

7. Hardscape Lighting: Lighting associated with architectural features, such as fountains, sculptures, and the like.
8. Landscape Lighting: **Luminaires** mounted in or at grade (not to exceed 3 feet overall above grade) and used solely for landscape rather than area lighting, or fully shielded **luminaires** mounted in trees and used solely for landscape or **façade** lighting.
9. Lighting Zone: A type of area defined on the basis of ambient lighting levels, population density, and/or other community considerations. The **lighting zones** are determined by the Planning Commission. A description of these four **lighting zones** is given in Table 1 of this ordinance.
10. Light Trespass: **Spill light** that because of quantitative, directional, or spectral content causes annoyance, discomfort, or loss in visual performance and visibility.
11. Lumen: The unit of **luminous flux**: a measure of the amount of light emitted by a lamp.
12. Luminaire ("light fixture"): A complete lighting unit consisting of one or more electric lamps, the lamp holder, reflector, lens, diffuser, ballast, and/or other components and accessories.
13. 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.
14. Luminous Flux: A measure of the total light output from a source, the unit being the **lumen**.
15. Mounting Height: The vertical distance between the lowest part of the **luminaire** and the ground surface directly below the **luminaire**.
16. Nadir: The downward direction; exactly vertical, directly below a **luminaire**.
17. Obtrusive Light: **Glare** and **light trespass**.
18. Ornamental or Accent Lighting: Outdoor lighting that is installed mainly or entirely for its decorative effect or to accent an object or a feature, rather than as an aid to visibility.
19. Photometric Test Report: A report by an independent testing laboratory or one 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**.

20. **Point of Service Canopy:** A **canopy** under which a business provides some service to a customer, such as food service, a bank transaction, or the like.
21. **Shielding:**
 - A. Fully Shielded – A **luminaire** emitting no **luminous flux** above the horizontal plane.
 - B. Partly Shielded – A **luminaire** emitting less than two percent (2%) of its **luminous flux** above the horizontal plane.
 - C. Unshielded – A **luminaire** that may emit its flux in any direction.
22. **Spill Light:** Lighting from a lighting installation that falls outside of the boundaries of the property on which the installation is sited.
23. **Temporary Lighting:** Lighting installed with temporary wiring and operated for less than 60 days in any calendar year.

15.20A3 SECTION 20A.3 CONFORMANCE AND APPLICATION

1. **Applicable Codes:** All outdoor lighting fixtures (**luminaires**) shall be installed in conformance with the provisions of this Chapter, the Building Code, and the Electrical Code, as applicable and under appropriate permit and inspection.
2. **Applicability:** Township street lighting is not covered by this Chapter. However, it is recommended that all such lighting conform to all aspects of this Chapter.

15.20A4 SECTION 20A.4 LIGHTING ZONES

1. Using Table 1 as a guide, the Township shall determine and maintain **Lighting Zones** (LZs) within the boundaries of its jurisdiction.
2. The **Lighting Zone** of a parcel or project shall determine the limitations for lighting as specified in this Chapter.
3. A decrease of one or more LZ numbers or an increase of one LZ number may be granted to a specific (individual) land parcel or project upon application to and approval by the Planning Commission.

Table 1 – Lighting Zone Ratings and Characteristics

Zone	Ambient Illumination	Representative Locations
LZ 0	Very Dark	Critical dark environments, such as especially sensitive wildlife preserves, parks, and major astronomical observatories. <i>(No LZ 0 zones are identified in the Township.)</i>
LZ 1	Dark	Developed areas in County or Township parks, recreation areas, wetlands and wildlife preserves; developed areas in natural settings; and areas where residents have expressed the desire to conserve natural illumination levels. <i>(This zone includes but is not limited to the Agricultural and Rural Preserve zoning districts.)</i>
LZ 2	Low	Rural areas, low- and medium density neighborhoods and districts. This zone is intended to be the default for residential areas. <i>(This zone includes the Rural Residential, Low Density Residential, R-1 Single Family, R-2 Single Family, R-3 Two Family, R-3.5 Restricted Multiple Family zoning districts, R-5 Manufactured Mobile Home, and any PUD single or two family development.)</i>
LZ 3	Medium	High-density urban neighborhoods, shopping and commercial districts, industrial parks and districts. This zone is intended to be the default condition for commercial and industrial districts in urban areas. <i>(This zone includes R-4 Multiple Family, Commercial, and Industrial zoning districts, and any PUD multifamily, commercial or industrial development.)</i>

15.20A5 SECTION 20A.5 EXEMPT LIGHTING

The following **luminaires** and lighting systems are EXEMPT from the requirements of this Chapter.

1. Internally illuminated signs. However, all such signs shall have "dark" backgrounds (opaque or colored) and "light" lettering (white or lighter colored than the background) so as to minimize **glare** or luminous overload.
2. Externally illuminated signs. However, all such signs shall be lit from above, with fully shielded fixtures.
3. **Temporary lighting** for theatrical, television, and performance areas.
4. Lighting in swimming pools and other water features governed by Article 680 of the National Electrical Code.
5. Code required exit signs.

6. Code required lighting for stairs and ramps.
7. Temporary holiday lighting.
8. Lighting required and regulated by the Federal Aviation Administration, U.S. Coast Guard, or other federal or state agency.
9. Interior lighting.

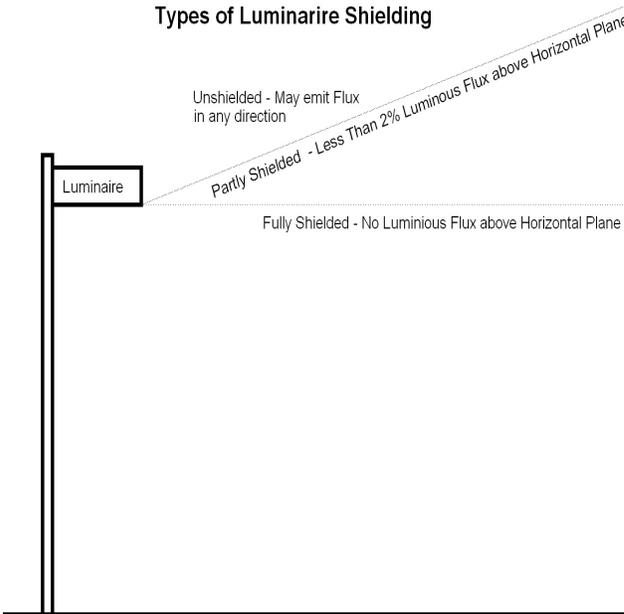
15.20A6 SECTION 20A.6 HIGH INTENSITY, SPECIAL PURPOSE LIGHTING

The following lighting systems are prohibited from being installed or used.

1. Aerial Lasers.
2. "Searchlight" style lights.
3. Other very intense lighting, defined as having a light source exceeding 200,000 **lumens** or intensity in any direction of 2,000,000 **candelas** or more.

15.20A7 SECTION 20A.7 LUMINAIRE LAMP WATTAGE, SHIELDING, AND INSTALLATION REQUIREMENTS

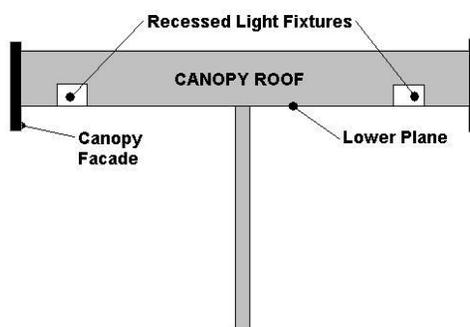
1. All outdoor lighting shall comply with the limits to lamp wattage and the **shielding** requirements in Table 2.
2. Only **luminaires** that are allowed to be unshielded in Table 2 may employ flexible or adjustable mounting systems. All other **luminaires** shall be permanently installed so as to maintain the **shielding** requirements of Table 2.



3. The Planning Commission may accept a **photometric test report**, demonstration or sample, or other satisfactory confirmation that the **luminaire** meets the requirements of the **shielding** classification.

4. Such shielded fixtures must be constructed and installed in such a manner that all light emitted by the fixture meets or exceeds the specification given. This includes all the light emitted by the fixture, either directly from the lamp or by a diffusing element, or indirectly by reflection or refraction from any part of the fixture. Any structural part of the fixture providing this **shielding** must be permanently affixed.

5. All **canopy** lighting must be fully shielded. However, indirect up light is permitted under an opaque **canopy** provided that no lamp or vertical element of a lens or diffuser is visible from beyond the **canopy** and such that no direct up light is emitted beyond the opaque **canopy**.



6. No portion of any fixtures under canopies (*including the glass housing*), such as over gasoline station pump islands, shall extend below the lower plane of the **canopy** roof, exclusive of any **façade** or ornamental trim which may extend below the **canopy** roof. They shall be recessed so the lamp does not extend below the lower plane of the **canopy** surface.
7. In residential lighting applications, the wattages in Table 2 may be too high (especially for energy efficient lighting sources and for building mounted lighting). It is important for homeowners and designers to assess this potential for over-lighting and adjust to lower wattages if necessary, to avoid **glare** and **light trespass**.
8. Any proposed neon lighting must be shown and found to be complementary to the overall design of the building and approved as part of the site plan approval (*if applicable*). Neon lights proposed to be used as an architectural detail shall be indicated on the building elevation and must be specifically found to be compatible with surrounding properties by the Planning Commission.
9. The Planning Commission may require verification that all approved lighting is installed per specifications. A registered engineer, architect, or other design professional may provide this verification to the satisfaction of the Planning Commission.

10. No lighting on any site shall cause or create obtrusive light.

Table 2 – Maximum Wattage and the Required Shielding

Lighting Zone	Fully Shielded	Partly Shielded	Unshielded <i>Shielding is highly encouraged however</i>
LZ 0	40 watts	None permitted	None permitted.
LZ 1	70 watts	45 watts	None permitted.
LZ 2	150 watts	50 watts	<ul style="list-style-type: none"> • 35 watts or less for landscape lighting applications • 20 watts or less for non-landscape lighting applications.
LZ 3	320 watts	165 watts	40 watts or less

15.20A8 SECTION 20A.8 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% of the horizontal distance of the light pole from the property line, nor a maximum height according to Table 3, whichever is lower.

Exception 1: Lighting for residential sports courts and pools shall not exceed 15 feet above court or pool deck surface.

Exception 2: Lights specifically for driveways, and then only at the intersection to 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 3.

Exception 3: **Mounting heights** greater than 40% of the horizontal distance to the property line but no greater than permitted by Table 3 may be used provided that the **luminaire** is side shielded toward the property line.

Exception 4: **Landscape lighting** installed in a tree. (See the Definitions section.)

Table 3 — Maximum Lighting Mounting Height

Lighting Zone	Max Height
LZ 0	20 feet
LZ 1	20feet
LZ 2	25 feet
LZ 3	30 feet

2. Lights Mounted to Buildings or Structures: Lighting mounted onto buildings or other structures shall not exceed a **mounting height** greater than 4 feet higher than the tallest part of the building or structure at the place where the lighting is installed, nor higher than 40% of the horizontal distance of the light from the property line, whichever is less.

Exception 1: Lighting attached to single-family residences shall not exceed the height of the eave.

Exception 2: Lighting for **façades** 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.

15.20A9 SECTION 20A.9 TOTAL SITE POWER LIMITS

1. This Chapter applies to all outdoor lighting, whether attached to building, poles, structure, or self supporting, including but not limited to hardscape areas (which include parking lots, lighting for building entrances, sales and non-sales canopies), lighting for all outdoor sales areas, and lighting for building **façades**.
2. The Maximum Allowed Lighting Limit shall be determined as follows:
 - A. Following the rules in Subsection 3 below, multiply the area (square footage) of each of the application types in Table 4 by the allowed lamp wattage per square foot for the appropriate **Lighting Zone**.
 - B. Add up the total of all wattage for each application type (separately).
 - C. The actual lighting load shall not exceed this total.
3. Rules
 - A. Power is not allowed for any use types not listed, except for those items given in Section 20A.5. (Exempt Lighting) and Section 20A.6. (Special Purpose Lighting). Only one application type may

be applied to any given area.

- B. **Canopy** allowances include only the area within the **drip line area** of the **canopy**.
- C. Areas that are not designed to be illuminated may not be counted toward the total site limit.

15.20A10 SECTION 20A.10 RECOMMENDED LIGHTING FOR EXTERNALLY ILLUMINATED SIGNS

Externally lighted signs should be lighted from the top of the sign downward and be fully shielded.

Exception: Signs not taller than 10 feet above grade may be illuminated by **landscape lighting** complying with Table 2.

Table 4 - Lamp power allowances (w/ft² unless otherwise noted)

Lighting Application	Allowed Area	LZ 0	LZ 1	LZ 2	LZ 3
Parking lots, plazas, hardscape lighting, driveways, on site private roads	Paved area plus 5 feet of the perimeter of adjacent unpaved land. Includes planters and landscaped areas less than 10 feet wide that are enclosed by hardscape on at least three sides.	0.010	0.020	0.040	0.080
Sidewalks, walkways, and bikeways	Paved area plus 5 feet of unpaved land on either side of path of travel.	0.020	0.040	0.080	0.15
Building entrances (without canopy)	Width of doors plus 3 feet on either side times a distance outward from the building from the surface of the doors 10 feet.	0.010	0.35	0.50	.70
Building entry, drive-up sales, and general use canopies	Drip line area under canopy. 13 watts plus the value in the LZ columns.	0.00	0.10	0.20	0.40
Vehicle Service Station	Drip line area under canopy; or 500 square feet per double-sided fuel dispenser unit not under canopy.	Not allowed	0.30	0.60	1.20
Building facades		Not allowed	Not allowed	0.18	0.35

GRAND HAVEN CHARTER TOWNSHIP
ZONING ORDINANCE

Lighting Application	Allowed Area	LZ 0	LZ 1	LZ 2	LZ 3
Outdoor Sales Lot	Portion of uncovered outdoor sales lot used for display of vehicles or other merchandise for sale. All adjacent access drives, walkway areas, customer parking areas, vehicle service or storage areas that are not surrounded on at least three sides by sales area shall be considered hardscape.	Not allowed	Not allowed	0.60	1.10
Outdoor Sales Frontage (Frontage in linear feet, and the allowance is per linear foot.)	Valid only for sections of an outdoor sales area that are along the frontage. A corner sales lot may include both sides provided that a different principal viewing location exists for each side.	Not allowed	Not allowed	Not allowed	30 w/lf
Ornamental Lighting	Entire site	Not allowed	By special permit only	0.010	0.020

15.20A11 SECTION 20A.11 SPECIAL PERMITS

1. Upon special permit issued by the Planning Commission, lighting systems not complying with the technical requirements of this Chapter but consistent with its intent may be installed for the following applications:
 - A. Sport fields and stadiums.
 - B. Construction lighting.
 - C. Industrial lighting for hazardous areas where the heat of the lighting fixture may cause a dangerous situation.
 - D. Bridges.
 - E. National and State Flag lighting with spotlights greater than 75 watts in LZ 3, and greater than 60 watts in LZ 0, LZ 1 and LZ 2
 - F. Specialized Theme Park lighting.
 - G. Public monuments, public buildings and Houses of Worship.
 - H. Industrial areas where higher pole heights are required to avoid interference of vehicle with the pole assembly.
 - I. Any other lighting application not listed in Table 4.

- 2. To obtain such a permit, applicants shall demonstrate that the proposed lighting installation:
 - A. Is not within LZ 1 or LZ 0, if such exists (except for necessary construction lighting).
 - B. For applications a, b, c, d above, 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 lighting certified professional that such **shielding** is impractical. Where fully shielded fixtures cannot be utilized, acceptable **luminaires** shall include only those which are installed with minimum aiming angles of 25 degrees downward from the horizontal. Said aiming angle shall be measured from the axis of the **luminaire's** maximum beam candlepower as certified by independent testing agency.
 - C. Has received every reasonable effort to mitigate **obtrusive light** and **artificial sky glow**, supported by a signed statement from a registered engineer or by a lighting certified professional describing the mitigation measures.

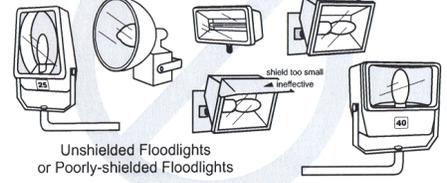
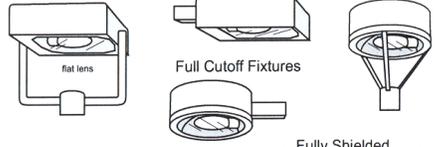
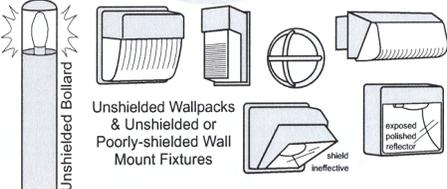
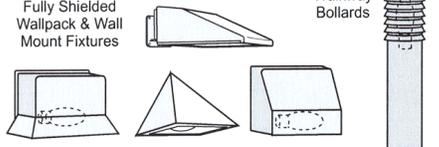
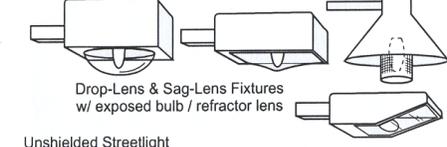
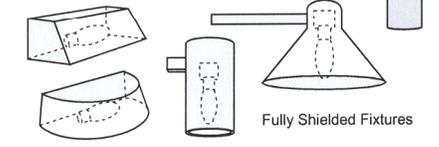
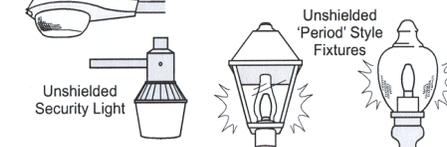
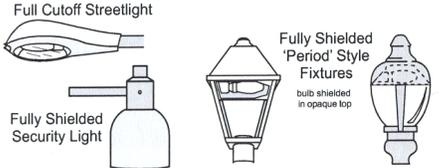
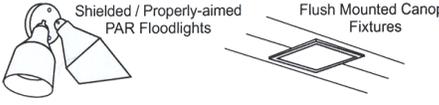
The Planning Commission shall review each such application. A permit may be granted if, upon review, the Planning Commission believes that the proposed lighting will not create unwarranted **glare**, sky glow, or **light trespass**.

**15.20A12 SECTION 20A.12 LUMINAIRE (LIGHT FIXTURE)
ILLUSTRATIONS**

The following **luminaire** illustrations shall be used as a guideline to help determine appropriate and inappropriate lighting fixtures, which offer different levels of **shielding**. Please note that these graphics do not represent a complete inventory of permitted and prohibited fixtures.

Prohibited Fixtures
(except as stated in Table 2)

Permitted Fixtures

<p>Unacceptable / Discouraged Fixtures that produce glare and light trespass</p>	<p>Acceptable Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night</p>
 <p>Unshielded Floodlights or Poorly-shielded Floodlights</p>	 <p>flat lens Full Cutoff Fixtures Fully Shielded Walkway Bollards</p>
 <p>Unshielded Bollard Unshielded Wallpacks & Unshielded or Poorly-shielded Wall Mount Fixtures</p>	 <p>Fully Shielded Wallpack & Wall Mount Fixtures Fully Shielded Bollards</p>
 <p>Drop-Lens & Sag-Lens Fixtures w/ exposed bulb / refractor lens</p>	 <p>Fully Shielded Fixtures</p>
 <p>Unshielded Streetlight Unshielded Security Light Unshielded 'Period' Style Fixtures</p>	 <p>Full Cutoff Streetlight Fully Shielded Security Light Fully Shielded 'Period' Style Fixtures bulb shielded in opaque top</p>
 <p>Unshielded PAR Floodlights Drop-Lens Canopy Fixtures</p>	 <p>Shielded / Properly-aimed PAR Floodlights Flush Mounted Canopy Fixtures</p>

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