



Traffic Engineering, Operations & Safety Manual

Chapter 11 Lighting/Electrical/Electronic Systems

Section 1 Lighting System Approval

11-1-1 Initial System Approval

May 2015

PURPOSE

This policy describes the requirements for approval of Lighting on the Wisconsin State Highway System.

POLICY

All lighting on the state trunk highway system **shall** require approval in accordance with this policy.

WisDOT Maintained Systems

The State Lighting Systems Engineer in the Bureau of Traffic Operations **shall** approve all proposed new lighting system installations on state trunk highways except as described below. When there is a possibility a project *may* include the installation of lighting, the DOT project manager for design **shall** work with the region lighting engineer in the traffic section to submit a DT1198 Roadway Lighting System Approval Request, supported by an investigation report, to the State Lighting Systems Engineer. These documents **shall** be submitted before any commitments are made concerning the installation of lighting systems.

The following lighting needs are required by the department and are exempt from the formal approval process. However, in these cases the project manager **shall** work with the region lighting engineer to accommodate coordination and oversight of the design:

- signalized intersections
- roundabouts
- metered ramps
- tunnels
- special facilities
 - Weigh stations
 - Park-rides
 - Crash investigation sites
 - Rest areas
 - Waysides

Improvement projects on roads where lighting presently exists are also exempt from the formal approval process.

The investigation report provides an objective description and analysis of the roadway/project for the State Lighting Systems Engineer to use in recommending installing and maintaining a lighting system.

The report **shall** include:

- DT1198 Roadway Lighting System Approval Request.
- Description/discussion of the project and plan drawing of the roadway project under consideration
- Data pertinent to determine the need for lighting that includes, but not limited to:
 - traffic volumes minimally broken down into day vs. night, but more specific time periods when pertinent to the investigation
 - crash history on the existing road including type of crash and if darkness was a pertinent factor
 - evaluation of other crash avoidance measures (geometric, signing, striping, etc.) being considered and/or implemented and how lighting relates to this overall safety evaluation
 - analysis based on the minimum warranting conditions as minimum thresholds for further consideration of lighting as described in the current AASHTO Roadway Lighting Design Guide
- Installation cost, maintenance cost, and what agency is funding/maintaining the system
- Discussion, correspondence, and recommendations from local jurisdictions, and any written agreements relating to lighting on the project
- A recommendation with supporting discussion based on the above evaluation

The State Lighting Systems Engineer will evaluate the proposal based on the information in the investigation report along with consideration of any additional items pertinent to the specific project and provide approval for acceptable projects.

Regardless of the need for approval, all WisDOT maintained lighting systems shall follow the design process described in other TEOpS sections.

Permitted Lighting Systems

All Locally-owned and maintained Lighting systems on the Wisconsin State Highway system shall require a permit in accordance with [TEOpS 11-3-1](#).

Aesthetic Lighting on Structures

Aesthetic lighting shall require approval in accordance with [TEOpS 11-3-2](#).

Connecting Highways

Lighting on connecting highways and permitted lighting maintained by local municipalities on state trunk highways are exempt from submitting a request for approval. However, in these cases the project manager **shall** work with the region lighting engineer to accommodate coordination and oversight of the design.

11-1-2 Lighting System Design Review

May 2015

POLICY

All DOT maintained Roadway Lighting System designs **shall** follow the process described in with this document.

POLICY APPLICATION

The purpose of this policy is to prescribe guidelines and procedures that will help ensure consistent lighting system designs statewide and clarify the review requirements.

PROCEDURAL REQUIREMENTS

For all Projects covered under this policy, after receiving the necessary Lighting System Approval described in [TEOpS 11-1-1](#), the lighting designer **shall** submit a Continuous Lighting System Illumination Application DT1886 (or Preliminary Permit Application for locally maintained systems), Roundabout Illumination form, or Signalized Intersection Illumination Form, as applicable to the project, to the DOT Regional Lighting Engineer prior to beginning the design.

The designer **shall** send a copy of all submittals to the State Lighting Engineer.

DESIGN PROCESS

The designer **shall** follow the appropriate WisDOT design standards/parameters described in later sections for the type of lighting system being proposed.

The designer **shall** follow the submittal/review procedures described in the WisDOT lighting review checklist.

DESIGN CHECKLIST FOR ROADWAY LIGHTING

System designed by: Design consultant Traffic (In-house) PDS (In-house)

Project ID (Design / Const) _____

Description _____

Highway _____ County _____

Designer Name (print/type) _____ Signature _____

Coordinate Lighting Design Process @ approximately 30% Plan

- Contact Region Traffic Section about the need for a lighting system on the project. Identify project segments.
- Prepare description of Lighting System and prepare & submit Roadway Lighting System Request Form DT1198.
- Consult current Chapter 11 of WisDOT Traffic Guidelines Manual.** Determine all Design Guidelines, Roadway and Area Classifications and Target Illumination Thresholds for the various project segments.
Obtain approval from Region Lighting Engineer in Traffic Section.
- Verify Luminaire used in the design.
- Prepare Preliminary Permit Application form, Continuous Lighting Illumination Form, Signalized Intersection Illumination Form, or Roundabout Illumination Form.
Obtain necessary Approval(s) before beginning the Design.

Preliminary Review @ approximately 60% Plan

- AGI32 Roadway Optimizer calculations for continuous roadway sections (Avg. Maintained Illumination, Uniformity) showing compliance with Application or Illumination form) N/A
- AGI32 calculations for Roundabouts showing compliance with Application or Illumination form) N/A
- AGI32 calculations for Signalized Intersections showing compliance with Application or Illumination form) N/A
- Preliminary Plan with proposed luminaire/pole locations

Final Review @ approximately 90% Plan

Submit to Region Traffic Section Lighting Engineer, with copy to State Lighting Engineer:

- Completed Lighting Permit (if applicable) N/A
- Lighting Plans (See FDM 15-1 Attachment 5.14 Sample Design Sheet). Include applicable plan details.
 - Miscellaneous Quantities
 - SPVs
 - Wiring Diagram per Sample Design Sheet
 - List of SDDs included in the Lighting Plan
- Voltage Drop Calculations for lighting (include festoon outlets where applicable)
- This Completed Checklist signed by Designer.

The following shall also be verified/checked by designer

- Miscellaneous Quantities/SPVs match the Plans.
- SPVs for luminaires on permitted projects specify compliance with permit conditions.
 - N/A
- On permitted projects, if banners, holiday decorations, or festoon outlets are to be installed or attached to the poles, the dimensions and locations must be included and shown on a detail drawing. The pole manufacturer needs this information for their pole design calculations. N/A
- The Designer has checked the design for completeness and correctness.

CONTINUOUS LIGHTING ILLUMINATION APPLICATION

DT1886 4/2015 s.84.02(4)(c) Wis. Stats.

Wisconsin Department of Transportation
State Project Number

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

- This completed DT1886 Continuous Lighting 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.
- Brief description of the project

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

Highway	Lighting Limits
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Project Lighting Engineer Name, Mailing Address and Telephone

County	Posted Speed Limit mph	ADT	Cross Section Rural	Urban	Roadway Width ft
Road Class		Area Class		Pavement Class	
<input type="checkbox"/> Major	<input type="checkbox"/> Minor Arterial	<input type="checkbox"/> Commercial	<input type="checkbox"/> Residential	<input type="checkbox"/> R1	<input type="checkbox"/> R3
<input type="checkbox"/> Collector	<input type="checkbox"/> Other	<input type="checkbox"/> Intermediate		<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 LED Category	Mounting Height Above Pavement				
Target Illuminance Values					
Average FC	Uniformity Ave/Min	Average cd/m sq	Veiling Luminance Ratio LV(max)/Lavg	Uniformity Ave/Min	Max/Min

The designated engineer requests permission to begin the design of highway lighting within the limits of the right of way of the state trunk highway, all as described above.

X

(Lighting Engineer)

(Date – m/d/yy)

APPROVAL

Permission is granted to begin the highway lighting design as described above and per the attached drawings and specifications.

CONTINUOUS LIGHTING

Approved for Division of Transportation System Development

X

(Signature)

(Date Reviewed – m/d/yy)