Nathan Griswold, ASLA, GRP

- Associate Landscape Architect (ASLA)
- Green Roof Professional (GRP)
- Founded Inhabitect in May 2013
- Over 15 years of experience in the green roof industry
- Played a role in over 1,000 green roof projects in North America
- North American Policy Educator (GRHC)
- Co-chair, Advanced Green Roof Maintenance Committee (GRHC)
Nathan Griswold, ASLA, GRP

- Spring 1997 – Traverse City High School and TBA
- Spring 2000 – NMC with Plant Science Associates Degree
- Spring 2000 – NMC University Center with Landscape & Nursery Certificate
- Spring 2004 – MSU with Bachelors Degree in Landscape Architecture
- Fall 2004 – Associate Member of ASLA
- Fall 2006 – Accredited Green Roof Professional
Inhabitect, LLC

- Inhabitect is a full-service firm devoted to *Designing, Building and Growing* all forms of living architecture
- We specialize in green roofs
Inhabitect, LLC

• Our comprehensive services encompass all aspects of every stage of the green roof design process:
  – Initial planning
  – Specification writing and technical assistance
  – Project design and budgeting
  – Materials and plant selection
  – Material procurement and installation
  – Plant establishment and maintenance

• Support project success with all-inclusive project management — from concept to completion
Green Roofs

- American Hydrotech, Inc
  - Single source manufacturer
    - Rubberized asphalt waterproofing/roofing membrane
    - Ultimate Assembly Pavers
    - Garden Roof Assembly
  - Over 50 years within the waterproofing market
  - Over 20 years within the green roof market
  - Single source warranty for membrane, pavers and green roof
Rainwater harvesting

• HOG Stormwater systems
  – 51 gallon capacity
  – Designed to be interconnected (increased capacity)
  – Horizontal (under decks, in basements, etc.) or vertical installations (green wall, etc.)
  – Designed to withstand temperature extremes
  – No light penetration
  – FDA Approved potable no-off gassing plastic
  – Approved for use in seismic zones
  – Contributes to 9 LEED points
Rain Gardens

- Customized systems to meet the needs of the project
- Many are being installed in an effort to protect and restore the Grand Traverse Bay Watershed
- Specialized soils, plants and textiles
Permeable Pavement

- Porous Pave
  - Mixed on site and applied in a single pour
  - Made from recycled tires
  - Every 1000 sf at 2” thickness keeps 300 tires out of the landfill
  - ADA Compliant, Slip resistant
  - Slip resistant
  - Can be applied between 40 and 90 degree F
  - Cures in 24 hours
  - Drains 6300 gallons/hr/sf
  - Non-flammable and non-toxic
  - Resistant to many hostile materials
  - Can be used in “over pours” (Concrete, Asphalt, Wood)
Permeable Pavement

- **Pave Drain**
  - Designed for high loads (parking lots, driveways, and public areas)
  - Can be assembled with a “cable mattress” or individually
  - Arch design = lighters block (20% void space)
  - Arched chamber holds 1” of stormwater per SF
  - Drains over 4,000 in/hr/sf
  - Various colors
  - Contributes to 5 LEED points
Living Walls

- Jakob Wire Rope
  - Trellis style system
  - Stainless steel
  - Free standing or fixed to vertical structure
  - Customizable
  - Many configurations and hardware options
  - Require climbing plants

Jakob®
Rope Systems
Living Walls

- Filtrexx
  - Numerous options
  - Structural and non-structural applications
  - Perfect for both free standing and high erosion zones
Solar PV

- Many incentives and tax rebates available
- Mutually beneficial relationship with green roofs
- Higher efficiency when back of panel is at lower temperature
Our Clients & Customers

- Architects
- Landscapes Architects
- Engineers
- Developers
- Contractors
- Schools
- Non-profits
- Home owners
- Community stakeholders – Decision makers
What is a Green Roof?

- A green roof (vegetated roof, living roof, or eco-roof) is a multi-layered system that is installed above a water tight man-made structure.
Extensive

- Media depth (< 6”)
- Light weight (< 35 lbs/sf)
- Minimal Plant diversity
- Low Maintenance

Halifax Seaport Farmer’s Market
Halifax, NS
Extensive
Extensive
Extensive
Extensive
Extensive
Extensive
Intensive

- Greater media depth (6”+)
- Higher weight (30-300 lbs/sf)
- High Plant diversity
- Standard Maintenance

Macallen Building Condominiums
Boston, MA
Intensive
Intensive
Intensive
Intensive
Why Green Roofs?

• Value added infrastructure option
• Provide numerous economic, environmental and social benefits in both the public and private sector
• Unmatched benefits when compared dollar-for-dollar to standard infrastructure options
• Can be incorporated on almost every project
  – New Construction
  – Retrofit
• Do not require additional land
Public Benefits of Green Roofs

• Create “Green Collar” jobs
• Improves stormwater management (quality and quantity)
• Improves air quality
• Increases biodiversity
• Decreases municipal infrastructure costs
• Increases tax revenue
• Reduces the urban heat island effect and peak load energy demand
• Improves community health and well being
• Facilitates new recreational opportunities
• Reduces greenhouse gas emissions
“Green Collar” Job Creation

- Green Roofs create long and short terms jobs in multiple business sectors for all skill levels.
Stormwater Management

- Water is a system, not substance
- No longer consider stormwater as a waste but as a resource --- as something that can make our cities more **beautiful, livable and resilient**
- Adopt technologies that manage water in creative and natural ways --- before it hits the pipes and treatment facilities that are becoming economic nightmares
Stormwater Management

• Restore nature's ability to capture water where it falls
• Capable of substituting or offsetting natural ecosystems as well as meeting stormwater management requirements
Stormwater Management

Act like a sponge

- Reduce volume of runoff
- Cleanse runoff and improve water quality
- Slow the rate (speed) of runoff
Stormwater Management

• Every project has a stormwater management budget
• Every drop of stormwater that hits a jobsite must be accounted for and managed in some form or fashion
Increased Tax Base

- Private sector interest and investment into green infrastructure
  - Reduces management costs by eliminating stormwater from municipal systems
  - Creates a new tax base
  - Provide a calculable ROI that makes incentive programs attractive to municipalities
Urban Heat Island reduction

Source: www.vegetalid.us
Private Benefits of Green Roofs

• Aesthetic improvements
• Energy savings
• Increased property values
• Increased employee productivity
• Reduces employee absenteeism
• Improves solar panel efficiency
• Improves roof membrane durability
• Meets stormwater and green space regulations
• Improves marketability
• Urban agriculture revenue potential
Increased Property Value

- Marketability
- Branding
- LEED accreditation
- Higher rent and sale prices
Urban Agriculture

- Green roofs provide a wonderful place to grow food
- Utilizing an otherwise unused space
- A unique educational opportunity for all age groups
Maximize property usage

- Reduce the size or remove the retention and detention ponds
- Replace with green space
- Expand foot print of the building = more rent $
- Use the space to add value
Policy Work

• North American Policy Educator for Green Roof for Healthy Cities
Industry Growth

• Since 2004 the industry has grown by a factor of 10 in North America
Michigan Green Roofs

• Inhabitect has designed and installed many projects in Michigan and consulted throughout the world
• More projects are in design, bid and installation stages
• The reasons for implementation vary
  – Help meet impervious surface requirements
  – Help offset stormwater management requirements
  – Assist with brownfield reclamation
  – Aesthetics – Architectural statement
  – Mission based design (Health and well-being)
  – Increased property values
  – Habitat replacement and retention
Federal recognition

• The EPA recognizes green roofs as an innovative Best Management Practice (BMP)
• EPA programs where green roofs can be applied
  – Green Infrastructure Action Plan
  – Clean Water Act
  – National Pollution Discharge Elimination System (NPDES) permit program
  – Urban Heat Island Initiative
Cherry Capital Foods

Traverse City, MI

- Food distribution warehouse
- Food Hub
- 3,000+ sf of Extensive and Intensive Green Roofs
- 1,000+ sf pedestal paver patio
- Status: Completed in 2014
- Maintenance Contract is in place
Cowell Family Cancer Center

Traverse City, MI

- Munson Medical Center
- 3 separate rooftops
  - Est. 4,200 sf green roof
- Extensive Green Roofs
- Large Plaza area
- Status: Completed Fall 2015
- Maintenance Contract
Munson Medical Center – NW Tower A

Traverse City, MI

• Over MRI unit
• 3,800 sf
• Tray system
• Extensive Green Roof
• Status: Completed Fall 2016
• Maintenance Contract
Uptown Development

Traverse City, MI

- High-end townhomes
- Combination of Extensive and Intensive Green Roofs
- Estimated 13,000 sf of green roof
- Status: Under construction now
- Maintenance Contract is planned
Botanic Gardens “Tack Room”

Traverse City, MI

- Will be used for educational purposes
- Part of the Walled Garden project
- Extensive Green Roof
- Status: Installed May 2015
Boyne City – City Hall

Boyne City, MI

- Will be used for meeting space and entertainment
- Intensive + Extensive Green Roof
- Status: Installed June 2017
GSA Building

Upper Peninsula, MI

- Maintained once per month during main growing season (June-October)
- 22,000 sf Extensive Green Roof
- Status: Installed Sept. 2010 (Sold and managed by Nathan Griswold)
- Maintenance contract in place
Private Residence

Leland, MI

- Private home
- 1,000 sq ft Extensive Green Roof
- Status: Installed Summer 2014
Private Residence

Honor, MI

- Private home
- 1,000 sq ft Extensive Green Roof
- Status: Installed Spring 2014
- Owner led maintenance
Private Residence

Benzonia, MI

- Private Home
- Rammed Earth Construction
- Steep Sloped
- 600 sq ft Custom Extensive Green Roof
- Status: Installed Summer 2000
Green Roof Structures

- Customized designs available
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