

Roof Repair Project Report

**Fairbank Complex
40 Fairbank Road
Sudbury, Massachusetts**

February 14, 2014

RBA Project No. 2014007.00

Prepared by:



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Roof Repair Project
Fairbank Complex, Roof Area Nos. 3, 4 & 6
Sudbury, Massachusetts
February 14, 2014

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Russo Barr Associates, Inc.
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February 14, 2014

Mr. James F. Kelly
Facilities Director
Town of Sudbury
275 Old Lancaster Road
Sudbury, MA 01776

Re: Roof Repair Project
Fairbank Complex, Roof Area Nos. 3, 4 & 6
40 Fairbank Road
Sudbury, Massachusetts
RBA Project No.: 2014007.00

Mr. Kelly:

During the month of February 2014, we reviewed the condition of the EPDM roof membrane systems on Roof Area Nos. 3, 4 & 6 of the Fairbank Complex. This report documents our observations, repair options, photographic documentation of deteriorated roof deck conditions & estimated construction costs.

The low-sloped roofs include an EPDM roof membrane system adhered to a layer of 3" thick polyisocyanurate insulation installed over existing built-up roofing felts & cementitious wood fiber roof decking. The roof insulation was fastened through the original built-up roofing felts and into the cementitious wood fiber roof decking at varying rates (from 1 per 4 SF to 1 per 2 SF). These fastening rates are consistent with industry standards at the time of installation as an FM 1 – 60 rated roof system.

In general, the condition of the roof systems is poor. We found all field seams to be stripped-in with 6" EPDM flashing membrane, which is in fair condition. The roof drains to scuppers sporadically located throughout the roof perimeters. The effectiveness of roof drainage is poor with ponding water existing in many locations. Above roofline ductwork is rusting & deteriorated. The brick masonry chimney is deteriorated and has a cracked concrete cap. Existing flashings at penetrations are in poor condition

Proscan Infrared Technologies performed an infrared survey on Roof Area 3 in April of 2013 and had found wet insulation in 4 general areas. This office performed an infrared survey of Roof Areas 3, 4 and 6 in February of 2012 and we found a greater number and greater area of moisture contaminated roof insulation materials. Suspected wet roof insulation areas are shown on the attached Roof Area Plan and total approximately 5,722 SF.

The existing cementitious wood fiber roof decking is deteriorated in many locations due to previous leaking (approximately 14 locations totaling 342 SF). These areas are also shown on the attached Roof Area Plan. Replacement of full roof deck panels is recommended. We must note however that the true extent of deteriorated roof deck conditions can only be determined when all roofing is removed and the entire roof deck is exposed.

It is understood that these low-sloped roofs are approximately 24 years old, are in poor condition and routinely leak. Complete removal and replacement has been recommended. However, the Town is contemplating replacement of the entire building at some future date.

Given the uncertainty of the building's future, repairs to the low-sloped roofs are desired by the Town.

Repairs should include the reworking of all EPDM seams and EPDM flashing and other work. It should be understood that other additional repairs such as puncture repairs may become evident after the roofs have received close scrutiny during the actual repair work. It must also be accepted that even widespread repairs to these roofs will have a reduced surety of effectiveness as compared to a full removal and replacement project.

A more sure method of providing a leak proof roof system would be to remove the existing EPDM roofing and insulation systems but to leave the existing built-up roofing felts in place and then install tapered roof insulation and a new roof covering. This will allow for a reliable roof system that drains satisfactorily. The new roof insulation could be mechanically fastened to the existing cementitious wood fiber roof decking or could be adhered to the existing built-up roof system with low rise foam adhesive. We cannot recommend mechanical attachment to the roof deck because it has already been pierced by many fasteners used within the current overlay roofing assembly and we fear that adding more large diameter fasteners will be detrimental for the roof decking structural capacity. Low-rise foam adhesive could be used but testing during the design phase is required to ensure that the adhesive performs will work.

REPAIR OPTIONS

OPTION #1

Recover all seams and existing EPDM flashings and perform related work as follows:

- Remove & replace wet insulation.
- Remove & replace deteriorated roof decking
- Strip-in all seams & edge metal with 12" wide EPDM flashing
- Remove & replace flashings at penetrations & basewalls
- Prepare all rusting ductwork & apply waterproof coating
- Repoint Chimney 100% & repair cracked chimney cap

Estimated Construction Cost for Option #1 – \$143,541.00

OPTION #2

Remove top layer of EPDM roofing and insulation. Go-over original built-up roofing felts and perform related work as follows:

- Remove existing EPDM roof membrane & insulation down to existing built-up roofing felts.
- Remove & replace deteriorated roof decking
- Install new tapered polyisocyanurate insulation & single ply EPDM roof membrane
- Replace flashings at penetrations & basewalls
- Prepare all rusting ductwork & apply coating
- Repoint Chimney 100% & repair cracked chimney cap
- Install gutters and downspouts
- Replace skylight assemblies

Estimated Construction Cost for Option #2 – \$431,868.00

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Note that there are a number of unknowns including the extent of deteriorated roof decking and attachment of new roof insulation related to the above noted options.

We recommend a meeting take place to discuss these repair options. Should you have any questions, please contact me.

Sincerely,

Michael J. Flaherty RRC
Senior Project Manager

Attachments

RBA

RUSSO BARR ASSOCIATES, INC.

33 Center St., 2nd Floor, Burlington, Massachusetts 01803 tel 781.273.15371 fax 781.273.1695 e-mail Info@russobarr.com

OPTION #1 Estimated Construction Cost

Project:	Roof Repair Project Fairbank Complex, Roof Area Nos. 3, 4 & 6 40 Fairbank Road Sudbury, Massachusetts	Sheet	1 of 1	
Project Number:	2014007.00	Date	2/14/14	
Description	Materials & Labor			Total
	Qty	Units	Unit Cost	
Construction Cost Estimate (Roof Repair Option #1)				
Recover all seams and existing EPDM flashings and perform related work.				
Deteriorated Deck Replacement	342	SF	25.00	8,550
Wet Insulation Replacement	5,722	SF	15.00	85,830
Reflash Vent Pipes	19	EA	25.00	475
Reflash Pipe Penetrations & Hot Pipes	7	EA	25.00	175
Top Off Pitch Pockets	2	EA	15.00	30
Reflash Exhaust Fans & J Vent	14	EA	25.00	350
Reflash Roof Top Units	2	EA	25.00	50
Install New Wood Sleepers Beneath Units	5	EA	30.00	150
Reflash Chimney & Install New Reglet	23	LF	25.00	575
Reflash Abandoned Penetrations	29	EA	20.00	580
Reflash Skylights	7	EA	25.00	175
Strip In Existing Seams & Edge Metal with 12" Wide EPDM Flashing	2,620	LF	12.00	31,440
Reflash Basewall & Install New Reglet	122	LF	25.00	3,050
Prepare & Coat Ductwork	18	LF	10.00	180
Repoint & Clean Chimney 100%	130	SF	18.00	2,340
Repoint Chimney Cap	1	EA	200.00	200
SubTotal				134,150
Construction Contingency (7%)				9,391
Roof Repair Option #1 Construction Cost Total				143,541
TOTAL PROJECT CONSTRUCTION COST ESTIMATE				\$143,541

RBA

RUSSO BARR ASSOCIATES, INC.

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OPTION #2 Estimated Construction Cost

Project:	Roof Repair Project Fairbank Complex, Roof Area Nos. 3, 4 & 6 40 Fairbank Road Sudbury, Massachusetts	Sheet	1 of 1	
Project Number:	2014007.00	Date	2/14/14	
Description	Materials & Labor			Total
	Qty	Units	Unit Cost	
Construction Cost Estimate (Roof Repair Option #2)				
Remove top layer of EPDM roofing and insulation. Go-over original built-up roof and perform related work.				
<i>Roof replacement w/single ply roof membrane system (60-mil); Completely remove existing EPDM roof systems down to the existing built-up roofing; Install new polyisocyanurate insulation (minimum R-value = 25.0), tapered to provide positive drainage; Adhere new 60 mil thick single ply roof membrane complete with flashings, aluminum/steel perimeter sheetmetal, gutters, downspouts and manufacturer's full system warranty.</i>	20,540	SF	17.00	349,180
Deteriorated Deck Replacement	342	SF	25.00	8,550
Deteriorated Wood Blocking Replacement	200	BF	6.00	1,200
Flash Vent Pipes	19	EA	25.00	475
Flash Pipe Penetrations & Hot Pipes	7	EA	35.00	245
Install Pitch Pockets	2	EA	50.00	100
Flash Exhaust Fans & J Vent	14	EA	30.00	420
Flash Roof Top Units	2	EA	30.00	60
Install New Wood Sleepers Beneath Units	5	EA	30.00	150
Flash Chimney & Install New Reglet	23	LF	25.00	575
Flash Abandoned Penetrations	29	EA	30.00	870
Flash Skylights	7	EA	30.00	210
Flash Basewall & Install New Reglet	122	LF	25.00	3,050
Prepare & Coat Ductwork	19	LF	10.00	190
Replace Skylight Domes	7	EA	2000.00	14,000
Repoint & Clean Chimney 100%	130	SF	18.00	2,340
Repair Chimney Cap	1	EA	1000.00	1,000
Install Gutters and Downspouts	600	LF	35.00	21,000
SubTotal				403,615
Construction Contingency (7%)				28,253
Roof Repair Option #2 Construction Cost Total				431,868
TOTAL PROJECT CONSTRUCTION COST ESTIMATE				\$431,868

Roof Repair Project
Fairbank Complex, Roof Area Nos. 3, 4 & 6
Sudbury, Massachusetts
February 14, 2014



Photo No. 01

Description:
Aerial view of the Fairbank Complex. The subject roofs are the black colored roofs surrounding the reddish brown shingled roofs of the Senior Center.



Photo No. 02

Description:
Overall view of Roof Area No. 3; the largest of the (3) older EPDM roofs.



Photo No. 03

Description:
Location of deteriorated cementitious wood fiber roof decking.



Photo No. 04

Description:
Location of deteriorated cementitious wood fiber roof decking.

Note:
Conduit and electric work box attached to underside of roof decking.

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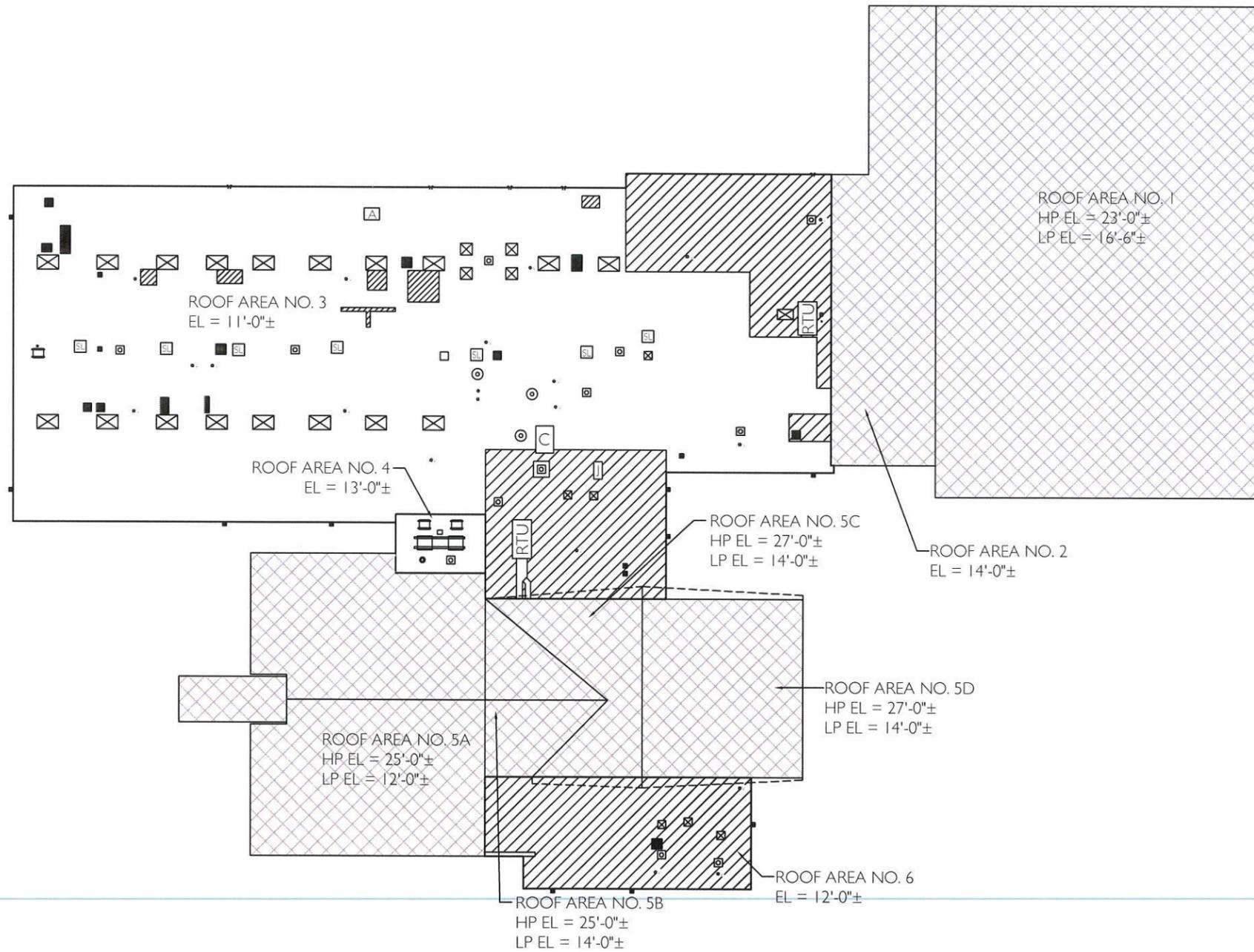
Photo No. 05

Description:
Location of
deteriorated
cementitious wood
fiber roof decking.



Photo No. 06

Description:
Location of
deteriorated
cementitious wood
fiber roof decking.



LEGEND	
SYMBOL	DESCRIPTION
OV	VENT PIPE
○	PIPE PENETRATION
⊙	HOT PIPE
■	PITCH POCKET
⊠	EXHAUST FAN
⊞	UNIT ON SLEEPERS
⊗	ABANDONED PENETRATION
⊠	SKYLIGHT
⊠	ANTENNA
⊠	J VENT
⊠	CHIMNEY
RTU	ROOF TOP UNIT
⊞	OVERFLOW SCUPPER
⊞	SCUPPER BOX
---	ROOF OVERHANG
▨	SUSPECTED WET ROOF INSULATION
■	DETERIORATED ROOF DECK
⊠	ROOF AREAS NOT IN CONTRACT



FAIRBANK COMPLEX
40 FAIRBANK ROAD
SUDBURY, MASSACHUSETTS
ROOF REPAIR PROJECT
ROOF AREA PLAN

DATE	02.14.14
SCALE	AS NOTED
DRAWN BY / CHECKED BY	jrw/MJF
PROJECT NO	2014007.00
DRAWING NO	

R-1

FAIRBANK COMPLEX - ROOF AREA PLAN
SCALE: 1/8"=1'-0"