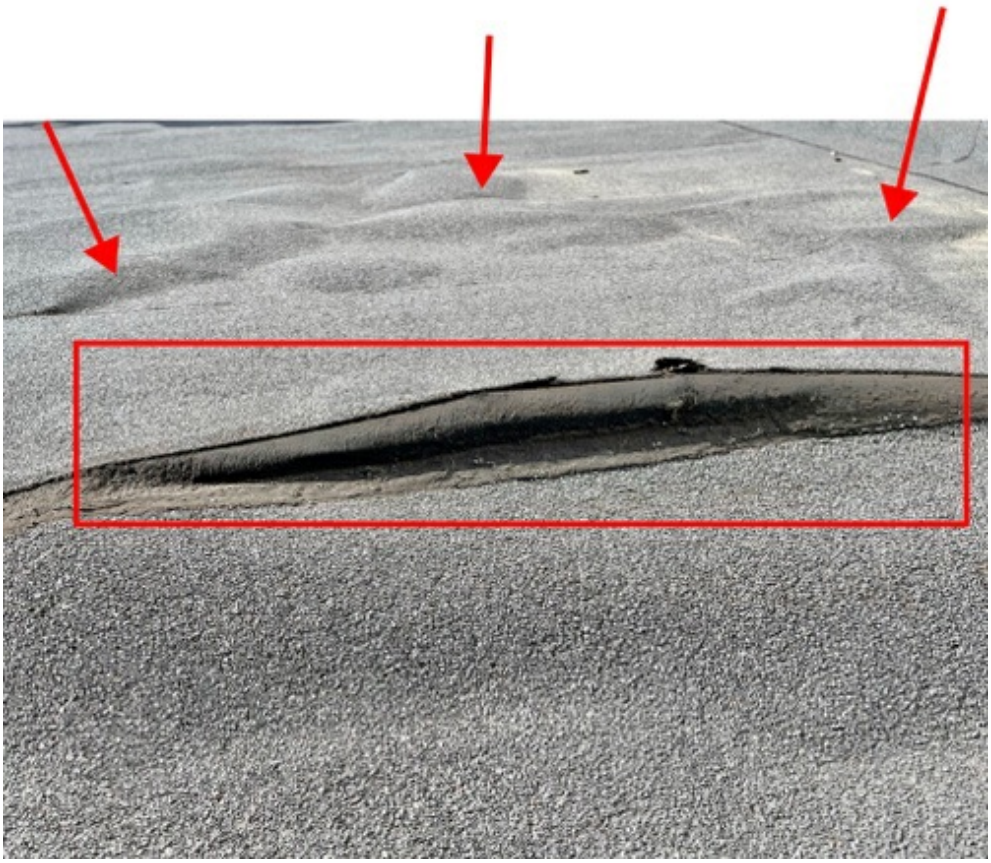

Photo 9

Seams: As the membrane blisters, this puts added stress on the seams. They are starting to split in many places allowing for moisture access into the building.

Blisters: Soft spongy pockets or swellings in the roofing material.

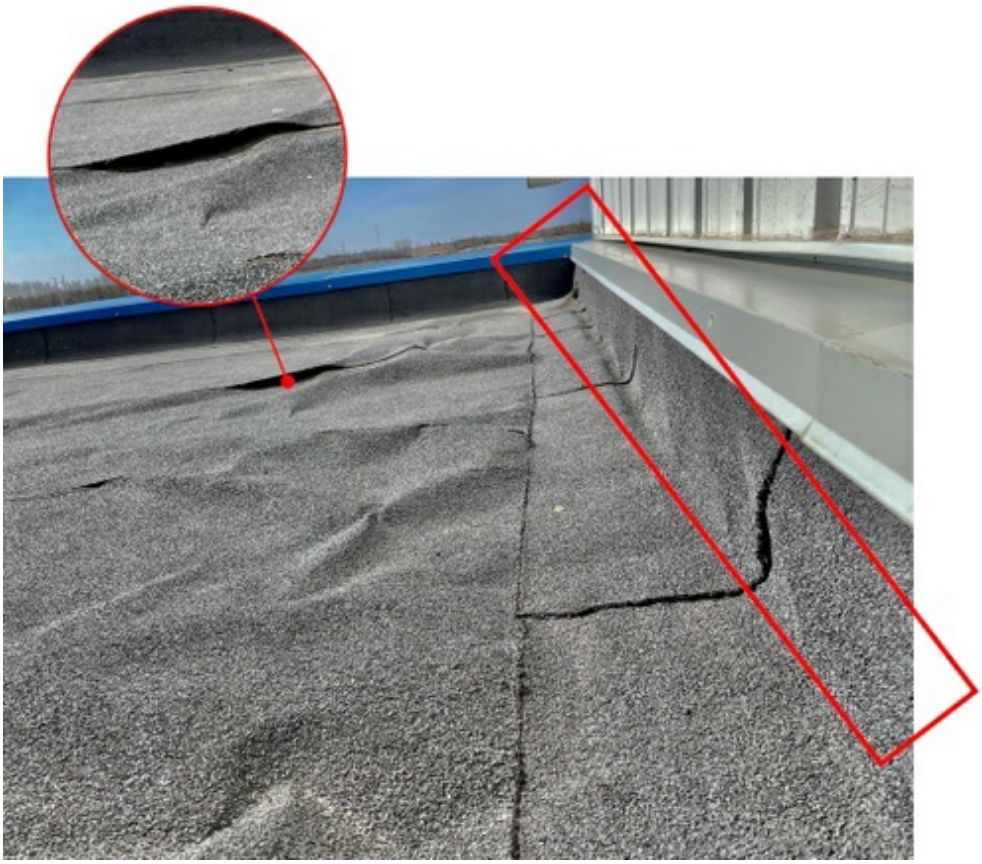

Photo 10

Blisters: Soft spongy pockets or swellings in the roofing material.

Perimeter Flashing Deterioration: Most roof failures start at perimeter and penetration locations.

Photo 11

Seams: As the membrane blisters, this puts added stress on the seams. They are starting to split in many places allowing for moisture access into the building.

Photo 12

Core Cut:

- Steel Deck
- Vapor Barrier
- 5" Expanded Polystyrene Insulation(Dry)
- 1.5" Fiber Board(Dry)
- 2 Ply Modified Bitumen Membrane

Photo 13

Core Cut: Repaired core cut using high-grade roof mastic imbedded with mesh to increase tensile strength of repair. Imbedded with gravel worn off of the membrane to help against UV.

Photo 14

CLEAR Analysis: Removal of membrane sample.

Photo 15

CLEAR Analysis: Repair of membrane sample.

Photo 16

CLEAR Analysis: Reinforced repair using roof granules to protect from UV and other elements.

Solution Options

Client: City of Prince Albert

Facility: Alfred Jenkins Field House

Roof Section: Roof Section 1

Replace Options			
Solution Option:	Replace	**Action Year:**	2022
Square Footage:	13,850	**Expected Life (Years):**	30
Budget Range:	$260,000.00 - $325,000.00		

Scope of Work: Replacement of Waterproofing Membrane With Up to 30 Year Water Tight Warranty

1. Remove all roof components down to dry insulation;
2. Install new recovery board in damaged areas;
3. Install new SBS modified bitumen base sheet
4. Install new SBS modified bitumen cap sheet

Photo Report

Client: City of Prince Albert
Facility: Alfred Jenkins Field House
Roof Section: Roof Section 2

Report Date: 04/26/2022
Title: Section 2 Initial Inspection

Photo 1

Section 2: Standing Seam Metal

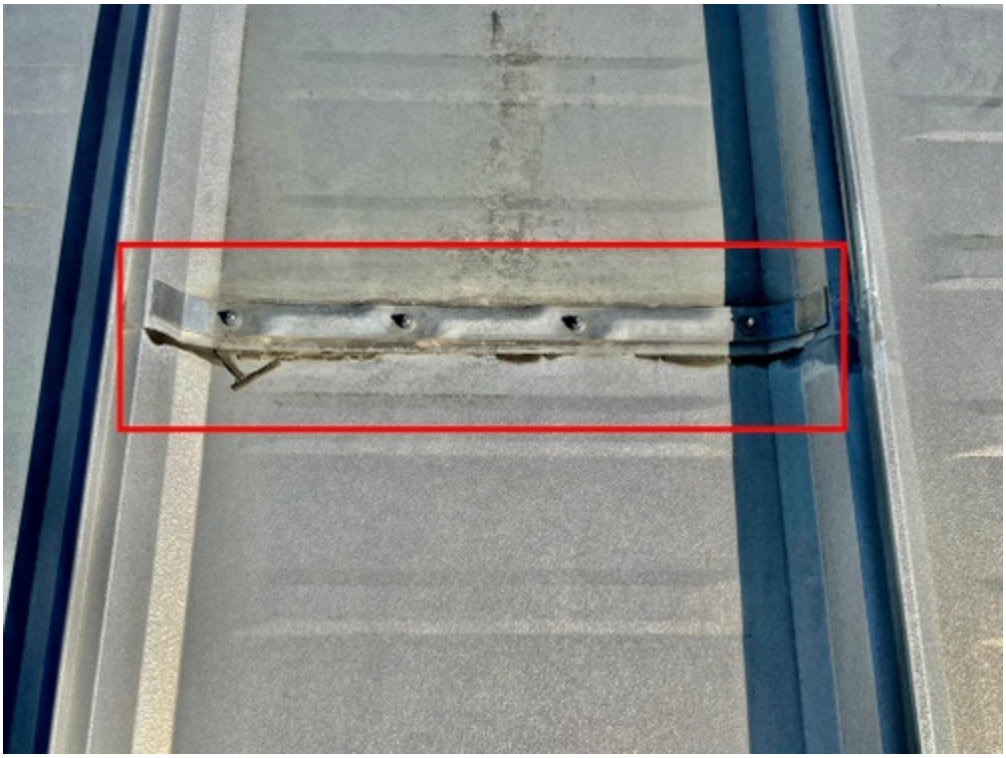

Photo 2

Panel Lap Seam Deterioration: Horizontal seam waterproofing deteriorating allowing for potential moisture access to the building.

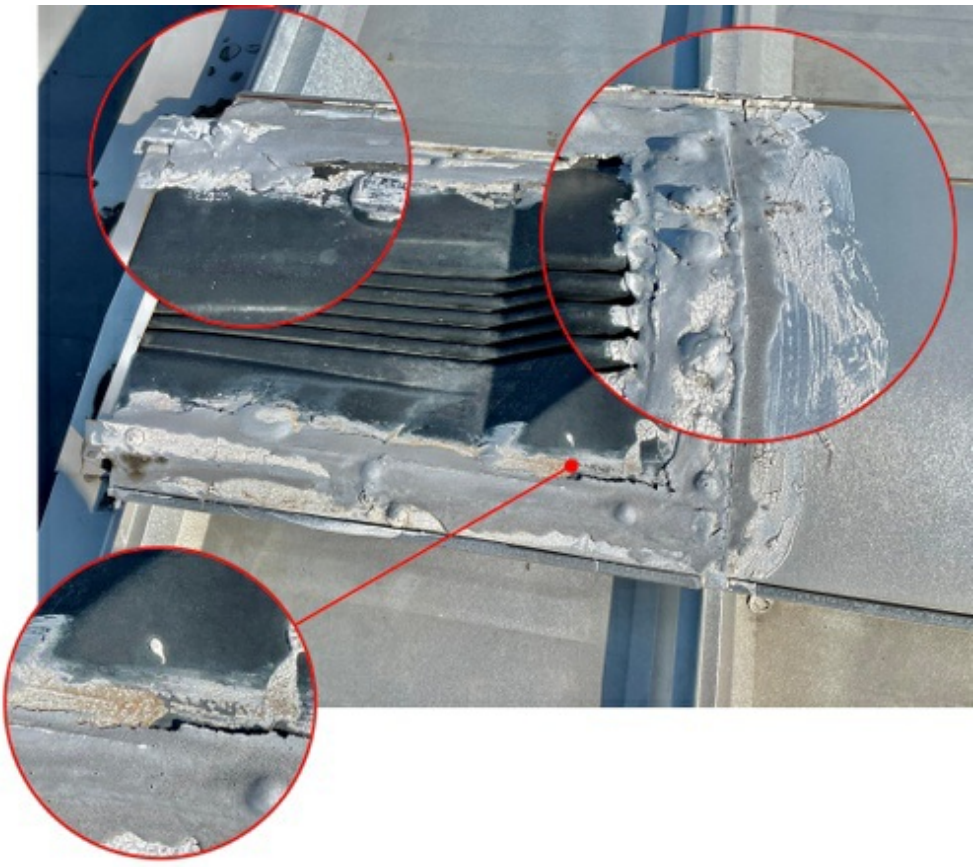

Photo 3

Ridge Cap Vent: Sealant around Ridge Cap Vent deteriorating allowing for potential moisture access.

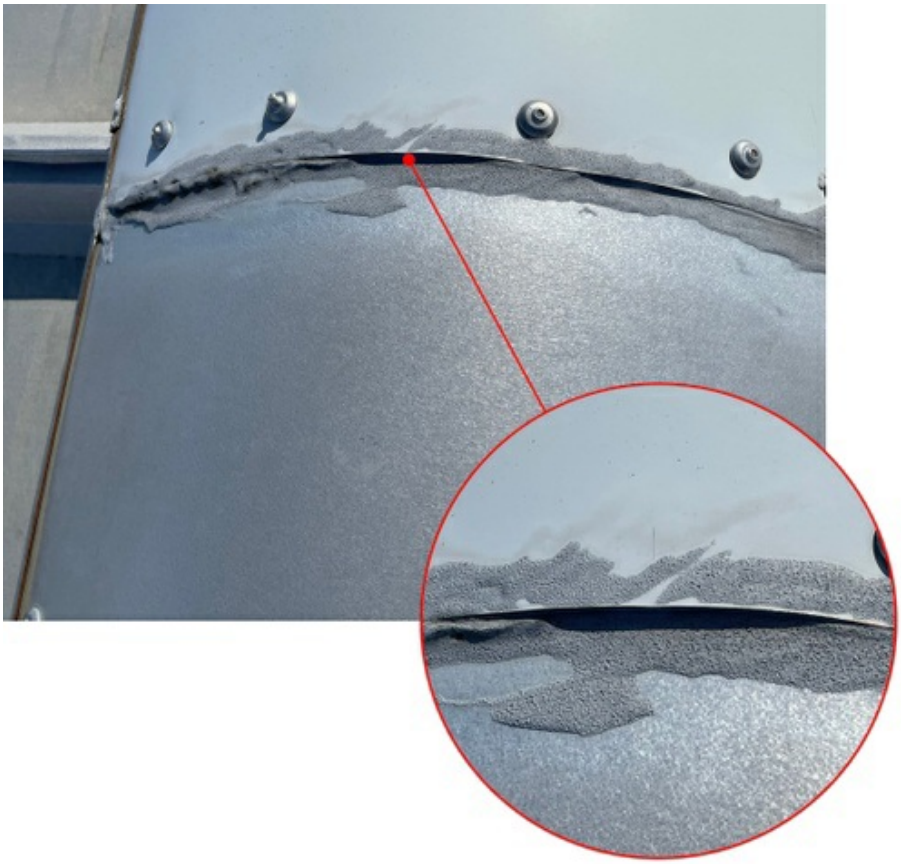

Photo 4

Ridge Cap Seam 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.

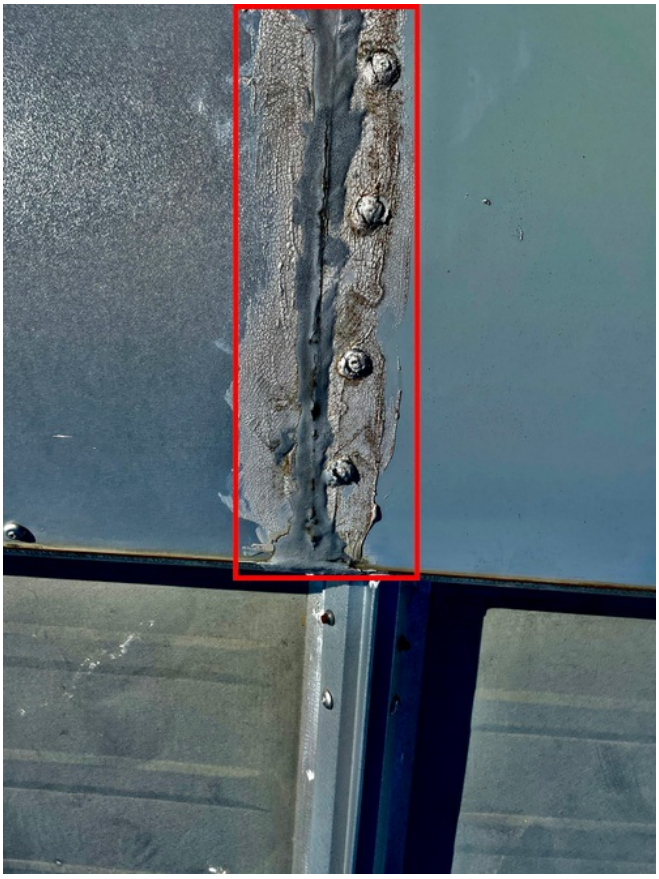

Photo 5

Ridge Cap Seam 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.

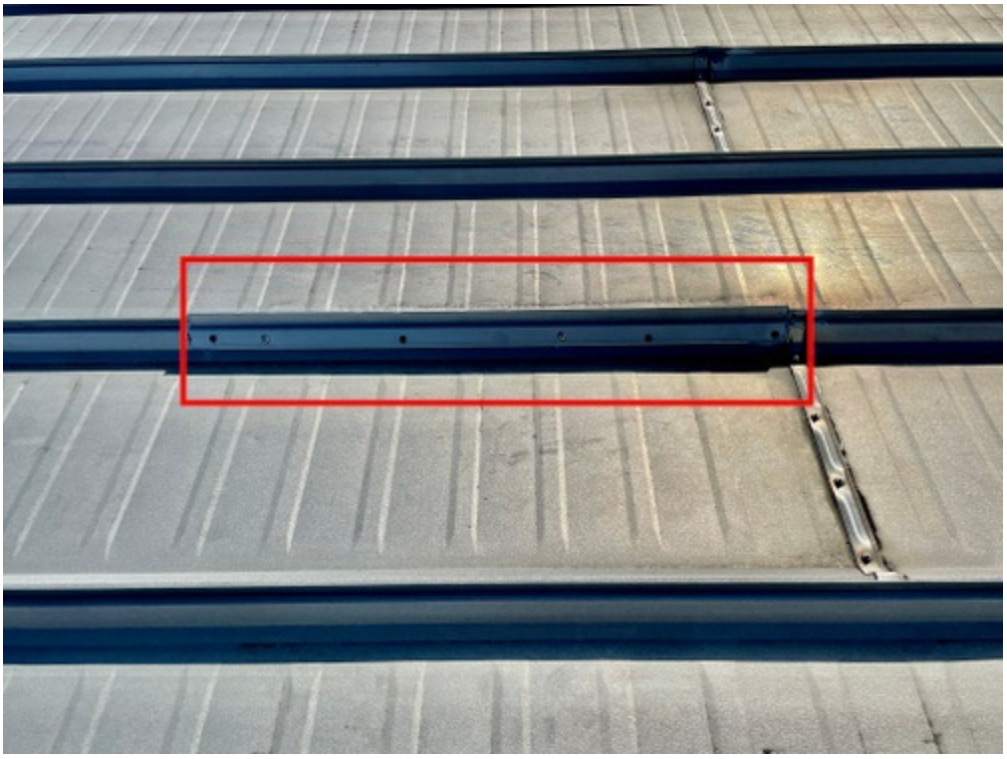

Photo 6

Previous Repair: Previous reinforcement of standing vertical seams found on several areas of the roof varying in length.

Photo 7

Previous Repair: Previous reinforcement of standing vertical seams found on several areas of the roof varying in length.

Photo 8

Previous Repair: Previous reinforcement of standing vertical seams found on several areas of the roof varying in length.

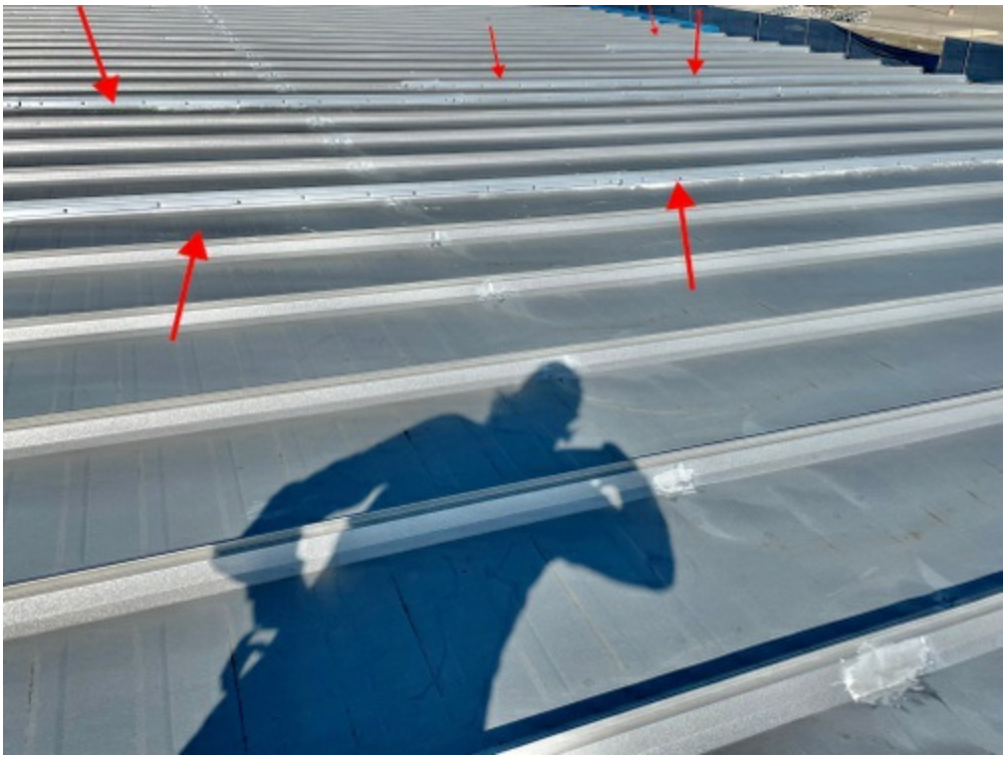

Photo 9

Previous Repair: Previous reinforcement of standing vertical seams found on several areas of the roof varying in length.

Solution Options

Client: City of Prince Albert

Facility: Alfred Jenkins Field House

Roof Section: Roof Section 2

Maintenance Options

Solution Option:	Maintenance	**Action Year:**	2025
Square Footage:	56,490	**Expected Life (Years):**	20
Budget Range:	$150,000.00 - $250,000.00		

Scope of Work: General Maintenace

1. Seal all vertical seams using a high performance polyester-faced adhesive tape followed by a coat of a fluid applied waterproofing system to insure the seams stay water tight
2. Seal all horizontal seams using a high performance polyester-faced adhesive tape followed by a coat of a fluid applied waterproofing system to insure the seams stay water tight
3. Seal all ridge cap seams using a high performance polyester-faced adhesive tape followed by a coat of a fluid applied waterproofing system to insure the seams stay water tight
4. Reinforce all previous seam repairs seams using a high performance polyester-faced adhesive tape followed by a coat of a fluid applied waterproofing system to insure the seams stay water tight
5. Reinforce all penetrations using a high performance polyester-faced adhesive tape followed by a coat of a fluid applied waterproofing system

Solution Options

Client: City of Prince Albert

Facility: Alfred Jenkins Field House

Roof Section: Roof Section 2

Restore Options			
Solution Option:	Restore	**Action Year:**	2028
Square Footage:	56,490	**Expected Life (Years):**	15
Budget Range:	$1,412,250.00 - $1,977,150.00		

Full Restoration with 10 year water tight warranty:

Extend the life of your roof with the LiquiTec fluid-applied waterproofing system built to form a virtually impenetrable surface for years of added waterproofing protection. This two-component, 100% solids, aliphatic polyurea coating contains zero VOCs, is extremely low odor, and cures quickly to form a highly durable, impact and UV resistant membrane over aged modified bitumen, metal and single-ply roof systems