

Sustainable Roadway Evolution

An Overview of Current Strategy
Mario Maciel PMP, CCM, LEED AP
Hill International, Inc
Presented by John Haynes, PSP

Mr. Ziegler

Mr. Malcom Chapman and his approach to motivating us toward peak performance speaks to the out of box innovative thinking necessary for moving us forward in this evolution.

Sustainable Roads



- Sustainability has become a standard in Construction.
- Last year we heard an Update from Steve Muench on development of the Greenroads Metric for evaluating projects.
- Greenroads has become the equivalent for Roadways of LEED for Buildings and Communities from the US Green Building Council
 - University of Washington and CH2MHill, with help from agencies and practitioners, have evolved a rating system
 - Points are earned in design, construction & maintenance
 - Roads can be Certified, Silver, Gold or Evergreen, the highest rating

Over 50 individuals were directly involved. The initial concept came from Martina Söderlund. The credit is due to Martina and her original master's thesis work, *Sustainable Roadway Design: a Model for an Environmental Rating System (2007)* is available at the University of Washington libraries

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(SPTC)**

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(ODOT)**

Sustainable Roads



- What are they?
 - As defined in the Greenroads Manual (guide to certification) “A Greenroad is defined as roadway project that has been designed and constructed to a level of sustainability that is substantially higher than current common practice.”
 - They are roads that take into consideration more than just the life-cycle of the work product

2004 AACE Annual meeting in Georgetown Gen Van Antwerp and the \$1.8 Trillion shortfall in infrastructure maintenance, construction, rehabilitation and reconstruction.

Interstate I-35W bridge in Minneapolis collapse, Katrina, and countless levee problems across America, and

the Nile Valley Landslide and its innovative management small project award

With 100s of billions in bridge and roadway construction to be managed from blue-sky conceptual design to ribbon cutting ceremonies across the US, its time to ring the bell and improve the sustainability of our roadways.

Sustainable Roads



- Roads designed and built under the Greenroads metrics also consider
 - Less energy expended in production, transportation and on-site equipment
 - Reductions in raw materials use
 - Reductions in water use
 - Reductions in air emissions
 - Reductions in wastewater emissions
 - Reductions in soil/solid waste emissions
 - Improve habitat and land use

Sustainable Roads



Roads designed and built under the Greenroads metrics also consider (continued)

- Improvements to human health and safety
- Improvements to access and mobility
- Increased lifecycle savings and service
- Increased awareness
- Increased aesthetics
- Development of new information
- Creation of energy

Sustainable Roads



- Why do we need them?
 - Reduced environmental negative impact
 - Positive impacts can also be achieved
 - Aquifer recharge through permeable pavements
 - Reduced solids discharges to receiving waters
 - Resource preservation
 - Material reuse and recycling
 - Less energy use through reduced mining and WMA in lieu of HMA

Sustainable Roads



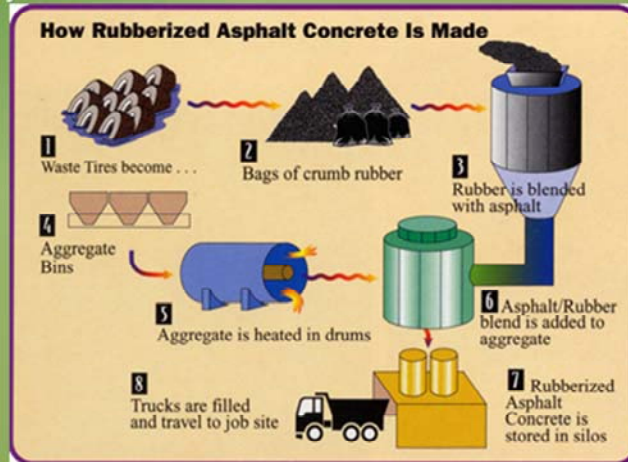
Projects under construction include:
Rubberized asphalt projects

Waste reduction

CA alone produces
More than \$30 MM
Waste tires per yr.

Less energy use

Reduced mining
Less waste handling

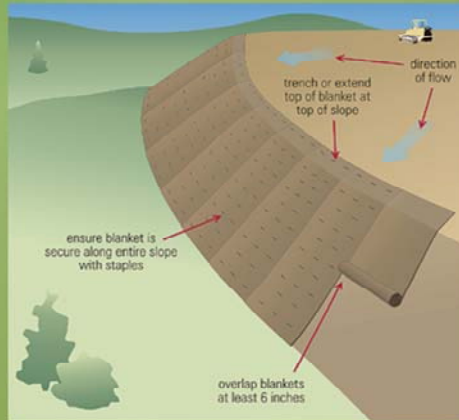


Southern states can take full advantage and mid latitude states can produce roadways in a wider ambient temperature range.

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- Roads constructed under the Greenroads metric will stress Storm Water Pollution Prevention



New SWPPP regulations have been implemented and will help to reinforce Greenroad metrics going forward

Sustainable Roads



- Pavement and Site Management
 - Monitoring and Maintenance plans and procedures
 - An expressed commitment to follow the plan



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- Educational Outreach
 - As described in the Greenroads metric guide this element includes:
 - the promotion of public, agency, and stakeholder awareness of the roadway sustainability activities, including potentially: technical presentations, heavily documented case studies, or permanent signs giving public notice of the road's certification level.

Sustainable Roads



- Other key elements of Certification include detailed
 - Environment and Water assessment
 - Runoff Control
 - SWPPP
 - Habitat and Vegetation
 - Ecological Connectivity
 - Light Pollution

Sustainable Roads



- Access and Equity
 - Safety
 - Intelligent Transportation
 - Emissions Reductions
 - Bicycle and Pedestrian Access
 - Transit and HOV access
 - Scenic Views
 - Cultural Outreach

Sustainable Roads



- Construction Activities (the area where most impact is sustained and can be positively affected)
 - Quality Management
 - Environmental Training
 - Site Recycling
 - Fossil Fuel Use Reduction
 - Equipment & Paving Emission Reduction
 - Water Use Tracking
 - Warranties

RATING SYSTEM v1.0

There is an abridged version of the full Greenroads Manual. Updated April 19, 2010 (83 pages)

The full Monty is over 400 pages

Sustainable Roads



- Materials and Resources
 - Lifecycle Assessment
 - Pavement Reuse
 - Earthwork Balance
 - Recycled Materials
 - Regional Materials
 - Energy Efficiency

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- Pavement Technology
 - Long-Life Pavement
 - Permeable Pavement
 - Warm Mix Asphalt
 - Cool Pavement
 - Quiet Pavement
 - Pavement Performance Tracking and Management

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- Custom Credits



Structures Bridges, tunnels, walls and other structures are not explicitly considered in Greenroads, but they are not explicitly excluded either. (Voluntary Credits i.e. via the Custom Credits).

Mandatory best practices are those that must be done as a minimum in order for a roadway to be considered a Greenroad.

These are called “Project Requirements,” of which there are 11. The Project Requirements are intended to capture the most critical ideals of sustainability. Many, but not all, projects will meet several of these outright with little or no additional effort.

Voluntary best practices are those that may optionally be included in a roadway project.

These are called “Voluntary Credits”. Each Voluntary Credit is assigned a point value (1-5 points) depending upon its impact on sustainability. Currently, there are 37 Voluntary Credits totaling 108 points. Greenroads also allows a project or organization to create and use its own Voluntary Credits (called “Custom Credits”), subject to approval of Greenroads, for a total of 10 more points, which brings the total available points to 118.

Project teams apply for points by submitting specific documentation in support of the Project Requirements.

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Last year we heard about how Greenroads was evolving as a metric.

Today we see progress towards implementation and voluntary participation in Greenroads 1.0, targeted for 2010, which will give rise to potential certification of projects.

Sustainable Roads



Reference:

Muench, S.T., Anderson, J.L., Hatfield, J.P., Koester, J.R., & Söderlund, M. et al. (2010). *Greenroads Rating System v1.0*. (J.L. Anderson and S.T. Muench, Eds.). Seattle, WA: University of Washington.

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Additional information and questions contact:

- Mario Maciel at mariomaciel@hillintl.com