


Green Roofs

Presentation by Robert Harrison at

Stormwater:
Turning a Potential Problem
into an Asset

Seminar sponsored by
Seattle Public Utilities
at UW Center for Urban Horticulture
January 25, 2006



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Today's Talk

- Introductions
- Benefits of Green Roofs
- Types of Green Roofs
- Two Local Examples
- Time for Questions

Who is here today?

- Landscape Architects?
- Planners?
- Civil Engineers?
- Developers?
- Architects?
- Arborists?
- Others?

Rob Harrison AIA



- founding member of the Northwest EcoBuilding Guild
- given workshops and talks on green design throughout Washington and Oregon since 1993.
- graduated from the University of Toronto in 1979, and after practicing in New York City for eleven years, relocated to Seattle in 1990.
- In 1992 opened Robert Harrison Architects, specifically to focus on "lyrical sustainable design."
- Since then RHA has completed more than thirty built projects, each of which has incorporated a broad range of energy- and resource-conserving, healthy building approaches.

Benefits of a Green Roof

- slows & filters rainwater run-off
- reduces urban heat island effect
- extends life of roof membrane
- reduces heating and cooling loads
- absorbs sound
- provides habitat and food for birds & insects
- additional slug-free garden space
- beautiful!

Green Roof Types

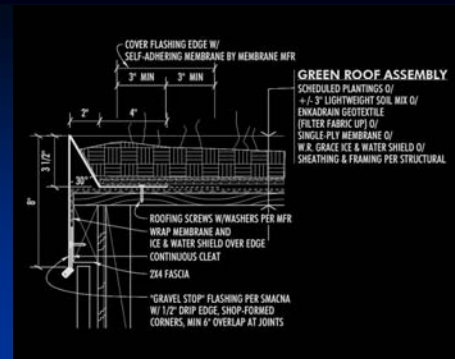
- Intensive = Thick
 - soil 12" - 18" deep or more
 - walkable
 - can support varied landscape
 - ~60 lbs/SF
 - requires serious structure
 - more expensive

Green Roof Types

- Extensive = Thin
 - lightweight soil 2 1/2" - 5" deep
 - not walkable on a daily basis
 - plants must be chosen carefully
 - ~17 lbs/SF
 - fairly easy to upgrade structure
 - less expensive

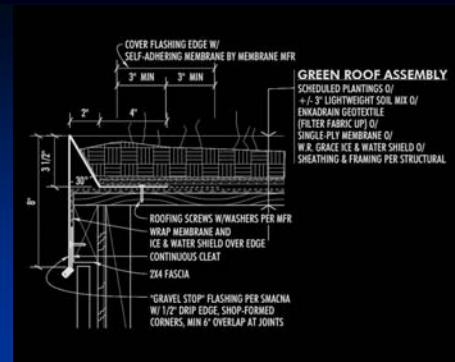
Green Roof Types

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|--|---|



Extensive Green Roof Assembly

- Framing
- Structural sheathing
- Self-adhesive waterproof membrane at edges (Ice & Water Shield)
- Single ply membrane (EPDM or TPO)
- Drainage layer (Enkadrain)
- Filter fabric/root barrier
- Lightweight soil
- Plants



Building Design Considerations

- Slope
- Orientation
- Access
- Drainage

Two Projects

With Green Roofs

green roof workshop



Sproull-Radke Garage/Workshop

Kirkland, Washington

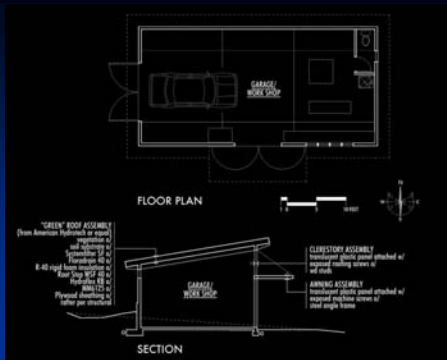
- Architect: Robert Harrison Architects
- Structural Engineer: Swenson Say Faget
- General Contractor: Sunshine Construction
- Interior Fit-out: Jim Sproull

Sproull-Radke Garage/Workshop Green Roof Team

- Hadj Design
- NW EcoBuilding Guild Green Roof Project
- Snyder Roofing
- American Hydrotech
- Local 54 Roofers & Waterproofers Union
- King County & City of Seattle



Existing Site





Interior View - Garage



Interior View - Workshop



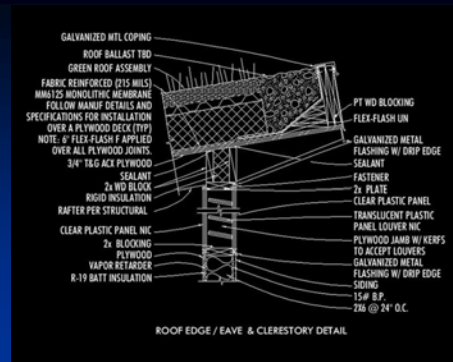
Jim Sproull - Co-Owner & Cabinetmaker



View from South



Canopy



American Hydrotech Roof Edge Detail



Planted Roof



View from North



Earth Hero Award



Barbat-Harrison Garage

Seattle, Washington

- Owners: Rob Harrison and Frith Barbat □
- RHA Project Team: Rob Harrison AIA, Dan Johnson □
- Pro Bono Structural Engineering: SlideRule Engineering Works □
- General Contractor: CJR Associates □
- Metal □ Shelving & Pegboard: Nathan Moss □
- Electrical: Tri-Star Electric □
- Garage Door: Cressy Door □
- Salvage Person-Door: Earthwise □
- Post-Industrial Waste Concrete Skull: Scot Hasenkamp □
- Photography: Rob Harrison AIA

BARBAT-HARRISON GARAGE

Seattle, Washington

- Green Roof Assembly Design, Sedum Selection, Installation & Planting: Hadj Design
- Flashing/Roof Edge: design RHA, fabrication Pacific Sheet Metal □
- Lightweight Soil: Soil Dynamics □
- Roof Membrane: Firestone TPO □
- Landscape Advice: Linnea Ferrell, Landscape Architect □
- Eco Turf Seed Mix: D. F. Marks □



Aerial View of Site



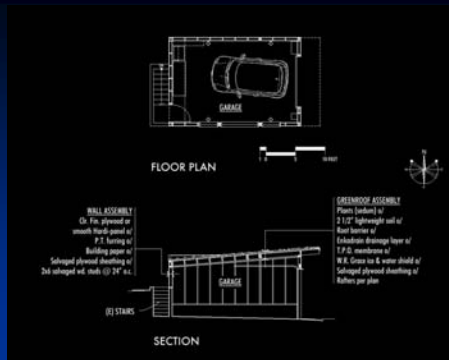
Existing Deck & Foundation



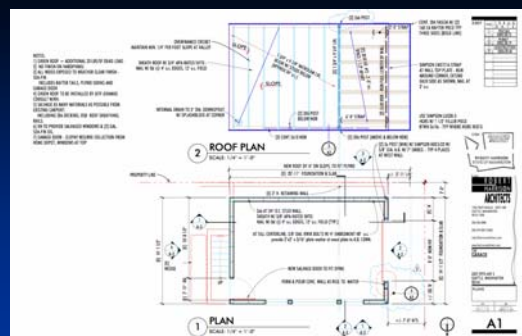
Moment Connection?



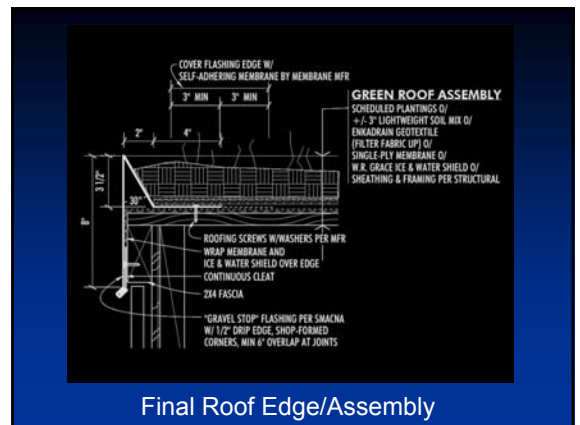
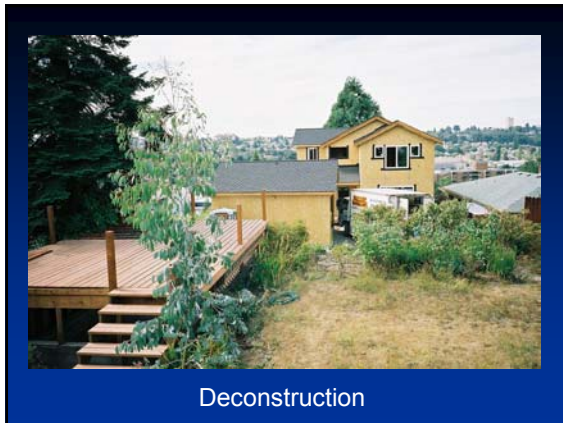
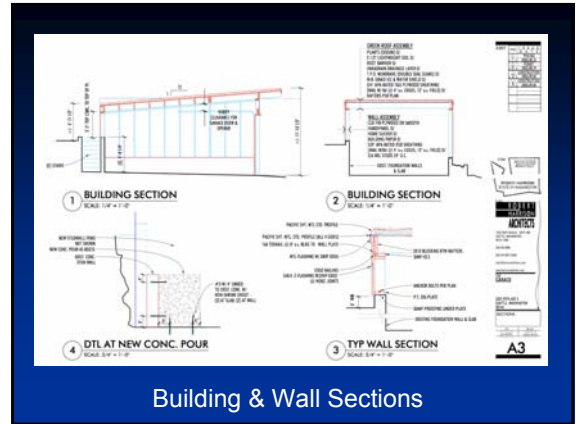
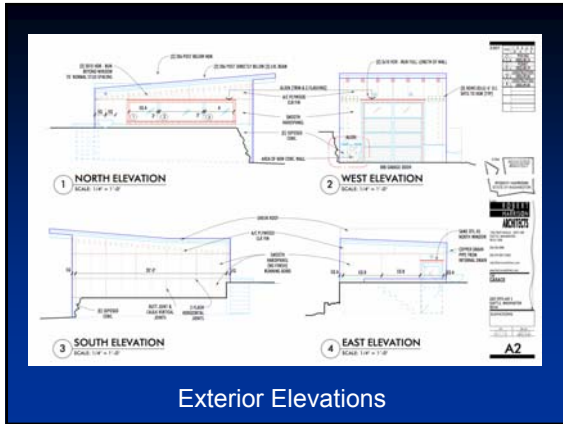
Built Context



Plan & Section



Architectural & Structural Plan





Roof Membrane & Edge



Soil Delivery



Spreading the Soil



Roof Drain - Interior



Roof Drain - Exterior



Roof Corner Issue



Access

Things to Remember

- easy access for maintenance & fun
- provide irrigation for first season
- use SMACNA detailing
 - Roof Drain
 - Scuppers
 - Roof Edge
- keep organics in the soil low
- vary plant heights and types

Net Resources

- www.ecobuilding.org
- www.greenroofs.com
- www.hadj.net
- www.harrisonarchitects.com
- www.seattle.gov/dpd/Sustainable_Building



View from Northwest



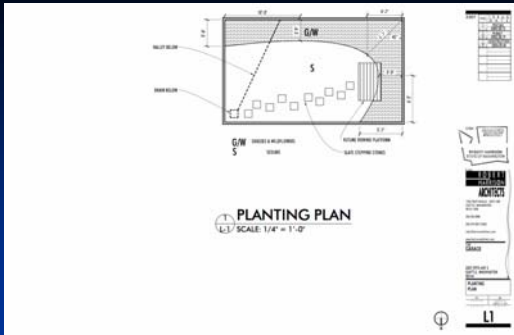
© Marco Prozzo

Sensitive New Age Garage



© Marco Prozzo

A Norman Rockwell Moment



Planting Plan



View from Kitchen



Roof Plants



The Reason Why



View from Porch



Spring Evening



View Across Yard



Winter Plants



Winter Plants Detail



Integration



www.harrisonarchitects.com

ROBERT HARRISON ARCHITECTS

1932 First Avenue Suite 200
Seattle, Washington 98101-1040
206.956-0883

info@harrisonarchitects.com

www.harrisonarchitects.com

More Information

On Sustainable Design
Principles & Techniques

Manifesto

Lyrical Sustainable Design

- Live, design and work in a way which is consistent with deeply held values and ideals. Recognize personal responsibility for the diverse implications of design decisions. Build consensus, share ideas, cooperate and collaborate.

- Find inspiration and models in ongoing ecological processes. Accommodate and celebrate the cycle of the seasons, days and nights, and other natural rhythms. Value all stages of human life. Honor diversity.

- Preserve, enhance and express the unique and special qualities of each site, region and climate; local history and culture. Make site-specific works which, like maps, orient their inhabitants and allow them to “place” themselves, and to dwell, in that context.

- Think locally, act locally. Maintain existing community ties and support the development of new ones. Work towards making local life as independent and self-sufficient as possible.

- Make the sources of materials, food, water and energy understandable and controllable. Make the processes and cycles of production, consumption, “waste” and re-production visible.

- Ask “What is enough?” Be frugal and humane in the acquisition and use of energy, and natural and financial resources. Live on the interest of the natural world instead of depleting its capital. Allow for expansion and change of use without extensive or expensive remaking.

- Begin design with poetic dreams and memories of lived experiences and ideal places, rather than with abstractions of art, science or technology. Make places that reflect the passage of time and allow their stories to be told.

- Gracefully support the activities of everyday life. Make places that engage all of the senses. Make evocative places that invite modification, enhancement and embroidery to suit the personal needs and desires of the people who use them. Make places that respond to affection.

Techniques

Lyrical Sustainable Design

Settlement Ecology

- Preserve and responsibly manage agricultural land, wildlife habitat, watersheds, and groundwater.
- Infill existing urban fabric before building on undeveloped rural land.
- Accommodate and support local manufacturers, food producers, craft and tradespeople; walking, bicycling, and public transit; home occupations and mixed-use zoning; community-based living and ownership arrangements such as shared housing, co-housing, & community land trusts.

A Healthier Life

- When choosing a building material, consider its effects on the health of the people who will produce, install, use, maintain, remove and dispose of it, as well as the environmental effects of its production and transportation.

A Healthier Life

- Install heating and ventilation systems that maintain high-quality indoor air.
- Reduce ambient and equipment noise.
- Rely on the energy of the human body (a form of solar energy) before turning to technological sources.
- Support organic farming and urban gardening.
- Reduce financial burdens.

Resource Conservation

- Make smaller places. Remodel before building new.
- Use durable, high-quality materials in well-crafted assemblies.
- Specify long-lasting appliances and equipment.
- Use renewable materials acquired from sustainable sources.
- Use recycled and resource-efficient materials. Re-use materials. Request job-site recycling.

Resource Conservation

- Build-in places for home and workplace recycling.
- Plan for easy disassembly of buildings and components for re-use or recycling.
- Specify water-conserving appliances and plumbing fixtures. Plan for gray-water systems. Collect and re-use rainwater.
- Plant native, perennial, drought tolerant and edible landscaping. Recycle nutrients.

Energy Conservation

- Specify super-insulation, and super-insulating windows. Use air-tightening techniques.
- Use energy-efficient household and office equipment and heating and ventilating systems.
- Use local materials. Specify materials with low embodied energy.

Energy Conservation

- Make the most of natural light. Use energy-efficient artificial lighting.
- Where appropriate, use energy derived from decentralized, localized and renewable sources such as passive and active solar, photo-voltaic, wind and bio-mass.

Robert Harrison Architects

Incorporated

- **Robert Harrison Architects Incorporated** is dedicated to helping our clients build high-quality green architecture in the Northwest. We offer a full range of architectural and interior design services for residential and small commercial new construction and renovation.
- We base our work on principles of “lyrical sustainable design” - conserving energy and resources; using healthier materials and finishes; reducing long-term costs; and making poetic places.

