



**Low Slope Roofing Systems**  
**The University of Wisconsin Madison**  
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**Vegetative roofs**

presented by

**Mark S. Graham**  
Vice President, Technical Services  
National Roofing Contractors Association  
Rosemont, Illinois

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**Vegetative Roof Systems**  
Sometimes called “green roofs”



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## **Definition**

*The NRCA Vegetative Roof Systems Manual, Third Edition*

**Vegetative roof system:** A roof area of planting/landscaping installed above a waterproofed substrate at any building level that is over habitable space.



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### **Benefits of vegetative roofs**

- Aesthetic improvement
- Storm water management
- Mitigation of heat island effect
- Energy efficiency
- Air quality improvement
- Noise reduction
- Increased roof system durability
- LEED® credit
- Rebates and other incentives



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### **Recommended membrane systems**

- Hot-fluid-applied polymer-modified asphalt
- Built-up
- App- or SBS-polymer modified bitumen
- Single ply:
  - EPDM
  - PVC
  - TPO
  - KEE
- One- or two-part liquid applied



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### **Additional membrane recommendations**

- Positive slope to drain
- Adhered membrane
- Enhance membrane durability
- Enhance membrane/metal flashings

*Think waterproofing, not roofing*



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### **Basic configurations**

- Modular systems
- Built-in-place systems



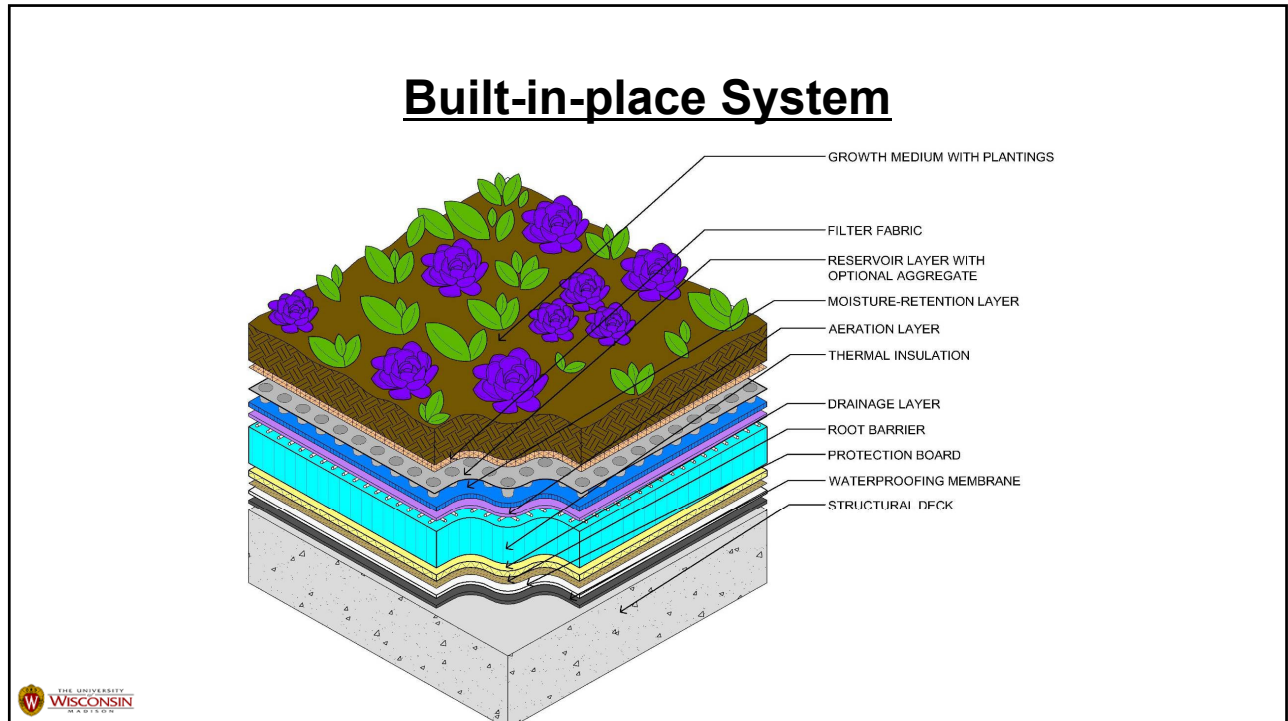
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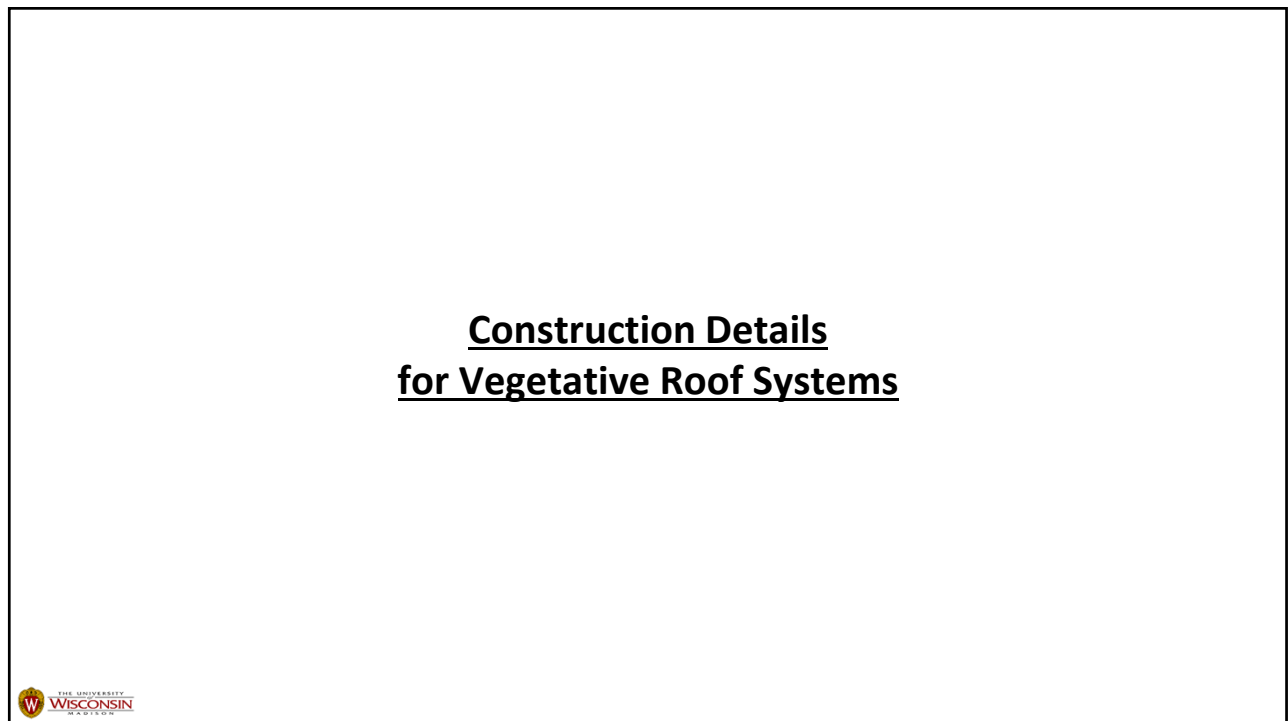
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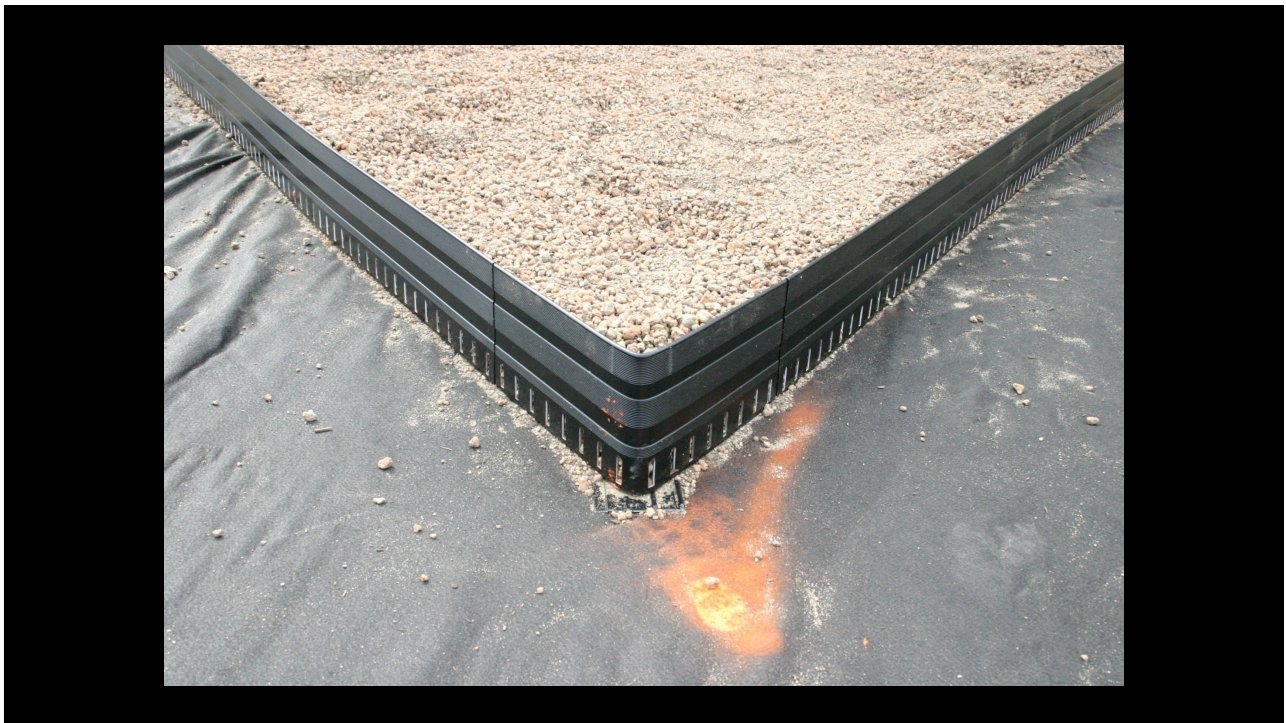


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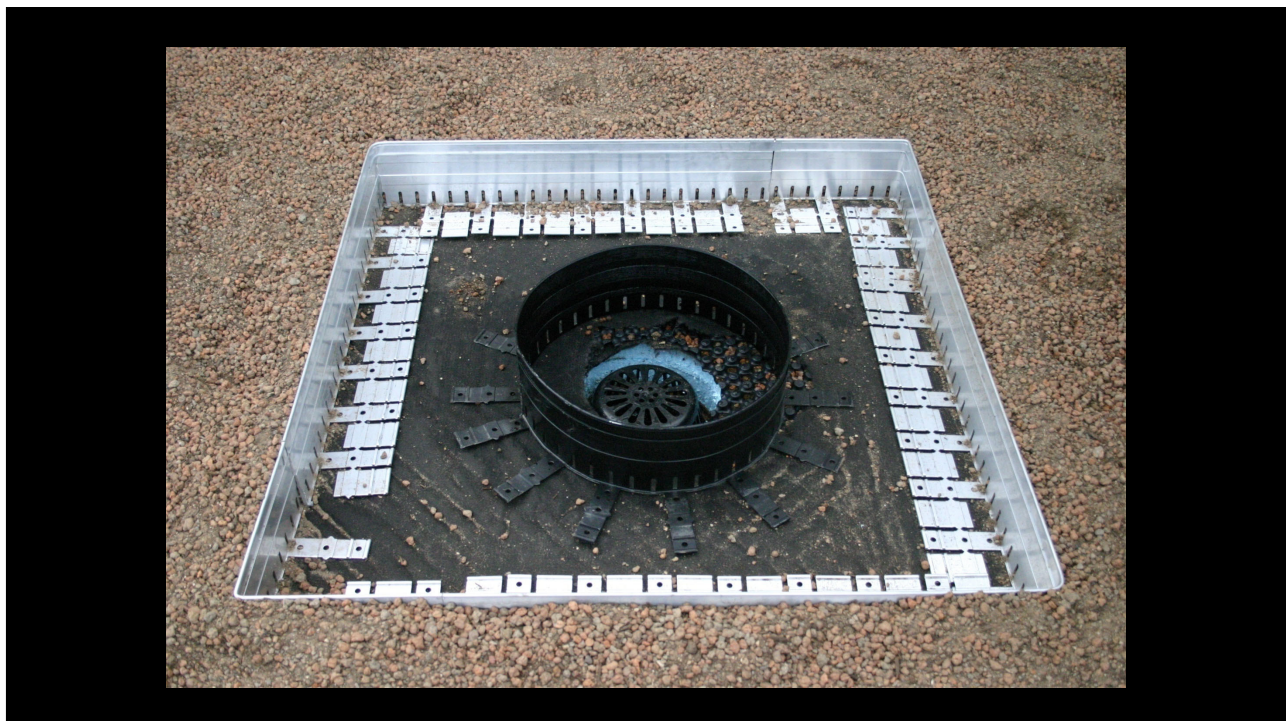
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## Membrane Integrity Testing

- Flood test
- Flowing water test
- Electronic field vector mapping



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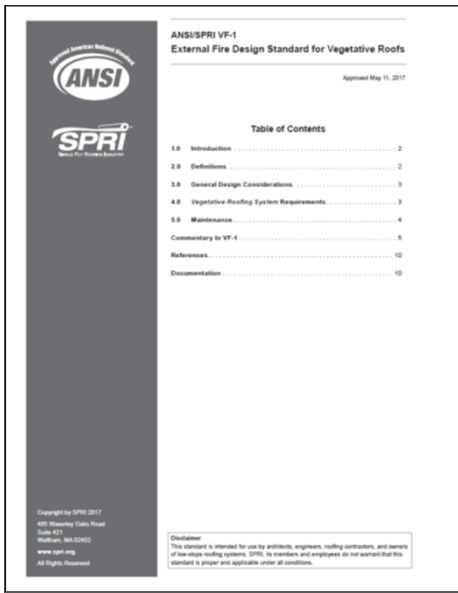
**Vegetative roof systems  
require regular maintenance**



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**Design standards -- ANSI/SPRI VF-1**  
www.spri.org

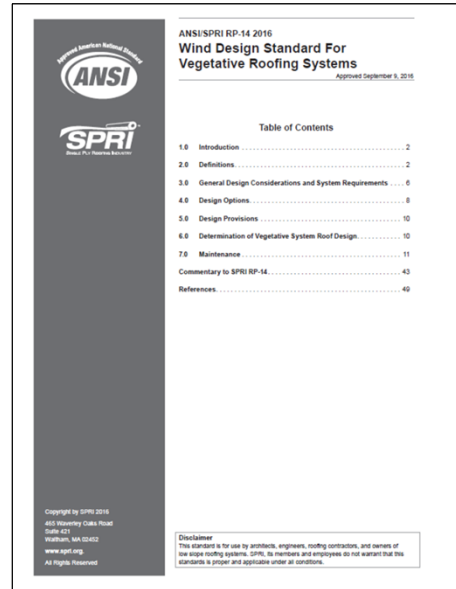


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## Design standards -- ANSI/SPRI RP-14

www.spri.org



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## Code requirements for vegetative roofs



### **IBC 2018:**

Ch. 15: Roofing

- Sec. 1511: Reroofing

Ch. 13: Energy efficiency

- References IECC 2018



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## Code requirements

*International Building Code, 2018 Edition*

### **Sec. 202-Definitions**

**VEGETATIVE ROOF.** An assembly of interacting components designed to waterproof a building's top surface that includes by design, vegetation and related landscape elements.



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## Code requirements

*International Building Code, 2018 Edition*

**1507.16 Vegetative roofs, roof gardens and landscaped roofs.** *Vegetative roofs, roof gardens and landscaped roofs shall comply with the requirements of this chapter, Section 1607.13.3 and the International Fire Code.*

**[BF] 1507.16.1 Structural fire resistance.** The structural frame and roof construction supporting the load imposed upon the roof by the *vegetative roof, roof gardens or landscaped roofs* shall comply with the requirements of Table 601.



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## **Code requirements**

*International Building Code, 2018 Edition*

### **Sec. 1505-Fire Classification**

**1505.10 Roof gardens and landscaped roofs.** Roof gardens and landscaped roofs shall comply with Section 1505.1 and Section 1507.16 and shall be installed in accordance with ANSI/SPRI VF-1.



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## **Code requirements**

*International Building Code, 2018 Edition*

**1607.13.3 Occupiable roofs.** Areas of roofs that are occupiable, such as *vegetative roofs*, roof gardens or for assembly or other similar purposes, and marquees are permitted to have their uniformly distributed live loads reduced in accordance with Section 1607.11.

**1607.13.3.1 Vegetative and landscaped roofs.** The weight of all landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil as determined in accordance Section 3.1.4 of ASCE 7. The uniform design live load in unoccupied landscaped areas on roofs shall be 20 psf (0.958 kN/m<sup>2</sup>). The uniform design live load for occupied landscaped areas on roofs shall be determined in accordance with Table 1607.1.



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**Code requirements**  
*International Building Code, 2018 Edition*

**Excerpts from TABLE 1607.1**  
**MINIMUM UNIFORMLY DISTRIBUTED LOADS,  $L_o$ ,**  
**AND MINIMUM CONCENTRATED LIVE LOADS<sup>g</sup>**

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (psf)
26. Roofs [some text omitted for clarity] Ordinary flat, pitched, and curved roofs (that are not occupiable) [some text omitted for clarity] Occupiable roofs: Roof gardens Assembly areas All other similar areas	20  100 100 <sup>m</sup> Note I.	Note I.

[Footnotes omitted for clarity]




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*Code compliance for vegetative roof systems is a challenge*

--Mark Graham



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## Some useful references...

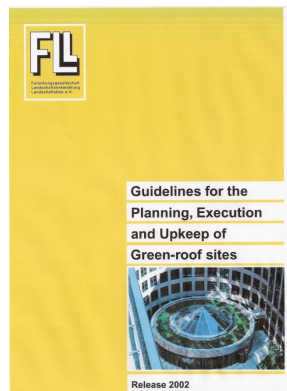
Vegetative roof systems



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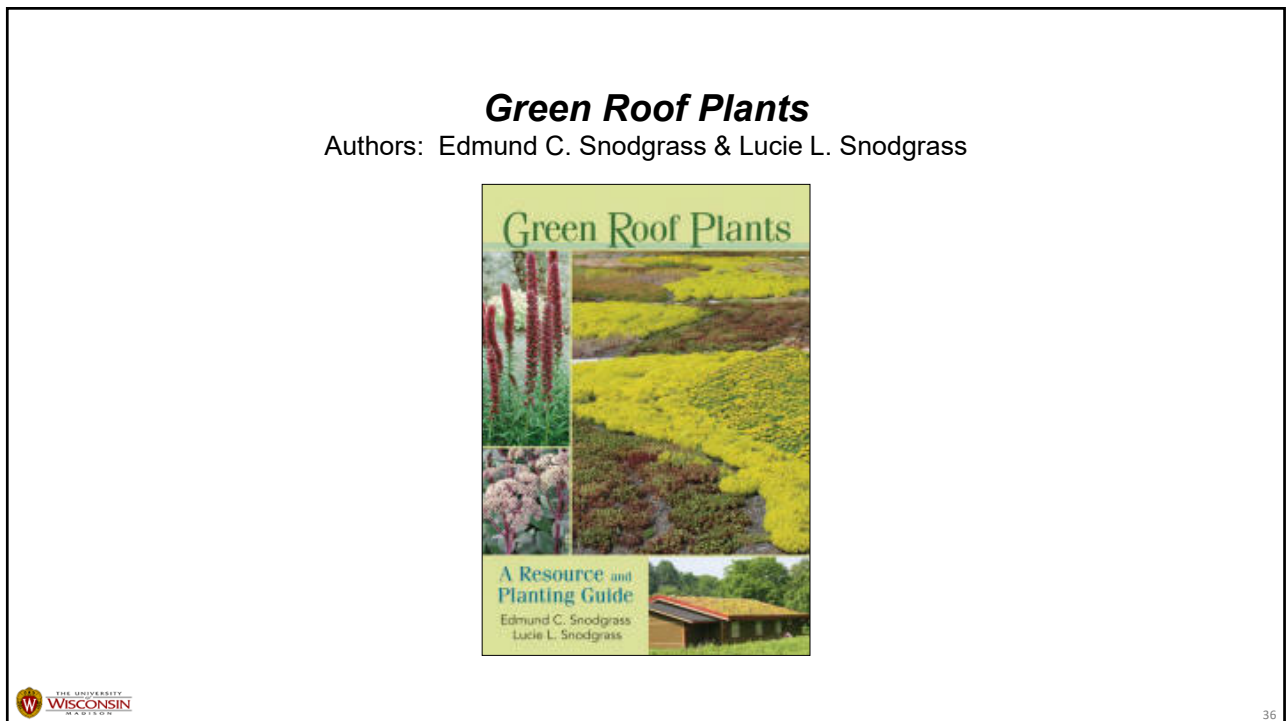
## FLL, “Guidelines for the Planning, Execution and Upkeep of Green-roof sites”



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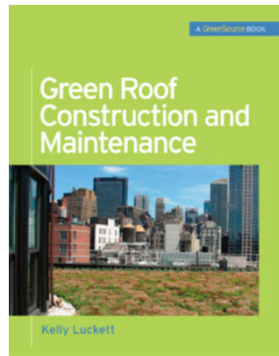
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## Green Roof Construction and Maintenance

Author: Kelly Lockett



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## www.greenroofs.com

Greenroof & Greenwall Projects Database: 1,629 Projects = 35,044,419 ft<sup>2</sup> (3,255,803 m<sup>2</sup>)

Friday, November 20, 2015

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Project of the Week: 11.16.15 Sherway Gardens Shopping Centre Expansion Toronto, Canada

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**Mark S. Graham**

Vice President, Technical Services  
National Roofing Contractors Association  
10255 West Higgins Road, 600  
Rosemont, Illinois 60018-5607

(847) 299-9070  
mgraham@nrca.net  
www.nrca.net

Personal website: [www.MarkGrahamNRCA.com](http://www.MarkGrahamNRCA.com)