

# Crossroads

Spring 2001



TRANSPORTATION Information Center — LTAP

University of Wisconsin—Madison

## New sign manual to arrive soon

After years of work the Federal Highway Administration has nearly finished rewriting the nation's road sign bible — the *Manual on Uniform Traffic Control Devices* (MUTCD). An almost-final version is available online. Paper copies will be printed in late spring when errors are corrected.

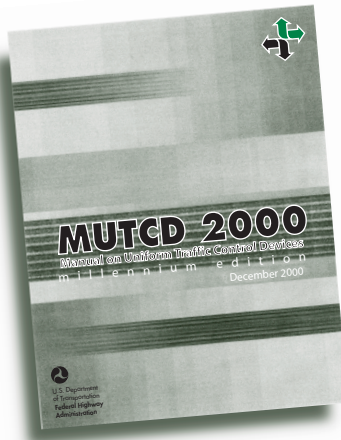
In Wisconsin the *MUTCD* will not take effect until after the Department of Transportation officially adopts it and puts out the *Wisconsin Supplement*. "It will probably be about a year until we formally adopt it," says Pete Rusch, Traffic Engineer at WisDOT. Also about a year away is the new book on how to lay out and manufacture the signs.

The manual's many changes reflect new technology, research and conditions. There are new signs for bike lanes, speed humps and traffic circles, for example, and guidance on accessible pedestrian signals that meet criteria in the *American's with Disabilities Act*. A new section, Part V, addresses traffic-control devices for low volume roads.

An April T.I.C. workshop, **Local Road Signing**, will introduce participants to the book, its significant changes, and timetables for adopting them. "We want feedback from workshop participants," says Bill Bremer, Wisconsin Coordinator for FHWA. "WisDOT will use the information when they work on the state Supplement." (See the Calendar on page 4 for workshop details.)

### What's new in the MUTCD?

The new manual is more user-friendly and has many more charts and pictures. Especially helpful are new headings that organize and clarify which sections are mandatory, recommended or optional.



**Standard**—Designates required, mandatory, or specifically prohibited practices.

**Guidance**—Recommended, but not mandatory, practices in typical situations.

**Option**—For permitted practices having no requirement or recommendation.

**Support**—For informational statements.

Other changes and additions include:

- Elimination of the term "warrants" for Stop and Yield signs.
- Changes in advance warning crosswalk signs.
- New requirements and guidance for centerline and edgeline pavement markings.
- New guidance for street name signs.
- Signs and markings for speed humps and traffic circles.
- Standards and guidance on signs and markings for bike lanes, bike paths and shared use paths.
- Guidance on the use of accessible pedestrian signals.

You can read and download sections of the new *MUTCD* in Adobe Acrobat from the Web: <http://mutcd.fhwa.dot.gov/kno-millennium.htm> See the Calendar on page 4 for workshop information.

## Signing on with inventory programs

Keeping road signs in shape is important for public safety and legal liability. To help with the job, some streets and highway agencies are using computer sign inventories.

"We're using it primarily to identify what have out there and to help with budgets," says Karl Manthe, Street Superintendent for the City of Stoughton Streets Department. The city has 1280 signs on its 57 miles of streets. Until last fall when they got the Sign View program working, crews recorded sign conditions in notebooks. Now they take a laptop computer out in the truck with them and record repairs and replacements at each sign job.

"It gives you a good idea of what you've got for signs," says Manthe. "It helps when you are asking for more money if you can say: 'gosh we have this many signs out there and here's the percentage we have to replace and it will cost this amount.'" It cost about

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## Idea Exchange

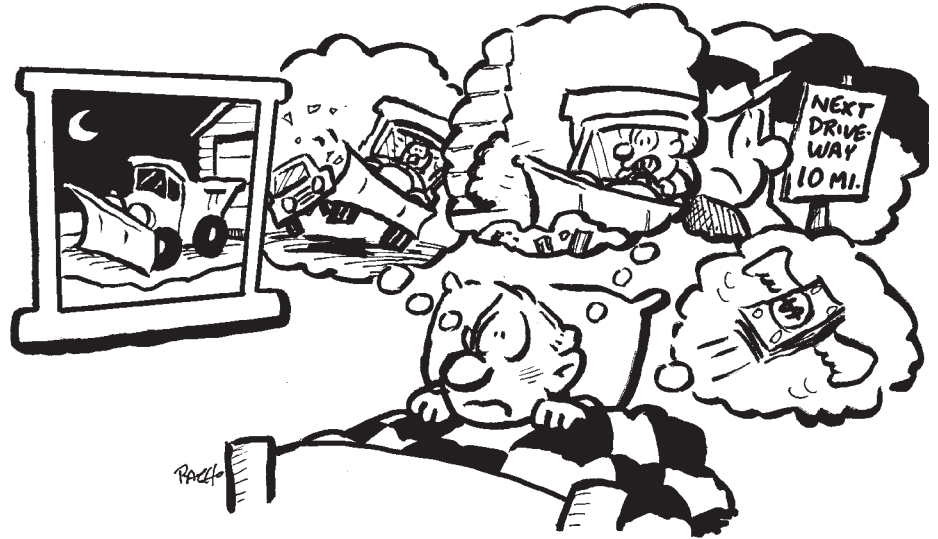
### Plowing private driveways too costly so town ends service

"We put time clocks in every vehicle and the driver would punch in and out for each private driveway," says Dale Siebert, Town of Drummond road foreman. "In a nine hour work day we were only charging for four-and-a-half hours, and that was time we couldn't spend doing other work."

For years the Town of Drummond, which lies about 30 miles south of Ashland in Bayfield County, Wisconsin, had plowed about 250 private driveways and charged residents a flat rate. In 1990 the town board changed the policy to charging for the actual time spent plowing at the state reimbursement rate (\$45/hour).

At the end of the 1990-91 season the Town Clerk reported that crews had spent 20 percent of their work time plowing private driveways. More than half of the time (76 out of 131 hours) was unbilled, wasted in traveling from drive to drive. Reports for the 1991-92 plowing year were similar.

"If we were a business, we would be going under real fast," says Siebert. To pay



for the unbilled travel time the town would have to charge \$111/hour, they calculated, and that didn't include the Clerk's billing time. Also, continuing the service would require buying an additional front-end loader and hiring a full time employee.

The alternative was to discontinue plowing private driveways. A survey of local contractors showed that private services could handle the plowing, and, in fact, it would be a welcome opportunity for workers on seasonal lay-offs.

After a public meeting, where citizens expressed a wide variety of views—"everything from yelling and screaming to feeling it was a better way to manage the town's money,"—the Board ended the service.

"It helped considerably, cost-wise," says Siebert. Equipment breakdowns and damage were much less. Trucks were no longer getting stuck in driveways or losing a mirror or communications antenna to low hanging tree limbs.

Operators were overjoyed. "It cut their stress levels in half because they were worried about people's property," says Siebert. "Also the number of complaint calls to the Town Chairman and Foreman at home at all hours of the day and night has gone to zero," he says.

The no-driveway-plowing policy is part of the Town's general winter road maintenance policy. It does allow for an excep-

tion when the private contractor can no longer push the snow back. Then the town will widen the driveway for a \$10 minimum charge plus an hourly rate.

"It's working very well," says Siebert.

"Most citizens feel they are getting plowed faster by contractors than when the town did it. The town is able to handle the work we have, we're not competing with private business, and operators get to go home after a long day and get some rest at night."

*For a copy of Drummond's Winter Maintenance Policy and clerk's analysis, contact the T.I.C. using the form on page 7. To talk to Road Foreman Dale Siebert, call 715/739-6641.*

### T.I.C. welcomes Ben Jordan



A new staff member joined the T.I.C. team in September. Ben Jordan, P.E., comes here from Village of Park Forest in Illinois where he was the

Director of Public Works and Village Engineer. A graduate of the University of Illinois at Urbana-Champaign, Jordan previously worked for the Illinois Department of Transportation.

Jordan is coordinating T.I.C. courses including the Asphalt Roadway Maintenance workshops in March, and is leading PASER training sessions in Rock and Sauk Counties. In addition he has updated the T.I.C. website and will be a regular contributor to **Crossroads**.

### Crossroads

This newsletter provides information on roads and bridges to local officials and is published quarterly by the Wisconsin Transportation Information Center, part of the nationwide Local Technical Assistance Program (LTAP). **Crossroads** is produced with assistance from the Federal Highway Administration, the Wisconsin Department of Transportation, and the University of Wisconsin-Extension.

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# Superpave mix designs offer more options

Standard specs for designing asphalt pavement mixes using Superpave designs are now available. Superpave mixes offer more options for traffic loads and temperature extremes than previous design systems.

Since October 2000 the Wisconsin Department of Transportation has required Superpave designs for all its asphaltic pavement. As a result, most state asphalt suppliers are geared up to deliver the new higher-tech materials for the spring 2001 construction season.

A chart prepared by the Wisconsin Asphalt Pavement Association helps simplify the mix design choice. For most local applications the main difference from the old spec system is that there are now two mix designs for the old Moderate Volume (MV) category. A different mix is recommended for major arterials, local business streets and medium industrial streets with heavier traffic conditions as measured in ESALs or Equivalent 18,000 pound Single Axle Loads.

"The main difference is that at the upper end of medium volume mixes we're looking for more angular sands than before, getting a little more support out of the aggregate structure," says Tom Brokaw Asphalt Aggregate and Soils Engineer at the WisDOT Bureau of Highway Construction.

With the chart and guidelines from WAPA it shouldn't be too hard to spec a Superpave design. "You really don't have to know the technical reasons behind the selections," Brokaw says.

## New binder grading system

There is a new system for specifying binders, the liquid asphalt component of a pavement mix. Performance Grades have replaced Penetration Grades and Viscosity Grades and are based primarily on climate conditions.

For lower volume traffic classes there are two recommended Performance Grades: PG 58-28 and PG 64-22. The first number is the maximum pavement design temperature in degrees

Celsius and the second is the minimum pavement design temperature. The maximum affects a pavement's rutting resistance and the minimum affects low temperature cracking.

"Normally in Wisconsin we have been specing PG 58-28 which pretty much compares to a 120-150 penetration graded material that we used in the past," says Brokaw. "We've found in some situations where there is a lot of traffic stopping and turning at intersections you can get depressions or scuffing at high temperatures. So we are trying to bump up that high temperature end by adding polymers to the asphalt." The PG 64-22 grade (which is close to 85-100 penetration type) stays stiffer at higher temperatures to resist rutting.

Choosing a PG category also depends on whether the surface will be laid on a new base or existing concrete or asphalt. Since an old pavement will produce reflective cracking in the new surface, there is currently no proven benefit in modifying the binder to resist cracking at lower temperatures.



Adding polymers raises the cost of the binder. Although it varies depending on the selected range, WisDOT has been paying \$30-\$70 more per ton of liquid asphalt for polymers on top of about \$160 per ton for unmodified (or natural) binder. To save money, Brokaw recommends using an unmodified binder on the lower layer because the maximum temperatures stay cooler and minimums don't get as cold in that layer.

"Locals should also keep in mind that you don't want to use too many different binders on a project because it costs the contractor more to have multiple storage tanks on site," says Brokaw. He recommends a maximum of two per project.

Current specs are on the WAPA web page: [www.wispave.org](http://www.wispave.org). Use the form on page 7 to request WAPA's handy design guide card from the T.I.C.

## WAPA DESIGN GUIDE UPDATE

Traffic Class	Design Daily ESAL*** Range	Old Specs	Superpave Type	Typical Examples of Use
I	<1	LV	E-0.3	<ul style="list-style-type: none"> <li>Residential driveways</li> <li>Parking lots, 50 stalls or less</li> <li>School areas and playfields</li> <li>Seasonal recreational roads</li> </ul>
		LV	E-0.3	
		LV	E-0.3	
		LV	E-0.3	
II	1-5	LV	E-0.3	<ul style="list-style-type: none"> <li>Parking lots, more than 50 stalls</li> <li>Residential streets and low volume rural roadways</li> </ul>
		LV	E-0.3	
III	6-50	MV	E-1	<ul style="list-style-type: none"> <li>Collector streets and other roadways</li> <li>Light industrial lots</li> </ul>
IV	51-275*	MV	E-3	<ul style="list-style-type: none"> <li>Local Business Streets</li> <li>Major arterial streets</li> <li>Medium industrial streets/lots</li> </ul>
		MV	E-3	
		MV	E-3	
V	276-1000**	HV	E-10	<ul style="list-style-type: none"> <li>Heavy truck terminals/truck stops</li> <li>Heavy industrial drives/lots</li> <li>Bus stops</li> </ul>
		HV	E-10	

\*Note: Traffic Class IV under certain traffic conditions at the high end of the design daily ESAL range, i.e., heavy loads at slow speeds, lots of stop and go conditions; consideration should be given to changing the Superpave type or binder properties. Contact WAPA or your local WAPA contractor for more information.

\*\*Note: Designs for extreme traffic conditions not covered by the table are available by contacting WAPA or your local WAPA contractor.

\*\*\*Note: ESAL is defined as Equivalent 18,000 pound Single Axle Load



## Calendar

### T.I.C. workshops

Specific details and locations are in the announcements mailed to all **Crossroads** recipients. For additional copies, or more information, call the T.I.C. at 800/442-4615.

**Asphalt Road Maintenance** Learn how to best maintain your asphalt roads and get the latest information on which maintenance treatments extend pavement life. Learn about your options for asphalt pavement rehabilitation and the new WisDOT SuperPAVE mix designs.

Mar 7	Green Bay	Mar 12	Tomah
Mar 8	Brookfield	Mar 13	Cable
Mar 9	Barneveld	Mar 15	Rhineland

**PASERWARE training** Attend this course and you will receive the WINDOWS version of PASERWARE and learn how to use it. Specific training shows you how to develop a capital improvement program, project the results of street maintenance and improvement decisions, keep a history of projects, and report condition ratings to WisDOT. (Runs on Windows 95 or later. See story on page 8.)

Mar 22	Barneveld	Mar 28	Cable
Mar 23	Brookfield	Apr 2	Eau Claire
Mar 26	Green Bay	Apr 3	Tomah
Mar 27	Rhineland		

**Local Road Signing** This workshop presents the changes in the new Manual on Uniform Traffic Control Devices (MUTCD) that will impact your signing, and describes when and how they take effect. You will see examples of new signs, learn how to use the new Manual, review basics of effective signing and marking, and hear about funding for safety improvements from Federal and state experts. Useful for those with responsibilities for local road signs, marking and safety: elected officials, street and highway superintendents, public works engineers, foremen, law enforcement personnel, and others.

Apr 4	Green Bay	Apr 10	Cable
Apr 5	Brookfield	Apr 11	Eau Claire
Apr 6	Barneveld	Apr 12	Tomah
Apr 9	Rhineland		

**Flagger Instructor Training** This course is for road supervisors and safety trainers who supervise or train flaggers for construction and maintenance operations. Participants will get the training and tools they need to properly train their own employees to be effective work zone flaggers. Participants will receive an instructors training kit that includes the *Flagger Training Instructors*

*Guide*, a professional quality training video, and 20 copies of the *Flaggers Handbook*.

May 8	Barneveld	May 15	Cable
May 9	Brookfield	May 16	Eau Claire
May 10	Green Bay	May 17	Tomah
May 14	Rhineland		

### UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for the following engineering courses in Madison. Fill in the form on page 7, call 800/442-4615 or e-mail [tic@epd.engr.wisc.edu](mailto:tic@epd.engr.wisc.edu) for more details.

## Resources

### Booklets

These booklets and material packets are available from the T.I.C.

**WAPA Design Guide Update** This pocket-sized quick reference card lists new Wisconsin SuperPAVE mix designs and asphalt cement specifications. It gives examples of typical uses and shows how new specs compare to older ones.

**Geotextiles packet** Includes applications booklet, WisDOT standard specs, EPA fact sheets on storm water management, and geotextile samples. Supplies limited.

**Sealcoat-PASER Manual**, T.I.C., Dec. 2000, 16 pp. This new T.I.C. manual guides local officials in evaluating gravel roads with seal-coat surfaces. Numerous photos of typical sealcoat-over-gravel conditions and distresses make it easy to identify problems and use the manual's simple rating system. This is the latest in the PASER pavement surface rating manual series.

### Videotapes

Videotapes are loaned through County Extension Offices at no cost.

**NEW!** **Gravel PASER**, T.I.C., 15 min. #18385. Describes types of common distress in gravel roads and how to rate gravel roads using the Gravel-PASER Manual. Local agency officials can use this video to refresh their skills at evaluating and rating gravel roads in the field.

**NEW!** **Sealcoat PASER**, T.I.C., 13 min., #18386. Describes common distress in gravel roads covered with asphalt chip seal and introduces evaluation and rating methods using the *Sealcoat-PASER*

### Effective Roadway Lighting

March 19-20

### Construction Risk Management Simplified

March 26-27

### Municipal Engineering Fundamentals for Non-Engineers

March 26-27

### Foundation Design

April 23-25

### Designing Best Management Practices for Stormwater Quality Improvement

April 30-May 2

### Surety Bonds for Construction Contracts

May 22-23

*Manual*. A helpful review for local agency officials on field evaluation and rating seal-coated gravel roads.

**NEW!** **PASER Series**, T.I.C., 74 min., #18390. Three separate PASER training videos on one tape. Includes Asphalt-PASER (46 min.); Gravel-PASER (15 min.) and Sealcoat-PASER (13 min.). Videos can be used to learn how to evaluate and rate pavement conditions using the PASER manuals. Asphalt PASER is available separately as well (#17761).

**Understanding SuperPAVE Mix Design**, 12 min., #17920, N.A.P.A./F.H.W.A. An excellent overview of the Superpave process for designing hot mix asphalt pavements. Describes the new performance graded asphalt binder specification and the new asphalt mixture design and analysis process.

**Signing videotapes** *Sign Maintenance and Installation*, #17821; *Traffic Sign Inspection and Maintenance*, #17754; *Traffic Control Devices*, #16861; *Traffic Sign Placement and Location*, #17753

### Websites

The T.I.C. homepage offers workshops, publications, and video catalog, and lists transportation links:

<http://www.engr.wisc.edu/centers/tic/>

The MUTCD Millenium Edition is online at <http://mutcd.fhwa.dot.gov/>

The Wisconsin Asphalt Paving Association site includes a link to Wisconsin Department of Transportation's SuperPAVE Specification: <http://www.wispave.org/index2.html>

# Weaving geotextiles into road projects

Geotextiles can help with a wide range of road construction problems such as filtration, stabilization, reinforcement, and erosion control. It is very important, however, to select the right geotextile for the application and to install it correctly. One source of help is WisDOT specifications that identify the geotextile to be used in a specific application. The actual project conditions will determine the exact material that is appropriate. At a recent T.I.C. workshop, Rusty Payne, Soil Reinforcement Applications Engineer with SI Geosolutions, introduced the basics of geotextile use. Extra copies of workshop materials are still available.

Among geotextiles' many uses are:

- separation between the subgrade and base on a paving project (similar to one shown in the Winter 2001 *Crossroads* Idea Exchange)
- moisture barrier between a new overlay and the old asphalt pavement
- separation around a drainage trench to keep the fines from plugging a subsurface drainage system (French drain)
- erosion control, including, erosion control blankets, turf reinforcement mats, and silt fence
- soil stabilization, such as steep slopes and retaining walls

In Wisconsin geotextiles can be very useful when building a road over soft soils like clay muck. The right geotextile works as a separator and reinforcement between soft soils and gravel base material as well as helping stabilize embankments. They are especially useful given the state's relatively large amount of rainfall and groundwater and the freeze-thaw cycles.

Erosion control is probably the most cost-effective use of geotextiles, Payne says. Cleaning up silt-choked streams, creeks, and dams is so much more costly if you don't use it. "It's much more effective than silt fence. Using silt fence is like catching the murderer after he's done the damage."

Temporary erosion control blankets (ECBs) hold soil particles down, keeping them out of silt fences. Permanent turf reinforcement mats (TRMs) hold soil in place while vegetation grows through the mat and permanently anchors the soil. TRMs allow vegetation to withstand higher velocity and higher water energies—up to 25 fps velocity. Without TRMs vegetation can only withstand about 5-6 fps velocity.



"It lets us take concrete and rock off the job and put in more vegetation," says Payne. Vegetation purifies water by absorbing pollutants. It allows surface water to recharge groundwater and reduces thermal pollution.

## Common mistakes

Probably the most common mistake in using geotextiles is specifying the wrong product for a particular application, Payne says. You have to understand the capabilities of the geosynthetic. It can be complicated because they come in a wide variety of types and characteristics, including:

- Woven, like typical cloth, or non-woven, like felt fabric or like snow fence which is extruded and punched
- Fiber shapes with round and flat yarns in woven fabrics
- Materials such as polyester, polypropylene, straw materials, etc.
- Openings between threads providing filtration for various particles sizes
- Strength, stretch, and creep
- Special properties for special uses

"The best way is to learn through manufacturers and/or distributors," says Payne. "We're pretty up front with where we are good and where we are not. We make many different types of products to fit different situations. You have to know their limits and qualities." DOTs have standard specs for these products and geosynthetic

associations have information too. The International Fabrics Association puts out an annual periodical, *Geosynthetics Fabrics Report*, which describes performance properties for all currently available products. Local American Society of Consulting Engineers (ASCE) chapters have a lot of information and can tap into the national library.

Most problems happen during installation. "People install it upside down and backwards," says Payne. "It's not hard to install, no more than changing the oil in your car, but you just need to understand how to install it." Common mistakes include driving directly on the fabric with an end loader, and leaving too little overlap between fabric pieces or overlapping uphill so water can seep under the joint. Another problem is inadequate compaction over the geosynthetic.



"All manufacturers supply installation guidelines," says Payne. "Inspectors should get those guidelines from the vendor and make sure the contractor is following them. If a contractor wants to change the installation procedures he should have cleared them with the vendor before he bid the job."

In the end, though, it's important to remember that geosynthetics have two jobs: keep the good material from mixing with the bad material and keep the water out or drain it away quickly. When they do these jobs well, you can save money by extending pavement life, preventing erosion, stabilizing embankments, and even building on marginal sites.

*For more information, request the T.I.C. Geotextiles Workshop information packet (see Resources on page 4).*

# Crossroads Index

Spring 1999–Winter 2001

This index lists all articles in the past eight issues of *Crossroads*. Previous issues are indexed in Spring of odd-numbered years. To request copies of stories listed here, use the reader response form on page 7 or e-mail: [tic@epd.engr.wisc.edu](mailto:tic@epd.engr.wisc.edu)

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Inventory programs from page 1

\$8,800 to get started: \$2185 for the software and \$6632 for consulting.

Stoughton hired consultant Bill Wiedenbeck to create the initial data base. However, it wasn't until they added clerical help that they could really begin to use the program.

For a sign inventory to be effective crews have to be willing (and able) to use it and management has to commit adequate staff resources.

Program protects liability

Liability concerns prompted Dodge County to invest in a computer sign inventory recently. "We get into court cases sometimes where they question the quality of the sign and when it was last updated," says Highway Commissioner Bob Sindelar.

Each sign record includes a digital photo which crews update when they replace the sign. Dodge County crews also take laptops along in the truck to record their actions. The program helps Dodge County manage its sign inventory and schedule maintenance work.



a county-wide GIS system when it is fully installed and the sheriff will also have access to sign data for the 911 system.

For 6,200 signs on 545 road miles it cost the county about \$30,000 to get the inventory program going: \$4500 for software, \$23,000 to the consultant for the initial inventory, and about \$2000 for the laptop computer.

State managing 500,000 signs

WisDOT districts have inventoried about half of the state's estimated 500,000 highway signs, says Matt Rauch the DOT civil engineer in charge of the sign program. "It takes a lot of work to get going, but we feel it is worth it," he says.

Administration's minimum retroreflectivity standard for signs takes effect."

Currently the big benefit is in helping Districts plan their work activities—both for immediate assignments and for the budget year. It also gives them more effective control of their sign inventories. In addition, it can help prevent replacing signs prematurely.

Plans are to make the sign database accessible to anybody who is interested, probably on an Internet web page.

For more information contact Karl Manthe, Stoughton, at 608/873-6303, Bob Sindelar, Dodge County, at 414/386-3653, or Matt Rauch, WisDOT, 608/266-0150.

Reader Response

If you have a comment on a Crossroads story, a question about roadways or equipment, an item for the Idea Exchange, a request for workshop information or resources, or a name for our mailing list, fill in this form and mail in an envelope to:

Crossroads

Transportation Information Center
University of Wisconsin-Madison
432 North Lake Street
Madison, WI 53706

Or call, fax, or email us:

phone 800/442-4615
fax 608/263-3160
email tic@epd.engr.wisc.edu

Form with checkboxes and lines for: Please put me on your Crossroads mailing list, Please send me information on, My idea, comment or question is

(We'll contact you to get more details or answer your question.)

Name, Title/Agency, Address, City, State, Zip, Phone, fax, email



