

JOHNSON COUNTY SECONDARY ROADS

Destination Lighting Policy

PURPOSE:

The purpose of this policy is to provide for the uniform application of criteria used to assist in determining whether destination lighting should be provided at various types of intersections throughout the Secondary Road System in Johnson County. For destination lighting to be effective, it should be installed in accordance with criteria uniformly established and in a cost-effective manner. This policy enhances the safe use of the Johnson County Secondary Roads System and provides for continuity with State Primary Roads and adjacent Secondary Roads.

SCOPE:

This scope of this policy pertains to the use of destination lighting for intersections on roads under the jurisdiction of the Johnson County Secondary Roads Department. The destination lighting policy for the County conforms to the Traffic and Safety Manual for lighting of rural intersections as adopted by the Iowa Department of Transportation. This policy provides guidance applicable to Johnson County Secondary Roads and outlines the basis for the engineer's determination of when and how to provide proper destination lighting at intersections.

OBJECTIVE:

The objectives of this policy are to establish when destination lighting should be considered, and to delineate where destination lighting shall be placed to enhance the safe use of secondary roads within the Secondary Roads System.

DEFINITIONS:

Destination lighting - Lighting of an intersection for the purpose of providing a means for the driver of a vehicle to visually locate the intersection at a distance and to be guided to the intersection with minimum distraction to through traffic. A destination lighting installation consists of a single luminaire per intersection. Lighting placed for the purpose of highlighting or attracting the attention of through traffic to the existence of an intersection or the possibility of conflicting turning movements at night.

Intersection lighting - Lighting of an intersection for the purpose of facilitating traffic movements and enhancing safety by improving the visibility of roadway features and objects on or near the roadway. The number of luminaires in this type of lighting installation will vary depending on the intersection configuration and the required lighting level.

Minor road - For the purpose of this policy, a minor road is an entrance to a primary road from a frontage road, a rural commercial establishment, a governmental agency facility, a generator of substantial traffic volume, or a secondary road.

Right-of-way - Land for any public road, street, or highway, including the entire area between the property lines.

Rural intersection - An intersection occurring on or outside a corporate line.

Average Daily Traffic (ADT) - Average daily traffic is the traffic count on any road based on the official counts conducted by the Iowa Department of Transportation. These counts are based on actual field data and traffic engineering studies.

VPD - Vehicles per day.

Channelized Intersection - An intersection with permanent delineation devices separating lanes such as islands, concrete barricades or raised curb sections.

T-Intersection - An intersection where one road terminates at another road so that the resulting intersection resembles the letter "T".

P.C.C. - Portland Cement Concrete.

A.C.C. - Asphalt Cement Concrete

Seal Coat (Chip Seal) - Asphalt Cement with crushed rock surface

Paved Road - Road Surfaced with A.C.C. or P.C.C.

PROCEDURE:

The following criteria (warrants) shall be used to determine if a Secondary Roads intersection is a candidate for destination lighting. However, meeting the criteria does not obligate Secondary Roads to provide lighting or to participate in lighting costs. Funding for lighting projects is measured in relation to the needs of the entire road system and not by the criteria established by this policy. The Secondary Roads Department may consider installation of destination lighting fixtures to existing power poles located near secondary roads intersections that meet the following requirements*.

*The Johnson County Engineer may evaluate paved or seal coat surfaced roads not meeting all of the stated requirements for application of destination lighting in special circumstances. Situations that may warrant special considerations include: temporary destination lightings, low visibility, horizontal and vertical curves, and specified detour routes for construction projects. In addition to the installations enumerated above, additional lighting as part of this policy may be evaluated for use when deemed appropriate by the County Engineer.

Proposed new or redesigned/reconstructed intersection

The intersection is a candidate for destination lighting if the intersection:

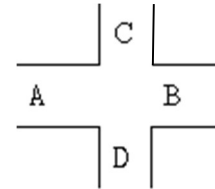
- A. Has current average daily traffic (ADT) exceeding 1750** entering vehicles and has a speed limit exceeding 45 mph, and
- B. Is a seal coat or paved road, or
- C. Is channelized or "T".

**Regardless of volume, the intersection may be a candidate for destination lighting if the County Engineer has documentation of motorists experiencing operational problems that could be reduced by the installation of a destination light and in accordance with the Local Road Safety Plan.

Existing intersection

- A. The request for lighting an existing intersection shall be submitted in writing to the Johnson County Engineer.
- B. The engineer shall then evaluate the request against intersection and destination lighting warrants and determine whether intersection or destination lighting is recommended.
- C. The engineer shall notify the requester of the results of the review. If lighting is recommended, the County Engineer shall proceed with lighting installation.
- D. The intersection is a candidate for destination lighting if one of the following criteria is met:
 - 1. The night-to-day crash ratio is 1.0 or greater with a minimum of 2 reportable nighttime crashes in a 5-year period.
 - 2. The warrants for destination lighting of new or redesigned/reconstructed intersections are met.
 - 3. After making the following calculations, the value of "c" exceeds 3000 points:

Calculation of "c"



Major traffic flow: A to B & B to A
 Minor traffic flow: C to D & D to C
 Possible left turns: A to C, B to D, C to B, & D to A

	Sight Distance	Speed Limit	Approaching Traffic
Actual A:	_____	_____	_____
Actual B:	_____	_____	_____
Standard sight distance*:	900 ft.	55 mph	
	800 ft.	50 mph	
	700 ft.	45 mph	
	600 ft.	40 mph	
	550 ft.	35 mph	

*Current AASHTO Passing Sight Distances shall be used. The values shown are from the 2018 AASHTO Elements of Design

SAF = Safety Adjustment Factor

$$SAF = \frac{\text{Standard sight distance}}{\text{Actual sight distance}} \times \frac{\text{Actual approaching traffic}}{1000}$$

$$\begin{aligned}
 \text{"A" SAF} &= \text{SSD/ASD} \times \text{AAT/1000} &= \\
 \text{"B" SAF} &= \text{SSD/ASD} \times \text{AAT/1000} &= \\
 \text{GSAF} &= \text{Greater Safety Adjustment Factor} &= \\
 &= \text{Greater "A" SAF or "B" SAF} &= \\
 \text{GSAF} \times \text{Traffic from C to D} & &= \\
 \text{GSAF} \times \text{Traffic from D to C} & &= \\
 \text{GSAF} \times \text{Traffic from C to B} \times 1.5 & &= \\
 \text{GSAF} \times \text{Traffic from D to A} \times 1.5 & &= \\
 \text{"A" SAF} \times \text{Traffic from B to D} \times 1.5 & &= \\
 \text{"B" SAF} \times \text{Traffic from A to C} \times 1.5 & &= \\
 & & \text{-----} \\
 \text{"c"} &= &
 \end{aligned}$$

INTERSECTION LIGHTING FOR RURAL PRIMARY/SECONDARY INTERSECTIONS:

See Administrative Rule - 761 IAC 136.1.

LIGHTING DESIGN REQUIREMENTS:

The design of a lighting installation for a road intersection shall comply with Secondary Roads specifications and Standard Road Plans for highway lighting. The County Engineer shall consider sustainable technologies, which will be considered on a submittal basis, as an alternative to the following general requirements:

- A. The electrical distribution system shall be adequate for the intended loads. Where breakaway poles are to be installed, the electrical distribution system shall be underground from the point of delivery. Where wood poles are allowed, the electrical distribution system may be underground or overhead. All underground circuits shall be in conduit. Conduit risers on wood lighting poles shall be placed away from traffic.
- B. The luminaire shall normally be placed to the left of traffic approaching the secondary or minor road. "All way" stop intersections shall be evaluated on a case-by-case basis.
- C. The typical distance from the near edge of the road traveled way to a light pole on the shoulder of the minor road shall be 48 feet.
- D. All light poles adjacent to paved roadways shall be mounted on breakaway bases unless an existing pole is recommended for use. The pole footings shall be constructed with the top surfaces flush with the ground surface.
- E. A breakaway light pole shall be placed with optimum lateral clearance. Lateral clearance is the distance between the edge of shoulder and the face of the pole. The breakaway pole must be placed within a zone that will optimize the height of impact due to the bumper trajectory of a vehicle leaving the shoulder at high speed, yet provide a minimum clearance for snow removal. The optimum lateral clearance is typically achieved when the breakaway pole is placed 2 feet beyond the shoulder-foreslope break point.

- F. For unpaved roads, where breakaway design is not required, the maximum normal horizontal mastarm span of 15 feet should be used. Location of the pole in relation to the centerline of the minor road should be determined such that an acceptable compromise between illumination, clear zone, drainage, and right-of-way considerations is achieved.
- G. Typically, placement of the mastarm and luminaire in relation to the secondary or minor road shall be as follows:
1. The mastarm shall be placed at a horizontal 90 degree angle to the centerline of the secondary or minor road, with an allowable tolerance of minus 2 to plus 2 degrees. The mastarm requirements are as follows:

Type of Roadway	Shoulder Width	Mastarm Length	Lateral Clearance
paved	2 feet	4 feet	2-3 feet
paved	4 feet	6 feet	2-3 feet
paved	6 feet	8 feet	2-3 feet
paved	8 feet	10 feet	2-3 feet
paved	10 feet	12 feet	2-3 feet
unpaved	none	15 feet	as applicable

Mastarm length may vary from the chart only if the requirements for overhang and lateral clearance are met.

2. The luminaire should be mounted so that the center of the light source, approximately 1.5 feet from the edge of the luminaire, overhangs the near edge of the pavement (or if unpaved, the edge of the roadbed) from minus 1 to plus 3 feet.
- H. The luminaire shall be specifically designed for highway lighting. The luminaire shall have a totally prismatic, enclosed refractor designed for horizontal lamp operation. The luminaire shall be rigidly mounted and shall have ANSI/IES "CUTOFF" glare control. Recommended light distribution is ANSI/IES Type II-M or Type III-M. The use of high pressure sodium luminaires is recommended, however, LED may be considered.
- I. The vertical distance between the center of the light source and the surface of the roadbed is the mounting height.
1. For intersection lighting, the recommended mounting height is 50 feet. Lower mounting heights will be considered with adequate justification; however, the minimum mounting height is 40 feet.
 2. For destination lighting, the minimum mounting height is 30 feet. A mounting height of 35 or more feet is desirable.
 3. Maximum lumen outputs for corresponding mounting heights are as follows:

Mounting Height	Maximum Lamp Lumen Output	Mercury Vapor	High Pressure Sodium
30-34 feet	11,000	H37KB-250	S54SB-100
35-49 feet	20,000	H33-1CD	S55SC-150
50 feet	30,000	H33-1CD	S50VA-250

MAINTENANCE AND CONTINUED USE:

The service life of destination lighting fixtures and luminaries depends on many factors including quality of equipment, type of support, weather conditions and other. Cost-effectiveness is the deciding factor for the selection of luminaries by the Johnson County Engineer. Changes in facilities can also negate the continued use of such lighting. Examples of this include improved signage reflectivity or placement, intersection geometry, and surface delineation. The Johnson County Engineer will determine when and whether replacement of luminaries is necessary.

In case of annexations from other governmental agencies or road vacations, the destination light will become the financial and maintenance responsibility of the new entity. If the designated entity does not take over responsibility, the County Engineer will request removal from service the destination light to the representative power company or direct removal of other power sources.