Department of Agriculture, Conservation and Forestry

MAINE LAND USE PLANNING COMMISSION

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Assessing and Minimizing Visual Impacts to Scenic Resources from Communication Towers

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This document is intended solely for guidance to Commission staff and the public when assessing and minimizing visual impacts from proposed communication towers. The document may not be relied upon to create rights, substantive or procedural. The Commission reserves the right to act in a manner that may vary from this document, consistent with its statute and regulations. Nothing in this document shall be construed to supersede or replace the statute, rules and Comprehensive Land Use Plan administered by the Commission.

I. INTRODUCTION

In recent years, a number of applications have been filed with the Commission for construction of new communications towers. These towers may be for public entities such as for emergency communications, or may be for the provision of private communications services, such as cellular telephone service.

Proposals to develop communication towers can vary widely, especially given the rate of technological change within the telecommunications field. The purpose of this document is to help establish a consistent, predictable review process for proposed communication towers in the areas served by the Land Use Planning Commission (the U.T.). This guidance does not address every eventuality, but rather communicates a general approach for reviewing and assessing individual proposals, while providing a few simple tools to assist with project review.

II. COMMUNICATION TOWERS POLICY

There are a number of communication towers in the U.T., and many more in nearby organized Minor Civil Divisions (MCDs), which help provide some level of telecommunication services within the U.T. The 2010 Comprehensive Land Use Plan (CLUP) notes that "As people become accustomed to having ready access to these cellular services, there will be increased pressure for the development of this infrastructure within the jurisdiction. Advancements in communication technologies provide new economic opportunities to previously isolated areas. These advancements increase employment opportunities for those who wish to live in relatively remote areas and work out of their homes" (2010 CLUP, pg. 109).

In light of a likely steady increase in demand, the Commission has developed policies for siting new towers, encouraging the co-location of services on existing infrastructure, and providing for the de-commissioning and removal of unused towers in the event they are abandoned for an extended period of time.

III. PROPOSAL REVIEW

New communication towers are "Utility Facilities", which include, without limitation: "radar, radio, television, or other communication facilities…and associated infrastructure such as towers and related equipment" (Chapter 10, Section 10.02, 213). Utility Facilities are an allowed use in certain

subdistricts[1] either by permit or special exception. Some subdistricts have additional requirements, such as compatibility with existing recreational or residential uses.

To be permitted, new towers must meet statutory criteria for approval, as described in 12 M.R.S. § 685-B(4); be an allowed use in the applicable subdistricts, as described in Chapter 10, Land Use Districts and Standards; and meet any additional applicable Chapter 10 standards (e.g., dimensional requirements, noise and lighting, etc.).

A. REVIEW CRITERIA RELATING TO POTENTIAL VISUAL IMPACTS

New communication towers have the potential to create significant visual impacts and, as a result, must be sited to fit harmoniously with their surroundings and not create any undue, adverse impacts on scenic character or historic resources. Review of proposals to develop new towers focuses in particular on potential visual impacts. These impacts are evaluated under 12 M.R.S. §685-B, and the Commission's rules, Chapter 10, Land Use Districts and Standards. The Commission's application of the applicable statutes and regulatory provisions may be informed by several relevant policies described in the Comprehensive Land Use Plan.

1. *CONSISTENCY WITH TITLE 12*

Proposals for new communication towers must meet statutory review criteria, which include:

12 M.R.S §685-B(4)

*"**Criteria for Approval.** In approving applications submitted to it pursuant to this section, the commission may impose such reasonable terms and conditions that the commission determines appropriate in order to fulfill the requirements and intent of this chapter, the comprehensive land use plan and the commission's standards, or denying approval of the application as proposed…*

The burden is upon the applicant to demonstrate by substantial evidence that the criteria for approval are satisfied, and that the public's health, safety and general welfare will be adequately protected…"

12 M.R.S §685-B(4)(C)

> *C. "Adequate provision has been made for fitting the proposal harmoniously into the existing natural environment in order to ensure there will be no undue adverse effect on existing uses, scenic character, and natural and historic resources in the area likely to be affected by the proposal…"*

2. *CHAPTER 10, LAND USE SUBDISTRICTS AND STANDARDS*

In addition to being an allowed use in the relevant subdistrict, proposals for new communication towers must also meet all of the standards described in Chapter 10, Land Use Districts and Standards. Each proposal will vary, and different standards in Chapter 10 may be more or less relevant depending on the characteristics of the project. For example, if the facility includes a back-

[1] Allowed as use requiring permit or by special exception in: D-CI; D-ES; D-GN; D-GN2; D-GN3; D-RB; D-RF; D-RS; D-RS2; D-RS3; M-GN; P-AR; P-FP; P-FW; P-GP; P-GP2; P-MA; P-RR; P-RT; P-SG; P-SL; P-UA; and P-WL subdistricts.

up generator, noise produced by the generator must meet the noise standards described in Chapter 10, Section 10.25,F. However, development standards regarding scenic character are particularly relevant to communication towers and are described in more detail below.

"Section 10.24, C

Adequate provision has been made to fit the proposed development harmoniously into the existing natural environment in order to assure there will be no undue adverse effect on existing uses, scenic character, and natural and historic resources in the area likely to be affected by the proposal.

Section 10.25, E

Scenic Character:

a. *The design of proposed development shall take into account the scenic character of the surrounding area. Structures shall be located, designed, and landscaped to reasonably minimize their visual impact on the surrounding area, particularly when viewed from existing roadways or shorelines.*

b. *To the extent practicable, proposed structures and other visually intrusive development shall be placed in locations least likely to block or interrupt scenic views as seen from travelled ways, water bodies, or public property.*

c. *If a site includes a ridge elevated above surrounding areas, the design of the development shall preserve the natural character of the ridgeline."*

The scenic character of an area can be negatively affected by the number of new towers constructed in order to provide telecommunication services. In order to minimize the number of towers necessary to adequately address existing gaps in coverage, the Commission encourages the co-location of service providers on shared infrastructure. If a new communications tower is necessary in order to provide adequate services, then the proposed location must account for the scenic character of the area, and reasonably minimize potential views from existing roadways or shorelines.

Co-location (also sometimes spelled "collocation") refers to when more than one antenna or transmitter is located on a single tower. The principal benefit from co-location is that fewer towers are needed to serve a given area. This can help reduce cumulative visual impacts of towers in a region, but could potentially lead to taller towers that have more room for additional service providers in some locations.

Specifically, the Commission requires that "communication towers be made available for other users where feasible in order to limit the number of such towers" (2010 CLUP, pg. 8). This policy intends to minimize the potential cumulative visual impacts stemming from duplicative facilities while still allowing for the development of necessary infrastructure needed to provide adequate network coverage and serve customers in remote locations in the state. Applicants should include, in applications for a development permit, a demonstration that co-location on another tower is not practicable, and a description of how future services may co-locate on the proposed new tower.

Permits for new towers should include conditions requiring the owner of the communication tower to allow for future co-location of services.

3. COMPREHENSIVE LAND USE PLAN

Pursuant to 12 M.R.S. §685-C(1) "the Commission must use the plan (the CLUP) as a guide in developing specific land use standards and delineating district boundaries and guiding development and generally fulfilling the purposes of this chapter." While proposals must meet the statutory review criteria and all applicable standards described in rule, the CLUP includes some materials relevant to communication towers and may be used by the Commission to guide interpretation and application of the standards.

Relevant excerpts from the CLUP regarding communication towers include:

C. Site Review (CLUP page 7)

"Goal: Assure that development fits harmoniously into the existing communities, neighborhoods and the natural environment."

"Policies (1): Require that provision be made for fitting development harmoniously into the existing natural environment, including: a) Requiring the use of buffers, building setbacks, height restrictions, design and materials standards, lighting standards, and landscaping to minimize the impacts of land use activities upon one another and to maintain the scenic quality of shorelines, hillsides, ridgelines, and roadways…"

D. Infrastructure (CLUP, page 8)

"Goal**:** Ensure that infrastructure improvements are well planned and do not have an adverse impact on the jurisdiction's principal values."

"Policies 5 & 6: 5) Require that highly visible facilities such as communication towers be dismantled and removed from the site when they are unused for an extended period of time; and 6) Require that communication towers be made available for other users where feasible in order to limit the number of such towers."

J. Scenic Resources (CLUP, page 18)

"Goal: Protect the high-value scenic resources of the jurisdiction by fitting proposed land uses harmoniously into the natural environment."

"Policy: 1) Establish, and refine as needed, scenic evaluation methodologies to aid in reviewing development proposals; and 2) Identify and protect areas that possess scenic features and values of state or national significance."

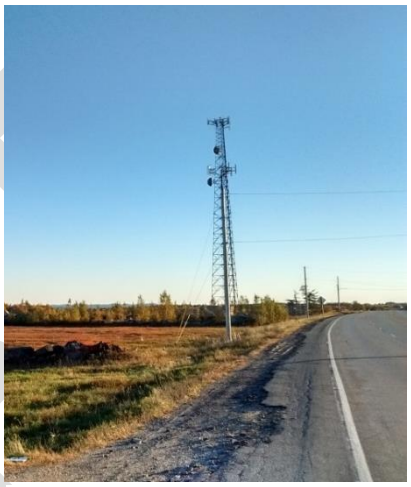
If there are no opportunities for co-location and a new tower is necessary to provide adequate level of services, the Commission may, and typically will, require a Visual Impact Assessment (VIA) to demonstrate that proposals meet the review criteria. Visual Impact Assessments are discussed in Section III.C., below.

B. VISUAL IMPACTS: TOWER DESIGN AND LOCATION

New communication towers generally need to be taller than their surroundings to provide adequate coverage. As a consequence, communication towers stick out and can potentially disrupt or alter views. The design and location of proposed communication facilities can greatly influence what kind of visual impacts are likely from a proposed facility.

1. TOWER DESIGN

Generally the Commission sees proposals for monopole type and lattice type towers. The two types can create different levels of visual impact, depending on different design components and the proposed location.


Lattice Tower, WA County

Monopole type towers generally can be up to 100' Above Ground Level (AGL[2]) without guy wires, and can be much taller with additional structural support. In order to achieve the necessary height to support adequate coverage areas they may need to be fairly tall, requiring either a more robust mast, or guy wires to safely support the structure. Guy wires allow construction of taller, skinnier, cost-effective towers that would otherwise be structurally unsound. However, the addition of guy wires can potentially impact birds and mammals, which can collide with, or become entangled by, the additional structural elements. A monopole tower can also have smooth or less textured surfaces than other designs, which can increase its contrast with the landscape in the background, particularly if it is brightly colored, and may make the structure more reflective and obtrusive.[3]

Lattice, or self-supporting type, communication towers can be quite tall and support more antennas and other appurtenances[4] at a greater height due to their structural stability, increasing co-location opportunities for future service providers. These towers generally have 3-4 steel "legs" and hold a variety of antennas that can support various telecommunications services. Due to their height and variety of appurtenances, these towers can potentially be quite visually disruptive. However, despite being large and quite visible, their textured appearance can sometimes help them blend into the background, particularly if unlighted and painted a flat, neutral color (such as gray or forest green if located in front of a forested backdrop). The lattice structure of the tower is broken up and

[2] "Above Ground Level", or "AGL", is a term used by the FCC to describe the elevation of the highest point of a communication tower.

[3] For a more detailed discussion of viewer perceptions of texture and color, please see: *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands, Bureau of Land Management, 2013, Section 2.2*.

[4] The FCC uses the term "appurtenances" to describe antennae and other hardware mounted on the tower, on or within the base station.

consists of many small pieces, reducing contrast with the background. and allowing the viewer to essentially see through the structure, as opposed to viewing one smooth surface. [5]

Factors such as height, lighting, design, and construction materials can make a difference in the visibility of a new facility. Towers over 200 feet tall are required by the Federal Aviation Administration to have strobe lights, so as to be visible to passing aircraft. These lights are intended to contrast starkly with their surroundings and are highly visible during the day and even more so at night when viewed against a darkened sky. Bright colors, smooth surfaces, or other discordant structural features can increase the tower's contrast with its background, making it more visible. The addition of guy wires can also potentially make the tower more visible as they increase the total area occupied by the development within the viewscape, and create straight edges for the viewer, the irregularities of which can attract attention when viewed in contrast with a surrounding natural setting.

Reflection of lighted communication tower off of nearby waterbody
(Photo courtesy of Terrence J. DeWan & Associates.)

2. *Tower Location*

The proposed location of a new communication tower can determine who, and how many people, are likely to have regular views of the tower, and how noticeable those views might be, given the context. The farthest distance at which buildings and other structures are recognizable, depending on topography and other landscape characteristics, is generally 3-5 miles. Beyond 5 miles, definition of sharp lines begins to soften and a structure will likely become less recognizable and

[5] For a more detailed discussion of viewer perceptions of texture and color, please see: *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands, Bureau of Land Management,* 2013, Section 2.2.

more just a part of the background.[6] The exception to this is a lit structure, which can be recognizable at greater distances both at night and during the day. The context of the viewer is also a factor. Views of a tower from a public road in a developed setting would likely be less noticeable than those from a well-traveled hiking trail on a mountaintop in a remote setting, primarily because of the expectations of viewers.

When assessing potential visual impacts in both natural and developed settings, it is necessary to know what kind of scenic resources are present and what kinds of views users of those resources may expect. Views of towers from certain settings can potentially be discordant enough to change a viewer's perception of the landscape type. For example, lit towers, sited in locations where people do not expect to see artificial lights and where viewers expect to have a primitive, remote experience (such as one might encounter while visiting Baxter State Park), can fundamentally change an individual's perceptions about what type of landscape (natural vs. developed) they are in, or moving through, and may adversely impact their experience. Potential visual impacts from a new tower are likely to be greater for more primitive landscapes, while the same proposal may be less impactful to already developed landscapes.

This guidance document does not address cumulative visual impacts, which can be thought of as the accumulation of visual impacts from one or more sources resulting in the degradation of important visual resources across the landscape. However, it is important to note that cumulative visual impacts from development of new communication towers in the U.T. are possible despite Commission policies on co-location and decommissioning.

C. VISUAL IMPACT ASSESSMENT

The VIA is a tool that the Commission can use to assess potential visual impacts from proposed development to waterbodies, travelled ways, or public property. Effective VIAs use existing information, predictive modeling techniques, and simulations, to accurately and impartially communicate the implications of potential visual impacts from proposed development.

The process to develop a robust VIA includes the following steps: 1) establish an "Area of Potential Effects" (APE); 2) inventory potentially affected resources within the APE; 3) agency concurrence with list of potentially affected resources and the proposed methodology for analyzing visual impacts; 4) analysis and possibly simulation of potential views from affected resources; and 5) submission of the VIA with an application for a development permit.

1. AREA OF POTENTIAL EFFECTS (APE)

The APE is an established distance from the proposed tower, in all directions, within which the reviewing agency (e.g., LUPC) will assess potential visual impacts. Generally, the APE determines where the applicant should search for public resources that potentially could have a view of the proposed tower. Larger or smaller APEs may be appropriate depending on the characteristics of a proposed facility. Proposed tower height, design, and location can be used to approximate likely

[6] For a more detailed discussion of how distance affects visual acuity, please see: *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands, Bureau of Land Management,* 2013, Section 2.2.

visual impacts, but each proposal is different and there are some factors that can affect how large an APE the agency may recommend. No matter the size of the APE, its outer limit should not be a "hard line". If a significant public resource exists just outside of the APE, then the applicant's methodology should include consideration of potential visual impacts.

APEs referred to in this guidance document are designated by the Commission to assess potential visual impacts to scenic resources such as publicly travelled ways, waterbodies, or public lands. Assessment of potential impacts to historic resources is a separate process, conducted with advice from the Maine Historic Preservation Commission or tribal historic preservation officials and may require surveying existing structures within a larger or smaller area, depending on site characteristics.

Table A (shown below) is based on the Commission's past experience permitting communication towers, and on available information about visual impacts from new facilities (described in more detail in Section III,B,1 & 2). Table A may be helpful in determining the appropriate APE for a VIA, based on a proposed tower's approximate height and the general context of a proposed location.

Table A: General guidelines for designating an APE for proposed new communication towers

Landscape Type (viewer expectations)	3 Mile APE	5 Mile APE	8 Mile APE
Natural (undeveloped)	0-100' AGL	100-200' AGL	200'+ AGL
Rural (Low density development)	0-150' AGL	150-200' AGL	200'+ AGL

In some instances, there may be reason to change the size of the APE due to specific characteristics of the proposal. Factors that may influence potential visual impacts and the size of the APE include:

- **Presence of scenic resources.** If there are unlikely to be sensitive shorelines, recreational or community resources, or other similar features nearby, than the Commission may require a smaller APE. However, if a project is located near sensitive shorelines and other recreational or community resources, then the Commission may require a larger APE.

- **Design characteristics.** Generally, the smaller a proposed tower, considering height, mast width, and construction materials, the less visually disruptive it is likely to be. If the proposed design would lead to greater visibility than a typical communication tower, then the Commission may request a larger APE. If a tower is intended to be temporary, then a smaller APE may be sufficient to assess potential visual impacts.

- **Landscape type.** A communications tower proposed in a natural setting, which may be clearly visible due to its design or lack of vegetative screening, may contrast significantly with its undeveloped surroundings and have greater visual impact on the scenic character of the area then a similar tower in a developed setting. Therefore, the Commission may designate a larger APE in order to fully assess potential views of some towers from nearby publicly traveled ways, waterbodies, or public lands. In more developed settings, a new

tower that may be visible from publicly travelled ways, waterbodies, or public lands may contrast less with its already developed surroundings and so a smaller APE may be more appropriate for some towers.

2. Inventory and Identification of Potentially Affected Resources

The applicant conducts a desktop inventory of the area within the APE and identifies any potentially affected resources within the APE. These could include public lands, trails, travelled ways, waterbodies, buildings listed on the national historic register, and other public resources of local significance. The applicant demonstrates where the proposed tower would be located in relation to all potentially affected resources on a map. The map should clearly show and identify:

- The location of the tower and potentially affected resources;
- Topographic information;
- Land cover information (if available)
- Travel ways;
- Scale and legend;
- Water bodies; and
- Other relevant information.

Including this information will assist the Commission in evaluating whether the proposal meets statutory criteria and applicable standards described in Chapter 10, Land Use Districts and Standards. However, the Commission also recognizes that each proposal will include different characteristics and that there may be many ways for an applicant to provide adequate information for the Commission to make a determination on whether the standards have been met.

In order to determine if any potentially affected resources identified in the inventory would have views of the proposed tower, the applicant may decide to use GIS software to spatially model areas within the APE that may have views of the tower. This inventory is submitted to reviewers along with a list of potentially affected resources. For instances in which the proposed tower would be unlikely to generate significant visual impacts (e.g., it is not very tall or may be in a location unlikely to have significant scenic resources), it may be appropriate for the applicant to submit alternative materials, such as photos or maps, to show likely areas from which the proposed tower may be visible instead of modeling information.

VIAs may require different levels of assessment, depending on the type of landscape and the scale of the project being proposed. For smaller towers proposed in locations where impacts are unlikely to be significant, due to distance from any significant scenic resources, it may be sufficient for applicants to investigate potential impacts in a smaller area closer to the proposed site, and to use less technical methods of analysis.[7] For larger-scale projects, or those closer to sensitive resources, it may be appropriate to investigate a wider area, and to use predictive modeling techniques to formally simulate potential impacts.

[7] For example, meteorological towers are temporary structures with fairly low visibility, and may not necessarily warrant a full GIS spatial analysis or photographic simulations of potential views. Meteorological towers are not discussed in detail in this guidance document, but the guidelines for assessing visual impacts, described in Section III, B & C are also applicable to meteorological towers.

3. Review of Pre-application Materials and Concurrence with Methodology

The Commission's review of the pre-application submission should provide guidance to the applicant regarding the proposed methodology for analysis of visual impacts, and on which potentially affected resources to focus more time and effort during analysis. This step in the process is an opportunity for applicants to talk to Commission staff informally about the proposed project and for staff to ask questions or provide more feedback about methods of analysis that would provide sufficient information for staff to make a determination.

4. Analysis and Simulations

Once Commission staff have concurred with the inventory and proposed VIA methodology, the applicant analyzes potential visual impacts in the field. This step in the process can include obtaining local knowledge from credible sources, conducting a balloon test or some other form of field verification and, if necessary, generating a photo simulation for areas where the proposed tower would potentially create significant visual impacts. Different analytic methods may include but are not limited to:

- *Map and Photo Demonstrations:* the applicant may submit: topographic maps showing the proposed location of the tower and identifying likely locations where it may be seen based on design characteristics (e.g., height, type, lighting, site elevation and intervening topography); and photographs of the proposed site from potentially affected resources to illustrate intervening topography.

- *Balloon Test/Photo Simulation:* the applicant may fly two weather balloons on a tether at the approximate height of the proposed tower, while another member of the team travels to each potentially affected resource and takes high resolution photographs of the balloons. The resultant photographs provide a strong indication of where the proposed tower may be visible. In those locations where the balloons are visible, the applicant may create a photo simulation of the proposed tower to illustrate what it would look like from that location.

The balloon test/photo simulation, or a similar technique, may be required if the proposed tower is located near significant resources and would likely be quite visible due to design characteristics such as height, lighting, or a lack of vegetative screening or intervening topography. For example, a 200 foot AGL lattice type tower is potentially quite visually obtrusive, and may warrant a balloon test and photo simulation if there are significant resources in the area.

Staff may also ask the applicant to obtain local knowledge about likely impacts from a credible source such as: local boards or representatives of boards; local recreational organizations or trail clubs; small business owners/operators (e.g., recreational lodging facility owners, or Maine Guides); game wardens or other knowledgeable resource agency staff who may commonly work in the area; or foresters who work in the area. Staff may direct applicants to obtain local knowledge in order to identify additional potentially affected resources for consideration in the VIA, but should avoid advising applicants on which individuals the agency would consider to be credible. Providing some guidance about the types of local knowledge considered by the agency to be credible may be helpful for the applicant and reduce the time they spend obtaining this kind of information.

5. Submission of VIA and Development Permit Application

After analyzing potential visual impacts on potentially affected resources, the applicant then submits the completed VIA with other application materials for review by the Commission and other review agencies such as Maine Historic Preservation Commission (MHPC).

The VIA should include:

- A statement from the applicant, or its agent, providing details about why it chose the proposed location and how the proposed tower would help address existing gaps in coverage, why co-location on another existing tower is not an option, and proposed strategies to mitigate potential visual impacts (e.g., reducing the size of the proposed tower, painting structures a neutral color, etc.);
- The type, and frequency of use of potentially affected resources, particularly waterbodies and other recreational resources;
- Any other information that may help to illustrate the degree to which potential views of the proposed tower have been minimized; and
- Sufficient demonstration that the proposed location will satisfy all other review criteria[8].

In summary, a sufficiently robust VIA includes the following four components:

1. *Inventory and Identification of potentially affected resources* within the established APE, consisting of a map, a list of potentially affected resources, and a description of the proposed strategy to assess potential impacts;
2. *Analysis of potential visual impacts and response to agency review of pre-application materials,* which may include: information about potentially affected resources such as the type and frequency of use of these resources; discussion of the likelihood of visual impacts based on analysis; and information obtained from credible local sources;
3. *Documentation of an appropriate analysis methodology* that visually conveys more information about potential views identified during analysis through photos, simulations, and/or field notes; and
4. *Narrative* that describes how the proposal meets the review criteria, and any strategies to minimize or mitigate potential impacts.

[8] This includes addressing any questions brought up during review of pre-application materials.