

Sustainability And Transportation Infrastructure: A GOLDEN AGE

We might be tempted to think that roads haven't changed because many look much the same; but closer inspection reveals that tremendous changes have occurred in transportation networks. Roadway design, construction, and operations can have a big impact on water and air quality, and on the prudent use of natural resources and consumption of fossil fuels.

In the growing list of issues facing today's community leaders, maintaining (let alone improving) transportation infrastructure is a significant challenge. The deficit between transportation investment needs and available funding has increased significantly. This situation is stressed further because the ability to move people and goods over local transportation networks is a fundamental building block for economic recovery and reinvestment in our communities. Simply creating transportation linkages with adequate capacity is no longer sufficient. Municipal officials are also required to balance the demand for increasing personal mobility and economic growth with the need to respect the environment and provide an acceptable quality of life for all citizens.

The efforts to formulate a process (such as Michigan Department of Transportation's context sensitive design) to emphasize responsible design and shift the paradigm from a purely functional perspective to one that respects cultural and environmental goals has already occurred—without much fanfare. Green transportation projects are quickly, but quietly, becoming the norm rather than the exception.

Examples include:

- **Intelligent Transportation Systems, or ITS**, which optimizes traffic flow through an intersection and reduces stop and go traffic, congestion, wait times, idling vehicle pollution, and improves fuel efficiency and motorist safety. Bill Huotari, traffic engineer for the city of Troy, finds that his real-time traffic



Roundabouts are a sustainable transportation technique—they are safer and more efficient than conventional intersections. Drivers are not required to stop, so there are fewer vehicle emissions.

adaptive traffic signal system “reduces motorist delay during both peak and off-peak periods.” It has also reduced the frequency of traffic crashes.

- **IntelliDrive technologies**, a subset of Intelligent Transportation Systems, allow communications between vehicles and infrastructure, enabling traffic signal timing and phasing to be displayed in vehicles. It can be used to reduce delays and prevent traffic crashes.
- Research indicates that **well-designed roundabouts** can be safer and more efficient than conventional intersections. Roundabouts have fewer injury accidents per year than signalized intersections. Roundabouts do not require drivers to stop, so there are fewer vehicle emissions.



Improving or increasing green transportation, such as adding bike lanes and trails, will take a concerted effort to balance environmentally sound design and construction practices, cultural impacts, mobility, and public safety, while recognizing scarce financial resources.

- **Fuel consumption** can be reduced by designing roadways for all users, encouraging bicycle and pedestrian travel. Shared right-of-way space for sidewalks, paths or trails provide for non-vehicular transportation opportunities and healthy recreational activities.
- **Efficient operations** come from a design that is sensitive to future operations and maintenance issues. Replacing incandescent bulbs in traffic signal heads with light-emitting diodes (LED) lowers energy consumption and extends service life, thus requiring less frequent replacement.
- **Innovative stormwater management** using best management practices to capture, treat, and discharge runoff from the roadway system to our valuable water resources is now a common element of roadway design.

Reducing congestion-related pollution, improving fuel efficiency, reducing reliance on the automobile, enhancing water quality, and reducing materials needed for transportation projects are noticeable green transportation endeavors. But underneath the pavement, unseen design and construction practices are some of the most fascinating innovations in sustainability.

Examples include:


- The use of recycled materials. Crushed old concrete and recycled asphalt products are used in many road sections, dramatically reducing the use of virgin materials.

- New products that have been introduced to lengthen the life expectancy of roads, many made with post-consumer recycled materials.
- Construction specifications that have changed dramatically over the past 10 years to include requirements for contractor operations to limit disruption, reduce construction runoff to adjacent watercourses, and to provide temporary stabilization of soils to prevent erosion and downstream sedimentation.
- Local communities and county and state agencies that are using a community-oriented approach to roadway planning and design to encourage stakeholder participation, project support, and to obtain thorough knowledge of the community. The city of Howell recently embarked on a multi-year, multi-mile residential road and infrastructure improvement program. This program includes a stormwater management plan that re-establishes the “green belt” between the road and sidewalk that has been used predominantly as off-street parking. Howell’s goal is to retain water closer to the source, thus reducing peak flows from reaching the outlets. This plan is better for the environment and can be built at a fraction of the cost of a typical stormwater conveyance system.

The future of improving or increasing green transportation projects will take a concerted effort to balance environmentally sound design and construction practices, cultural impacts, mobility, and public safety, while still recognizing the scarce financial resources.

Some potential areas for improvement and expanded sustainable transportation facilities include:

- Sharing transportation corridors with non-motorized transportation, and providing connections to various transportation modes. The city of East Lansing Abbott Road improvements shared right of way for non-motorized trails that link parks, residential areas, shopping, restaurants, and the city's Aquatic Center, and provided access to mass transit.
- Increasing the use of available space for stormwater enhancing features and integrating stormwater management into the design from the earliest stages of a project. The Abbott Road improvements also utilized a narrow median to reduce the area of construction and avoid wetland areas, constructed wetlands for storm water volume management and water quality enhancement, and became part of the city's passive recreational and environmental area.
- Greater use of asset management systems to more actively maintain roadways in a structured and prioritized basis can extend the service life of infrastructure improvements. Educating citizens on the benefits and consequences of improving the environment through infrastructure projects. For example, biking or ride sharing may be inconvenient but better for the environment and more cost efficient; and roundabouts use less fuel and take less time for the driver than traditional signalized intersections even though some drivers find them difficult to navigate.

Much has been done to build sustainability into our transportation networks, and the bar is constantly being raised. The greatest challenge we face in an era of slower growth is how to fund what we need. We will need to apply the same ingenuity that produced this golden age in transportation networks to this new challenge. 



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CONVENTION SPEAKER



Robert Bobb
Education

Robert Bobb is the former Kalamazoo city manager and now the emer-

gency financial manager of Detroit Public Schools. Bobb's team is creating a Master Education Plan for 21st Century Teaching and Learning even as they work to turn around the district's legacy deficit of more than \$300 million. You won't want to miss his presentation on education.



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