



Traffic Guidelines Manual

ORIGINATOR Director, Bureau of Traffic Operations	11-3-1
CHAPTER 11	Lighting/Electrical/Electronic Systems
SECTION 3	Permitted Lighting
SUBJECT 1	Permitted Lighting Systems

POLICY

All locally owned and maintained Roadway Lighting Systems installed on the State Trunk highway System **shall** require a permit in accordance with this document.

THIS POLICY DOES **NOT** APPLY TO LIGHTING SYSTEMS PROPOSED FOR INSTALLATION ON **LOCAL ROADWAYS OR CONNECTING HIGHWAYS**. THESE ARE THE RESPONSIBILITY OF THE LOCAL MUNICIPALITIES. THIS DOCUMENT MAY BE USED AS A REFERENCE FOR DESIGN OF SUCH SYSTEMS.

POLICY APPLICATION

The purpose of this policy is to prescribe guidelines and procedures that will provide for the uniform accommodation of roadway lighting facilities installed and maintained by others within the limits of the public highway rights-of-way of the State Trunk system.

The provisions of this policy **shall** apply to all cities, villages, counties and towns (agencies) which desire to use or occupy rights-of-way of the State Trunk Highway system for locally owned and maintained highway lighting. Public, private and municipal utilities, cooperatives, and private citizens who desire to use or occupy rights-of-way of the State Trunk Highway System for highway lighting **shall** apply to the city, village, county or town in which the State Trunk Highway is located.

PERMIT REQUIREMENTS

For all Projects covered under this policy, an application for approval to install roadway lighting **shall** be submitted to the DOT Regional Office by the city, village, county or town that will be paying for the maintenance and energy costs associated with the lighting system.

The application **shall** be submitted on the appropriate current forms and **shall** include all items outlined in this document. The forms are available on the WisDOT web site. Sample copies of the current forms follow this policy.

Permit applications that require State Lighting Engineer approval **shall** be submitted to the attention of the Regional Office.

APPROVAL AUTHORITY

The State Lighting Engineer **shall** review and approve all permits involving new continuous lighting systems.

New permits are required if an agency wishes to upgrade or otherwise modify an existing continuous system, including altering or moving lighting equipment or altering equipment associated with a lighting transition zone.

The State Lighting Engineer **shall** also review and approve applications that include:

- decorative lighting installed on the State Trunk Highway system
- lighting for a trail or walkway that is adjacent to the roadway
- receptacles for festoon lighting
- flood lighting proposed for bridges and retaining walls

The Regional Office has the approval authority to review and issue permits for isolated lighting on the State Trunk Highway system. This includes the installation of a luminaire and arm added to an existing or new utility pole. The Regional Office may review and issue a permit for continuous lighting when an agency wishes to add lighting units to an existing continuous system as long as the new lighting units match the existing equipment and generate equivalent lighting levels.

Any changes to an existing permitted installation that result in the following alterations, **shall** not be made until a new permit authorizing such changes is issued (Excludes routine maintenance activities):

- Pole locations
- Pole heights and types
- Luminaire and lamp types
- Operating conditions such as lighting curfews/dimming
- Other items affected by this policy

CONTINUOUS LIGHTING PERMIT APPLICATION

The applicant **shall** follow the following two-part process for Continuous Lighting permit applications, consisting of a preliminary and a final application form:

1. At project scoping or as soon as it is known that lighting will be included, the Applicant **shall** contact the Region Office to coordinate the submittal of a preliminary permit application. The name and address of the project electrical and lighting designer **shall** appear on the form. The applicant **shall** provide catalog cut sheets for proposed poles and luminaires. Photometric design and pole layout **should** not begin until the preliminary application is submitted and

approved. The Regional Office may review the basic project information, and coordinate with State Lighting Engineer on acceptance of poles and luminaires.

As part of this preliminary process, the applicant shall describe the purpose for the proposed lighting system, such as:

- a. Roadway safety lighting in accordance with AASHTO requirements
 - b. Decorative lighting for downtown shopping, etc.
2. At or before Pre-PS&E completion, the Applicant **shall** submit the Final permit application to the Regional Office. Lighting and electrical plans, special provisions, photometric and voltage drop calculations, and pole and luminaire cut sheets **shall** be submitted with the final permit application. The name and address of the project electrical and lighting designer and appropriate signatures **shall** appear on the form. After initial review, the Regional Office **shall** forward the Application to the State Lighting Engineer.
 3. The designer **shall** include in the project plans the necessary SPV verbiage that ensures that the final luminaires provided on the project will meet the design parameters of the permit.

ISOLATED LIGHTING PERMIT APPLICATION

Since Isolated Lighting covers numerous situations, such as leased Utility lights at an intersection, the Regional Office may allow substitution of the Isolated Lighting Permit Application as conditions dictate. In any case, the Applicant **shall** contact the Regional Office at project conception to begin the permit process.

DESIGN PARAMETERS

The designer shall follow the appropriate WisDOT design standards/parameters for the type of lighting system being proposed. Unless indicated otherwise, the Illuminance Method of calculation **shall** be used to determine average and uniformity roadway lighting levels.

The designer/engineer **shall** also perform veiling luminance calculations. The specified Veiling Luminance Ratio **should not** exceed that defined in the AASHTO Roadway Lighting Design Guide.

The calculation of roadway lighting levels **should** be performed using AGI32 software.

1. For straight sections of Continuous Roadway lighting, the calculation and submittal/report **shall** be based upon The Roadway Optimizer tool.
2. For intersections, the calculation and submittal/report **shall** be calculated using a grid defining the traffic conflict areas and **shall** include the outside edges of pedestrian crosswalks. Intersection calculations **shall** be independent of any

continuous roadway calculations included in the project area.

3. For roundabouts, the calculation and submittal/report **shall** be calculated using a grid defining the traffic conflict areas and **shall** include the outside edges of pedestrian crosswalks. Roundabout calculations **shall** be independent of roadway calculations

The Light Loss Factor to be applied to initial luminaire lumen output to calculate maintained illumination as prescribed in this section **shall** be justified and furnished with the permit application.

The Voltage Drop and related Wire sizing for lighting circuits and festoon receptacles *shall* be calculated in conformance with the NEC, along with any additional requirements of the applicant agency. See TGM 11-2-1 for additional information.

Festoon receptacle branch circuits *should* be circuited independent from roadway lighting circuits unless maintaining agency has specific reasons to warrant a combined circuit.

DISTRIBUTION REQUIREMENTS FOR LUMINAIRES

No luminaire **shall** be proposed for use on the State Trunk Highway System that cannot meet the Veiling Luminance Ratio required for the Lighting System.

CURFEWS

Curfews are defined as the switching off or dimming of lights during certain off-peak hours. The Department will consider allowing curfews of a permitted lighting system if the maintaining agency can demonstrate that it will not violate the AASHTO table lighting levels. This would include:

- Evaluation of the conditions during the proposed curfew hours showing that the roadway/area is different than the normal hours such that a reduction in illumination is justified if dimming is proposed. Such an evaluation typically would typically include such items as reductions in traffic volume and/or pedestrians.
- A statement that illumination is not necessary during the proposed curfew hours if the maintaining agency desires to switch off the lights. Although AASHTO does not require roadway lighting, the maintaining agency installed it for a reason, and therefore shall evaluate the proposed switching accordingly.

FINAL PERMIT APPLICATION SUBMITTAL REQUIREMENTS

The following information **shall** be identified on the submittal:

1. Roadway names.
2. Roadway and area classifications.
3. Pavement classification.

4. Posted speed limit of roadways.
5. Local maintaining authority.
6. Catalog cut sheets for pole and luminaire which include manufacturer's luminaire catalog numbers and include wattage, light source, initial luminaire or lamp lumens, voltage, lens type, Illumination Engineering Society (IES) distributions, and options.
7. Light Loss Factor (LLF) used for the design.
8. If banners, holiday decorations or festoon receptacles are to be installed or attached to the poles, the dimensions and location **shall** be included and shown on a detail drawing in the plans.
9. Voltage Drop calculations for lighting and festoon receptacle circuits.
10. Computer design computations for illumination and spacing of computed roadway sections as described above.
11. Summary tables that include both design parameter target values and calculated results.

The Project Electrical/Lighting Engineer **shall** sign and date the final permit application.

REFERENCE TO STANDARDS

The installation of highway lighting **shall** conform to applicable provisions of Chapter 9, Section 15 of the WisDOT Highway Maintenance Manual, except as modified herein. In addition, the highway lighting installation **shall** comply with the requirements of the latest edition of the following:

- National Electrical Code
- Wisconsin Electrical Code
- Local codes and ordinances

The following guides apply to all highway lighting installations covered by this policy. Unless otherwise indicated, the latest editions of the following guides **shall** be used.

1. American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide, October 2005.
2. American National Standard Institute (ANSI), American National Standard Practice for Roadway Lighting RP-8-00.

The most restrictive, policy, code, standard, or guide **shall** govern. State Lighting Engineer will make the final decision on the interpretation of conflicting policies, codes, or standards.

POLICY REVISIONS

The requirements of this policy *may* be updated to reflect changing technology or other conditions appropriate at the time. Such additions, revisions, and modifications will not be made retroactive to lighting installations covered by existing permits.

DOT *may* require the updating of all or part of an existing installation to conform to the latest criteria in the event damage to an installation, highway reconstruction, or other reasons requiring the replacement or relocation of all or part of an existing lighting installation offers an opportunity to upgrade the installation.

ISOLATED LIGHTING PERMIT APPLICATION

DT1885 11/2014 s. 84.02(4)(c) Wis. Stats.

Wisconsin Department of Transportation
State Project Number

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Submit 2 copies to the Regional Office of the Wisconsin Department of Transportation, including:

- Attach engineering drawing of lighting installation including all applicable information such as location, spacing of poles, wiring, lighting units, edge of pavement, curblines and shoulders, etc. Include complete proposed installation from source line to lighting fixture. Include specifications and special provisions.

Highway		Intersected Highway Name or Number; Area Limits		
Applicant Name (must be a Government Unit)		Applicant Mailing Address, City, State, ZIP Code		(Area Code) Telephone Number
Designer Name		Designer Mailing Address, City, State, ZIP Code		(Area Code) Telephone Number
Maintainer Name		Maintainer Mailing Address, City, State, ZIP Code		(Area Code) Telephone Number
County	Posted Speed Limit mph	ADT and Year vpd	Cross Section <input type="checkbox"/> Rural <input type="checkbox"/> Urban	
Number of Poles	Material and Class	Mast Arm Length ft	Base Type <input type="checkbox"/> Breakaway <input type="checkbox"/> Non-Breakaway <input type="checkbox"/> Direct Bury	Wiring <input type="checkbox"/> Overhead <input type="checkbox"/> Underground
Number of Luminaires	Mounting Height Above Pavement	Watts Source	IES Distribution Type and BUG Rating	Initial Lumens

The list of attachments to this permit application includes plan sheets, calculations, specifications, etc.

The designated applicant applies to the Wisconsin Department of Transportation, Division of Transportation System Development for permission to install, operate and maintain, or to contract for the installation, operation and maintenance of highway lighting units within the limits of the right of way of the state trunk highway, all as described above.

The applicant certifies that if the proposed lighting is located in another unit of government, written consent has been obtained as required by Wisconsin Statutes from the other unit of government in which the proposed lighting units and associated power line extensions are located, and that such consent is currently valid and covers all of the proposed work.

The undersigned certifies that s/he is authorized to sign this application on behalf of the designated applicant.

X

(Applicant Signature)

(Date – m/d/yyyy)

(Applicant Title)

Applicant: Do Not Write Below This Line

PERMIT APPROVAL

Permission is granted to the above applicant to install, operate and maintain highway lighting units and associated power lines and poles as described in this application and the attached drawings and specifications, subject to the conditions on the following page of this application.

ISOLATED LIGHTING – Approved for Regional Office

Permit Number	Date Issued (m/d/yyyy)	X
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(Approval Signature)

ISOLATED LIGHTING PERMIT APPLICATION *(continued)*

Wisconsin Department of Transportation DT1885

Highway Lighting Installation Permit Conditions

1. The installation, including all wiring, supports, equipment, roadway clearance, etc., shall be in accordance with pertinent statutes, codes, and regulations as well as good trade and engineering practice, and shall be properly maintained.
2. The installation, operation, and maintenance of the highway lighting facilities shall be at the expense of the permittee. Alterations in any part of the installation as are required at any time by the Wisconsin Department of Transportation shall be made by the permittee at his/her own expense within 60 days.
3. Construction and maintenance operations shall be performed without closing the highway to traffic except as may be specifically authorized by authorized representatives of the governmental agency maintaining the highway. Unless otherwise authorized, two-way traffic shall be maintained at all times. Proper barricades, signs, flags, lights, and flagpersons shall be provided and maintained at all locations in accordance with the Manual on uniform Traffic Control Devices.
4. The permittee shall not interfere with the normal use of the adjoining land by the owners in the installation, alteration, maintenance, or removal of the facilities authorized by this permit.
5. A concrete base, if used, shall not extend more than four (4) inches above ground level at any point.
6. The highway lighting facilities installed by authority of this permit may be removed by the permittee, following 30 days written notice to the Wisconsin Department of Transportation, but such removal shall be subject to the conditions governing the installation of the lighting and associated electric power lines.
7. Any excavations necessitated by the proposed work shall be effectively backfilled and subsequent settlements after backfilling repaired to the satisfaction of the highway authority. Roadway surfaces, pavements, structures, vegetation, or other highway facilities damaged shall be repaired or restored to the satisfaction of the highway authority. Temporary sheeting and shoring shall be used as necessary to prevent soil caving in any trenches and tunnels.
8. Following any work on the highway right of way incident to an installation, alteration, or removal under this permit, the permittee shall restore the right of way to its condition previous to the work by the permittee, said restoration to meet with the approval of the Wisconsin Department of Transportation.
9. No trees or shrubs shall be cut, trimmed, or branches cut or broken in the construction or maintenance of the line without the consent of the owner of the trees or shrubs.
10. Any brush, trash, waste, or rubbish resulting from construction or maintenance of the line shall be removed from the highway right of way.
11. All wood and debris from any elm trees or other diseased trees which have been trimmed in performance of the work permitted under this permit shall be disposed of in accordance with approved Wisconsin Department of Transportation's procedure, a copy of which may be obtained from the approving district office.
12. The permittee shall immediately notify the district office when the installation has been completed.
13. Any special provisions attached shall be considered as part of this permit.

PRELIMINARY CONTINUOUS LIGHTING PERMIT APPLICATION

DT1878 10/2013 s.84.02(4)(c) Wis. Stats.

Wisconsin Department of Transportation
State Project Number

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Submit 2 copies to the Regional Office of the Wisconsin Department of Transportation, including:

- Completed Preliminary Information Form. Provide additional forms as necessary when there are multiple Roadways and/or Roadway Types.
- Engineering drawing of the Roadway Plan, or typical section, showing edge of pavement, curb lines, shoulders, etc.
- Catalog cut sheets of the Proposed Poles and Luminaries.

Preliminary Information Form (Provide additional forms as necessary for multiple roadways and/or roadway types)

Highway		Lighting Limits			
Applicant Name and Mailing Address (Must be a Government Unit)			Project Electrical Engineer Name, Mailing Address and Telephone		
Maintainer Name, Mailing Address and Telephone			Project Lighting Engineer Name, Mailing Address and Telephone		
County	Posted Speed Limit mph	ADT	Cross Section Rural	Urban	Roadway Width ft
Road Class <input type="checkbox"/> Major <input type="checkbox"/> Minor Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Other		Area Class <input type="checkbox"/> Commercial <input type="checkbox"/> Residential <input type="checkbox"/> Intermediate		Pavement Class <input type="checkbox"/> R1 <input type="checkbox"/> R3 <input type="checkbox"/> R2 <input type="checkbox"/> R4	

Based on Roadway information above, provide Design Criteria Values in accordance with AASHTO 2005 Roadway Lighting Guide, Table 3-5a.

Luminaire Description	IES Distribution and BUG Rating	Mounting Height Above Pavement	Watts/Source	Initial Lumens	LLF
Target Illuminance Values		Target Luminance Values (If applicable. See Design Requirements in TGM 11-10-1)			
Average FC	Uniformity Ave/Min	Average cd/m sq	Veiling Luminance Ratio Lv(max)/Lavg	Uniformity Ave/Min	Max/Min

The designated applicant applies to the Wisconsin Department of Transportation, Division of Transportation System Development for permission to begin the design to install, operate and maintain, or to contract for the installation, operation and maintenance of highway lighting units within the limits of the right of way of the state trunk highway, all as described above.

The applicant certifies that the Lighting Engineer has explained the WisDOT Lighting Requirements.

The undersigned certifies that s/he is authorized to sign this application on behalf of the designated applicant.

X

(Applicant Signature)

(Date)

(Title)

Applicant: Do Not Write Below This Line

PRELIMINARY PERMIT APPROVAL

Permission is granted to the above applicant to begin the design to install, operate and maintain highway lighting units and associated power lines and poles as described in this application and the attached drawings and specifications, subject to the conditions on the following page of this application.

CONTINUOUS LIGHTING

Permit Number	Date Issued – m/d/yyyy	Approved for Division of Transportation System Development X (Signature)
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Highway Lighting Installation Permit Conditions

1. The installation, including all wiring, supports, equipment, roadway clearance, etc., shall be in accordance with pertinent statutes, codes, and regulations as well as good trade and engineering practice, and shall be properly maintained.
2. The installation, operation, and maintenance of the highway lighting facilities shall be at the expense of the permittee. Alterations in any part of the installation as are required at any time by the Wisconsin Department of Transportation shall be made by the permittee at his/her own expense within 60 days.
3. Construction and maintenance operations shall be performed without closing the highway to traffic except as may be specifically authorized by authorized representatives of the governmental agency maintaining the highway. Unless otherwise authorized, two-way traffic shall be maintained at all times. Proper barricades, signs, flags, lights, and flagpersons shall be provided and maintained at all locations in accordance with the Manual on uniform Traffic Control Devices.
4. The permittee shall not interfere with the normal use of the adjoining land by the owners in the installation, alteration, maintenance, or removal of the facilities authorized by this permit.
5. A concrete base, if used, shall not extend more than four (4) inches above ground level at any point.
6. The highway lighting facilities installed by authority of this permit may be removed by the permittee, following 30 days written notice to the Wisconsin Department of Transportation, but such removal shall be subject to the conditions governing the installation of the lighting and associated electric power lines.
7. Any excavations necessitated by the proposed work shall be effectively backfilled and subsequent settlements after backfilling repaired to the satisfaction of the highway authority. Roadway surfaces, pavements, structures, vegetation, or other highway facilities damaged shall be repaired or restored to the satisfaction of the highway authority. Temporary sheeting and shoring shall be used as necessary to prevent soil caving in any trenches and tunnels.
8. Following any work on the highway right of way incident to an installation, alteration, or removal under this permit, the permittee shall restore the right of way to its condition previous to the work by the permittee, said restoration to meet with the approval of the Wisconsin Department of Transportation.
9. No trees or shrubs shall be cut, trimmed, or branches cut or broken in the construction or maintenance of the line without the consent of the owner of the trees or shrubs.
10. Any brush, trash, waste, or rubbish resulting from construction or maintenance of the line shall be removed from the highway right of way.
11. All wood and debris from any elm trees or other diseased trees which have been trimmed in performance of the work permitted under this permit shall be disposed of in accordance with approved Wisconsin Department of Transportation's procedure, a copy of which may be obtained from the approving district office.
12. The permittee shall immediately notify the district office when the installation has been completed.
13. Any special provisions attached shall be considered as part of this permit.
 Special Provisions are attached, please explain: