

SECTION VI

ROADWAY AND PARKING LOT LIGHTING

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PART I - ROADWAY LIGHTING

A. PURPOSE

The principal purpose for fixed lighting of public and private roadways for both vehicles and pedestrians is to create a nighttime environment conducive to quick, accurate and comfortable visibility. It is the intent of these Standards to improve traffic safety, achieve efficient traffic movement, and promote nighttime use under a wide variety of weather conditions.

B. GENERAL

Regardless of size, all developments within the corporate limits or under the control of the Village shall include provisions for the construction of roadway and parking lot lighting facilities. Construction of such lighting facilities shall be designed in accordance with this Section.

The details of the roadway and parking lot lighting systems shall be approved by the Village Engineer.

C. CODES AND REGULATIONS

Street and parking lot lights and appurtenances shall be designed in compliance with the Building and Zoning Codes and installed according to:

- The American National Standard Practice for Roadway Lighting, current edition, published by the Illuminating Engineering Society.
- The IES Lighting Handbook, current edition published by the Illuminating Engineering Society.
- The Roadway Lighting Handbook, current edition, published by USDOT-FHA.
- The National Electric Code, current edition.

The street or parking lot lighting system shall consist of the poles, mast arms, luminaires, conduit, hand holes, controllers, wire and all other materials and work necessary to complete a new lighting installation.

D. PUBLIC EASEMENTS AND UTILITIES (See Section II - Water Distribution System and Appurtenances - Page II-3)

The roadway lighting system is to be constructed within the right-of-way or utility easements for public improvements in locations shown on the approved plans and accepted by the Village.

All public conduit, cables, or controllers on private lots shall be confined to public utility easements now in existence or to be procured by the developer. A minimum easement of ten (10) feet shall be provided for all underground roadway lighting supply conduits or cable to be laid across private property. Such easements shall be properly documented by

deed or plat, accepted by the Village and recorded. All documents required to properly establish such easements shall be provided by the developer.

E. SUBMITTAL REQUIREMENTS AND APPROVAL

Two (2) sets of complete exterior lighting system plans and photometrics shall be submitted by a registered professional engineer of the State of Illinois along with the catalog cuts to the Village Engineer for approval. In special cases, the Village Engineer may designate larger lamps, higher poles, two (2) mast arms, or vary the spacing pole height, bracket arms length, specific light pattern, color and/or pole finishes as he deems necessary to meet special conditions.

F. PERMITS

The contractor shall, at his expense and in his name, obtain all Village electrical and highway permits, certificates of insurance and business licenses required for the work.

G. LIGHT DISTRIBUTION CLASSIFICATION

Proper distribution of the light flow from luminaires is one of the essential factors in efficient roadway lighting. The light emanating from the luminaires shall be directionally controlled and proportioned in accordance with this Section and meeting the requirements for seeing and visibility.

Light distributions are to be designed for the specific roadway and area classification with a minimum mounting height (MH), overhand, pole spacing and roadway width to be effectively lighted.

All luminaires can be classified (Type I through V) according to their lateral and vertical distribution patterns. Different lateral distributions are available for different street width-to-mounting height ratios. Different vertical distributions are available for different spacing-to-mounting height ratios.

Guide for Luminaire Lateral Light Type and Placement

Side of the Roadway Mounting			Center of the Roadway Mounting		
One side or Staggered	Staggered or Opposite	Grade Intersection	Single Roadway	Twin Roadways (median mounting)	Grade Intersections
Width up to 1.5 MH	Width beyond 1.5 MH	Width up to 1.5 MH	Width up to 2.0 MH	Width up to 1.5 MH (each pavement)	Width up to 2.0 MH
Types II-III-IV	Types III and IV	Type II 4-way	Type I	Types II and III	Types I 4-way and V

Note: In all cases suggested maximum longitudinal spacings and associated vertical distribution classifications are: Short distribution = 4.5 MH, Medium distribution = 7.5 MH, and Long distribution = 12.0 MH.

H. LIGHTING DESIGN

The design of a lighting system involves many variables. The design process and calculations should follow these major steps:

1. Determination of roadway geometrics, adjacent land use and traffic accident experience to obtain quantity of horizontal light required.
2. Formulation of a tentative concept as to luminaire location and mounting height.
3. Selection of a luminaire light distribution type.
4. Detailed photometric calculations (manual or computer generated).
5. Comparative calculations determining maximum-to-minimum uniformity ratios.
6. Selection of final design upon Village Engineer requested revisions.

I. ILLUMINANCE REQUIREMENTS

The recommended illuminance values are specified below:

Roadway/Walk/Bikeway Average
Maintained Illuminance on the Horizontal

Vehicular Roadway Classification	Commercial		Intermediate		Residential	
	Lux	Foot-candles	Lux	Foot-candles	Lux	Foot-candles
Expressway +	15	1.4	13	1.2	11	1.0
Major	22	2.0	15	1.4	11	1.0
Collector	13	1.2	10	0.9	6	0.6
Local	10	0.9	6	0.6	4	0.4

Sidewalk/Bikeway Average Maintained Illuminance
On the Horizontal

Walkway and Bikeway Classification	Minimum Average Levels	
	Lux	Footcandles
Sidewalks (roadside) and bikeways:		
Commercial areas	10	0.9
Intermediate areas	6	0.6
Residential areas	2	0.2
Walkways (distant from roadways) and bikeways:		
Park walkways and bikeways	5	0.5

J. UNIFORMITY

The average level to minimum point method and maximum level to minimum point method should not exceed the 4 to 1 and 8 to 1 limits respectively for local residential streets.

K. LUMINAIRE MOUNTING HEIGHT

<u>Roadway Classification</u>	<u>Mounting Height</u> (Feet)	<u>Pole Height</u> (Feet)	<u>Maximum Spacing</u> (Feet)	<u>Luminaire Size (Watt)</u>	<u>Bracket Length</u> (Feet)
Arterial Roadways	33'-43'	30'-40'	175'	250S	8'-15'
Collector Streets	31'	28'	200'	200S	8'-15'
Residential Subd.	14'	14'	300'	100S	N/A
Commercial Subd.	31'	28'	175'	200S	8'-15'
Industrial Subd.	35'	32'	200'	250S	8'-15'

L. LUMINAIRE SPACING

The spacing of poles and luminaires is influenced by the location of utility poles, fire hydrants, buried utilities, block lengths, property lines, roadway geometrics and driveway locations.

The desired luminance at any point on the pavement to the average illuminance should be maintained to prevent loss of object visibility between luminaires.

M. POLE LOCATION

Street lights shall be located on one side of the street unless, in the judgement of the Village Engineer, it is impractical to do so. All street light poles shall be set two (2) feet back from the curb line. At intersections with only one standard, the bracket shall be pointed perpendicular to one street. Where two (2) or four (4) standards are located at a major intersection, the bracket of each shall be perpendicular to a street as determined by the Village Engineer.

Other factors to consider in selecting locations are:

1. Access for maintenance
2. Visibility
3. Vehicular - pole collision probabilities
4. Trees
5. Aesthetic appearance
6. Combination traffic signal mast arm poles

Residential street lights are to be located as a minimum at all intersections, pronounced street curvatures, cul-de-sac terminations and at midblock intervals.

Types II, III and IV luminaires are intended to be mounted over or near the edge of the roadway.

Types I and V are generally designed to be mounted over or near the center of the area to be lighted.

N. TRAFFIC CONFLICT AREA LIGHTING

Intersecting, converging or diverging roadway areas require higher illuminances. Very high volume driveway connections to public streets and midblock pedestrian crosswalks should be illuminated at least 50% higher than average. Landscaped border areas, median strips and adjacent school or park grounds require higher than average illuminance.

O. TRANSITIONAL LIGHTING SECTIONS

Roadway lighting systems shall be designed to decrease the driver's brightness when emerging from a lighted section of roadway. Using the design speed of the road, the reduced lighting level zone with smaller lamp sizes shall allow for a ten (10) second eye exposure adjustment.

Heavily traveled roadway intersections and converging and diverging traffic lanes shall have illuminance levels of the summation of each roadway traditionally obtained by using combination traffic signal and lighting poles on both corner approaches.

Special lighting design shall be considered at railroad grade crossings and roadway under and overpasses. Railroad grade crossings must be adequately lighted to permit identification of the crossing, trains and unlighted vehicles or pedestrians at the crossing. Illuminance levels over and within one hundred (100) foot should be increased to twice that of the adjacent roadway.

P. DETAILED MATERIAL AND EQUIPMENT SPECIFICATIONS

1. Trench and Backfill

The cable/conduit trench shall be located two (2) feet in back of the curb. Approved granular backfill material shall be deposited in the trench in layers, not to exceed six (6) inches in depth, and shall be thoroughly compacted by suitable tamping before the next layer is deposited in the trench.

Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed.

Trenching shall be conducted so as to avoid disturbing existing trees, utilities, pavements and equipment. Excavation shall be deeper than minimum wherever required in order that conduit may be installed so as to avoid existing piping or other obstructions.

All areas disturbed by the trenching, storing of dirt, and other work shall be restored to their original condition. The restoration shall include any necessary topsoiling, fertilizing, liming, seeding or mulching. All excess and unsatisfactory spoil or backfill material shall be hauled away. The contractor shall be held responsible for maintaining all disturbed surfaces and repair thereof until final acceptance.

2. Handholes

Handholes are required at the ends of all isolated rigid steel conduit and at intermediate locations between light poles on rigid steel conduit systems to facilitate pulling cable. Handholes shall be precast concrete or if poured constructed of Class S1.

3. Ground Wire

In addition to the power circuit, a direct buried bare equipment ground wire shall be provided interconnecting all poles, controllers and ground rods. Ground rods shall be provided at the controller or Commonwealth Edison pole and at the end of each circuit. Ground rods shall be 3/4 inch in diameter and 8 feet long with steel core and heavy exterior layer of pure copper driven into the ground.

4. Light Pole Foundations

Pole foundations shall be constructed of Class S1 concrete as described in the Standard Specifications for Road and Bridge Construction. They shall be of sufficient diameter and depth, based on actual soil conditions, to safely support the proposed light pole.

5. Cable

Single conductor, #6 wire gauge stranded copper, commercial grade, neophrene-jacketed, U.S.E. type, 600 volt direct burial cable of the proper size dependent upon circuitry (Hazard No. S-501 orequal) shall be used from the power source to the base of the light standard. All such cable in rigidsteel conduit shall be buried to a

minimum depth of twenty-seven (27) inches below finished grade. The cable shall be surrounded on all sides by three (3) inches of clean sand backfill material. When laid in parkway locations, such cable shall be installed two (2) to three (3) feet from and parallel to the back of street curbing. In the event of a sidewalk improvement immediately adjacent to the curb, the cable shall be installed as dimensioned above parallel to the private property side of the sidewalk. All underground cable shall be continuous. If splices are necessary, prior approval must be given by the Village Engineer and locations of splices recorded as to their exact location on the "As-Built" plans.

Ninety (90) percent trench compaction shall be obtained to at least the bottom of the curb. Care shall be taken during installation so that the cable is not stretched or unduly strained. All cable shall be shown on the "Record Drawings" where actually installed.

6. Uni-Duct (non-paved areas)

One inch diameter polyethylene conduit may be used in non-paved areas. It shall be manufactured from a polyethylene meeting the requirements of ASTM specification D-1248-72 for Type II, Class C, category 5, Grade P-23. The finished duct shall have sufficient flexibility for coiling and uncoiling and ease of handling. It shall be approved for direct earth burial in trench.

7. Pole Wire

The cable within the pole from the handhole to the luminaire shall be single conductor, copper, neoprene-jacketed, and photoelectrically controlled, commercial grade, color coded, stranded type THHN, 600 Volt insulation, #10 wire gauge AWG.

8. Steel Conduit

All conduits shall be rigid galvanized steel, commercial grade, a minimum 2" size, threaded in 10' lengths, with proper accessories for coupling or 90 degree long elbows. All conduits shall terminate in plastic bushings and sealed to prevent entrance of moisture and debris. They shall be buried a minimum of 27 inches deep and shall always be used in side yard easements and under and within two (2) feet of existing sidewalks, driveways, parking lots and roadways.

9. Underground Connection Pedestal

Conduit shall be terminated 18" from Commonwealth Edison Company pedestal and 27" below grade. Eight (8) feet of cable with ends sealed shall be left for connections by Commonwealth Edison Company.

When conduit is to be installed under existing pavement it shall be pushed into place where possible and open cut excavation and patching avoided.

10. Electrical Connection and Power Supply

The contractor shall contact the Commonwealth Edison Company to obtain service connection locations. The contractor shall be responsible for all service connection charges.

Connection to the power supply shall be made as near to the secondary supply of the distribution transformer as is practical. Such connection shall be made in accordance with Commonwealth Edison Company regulations.

Service cables shall be run directly from the underground cable entrance to the circuit breaker, then up to the relay. From the relay, the color coded leads shall go to the handle. Neutral wires shall also be spliced in the handhole. All splices shall be removable for inspection and maintenance purposes.

11. Fuses

A weather-proof fusetron HEB-AA holder with a 5 amp "fusetron" shall be placed in the handhole of each light pole and shall be connected in series with the underground conductors feeding each luminaire. Sufficient slack cable shall be provided in each handhole so that socket splices may be removed for inspection and maintenance.

12. Circuitry

No circuit shall be greater than 1,000 feet from power source to the most distant luminaire. Line voltage drop must not exceed ten (10) percent through such distance. All cable shall be No. 6 in size or larger. Luminaires in the circuit shall be photoelectrically controlled (Westinghouse No. P-12 or equal). Group units shall be limited to four (4) unless a relay (Westinghouse Type MR or equal) is used with the group control being mounted on the luminaire closest to the power source. The photoelectric device shall, in all cases, be mounted on the top of the luminaire closest to the power source.

13. Control and Connection

Power for street lighting may be either metered or nonmetered as required by the Village Engineer and Commonwealth Edison Company. Complete wiring schematics shall be provided as part of the plans submitted for approval.

(a) Nonmetered Power

A light pole, designed as the service pole, shall be provided, equipped as follows:

- A circuit disconnect breaker box, 8" x 6" x 4" or larger, of cast aluminum with tamper proof, screwed cover; 1 1/2 inch back hub; thermal magnetic breaker; back mounted screw hub for ground lug and stainless steel mounting hardware shall be mounted on the pole approximately 10 feet above the ground or approved equal shall be

installed next to Commonwealth Edison box as directed by the Village Engineer.

(b) Metered Power

When power is to be metered, a control center shall be provided. The control center shall be installed where shown on the drawings, usually in the parkway between sidewalk and street curb, with enclosure door facing street. It shall be painted "green" in residential areas and "yellow" in nonresidential areas. Concrete foundation top shall be two (2) inches above finished grade. Ground wire shall be installed between enclosure and ground rod in foundation. The circuit from the power source to the control center shall be installed in continuous rigid steel conduit. The control center shall be manufactured by Crouse Hinds Company or an "approved" equal.

- (1) Foundation shall be a State of Illinois, Type A, Traffic Signal Controller Foundation, field modified as required.
- (2) Crouse Hinds Company, Pedestal and Base No. 4639.
- (3) Enclosure shall be a Crouse Hinds Company, Number 46394, Traffic Signal Type, Cast Aluminum Meter Cabinet.
- (4) Crouse Hinds Pole Adapter No. KL3403.
- (5) Equipment to be installed in the enclosure shall include:
 - An electrically held contactor of proper size for system with 120/240 volt coil.
 - A thermal magnetic main circuit breaker of adequate size.
 - CB Duplex convenience outlet and porcelain lamp holder with pull chain.
 - Wiring for a circuit breaker.
 - A twenty (20) amp. circuit breaker.
- (6) A meter socket with locked metal protective cover of sufficient depth for meter to be mounted on rear of enclosure.
- (7) A photoelectric cell, shall be installed, complete with pole tap adapter and receptacle on light post nearest to the control center, interconnected with the control center with a 3 wire, No. 12 color coded circuit.

14. Luminaires

(a) Luminaires and Ballasts (on concrete poles)

The luminaires shall be General Electric Company Town and Country T.C. or an "approved" equal with energy efficient constant wattage ballasts, nominally wired for 120/240 volt operation and equipped with Fusetron in-line fuse holders and 5 amp slow blow fuses. Each luminaire shall have the proper light distribution pattern and shall be furnished with a lamp of the wattage indicated. Mounting height shall be 14'-0".

<u>Manufacturer</u>	<u>Style</u>	<u>Size</u>	<u>Volts</u>
G. E.	Town & Country	100 watt	120/240HP Sodium

(b) Luminaires and Ballasts (on aluminum poles)

The luminaires for lighting improvements to be accepted by the Village for maintenance shall be a standard line of Quality Lighting (Q.L., Inc.) or equivalent luminaires equipped with photoelectric control units and one piece reflector housing of bronze finished aluminum and flat clear lens. The luminaire shall be equipped also with a hinged lens holder that shall be securely held in place by a suitable latch. The luminaire head with Q.L. - 24B reflector shall embody a two (2) inch slip fitting and shall be equipped with adjustable latch lugs to permit the proper orientation of the light pattern on the pavement; and EEL - NEMA standard, three (3) terminal polarized lock-in type, photo-electric-control receptacle. In addition, constant wattage high pressure sodium vapor units shall be equipped with quick removeable ballasts that are wired for 120 volt operation but may be reconnectable for 240. The luminaires shall provide lighting distribution equivalent to IES type II except at intersections where IES type V or IES type II with four (4) way distribution shall be provided.

All luminaires shall be installed as part of the pole erection and shall be individually leveled by means of a spirit level after installation. All connections shall be adequately tightened.

<u>Manufacturer</u>	<u>Reflector</u>	<u>Size</u>	<u>Volts</u>
G.E. (or approved equal)	24B	200 watt HP Sodium	120/240
G.E. (or approved equal)	24B	250 watt HP Sodium	120/240

(c) Luminaires shall be controlled by one of the following methods:

- (1) Individual (Less than six (6) standards) Each luminaire shall be controlled by an individual photoelectric control unit (G.E. Co. Astrodome or approved equal) recessed in top of each luminaire.
- (2) Group (more than six (6) standards) The control unit controlling more than one luminaire shall consist of a switch (G.E. Co. multi-control or approved equal) actuated by a photoelectric control unit (G.E. Co. Poly-volt or approved equal). No timers are to be used.

15. Light Standards

(a) Light Standards

Residential light standards to be accepted by the Village for maintenance may be manufactured of concrete, centrifugally cast, pre-stressed and steel reinforced. The standards shall have smooth ground and polished surfaces with a sky gray finish. The cross section of the standard shall contain a raceway extending throughout the length of the standard and dual cable entrances below grade. The raceway shall have a minimum opening of one and one-half (1 1/2) inches and shall not exceed two (2) inches at the top of the standard. A handhole shall be provided on the opposite side from the luminaire and shall be covered with a heat treated cast aluminum door, fastened to nonferrous inserts in the standard with stainless steel bolts a distance of eighteen (18) inches above finished grade.

All standards shall be provided with an aluminum mast cap held to the top of the standard by stainless steel screws and nonferrous inserts.

Concrete light standards are to be of the type manufactured by the Centrecon Pole Company, or approved equal.

Aluminum light standards are to be of the type manufactured by Hapsco or approved equal.

Aluminum for the handhole doors and mast caps shall conform to ASTM specifications S5A-F or SG70A-T6 and B26-50T.

Roadway lighting standards shall not be less than eight (8) inches in diameter with a butt base below final grade level. It shall be equipped with mast arm brackets securely attached to the standard.

Poles shall be set vertical in tamped wet screenings, at proper grade, and shall be straight to within one (1) degree of vertical, straightened and maintained throughout the duration of the twelve (12) month Guarantee Period.

(b) Summary

1. Concrete Pole Specifications

<u>Manufacturer</u>	<u>Height (Ft)</u>	<u>Finish</u>
Centrecon	14 - 28	Gray

2. Brackets (variable)

<u>Single</u>	<u>Double</u>	<u>Length (Ft.)</u>
AD	ADD	8, 10, 12, 14

3. Power Cap - AP-490
4. Aluminum Pole Specifications

<u>Manufacturer</u>	<u>Height (Ft.)</u>	<u>Arm Length (Ft.)</u>
Hapsco Poles	30-45	w/12-15
Lexington Poles	30-45	w/12-15

(c) Materials and Equipment:

1. Equipment Standardization

In the interest of encouraging uniform appearance, standardization of replacement parts and familiarization of maintenance personnel with the equipment, the Village has selected certain equipment which is to be incorporated.

2. Materials

All materials comprising the lighting systems shall be the product of a firm or firms regularly engaged in the manufacture of such materials and shall be covered by the manufacturer's or installing contractor's warranty or guarantee. The materials shall be new, of current manufacture and of standard design free from all defects.

3. Other Equipment

All other components of the street lighting system not covered or detailed by these specifications shall be designed and provided in conformance with currently accepted practices of good engineering and in full compliance with the requirements of the Commonwealth Edison Company.

A type E, 100 ampere, double pole, 240 volt circuit breaker (Westinghouse AB-De-ion or equal shall be used. A single pole, 20 ampere rated toggle switch shall be installed to by-pass the photoelectric control. A 15 ampere, medium socket fuse (Fusetron or equal) shall be provided to protect the photoelectric control from overload.

4. Substitute Material or Equipment

If the general requirements, law, ordinance or applicable rules or regulations permit the developer to furnish or use an approved substitute that is equal to any material or equipment specified, and if the developer wishes to furnish or use a proposed substitute, he shall make written application to the Village Engineer for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the function called for by the general design, be similar and of equal substance to that specified and be

suited to the same use and capable of performing the same function as that specified; stating whether or not its incorporation in or use in connection with the project is subject to the payment of any license fee or royalty; and identifying all variations of the proposed substitute from that specified and indicating available maintenance service. No substitute shall be ordered or installed without the written approval of the Village Engineer who will be the judge of equality and may require the developer to furnish such other data about the proposed substitute as he considers pertinent.

Q. SUPERVISION AND SAFETY

The contractor shall supervise and direct the work efficiently and with his best skill and attention.

The developer's engineer shall be responsible for coordinating the improvement work, correcting faulty work, and consulting with the Village Engineer in the settlement of any construction disputes, plan changes or plan adjustments.

The contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

R. INSPECTION AND TESTING

After the installation is complete and at a time convenient to the Village, all equipment shall be demonstrated to operate in accordance with the drawings and specifications. All systems shall pass a first time 5 megohm installation resistance test. All circuits shall be designed for a voltage drop not greater than that required for the proper operation of lamps and in any case not to exceed 10%. This work shall be considered as incidental to the lighting contract. The contractor shall notify the Village Engineer at least forty-eight (48) hours prior to testing and all testing shall be done in the presence of the Village Engineer.

S. RECORD DRAWINGS

Upon completion of construction, the developer shall be responsible for providing one (1) set of "As Built" - sepia mylar reproducible plans and one (1) blue line print set to the Village Engineer for permanent record use.

T. GUARANTEE PERIOD AND WORKMANSHIP

All work to be performed under this contract shall be performed in a neat and workmanlike manner and shall be guaranteed by the contractor and his surety against defects in workmanship and materials of whatever nature for a period of twelve (12) months from the date of final acceptance of the work. Any defective material or workmanship shall be repaired or replaced by said contractor to the satisfaction of the Village without cost to the Village.

PART II - PARKING LOT LIGHTING

A. ILLUMINANCE

1. Uniformity/Intensity

The horizontal illuminance method shall be utilized on an average-to-minimum ratio and maximum-to-minimum ratio as designated below:

Horizontal Illuminance Table

<u>General Parking and Pedestrian Area</u>				
<u>Level of Activity</u>	<u>Lux (Minimum on pavement)</u>	<u>Footcandles (Minimum on pavement)</u>	<u>Uniformity Ratio (Average/Minimum) (Max./Min.)</u>	
High	10	0.9	4:1	9:1
Medium	6	0.6	4:1	9:1
Low	2	0.2	4:1	9:1

2. Glare

Efforts must be made to use luminaires that control the view of the light source from drivers and pedestrians. Both disability and discomfort glare must be avoided.

B. LIGHT SOURCE

1. Atmospheric Conditions

All exterior fixtures shall be totally enclosed and gasketed for protection from the elements.

2. Lamp Position

Each lamp shall be positioned to achieve the maximum light output for even distribution within the parking lot.

C. LIGHTING EQUIPMENT

A variety of luminaires are used for lighting parking facilities such as area lighting, architectural, post top, wall mounted and roadway lighting. "Shoe box" style shall be used with sharp cut off designed to confine light to specific designated areas.

Floodlight luminaires, adjustable wall packs and high-mast aerial lighting (greater than sixty (60) feet) shall not be acceptable.

The luminaire types that are suited for a specific application can be determined by comparing luminaire and lamp combinations to basic considerations, such as:

1. Size and shape of area.

2. Mounting height of luminaire (normally 20 to 40 feet/flat glass unit).
3. Location requirements of poles and luminaires:

When perimeter poles are used a one way beam in a cut off design shall be considered or lamp positioned so as it is capable of procuring a rectangular pattern.
4. Illuminance requirements
5. Quality of uniformity requirements (maximum to minimum).
6. Energy requirements (lamp source and ballast). PF-90 CWA energy efficient constant wattage auto factor type ballasts shall be used.
7. Code restrictions.
8. Effects of spill light, street and house side light must be controlled by optics, reflectors or visors to minimize unwanted light. If visors are used the structural integrity of the pole and lamp combination must be safely determined as acceptable for local wind conditions.

D. ARCHITECTURAL LUMINAIRES

These varied types of luminaires are designed to blend with the total architectural environment and shall be capable of producing efficient, uniform illumination while offering control of undesirable light or glare.

E. POST TOP LUMINAIRES

The mounting height for this type of lamp shall not exceed twenty-five (25) feet.

F. WALL MOUNTED LUMINAIRES

The cutoff type shall be used with a maximum mounting height of twenty-five (25) feet and maximum spacing of four (4) times the mounting height and maximum lamp of 400 watts.

G. SPECIAL LIGHTING

Should closed circuit television monitoring equipment be necessary, special considerations will be given to the lighting level, type of light source and distribution pattern in order to ensure effective results.

H. ENERGY MANAGEMENT

Timers shall be considered in reducing the lighting levels during reduced activity levels to provide for only security lighting levels.

I. DESIGN AND SUBMITTAL PROCEDURES

Private parking lot and area lighting will be reviewed on an individual basis for meeting the intent of these provisions. Catalog cuts and photometrics must be submitted for approval by the Village Engineer.