Introduction

All the files that you will need for the class are located under:
“C:\ AGI32_Training”

General Outline of Topics for the Class:
1.) Title Page and Index (pages 1-2)
2.) AGI32 System Settings (pages 3-11)
3.) Importing DXF files into AGI32 (pages 12-15)
4.) Exporting to DXF from AGI32 (pages 16-17)
5.) MISC Tools, View Commands & View Manager (pages 18-21)
6.) Defining Luminaires (pages 22-35)
6.) Luminaire Tools (pages 36-37)
6.) Luminaire Templates (pages 38-41)
7.) Calculation Point Tools / Calculation Point Grid Placement / Calc. Point Status Manager (pages 42-44)
7.) Luminance, Veiling Luminance, Spacing, MH, & Wattage Relationships (pages 45-47)
7.) Roadway Luminance and Veiling Luminance Grids (pages 48-50)
8.) Isolines and Highlighted Values (pages 51-52)
8.) Statistical Areas / Statistical Summary (pages 53-54)
8.) Project Manager (page 55)
9.) Printing / Documentation (pages 56-62)
10.) Network License Manager/Check-out/Check-in program/Customizing & Creating Tools (pages 63-66)
10.) Tech Support and Contacts (page 67)
11.) 3 Examples (#1 is pages 68-75) 12.) (#2 is: pages 76-83) 13.) (#3 is pages 84-111)
18.) TEST ( page 112) TESTHANDOUT ( pages 112 – 126)
System Settings – Tools (main menu)

Or use this tool icon to bring Up system Settings menu
System Settings - Switches/Settings

Match the settings as shown below.

- Show Welcome Browser
- Digitizer Button Beep
- Ortho Mode
- Automatic Calculation

- Undo/Redo
- Smart Text

- Auxiliary Coordinate Display
- Direct Calculation Mode
- Snap To
- Classic Keystrokes
- Automatically Show Statistical Summary Window
- Show Calc Mode Dialog With New Files

- Virtual Axis
  - Off
  - Display in Upper Left Hand Corner
  - Attach to: X=0, Y=0

- Dimensions
  - Precision (decimals): 3

- Snap
  - Snap On: Value: 0.1
  - Snap Off

- Hints
  - Activate All
  - Deactivate All

- Smart Symbols
  - Full Calc Mode
  - Direct Calc Mode

- Save Settings As Startup Defaults
System Settings - Units

Match the settings as shown below.
System Settings – View/Project

Type in a View Name and Project Name.
System Settings - Defaults
Match the settings as shown below.
System Settings - Rendering

Match the settings as shown below.

Select this button for menu on next slide.
System Settings - Advanced Settings

Match the settings as shown below.

[Image of Advanced Settings window with settings highlighted]

Please use caution when changing these settings.
System Settings - File System

Match the settings as shown below. (use your name)
System Settings - File System
Match the settings as shown below. (use your name)
Importing a DXF File into AGI32

Open a new file in AGI and go to File\Import.

Notes:
Set up the AGI System Settings before Importing DXF file. (**Decide on the units** that you are going to use.)

When creating the DXF File, delete any non useful elements from the basemap before exporting.

Recommend you draw lines around each design area for use in AGI32.

Don’t move or reorient the basemap after Importing.

Select the file you wish to import.
Importing a DXF File into AGI 32 Cont..

Select All Layers
Do not change the scale factor
Verify unit are feet

Note: If you want to Export Luminaire locations back to MicroStation, don’t move or rotate the basemap once it has been imported.
Importing a DXF File into AGI 32 Cont...

After the Import has completed this Report window will appear. Some drawing entities were not imported. Just select “OK” and proceed on.
Exporting from AGI32 to DXF

Open the file in AGI32 that you want to Export. Next go to File\ Export.

Select a name and location for the exported file.
Exporting from AGI32 to DXF Cont..

Leave all settings at the default and select OK.

Note: Before exporting, you should copy the AGI32 file and then delete everything except for the Luminaire locations. This way you will only be importing the luminaire locations into your CADD basemap.
1.) **Units** (The imported basemap is in feet, light levels and values are in Ftc.)

2.) **Snap** (**OFF** is best. The cursor moves by the displayed increment on the design grid.)

3.) **OrthoMode** (**OFF** is best. Allows you to move in any direction instead of by right angles.)

4.) **Snap To** (Used to Snap To the end points of all entities, including drawing entities, rooms and objects)

5.) **Auto Calc** (within Direct Mode, when “on”, will recalculate when a luminaire is modified or moved or a calculation modified is applied)

6.) **Calc Mode Switch** (Switches between **Direct** and **Full Calc** Modes. Use Direct Calculation Mode unless you wish to render the design file. In order to render you need to place objects with reflectance properties. See Manual for more information on Objects and Rendering.

7.) **Calculate Switch** (Calculates the design file.)

8.) **Update Status** (Displays a red ball until program is done calculating and updating the database.)

9.) **More Tools** (Add or Remove tools from toolbar.)
# View Commands

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

1. **Redraw Current View** *(Refresh View)*
2. **Pan Center** *(Use to move any point to the center of the view)*
3. **Pan Point** *(Use to move the view in any direction.)*
4. **Zoom Center** *(Moves the selected point to the center of the screen and zooms in the amount set in the system settings. The default setting is 2x.)*
5. **Zoom In** *(home)*
6. **Zoom Out** *(end)*
7. **Zoom Window** *(Place a fence around the area that you wish to view closer.)*
8. **Zoom Extents** *(Fits everything in the file to your specified view.)*
9. **Limits** *(Brings the view to the X=0, Y=0 Grid Location)*
10. **View Previous** *(Allows you to see previous view)*
11. **Plan-view** *(Rotates the view to any orientation that you wish)*
12. **Elevation View** *(Select 2 pts from left to right in the direction of the cross section that you wish to view.)*
13-16. **Elevation View** *(View North, South, East & West Elevation Views)*
17. **View Room Wall or Object Side Surface**
18. **Isometric View** *(Shows a skewed 3D view according to System Settings)*
19-22. **Preset Isometric View** *(View Northeast, Northwest, Southeast, Southwest Isometric Views)*
23. **View Manager** *(Allows you to add / create / name / manipulate (Turn ON/OFF) different views)*
View Manager
The View Manager allows you to create different views of the file.

1.) Type the name of the new view under “add new view”
2.) You can select multiple views by holding in the shift key and selecting the views you want.
3.) When multiple views are present you can change the perspective of each view individually by selecting the view window and then applying the appropriate command.
For 200W, 250W, 310W, or 400W HPS, Type III, Medium Cutoff with Flat Glass use the **GE1002.ies** photometric file.  
(The yellow 40 label stands for 400W HPS)  
(blue = mercury & red = metal halide per Std. Spec. 9-29.10)

\[
\begin{align*}
200W &= 22,000 \text{ Lumens}(248W), \\
250W &= 28,000 \text{ Lumens}(314W), \\
310W &= 37,000 \text{ Lumens}(387W), \\
400W &= 51,000 \text{ Lumens}(479W)
\end{align*}
\]
Cobra Head Fixture - Specification

M-400A POWR/DOOR® LUMINAIRE
WITH CUTOFF OPTICS

APPLICATIONS
- Freeway, Highway and parking lot lighting

SPECIFICATION FEATURES
- Power module ballast assembly
- Filtered optics
- Universal two or three bulb slig or filter
- Standard reflector
- *Head back* tuning type, FRF
- Terminals included
- 2 in-type mounting only
- With MDC
- Heavy-duty aluminum housing
- with ebonite or grey paint
- Finish
- Adjustable mogul base socket
- (house side) E-39 standard

ORDERING NUMBER LOGIC

PHOTOMETRIC SELECTION TABLE

CLEAR REFRACTORS: All light sources are clear.

<table>
<thead>
<tr>
<th>Wattage</th>
<th>Light Source</th>
<th>Photometric Curve Number 35-45xxx</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 (65W)</td>
<td>HPS</td>
<td>M2</td>
</tr>
<tr>
<td>200-400</td>
<td>PO</td>
<td>M3</td>
</tr>
<tr>
<td>400-500</td>
<td>MH</td>
<td>M3</td>
</tr>
<tr>
<td>400 (Coated)</td>
<td>Proc.</td>
<td>M2</td>
</tr>
<tr>
<td>NOTE: N/A = Not Available, C/F = Contact Factory</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Requires the use of a D-28 lamp, 250 watts maximum*
Cobra Head Fixture - Specification

M-400A POWR/DOOR* LUMINAIRE
WITH CUT OFF OPTICS & 4 BOLT SLIP FITTER

FIXTURE DIMENSIONS

DATA

- Specimen Free Weight: 33-39 lbs
- Effective Projected Area: 1.1 sq ft
- Supplied Mounting Height: 20 ft

REFERENCES

See Page R-46 for start of Accessories.
See Page R-52 for Explanation of Options and Other Terms Used.
See Pole and Bracket Section Page P-2 for pole selection.

Ballast Selection Table

| Wattage | Light Source | Multi-volt | 120 | 240 | 277 | 480 | 100K | 120K | 150K | 240/120 P | 250 | 260 | 270 | 300 | 315 | 360 | 400 | 480 |
|---------|--------------|------------|-----|-----|-----|-----|------|------|------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 150/650 | HPS          | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 250     | HPS          | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 250/400 | HPS          | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 310     | HPS          | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 400     | HPS          | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 115     | MH           | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 250     | MH           | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 400     | MH           | A           | A   | A   | A   | A   | A    | A    | A    | A          | A   | A   | A   | A   | A   | A   | A   | A   |
| 600     | Merc         | C           | C   | C   | C   | C   | C    | C    | C    | C          | C   | C   | C   | C   | C   | C   | C   | C   |

NOTE: N/A - Not Available
*Not available in 120/240 volt
CT = Contact factory

MCDA — SUGGESTED CATALOG ORDERING NUMBERS

<table>
<thead>
<tr>
<th>Catalog/Number</th>
<th>Wattage</th>
<th>Light Source</th>
<th>Voltage</th>
<th>Ballast Type</th>
<th>Reflector Type</th>
<th>Photometric Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCDCA250A29MIC21</td>
<td>250</td>
<td>HPS</td>
<td>29V</td>
<td>Multi-volt</td>
<td>Auto Regulator</td>
<td>Class IC</td>
</tr>
<tr>
<td>MCDCA250A29MIC21</td>
<td>400</td>
<td>HPS</td>
<td>29V</td>
<td>Multi-volt</td>
<td>Auto Regulator</td>
<td>Class MC</td>
</tr>
</tbody>
</table>

All GE suggested catalog ordering numbers come with PC receptacles. PC control must be ordered separately.
Order and install SCOL/FCCL if no PC is desired.
Multi-volt ballasts combine either 120, 208, 240, or 277 volt incoming power supply.
Cobra Head Fixture - Accessories

ACCESSORIES
REFER TO ACCESSORY INDEX TO MATCH ACCESSORY WITH PRODUCT. ILLUSTRATIONS SHOW VARIOUS TYPICAL REPRESENTATIONS.

BOTTOM VISOR
- BVAL-V2FS Aluminum
- BVDB-V2FS Dark Bronze

CORNER MOUNTING ADAPTER
- CMA-PB

EXTERNAL LIGHT SHIELD
- ELS-M2A
  For M-250AZ (160° shield)
- ELS-M2R
  For M-250RZ (160° shield)
- ELSH5-M4R
  House side light shield for M400 and M400A non-cutoff, house or street side light shield for MSRL/MSCL/MDRA/MDCA

FUSE KITS (LESS FUSE(S))
- FK1-M24
  Single
- FK2-M24
  Double

HAIL SHIELD
- HMMA-HS
  Hail shield for high mast luminaire

INTERNAL LIGHT SHIELD
- ILS-M2
  House or street side light shield for M-250A and M-250R non-Cutoff
- ILS-M4
  House or street side light shield for M-400 and M-400 non-cutoff or reflector type units
- ILS-M4RL
  House or street side light shield for MSRL/MDRL non-cutoff or reflector type units

GE Lighting Systems, Inc.
www.lightingsystems.com

Street side shield
House side shield
Cobra Head Fixture - Ballast Spec.

Per Std. spec. 9-29.9 Ballast, Transformers

<table>
<thead>
<tr>
<th>ANSI Lamp Type</th>
<th>Rated Lamp Watts</th>
<th>Input Volts</th>
<th>Maximum Input Amps</th>
<th>Input Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-51</td>
<td>400</td>
<td>120</td>
<td>3.0</td>
<td>431</td>
</tr>
<tr>
<td>S-67</td>
<td>310</td>
<td>208</td>
<td>2.0</td>
<td>375</td>
</tr>
<tr>
<td>S-50</td>
<td>250</td>
<td>208</td>
<td>1.5</td>
<td>316</td>
</tr>
<tr>
<td>S-66</td>
<td>200</td>
<td>208</td>
<td>1.0</td>
<td>240</td>
</tr>
<tr>
<td>S-56</td>
<td>150</td>
<td>120</td>
<td>1.7</td>
<td>192</td>
</tr>
<tr>
<td>S-54</td>
<td>100</td>
<td>120</td>
<td>1.3</td>
<td>126</td>
</tr>
<tr>
<td>S-62</td>
<td>70</td>
<td>120</td>
<td>0.9</td>
<td>91</td>
</tr>
<tr>
<td>S-58</td>
<td>50</td>
<td>120</td>
<td>0.7</td>
<td>69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANSI Lamp Type</th>
<th>Rated Lamp Watts</th>
<th>Input Volts</th>
<th>Maximum Input Amps**</th>
<th>Input Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-111</td>
<td>150</td>
<td>120</td>
<td>3.7</td>
<td>830</td>
</tr>
<tr>
<td>E-55</td>
<td>150</td>
<td>120</td>
<td>2.7</td>
<td>192</td>
</tr>
<tr>
<td>E-54</td>
<td>100</td>
<td>120</td>
<td>2.0</td>
<td>126</td>
</tr>
<tr>
<td>E-62</td>
<td>70</td>
<td>120</td>
<td>1.4</td>
<td>91</td>
</tr>
<tr>
<td>E-58</td>
<td>50</td>
<td>120</td>
<td>0.9</td>
<td>69</td>
</tr>
</tbody>
</table>

** Note: For E-111 type systems the maximum current is for the open circuit or starting condition. Normal running current will be lower.
# Cobra Head Fixture - HPS Lamp Data

The table below provides data on Cobra Head Fixtures for different wattages of HPS lamps. The data includes details on ordering abbreviations, ANSI codes, finishes, light center length, initial lumens, and mean lumens.

## 200W Fixtures

<table>
<thead>
<tr>
<th>Ordering Abbreviation</th>
<th>ANSI Code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU20/Med</td>
<td>S76</td>
<td>Clear</td>
</tr>
<tr>
<td>LU20/D/Med</td>
<td>S76</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU50/Med</td>
<td>S68</td>
<td>Clear</td>
</tr>
<tr>
<td>LU50/D/Med</td>
<td>S68</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU100/D/Med</td>
<td>S54</td>
<td>Clear</td>
</tr>
<tr>
<td>LU100/D</td>
<td>S54</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU100/D/00</td>
<td>S51</td>
<td>Clear</td>
</tr>
<tr>
<td>LU100/D/00/00</td>
<td>S51</td>
<td>Diffuse</td>
</tr>
</tbody>
</table>

## 250W Fixtures

<table>
<thead>
<tr>
<th>Ordering Abbreviation</th>
<th>ANSI Code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU250/Med</td>
<td>S72</td>
<td>Clear</td>
</tr>
<tr>
<td>LU250/D/Med</td>
<td>S72</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU500/D/Med</td>
<td>S62</td>
<td>Clear</td>
</tr>
<tr>
<td>LU500/D</td>
<td>S62</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU1000/D/Med</td>
<td>S56</td>
<td>Clear</td>
</tr>
<tr>
<td>LU1000/D</td>
<td>S56</td>
<td>Diffuse</td>
</tr>
</tbody>
</table>

## 310W Fixtures

<table>
<thead>
<tr>
<th>Ordering Abbreviation</th>
<th>ANSI Code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU310/Med</td>
<td>S78</td>
<td>Clear</td>
</tr>
<tr>
<td>LU310/D/Med</td>
<td>S78</td>
<td>Diffuse</td>
</tr>
<tr>
<td>LU620/D/Med</td>
<td>S60</td>
<td>Clear</td>
</tr>
<tr>
<td>LU620/D</td>
<td>S60</td>
<td>Diffuse</td>
</tr>
</tbody>
</table>

## 400W Fixtures

<table>
<thead>
<tr>
<th>Ordering Abbreviation</th>
<th>ANSI Code</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU400/Med</td>
<td>S75</td>
<td>Clear</td>
</tr>
<tr>
<td>LU400/D/Med</td>
<td>S75</td>
<td>Diffuse</td>
</tr>
</tbody>
</table>

## NOTE

Similar wattage clear, diffuse, or deluxe HPS lamps may not have the same bulb size or light center length. If lamps are interchanged, the socket position may need to be changed to obtain the desired photometric distribution.

Most GE Lighting Systems products will be furnished with mogul base sockets. Any exceptions will be noted on product pages. Medium base socket must be rated for 450W.

## Average Life vs. Hours/Start

<table>
<thead>
<tr>
<th>Hours/Start</th>
<th>Estimated Avg. Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>Greater than 100%</td>
</tr>
<tr>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>25</td>
<td>50%</td>
</tr>
<tr>
<td>12</td>
<td>40%</td>
</tr>
</tbody>
</table>

* Applies to HPS, Metal Halide and Mercury lamps.

* Rating standard for 1500, 1650 and 2000 watt lamps. Contact factory for life on other burning cycles.

NOTE: Consult lamp manufacturer for lamp lumen depreciation.
For 400W Clear, HPS, Cutoff, Type V High Mast use the Holophane 43842.ies photometrics file.

400W = 51,000 Lumens
High Mast - Specifications

Dark Skies
High Mast Cutoff

The Dark Skies High Mast Cutoff (DSM) luminaire provides highly efficient lighting while protecting against the veiling glare caused by light pollution. The provided light control provided by the DSM luminaire can be utilized in a wide variety of applications, especially in areas near observatories or other locations sensitive to "dark skies". The optional low-brightness reflector increases the luminaire's efficiency by reducing direct glare even further.

The open ventilated glass optic system provides both lower dielectric loss and easy maintenance. When combined with a high-performance luminaire, the DSM luminaire provides efficient and effective lighting with a system that reduces maintenance and replacement time.
Underpass Style Fixture - Wall Mount

Wallpack II and Wallpack III

For 250W or 400W Clear, HPS, Non-Cutoff, Type None Underpass Style use the Holophane 43346.ies photometrics file.

- **200W** = *11,000 Lumens
- **250W** = *14,000 Lumens
- **400W** = *25,000 Lumens

* Design Experience has shown that 50% of the design lumen output is more accurate.
Wallpack - Specification

Wallpack® Series

Perimeter and security lighting require excellent control and uniformity. Light trespass and glare must be minimized at the points of shadow. Wallpack II and Wallpack III fixtures exist at this, requiring fewer units to achieve needed light levels. The control readily transfers to lighting otherwise such as uniflow grages and reflectors for the most economical solutions.

Wallpack fixtures feature bicolored glass reflectors to provide illumination and they even allow high heat or UV sockets are field adjustable for maximum control of light these.

All housings are formed of die cast aluminum for corrosion resistance. This is complemented by a seven stage polyester powder paint finish for wide variety of colors. Vandal resistant options are available.
Wallpack - Special Provision / Cost Estimate

Underdeck and Wall Mount Luminaires

Section 9-29.10(4) is supplemented with the following:

Underdeck fixtures shall be wall mountable and shall be hose-down rated with a gasket between the doorframe and ballast housings and between the doorframe and lens. Housing shall be low copper alloy cast aluminum with gray paint finish. The luminaires down light efficiency shall be no less than 64% of lamp output, with peak candle power occurring at 65 to 70 degrees, using a heavy borosilicate prismatic glass lens with 180 degree beam spread. Lamps shall have HPF ballasts, per requirements of Section 9-29.9. Lamps shall be high-pressure sodium, with mogul base socket. Lens shall be vandal resistant. The luminaires shall have wire protective guards on the lenses. Fusing shall be provided for all conductors above ground potential.

More information on 250W Wallpack III Underdeck Fixture (mounted to wall with unistrut type material)

Cost Estimate: Materials = $315 per fixture w/ Ballast
Installation labor = 2.0 hr per Fixture
Defining Luminaires

Photometric Collections  (After defining a luminaire you can save it for use in another file etc.)

Find Photometric File  (Searches your computer for any IES or PPF files)

Select IES Photometric File  (Allows you to manually search for IES or PPF files.)

When you send an AGI file to another user, AGI sends along all of the IES (photometric) files that are needed for that file. When the other user opens up the file, they are asked where they would like to store that design file’s IES file or files. See Next Slide.
This window is asking you where you wish to store the photometric files on your computer. Leave the location at the Program assigned default.
Defining Luminaires Cont..

- **Label** / **Description** (Whatever you want to describe your luminaire or light standard.)

- \[ \text{LLF} = 85\% (\text{Dirt Factor})(\text{LDD}) \times 73\% (\text{Lamp Lumen Depreciation Factor})(\text{LLD}) \times 100\% (\text{BF}) = 62\% \text{ or } 0.62 \]
  
  (\text{BF} = \text{Ballast Depreciation Factor}, \text{this value is already incorporated into the other numbers.})

- **Arm Length** is always the actual arm length plus **1.5 ft** to the center of the light source. The arm length also determines the distance between the light source and the insertion point.

- **Pole**  
  - **Dynamic** changes the length of the pole according to the mounting height of the light source.
  - **Static** the pole length remains constant regardless of the mounting height. (Use this for 3D designs where light standards are placed at elevations other than zero.

- **Symbol** Use the appropriate symbol to fit your application. The type of symbol does not affect the lighting calculations. **Do Not** change the Housing or Luminous Area color.

- **Arrangement** select the one that fits your situation. Usually **Single** or **Back-Back**.
1.) **Add Luminaire Location**  (Place Selected Luminaire According to what is defined.)
2.) **Specify Luminaire Labels**
3.) **Add Parametric Mirror**  (Advanced class)
4.) **Create LPD/UWLR Area**  (Advanced class)
5.) **Array Luminaire**  (Advanced class)
6.) **Luminaire – Change Height**  (Change Luminaire heights. Uses same aiming angles)
7.) **Copy Luminaire**  (Copies the luminaire and all its characteristics.)
8.) **Delete Luminaire**
9.) **Edit Luminaire**  (Ex: change from 250W to 400W luminaire, 25ft-MH to 40ft-MH, etc.)
10.) **Move Luminaire**  (can be moved in any direction while maintaining aiming angle or point)
11.) **Mirror Luminaire**  (Advanced class)
12.) **Photometric web display**  (Advanced class)
13.) **Re-Aim Luminaire**  (modify a single luminaire aiming point in Plan, Isometric or Elevation view.)
14.) **Re-Orient Luminaire**  (Allows you to rotate the luminaire 360 Deg. around insertion point.)
15.) **Switch Luminaire**  (turn luminaire on and off)
16.) **Luminaire – Template**  (Displays a Light Output(Ftc) contour line pattern for each specific luminaire after considering tilt, mounting height, photometrics, wattage etc.)
17.) **Magnify Symbol**  (magnifies the Luminaire Symbol, Insertion point remains constant.
18.) **Luminaire Group**  (combine luminaires into a group of luminaires that act as one luminaire (receive common edit, move, modify, etc.)
19.) **Modify Parametric Mirror**  (Advanced class)
20.) **Edit LPD/UWLR Area**  (Advanced class)
1. **Define Luminaires** (Define mast arm length, photometrics, lumens, LLF, symbol, etc..)

**Luminaire** → Select the Luminaire to be placed.

**Aim Type** → Select **Locate and Orient**

**MH** → Type in the desired Mounting Height for the luminaire above the roadway surface, Z=0.

*(Remember to use a MH that is 1.5ft-2.5ft lower than the design height, see below)*

**Orient** → Leave this set to 0 Degrees because you can orient the light standard 360 Degrees around the insertion point once you have placed it in the file.

Press this icon to place the luminaire that you have described above.

Try to maintain a **90 degree** orientation to the roadway edge line. Place the luminaire at a mounting height (in AGI32) of **(1.5 ft - 2.5 ft)** lower than the mounting height you are calling out in the plans. This will make your design more conservative and flexible in the field. Make sure that you look at the roadway cross sections to determine the actual mounting height at that location. (However, don’t specify odd pole lengths to maintain a consistent mounting height (i.e. 37ft, 40ft, 42ft, 38ft, etc. → Use 40ft for all.))
Press this Icon to create a luminaire template.

1. **Example:** Light distribution of a 400 Watt HPS Type III Medium Cutoff, GE1002.ies.
   The Vertical lines are 25FT Apart.

Luminaire Template

- **MH=30 FT**
- **MH=40 FT**
- **MH=50 FT**
Choosing isoline value when creating the Luminaire Templates.

Example: The required Average Illuminance is 1.1 \( \text{Ftc} \) with 3:1 Uniformity (Avg./Min).

1.) Do the following: \( 1.1 \text{Ftc} \times 1.25 = 1.4 \text{Ftc} \) (Average Illuminance - Design) → We don’t want to design for the bare minimum Average Illuminance. (Use 1.4 instead of 1.1)

2.) Next: Take \( 1.4 / 2.75 = 0.50 \text{Ftc} \) (Minimum Light Level) → We don’t want to design for a maximum Uniformity. (Use 2.75:1 instead of 3:1)

3.) Take \( 0.50 \text{Ftc} / 2 = 0.25 \text{Ftc} \)

4.) Place Template Isolines at \( 0.50 \text{Ftc} \) and \( 0.25 \text{Ftc} \).

5.) After you calculate the Design File Repeat steps 2 thru 4. Substitute the actual calculated Average Illuminance for Step 2 in place of 1.4. (Example: For my design area I calculated 1.8Ftc for my Average Illuminance. Take 1.8/2.75 = 0.66 Now place new Template Isolines at 0.66Ftc and 0.33Ftc and recalculate the design file.)
Test
Average = 1.50
Maximum = 3.20
Minimum = 0.56
Avg/Min Ratio = 2.68
Luminaire Template Cont...

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</table>
Calculation Point Tools

1.) Calc Pts - Isolines (Set “Contour” lines at a given statistical value. Color Code.)
2.) Calc Pts - Highlighted Values (Color code calculated statistical value ranges.)
3.) Calculate Points Automatic Placement (Advanced class)
4.) Calc Pts - Grid (Advanced class)
5.) Calc Pts-Line (Advanced class - RP-8 point placement concept)
6.) Calc Pts - Polygon (Place calc points by drawing a polygon shape on the design plane.)
7.) Calc Pts - Scattered (Allows you to specify individual points for calculation of illuminance values)
8.) Calculation Points-daylight factor (Advanced class)
9.) Calc Pts-Glare Rating (Advanced class)
10.) Calc Pts-Unified Glare Rating (Advanced class)
11.) Calc Pts - Roadway Luminance (Place a 3 point grid for calculating Roadway Luminance and Veiling Luminance. See the new commands manual for more explanation.)
12.) Calc Pts - Statistical Area (Calculates Min, Max, Avg., Avg./Min, Etc. for values that are inside a polygon that you draw. Use this feature to calculate values for design areas that are larger or smaller than one Calculation Point Grid.
13.) Delete Calc Pts (Deletes the entire calculation point plane that you select.)
14.) Edit Calc Pts (Allows you to modify the calculation point grid characteristics.)
15.) Move Calc Pts (Allows you to move the entire calculation point grid.)
16.) Calc Pts - Labels (Allows you to delete or move calculation point labels.)
17.) Calc Pts - Remove Pts (Removes some calculation points so they are not calculated.)
18.) Calc Pts - Replace Pts (Allows you to replace removed points.)
19.) Modify Statistical Area (Delete, Change properties (what values are being calculated), and Move Labels.)
Calculation Point Grid Placement

Use the values as shown above.
Make Sure that you use a **5 X 5 Grid Point Spacing** with **2 Decimal Points**.
Use the Project Manager - Entity Type Luminaire, to Change Visibility (On/Off), Calc Pts status (On/Off), Visibility of Values Only (On/Off), & Visibility of the Isolines (On/Off) for each individual entity type. A very powerful tool.
Veiling Luminance

Red → Path of Veiling Luminance (Disability Glare) from the luminaire to the observer's eye.

Green → Observers line of sight looking at the Veiling Luminance point value (Lv) to be calculated on the pavement surface.
Luminance

**Red** → Path of Luminance from the luminaire to the observers eye.

**Green** → Observers line of sight looking at the Luminance point value to be calculated on the pavement surface.
Illuminance / Luminance / Max Veiling Luminance Comparisons

If you Increase the MH:
1.) Average Illuminance Values $\rightarrow$ Decrease BAD (i.e. 1.6Ftc to 1.3Ftc)
2.) Uniformity Values $\rightarrow$ Decrease GOOD (i.e. 5.0 to 2.5)
3.) Max Veiling Luminance Ratio Values $\rightarrow$ Decrease GOOD (i.e. 0.35 to 0.25)

If you Decrease the Spacing:
1.) Average Illuminance Values $\rightarrow$ Increase GOOD (i.e. 1.1Ftc to 1.7Ftc)
2.) Uniformity Values $\rightarrow$ Decrease GOOD (i.e. 5.0 to 2.5)
3.) Max Veiling Luminance Ratio Values $\rightarrow$ Decrease GOOD (i.e. 0.35 to 0.25)

If you Increase the Luminaire Lumens:
1.) Average Illuminance Values $\rightarrow$ Increase GOOD (i.e. 1.1Ftc to 1.7Ftc)
2.) Uniformity Values $\rightarrow$ Remain Constant OK
3.) Max Veiling Luminance Ratio Values $\rightarrow$ Remain Constant OK
Placing Luminance and Veiling Luminance Grids

1) Place both Luminance and Veiling Luminance Grids in the same locations using the Roadway Luminance Grid in AGI32.

2) Place the grid parallel to the direction of travel. Grid points 1 & 2 define the direction of travel.

3) Place the grid width so it includes the widest section of roadway traveling in the same direction. Include all pedestrian features in this calculation if they were included in the illuminance calculations.

4) Place the first grid point on the right edge line of the start of the design area. Place the second point downstream (direction of travel) on the right edge line of the end of the design area. Place the third point at the left edge of the design area (in the direction of traffic).

5) Evaluate the results from each set of grids independently.

6) Follow steps 1-5 for all directions of travel including the minor approaches.
7) Review the concepts shown in section 1. Veiling Luminance calculations are only valid when the 272 foot tangent area exists before the beginning of the design area.

8) There should be at least 200 feet of tangent design area after the 272 feet of Veiling Luminance observer approach area. Do not calculate Veiling Luminance if there is not 472 feet (or greater) of tangent length, except the minor leg approach to a “T” intersection. Calculate the minor leg of a “T” intersection if there is 272 feet of Veiling Luminance observer approach area prior to the intersection.
Use the settings as shown above.

Place grid points 1 and 2 parallel to the directions of travel. Place the 3rd grid point perpendicular to the direction of travel to encompass the appropriate width.
You can set isoline values to whatever you want.

Set separate values for Illuminance, Luminance and Veiling Luminance.

You can modify the color of the isoline by double clicking on the colored rectangle.

**Illuminance** Isolines are great for helping to solve uniformity problems. A low minimum light level is usually the cause of poor uniformity. (Uniformity = Avg Ftc / Minimum Ftc) Figure out what the minimum light level is and set a couple of isoline values slightly above that value. Then adjust your luminaire locations to increase the minimum value in that particular area.
You can set Highlight Values to whatever you want.

Set separate values for Illuminance, Luminance and Veiling Luminance.

The colors can be changed by double clicking on the colored rectangle.

**Illuminance Highlight Values** are great for colorizing trouble areas or hot spots in your design.

Specified ranges refer to the Light Level (Ftc) values that you wish to separate by color.
1.) Select Icon and draw a box around the calculated values that you wish to analyze.
2.) Enter Label
3.) Select Values to Summarize (Illuminance, Luminance or Veiling Luminance)
4.) For **Illuminance** → Select Average, Maximum and Minimum, Average/Minimum Ratio
   For **Luminance** → Select Average
   For **Veiling Luminance** → Select Maximum and Minimum
5.) If you would like the values displayed in the design file Select Options under “Labeling-Include” and change the text size to 10.
This term is a carry over from earlier AGI Program versions (see Program Manager). Decide which **Calculation Points**, **Luminaire** or **Statistical Area** Values you wish to view (or to not view). Just **left click** on the check box to make your choice.

This is the statistical summary display.
Use the project manager to turn On/Off Calc Points, Luminares, Statistical Areas, Imported file Elements, etc.. Create multiple projects to decrease calculation time, and much more.

Just Left Click on any line heading to make your choice. Read the help menu for in depth discussion of all the features of Project Manager.
If you would like a print out of all the technical information in the file go to **File - Print Text** and select the information you would like to see.
Printing in AGI works like any other windows program except for the **Window and Scale Options**.

**Window** → After selecting the window option you need to specify a window around what part of the drawing you wish to print.

**Scale** → When using the User Defined Scale make sure to watch the number of pages to be printed.

Select specify button to use mouse to draw around view on screen.
See Example 1

1.) Include a Graphical Print of all design areas with calculation points. Make the print legible and scaleable.
2.) Clearly indicate all calculated values and exactly where they came from.
3.) Clearly explain any unusual design areas.
4.) Include Average Illuminance, Minimum Illuminance, Average Illuminance / Minimum Illuminance Ratio and Max Veiling Luminance Ratios for each design area and direction of travel.
5.) Clearly list all photometric files, luminaire definitions and their characteristics.
User and Job File Information

User Information
Keith Calais
WSDOT
310 Maple Park Ave SE
Olympia, WA 98504-7344
Voice Number : 360-705-6986
Fax Number : 360-705-6826
Email Address : calaisk@wsdot.wa.gov

Job File Information
Filename : Example 1 - Completed.A32
Location : C:\calais\Class Stuff\agi class\Class Examples\
Created By : Keith Calais
Created Date : 1/11/2007 11:01:26 AM
Created Version : 1.92.8
Modified By : Keith Calais
Modified Date : 1/14/2007 12:29:21 PM
Modified Version : 1.92.8
Total Time (Hrs) : 1.23
Description :

Information :
Luminaire Definition(s)

**GE451002**
State Standard-Type III-Med Cut Off, HPS, Flat Glass d

Filename = GE451002.IES
Lumens per Lamp = 51000
Number of Lamps = 1
Lamp Lumen Depreciation (LLD) = 0.62
Lamp Dirt Depreciation (LDD) = 1
Ballast Factor (BF) = 1
Total Light Loss Factor (LLDxLDDxBF) = 0.620
Luminaire Watts = 468
Total Watts = 468
Luminaire Effective Projected Area = 0 Sq.Ft.
Total Effective Projected Area = 0 Sq.Ft.
Normal Mode Symbol = 1200X300 mm DOWN
Normal Mode Symbol Scaling = (X= .33 Y= 1.016 Z= 1.016)
Render Mode Symbol = 1200X300 mm DOWN
Render Mode Symbol Scaling = (X= .33 Y= 1.016 Z= 1)
Housing Color = (R= 51 G= 51 B= 51)
Luminous Color = (R= 255 G= 255 B= 255)
Arrangement = SINGLE
Arm Length = 17.5
Offset = 0
Pole Mounted
Luminaire Location(s)

Luminaire Locations
Project Name : WSDOT Illumination Design
Coordinates in Feet

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<th>Y</th>
<th>Z</th>
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<th>Tilt</th>
<th>Roll</th>
<th>Spin</th>
<th>X</th>
<th>Y</th>
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</table>

Summary By Label
Project Name : WSDOT Illumination Design

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<th>Label</th>
<th>On</th>
<th>Off</th>
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</thead>
<tbody>
<tr>
<td>GE451002</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
Statistical Area(s)

SB Off Ramp
Southbound Off Ramp From Mainline
Project: WSDOT Illumination Design
Illuminance Values (Fc)

Average = 1.06
Maximum = 3.07
Minimum = 0.31
Avg/Min = 3.42
Max/Min = 9.9
WAN License Manager

1.) There are 25 Concurrent Licenses available in a statewide license pool.

2.) There is no limit to the number of people that can have the AGI32 Software.

3.) There will also be 2 Individual User Licenses available for computers that do not have access to the network.

4.) If you are experiencing problems with the Network contact HQ Help Desk @ (360)705-7050.
License check-out / check-in

1. Click on the Tools menu and select Network License.
2. Click on Convert To Network License to check out a license.
3. You have successfully checked out a network license. This installation will now operate as a standalone for 30 day(s). Please remember to check the license back in the next time you connect to the server. Thank you!
License check-out / check-in

1) You will receive this message each time you use AGI32 on your PC. When you are on network, check it back in.
**Customizing and Creating Tool Bars**

**Modify Existing Tool Bar**
1.) Right click anywhere on the Tool Bar.
2.) Go to Customizing at the bottom of the menu. The Customize window will appear.
3.) The **Customize Window** must be open in order to make any changes to an existing or created tool bar.
4.) If you want to create a new Tool Bar, select new and this window will appear.

**Remove Tool** ➔ Hold the cursor over the tool icon, press the left mouse button and drag it off to the side.

**Copy Tool to Another Bar** ➔ Hold down the **CTRL**+**ALT** keys and drag the tool to the new tool bar.

**To Replace a Tool** ➔ Go to the down arrow at the end of the tool bar and select the tool you wish to replace.

**Reset a Tool Bar** ➔ Use the Customize Window above. Select the Tool Bar and press reset.
AGI32 Contacts
Tech Support from Lighting Analysts in Littleton, CO

To obtain technical support for the AGI32 product

First - Please consult the AGI32 Help system.
Second - See our online forums available from the Help menu, “On the Web - Forums”
Third - Use one of the following support avenues:

North America (USA and Canada):

User's with current SupportPlus annual maintenance plan:
Telephone support (please have your user identification number ready): 360-972-8887
Fax support: 360-972-8851
Email: help@agi32.com
Web: www.agi32.com

WSDOT Internal Support
(All support questions need to be routed through the HQ Help Desk (360)705-7050)

Keith Calais
calaisk@wsdot.wa.gov Ph: (360)705-6986
Fax: (360)705-6826

Terry Thayer
thayert@wsdot.wa.gov Ph: (360)705-7290
Fax: (360)705-6826

Computer Number (Shared Files)
*Keith Calais HQA1736039
*Terry Thayer HQA0268001L

Go to Start/Search/Printers/Computers/People/Computer on the network/ (ex: HQA1736039 to see shared files on Keith’s PC).
Example 1 - Practice Using AGI32

Open new file. Name File: Example 1.A32
Import File: example 1.dxf

Roadway Design Class – Highways with full access control
Pedestrian Area Classification - Low

Design for:  
1.) **Average Illuminance** of *0.6 Ftc,
2.) **Uniformity** (Avg./ Min Illuminance) <= *4:1
3.) **Max Veiling Luminance Ratio** (Max Veiling Luminance / Avg. Luminance) <= *0.3:1

Note: * Design Values are from the Light Level and Uniformity Ratio Chart, Figure 840-25, Page 840-41 of the November 2006 Design Manual, Chapter 840.
Example 1
File: Example 1 - File Imported.A32
Example 1

File: Example 1 - Required Design Area Layout.A32

Required Levels
Highways with Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veiling Luminance Ratio - <=0.3:1
Example 1
Calculation Points Layout

Required Levels
Highway With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veiling Luminance Ratio - <=0.3:1
Example 1
Statistical Area Layout

Required Levels
Highway With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veiling Luminance Ratio - <=0.3:1

SB Off Ramp
Southbound Off Ramp From Main Line
Illuminance Values(Fc)
Average = 0.00
Maximum = 0.00
Minimum = 0.00
Avg/Min Ratio = 0.00
Example 1
Veiling Luminance Grids Layout

Required Levels
Highway With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veiling Luminance Ratio - <=0.3:1
Example 1
1st try on Luminaire Placement

Required Levels
Highway With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veilling Luminance Ratio - <=0.3:1

SB Off Ramp
Southbound Off Ramp From Main Line
Illuminance Values(Fc)
Average =0.67
Maximum =1.99
Minimum =0.23
Avg/Min Ratio=2.91

Main Line
Veiling Luminance Ratio = 0.42

Ramp
Veiling Luminance Ratio = 0.30
Example 1
Completed

Required Levels
Highway With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - \( \leq 4:1 \)
Maximum Veiling Luminance Ratio - \( \leq 0.3:1 \)

---

SB Off Ramp
Southbound Off Ramp From Mainline
Illuminance Values (Fc)
Average = 1.06
Maximum = 3.07
Minimum = 0.31
Avg/Min Ratio = 3.42

Main Line
Veiling Luminance Ratio = 0.25

Ramp
Veiling Luminance Ratio = 0.22

---
Example 2 - Practice Using AGI32

Open new file. Name file: Example 2.A32
Import file: example 2.dxf

Roadway Design Class - Highway with Full Access Control
Pedestrian Area Classification - Low

Design for:
1.) Average Illuminance of \(*0.6\) Ftc,
2.) Uniformity (Avg./ Min Illuminance) \(\leq *4.0:1\)
3.) Max Veiling Luminance Ratio (Max Veiling Luminance / Avg. Luminance) \(\leq *0.3:1\)

Note: * Design Values are from the Light Level and Uniformity Ratio Chart, Figure 840-25, Page 840-41 of the November 2006 Design Manual.
Example 2
File: Example 2 - File Imported.A32
Example 2

File: Example 2 – Required Design Area Layout.A32

Required Levels
Highways With Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <=4:1
Maximum Veiling Luminance Ratio - <=0.3:1
Example 2
Calculation Points Layout

Required Levels
Highways with Full Acces Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <= 4:1
Maximum Veiling Luminance Ratio - <=0.3:1
Example 2
Statistical Area Layout

Required Levels
Highways with Full Access Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <= 4:1
Maximum Veiling Luminance Ratio - <=0.3:1

L LINE
1515+00

NB On Ramp
Northbound On Ramp to Main Line
Illuminance Values (Fc)
Average = 0.00
Maximum = 0.00
Minimum = 0.00
Avg/Min Ratio = 0.00
Example 2
Veiling Luminance Grids Layout

Required Levels
Highways with Full Access Control - Main Line
Minimum Average Light Level - 0.6 fc
Maximum Uniformity Ratio - <= 4:1
Maximum Veiling Luminance Ratio - <= 0.3:1

L LINE
1515+00

NB On Ramp
Northbound On Ramp to Main Line
Illuminance Values (Fc)
Average = 0.00
Maximum = 0.00
Minimum = 0.00
Avg/Min Ratio = 0.00
Example 2
1st try on Luminaire Placement

Required Levels
Highways with Full Access Control - Main Line
Minimum Average Light Level - 0.6 fc
Maximum Uniformity Ratio - <= 4:1
Maximum Veiling Luminance Ratio - <= 0.3:1

NB On Ramp
Northbound On Ramp to Main Line
Illuminance Values (Fc)
Average = 0.74
Maximum = 2.17
Minimum = 0.26
Avg/Min Ratio = 2.85

Main Line
Veiling Luminance Ratio = 0.29

Ramp
Veiling Luminance Ratio = 0.22
Example 2
Completed

Required Levels
Highways with Full Acces Control - Main Line
Minimum Average Light Level - 0.6fc
Maximum Uniformity Ratio - <= 4:1
Maximum Veiling Luminance Ratio - <=0.3:1

L LINE
1515+00

NB On Ramp
Northbound On Ramp to Main Line
Illuminance Values(Fc)
Average =0.77
Maximum =2.81
Minimum =0.26
Avg/Min Ratio=2.96

Main Line
Veiling Luminance Ratio = 0.27

Ramp
Veiling Luminance Ratio = 0.21
Example 3 - Practice Using AGI32

Open new file. Name File: Example 3.A32
Import file: example 3.dxf

Roadway Design Class - Principal Arterial
Pedestrian Area Classification - Low

Design for:

1.) **Average Illuminance** of *0.6 ftc mainline

   *0.9 ftc intersection

2.) **Uniformity** (Avg./Min Illuminance) <= *3.0:1

3.) **Max Veiling Luminance Ratio** (Max Veiling Luminance / Avg. Luminance) <= *0.3:1

Note: * Design Values are from the Light Level and Uniformity Ratio Chart, Figure 840-25, Page 840-41 of the November 2006 Design Manual.
Example 3
Required Design Area Layout

End of Continuous Lighting

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1

End of Continuous Lighting
Example 3
Calculation Points Layout - Intersection

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Calculation Points Layout - East Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <=0.3:1
Example 3
Calculation Points Layout - North Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
  Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Calculation Points Layout - West Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
  Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Calculation Points Layout - South Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
  Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Statistical Area Layout - Intersection

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Statistical Area Layout - East Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Statistical Area Layout - North Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
  Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Statistical Area Layout - West Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Statistical Area Layout - South Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Veiling Luminance Layout - Westbound

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Veiling Luminance Layout - Southbound

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Veiling Luminance Layout - Eastbound

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <=0.3:1
Example 3
1st try on Luminaire Placement - Intersection

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <=0.3:1
Example 3
1st try on Luminaire Placement - East Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <=0.3:1
Example 3
1st try on Luminaire Placement - North Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
1st try on Luminaire Placement - West Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
1st try on Luminaire Placement - South Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc

Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <=0.3:1
Example 3
2nd try on Luminaire Placement - Intersection
(Same as 1st try on Luminaire Placement - South Leg)

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
2nd try on Luminaire Placement - East Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
2nd try on Luminaire Placement - North Leg

North Leg
Illuminance Values (Fc)
Average = 4.68
Maximum = 6.47
Minimum = 0.60
Avg/Min Ratio = 2.60

East Leg
Illuminance Values (Fc)
Average = 4.55
Maximum = 3.90
Minimum = 0.56
Avg/Min Ratio = 2.84

Wyatt Leg
Illuminance Values (Fc)
Average = 1.54
Maximum = 3.05
Minimum = 0.47
Avg/Min Ratio = 3.26

South Leg
Illuminance Values (Fc)
Average = 1.45
Maximum = 3.08
Minimum = 0.93
Avg/Min Ratio = 3.32

Required Levels
- Continuous Illumination
- Minimum Average Light Level
  - Principal Arterial Main Line = 0.6fc
  - Intersection = 0.9fc
- Pedestrian Level = Low
  - Maximum Uniformity Ratio <= 3:1
  - Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
2nd try on Luminaire Placement - West Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
2nd try on Luminaire Placement - South Leg

Required Levels
Continuous Illumination
Minimum Average Light Level
Principal Arterial Main Line = 0.6fc
Intersection = 0.9fc
Pedestrian Level = Low
Maximum Uniformity Ratio <= 3:1
Maximum Veiling Illuminance Ratio <= 0.3:1
Example 3
Completed - Ready to Export
TEST

1.) Import the DXF files that are located in the Class folder.

2.) Determine Required Illumination areas in EACH file.

3.) Determine required Design Requirements for all locations.

4.) Use 40 foot Mounting Height.

6.) Use ONLY the state Standard Luminaire.

7.) Use 16 foot Mast arm Length.

8.) Show that you have met all the State Lighting Standards

9.) Export Only the light standards back to DXF.

10.) Save the file as “Test-name”. (i.e. Test-Your Name)