

Roof System Condition Evaluation Report

Project Information

Facility Name: Georgie D. Tyler Middle School
 101 Georgie D. Tyler Drive
 Windsor, VA

Contact: Chris Gossett
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Total Roof Area Sq. Ft. (+/-): 14,680

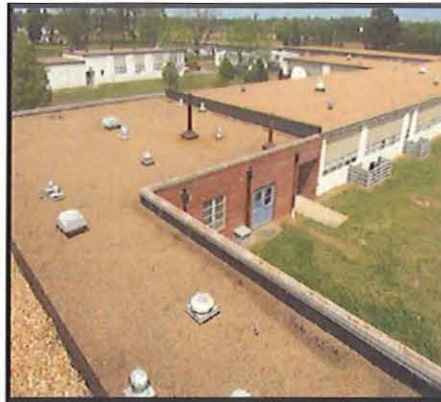
Exterior Wall Type: Masonry

Year Building Built: N/D

Exterior Wall Condition: Good

Building Use: School

Exterior Moisture Staining: None Observed



Roof Areas Recommendations Summary

Roof Area Identification	Size (sq/ft)	Year Installed	Remaining Life (Yrs)	Recommendation	Replacement Year	Replacement Cost Estimate	Repair Cost Estimate
Gym & Lower Roof	14,680	1999	3-5 +/-	Repair	2016	\$176,000.00	\$8,100.00
Totals	14,680 Sq Ft					\$176,000.00	\$8,100.00

Project Comments:

As requested, a comprehensive nuclear roof moisture and condition survey was completed for the Georgie D. Tyler Middle School facility located at 101 Georgie D. Taylor Drive, Windsor, Virginia. The survey was conducted on April 17th, 2012. The purpose of this inspection and survey was to identify the extent, if any, of moisture migration within the roof systems, document observed deficiencies, determine the overall condition of the existing roof systems and to estimate the remaining service life of the roof assembly.

Georgie D. Tyler Middle School is a multi-level brick structure with multiple roof areas. The primary type of roof assembly consists of an asphalt built-up roof membrane with gravel surfacing. The overall condition of the in-place roof assemblies is fair.

Please reference the Roof Inspection Summary, Detailed Deficiency Listing, Photographic Documentation and Roof Plans for additional information pertaining to this inspection.

Roof Inspection Summary

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive - Windsor, VA

Inspection Date: 04/17/2012

Inspection Type: Nuclear Moisture Survey

Inspector: Jorge Virgin

Inspection Comments:

The Georgie D. Tyler Middle School facility consists of multiple roof areas and levels. A new construction project is taking place at this school location and RCS was contracted to perform a comprehensive roof moisture and condition survey on a small portion of the original school. The roof area included in this survey is the gymnasium and adjoining classrooms on the west end of the original school.

The primary roof assembly consists of a gravel surfaced asphalt built-up roof system on both areas. The overall condition of the in-place roof system is fair. As part of this inspection, roof system composition test cuts were performed to determine the existing roof system cross section and to also verify readings obtained during the roof moisture survey.

The roof system composition cross section is as follows:

- Metal deck
 - 1" - 1.25" Polyisocyanurate insulation sprinkle mopped to the metal deck
 - 1/2" Perlite in hot asphalt
 - 4 plies of fiberglass felts in hot asphalt
 - Gravel in hot asphalt
-

In an effort to explain the basics of the nuclear roof moisture survey performed on this project, we offer the following narrative. For a nuclear roof moisture survey, we utilize the Troxler, Model #3216 moisture meter. The survey begins with a 5' x 5' grid pattern being marked on the entire roof system with spray paint. At each grid point, a reading is taken with the nuclear meter and a numeric readout is recorded on a roof plan grid sheet. After taking readings at all grid points, roof cores are taken at one of the highest numeric readouts recorded to determine if moisture is present. A Delmhorst Model G-40 electrical capacitance meter was utilized during the test cut procedures to verify and/or validate the nuclear meter readings. If moisture is found, we then take additional roof cores at lower readouts until no moisture is found. With these diagnostic procedures, we are able to determine what percentage of the roof area is affected by moisture intrusion by developing a Histogram/Bar Graph of all the numerical readouts.

Based on the statistical analysis and roof core verification established for this project, it has been determined that approximately four hundred thirty (430) square feet of roof system was found detrimentally affected by moisture migration within the roof insulation. Of that area one hundred forty five (145) square feet is considered damp while two hundred eighty five (285) square feet is wet to saturated.

The overall roof condition for this built-up roof assembly is fair. This condition assessment is based on the visual observation of deficient conditions as well as the results of the roof moisture survey. A number of deficient conditions were observed during this inspection that require remedial attention. Three (3) leaks were reported by on-site personnel and all three leak locations are in the area of identified deficient conditions. The observed deficiencies include:

Roof Inspection Summary

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive - Windsor, VA

Inspection Date: 04/17/2012 **Inspection Type:** Nuclear Moisture Survey **Inspector:** Jorge Virgin

- Low / open fill material at pitch pocket
- Open coping joints
- Deteriorated / missing caulk
- Open conditions at wall and curb base flashing laps
- Disconnected downspout
- Damaged / broken masonry brick
- Open / suspect gravel stop stripping
- Improper repair
- Wet insulation
- Lead collar open on stack pipe

The complete list of deficient conditions along with recommended corrective action procedures can be found in the Detailed Deficiency Listing portion of this report.

Project Recommendations:

The roof moisture survey revealed approximately 430 square feet of detrimentally affected roof insulation within the Gym and surrounding classroom roofs. Additionally, a number of other deficient conditions were found in this roof system.

Although a number of deficient conditions were found including several areas of wet roof insulation, it is the opinion of RCS that additional service life is available from the existing roof system. Our recommendation is to have extensive roof repairs be initiated as outlined in this report. With prompt execution of suggested corrective actions, the existing built-up roof system should provide the owner with three to five (3-5 +/-) years of additional service life.

After all repairs have been completed, a regular inspection and maintenance program should be established to ensure that all developing conditions are identified and corrected in a timely manner and the in-place roof system provide the longest service lives possible. Annual inspection is recommended for all roofing installations as an integral part of good roofing practice.

Roof Area Information For:
Georgie D. Tyler Middle School
101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

Roof System Data

Area Name: Gym & Lower Roof	Year Installed: 1999	Active Leaks: Yes - 3
Size Sq. Ft. (+/-): 14,680	Remaining Service Life (Years): 3-5 +/-	Leak History: Moderate
Roof Elevation: 16' - 20' +/-	Roof System R Value: 8.68 +/-	Leak Sensitivity: Normal

Roofing Contractor:	Guarantee Info:	Roof System:
Company: Unknown	Guarantee (Y/N): Unknown	Roof System Type: Asphalt Built-up Roof
Contact: Unknown	Manufacturer: Unknown	Roof Membrane Type: 4 Ply Fiberglass Felt
Phone: N/D	Guarantee Term: N/D	Membrane Condition: Fair
	Guarantee Number: N/D	Roof Surfacing Type: Gravel
		Recovery System: No

Roof Deck and Support Structure:	Vapor Retarder:	Maintenance Items:
Deck Type: Painted Steel	Vapor Retarder: No	Mechanical Damage: None Observed
Deck Thickness: 22 Gauge +/-	Type: N/A	Chemical Exposure: None Observed
Roof Truss Type: Steel Beams/Bar Joists	Location: N/A	Roof Traffic: Yes - Equipment Service
Truss Height: 8 - 12 Inch +/-	Attachment: N/A	Debris: None Observed
Truss Span: Varies	Condition: N/A	
Truss Spacing: 5 - 6 LF OC +/-	Relative Humidity: N/D	

Base Flashings:	Perimeter Types:	Penetrations:	Quantity:
Flashing Type: Modified	Gravel Stop Type: Aluminum	Soil Stacks: <input checked="" type="checkbox"/>	19
Height: 8 - 22 Inch +/-	Gravel Stop Condition: Fair	Exhaust Units: <input checked="" type="checkbox"/>	6
Coated: Granules	Parapet Wall Type: Masonry	Standard Curbs: <input checked="" type="checkbox"/>	17
Shear Action: No	Parapet Wall Condition: Good	Pipe Supports: <input type="checkbox"/>	0
Cant Strip Type: N/D	Wall Coping Type: Concrete	Pitch Pans: <input checked="" type="checkbox"/>	1
Open End Laps: Yes - 1	Open Coping Joints: Yes	Roof Hatch: <input type="checkbox"/>	0
Condition: Fair	Wall Coping Condition: N/A	Hot Stacks: <input checked="" type="checkbox"/>	2
Securement: Asphalt & Mechanical	Wall Coping Size: 10 Inch +/-	Skylights: <input type="checkbox"/>	0
Counter Flashing:	Metal Coping Material Type: N/A	Smoke Hatch: <input type="checkbox"/>	0
Reglet Joint: <input type="checkbox"/> Surface Mount: <input checked="" type="checkbox"/>	Metal Coping Quantity: N/A	Other: <input type="checkbox"/>	0
Thru Wall: <input type="checkbox"/> Term Bar: <input type="checkbox"/>	Expansion Joint Type: Sponge Tube		
CF Metal Type: Aluminum	Expansion Joint Condition: Fair		
	Nallers: Yes		

Drainage:	Item:	Size:	Material Type:	Quantity:	Condition:
Drainage: Good	Roof Drains: <input checked="" type="checkbox"/>	4" +/-	Cast Iron	2	Good
Slope: 1/4" - 1' +/-	Scuppers: <input checked="" type="checkbox"/>	4.5" x 6.5" +/-	Copper	5	Fair
Ponding Water: No	Gutters: <input checked="" type="checkbox"/>	3.5" x 4" +/-	Aluminum	197'	Fair
Drainage Comments: No ponding water observed during this inspection	Downspouts: <input checked="" type="checkbox"/>	4" x 6.5" +/-	Aluminum	5	Fair

Roof Area Information For:

**Georgie D. Tyler Middle School
101 Georgie D. Tyler Drive
Windsor, VA**

Roof Area - Gym & Lower Roof

Asbestos Material Testing:

Performed:	Results:	Required:
Membrane: No	Membrane: AB Test Not Performed	Membrane: Yes
Flashing: No	Flashing: AB Test Not Performed	Flashing: Yes
Repairs: No	Repairs: AB Test Not Performed	Repairs: Yes
Other: No	Other: AB Test Not Performed	Other: Yes

Roof Moisture Survey:

Moisture Survey Completed: Yes
Results: Positive
Number of Anomalies:
Average Anomaly Size: Sq. Ft.
Total Sq. Ft. of Wet Roof Area: Sq. Ft.

Roof System Composition

Layer No	Layer Type	Thickness	Attachment	Condition
1	Metal Deck	22 Ga. +/-	Spot Weld	Unknown
2	Polyisocyanurate	1 - 1.25 Inch	Sprinkle Mopped	Fair
3	Perlite	1/2 Inch +/-	Hot Asphalt	Fair
4	Fiberglass Felt	4 Plies	Hot Asphalt	Fair
5	Gravel	Varies	Hot Asphalt	Good

Roof Condition Code: Fair

Recommendation: Repair

Replacement Year: 2016

Replacement Cost (+/-): \$176,000.00

Deficiencies Repair Cost: \$8,100

Budget Notes:

The budget estimate does not include pricing for asbestos or lead abatement, if required, or for any unforeseen conditions that may exist. Deficiency repair costs are based on all work being completed under one work order.

Detailed Deficiency Listing For:
Georgie D. Tyler Middle School
101 Georgie D. Tyler Drive - Windsor, VA

Roof Area - Gym & Lower Roof

Deficiency Priority Codes:

Current Year Priorities	Future Year Maintenance	N/A - Not Applicable
E - Emergency	1 - First Year Funding	No Correction Action Required
C -Critical	2 - Second Year Funding	
S - Significant	3 - Third Year Funding	
M - Minor	4 - Fourth Year Funding	
MN - Monitor	5 - Fifth Year Funding	

Inspection Date: 4/17/2012 Inspectors: Jorge Virgin

NUMBER	PRIORITY CODE	DEFICIENCY DESCRIPTION	QUANTITY	UNIT PRICE	REPAIR COST
		DEFICIENCY SOLUTION	UNITS		
1	M	Low / open fill material at pitch pocket	1	\$50.00	\$50.00
		Remove loose / cracked sealant from pitch pocket	Each		
		Fill with compatible material to provide a convex finish to shed water away from the penetration			
2	M	Open coping joints	5	\$75.00	\$375.00
		Clean joint and seal with Sonneborn NP-1 or equal	Areas		
3	M	Deteriorated / missing caulk	7	\$50.00	\$350.00
		Remove loose / deteriorated caulk and seal with Sonneborn NP-1 or equal	Areas		
4	M	Open conditions at wall and curb base flashing laps	3	\$50.00	\$150.00
		Apply a five (5) course application of industrial grade roof cement and reinforcing fiberglass fabric over open base flashing laps to prevent moisture entry into the flashing and roof system	Each		
5	M	Disconnected downspout	3	\$50.00	\$150.00
		Re-connect downspout to restore positive drainage	Each		
6	MN	Damaged / broken masonry brick	1		
		Not a roof related issue - if area continues to deteriorate, contact qualified masonry contractor for repairs	Location		
7	M	Open / suspect gravel stop stripping	6	\$75.00	\$450.00
		Remove existing loose stripping material and install one ply of modified membrane stripping in compatible mastic or a five course application of roof cement and reinforced fiberglass fabric	Locations		

Detailed Deficiency Listing For:

Georgie D. Tyler Middle School

101 Georgie D. Tyler Drive - Windsor, VA

Roof Area - Gym & Lower Roof

Deficiency Priority Codes:	Current Year Priorities	Future Year Maintenance	N/A - Not Applicable
	E - Emergency	1 - First Year Funding	No Correction Action
	C - Critical	2 - Second Year Funding	Required
	S - Significant	3 - Third Year Funding	
	M - Minor	4 - Fourth Year Funding	
	MN - Monitor	5 - Fifth Year Funding	

Inspection Date: 4/17/2012 **Inspectors:** Jorge Virgin

NUMBER	PRIORITY CODE	DEFICIENCY DESCRIPTION	QUANTITY	UNIT PRICE	REPAIR COST
		DEFICIENCY SOLUTION	UNITS		
8	M	Improper repair	1	\$75.00	\$75.00
		Remove existing loose stripping material and install one ply of modified membrane stripping in compatible mastic or a five course application of roof cement and reinforced fiberglass fabric	Each		
9	M	Wet insulation	430	\$15.00	\$6,450.00
		Removed wet area, install compatible in fill roof insulation and compatible modified or built-up roof system	Sq Ft		
10	M	Lead collar open on stack pipe	1	\$50.00	\$50.00
		Install new lead cap that extends down over existing lead collar and turns down into pipe min of 1 inch	Each		

Grand Total **\$8,100.00**

Priority Code Totals:

Minor **\$8,100.00**

TEST CUT / PROBE INFORMATION FOR:

**Georgie D. Tyler Middle School
Roof Area - Gym & Lower Roof**

Inspection Date: 4/17/2012

TEST CUT / PROBE NUMBER	1	2	3	4	5	6
Test Cut Size	4 x 4	4 x 4	4 x 4	Probe	Probe	Probe
Troxler Reading	15	28	14	16	18	15
Infra-red Reading	N/A	N/A	N/A	N/A	N/A	N/A
Delmhorst Reading	Dry	Wet	Dry	Wet	Wet	Dry
Deck Condition	Good	Fair	Good	N/A	N/A	N/A
Vapor Retarder Condition	N/A	N/A	N/A	N/A	N/A	N/A
Insulation Condition	Fair	Poor	Fair	Poor	Poor	Fair
Membrane Condition	Fair	Fair	Fair	Fair	Fair	Fair

TEST CUT / PROBE INFORMATION FOR:

Georgie D. Tyler Middle School

Roof Area - Gym & Lower Roof

Inspection Date: 4/17/2012

7	8
Probe	Probe
15	15
N/A	N/A
Dry	Dry
N/A	N/A
N/A	N/A
Fair	Fair
Fair	Fair

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

1. Exterior view



2. Exterior view



4/17/2012

Photograph Documentation

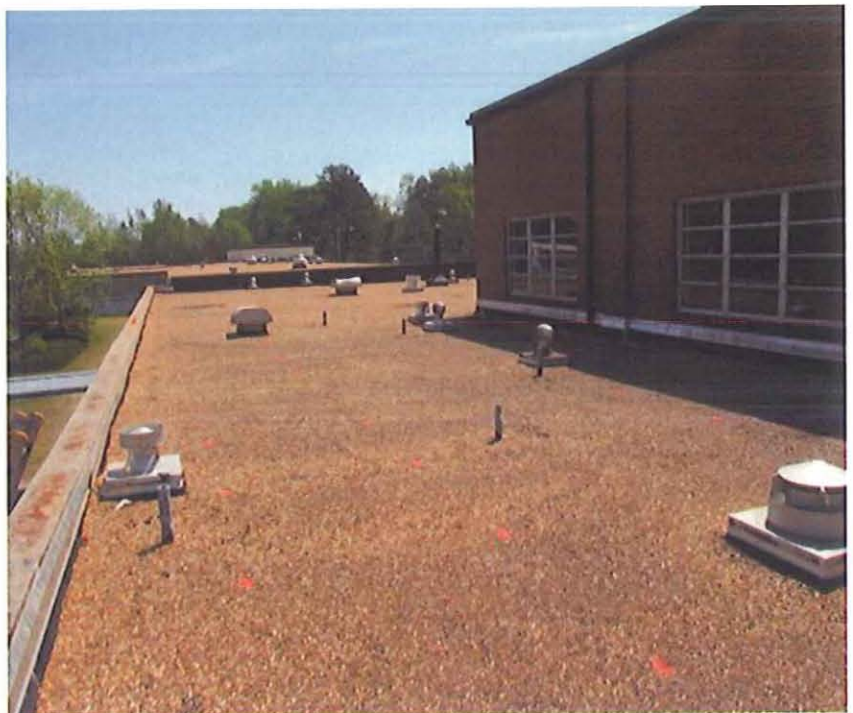
Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

3. Water stains on wall



4. Roof overview



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

5. Roof overview



6. Roof overview



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

7. Deficiency #1 - Open fill material
at pitch pocket



8. Deficiency #2 - Open coping joint



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

9. Deficiency #2 - Open coping joint



10. Deficiency #3 - Deteriorated caulk



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

11. Deficiency #3 - Deteriorated
caulk



12. Deficiency #4 - Open condition
at wall flashing laps



4/17/2012

Photograph Documentation

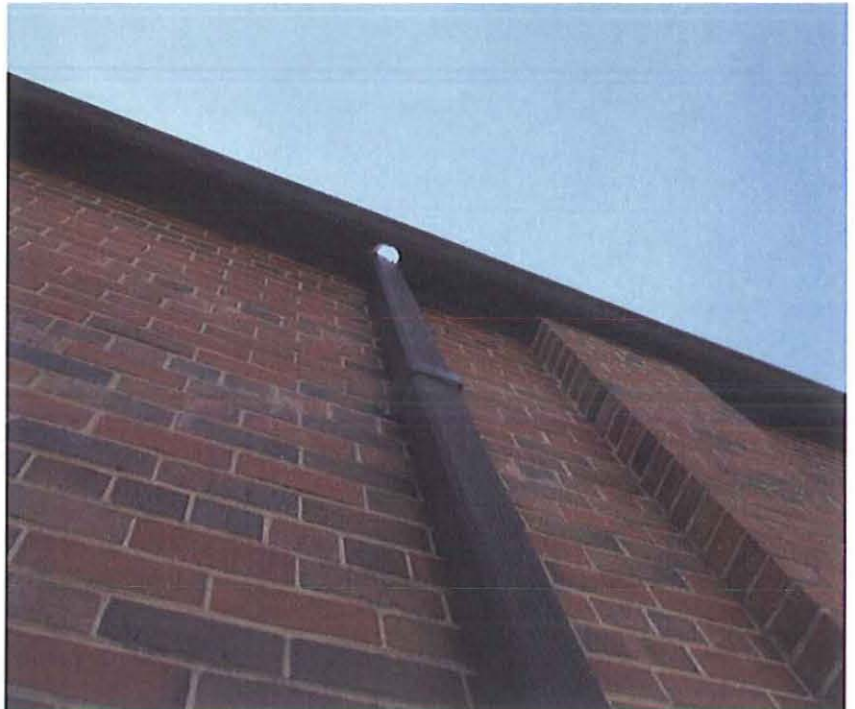
Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

13. Deficiency #4 - Open condition
at wall flashing lap



14. Deficiency #5 - Disconnected
downspout



4/17/2012

Photograph Documentation

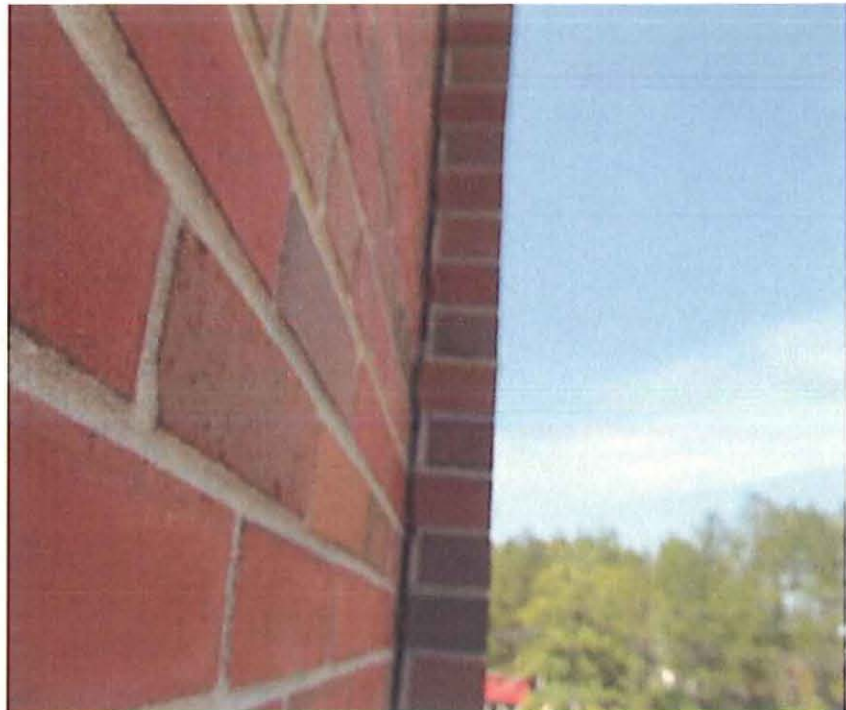
Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

15. Deficiency #5 - Disconnected
downspout



16. Deficiency #6 - Damaged /
broken masonry brick



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

17. Deficiency #7 - Suspect gravel stop stripping



18. Deficiency #7 - Suspect gravel stop stripping



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

19. Deficiency #8 - Improper repair



20. Deficiency #9 - Delmhorst meter reading insulation as saturated in probe



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

21. Deficiency #10 - Lead collar
open on stack pipe



22. Test Cut #1 - Roof membrane
removed to reveal perlite



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

23. Test Cut #1 - Delmhorst meter
reading perlite as dry



24. Test Cut #1 - Perlite and
polyisocyanurate insulation
removed to reveal metal deck



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

25. Test Cut #1 - RCS repair



26. Test Cut #2 - Roof membrane removed to reveal perlite



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

27. Test Cut #2 - Delmhorst meter reading perlite as saturated



28. Test Cut #2 - Perlite and polyisocyanurate insulation removed to reveal metal deck



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

29. Test Cut #2 - RCS repair



30. Test Cut #3 - Roof membrane removed to reveal perlite



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

31. Test Cut #3 - Delmhorst meter
reading perlite as dry



32. Test Cut #3 - Perlite and
polyisocyanurate insulation
removed to reveal metal deck



4/17/2012

Photograph Documentation

Georgie D. Tyler Middle School - 101 Georgie D. Tyler Drive
Windsor, VA

Roof Area - Gym & Lower Roof

33. Probe #4 - Delmhorst meter reading insulation as saturated



34. Probe #4 - RCS repair



4/17/2012