# **Roof Inspection Report**

### Prepared for:

Mr. Greg Boettger Bellevue Schools & Mr. Ralph Gladbach GP Architecture, LLC.

### Prepared by:

Roofing Solutions, Inc. 6728 W. 153<sup>rd</sup> Street Overland Park, KS 66223



**Project Location** 

Central Elementary School 510 W. 22<sup>nd</sup> Avenue Bellevue, NE 68005 Facility: Central Elementary 510 W. 22nd Avenue Bellevue Nebraska 68005 U.S.A.

Contact Name: Greg Boettger

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Date of Last Inspection: Mar 22, 2017

#### Type of building: School

Type of Neighborhood: Residential



Roof Section List					
Photo	Section / Name / Year Installed	Size / Height	Roof Type	Condition Index/ *RCI/ ASLR(Yrs)	Estimated Replacement Value
	Roof A A 1992	19,435 sq. ft. 12 ft.	Built-Up Asphalt Roofing	Poor 33 0(Yrs)	\$165,197.50
	Roof B B 2012	465 sq. ft. 12 ft.	(EPDM) Ethylene-Propyl ene-Diene-Mon omer Roofing	Good 75 15(Yrs)	\$8,370.00
	Roof C C 1996	6,462 sq. ft. 20 ft.	(EPDM) Ethylene-Propyl ene-Diene-Mon omer Roofing	Poor 33 0(Yrs)	\$77,544.00
		26,362			\$251,111.50
*RCI Rating 0 -100 where 100 is	excellent				

Recommendation Summary						
Section ID	Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Budget Amount
Roof A	2017	Retrofit	Yes	Capital	High	\$165,197
Roof A	2017	Infrared Scan	Yes	Expense	High	\$2,500
Roof B	2017	No Action	No	N/A	N/A	\$0
Roof C	2017	Replacement	Yes	Capital	High	\$77,544
						\$245,241

Capital Budgets - 5 Years					
Section ID	2017	2018	2019	2020	2021
Roof A	\$165,197	\$0	\$0	\$0	\$0
Roof C	\$77,544	\$0	\$0	\$0	\$0
	\$242,741	\$0	\$0	\$0	\$0

Expense Budgets - 5 Years					
Section ID	2017	2018	2019	2020	2021
Roof A	\$2,500	\$0	\$0	\$0	\$0
	\$2,500	\$0	\$0	\$0	\$0

Total Budgets - 5 Years					
Section ID	2017	2018	2019	2020	2021
Roof A	\$167,697	\$0	\$0	\$0	\$0
Roof B	\$0	\$0	\$0	\$0	\$0
Roof C	\$77,544	\$0	\$0	\$0	\$0
	\$245,241	\$0	\$0	\$0	\$0

Roof Name:	A			
Roof Size:	19,435 sq. ft.			
Est. replacement Cost:	\$ 165,197.50			
Existing System Type:	Built-Up Asphalt Roofing			
Year Installed:	1992			
Assessed Service Life Remaining (Years) :	0			
Height:	12 Ft.			
Slope:	1/4" per ft.			
Interior Sensitivity:	Normal			
Drainage:	Adequate			
Currently Leaking?	Yes			
History of Leaking?	Yes			
Drainage and Leak Details:	The A roof areas slope to the interior and drain to primary roof drains. The A-3 roof area has two (2) overflow drains and the A-1 roof area has five (5) scuppers that go through the raised roof edge detail.			
	Facility personnel reported an ongoing leak issue around a roof drain on the A-1 roof area.			



Existing Roof System Construction				
Layer Type	Description	Method Of Attachment		
Deck	Metal	Spot Attached		
Insulation	Polyisocyanurate	Mechanically Fastened		
Cover board	Fiberboard5" (1/2")	Hot Asphalt		
Membrane	BUR - Multiply	Hot Asphalt		
Surfacing	Gravel	Hot Asphalt		

### **Overall Core Condition**

Core samples were taken on the A-1, A-2 & A-3 roof areas, all of which revealed the same roofing layers in place. The deck is a steel decking. The insulation is one (1) layer of polyisocyanurate board and one (1) layer of 1/2" wood fiber cover board. The membrane is a multiply BUR with a gravel surface. The polyisocyanurate board was 2.25" thick on the A-1 roof area, 1.75" thick on the A-2 roof area and 3" thick on the A-3 roof area.

Core Photos				
Photos	Date	Description		
	Mar 22, 2017	Core cut #1		
	Mar 22, 2017	Core cut #2		
	Mar 22, 2017	Core cut #3		
	Mar 22, 2017	Deck Underside		

Inspection Type

**Overall Roof Inspection Assessments** 

Date	Inspection Type	Ins	pecting Company	In	spector			
Mar 22, 2017	Phase 1 Roof Inspection	Ro	ofing Solutions, Inc.	Garry	Hendrickson			
Roof Section A Multi-Purpose (south side of approximately a raised roof e edging. The ir mounted coun set under an E	Roof Section A refers to the low slope roof system over the west wing and the roof areas which surround the raised Multi-Purpose Room at the Central Elementary School facility. The roof section includes the A-1 (west wing), A-2 (south side of Multi-Purpose Room) and A-3 roof area (north side of Multi-Purpose Room). The roof is an approximately twenty-five (25) year old BUR with a gravel surface. The perimeter sides of the roof area consist of a raised roof edge detail which is flashed with a BUR type of membrane flashing that terminates with a metal roof edging. The internal walls are flashed with a BUR type of membrane flashing which extends under a surface mounted counter flashing or a metal wall cap. There are portions on the internal wall where the counter flashing is set under an EIFS wall covering.							
<ul> <li>Deteriorated</li> <li>Accumulation</li> <li>Caulking rep</li> <li>Roof mastic</li> <li>One (1) repo</li> <li>BUR flashing</li> <li>Split BUR fla</li> <li>Open BUR p</li> <li>Areas where</li> <li>One (1) ruste</li> <li>One (1) split</li> </ul>	<ul> <li>Detects and conditions found during the inspection include the following:</li> <li>Deteriorated or split caulking observed in the brick wall expansion joints above the roof system</li> <li>Accumulation of debris around the drain strainers and fallen tree limbs on the A-1 area</li> <li>Caulking repair attempts observed to the brick walls</li> <li>Roof mastic and cold process repair attempts observed to the BUR system</li> <li>One (1) reported leak issue at a roof drain on A-1; the plumbing should be investigated for leaks</li> <li>BUR flashings are weathered with deterioration and splitting</li> <li>Split BUR flashings observed at scupper, edge metal joints and corner flashings</li> <li>Open BUR plies observed around the lead drain flashings</li> <li>Areas where the metal counter flashing is incorrectly sealed to an EIFS wall covering</li> <li>One (1) rusted vent stack observed</li> <li>One (1) split in the EIFS wall covering</li> </ul>							
Overall, the roof system is in poor condition due to its age and the deteriorated nature of the roof system. Given the observed conditions, it is our opinion comprehensive repairs in an effort to extend the life of the system would be neither feasible nor cost effective. We recommend the roof be replaced. There was no warranty information available for this roof section at the time of inspection.								
Recommendations Details								
Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Quotation \$			
2017	Infrared Scan	Yes	Expense	High	\$2,500			

RSI recommends an infrared scan be performed to locate any wet insulation present in the current roof system.

RSI recommends the installation of a new twenty (20) year design life roof system. We further recommend installation of new perimeter metal and projection details per the SMACNA Architectural Sheet Metal Manual.

Yes

\$167,697

\$165,197

Retrofit

2017

Capital

High

Roof Name:	В
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Roof Size: 465 sq. ft.

Est. replacement Cost: \$8,370.00

- Existing System Type: (EPDM) Ethylene-Propylene-Diene-Monomer Roofing
  - Year Installed: 2012
- Assessed Service Life Remaining (Years) : 15
  - Height: 12 Ft.
    - Slope: 1/4" per ft.
  - Interior Sensitivity: Normal
    - Drainage: Adequate
  - Currently Leaking? No
  - History of Leaking? Yes
  - Drainage and Leak Details: The B roofs slope to the perimeters and drain to scuppers through the raised roof edge detail. The roof area at the north side of the Multi-Purpose Room drains to a single roof drain.

No recent leaks were reported on these roof areas at the time of inspection.

Existing Roof System Construction				
Layer Type	Description	Method Of Attachment		
Deck	Wood plank	Nailed		
Membrane	BUR - Coal Tar Pitch	Coal Tar Pitch		
Surfacing	Gravel	Coal Tar Pitch		
Insulation	Polyisocyanurate	Mechanically Fastened		
Membrane	EPDM	Cold Adhesive		



### **Overall Core Condition**

One (1) core sample was taken on the larger roof area at the east side of the A-1 roof area. The core sample revealed two (2) roof systems in place. The deck is wood plank. The original roof system is a coal tar pitch BUR system with a gravel surfacing. That roof system was later covered with one (1) layer of 2" polyisocyanurate board and a fully-adhered, Firestone EPDM membrane.

Core Photos				
Photos	Date	Description		
Status and	Mar 22, 2017	Membrane stamp		
	Mar 22, 2017	Roof System Core		

	Overall Roof Inspection Assessments					
Date	Inspection Type	Inspecting Company	Inspector			
Mar 22, 2017	Phase 1 Roof Inspection	Roofing Solutions, Inc.	Garry Hendrickson			

Roof Section B refers to the low slope roof system over the small roof areas which adjoin the A-1 and C roof areas at the Central Elementary School facility. The roof section includes four (4) small roof areas. The roof system is an approximately five (5) year old, fully-adhered, Firestone EPDM. The perimeter sides of the roof area are a raised roof edge detail which is flashed with the same type of EPDM membrane flashing that terminates with a metal roof edging. The internal walls are flashed with same type of EPDM membrane flashing which terminates with a caulk strip detail.

Overall, the roof system is in good working condition, with no defects observed at the time of inspection. With routine maintenance and regular inspection, the roof system should remain effective for the duration of its assessed service life. There was no warranty information available for this roof section at the time of inspection.

	Recommendations Details							
Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Quotation \$			
2017	No Action	No	N/A	N/A	\$0			
No action is r	recommended at this time.							
					\$0			

Roof Name: C
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Roof Size: 6,462 sq. ft.

Est. replacement Cost: \$77,544.00

Existing System Type: (EPDM) Ethylene-Propylene-Diene-Monomer Roofing

Year Installed: 1996

- Assessed Service Life Remaining (Years) :
  - Height: 20 Ft.
    - Slope: 1/4" per ft.
  - Interior Sensitivity: Normal
    - Drainage: Adequate
  - Currently Leaking? No
  - History of Leaking? Yes
  - Drainage and LeakRoof Section C slopes from south to north and<br/>drains to an external gutter.

No recent leaks were reported on this roof section at the time of inspection.

Existing Roof System Construction					
Layer Type	Layer Type Description				
Deck	Tectum	Laid - In -Place			
Insulation	Expanded Polystyrene (EPS)	Laid - In -Place			
Cover board	Fiberboard - 1"	Mechanically Fastened			
Membrane	EPDM	Mechanically Fastened			
Membrane	EPDM	Cold Adhesive			

### **Overall Core Condition**

One (1) core cut revealed a tectum panel decking. The insulation is one (1) layer of 2.5" and one (1) layer of 1" air-expanded polystyrene insulation with a 1" layer wood fiber cover board. The original roof membrane is an EPDM which was mechanically attached with bars. It appears that EPDM roof membrane was later covered with an additional fully-adhered EPDM membrane. Note the insulation does not appear to be a tapered insulation system.

	Co	re Photos
Photos	Date	Description
	Mar 22, 2017	Deck Underside
148845 1	Mar 22, 2017	Membrane stamp
	Mar 22, 2017	Roof System Core

	Overall Roof Inspection Assessments						
Date	Inspection Type	Inspecting Company	Inspector				
Mar 22, 2017	Phase 1 Roof Inspection	Roofing Solutions, Inc.	Garry Hendrickson				
Roof Section ( facility. The ro perimeter side and topped wi Defects and c	Roof Section C refers to the low slope roof system over the Multi-Purpose Room at the Central Elementary School facility. The roof is an approximately twenty-one (21) year old, fully-adhered EPDM. The south, east and west perimeter sides of the roof area are a wall detail. The walls are covered with the same type of EPDM membrane and topped with a metal cap. The north edge is an external gutter detail that terminates with a metal roof edging. Defects and conditions found during the inspection include the following:						
<ul> <li>EPDM stripping repairs observed to the field seams</li> <li>Random areas where the base flashing attachment has failed</li> <li>The EPDM flashings are bridged</li> <li>The wall cap cover plates are loose along the south wall detail</li> <li>The edge metal and guttering are rusted</li> </ul>							
Overall, the ro observed cond neither feasibl available for th	Overall, the roof system is in poor condition due to its age and the deteriorated nature of the roof system. Given the observed conditions, it is our opinion comprehensive repairs in an effort to extend the life of the system would be neither feasible nor cost effective. We recommend the roof be replaced. There was no warranty information available for this roof section at the time of inspection.						

	Recommendations Details							
Budget Year	Activity Type	Action Item ?	Allocation	Urgency	Quotation \$			
2017	Replacement	Yes	Capital	High	\$77,544			
RSI recommo roof system. SMACNA Art	RSI recommends a complete tear-off of existing roof system and the installation of a new twenty (20) year design life roof system. We further recommend the replacement of all perimeter coping cap and projection details per SMACNA Architectural Sheet Metal Manual.							

Prepared By: Roofing Solutions, Inc.

\$77,544



Defect Code:	1	Quantity:	Random	Priority:	First Year	
Description: Deteriorated or missing sealant at counterflashing, termination bar, sealant lip, metal flashing, expansion joint, etc.						
Repair: Clean I polyurethane se	oose s ealant a	ealant and c Ind tool to sh	lirt from all sur ned water.	faces. Appl	ynew	



Defect Code:	22	Quantity:	Random	Priority:	First Year	
Description: Debris, trash, construction materials, HVAC equipment, filters, motors, etc. on roof surface.						
Repair: Remov surfaces and re	e all tra pair an	sh and debi ydamages	ris from roof. ( to the membra	Clean and ir ane or flashi	nspect ngs.	



Defect Code:	24	Quantity:	Numerous	Priority:	Monitor	
Description: Evidence of past problem and previous repair.						
·			•	•		
Repair: Investio	ate for	chronic leak	problems an	d repair anv	areas that	
are suspect	<b>J</b> ato 101	00				



Description: Report	ed leak locatio	n				
Repair: Investigate leak and determine source. Repair areas with like materials of appropriate gauge and plies.						



Defect Code:	43	Quantity:	Widespread	Priority:	First Year	
Description: Weathered and deteriorated flashing						
Repair: Clean a and other debris the flashing ma	and pre s. Apply terials.	pare surfac y two coats (	es by removing of elastomeric	g loose grar coating con	nules, dirt, npatible with	



Defect Code:	46	Quantity:	Widespread	Priority:	First Year
Description: Sp	lit in fla	shing			
Repair: Cut awastrip in of like m all directions pa	ay loos aterial st prep	e flashing a centered ov ared area.	nd clean and p er split extendi	orime repair ng a minim	area. Apply um of 4" in



Defect Code:	53	Quantity:	Widespread	Priority:	First Year
Description: Op	ben lead	d flashing.			-
Repair: Provide	extens	ion lead an	d turn into pipe	<ol> <li>Counterfla</li> </ol>	ash top of

short lead with extension a minimum of 3".



Defect Code:	58	Quantity:	Random	Priority:	Monitor
Description: Ina flashings or flas	adequa shing de	te, incomple etails.	ete, nonconfori	ming memb	rane
Repair: Comple recommendatic requirements o	ete men ons and n warra	nbrane flash good roofin nted system	ning repairs in g practices. F ns.	accordance follow manu	with NRCA facturer



Description: Corrosion or rust Repair: Remove rusted components and replace with similar metal fabricated and installed per SMACNA requirements.	Description: Corrosion or rust Repair: Remove rusted components and replace with similar metal fabricated and installed per SMACNA requirements.	Defect Code:	86	Quantity:	1	Priority:	Monitor
Repair: Remove rusted components and replace with similar metal abricated and installed per SMACNA requirements.	Repair: Remove rusted components and replace with similar metal abricated and installed per SMACNA requirements.	Description: Co	orrosior	n or rust			
Repair: Remove rusted components and replace with similar metal abricated and installed per SMACNA requirements.	Repair: Remove rusted components and replace with similar metal fabricated and installed per SMACNA requirements.						
fabricated and installed per SMACNA requirements.	fabricated and installed per SMACNA requirements.	Repair: Remov	e ruste	d componer	its and repla	ce with simila	r metal
		abricated and i	nstalle	d per SMACN	NA requireme	ents.	



Defect Code:	89	Quantity:	Under 10 LF	Priority:	First Year
Description: M	lissing	wall coverin	g/cladding.		
Repair: Replac methods. Reat	e cladd tach an	ing/wall cov d reseal all	ering with mat joints, seams,	ching mater laps, etc.	ials and



Defect Code:	24	Quantity:	Widespread	Priority:	Monitor
Description: Ev	idence	of past prob	lem and previo	ous repair.	
Repair: Investio are suspect.	gate for	chronic leal	cproblems and	d repair any	areas that



Defect Code:	41	Quantity:	Random	Priority:	Monitor
Description: Mi	ssing c	r inadequate	e flashing atta	chment.	
Repair: Mechan and plates or 1" compression ba	iically a ' cap na ar.	ttach flashin iils. Termin	gs a maximur ate with metal	n of 6" O.C ເ I flashings c	using screws r



Defect Code:	44	Quantity:	Widespread	Priority:	Monitor
Description: Br	idged fl	ashing			
Cut out all bridg flashings. App and splice inter	ed flas ly corne section	hings. Clea er flashings s.	n area thoroug and overlay all	ghly and app T-laps, flas	olynew hings laps,



Description: Op	en or r	nissing join	t cover.		
Repair: Replace	e joint	covers that a	are open or mis	ssing with m	natching joir
covers and seal	ant.		·	C C	



Defect Code:	86	Quantity:	Widespread	Priority:	Monitor
Description: Co	orrosior	or rust			
Repair: Remov fabricated and i	e ruste nstalled	d componei d per SMACI	nts and replace NA requiremer	e with simila hts.	ar metal





## Deficiency Legend

Defect #	FIELD MEMBRANE AND ROOF SURFACE
	Description: Deteriorated or missing sealant at counterflashing, termination bar, sealant lip, metal flashing,
1	expansion joint, etc.
2	Description: Fishmouth in field or flashing seam.
3	Description: Open lap in field membrane.
4	Description: Dry lap edge.
5	Description: Buckling or ridging of membrane.
6	Description: Split in membrane.
7	Description: Wrinkle in membrane.
8	Description: Surface erosion.
9	Description: Membrane deterioration.
10	Description: Tented membrane at fastener.
11	Description: Blister in field membrane or flashing.
12	Description: Alligatoring of asphalt surfacing.
13	Description: Tar boils/blueberries.
14	Description: Displaced ballast.
15	Description: Ponding of water.
16	Description: Blocked drain, scupper, or downspout.
17	Description: Missing or damaged drain/scupper strainer
18	Description: Unadhered membrane or inadequate membrane attachment.
19	Description: Unadhered insulation or inadequate insulation attachment.
20	Description: Displaced insulation
21	Description: Loose walkway pad or deteriorated paver.
22	Description: Debris, trash, construction materials, HVAC equipment, filters, motors, etc. on roof surface.
23	Description: Physical damage to membrane including cuts, holes, tears, scrapes, scuffs, or abrasions.
24	Description: Evidence of past problem and previous repair.
25	Description: Membrane slippage
26	Description: Membrane shrinkage
	Description: Missing or damaged membrane protection layer at sleeper, antenna, satellite sled, blocking,
27	pipe stand, paver, etc.
28	Description: Reported leak location
29	Description: Missing, loose, or broken shingles
30	Description: Open or missing tile eave stop.
31	Description: Missing or open mortar joints at the ridge or hip.
32	Description: Broken or missing tile.
33	Description: Loose, displace, or unsecured tiles.

All

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### Deficiency Legend

Defect #	ELASHINGS AND DENETRATIONS
40	Description: Low flashing height
41	Description: Missing or inadequate flashing attachment
42	Description: Loose or unadhered flashings
43	Description: Weathered and deteriorated flashing
44	Description: Bridged flashing
45	Description: Open flashing lap
46	Description: Split in flashing
47	Description: Racked flashings
48	Description: Missing termination
49	Description: Missing counterflashing
50	Description: Missing pipe flashing.
51	Description: Leaking or damaged gutters/downspouts.
52	Description: Missing rain cap, rain collar, or hood.
53	Description: Open lead flashing.
54	Description: Fallen or loose backer rod.
55	Description: Deteriorated or shrunken pitch pan filler.
56	Description: Abandoned and obsolete equipment.
57	Description: Expansion joint deficiencies.
58	Description: Inadequate or nonconforming membrane flashing detail.
70	
70	Description: Open joint in metal flashing.
71	Description: Open or missing joint cover.
72	Description: Signage penetration not sealed properly.
73	Description: Improper sneet metal detail.
74	Description: Inadequate coverage of metal flange.
75	Description: Inadequate transition flockings.
70	Description. Inadequate transition liasnings.
70	Description: Grease of other contaminants exhausted of vented onto roof surface.
70	Description: Cracks in walls
80	Description: Broken plugged or disconnected condensate line
81	Description: Displaced antenna, sign, bracing, support, stran, etc.
82	Description: Open or deteriorated wall joint
83	Description: Efflorescence
84	Description: Deck deflection
85	Description: Vegetation growth.
86	Description: Corrosion or rust
87	Description: Mechanical defect
88	Description: Skylight defect/cracked/deteriorated
89	Description: Missing wall covering or cladding materials.

All









































































































































































































































































