

# MEMORANDUM

CITY/BOROUGH OF JUNEAU  
155 South Seward Street, Juneau, Alaska 99801

**DATE:** January 17, 2013  
**TO:** Planning Commission  
**FROM:** Ben Lyman, Senior Planner  
Community Development Department  
**FILE NO.:** CSP2013 0001; and,  
CSP2013 0002

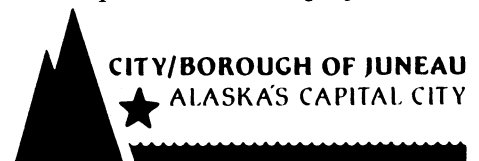


**PROPOSAL:** Illuminate Egan Drive from Norway Point to the McNugget\* Intersection; and, a related easement on municipal property for an electrical connection to support an ADOT project for a continuous lighting system along Egan Drive.

\*Although the description of the project submitted by the applicant states that it will extend to the McNugget Intersection (Glacier Highway and Egan Drive near the Nugget Mall and McDonald's), the project plans show the northwestern limit of the project to be at the intersection of Yandukin Drive and Egan Drive, approximately 4,000 feet to the southeast of the McNugget Intersection. The applicant has stated that this is correct, and that the continuous lighting will extend to the McNugget Intersection, but that the proposed project terminates at Yandukin Drive.

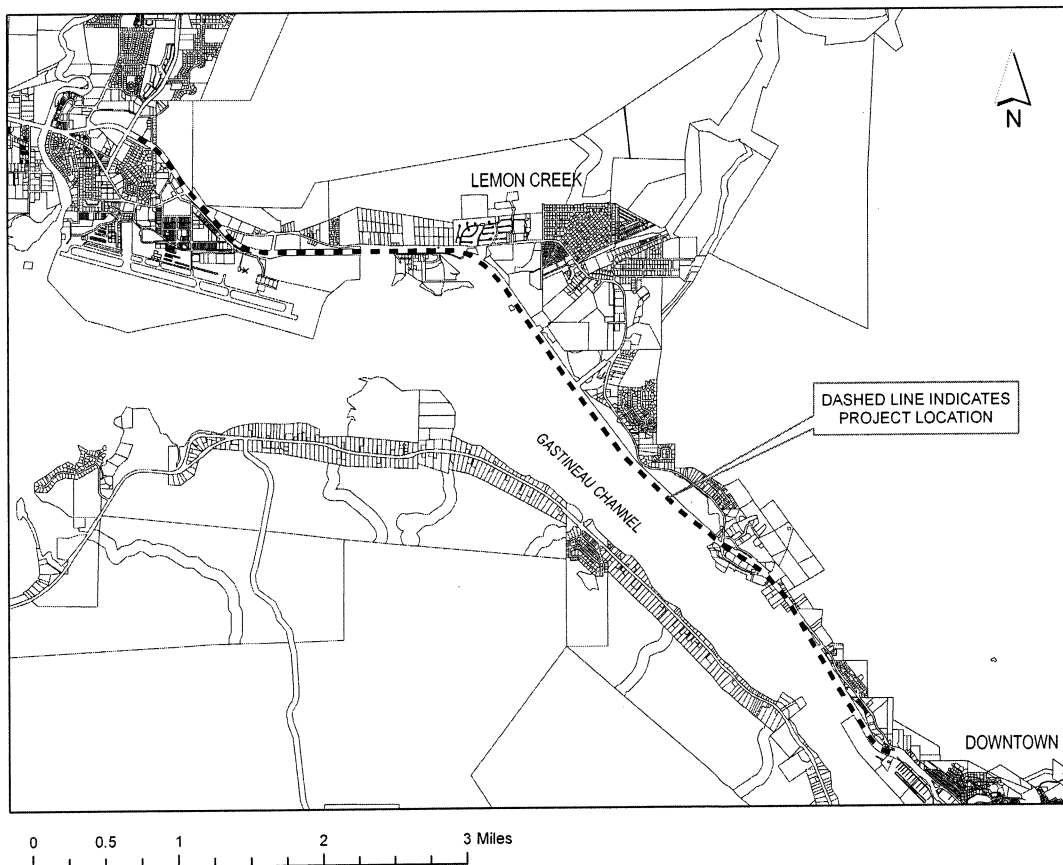
## GENERAL INFORMATION

**Applicant:** State of Alaska  
**Property Owner:** State of Alaska; and,  
City and Borough of Juneau  
**Property Address:** Egan Drive; and,  
Glacier Highway  
**Site Size:** Approximately Six Miles in Length  
**Comprehensive Plan  
Land Use Designation:** N/A (Varies)  
**Zoning:** N/A (Varies) – Arterial (Egan Dr.) and Collector (Glacier Hwy.)  
**Utilities:** Water and Sewer - N/A; Electricity will be provided in this project



Existing Land Use: Limited-Access Highway (Arterial); and,  
Separated path, vegetation, and lake at easement location

Surrounding Land Use: North - Varies, Generally Developed  
South - Varies, Generally Un-Developed/Mendenhall Wetlands  
State Game Refuge  
East - Varies, Generally Developed  
West - Varies, Generally Un-Developed/Mendenhall Wetlands  
State Game Refuge



### **BACKGROUND**

The Alaska Department of Transportation and Public Facilities (DOT&PF) and Federal Highway Administration (FHWA) propose to install lighting along the length of Egan Drive, where no lighting currently exists.

Local review and concurrence is required for State projects by CBJ §49.15.580 State project review:

The commission shall review proposed Alaska State Capital Improvement Projects for consistency with this title pursuant to AS §35.30.010, and may impose conditions on and modifications to such projects.

The applicant states that “during lowlight or night driving, drivers go in and out of lighted areas as they progress along Egan Drive. The varying light conditions require the eyes of drivers to repeatedly adjust to available light. When drivers’ eyes do not adequately respond to light conditions, the ability of the drivers to perceive and judge distance is impaired, and the risk of accidents increases. DOT&PF’s proposed solution is a comprehensive lighting system that would help reduce the number and severity of accidents.”<sup>1</sup>

Although most of the project will occur within the existing right-of-way (ROW) for Egan Drive, the project calls for connecting the Egan Drive lighting system to the electrical grid where Glacier Highway and Egan Drive are closest to one another, between the north and south Twin Lakes. This property is owned by the City and Borough of Juneau, and a utility and maintenance easement will be required for this connection to be made. The location of the proposed connection is shown on Sheet R6, and detailed on Sheet R13.

CBJ §49.10.170(c) specifies that:

The commission shall review and make recommendations to the assembly on land acquisitions and disposals as prescribed by title 53... The report and recommendation of the commission shall be based upon the provisions of this title, the comprehensive plan, and the capital improvements program.

CBJ §53.09.310 describes the process for granting an easement on municipal property, with the Community Development Department (referred to as “the planning department”) and Planning Commission’s roles specifically identified at (c); (d) and (e) are also provided for reference:

*(c) Departmental and planning commission action.* The application for the easement shall be referred to the planning department and public works department for comment. The manager may refer the application to other departments which may have an interest in the parcel subject to the proposed easement. Upon receipt of the comments of other departments, the planning department shall refer the application and departmental comments to the Planning Commission for its recommendation to the Assembly. The Planning Commission may hold a public hearing on the application prior to making its recommendation.

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<sup>1</sup> Request for Scoping Comments, Dec. 27, 2012; Project #67402 / EBL-0932 (50)

- (d) *Assembly action.* Upon receipt of the Planning Commission Recommendation, the Assembly may, by resolution, authorize the manager to execute the easement under such terms and conditions as are authorized by the Assembly.
- (e) *Survey.* Prior to the execution of an approved easement, the applicant shall provide a survey of the easement to the standards required by the Manager.

Comments on the proposed project were solicited from CBJ Departments; the only comment received was from Lands Manager Heather Marlow, who noted that an easement would be required for the electrical connection at Twin Lakes.

### ANALYSIS

The proposed project is intended to improve public safety within the Egan Drive corridor. No data regarding the number or severity of vehicle crashes due to intermittent light conditions is available for this corridor; the two fatal crashes that occurred on Egan Drive in 2011 and 2012 (one each year) were both outside the project area. The *Review of the Safety Benefits and Other Effects of Roadway Lighting: Final Report*<sup>2</sup> states that lighting a roadway has an average estimated impact of reducing nighttime crashes by 23%. This report summarizes its findings as:

- Published studies having different methodologies tend to converge on an overall average reported 20% to 30% reduction in nighttime crash risk from lighting.
- The positive safety benefit of roadway lighting appears to grow larger with increased roadway geometric complexity, population density and has the largest benefit at locations with pedestrian activity. The effect is smallest at locations where there are the fewest opportunities for pedestrian conflict and for conflicting traffic patterns such as midblock locations.
- While a broad understanding of the role that lighting plays in reducing nighttime crash risk can be gleaned from the literature, there is much less certainty with respect to *why* lighting appears to reduce the risk of crashes, and what specific aspects of lighting (illuminance/luminance, glare, uniformity, distribution of light, spectral power distribution) have the greatest effect on safety-related outcomes. Although the role of lighting for supporting visibility has been studied extensively, but with many different methodologies, a theoretical bridge between visibility and safety has not been established...<sup>3</sup>

In its discussion on the relative safety benefits resulting from various types of roadway improvements, the *Review of the Safety Benefits and Other Effects of Roadway Lighting: Final*

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<sup>2</sup> National Cooperative Highway Research Program, Transportation Research Board of The National Academies, 2009, Table 1

<sup>3</sup> Ibid, p. 22-23

*Report* lists “Illumination” as the top improvement by benefit/cost ratio (26.8).<sup>4</sup>

Beyond its intended safety benefits, the proposed project will also increase the risk and amount of potential light pollution around the project area. The *Review of the Safety Benefits and Other Effects of Roadway Lighting: Final Report* discusses light pollution:

Light pollution is an unintended consequence of roadway lighting and includes such effects as sky glow, light trespass, and glare. Sky glow is the brightening of the sky due to outdoor lighting and is usually objected to because it inhibits one’s ability to see and appreciate the stars. Light trespass is light falling where it is not wanted or needed. Light from a streetlight or a neighbor’s floodlight that illuminates one’s bedroom at night is an example. Glare is excessive brightness causing discomfort or visual disability and a good example is an unshielded luminaire where the lamp can be directly seen.

Aside from potentially interfering with the enjoyment of the nighttime surroundings, light pollution can also have detrimental environmental impacts. Street lighting on coastal roadways can be visible from beaches and can disrupt [habitat]...

Recommendations to mitigate light pollution resulting from roadway lighting are given in various lighting publications and guidelines. Suggestions for reducing light pollution include avoiding excessive lighting to minimum recommended light levels including light levels on the windows of residences on adjacent properties to avoid light trespass, using cutoff luminaires to reduce the amount of light emitted directly upward by the luminaires, selecting appropriate luminaire lamp spectrum (e.g., to take advantage of improved peripheral visibility provided by lamps with “whiter” color than high pressure sodium lamps most commonly used for roadway lighting), using efficient lamp technologies, and using lighting zones (defining limits on light pollution based on the characteristics of a local area [e.g., in downtown Manhattan, even relatively large amounts of light trespass might have negligible impacts, whereas in environmental preserves, small amounts of light trespass will be unacceptable]) to limit lighting depending on the population. None of these approaches are entirely successful at limiting light pollution, partly because equipment-based proscriptions do not guarantee against light pollution and partly because the characteristics of adjacent properties are rarely known by the roadway lighting engineer...

Many states have adopted legislation controlling outdoor lighting, more states have pending outdoor lighting bills in front of their legislators. Numerous adopted and pending local ordinances pertain to the lighting of cities, towns, and counties. Legislation typically includes requirements for full cutoff luminaires, minimum light levels, lumen or wattage limitations, light source limitations, controlled operating periods, curfews, and

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<sup>4</sup> Ibid, Table 5

the elimination of certain kinds of lighting... In addition to preserving dark skies, legislation is being justified on the basis of minimizing wasted energy and money, reducing unwanted light on adjoining properties (such as light in bedroom windows), reducing glare, and preserving animal breeding and migration habitats.

Luminaires are designed to have lighting distributions that are appropriate for specific applications. Virtually any luminaire can generate sky glow, light trespass, and glare if installed improperly or in the wrong application. These problems can be avoided by selecting luminaries that have the appropriate distribution for the application and installing them correctly to limit spill light and uplight. Although the goal may be to eliminate light pollution, in some locations light pollution cannot be avoided altogether...<sup>5</sup>

Staff discussed the potential issue of light pollution with the applicant, who stated that the project contractor, USKH, had considered using LED lights instead of the High-Pressure Sodium (HPS) lights that will be installed under this project. Although DOT&PF staff are interested in investigating the use of LED lights, which use much less electricity than do HPS lights, as well as giving off a whiter light as suggested by the statement that “improved peripheral visibility [may be] provided by lamps with “whiter” color than high pressure sodium lamps,”<sup>6</sup> this type of lighting has not been used on state roads in Alaska to date, and DOT&PF staff are not comfortable using Egan Drive as a pilot project.

Furthermore, *LED Street Lights in Alaska: Final Report*<sup>7</sup> concludes that:

- 1) Two of the LED street lights tested (Beta 40 and Dolphin 90) need improvement in minimum average illuminance along the roadway in order to meet AASHTO standards. This would mean that the Beta 40 LED light would need to operate on the high driver setting and that we would need to install a Dolphin 120 LED light at a minimum to avoid the need to space the poles closer together.
- 2) The marked decrease in power consumption achieved by performing a strict replacement of an HPS street light with an LED street light that meets AASHTO standards given the current pole placement provides a considerable reduction in annual electricity costs. However, the simple payback given the capital and installation cost of the LED lamps has been shown to exceed 20 years given 1000 lamps at \$1100 each including installation and a \$0.15/ kW-hr energy cost.
- 3) Reduction in the color temperature of LED street lights is needed to help alleviate the reflection or halo effect that researchers on this project and others observed with the

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<sup>5</sup> Ibid, p. 32-34

<sup>6</sup> Ibid, p. 32

<sup>7</sup> University of Alaska Fairbanks, Institute of Northern Engineering, Report # FHWA-AK-RD-XX-XX

4000 K or 5000 K color temperature of the shorter wavelength blue spectrum light. This is particularly an issue for those wearing prescription glasses with ultraviolet protective coating that refracts more of the shorter wavelength light.

In general these findings suggest that LED street lights need improvement in illuminance and color quality before they are considered as strict replacements for HPS street lights. To that end, increased illuminance will likely require the use of more LEDs resulting in higher power consumption and less energy savings over continuing to use the HPS street lights.<sup>8</sup>

For these reasons, DOT&PF proposes to use HPS fixtures in the project. LED fixtures could be installed at a future date, when the technology has been improved in illuminance and color quality.

#### **CONFORMITY WITH ADOPTED PLANS**

Although the City and Borough of Juneau does not have local ordinances regarding light pollution, CBJ §49.40.230(d) restricts parking lot lighting to “full cutoff” fixtures that direct light directly down in order to reduce light pollution. The applicant has stated that although the fixtures are described as “cutoff” on Sheet R21, Note 8, they will be full cutoff fixtures and not “drop” or “sag” fixtures that create glare.

The Comprehensive Plan includes a Policy and an Implementing Action that are directly related to the proposed project:

**POLICY 7.1. IT IS THE POLICY OF THE CBJ TO PROTECT THE REGION’S SCENIC, ENVIRONMENTAL, AND ECONOMICALLY-VALUABLE NATURAL RESOURCES FROM THE ADVERSE IMPACTS OF URBAN DEVELOPMENT. DEVELOPMENT SHALL BE CONTROLLED CAREFULLY AND, IF NECESSARY, PROHIBITED IN NATURALLY HAZARDOUS AND ECOLOGICALLY-PRODUCTIVE OR SENSITIVE AREAS.**

7.1.IA4 Adopt a “dark sky” outdoor lighting code and require adherence to this code in rural areas of the CBJ from which stars and the aurora borealis can be viewed. Those areas should be protected from glare from outdoor lighting that obscures those sightings.

While the proposed project has the potential to create light pollution and to impact night-time scenic opportunities throughout the project area, the project area is not rural, and the proposed full-cutoff lighting fixtures will not create glare.

The proposed project is consistent with adopted plans.

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<sup>8</sup> Ibid, p. 16-17

### **HABITAT**

The project area crosses seven anadromous fish streams, and is directly adjacent to the Mendenhall Wetlands State Game Refuge (the refuge) for much of the project. Although the proposed illumination could impact these habitat areas, the Alaska Department of Fish and Game (ADF&G) has submitted comments<sup>9</sup> that no ADF&G permits will be required for the project, and that the project will use “full cut-off light fixtures that will minimize the amount of light that will spill over into the refuge.”

CBJ §49.70.905(12) states that “To the extent feasible and prudent, development shall not detract from the scenic qualities of the shorelines, shall be compatible with its surroundings, and shall not significantly block scenic vistas.

CBJ §49.70.925 refers to avoiding alteration of water courses and preventing habitat disturbance in transportation and utility projects. The proposed project will occur within the existing developed right-of-way, and will not require any new fill or disturbance to anadromous streams or the refuge.

No bald eagle nests have been documented within 330 feet of the project area.

### **FINDINGS**

The proposed project is a public safety project that is consistent with adopted plans, and with CBJ 49, the Land Use Code.

### **RECOMMENDATION**

Staff recommends that the Planning Commission find that the proposed project, to illuminate Egan Drive continuously from Norway Point to the McNugget Intersection, is consistent with adopted plans of the CBJ, and to endorse the project as required at CBJ §49.15.580 and AS §35.30.010.

Staff further recommends that the Planning Commission recommend that the Assembly approve an easement for electrical utilities and maintenance where electrical conduit is proposed to cross CBJ property between North and South Twin Lakes, as required at CBJ §53.09.310.