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City of Gainesville Policy Program
Preliminary Research & Analysis

TOPIC: Pedestrian Lighting

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REQUESTED BY: Commissioner Hayes-Santos

QUESTION

Explore the effects of good and bad lighting in communities and how to create good lighting standards to promote pedestrian and driver safety.

EXECUTIVE SUMMARY

The recent increase in outdoor dining in Gainesville, due to the COVID-19 pandemic, has shed light on some of the areas where Gainesville's street and site lighting regulations can be updated. New technologies and uses for the benefit of neighbors and businesses, are the focus of the City. Recommendations for updating Gainesville's lighting code, which has been a priority of past City Commissions, include reevaluating the lighting requirements of different areas on a more specific basis and integrating new lighting technologies, such as LED lighting and proper shielding to reduce light pollution. Some form of these methods are in use in cities across the globe to promote the health and safety of residents. There are a number of benefits that may arise from improving lighting, most notably including an increase in safety on the part of neighbors. However, if not carefully implemented, the benefits of increased lighting can have neutral or negative effects on public safety and may raise environmental concerns. Through consultation with various stakeholder entities and environmental groups, it may be advised to update Gainesville's lighting code to better keep neighbors and businesses safe.

HISTORY/BACKGROUND INFORMATION

Gainesville, Florida

Historically, ensuring that the neighbors and businesses in the City of Gainesville have access to lighting that is both sufficient, specifically in regards to ensuring pedestrian and driver safety, and environmentally friendly has been a major focus of the Commission and staff. In 2013, Gainesville completed a two-year pilot program with the aim to replace a number of the common high pressure sodium cobra streetlights with more energy efficient LED lights. The purpose of replacing the old lights was to "evaluate the savings potential of LED streetlights in downtown Gainesville."[1] Three years later in 2016, the City, Gainesville Regional Utilities (GRU) and the Public Works Department, collaborated with the University of Florida to improve the safety of Downtown and reduce crime in areas that are poorly lit. Upgrades to lighting were done across the city including in Sorority Row, along Northeast 8th Ave and in parts of the Duckpond neighborhood, with additional upgrades planned on Northwest 3rd Ave.[2]

An important differentiation that must be made is the separation of "street lighting" from "outdoor/site lighting." While the terms are easily interchangeable, each type of lighting is treated differently under Gainesville's code and are managed by different departments. "Street lighting" is defined as "lights installed along public thoroughfares"[3] and is the main source of lighting present in the downtown area. Private streets are also required to comply with the "street lighting" standards. GRU and the Public Works Department are responsible for the supply of electricity to and maintenance of the approximately 12,000 street lights along Gainesville's roadways. "Outdoor/site lighting" refers to lighting present on public and private sites and can interact with street lighting.[4] Gainesville's Department of Sustainable Development is the entity that is responsible for regulating outdoor/site lighting. The "Outdoor/site lighting" regulations are designed to create outdoor lighting that protects and promotes the public health, safety, and welfare, promotes safety and security in vehicular use areas and protects properties. The "Outdoor/site lighting" regulations are designed to create outdoor lighting that protects and promotes the public health, safety, and welfare; promotes safety and security in vehicular use areas; protects properties, the environment, and the night sky from adverse lighting impacts such as light pollution; promotes energy and resource efficient lighting; and encourages the use of Crime Prevention Through Environmental Design (CPTED).

Crime Prevention Through Environmental Design (CPTED) is a multi-disciplinary approach to crime prevention utilizing urban and architectural design and the management of built and natural environments. CPTED strategies aim to reduce victimization, deter offender decisions that precede criminal acts, and build a sense of community among inhabitants so they can gain territorial control of areas, reduce crime, and minimize fear of crime.[5] In 2014-2015, the Gainesville Police Department (GPD)

[1] http://www.cityofgainesville.org/PublicWorks/ProgramsandServices/StreetLighting.aspx
[2] https://www.gainesville.com/article/LK/20160109/News/604142725/GS
[3] Chapter 27 Article II Sec. 27-29. - Public streetlights—Generally.
[4] Calderon L. (2021, January) Gainesville City Planner III, personal communication
[5] https://www.cpted.net/

partnered with the Department of Sustainable Development to incorporate CPTED principles into the lighting ordinances for both site and street lighting.[6] An example of this partnership are the changes to the lighting criteria mandated in areas near dumpsters.[7] Criminals were previously using this poorly lit area to commit crimes and our lighting ordinance was updated to address this gap. Currently, pedestrian lighting is not addressed in our Site Lighting ordinances. Enhancing the requirements for buildings built adjacent to sidewalks and roadways[8] based on CPTED principles should be considered. Attention should also be given to incorporating CPTED design principles into the City's Building and Lighting Codes. One of the primary concerns present is the perceived extra cost and burden to development. However, as Dr. Randall Atlas of the American Society of Industrial Security has stated "If security is treated as one of the many design requirements, then the implementation and costs for such measures will be no more a burden to the project owners than fire safety features or landscaping requirements."[9]

Part of the interest in the adequacy of Gainesville's lighting is the result of the rapid introduction of outdoor dining, in response to the onset of the COVID-19 pandemic. Limitations were set on the occupancy levels of many restaurants and businesses to slow the spread of the virus, and the implementation of outdoor dining was encouraged as a way to assist restaurants while also keeping neighbors safe. The City gave temporary authorization to many restaurants to set up outdoor dining in right-of-way areas and went as far as blocking off certain streets. While this has been beneficial to both businesses and neighbors, it has raised concerns about quality of lighting in certain areas. To this end, a reevaluation of current lighting across the city could be helpful to address these concerns. In order to determine if all lighting should be reevaluated, the future of outdoor dining in right-of-way areas and in certain streets should first be addressed. If it is determined that outdoor dining will remain as it is in a post COVID-19 environment, then the inclusion of street lighting in the affected areas should be included. If outdoor dining will return to its pre-pandemic levels, then a focus on outdoor/site lighting would be more useful.

An additional focus of lighting, is the interactions between street lighting and site lighting. There are regulations in place to mitigate areas of inconsistent lighting in certain areas, such as the entrances to parking garages and the transition between parking lots and businesses. However, the problem of inconsistent lighting is still present along many pedestrian walkways, especially those along some of the newer developments around the city.[10] Inconsistent and inadequate lighting can be a safety issue for pedestrians and bicyclers.

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[6] Kurnick, J. (2021, February). *Crime Prevention Through Environmental Design*. Presented at the meeting of the City of Gainesville General Policy Committee, Gainesville, Florida.

[7] https://library.municode.com/fl/gainesville/codes/code_of_ordinances?nodeId=PTIICOOR_CH30LADECO_ARTVIDEST_DIV3GEST_S30-6.12OULI

[8] Kurnick, J. (2021, February). *Crime Prevention Through Environmental Design*. Presented at the meeting of the City of Gainesville General Policy Committee, Gainesville, Florida.

[9] https://www.experts.com/articles/architectural-security-integrating-security-with-design-by-randall-atlas

[10] Calderon L. (2021, January) Gainesville City Planner III, personal communication

The regulations surrounding outdoor lighting focus on placement and types of lighting. The placement of streetlights takes into consideration both proper illumination and the avoidance of excess light pollution. Energy efficiency and ensuring that lights are not on during the daytime are also prioritized.[11] Standard lighting requirements along local residential streets includes the placement of lighting fixtures at critical areas such as intersections, high volume driveway connections, and curves. Between intersections, mid-block fixtures are generally installed every 200 to 300 feet to avoid large dark spaces. To mitigate excessive light pollution, all lighting on primary and connector roadways must be designed to meet particular photometric requirements that are based on the city's adopted practice."[12] Other restrictions focus on limiting the height of public lighting. Currently, lighting is limited to 15ft in parking lots but is allowed to exceed 30ft in outdoor recreational areas where it is deemed appropriate. In all areas, lighting cannot "exceed an average vertical illuminance of 0.5 foot candles at a height of five feet above the mounting height of the highest luminaire."[13]

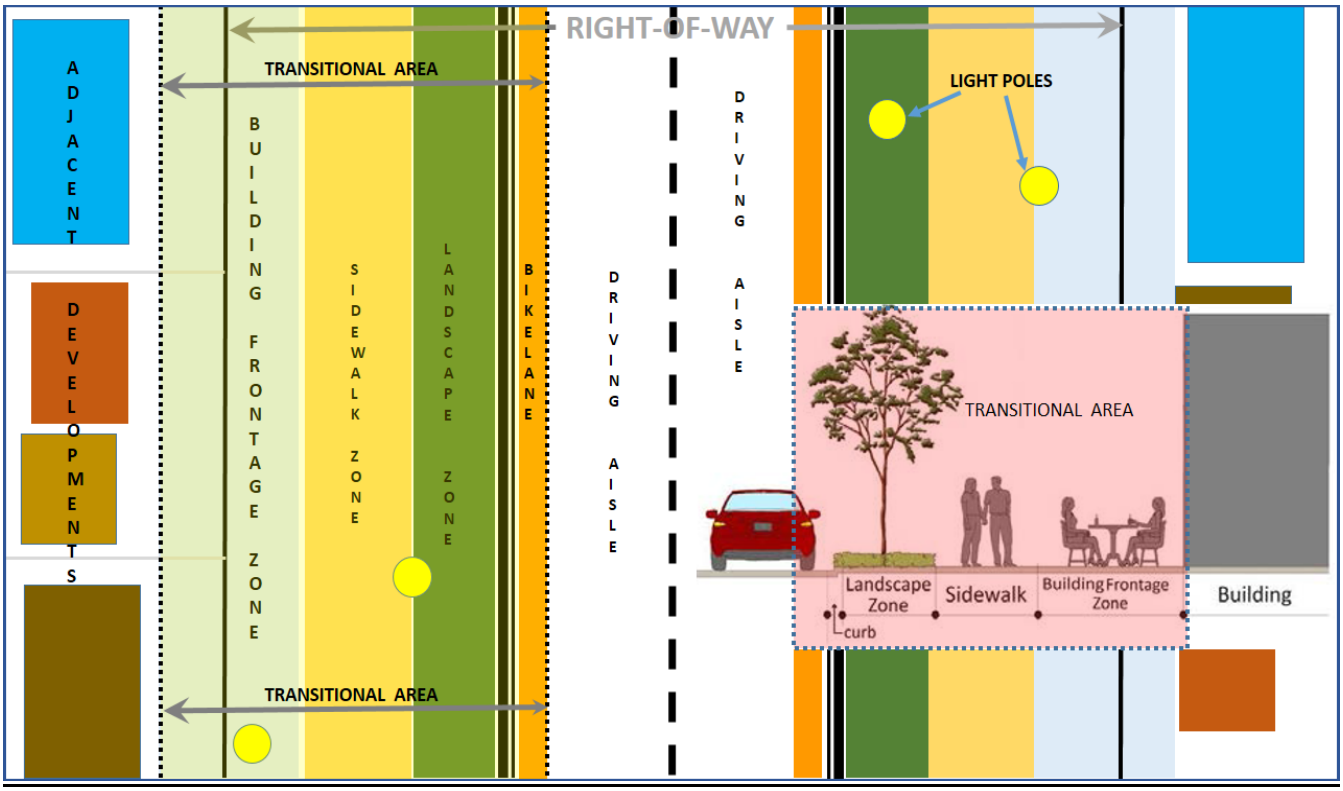
Pedestrian Lighting

One notable issue is that Gainesville has a set of lighting regulations specifically related to rights-of-way (Streets, Alleys, Public and Private Routes, and Private streets). Those regulations are found in the FDOT's "Florida Greenbook", Chapter 6, and Lighting[14][15]. It recommends that, "…Lighting of independent sidewalks or shared use paths should be evaluated on a project specific basis. Considerations include the likelihood of night time use, the role of the facility in the community's bicycle and pedestrian network, and whether alternatives are available for night time travel …" There is another set of regulations, in the Gainesville Land Development Code, Sec.30-6.12 Outdoor Lighting [16], applicable to individual development sites.

The roadway lighting focuses on lighting for the roadway corridor, which includes the pedestrian route – "The Sidewalk", which is one component of the right-of-way. Detailed Sidewalk lighting within the right-of-way is addressed in some cases but in general is covered under the general heading of Roadway Lighting. The Gainesville site lighting ordinance, Sec. 30-6.12, addresses the issues of pedestrian lighting in a more comprehensive manner and covers all types of pedestrian activities on development site.[17] There is a transitional area of activities occurring between the face of buildings on private development site and the driving aisle, within the roadway which contains a significant amount of bicycle, scooter and pedestrian activities. That area of primarily "Pedestrian Activity", has not been adequately addressed in the context of outdoor lighting and remains deficient in terms of pedestrian lighting, see Figure 1.[18]

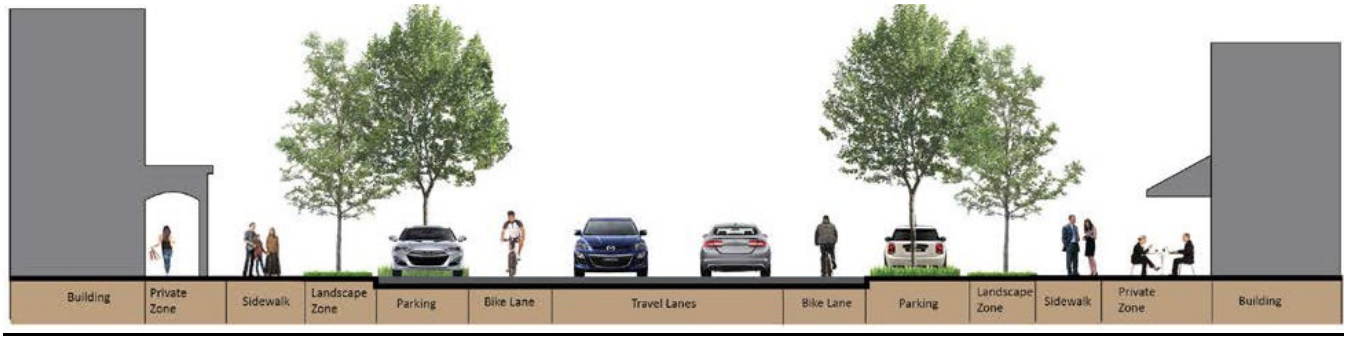
[11] Chapter 27 Article II Sec. 27-29. - Public streetlights—generally.
[12] http://www.cityofgainesville.org/PublicWorks/ProgramsandServices/StreetLighting.aspx
[13]https://library.municode.com/fl/gainesville/codes/code_of_ordinances?nodeId=PTIICOOR_CH30LADECO_ARTVIDEST_DIV3GEST_S30-6.12OULI
[14] L. Calderon, Gainesville City Planner III, personal communication, February 2021
[15] FDOT Manual of Uniform Minimum Standards for Design, Construction and maintenance for Streets and Highways ("Florida Green Book")
[16] City of Gainesville, Land Development Code, Sec. 30-6.12. Outdoor Lighting.
[17] Calderon L. (2021, January) Gainesville City Planner III, personal communication
[18] Calderon L. (2021, January) Gainesville City Planner III, personal communication

Figure 1.
Transitional Activity Area between Adjacent Development and Driving Aisle



The Transect Zoning Districts clearly recognizes and addresses this pedestrian transition area through the various street frontage standards: Building Placement, Building Frontage, Landscape, Sidewalks and Public Realm Zones[19] See Figure 2. Similar to the Transect Zoning approach, we can design lighting standards that adequately address pedestrian activities occurring within this area.

Figure 2.
Transitional Activity Area between Adjacent Development and Driving Aisle



[19] Calderon L. (2021, February) Gainesville City Planner III, personal communication

Sidewalks primarily occur within the right-of-way, but occasionally are placed on private property adjacent to the right-of-way. When sidewalks occur on private property, they are subject to the site lighting ordinance and the appropriate standards are applied. On the other hand, when they occur within the right-of-way, they become subject to the general roadway lighting regulations which does not explicitly address the need for a focused approach to sidewalk lighting.[20]

Lighting of independent sidewalks or shared use paths within the right-of-way should be evaluated on a project specific basis. Considerations include the likelihood of night time use, the role of the facility in the community's bicycle and pedestrian network, and whether alternatives are available for night time travel.[21]

Advantages and Disadvantages of Increased Outdoor Lighting

Increasing the amount of street lighting in an area can have a number of positive effects on a community. The primary impact that street lighting can have is its effect on pedestrian safety, as sufficient street lighting has the potential to positively impact both the perceptions and reality of pedestrian and road safety.[22] [23] Additionally, lighting has been demonstrated to slightly reduce the amount of crime in areas where it is implemented. A working study on certain housing projects in New York City has shown a reduction in night-time crime rates of around 30% when lighting towers were installed.[24] It must be noted that the lighting towers used in this study were significantly brighter than ordinary streetlights and were not designed to be a part of the natural urban landscape.

An increase in lighting downtown may also be beneficial for businesses since it could encourage customers and patrons to stay out past sunset. This benefit may be better realized after daylight savings time when the sun sets much earlier. The feelings of increased comfort when streets are well lit is tied to the natural human fear of the dark which lighting can ease. A British study published in the international journal, Health & Place, found mixed reactions to an experiment in which public lighting was turned off at midnight in certain villages surrounding London.[25] Through the study, researchers "identified little direct impact from lighting reductions on determinants of health such as mobility or fear of crime, [although] at a social level reduced street lighting may have significant effects in urban and suburban settings where residents associate well-lit streets with competent and trustworthy government."[26] The biggest take away from this study is that the presence or absence of public lighting has more important social effects than direct public health benefits or drawbacks. Since good street lighting can be correlated with a strong local government capable of providing basic services, the lack of adequate lighting can be indicative, in the minds of residents, of a weaker government. While

[20] Calderon L. (2021, February) Gainesville City Planner III, personal communication
[21] Calderon L. (2021, February) Gainesville City Planner III, personal communication
[22] https://jech.bmj.com/content/69/11/1118
[23] https://theconversation.com/the-science-of-street-lights-what-makes-people-feel-safe-at-night-103805
[24] https://www.nber.org/system/files/working_papers/w25798/w25798.pdf
[25] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4509526/
[26] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4509526/

increased lighting might not drastically affect levels of crime, it has the potential for increasing the confidence of residents in the ability of the local government to provide for their basic safety needs. However, increased street lighting is not without potential side effects. The biggest drawback of increased street lighting is the potential for increased light pollution and impacts to the "Dark Sky." Dark Sky refers to a set of policy suggestions and guidelines aimed at ensuring that lighting is area-appropriate in terms of intensity and that the amount of light pollution affecting the environment is kept to a minimum.[27] There can be many ecological impacts of light pollution, one impact is the effect on our local bat population. The City is home to the Lubee Bat Conservatory, the "largest and most diverse collection of fruit bats in the world."[28] Specifically, an increase in light pollution can interrupt the feeding patterns of Gainesville's local bat population leading to a reduction in their population.[29] The effects of light pollution on humans is also well documented with interruptions to sleep patterns being a root cause of many health issues.[30] A 2018 study, published in the *Special Issue: Artificial Light at Night as an Environmental Pollutant* of the JEZ-A Ecological and Physiology journal, found that those living in areas where there is an abundance of artificial lighting go to bed later and have less restful sleep.[31] This can be attributed to many factors, but the increase in blue light from LED equipped streetlights has been shown to affect the ability of the human brain to fall into a deep sleep.[32]

PRELIMINARY RESEARCH AND FINDINGS

Fort Collins, Colorado

The City of Fort Collins, Colorado has drafted new regulations to "reduce light trespass, glare, artificial night glow, and obtrusive light; protect the local natural ecosystem from damaging effects of artificial lighting; and encourage quality lighting design and fixtures."[33] They have created Lighting Context Areas where certain levels of artificial light are permitted. These range from LC0, where no ambient lighting is permitted (generally in nature areas), to LC3 where moderately high ambient lighting is permitted. LC3 areas include areas where "lighting is generally desired for safety, security, and/or convenience and is often uniform and/or continuous."[34] These designations are aimed at ensuring that areas have the appropriate amount of light dependent on the activity and wildlife typical to that area. A gradient for lighting levels can help to address issues of light pollution and improper lighting levels. In addition to lighting context areas, Fort Collins also implemented limitations on when artificial lights can be used as well as their brightness. Artificial lighting around businesses must be reduced by at least 50% during closed hours or after a certain time dependent on which lighting context area the business is located in.

[27] https://www.darksky.org/our-work/
[28] https://www.floridamuseum.ufl.edu/bats/
[29] https://doi.org/10.1289/ehp.117-a20
[30] (http://www.sciencedirect.com/science/article/pii/S0306987711004762)
[31] https://doi.org/10.1002/jez.2189
[32] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4734149/
[33] https://www.fcgov.com/developmentreview/files/final-draft_lighting.pdf?1604350398
[34] https://www.fcgov.com/developmentreview/files/final-draft_lighting.pdf?1604350398

Limitations on the number of lights and the lumens, intensity, of those lights also follow similar guidelines.[35]

Key West, Florida

The City of Key West, Florida is significantly smaller than Gainesville but has a robust downtown area with similar qualities to Gainesville's downtown. The Key West Public Works Department is responsible for maintaining lighting fixtures across the city[36] while the publicly owned Keys Energy Services is responsible for the maintenance of all public security and street lighting.[37] Like Gainesville, Key West does not classify public street lights into categories. Street lights are regulated under Exterior Lighting with "Street lighting … installed on all internal and perimeter streets, within parking areas, and along pedestrian walkways."[38] Additionally, it is required that streetlights be installed at all intersections, at the end of cul-de-sacs, and in the middle of blocks longer than 900 feet for the safety and welfare of the general public. The city engineer and commission also reserve the right to require additional street lighting beyond the specified locations if there is a need.[39]

Beyond these regulations, Key West states that all "Light sources shall be shielded and arranged to eliminate glare from roadways and streets and shall be directed away from properties lying outside the district."[40] Proper shading of public lighting on buildings to prevent light spillage and glare onto roadways is also required and neon signs, flashing lights, or other lighted signs are prohibited in mixed-use planned redevelopment/development districts.[41] To protect the natural environment, any lighting in beachside parking lots must be low-intensity and not visible from the beach and any residential lights must be shielded from the beach.[42] This is, in part, done to prevent hatchling sea turtles from becoming confused and unable to determine which way the ocean is.[43]

Pittsburgh, Pennsylvania

The City of Pittsburgh, PA focuses heavily on the sustainability and environmental impact of its public lights.[44] Unlike Gainesville, their lighting code categorizes public lighting into 6 classes. These are Class 1

[35] https://www.fcgov.com/developmentreview/files/final-draft_lighting.pdf?1604350398
[36] https://www.cityofkeywest-fl.gov/308/Public-Works
[37] https://www.keysenergy.com/customer-service-requests/
[38]https://library.municode.com/fl/key_west/codes/code_of_ordinances?nodeId=SPBLADERE_CH108PLDE_ARTIIISIPL_S108-284EXLI
[39]https://library.municode.com/fl/key_west/codes/code_of_ordinances?nodeId=SPBLADERE_CH118SU_ARTIVREIMDECR_DIV6STOTRI-W_S118-479STLI
[40]https://library.municode.com/fl/key_west/codes/code_of_ordinances?nodeId=SPBLADERE_CH108PLDE_ARTIIISIPL_S108-284EXLI
[41]https://library.municode.com/fl/key_west/codes/code_of_ordinances?nodeId=SPBLADERE_CH107PLREDEDI_ARTIIDEPLPL_DIV1GE_S107-36SHLI
[42]https://library.municode.com/fl/key_west/codes/code_of_ordinances?nodeId=SPBLADERE_CH110REPR_ARTIVCORE_S110-183LIMARE
[43] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4892457/
[44]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.01COSU

Roadway, Class 2 Public Realm, Class 3 Residential, Class 4 Commercial, Class 5 Industrial, and Class 6 Decorative.[45] Of these classifications, Public Realm and Commercial are most applicable. Lights falling into the Public Realm are "All exterior lighting used for, but not limited to, illumination for walkways, parking areas (including garages), and outdoor security, where general illumination for circulation, safety, or security of the illuminated area is the primary objective." Commercial lights are "Any lighting used for exterior illumination of a storefront, office building, multi-unit dwelling, restaurant, or commercial establishment, that is not considered part of public realm."[46]

In order to reduce the amount of light pollution that comes from these lights, Pittsburgh requires that all lights be designed to reduce light spillage, usually through the use of shielding, and has set the limit on the amount brightness lights are allowed to produce to less than 14,000 lumens.[47] To ensure compliance with these regulations, any company or business that wants to install more outdoor lighting must submit an application that includes plans for how the new lighting will follow the lighting codes. Any changes after the approval of plans must be resubmitted to the relevant office for additional approval.[48] The Pittsburgh Department of Public Works is responsible for enforcement of the code and any violations of it are subject to a $100 per day fine.[49]

Orlando, Florida

The City of Orlando's outdoor lighting regulations are intended to prevent or mitigate the negative effects of light pollution and to promote energy conservation.[50] Orlando's regulations apply to all exterior lighting other than for single family homes, duplexes, and agricultural use.[51] To ensure that the regulations are followed, any installation or operation of exterior lighting is subject to approval from a City official in the Planning Department via an official Lighting Approval Plan. There are a few exemptions from this approval process, namely for historical landmarks, preapproved temporary improvements, and in instances where there is not a "substantial improvement to the outdoor lighting system of a building or site."[52] Outdoor Lighting Plan applications must, at minimum, include a photometric plan showing the

[45]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.04LICL
[46]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.04LICL
[47]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.06LIPO
[48]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.09SUPLEVCO
[49]https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITTWELVELICO_CH1201LICO_S1201.13ENPE
[50]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.400PUIN
[51]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.401SC
[52]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.403OULIPLAPRE

layout of all planned lighting for the site, a light fixture schedule showing all light specifications, and be signed off on by a licensed design professional.[53]

More general requirements for outdoor lighting plans specify the allowed levels of illumination, the type of fixtures that are permitted, the use of time controls and motion detectors where applicable, and manual and automatic light controls. Decorative lighting and landscape lighting below 60 lumens are exempt from the regulations above.[54] Additional regulations exist for limiting the height of light fixtures, proper illumination of parking lots and similar areas, and pedestrian walkways and bikeways. For example, with the exception of public right-of-ways, light fixtures cannot exceed 30 feet in height when located within a parking lot, and may not otherwise exceed 15 feet in height.[55] Any variations in the above mentioned regulations must be approved in the Lighting Approval Plan by a City official.[56]

Sydney, Australia

The City of Sydney, Australia has a comprehensive lighting code that guides the design, installation, and function of public lighting.[57] Most notably, their lighting code has an extensive classification system aimed at identifying the appropriate intensity and color of public lighting for different areas of the city. These classifications are streets and footways which include the city center, local areas, heritage areas, and urban renewal areas, pedestrian connections which include underpasses or tunnels, pedestrian crossings, and stairs, ramps, and footbridges, parks, and plazas. Each of these general categories are further subdivided based on the context and amount of light needed for safety and proper use of the area by the general public.

Sydney also regulates the color of lighting and the height of light poles with the aim of reducing excess light pollution and incorporating design elements that enhance the area the lights are placed in. [58] With the aim of reducing the city's carbon footprint and energy expenditure, old sodium and mercury vapor lighting was replaced with LED lighting in 2019.[59]

PRELIMINARY COST/BENEFIT ANALYSIS

Risk

- Potential for increased light pollution

[53]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.404APOULIPLAP
[54]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.405GEREOULIPL
[5555]
https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.406SPREOULIPL
[56]https://library.municode.com/fl/orlando/codes/code_of_ordinances?nodeId=TITIICICO_CH63ENPR_PT2SPRE_2MOULI_S63.407VA
[57] https://www.cityofsydney.nsw.gov.au/design-codes-technical-specifications/sydney-lights-design-code
[58] file:///Users/charlottecoon/Downloads/Sydney%20Lights%20Public%20Domain%20Design%20Code.pdf
[59] https://www.smh.com.au/national/nsw/led-street-lights-sydney-council-clover-20180815-p4zxl4.html

- Monetary costs for upgraded lights
- Monetary costs for installation and ongoing maintenance

Benefits

- Identification of high pedestrian trafficked areas
- May improve pedestrian safety
- May increase pedestrian visibility in high vehicular traffic areas
- Potential for reduction in crime rates
- May encourage restaurants to implement outdoor or open-air dining

PRELIMINARY AND ILLUSTRATIVE LIST OF POTENTIAL STAKEHOLDERS

- City of Gainesville
- Department of Sustainable Development
- Gainesville Restaurant Owners/Operators
- Greater Gainesville Chamber of Commerce
- Department of Public Works
- Gainesville Regional Utilities
- Developers

RECOMMENDED POINTS FOR FURTHER RESEARCH/DISCUSSION

Further consideration should be given to:

- Identifying **high** pedestrian areas of the City of Gainesville
- Development of a Pedestrian Lighting Plan in the identified **high** pedestrian areas

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