Agenda Number
File 2013040

PLYMOUTH COMMUNITY DEVELOPMENT DEPARTMENT

PLANNING AND ZONING STAFF REPORT

TO: Plymouth Planning Commission

FROM: Barbara Thomson, Planning Manager (509-5452)

MEETING DATE: October 16, 2013

APPLICANT: City of Plymouth

PROPOSAL: **Zoning ordinance amendments** relating to the regulation of outdoor lighting

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DESCRIPTION:

The City of Plymouth is proposing zoning text amendments that would bring the city's lighting-related regulations in line with current lighting technology. These regulations are based on a model lighting ordinance that was designed to evolve over time, in recognition of the fact that lighting technology will change, in turn necessitating changes to lighting regulation.

Sections of the zoning ordinance proposed for change at this time include: 1) definitions; 2) site plan review; 3) general building and performance standards; 4) signs; and 5) convenience grocery markets and motor fuel sales.

Due to the extent of changes in the definitions and building and performance standard sections, the attached ordinances for both show only the proposed language. Staff has included the current language for ease of comparison. The draft ordinances of the other sections (also attached) show proposed new language as underlined text and proposed deleted language as ~~stricken~~ text.

Notice of the public hearing was published in the city's official newspaper.

BACKGROUND:

In November 2004, the City of Plymouth adopted a new set of lighting regulations based on the joint Illuminating Engineering Society and International Dark Sky Association's model lighting ordinance (MLO). The adoption of the new regulations was the culmination of four years of work to improve lighting regulation in the city, particularly in areas where homes bordered commercial or industrial development. The city contracted with Nancy Clanton and Associates to help prepare the ordinance and to provide background for the Planning Commission and City Council about outdoor lighting in general and the new approach to regulating it. Ms. Clanton was one of the chief authors of the MLO.

The key concepts that defined the 2004 regulations were: 1) lighting zones and 2) total site lighting limits. **Lighting zones** reflect the base or ambient light levels desired in a community. Lighting restrictions in each zone reflect the sensitivity of the area – the more intense the uses are in a zone, the less stringent the regulation on outdoor lighting. The use of different lighting zones is what provides the flexibility in the MLO, allowing the model to be used in a multitude of different settings. **Site lighting limits** are intended to help produce light levels that are appropriate for the various exterior spaces on an individual site. Prior to 2004, staff had determined acceptable lighting levels on a site on the basis of foot-candle readings at either a property line or the centerline of a public street, whichever applied. The approach adopted in 2004 calculates the watts per square foot of each proposed lighting application (e.g. parking lot, sidewalk, building façade). Based on the results of due diligence performed at the time the MLO was developed, the power allowances specified yielded outcomes that met the intent of the ordinance to produce safe light levels that minimized glare and obtrusive light.

Using watts per square foot served the city well until LED lighting came into common use in outdoor lighting. Because LED watts do not translate into conventional lighting watts, such as those associated with metal halide or high pressure sodium, staff cannot accurately calculate site lighting limits for LED lighting under the existing regulations.

When this issue arose, staff contacted the same consultant, Nancy Clanton, to discuss options for resolving it. Staff learned that the introduction of LED lighting had led to changes in the MLO. To calculate site lighting limits, the model now uses luminaire lumens, which is a measure of light emitted in place of watts, which are a measure of power consumption. This change, along with the introduction of an improved approach to off-site impacts, has led to greater uniformity between sites and an increased quality in the resulting product. Staff again contracted with Ms. Clanton's firm to assist in drafting updated regulations for the city.

ANALYSIS:

The two primary elements of the city's lighting regulations are the definitions and the standards. To aid in the comparison of the draft and existing ordinance, staff has summarized what has changed and what has stayed the same, in the order the sections appear in the draft ordinance. The titles of new sections or sections where substantive changes are proposed are highlighted. Any changes in the other sections reflect proposed changes in lighting zone level, use of lumens

versus watts and the new luminaire rating system. Staff is proposing those same types of changes under site plan review, sign regulations and convenience grocery and motor fuel sales.

Definitions

Under the draft changes, the number of definitions has increased substantially to include primarily technical terms used in the proposed regulations. Nine definitions carried over from the current ordinance: candela, curfew, luminance, luminous flux, mounting height, nadir, obtrusive light, photometric test report, and temporary lighting. All the definitions related to cut-off and shielding were deleted as this system of measuring off-site lighting impacts has been replaced with a more comprehensive and effective system that measures back light, uplight and glare.

General Building and Performance Standards

Purpose and Scope: No change proposed.

Use of Lighting Zones: No change proposed to the text. Staff did move this section ahead of the "Applicability" section to introduce the concept of lighting zones before lighting zones are referenced in later sections.

Staff is proposing revisions to the lighting zone table, based on lighting plans received over the past three years as well as input from the consultant. In eight of the ten lighting plans reviewed over the past three years, the proposed lighting was roughly half the allowed maximum in the applicable zone and therefore equivalent to the allowed maximum in the next lowest lighting zone. As a consequence, staff has proposed: 1) adding a lighting zone, LZ0 to cover the city-owned natural open space areas now designated LZ1 and 2) making LZ3 a zone restricted to special cases, which would require a conditional use permit. Areas of the city now shown as LZ 3 would be designated LZ2 and areas shown as LZ2 would be designated LZ1. The consultant also recommended these changes, based on experience gained over the past decade in communities similar to Plymouth.

Any sites that could not meet the requirements in the new zone would become legally non-conforming. In those instances, the city would only require lighting to conform to the new requirements if more than 50 percent of the lighting on the site was being replaced in any one year period. This was also the case when the city adopted the current regulations in 2004.

Applicability: One proposed addition. The addition recommends that even though this section does not regulate lighting in the public right-of-way (roadway lighting), that such lighting conform to the lighting regulations.

Luminaire Shielding and Installation Requirements: This section no longer includes maximum wattages and shielding requirements as they would be replaced by a system that is more effective in addressing off-site lighting impacts. The BUG rating system is discussed below. The proposed draft does retain the requirement for house side shielding for luminaires within 300 feet of a residential property line.

Height Limits: This section is essentially the same except for: 1) the addition of lighting zone LZ0 and revised maximum heights based on the shift in lighting zones discussed above and 2) values that reflect the use of the BUG rating system versus luminaire shielding.

Lighting Quality: This is a new section is intended to produce lighting of high quality. The two measures that relate to lighting quality are *correlated color temperature (CCT) and color-rendering index (CRI)*. CCT, expressed in units of Kelvin, relates to the whiteness of light on a scale from warm (reddish light) to cool (bluish light). CRI is a general expression for the effect of a light source on the color appearance of objects. Assuming two light sources at the same color temperature, the source with the higher color rendering index would provide a truer color rendition (refer to attachments).

Total Site Lumen Limit/Limits to Off-Site Impacts: Consistent with the existing regulations, determining a site lighting limit is a key element in ensuring that lighting for each site is appropriate to the zone in which it is located. Off-site impacts are an equally important factor, and the proposed ordinance includes a more effective approach to address them. Together, these two elements comprise the core of the revised regulations.

- **Lumen limit** – Determining the site lumen limit requires the calculation of initial luminaire lumens (the total amount of light output from a new light fixture consisting of one or more bulbs) per square foot of hardscape (e.g. parking lots, drive aisles, building entrances, sidewalks). Requiring the use of initial luminaire lumens allows all types of lighting sources, including LEDs to be considered on an equal footing. This is a critical factor as it directly addresses a major shortcoming in the existing ordinance. For very small properties with ten parking spaces or less, there is also an option to calculate initial luminaire lumens per parking space. For sites with sales and/or service facilities, there are additional lumens per square foot allowances that may be applied. In any case, this calculation replaces the watts per square foot calculation in the existing regulations.

- **Off-Site Impacts** – Off-site lighting impacts include glare, light trespass and sky glow. All of these are functions of the design and installation of a luninaire. The so-called BUG rating system replaces the current cut-off/shielding classification system. *This approach is more effective in controlling off-site impacts as it limits the amount of light in all quadrants that is directed toward or above the property line.*

  The BUG rating system requires that each luminaire be rated according to the amount of backlight, uplight and glare it produces on adjacent properties. Backlight creates light trespass onto adjacent properties. Uplight causes artificial sky glow. Glare can be annoying or even visually disabling. (Refer to graphic in attachments.) BUG rating limits are defined for each luminaire and are based on the internal and external design of the luminaire, its aiming, and the initial luminaire lumens of the specified luminaire. BUG rating limits also take into consideration the distance the luminaire is installed from the property line.

Required Lighting Controls: This section is essentially the same except for: 1) the addition of lighting zone LZ0 under curfew requirements and 2) reference to BUG ratings versus watts.

Light Trespass Limitations: This section is now Subd. 5. The only change is the addition of foot-candle values for LZ0. By way of background, this section was included in the 2004 regulations, despite the fact that the MLO did not include separate light trespass limits. However, based on past concerns about light trespass in various parts of Plymouth, the City Council included specific light trespass limitations for use only in questions of compliance. Although staff has never had to rely on this section, it does serve as a failsafe and is therefore carried over into the revised ordinance.

Exempt Lighting: This section is the same except for the reference to lumens versus watts in subd. 6(c).

Special Purpose Lighting: Most of the changes in this section follow the same pattern of reference changes from watts to lumens and the realignment of lighting zones. There is one additional proposed change for lighting for single, two-family, manor homes and townhomes. Currently, the regulations do not allow glare beyond either the property line or subdivision, as applicable. The proposed regulations refer back to the light trespass limitation in Table 8, which now provides a measurable standard.

RECOMMENDATION:

Community Development Department staff recommends approval of: 1) the attached ordinances approving the text amendments; and 2) the attached resolution approving findings to support the amendments.

ATTACHMENTS:

Draft Ordinance Approving Zoning Ordinance Text Amendments
Draft Resolution Approving Findings of Fact
Existing Lighting Regulations
Graphics

CITY OF PLYMOUTH
HENNEPIN COUNTY, MINNESOTA

ORDINANCE NO. 2013-__

AN ORDINANCE AMENDING CHAPTER 21 OF THE PLYMOUTH CITY CODE, ENTITLED THE PLYMOUTH ZONING ORDINANCE (2013040)

THE CITY OF PLYMOUTH ORDAINS:

SECTION 1. Amendment. Section 21005.02 of the Plymouth City Code (RULES AND DEFINITIONS—DEFINITIONS) is amended by deleting the existing lighting-related definitions and replacing them with the following definitions:

Lighting Related:

(a) Absolute Photometry: Photometric measurements (typically used for an LED luminaire) that directly measures the light distribution and lumen output of the luminaire. Reference Standard IES LM-79.

(b) Artificial Sky Glow: The brightening of the night sky attributable to man-made sources of light. Skyglow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.

(c) Backlight: For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.

(d) BUG: An exterior luminaire classification system, as defined by IES TM-15-11, which classifies backlight (B), uplight (U) and glare (G).

(e) Candela: The unit of luminous intensity of a lighting source emitted in a given direction.

(f) Color-Rendering Index (CRI): A general expression for the effect of a light source on the color appearance of objects. Sources with higher CRI values than other sources at the same CCT provide truer color rendition.

(g) Correlated Color Temperature (CCT): A general expression related to the whiteness of light on a scale from warm to cool. Expressed in units of Kelvin, sources with low CCTs exhibit warmer light and sources with high CCTs cool light.

(h) Curfew: A time each night after which certain electric illumination must be turned off or reduced in intensity.

(i) Footcandle: The English unit illumination or measure expressing the density of light received on a surface (lumens/ft^2). The metric unit is Lux (lumens/m^2).

(j) Forward Light: For an exterior luminaire, the lumens emitted in the quarter sphere below the horizontal and in the direction of the intended orientation of the luminaire.

(k) Fully Shielded Luminaire: A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the light source or a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting point.

(l) Glare: Light entering the eye directly from luminaires or indirectly from relative surfaces that causes visual discomfort or reduced visibility.

(m) Hardscape: Permanent hardscape improvements to the site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, walkways and non-vegetated landscaping that is 10 feet or less in width. Materials may include concrete, asphalt, stone, gravel, etc.

(n) Hardscape Area: The area measured in square feet of all hardscape. It is used to calculate the Total Site Lumen Limit. Refer to Hardscape definition.

(o) Hardscape Lighting: Lighting provided to illuminate Hardscape Areas.

(p) Ideally Oriented: A luminaire is considered "ideally oriented" if it is mounted such that the backlight portion of the light output is oriented perpendicular and toward the property line.

(q) IES: The Illuminating Engineering Society.

(r) Initial Luminaire Lumens: For luminaire with relative photometry per IES, it is calculated as the sum of the initial lamp lumens for all lamps within an individual luminaire, multiplied by the luminaire efficiency. If the efficiency is not known for a residential luminaire, assume 70%. For luminaires with absolute photometry per IES LM-79, it is the total initial luminaire lumens. The lumen rating of a luminaire assumes the lamp or luminaire is new and has not depreciated in light output (light loss factor = 1).

(s) Lamp or Light Source: A generic term for a source of optical radiation (i.e. "light"), often called a "bulb" or "tube". Examples include incandescent, fluorescent, high-intensity discharge (HID) and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.

(t) Landscape Lighting: Luminaires mounted in or at grade (not to exceed three feet overall above grade) and used solely to illuminate trees, shrubs, other plant material, ponds and landscape features, rather than area lighting; or fully shielded luminaires mounted in trees and used solely for landscape or façade lighting.

(u) LED: Light-emitting diode.

(v) Light Pollution: Any adverse effect of artificial light including, but no limited to, glare, light trespass, sky-glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

(w) Light Trespass: Light that falls beyond the property it is intended to illuminate.

(x) Lighting Zone: A type of area defined on the basis of ambient light levels, population density and/or other community considerations. The zone for each parcel is determined by the City Council.

(y) Low Voltage Landscape Lighting: Landscape lihgitng powered at less than 15 volts and limited to luminaires having a rated initial luminaire lumen output of 525 lumens or less.

(z) Lumen: The unit of luminous flux; a measure of the amount of light emitted by a luminaire, as compared to "watt," a measure of power consumption.

(aa) Luminaire ("light fixture"): A complete lighting unit consisting of one or more electric lamps or light sources, reflector, lens, ballast or driver and/or other components and accessories.

(bb) Luminance: The amount of light emitted in a given direction from a surface by the light source or by reflection from a surface. The unit is candela per square meter or nits.

(cc) Luminous Flux: A measure of the total light output from a source, the unit is the lumen.

(dd) Mounting Height: The vertical distance between the lowest part of the luminaire and the ground surface directly below the luminaire.

(ee) Nadir: The downward direction, exactly vertical, directly below a luminaire.

(ff) Not Ideally Oriented: A luminaire is considered "not ideally oriented" if it is mounted in any way other than such that the backlight portion of the light output is oriented perpendicular and towards the property line.

(gg) Obtrusive Light: Glare and light trespass.

(hh) Ornamental Lighting: Lighting that does not impact the function and safety of an area but is purely decorative, or used to illuminate architecture and/or landscaping, and installed for aesthetic effect.

(ii) Partially Shielded Luminaire: A luminaire with an opaque top and translucent or perforated sides, designed to emit most light downward.

(jj) Photometric Test Report: A report by a testing laboratory certified by the National Institute of Standards and Technology (NIST) describing the candela distribution, shielding type, luminance and other optical characteristics of a specific luminaire.

(kk) Relative Photometry: Photometric measurements made of the lamp or light source plus luminaire, and adjusted to allow for light loss due to reflection or absorption within the luminaire. Reference standard IES LM-63.

(ll) Sales Area: Uncovered exterior area used for sales of retail goods and materials, including but not limited to automobiles, boats, tractors and other farm equipment, building supplies, and gardening and nursery products.

(mm) Temporary Lighting: Lighting installed with temporary wiring and operated for less than sixty (60) days in any calendar year.

(nn) Unshielded Luminaire: A luminaire capable of emitting light in any direction including downwards.

(oo) Uplight: For an exterior luminaire, flux radiated in the hemisphere at or above the horizontal plane.

SECTION 2. Amendment. Section 20145.07, Subd. 1(q) of the Plymouth City Code (SITE PLAN REVIEW—INFORMATION REQUIREMENT) is amended as follows:

(q) Lighting Plan. The plan shall depict all exterior lighting for the development and must include:

(1) Lighting zone assignment(s).

(2) Location of all exterior lighting by type.

(3) Description, including but not limited to catalog cut sheets by manufacturers and drawings, of the illuminating devices, fixtures, lamps, supports, reflectors, and other devices proposed.

(4) Mounting height of all luminaires.

(5) Hours of illumination.

(6) Photometric data, such as that furnished by manufacturers showing ~~the angle of cutoff or light emissions. Photometric data need not be submitted when the shielding of a fixture is obvious to the Zoning Administrator~~ initial luminaire lumens, color-rendering index (CRI), correlated color temperature (CCT) and BUG rating, for each exterior luminaire.

(7) Calculations providing ~~watts~~ proposed and allowed lumens per square foot of hardscape, including calculations addressing the proposed and allowed additional allowances for sales and service facilities.

(8) Signature of registered engineer or certified lighting professional who prepared the plan.

(Amended by Ord. No. 2004-30, 11/23/04) (Amended by Ord. No. 2006-04, 02/07/06)

SECTION 3. Amendment. Section 21105.06 of the Plymouth City Code (GENERAL BUILDING AND PERFORMANCE STANDARDS—EXTERIOR LIGHTING) is amended by deleting the existing Exterior Lighting section and replacing it with the following:

21105.06. EXTERIOR LIGHTING: Exterior lighting shall comply with the following standards:

Subd. 1. Purpose and Scope. The purpose of this Section is to establish exterior lighting requirements that will 1) permit reasonable uses of lighting for night-time safety, utility, security, productivity, enjoyment and commerce, 2) minimize glare, obtrusive light and artificial sky glow by limiting outdoor lighting that is misdirected, excessive or unnecessary, 3) conserve energy and resources to the greatest extent possible and 4) help protect the natural environment from the damaging effects of night lighting from man-made sources.

Subd. 2. Use of Lighting Zones.

(a) Using Table 1 as a guide, the City Council shall determine and maintain Lighting Zones within the boundaries of the City.

(b) The lighting zones established by this Ordinance are hereby set forth on the Plymouth, Minnesota Lighting Zone Map; and said map is hereby made a part of this Ordinance; said map shall be known as the "Plymouth, Minnesota Lighting Zone Map".

Said map and all notations, references, and data shown thereon are hereby incorporated by reference into this Ordinance and shall be as much a part of it as if all were fully described herein. It shall be the responsibility of the Zoning Administrator to maintain said map, and amendments thereto shall be recorded on said Lighting Zone Map within 30 days after official adoption of amendments. The official Lighting Zone Map shall be kept on file in the City Hall. The Lighting Zone of a parcel or project shall determine the limitations for lighting as specified in this Section.

(c) Amendments to the Lighting Zones shall be processed according to the procedures established in Section 21010 of this Chapter.

Table 1 – Lighting Zone Ratings and Characteristics

Zone	Ambient Illumination	Typical Locations
LZ0	No ambient lighting	Natural areas (City-owned open space as defined in the Plymouth Comprehensive Plan).
LZ1	Low ambient lighting	Low and medium density residential areas, (generally properties guided Living Area-1, Living Area-2, Living Area-3).
LZ2	Moderate ambient lighting	High density residential areas (properties guided Living Area-4, Living Area-5), shopping and commercial districts (generally properties guided Commercial, City Center and Commercial Office), industrial parks and districts (properties guided Planned Industrial), City playfields and major institutional uses and mixed use districts.
LZ3	Moderately high ambient lighting	By conditional use permit only.

Subd. 3. Applicability.

(a) All outdoor lighting fixtures (luminaires) in Lighting Zone 2, and all outdoor lighting fixtures on non-residential properties in Lighting Zones 0 and 1 shall be installed in conformance with the provisions of this Section and Section 21155 (Sign Regulations) as applicable as well as the latest rules, codes and regulations, including but not limited to OSHA, National Fire Codes of Fire Protection Association (NFPA), Minnesota State Building Code, and National Electrical Code. In addition, all luminaires shall be installed under appropriate permit and inspection.

(b) Lighting on single- and two-family homes, manor homes, and townhouses is subject only to the regulations as outlined in Subd. 6 and in Subd. 7 (c) of this subsection.

(c) Lighting in the public right-of-way is not regulated by this Section. However, it is recommended that all such lighting conform to the regulations in this Section.

Subd. 4. General Performance Standards:

(a) Luminaire shielding and installation requirements.

(1) Luminaires within 300 feet of a residential property line shall be equipped with side shielding (house side shielding), except that luminaires mounted at a height of 12 feet or lower shall be exempt from this requirement provided they meet IESNA U0 rating.

(b) Height Limits.

(1) Pole mounted lighting. Lighting mounted onto poles or any structures intended primarily for mounting of lighting shall not exceed a mounting height of 40 percent of the horizontal distance of the light pole from the property line, nor a maximum height according to Table 2, whichever is lower. Height includes the base and the pole heights.

Table 2 – Maximum Lighting Mounting Height in Feet

Lighting Zone	Lighting for Driveways, Parking, and Transit	Lighting for Walkways, Plazas, and other Pedestrian Areas	All Other Lighting
LZ0	25 feet	12 feet	4.5 feet
LZ1	25 feet	18 feet	8 feet
LZ2	30 feet	18 feet	15 feet
LZ3	30 feet	18 feet	15 feet

(2) Exceptions for pole heights.

a. Mounting heights greater than 40 percent of the horizontal distance to the property line but no greater than permitted by Table 2 may be used provided that the luminaire has a B0 rating if ideally oriented or a G0 rating if not ideally oriented.

b. Lights specifically for driveways, and then only at the intersection of the road providing access to the site, may be mounted at any distance relative to the property line, but may not exceed the mounting height listed in Table 2.

c. Landscape lighting may be installed in a tree.

(3) Lights mounted to buildings or structures. Lighting mounted onto buildings or other structures shall not exceed a mounting height greater than four feet higher than the tallest part of the building or structure at the place where the lighting is installed, nor higher than 40 percent of the horizontal distance of the light from the property line, whichever is less.

(4) Exceptions for building mounted lights.

a. Lighting for facades may be mounted at any height equal to or less than the total height of the structure being illuminated regardless of horizontal distance to property line.

b. For buildings less than 40 feet to the property line, including canopies or overhangs onto a sidewalk or public right of way, luminaires may be mounted to the vertical façade or underside of canopies at 16 feet or less.

c. The top exterior deck of parking garages shall be treated as normal pole mounted lighting rather than as lights mounted to buildings. The lights on the outside edges of such a deck must be side shielded to the property line.

(c) Lighting Quality

(1) All permanently installed lighting for high density residential developments and all non-residential lighting shall have a minimum CRI of 70.

(2) All permanently installed lighting for high density residential developments and all non-residential lighting shall have a CCT of no greater than 4100K.

(d) Lighting quantity and luminaire distribution.

(1) Total site lumen limit: The total installed initial luminaire lumens of all outdoor lighting shall not exceed the total site lumen limit. The total site lumen limit shall be determined using either the Parking Space Method (Table 3) or the Hardscape Area Method (Table 4). Only one method shall be used per application, and for sites with existing lighting, existing lighting shall be included in the calculation of total initial installed luminaire lumens. The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.

Table 3 – Allowed Total Initial Luminaire Lumens per Site per Parking Space Method (May only be applied to properties with no more than 10 parking spaces, including handicapped accessible spaces)

Lighting Zone	LZ0	LZ1	LZ2	LZ3
Allowance	350 lumens/space	490 lumens/space	630 lumens/space	840 lumens/space

Table 4 – Allowed Total Initial Luminaire Lumens per Site per Hardscape Area Method (May be used for any project)

Lighting Zone	LZ0	LZ1	LZ2	LZ3
Base allowance of lumens per square foot of hardscape[1]	0.5	1.25	2.5	5
Additional allowances for sales and service facilities. No more than two additional allowances per site. Use it or lose it.				
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non-sales areas. To use this allowance, luminaires must be within 2 mounting heights of the sales lot area.	0	4 lumens/ sf	8 lumens/ sf	16 lumens/ sf
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principle viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1,000 lumens/ LF	1,500 lumens/ LF
Drive Up Windows. In order to use this allowance, luminaires must be within 20 feet horizontal distance of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window
Vehicle Service Station. This allowance is lumens per installed fuel pump.	0	4,000 lumens per pump	8,000 lumens per pump	16,000 lumens per pump

[1]When lighting intersections of site drives and public streets or roads, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting.

(2) Limits to off-site impacts: All luminaires shall be rated and installed according to Tables 5, 6 and 7. A luminaire may be used if it is rated for the lighting zone of the site or lower in number for all B, U and G ratings. Luminaires equipped with adjustable mounting devices permitting alteration of luminaire aiming in the field shall not be permitted.

Table 5 – Maximum Allowable Backlight Ratings

Mounting Condition[1]	LZ0	LZ1	LZ2	LZ3
Greater than 2 mounting heights from property line or not ideally oriented	B1	B3	B4	B5
1 to less than 2 mounting heights from property line and ideally oriented	B1	B2	B3	B4
0.5 to less than 1 mounting height from property line and ideally oriented	B0	B1	B2	B3
Less than 0.5 mounting height from property line and ideally oriented	B0	B0	B0	B1

[1]For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property lien for purpose of determining compliance with this table. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public corridor for the purpose of determining compliance with this table. NOTE: This adjustment is relative to Tables 5 and 7 only, and shall not be used it increase the Hardscape Area of the site.

Table 6 – Maximum Allowable Uplight Ratings

Description	LZ0	LZ1	LZ2	LZ3
Area lighting	U0	U0	U0	U0
Ornamental lighting and luminaires not used for area lighting	U0	U1	U2	U3

Table 7 – Maximum Allowable Glare Ratings

Mounting Condition	LZ0	LZ1	LZ2	LZ3
Greater than 2 mounting heights from property line or ideally oriented	G0	G1	G2	G3
1 to less than 2 mounting heights from property line and not ideally oriented	G0	G0	G1	G1
0.5 to less than 1 mounting height from property line and not ideally oriented	G0	G0	G0	G1
Less than 0.5 mounting heights from property line and not ideally oriented	G0	G0	G0	G0

(3) Shielding for parking lot lighting: All parking lot lighting shall have a U0 rating, except that ornamental parking lot lighting shall meet the requirements of Tables 5, 6 and 7 without the need for external field-added modifications.

(d) Required lighting controls. Lighting systems for non-residential properties shall be extinguished or reduced in lighting by at least 50 percent beginning at curfew and continuing until dawn or start of business, whichever is sooner. The reduction shall be determined as an overall average for a site. When possible, the lighting system should be turned off entirely.

(1) Curfew. Curfew shall be as follows:
LZ0, the later of 8:00 PM or close of business
LZ1, the later of 8:00 PM or close of business
LZ2, the later of 10:00 PM or close of business
LZ3, the later of midnight or close of business

(2) Low voltage landscape lighting shall be completely extinguished at the Curfew time stated above or one hour after the site is closed, whichever is sooner.

(3) Exceptions to curfew:

a. When there is only one (conforming) luminaire for the site.

b. Code required lighting for steps, stairs, walkways, and building entrances.

c. When in the opinion of the City Council, reduced lighting levels at a given location will cause unacceptable increased risk and design levels must be maintained.

(e) Prohibited lighting.

(1) Mercury vapor lamps

(2) Luminaires mounted to aim light only toward a property line.

(3) Luminaires mounted in a way so as to cause confusion or hazard to traffic or to conflict with traffic control signs or lights.

(f) Following installation of any lighting on a site, the engineer or lighting professional who prepared the lighting plan shall certify in writing that the location, type, mounting height, initial luminaire lumens, and photometric data including BUG ratings all comply with the approved lighting plan.

(g) Any new lighting installed after the effective date of this ordinance shall be in compliance with the requirements of this Section. Any lighting in existence before the effective date of this ordinance that does not comply with the requirements shall be considered legally non-conforming. However, if a property owner proposes to replace (50) percent or more of the existing exterior luminaires or standards in any one year period, the luminaires or standards must be replaced in conformance with this Chapter.

Subd. 5. Light Trespass Limitations. The illuminance levels provided in Table 8 shall be used for enforcement should concerns of obtrusive lighting or questions of compliance arise. This provision shall apply to all exterior lighting, and to interior lighting if the light source is visible off-site. The illuminance values provided in Table 8 shall be measured at the lot line unless said lot line abuts a public street, in which case the illuminance values shall be measured at the centerline of such public street.

Table 8 – Light Trespass Limitations

Lighting Zone	Maximum Illuminance Level – Pre-Curfew	Maximum Illuminance Level – Post-Curfew
LZ0	0.0 foot-candles	0.0 foot-candles
LZ1	0.1 foot-candles	0.1 foot-candles
LZ2	0.3 foot-candles	0.1 foot-candles
LZ3	0.8 foot-candles	0.2 foot-candles

Subd. 6. Exempt Lighting: The following luminaires and lighting systems are exempt from the provisions of this Section.

(a) Lighting required and regulated by the Federal Aviation Administration or other federal or state agency.

(b) Situations where fire, police, rescue or repair personnel need light for temporary emergencies or road repair work.

(c) Temporary seasonal lighting provided that individual lamps are less than 10 watts and 70 lumens.

(d) Temporary lighting for theatrical, television and performance areas.

(e) Soffit or wall-mounted luminaires with less than 375 initial luminaire lumens and permanently attached to dwellings (including multi-family residence but excluding hotels or motels) at a height not to exceed 20 feet above the adjacent grade.

(f) Lighting in swimming pools and other water features governed by Article 680 of the National Electrical Code.

(g) Code required exit signs.

(h) Code required lighting for stairs and ramps.

(i) Interior lighting, except as addressed by Section 21105.06, Subd. 4 of this Section.

Subd. 7. Special Purpose Lighting.

(a) High intensity lighting. The following lighting systems are prohibited from being installed except by administrative permit.

(1) Aerial lasers.

(2) Skytrackers.

(3) Motion detection security lighting, except that such lighting for single- and two-family homes shall be permitted and shall be exempt from the requirement for an administrative permit.

(b) Other special lighting.

(1) Lighting systems not complying with the technical requirements of this Section but consistent with its intent may be installed for the following applications upon issuance of a conditional use permit. Each request for a conditional use permit shall be evaluated based upon the standards and criteria set forth in Section 21015.02, Subd. 4 of this Chapter.

(i) Outdoor athletic fields and recreation areas.

(ii) Construction lighting.

(iii) National and State flag lighting with spotlights greater than 3,400 lumens in LZ2 and LZ3 and 2,000 lumens in LZ0 and LZ1.

(iv) Floodlighting of buildings over two (2) stories high.

(v) Public monuments, public buildings and religious institutions.

(vi) Ornamental lighting in LZ0 and LZ1.

(2) To obtain a conditional use permit, applicants shall demonstrate that the proposed lighting installation:

(a) Is not within LZ0 or LZ1, except for ornamental lighting and necessary construction lighting.

(b) Utilizes fully shielded luminaires and, if required, side shielded and internally shielded luminaires that are installed in a fashion that maintains the shielding characteristics unless certified in writing by a registered engineer or by a certified lighting professional that such shielding is impractical. Where fully shielded fixtures cannot be utilized, acceptable luminaires shall include only those that are installed with maximum aiming angles of 65 degrees above nadir. Said aiming angle shall be measured from nadir as defined by an independent testing agency using Type B photometry as defined by the IES.

(c) Has received every reasonable effort to mitigate light trespass and light pollution, supported by a signed statement from a registered engineer or by a certified lighting professional describing the mitigation measures.

(d) Complies with all the technical requirements of this Section after curfew, with the following exception: No illumination of athletic fields shall be permitted after 11:00 PM, except to conclude a scheduled event that was in progress before 11:00 PM and circumstances prevented concluding before 11:00 PM.

(c) Lighting for single and two family homes, manor homes, and townhouses.

(1) Lighting systems for single family homes in all Lighting Zones shall be in compliance with the Pre-Curfew Light Trespass Limitations at the lot line provided in Table 8 above. Lighting systems for two family homes, manor homes, and townhouses in all Lighting Zones may consider the Pre-Curfew Light Trespass Limitations at the subdivision boundary instead of the lot line.

(2) Motion activated lighting systems for single family homes in all Lighting Zones shall not be activated by movement beyond the lot line, and motion activated lighting systems for two family homes, manor homes, and townhouses in all Lighting Zones shall not be activated by movement beyond the subdivision boundary.

(3) Lighting systems for single family homes, two family homes, manor homes, and townhouses in all Lighting Zones that provide lighting, or are intended to provide lighting, for recreational purposes (i.e., sport courts, hockey rinks, or other similar features) shall direct lighting downward and inward from

the perimeter lot boundaries, shall not exceed 15 feet in height, and shall be turned off between 10:00 PM and 7:00 AM.

SECTION 4. Amendment. Section 21155.05, Subd. 2 of the Plymouth City Code (SIGN REGULATIONS—GENERAL REGULATIONS AND RESTRICTIONS) is amended as follows:

Subd. 2. Unless specifically prohibited, all signs may be illuminated internally or by reflected light subject to the following:

(a) The light source shall not be directly visible and shall be arranged to reflect away from adjoining premises.

(b) The illumination source shall not be placed so to cause confusion or hazard to traffic, or to conflict with official or traffic signs, signals, or lights.

(c) Maximum illumination levels:

(1) Signs using an LED (Light Emitting Diode) light source shall not exceed a luminance level of ~~600~~ 350 candela per square meter (nits) between sunset and sunrise, and shall not exceed a luminance level of ~~5,000~~ 4,500 candela per square meter between sunrise and sunset.

(2) Signs using florescent, neon, or incandescent light sources shall not exceed 12 watts per square foot of sign surface area.

(3) All signs with illumination shall be equipped with a mechanism that automatically adjusts the brightness to ambient lighting conditions (e.g., dusk).

(d) No illumination involving movement, by reason of the lighting arrangement, lighting source, changes in either color or intensity of lighting, or other devices shall be permitted. This includes video display signs (except as allowed in Section 21155.05, Subd. 2 (e) and scoreboards as allowed in Section 21650 of this Chapter), or any signs that have blinking, flashing, scrolling, shimmering, and rotating, except that time and temperature signs may be allowed. Furthermore, the transition from one static electronic display to another must be instantaneous without any special effects.

(e) An electronic changeable copy sign, electronic graphic display sign, video display sign or a changeable copy sign, in addition to other permitted signage, may be permitted provided the following conditions are met:

(1) The message shall not be visible from any public street.

(2) The portion of the sign allocated to changeable copy shall be no greater than six square feet.

(3) The sign shall comply with all other signage regulations.

(f) Electronic changeable copy and electronic graphic display signs shall be designed and equipped to freeze the device in one position if a malfunction occurs or immediately discontinue the display. Additionally, the sign owner shall immediately stop the display if notified by the City that the sign is not complying with the standards of this Chapter.

(Amended by Ord. No. 2008-09, 03/25/08) (Amended by Ord. No. 2012-12, 03/27/12)

SECTION 5. Amendment. Section 21450.07, Subd. 4(h) of the Plymouth City Code (O, OFFICE DISTRICT—CONDITIONAL USES) is amended as follows:

(h) All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 6. Amendment. Section 21455.07, Subd. 2(h) of the Plymouth City Code (C-1, CONVENIENCE COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(h) All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter. *(Amended by Ord. No. 2004-30, 11/23/04) (Amended by Ord. No. 2006-04, 02/07/06)*

SECTION 7. Amendment. Section 21460.07, Subd. 2(h) of the Plymouth City Code (C-2, NEIGHBORHOOD COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(h) All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 8. Amendment. Section 21465.07, Subd. 5(h) of the Plymouth City Code (C-3, HIGHWAY COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(h) All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 9. Amendment. Section 21465.07, Subd. 14(d) of the Plymouth City Code (C-3, HIGHWAY COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(d) A protective canopy located over pump islands may be an accessory structure on the property and may be located 20 feet or more from the front lot line, provided adequate visibility both on and off site is maintained. All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 10. Amendment. Section 21470.07, Subd. 15(f) of the Plymouth City Code (C-4, COMMUNITY COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(f) All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 11. Amendment. Section 21470.07, Subd. 16(d) of the Plymouth City Code (C-4, COMMUNITY COMMERCIAL DISTRICT—CONDITIONAL USES) is amended as follows:

(d) A protective canopy located over pump islands may be an accessory structure on the property and may be located 20 feet or more from the front lot line, provided adequate visibility both on and off site is maintained. All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter.

SECTION 12. Amendment. Section 21475.09, Subd. 3(c)(7) of the Plymouth City Code (CC, CITY CENTER DISTRICT—CONDITIONAL USES) is amended as follows:

(7) A protective canopy located over pump islands may be an accessory structure on the property and may be located 20 feet or more from the front lot line, provided adequate visibility both on and off site is maintained. All canopy lighting for motor fuel station pump islands shall be recessed or fully shielded. ~~Illumination levels~~ Luminaires for pump islands shall comply with Section 21105.06 of this Chapter. *(Amended by Ord. No. 2001-06, 02/13/01) (Amended by Ord. No. 2006-04, 02/07/06)*

SECTION 13. Effective Date. This Ordinance shall be in full force and effect upon its passage.

ADOPTED by the Plymouth City Council on October 22, 2013.

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Kelli Slavik, Mayor

ATTEST:

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Sandra R. Engdahl, City Clerk