2016

I-10 Deck Park Tunnel Lighting



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FINAL PROJECT ASSESSMENT

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Scope

The scope of work for the Project Assessment for the I-10 Deck Park Tunnel includes:

Review Background Information

Review, at a minimum, the prior energy and traffic studies performed for the tunnel.

Data Collection and Analysis

Data collection necessary to perform visibility analysis for the tunnel during different conditions and operating speeds including posted speeds of 55mph and 65mph, as well as for a variable speed limit (VSL) of 45-65mph.

Alternatives Development and Analysis

Perform visibility analysis for various speeds and day/time conditions and review the benefits of various technologies (lighting and control) to meet the requirements of ADOT and operating conditions within the tunnel.

Capital Cost Analysis

Prepare concept level cost estimates for the various alternatives studied as part of this report.

Identification of Environmental Issues

Identify possible environmental issues and impacts associated with the alternatives studied and propose methods for mitigating these impacts.

Identification of Preferred Alternative

Identify preferred alternative in conjunction with ADOT staff.

Draft and Final Project Assessment

Prepare a comprehensive study report for all of the items identified in this scope.

Executive Summary

This Project Assessment evaluates the required design parameters and potential equipment for the replacement of the tunnel lighting system in the I-10 Deck Park Tunnel. Prior studies have identified lighting as one of the possible improvements for providing increased safety. This study looks at the necessary lighting levels based on operating conditions including posted speed, possible lighting equipment technologies, and potential control systems.

The concept study shows the need to install higher lighting levels in the tunnel threshold and transition zones. It also recommends the use of next generation LED tunnel lighting technology for luminaires as well as the use of a power line carrier control system to vary light levels depending on external conditions, and monitor the operating status of the lights within the tunnel.

Evaluating changes in the posted speeds on the approach roads to the tunnel showed a significant benefit in reduced construction and operating costs. The use of Variable Speed Limits (VSL) on the approach roads also showed construction and operating cost benefits but not as significant as a permanent change in posted speed.

Background Information

This report contains recommendations for the I-10 Deck Park Tunnel lighting replacement. Prior reports prepared regarding energy usage, lighting options, and safety at the tunnel were reviewed as part of this study and considered in the overall recommendations. The report reviews current lighting and control technology as possible solutions for the tunnel, as well as the impact of posted speed on the visibility requirements. Budget construction costs for several of the options are included.

Previous Studies

Several studies have been conducted over the years on the Deck Park Tunnel evaluating improvements for energy efficiency as well as safety in the tunnel. Key reports include:

Deck Park Tunnel Energy Efficiency Study – 2011

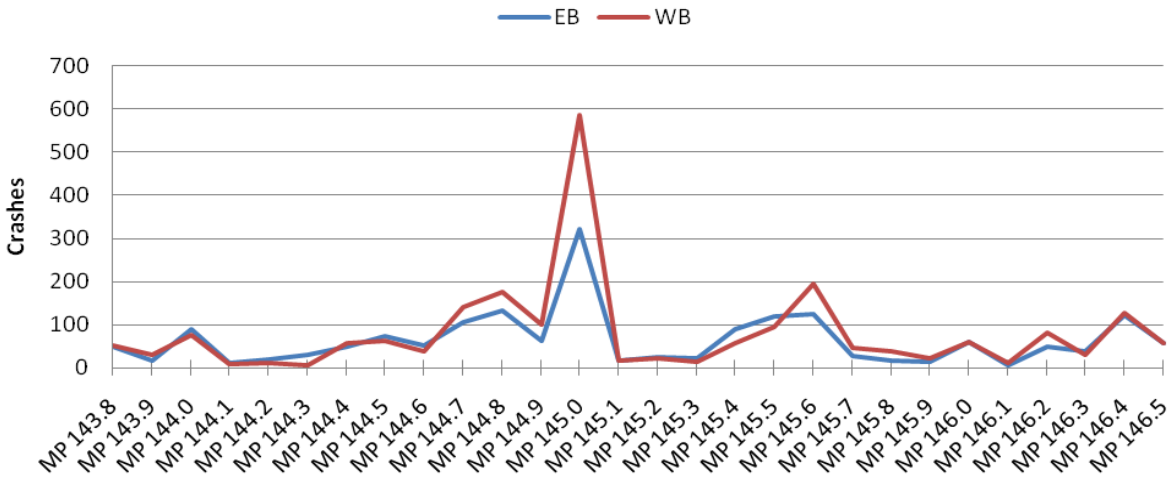
This study evaluated the tunnel, the amount of power consumed by the lighting system, and whether it met the recommendations included in the latest tunnel lighting guidelines, IES RP-22-11 Standard Practice for Tunnel Lighting. The report found the following key findings:

- ADOT spends approximately over $350k per year in lighting related electrical charges.
- The existing lighting levels in the tunnel are lower than current lighting design recommendations.
- Shade structures were considered in the recommended options.
- High pressure sodium fixtures were recommended in the replacement options (however this probably had more to do with the LED products available at the time).
- With the increase in lighting levels to meet current IES recommendations, the replacements simply did not pay back in a reasonable amount of time to be an energy efficiency improvement.

ADOT Traffic Group Crash Analysis at Tunnel – 2011 (relating to the energy study)

At the request of the ADOT tunnel energy efficiency study team, the ADOT traffic group prepared a crash analysis for the tunnel and approximately one mile of approach road on either side of the tunnel. The data analyzed was for the years 2005 to 2010 (before GPS recording was used in the crash data collection) which showed 230 crashes per mile on the approach road segments and 600 crashes per mile at the tunnel (graphic from ADOT's August 9, 2011 Crash Data Presentation below). The crash issues at the tunnel and possible safety benefits of lighting however were not included as part of the energy study analysis and recommendations.





I-10, 35th Avenue – Sky Harbor Boulevard Safety Planning Study - 2015

This study looked at the downtown Phoenix corridor section of I-10 between 35th Ave and Sky Harbor Blvd. The study conducted a safety performance evaluation following the AASHTO Highway Safety Manual evaluation methodologies. The study also used the I-10 study section and prediction models as a potential methodology for assessing other Phoenix area freeways.

The study had several key findings performing a detailed diagnosis of the 2012-2013 crash data. Specifically for the area at the Deck Park Tunnel the study finds:

"A combination of several factors likely contributes to the exceptionally high crash frequency in the Deck Park Tunnel. These factors include:

- The illumination levels at the tunnel threshold zones are lower than the original design, likely due to the effect of age and environment on the luminaires
- The difference between the day-time ambient illumination level outside of the tunnel and the illumination level at the tunnel portals which can affect drivers vision as their eyes adjust when they enter/exit the tunnel

- Lane changing within the tunnel associated with the eastbound and westbound weaving sections between 7th St. and 7th Ave.
- The horizontal curve within the tunnel, and
- Congestion occurring within the tunnel and just outside the exit portals"

The study also recommends counter measures, based on the results of a cost/benefit analysis, for considerations which include:

- Lower speed limit: lowering the speed limit from 65mph to 55mph along the study corridor
- Variable speed limit: installing a variable speed limit system that operated primarily during weekday peak traffic
- Upgrade Deck Park Tunnel Lighting
- Meter EB 7th Ave and WB 7th St Entry Ramps
- High Friction Surface Treatment

Existing Conditions within the Tunnel

Exterior Light Levels

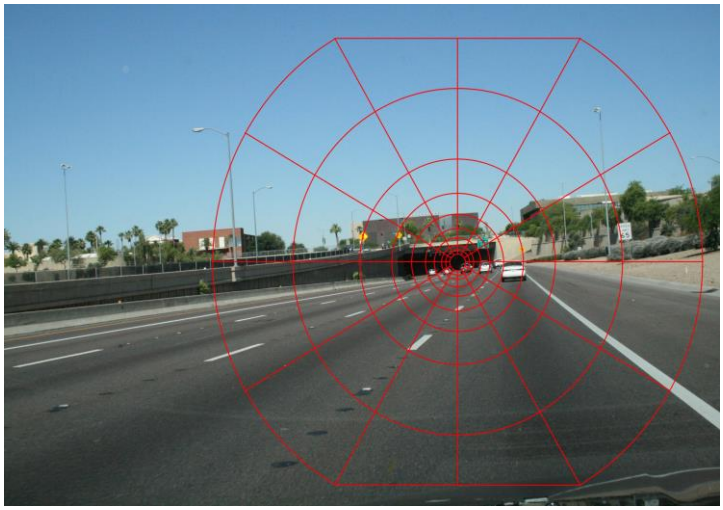
Exterior luminance readings were collected for both eastbound and westbound directions on I-10. These readings were done with the intent of performing an Lseq analysis for the tunnel to determine the required threshold lighting level within the tunnel under those ambient conditions at that specific time of year. The levels were taken around midday on 23 Oct 2015 and represent typically expected midday values. Other light levels were collected in the morning and afternoon in August of 2011 when the peak brightness would be expected.

I-10 Westbound Exterior Light Levels

October - Midday
Sky – 5,800 to 7,000 cd/m^2
Roadway – 2,000 to 2,500 cd/m^2
Portal surfaces – 1,000 to 5,500 cd/m^2
Landscaping – 2,700-5,600 cd/m^2

July - Morning
Sky – 6,300 to 7,400 cd/m^2
Roadway –2,500 cd/m^2
Portal surfaces – 7,000 cd/m^2
Landscaping – 7,100 cd/m^2

July - Afternoon
Sky – 10,000 to 14,500 cd/m^2
Roadway – 11,000 cd/m^2
Portal surfaces – 1,000 cd/m^2
Landscaping – 4,000 cd/m^2

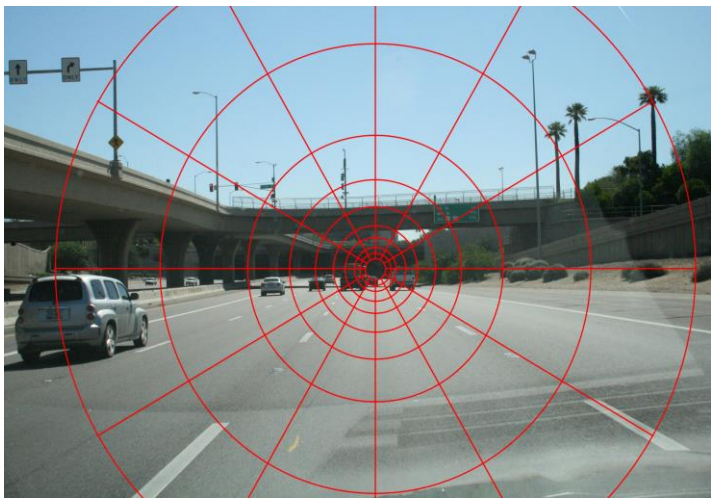


I-10 Eastbound Exterior Light Levels

October -Midday
Sky – 5,800 to 7,000 cd/m^2
Roadway – 2,000 to 2,500 cd/m^2
Portal surfaces – 1,000 to 5,500 cd/m^2
Landscaping – 2,700-5,600 cd/m^2

July - Morning
Sky – 6,000 to 9,600 cd/m^2
Roadway –5,000 cd/m^2
Portal surfaces – 900 cd/m^2
Landscaping – 5,200 cd/m^2

July - Afternoon
Sky – 3,400 to 8,200 cd/m^2
Roadway – 2,400 cd/m^2
Portal surfaces – 6,000 cd/m^2
Landscaping – 6,000 cd/m^2



Interior Light Levels

Roadway lighting levels were taken inside the tunnel for I-10 westbound in the areas of the threshold lighting and the area of interior lighting. The right lane and the adjacent lane were sampled and the results are as follows:

Tunnel Threshold zone

Right lane – 185 cd/m^2
Adjacent lane – 84 cd/m^2

Based on the lighting locations and geometry this would result in an average threshold lighting level of approximately 145 cd/m^2.

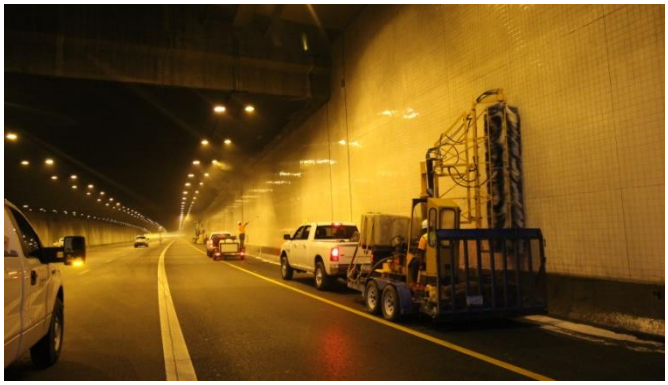
Tunnel Interior zone

Right lane – 14.5 cd/m^2
Adjacent lane – 9.3 cd/m^2

Based on the lighting locations and geometry this would result in an average threshold lighting level of approximately 12.4 cd/m^2.

Wall reflectance readings were also taken before and after cleaning of the walls. The readings were taken by measuring the light landing on the wall and then the amount of light reflecting from the wall. Based on those readings the tunnel wall reflectance was approximately 48% reflective and approximately 56% after cleaning.









Existing Lighting, Electrical, and Control

The existing lighting system is comprised of GE Tunnelguard luminaires with counterbeam and symmetrical optic systems, mounted in three double rows along the tunnel.

The luminaires are mounted either to embedded strut in the ceiling structure or a fabricated metal support structure, depending on the location. A wireway is used between the luminaires for the routing of electrical conductors to feed the lighting and cord and plug attachments for connection from the luminaire to the wireway. Lighting control is done through lighting contactors switching on/off fixtures using 5 levels of control signaled by photosensors. Emergency power for the facility is through back-up diesel generator.

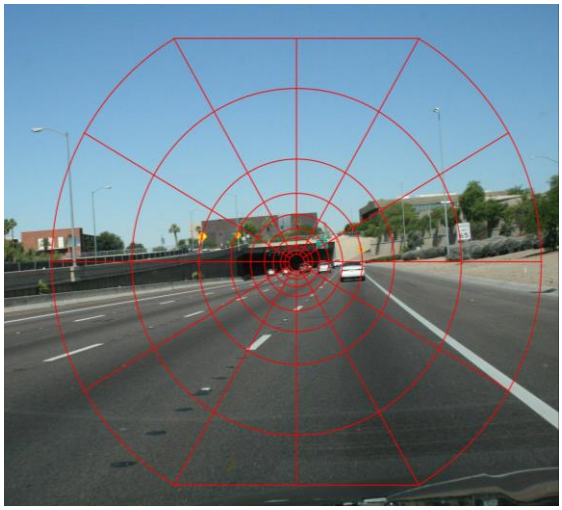


The lighting and electrical components seem in good condition for the age of the system, although dust/dirt build-up on some components is significant and cord and plug connections have some age fatigue.

Design Recommendations of ANSI/IES RP-22-11 Standard Practice for Tunnel Lighting

RP-22-11 outlines the key design approaches required to provide adequate lighting within a tunnel. These include lighting levels in the beginning of the tunnel to ensure a driver approaching the tunnel can adequately see stopped vehicles or hazards in the tunnel, the time needed for a driver's eye to adapt to lower lighting levels within the tunnel, and the levels and design considerations for the lower level interior of the tunnel. These key areas are explained in more detail below.

Threshold Lighting

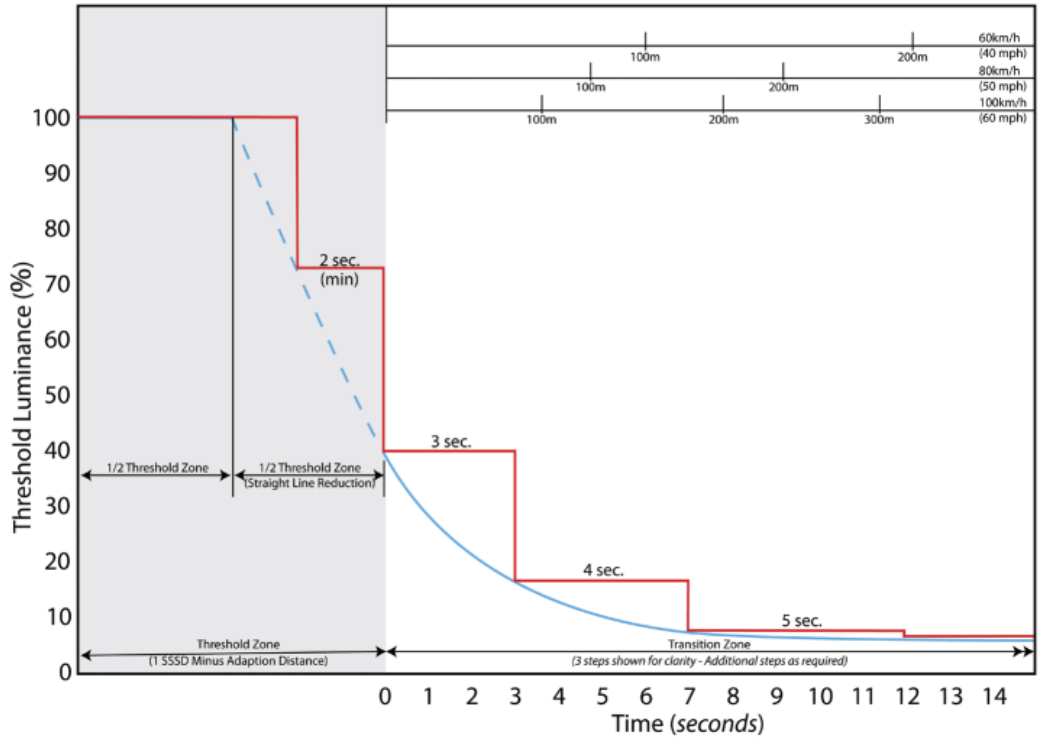


Determining how much light an approaching driver needs to see inside the tunnel requires a visibility analysis. RP-22 uses the Lseq analysis method for this purpose. This analysis looks at the brightnesses of the surfaces in a driver's field of view and weight them based on where they occur in that field. In order to do this analysis, luminance readings are taken (or assumed) for the surfaces at the entrance of the tunnel (e.g. roadway, sky, buildings, shoulder area, etc.). A polar diagram is then placed over the approach scene, at a distance of 1 Safe Sight Stopping Distance (SSSD) based on the roadway's posted speed. The measured luminance readings are then inputted into a matrix and summed to determine the equivalent straylight at the eye and then factored to determine the amount of threshold lighting in the tunnel is required to provide sufficient contrast for that level of adaptation. Looking at the figure showing the polar graph overlay one can see that the key elements which will impact the visibility in this tunnel include:

- The brightness of the sky and roadway. These are the two predominant surfaces in the field of view, occupying most of the diagram segments, thus having the greatest impact on the necessary threshold lighting level. These surfaces will greatly vary in brightness based on time of day, time of year, and atmospheric conditions.
- The posted speed which establishes the stopping distance. Since the visibility analysis is performed at 1 SSSD posted speed has an impact. For example, if the polar graph is moved closer to the entrance then a greater number of graph segments fall within areas of low luminance like the interior of the tunnel. The more segments with low luminance levels, the lower the calculated threshold lighting level.

Transition Zone Lighting

The transition zone of the tunnel is the area where the lighting is reduced based on the driver's ability to adapt from the bright daytime exterior of the tunnel to the darker tunnel interior. Since it based on time, the distance of the transition zone will vary with posted speed. The adaptation curve from RP-22-11 is below.



The lighting within the tunnel can begin transitioning to a lower level halfway through the calculated threshold zone based on posted speed. The reduction can then either follow the transition curve or be reduced in steps, keeping the lighting levels above the transition curve. This adaptation curve is one of the largest changes made in RP-22 in recent years. Key design elements to be considered when applying this curve include:

- Reduction of the lighting in steps or following the curve. Control systems have typically been designed using lighting contactors to shut off circuits supplying lighting installed in "blocks" of luminaires. New control systems using LED luminaires allow greater flexibility in controlling the output of fixtures so a better fit can be made to reducing light levels following the adaptation curve.
- Posted speed. The lower the posted speed, the shorter the transition zones. This requires fewer fixtures and less power consumption.

Interior Zone Lighting

The lighting of the interior zone of the tunnel is based on whether it is daytime or nighttime, posted speed within the tunnel, and predicted traffic volume. The recommended daytime values for the interior zone of the tunnel are included below.

Table 7: Recommended Daytime Interior Zone Average Pavement Luminance (In cd/m2)

Traffic Speed	Traffic Flow		
	< 2,400 AADT	> 2,400 AADT < 24,000 AADT	> 24,000 AADT
100 km/h (60 mph)	6	8	10
80 km/h (50 mph)	4	6	8
60 km/h (40 mph)	3	4	6

"AADT" – Annual Average Daily Traffic

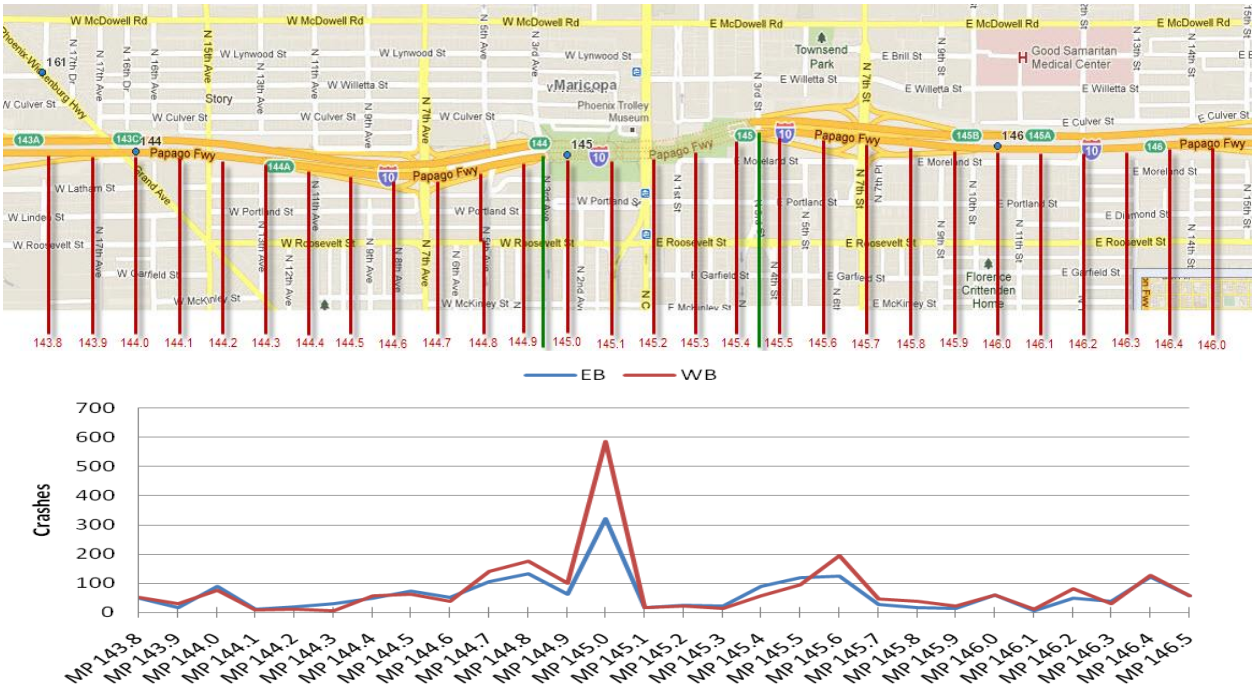
The nighttime lighting level for tunnels is recommended to be 2.5 cd/m^2. Key design elements that should be considered to the interior lighting of a tunnel include:

- Posted speed. The lower the posted speed within a tunnel, the lower the required lighting level.
- Glare and flicker. After the drivers' eye is adapted to the darker tunnel interior then glare can become an issue and luminaire optical performance needs to be carefully considered. Also, if exposure time inside the tunnel is greater than 20 seconds, then the spacing of the luminaires should not be between 4 and 11 Hz based on the posted speed.

Analysis of Crash Data as it Relates to Lighting

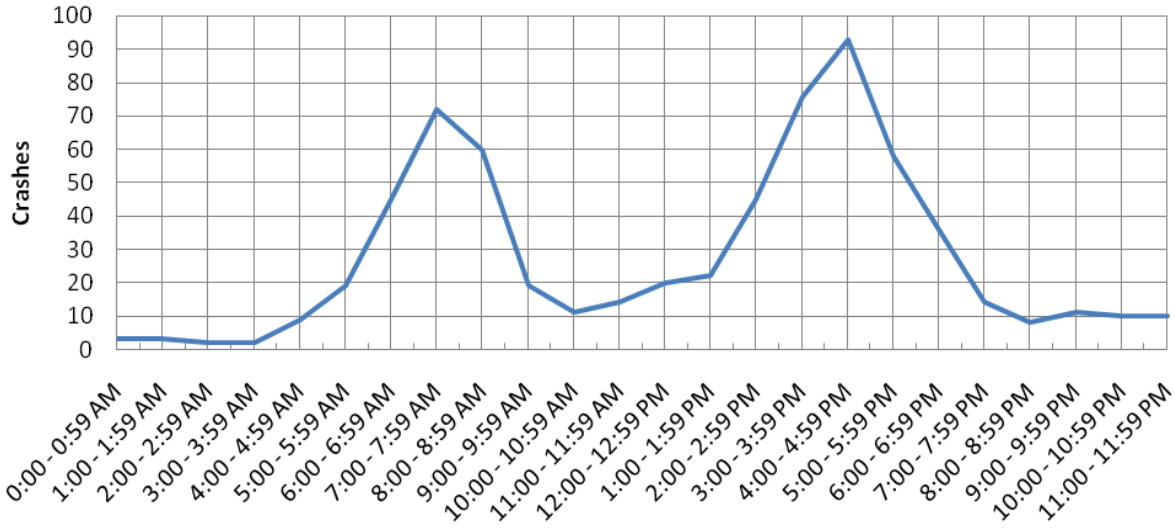
Because lighting is being considered as part of the safety improvements at the Deck Park Tunnel, prior crash analysis was considered with additional aspects investigated whether the crash times correlate with times of poor visibility. From prior crash analysis performed by ADOT, crashes at the tunnel are greater than the approach roads and lighting is considered one area to evaluate for improvements.

Crashes at tunnel compared with approach roads



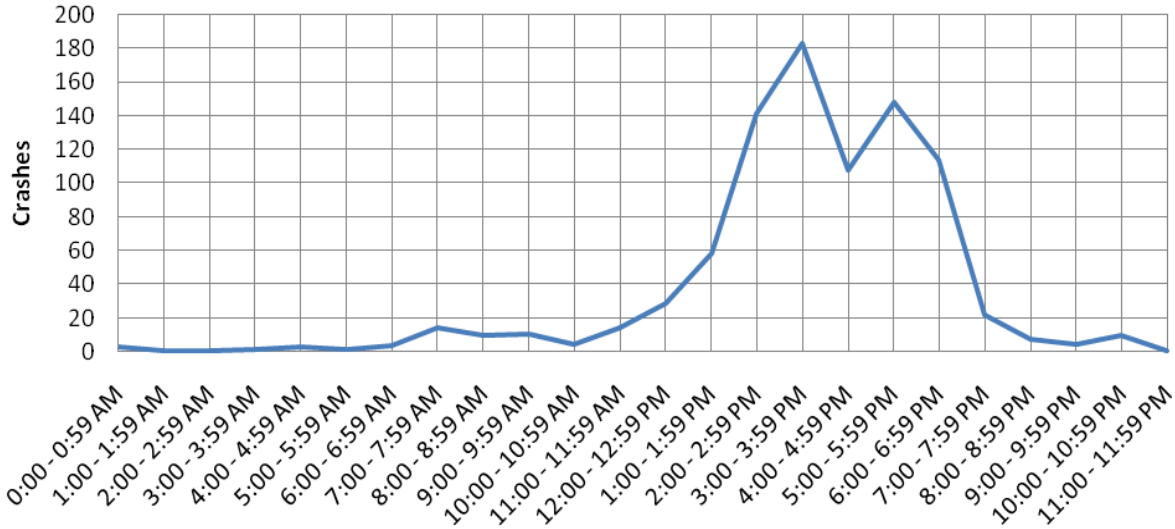
ADOT had also reviewed at what time of day the crashes occurred. From the visibility analysis, the time of day when the visibility on the eastbound approach is at its worst condition is in the morning during the summer, requiring a threshold luminance in the tunnel of 239 cd/m^2. The next worst condition occurs in the afternoon in the summer. At that point the lighting level is required to be 205 cd/m^2 in the tunnel. This is a bit unexpected from analysis of other tunnels of this type and orientation but would suggest potential visibility issues primarily in the morning but then again in the afternoon. The ADOT time of day analysis did show a higher incidence of crashes at those times.

Crashes at tunnel by time of day - Eastbound



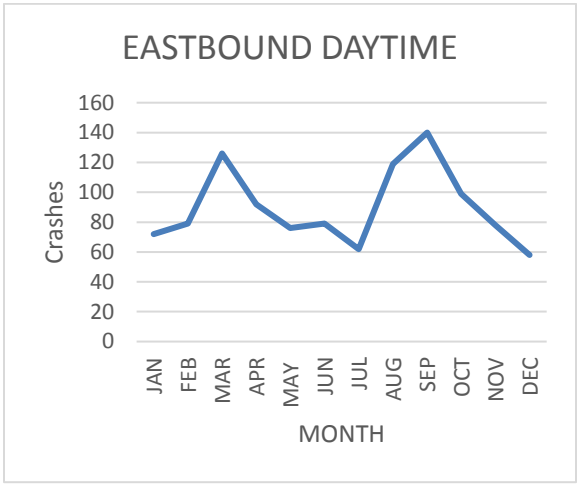
For the westbound direction in the tunnel the visibility analysis showed a significant amount of threshold lighting being required in the afternoon during the summer at 467 cd/m^2 with a much lesser requirement for the mornings during the summer at 235 cd/m^2. The ADOT time of day analysis for crashes does seem to correlate with those visibility needs.

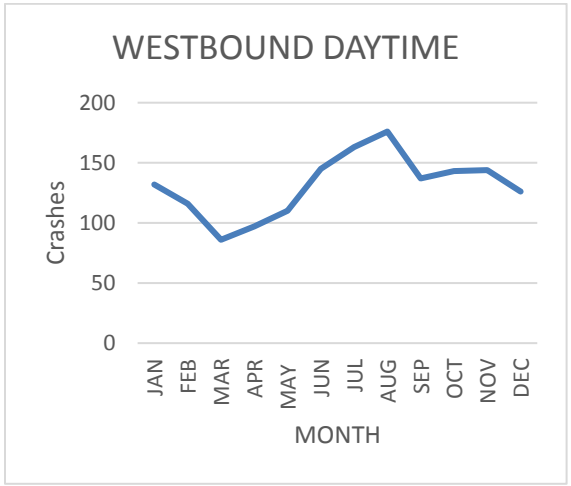
Crashes at tunnel by time of day – Westbound



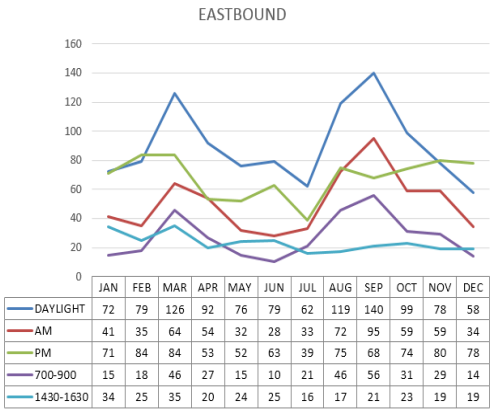
Crashes were also evaluated looking at time of year and looking at additional detail for time of day. This analysis didn't really provide any further insight into the correlation of the lighting levels and the amount of crashes.

Crashes by time of year

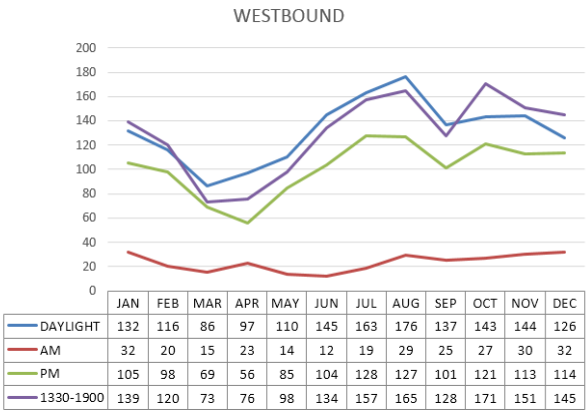




Crashes by AM or PM



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAYLIGHT	72	79	126	92	76	79	62	119	140	99	78	58
AM	41	35	64	54	32	28	33	72	95	59	59	34
PM	71	84	84	53	52	63	39	75	68	74	80	78
700-900	15	18	46	27	15	10	21	46	56	31	29	14
1430-1630	34	25	35	20	24	25	16	17	21	23	19	19



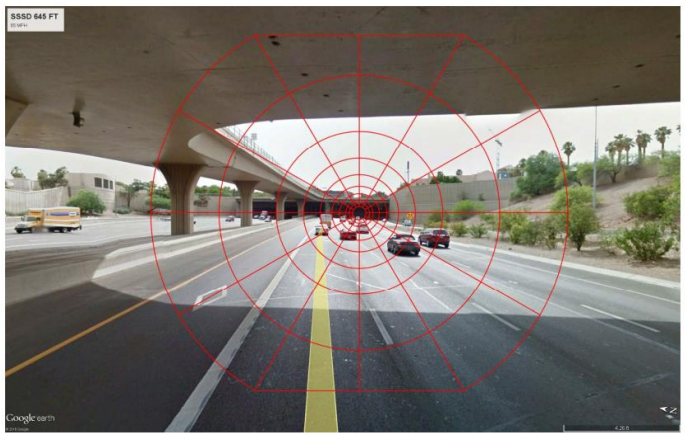
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAYLIGHT	132	116	86	97	110	145	163	176	137	143	144	126
AM	32	20	15	23	14	12	19	29	25	27	30	32
PM	105	98	69	56	85	104	128	127	101	121	113	114
1330-1900	139	120	73	76	98	134	157	165	128	171	151	145

Based on the review of the crash data, there appears to be a strong correlation between high visibility requirements and crashes for the westbound tunnel and a reasonable correlation for the eastbound. Other conditions like traffic volumes, speeds, and weaving movements within the tunnel are also reasons for the high crash rate but it would be expected to see safety improvements with improvements to the tunnel lighting system.

Design Requirements for the Deck Park Tunnel using RP-22-11

An Lseq analysis was performed to determine the threshold zone lighting level for different posted speeds on the approach to the tunnel for the assumed peak periods. For this tunnel that would be during the summer, westbound in the afternoon and eastbound in the morning.

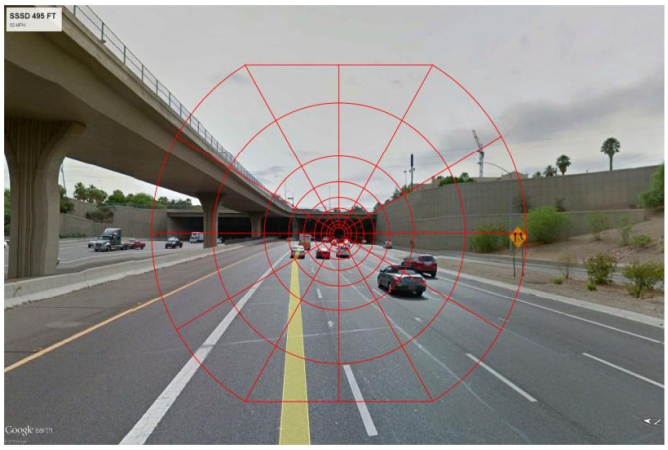
Eastbound – Summer – AM – 65mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	239 cd/ M2	435.02	132.59
Lth2	168 cd/ M2	145.01	44.20
Ltr1	97 cd/ M2	286.00	87.17
Ltr2	26 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1442.64	439.72
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	580.03
ft/sec	95.33

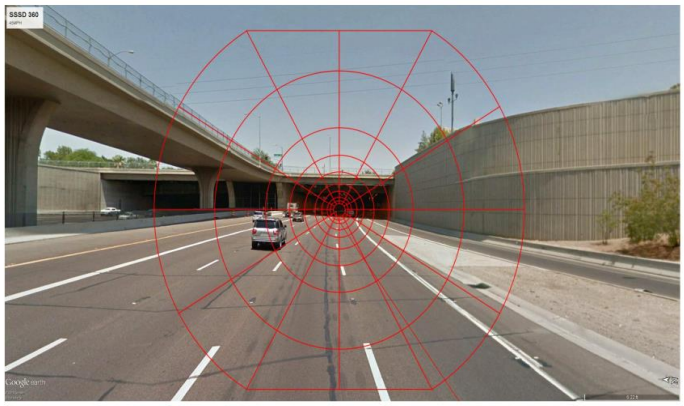
Eastbound – Summer – AM – 55mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	224 cd/ M2	322.52	98.30
Lth2	158 cd/ M2	107.51	32.77
Ltr1	91 cd/ M2	242.00	73.76
Ltr2	24 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1695.30	516.73
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	430.03
ft/sec	80.67

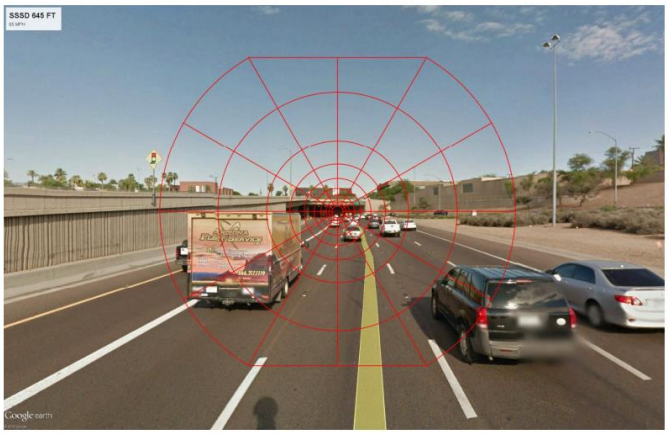
Eastbound – Summer – AM – 45mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	199 cd/ M2	221.27	67.44
Lth2	140 cd/ M2	73.76	22.48
Ltr1	81 cd/ M2	198.00	60.35
Ltr2	21 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1932.97	589.17
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	295.03
ft/sec	66.00

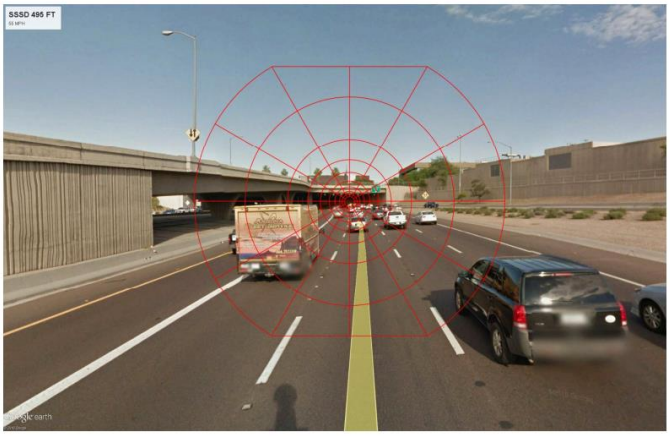
Westbound – Summer – PM – 65mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	467 cd/ M2	448.02	136.56
Lth2	329 cd/ M2	149.34	45.52
Ltr1	190 cd/ M2	286.00	87.17
Ltr2	51 cd/ M2	381.33	116.23
Ltr3	22 cd/ M2	476.67	145.29
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	996.65	303.78
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	597.35
ft/sec	95.33

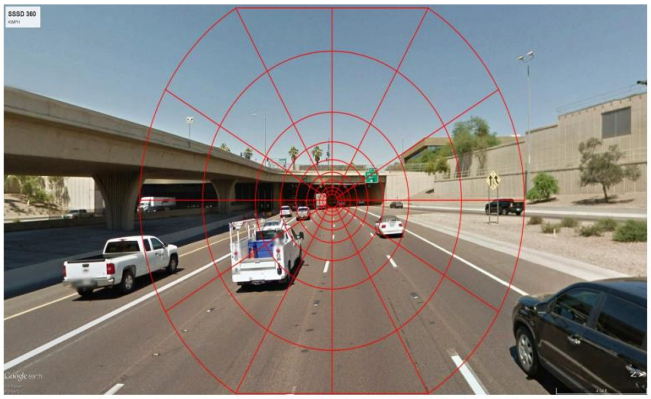
Westbound – Summer – PM - 55mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	429 cd/ M2	335.52	102.27
Lth2	302 cd/ M2	111.84	34.09
Ltr1	175 cd/ M2	242.00	73.76
Ltr2	46 cd/ M2	322.67	98.35
Ltr3	20 cd/ M2	403.33	122.94
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1322.65	403.14
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	447.35
ft/sec	80.67

Westbound – Summer – PM – 45mph



Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	414 cd/ M2	234.27	71.40
Lth2	291 cd/ M2	78.09	23.80
Ltr1	168 cd/ M2	198.00	60.35
Ltr2	45 cd/ M2	264.00	80.47
Ltr3	19 cd/ M2	330.00	100.58
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1633.65	497.94
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	312.35
ft/sec	66.00

A complete analysis was done for eastbound and westbound, AM and PM, Summer and Fall and are summarized below.

AZDOT I-10 DECK PARK TUNNEL LSEQ RESULTS FOR LTH1

	TIME OF YEAR	TIME OF DAY	POSTED SPEED (MPH)	L_{TH} (CD/M2)
EASTBOUND	SUMMER	AM	45	199
	SUMMER	AM	55	224
	SUMMER	AM	65	239
	SUMMER	PM	45	148
	SUMMER	PM	55	177
	SUMMER	PM	65	205
	FALL	AM	45	132
	FALL	AM	55	167
	FALL	AM	65	185
WESTBOUND	SUMMER	AM	45	189
	SUMMER	AM	55	211
	SUMMER	AM	65	235
	SUMMER	PM	45	414
	SUMMER	PM	55	429
	SUMMER	PM	65	467
	FALL	AM	45	152
	FALL	AM	55	159
	FALL	AM	65	174

The visibility analysis included two major design elements. One is the required peak lighting levels in the tunnel threshold and the other is the posted speed of the road which affect both the required light level as well as the length of the threshold and transition zones.

For the Deck Park Tunnel, three lighting options are being considered. These include:

- Posted speed of 65 mph (existing condition)
- Posted speed of 55 mph
- Variable Speed Limit (VSL) of 45-65 mph

Based on these speed options, the recommended lighting level and threshold/transition zone distances based on a visibility analysis done in accordance with RP-22-11 would be as follows:

Posted Speed of 65 mph

Eastbound
Threshold luminance level (peak) – 239 cd/m^2
Threshold length – 580'
Transition zone length – 667'

Westbound
Threshold luminance level (peak) – 467 cd/m^2
Threshold length – 600'
Transition zone length – 1,143'

Posted Speed of 55 mph

Eastbound
Threshold luminance level (peak) – 224 cd/m^2
Threshold length – 429'
Transition zone length – 564'

Westbound
Threshold luminance level (peak) – 429 cd/m^2
Threshold length – 446'
Transition zone length – 967'

Variable Speed Limit of 45-65 mph

Eastbound
Threshold luminance level (peak) – 199 cd/m^2
Threshold length – 580'
Transition zone length – 660'

Westbound
Threshold luminance level (peak) – 414 cd/m^2
Threshold length – 600'
Transition zone length – 1,100'

The variable speed limit option has several variants in its application. With this option a lighting system would be designed based on the lighting level required for a 45mph posted speed. This lighting level is adequate for much of the year from a visibility standpoint for a 65 mph operating speed with the exception of certain times of the day during the summer. During those day/times of peak visibility when a 65mph speed would require a higher threshold lighting level, then the speed limit on the approach roads would be adjusted to a lower posted speed (55 or 45 mph) to keep the installed lighting level within the necessary range of visibility. The lighting control system, with a luminance meter outside of each portal, would interface with the VSL system to signal these conditions.

The drawback to a VSL system is that the threshold and transition zones lengths need to be designed for the highest speed. For example, at 65 mph the threshold zone length is approximately 580' for the eastbound tunnel. At a posted speed of 45 mph the threshold length could be about 300'. If a VSL is used, the threshold lighting level can be reduced but the threshold and transition zone lengths will still need to be based on the higher speed which makes a 55 mph posted speed a lower cost alternative.

Possible exception to IES RP-22-11

Based on the visibility analysis and the exceptionally high lighting level calculated for the westbound tunnel, ADOT may want to consider the basis for RP-22 as well as standard tunnel lighting practice in North America. The visibility analysis for the westbound tunnel shows a requirement for 469 cd/m^2. This is a very high threshold value, much higher than any other tunnel lighting threshold zone. The highest threshold lighting level that we are aware of in the US is 350 cd/m^2. A brief discussion of the development of the recommendation in RP-22 might be beneficial.



The Lseq method used in RP-22 was developed by Dr. Werner Adrian in the late 1980's. The method determined how much lighting a driver would need at the beginning of a tunnel based on their eye adaptation and the visibility of a 10 minute target, which given the geometry in this application would result in seeing something approximately 18cm square. This dimension also approximated the height object a car axle would clear in this period. The photograph shows the targets used for typical visibility tests placed in the middle of the right lane. Adrian's tests used 18 participants to make subjective assessments of their ability to see into a tunnel, while viewing a test screen which varied the background brightness. He then correlated these Subjective Rating Numbers (SRN) to predicted contrast levels shown to provide adequate visibility. There has been, and continues to be, discussion

within the IES Tunnel Lighting Subcommittee as to whether the task of seeing an 18cm object might be too restrictive and that perhaps a large object, similar to the size of a car, could be considered. When examining the Deck Park Tunnel, and the goal of reducing the mostly rear-end and sideswipe crashes that are occurring in the tunnel, it is worth discussion.

Visibility Level (VL) is a metric used in roadway lighting concepts like Small Target Visibility (STV). Whether an object is visible to a large percentage of people depends on the luminance contrast, fixation time, object size, and person's age. Using the formulas for visibility level, we can change the object size (from an 18cm object to an approximately 1M target representing a vehicle) and see the relative increase in VL. We can then adjust the luminance contrast to reduce the VL back to what is was for an 18cm target and theoretically determine what threshold luminance adjustment can be made for the task of seeing a car rather than seeing a small object in the road.

	Background Luminance	Target Luminance	Age	Target Height (Meters)	Target Size (Meters)	Distance (Meters)	Target Size (Minutes of Arc)	Observation Time (seconds)	VL from Adrian
Stationary 1 - Avoid	10.67	2.49	60	0.2	0.2	83	9.347179393	2	20.53680495
Position 2	14.49	2.1	60	0.2	0.2	83	9.347179393	2	23.46867316
TH1 - Org.	469	78.51	60	0.2	0.2	83	9.347179393	2	24.99563888
TH1 - Adj.	469	78.51	60	1	1	83	46.73520596	2	59.02977863
TH1 - Mod.	257.8	45.54	60	0.2	0.2	83	9.347179393	2	24.5686949

Using this method the threshold lighting level in the westbound tunnel could be factored from 469cd/m^2 to approximately 260 cd/m^2.

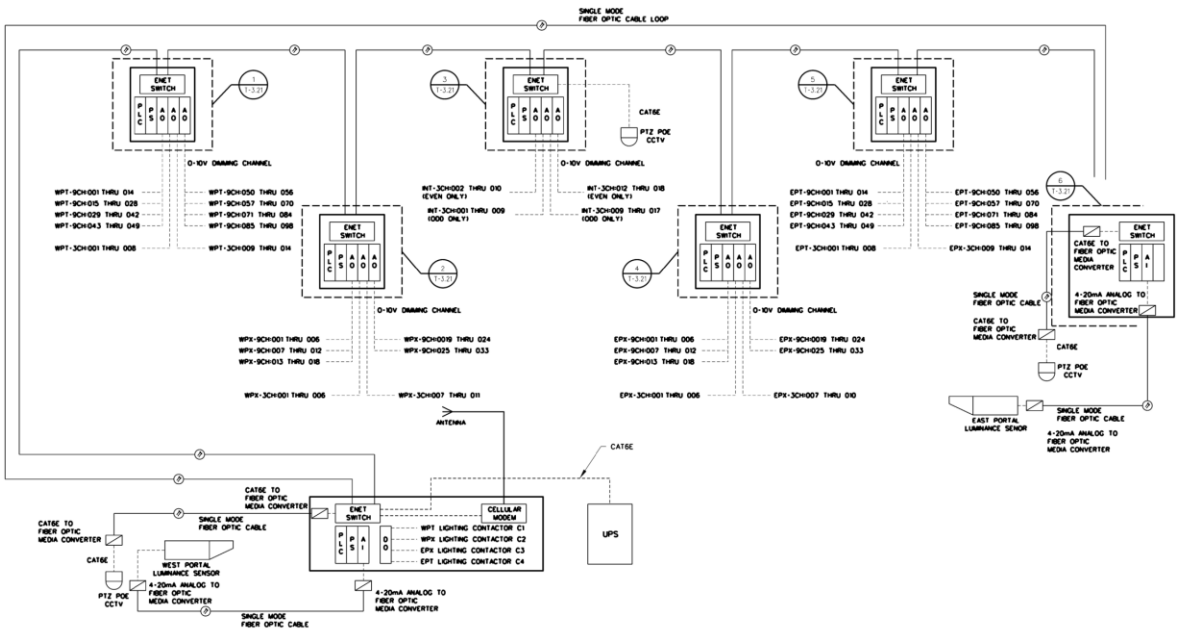
While the methodology of VL is fairly well researched there are differences in opinion about the required contrast level to be used, particularly in dynamic environments like driving, and in conditions where eye adaptation is changing. While we consider VL a very strong indication that the threshold lighting levels can be reduced based on an increase in target size the amount of that reduction would require additional research. Because of this ADOT may want to consider capping the upper luminance level in the threshold to 350cd/m^2. This level is almost 2.5 times the existing lighting level and as previously stated would be one of the highest in the country.

Control System Options

The current lighting control system for the tunnel consists of lighting contactors shutting off banks of light fixtures based on a photoreceptor located at the tunnel portal. A replacement lighting system would use LED luminaires which offers a much greater level of control and potential operations and maintenance savings than prior technologies. Lights can be dimmed when new to account for light loss factors included in the design phase. A more discrete level control can be used based on exterior lighting conditions to save energy while operating the system and also to extend the operating life by reduced drive currents to the solid state components.

Three classes of systems are available for lighting control including wired, wireless, and power line carrier.

A wired system would consist of several 4-20ma control loops being run in each tunnel tube which would then be converted to 0-10v control loops at intervals of approximately 500'. The 0-10v control loops would be connected to each fixture which would be provided with 0-10v dimming drivers. This system would provide control only of the fixtures based on the lighting levels outside the tunnel as measured by a luminance meter. A separate control system would be provided for each tunnel tube.



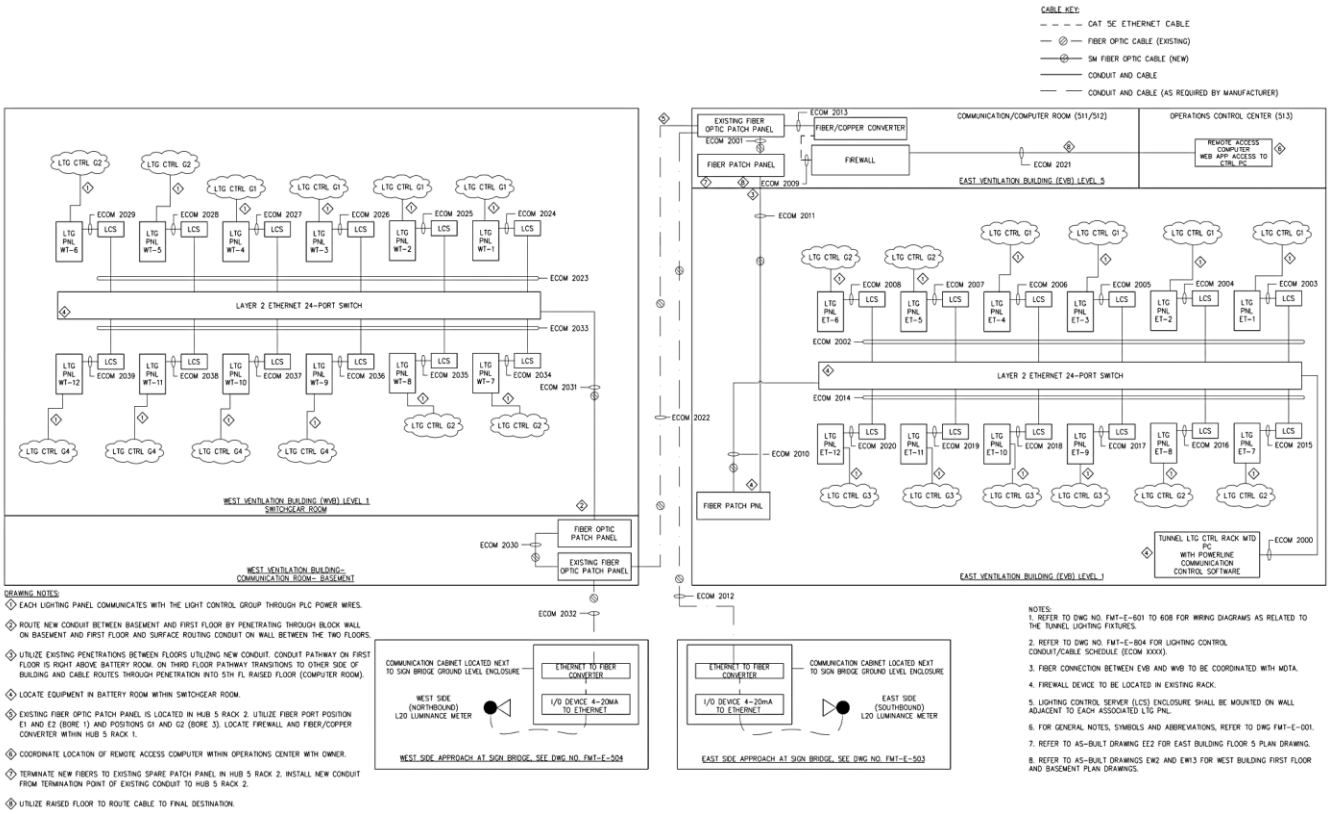
CONTROL DIAGRAM

	NAME	DATE
DESIGN	KMM/SOR	07-15
DRAWN	KLN	07-15
CHECKED	PJL	07-15

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

A wireless system would consist of adding wireless control nodes in each one of the fixtures. These nodes would establish a 2.4GHz secure, encrypted wireless mesh network. These control nodes would report back to gateways in the tunnel transmitting both status and control to a software interface located in the tunnel control room. Gateways can support up to 250 nodes within the tunnel. This type of control system offers the same level of control as a wired system as well as reporting operational status of all of the fixtures within the tunnel. Due to signal reflections however in a tunnel environment, they have not been successfully tested for this application. Several manufacturers have systems under development but application at this point in time seems premature.

A power line carrier system uses high frequency signals induced on the power conductors of the lighting circuits, to communicate with nodes located within the tunnel luminaires. Each luminaire is separately addressable. One PLC system was tested at the Fort McHenry Tunnel in Maryland (riser diagram for final PLC design shown in the graphic below) to see if signal interference would occur and if communication to the luminaires would be reliable. The test involved a group of luminaires in the center of a 1 mile long tunnel with PLC signals generated at the electrical panels at the tunnel ends. The pilot test was successful and complete installation is expected to take place in the next year.



Review of Available LED Lighting Equipment

A number of new LED tunnel products are under review being evaluated for overall optical performance, expected longevity, fixture construction, and maintenance considerations. The manufacturers of such luminaires that have been identified as having advanced far enough in product development to be testing include those manufactured by:

Cree, Inc TSP



Osram Propoint



Holophane TunnelPass



Schreder OminStar



Kenall LTIU



AZZ Rig-A-Lite MHD2



These products (above) vary in benefits, options, lensing, form factor, and available lumen output packages. When evaluating LED tunnel luminaires it is important to scrutinize every aspect of the luminaire. The focus should not only be on lumens per watt (LPW) as this information is important, but in order to ensure a long easily maintained life of these products one must review all aspects. The construction of housing, materials of the housing, lens, bracket, and hardware, access to the internals, strength and robustness, and heat dissipation method to name a few other important characteristics beyond LPW. Light distribution of all these different fixtures also widely vary. Some of the fixtures are linear and completely diffuse while other fixtures have typical roadway distributions such as Type II and Type III (symmetrical), some other manufacturers have chosen to include light distributions that are specific towards tunnel roadway lighting and these types of distributions are call counter-beam and pro-beam. A counter-beam system directs the light toward the driver (against traffic flow) to achieve the maximum roadway luminance but with low object luminance. A pro-beam system directs the light away from the driver (with traffic flow) creating maximum object luminance but low roadway luminance. The initial assessment was to consider the light source based on recent as well as current tunnel design in

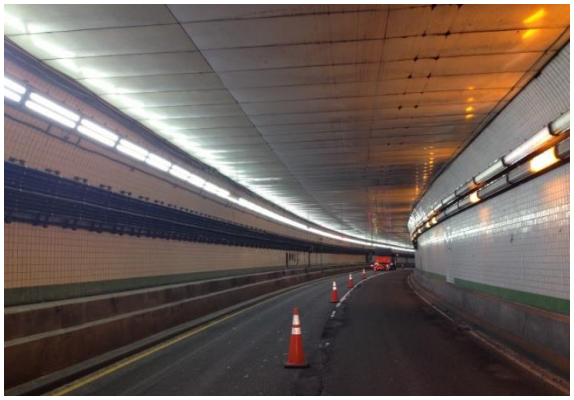
other parts of the US. These evaluations with these manufacturers have been performed on the following tunnels:

- Queen Creek Tunnel, AzDOT
- Detroit Windsor Tunnel, Detroit-Windsor Tunnel Company
- Twin Tunnels, CDOT
- US176, CDOT
- Eisenhower Tunnel, St. Lawrence Seaway Development Corp.
- Midtown and Downtown Tunnels, VDOT (ERC)
- Sumner Tunnel, MassDOT
- Copley/Prudential Tunnel, MassDOT
- Logan Airport Tunnels, Massport
- Queens Midtown Tunnel, TBTA
- Fort McHenry Tunnel, MdTA

Based on these past and recent evaluations, LED systems consistently resulted in the lowest life cycle of any source including high pressure sodium, metal halide, fluorescent, induction and light emitting plasma. Methods to gauge the suitability of these LED fixtures include the evaluation of a number of applicable test results. It was found that only a few of the luminaires have been fully tested and passed the stringent tunnel environment requirements. The following list is some of the testing that is required for products of this type:

- IESNA LM-79 Electrical and Photometric Measurements of Solid State Lighting Products
- IESNA LM-80 Measuring Lumen Maintenance of LED Sources
- ANSI C136.31 Luminaire Vibration (2G/3G Vibration)
- IEC/EN 60529 IP66 Water and Dust Proof test reports
- ANSI 136.27 High Pressure Water Spray Test (100 PSI)
- ASTM B117 Salt Spray Test Reports
- Various AAMA Tests for Luminaire Corrosion Analysis, Chemical Resistance, Film Adhesion, and Impact Resistance
- Thermal Test (at expected operating temperatures)

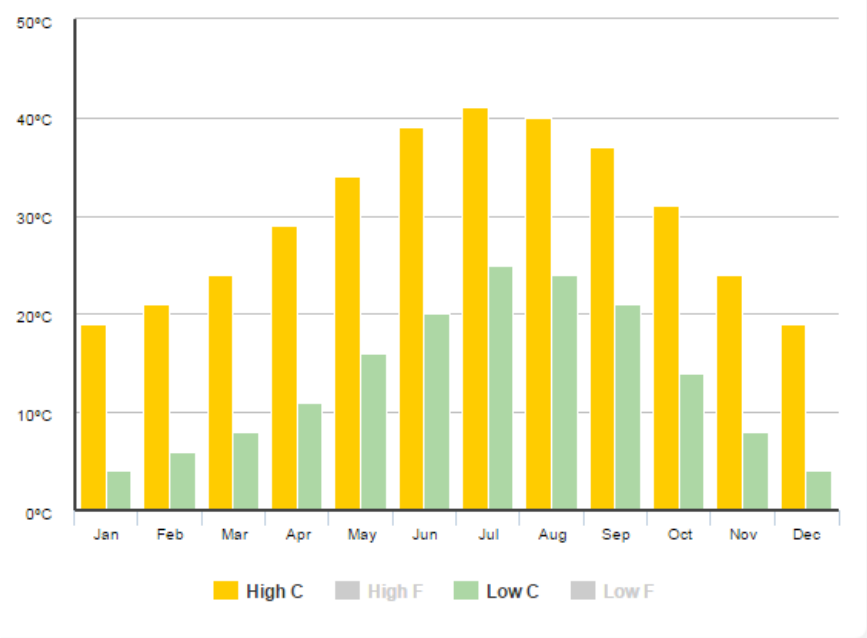




Luminaires that have completed the necessary testing for their particular application and are installed or being installed in tunnels include Cree (Twin Tunnels, CDOT, left photo), Holophane (Queen Creek Tunnel, ADOT, Mid-town Tunnel, VDOT), and Osram (Midtown Tunnels, VDOT, right photo-left wall).

For the requirements of the I-10 Deck Park Tunnel, the best base case luminaire, having the needed optics package and passed testing applicable to this installation, is the Holophane TunnelPass luminaire. The Holophane luminaire is of high quantity and construction for a tunnel of this caliber and made to withstand tunnel washing hose downs. The fixture also features a removal drop down door for maintenance as well as a thick fritted glass lens to break up the LED pattern. This fixture has also been subjectively evaluated for low glare and comfort as compared to equivalent fixtures.

Reviewing historic temperature data (see Chart below) for the Phoenix, AZ, area shows a high average maximum temperature of approximately 106oF (41 oC), thus additional heat dissipation tests for the luminaire in a similar environment are needed to show that the life time of the equipment (LED's and Driver) will be as expected.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High °C	19	21	24	29	34	39	41	40	37	31	24	19
High °F	66	70	75	84	93	102	106	104	99	88	75	66
Low °C	4	6	8	11	16	20	25	24	21	14	8	4
Low °F	39	43	46	52	61	68	77	75	70	57	46	39

Cost Analysis of Options

Budget cost estimates were developed for three options, 65mph posted speed, 55mph posted speed, and 45-55mph VSL. The costs were based on the peak lighting threshold lighting levels according to IES

RP-22-11 and do not take into account reductions based on task/target modifications (i.e. capping the maximum threshold level at 350 cd/m^2) as discussed in the study. If the threshold lighting levels are capped then the construction cost estimates would be reduced by approximately $2.5M. The construction cost estimates included in the annex include typical ADOT construction cost adders which are not reflected in the values below which assumes construction as part of a P3 type of contract. The costs do not include O&M costs, finance cost, or other P3 related items.

The construction costs assume the re-use of the electrical distribution system including panels, wiring, raceways, wiring trough, etc.. The control system is assumed to be a power line carrier system.

Budget Construction Cost

Posted speed 65mph	$20,000,000
Posted Speed 55mph	$15,900,000
VSL 45-65mph	$17,700,000

Approximate Energy Usage (connected load for lighting)

Existing	1,300 kW
Posted Speed 65mph	1,050 kW
Posted Speed 55mph	775 kW
VSL 45-65mph	900 kW

Options for Consideration by ADOT

The draft report outlined options and costs for discussion. Those discussions shaped the final recommendations. Key elements of discussion included:

- Speed used for the design. A posted speed of 55mph on the approach to the tunnel results in the lowest cost option from a lighting standpoint. A speed limit reduction was also one of the possible items mentioned in the prior safety report. If viable from a traffic standpoint it should be considered. The next lowest cost option is the use of VSL which could also be considered.
- Reduction in the RP-22 recommended threshold levels for the westbound tunnel. Using a lighting level as high as the analysis shows is necessary is a questionable improvement when considering the project goal of reducing crashes. Changing the task from small target to something the size of a vehicle may provide the justification for reducing that level.
- The use of a power line carrier control system. The two options available are wired and PLC. Because the current plan is to re-use the existing wiring in the tunnel, adding control wire for a wired system could be problematic. A PLC system appears to be a good option for this project.

Final Report Recommendations

Discussions occurred with ADOT concerning design direction for the tunnel lighting and control system. The direction given by ADOT on October 18, 2016 is as follows:

- **Posted Speed.** The posted speed used for the design of the lighting in the tunnel will be 65mph. The tunnel lighting control system will have the capability of communicating with a Variable Speed Limit system which may at a future time, reduce approach speeds based on the luminance level measured by the portal luminance meter.
- **Threshold Lighting Level.** The threshold lighting level for the eastbound tunnel will be 240 cd/m^2 based on the Lseq analysis done in accordance with RP-22. The threshold lighting in the westbound tunnel will be 350 cd/m^2 based on several assumptions. One is that the visibility task is based on the detection of a vehicle sized object rather than a small target as used in IES RP-22. The other is typical practice in US tunnels. The highest design level used in many major US tunnels is 350 cd/m^2. Based on this, and that the initial lighting level that can be generated by a system designed using a light loss factor of 0.63 is 555 cd/m^2, allows a level of adaptability for the first half of the system's expected life, if crash frequency does not reduce as expected.
- **Control System.** The control system in the tunnel will be a power line carrier system capable of dimming, extinguishing, monitoring, and generating alarms, regarding the lighting system. It will also be compatible with a Variable Speed Limit system allowing speed adjustments in 5 mph steps.

Recommended Requirements for Design/Build or P3 Procurement

Design Criteria

The tunnel lighting design will meet the requirements of ANSI/IES RP-22-11 Standard Practice for Tunnel Lighting and ADOT requirements. Based on a prior study of the tunnel the proposed design should be based on:

- 350 cd/m^2 threshold lighting levels for the westbound direction
- 240 cd/m^2 threshold lighting levels for the eastbound direction
- Approach posted speed limit of 65 mph
- Transition zones and daytime and nighttime interior lighting levels as recommended by RP-22
- An assumed light loss factor of 0.63
- Meeting the requirements of NFPA 502-2017 for any new work
- Assumed pavement type of R3
- Source Correlated Color Temperature of 4000^oK or lower for nighttime luminaires and 5000^oK or lower for threshold and transition zone daytime luminaires
- No drilling is allowed into any web areas of the bridge deck (roof of tunnel)

Luminaires used for the tunnel lighting shall be supplied by a company having manufactured vehicle tunnel lighting luminaires for at least 5 years and have successfully passed the following tests and certifications (for the proposed luminaire including any components required for the control system in the luminaire):

- IES LM-80 projected life of at least 100,000 hours and projected driver life of at least 100,000 hours with a projected failure rate of under 3%
- ANSI C136.31 Luminaire Vibration testing to 3G
- IEC/EN 60529 IP66 Water and Dustproof test rating
- ANSI 136.27 High Pressure Water Spray Test (100 psi)
- ASTM B117 Salt Fog Test with a creep rating of greater than 6

The lighting control system for the tunnel shall be a power line carrier type of control system capable on monitoring status of each luminaire in the tunnel, dim and turn off each luminaire, and actively report system status to ADOT. All necessary software and hardware will be included for a monitoring and control station at an ADOT facility.

Lseq Analysis

ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.503	2.683	0.8795	5.515	0.751	1.0975	0.2	5.634	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.20		0.20		0.75		6.50		6.50		6.50		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	100%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.20		0.20		0.34		1.85		5.93		5.94		6.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	90%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	5%	Wall Dark	10%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	25%	Portal Façade	70%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	75%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		0.20		0.80		0.88		1.16	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	80%	Wall Dark	100%	Wall Dark	95%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	10%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		0.70		1.44		2.06		2.23		2.32		2.32	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	75%	Road	75%	Road	80%	Road	80%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	25%	Wall Dark	20%	Wall Dark	20%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		2.06		2.68		2.68		2.68		2.68		2.68		2.68		2.68	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	75%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.43		2.68		2.68		2.68		2.68		2.68		2.68		2.68		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	90%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1		2		3		4		5		6		7		8		9	
7		2.43		2.68		2.68		2.68		2.68		2.68		2.68		2.68		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	90%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
8		0.20		2.06		2.68		2.68		2.68		2.68		2.68		2.68		2.68
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	75%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
9		0.20		0.20		0.45		2.19		2.19		2.19		3.25		2.50		2.50
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	10%	Road	80%	Road	80%	Road	80%	Road	80%	Road	90%	Road	90%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	10%	Wall Dark	10%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	20%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	20%	Tunnel	20%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
10		0.20		0.20		0.20		0.20		0.20		0.20		0.64		0.74		0.83
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	60%	Misc Str	70%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	20%	Tunnel	40%	Tunnel	30%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
11		0.20		0.20		0.20		0.20		0.34		1.79		5.64		6.50		6.50
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	85%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	25%	Portal Façade	60%	Portal Façade	15%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	75%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
12		0.20		0.20		0.20		0.20		0.75		6.50		6.50		6.50		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	100%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

NC:01

NC:01

Assumptions				
Posted Speed Limit	45	MPH	72.42 KMH	
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728 M	
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	31.00	FT	9.4488 M	Estimated
Tunnel Length	2690.00	FT	819.912 M	Estimated
Adaptation Distance	64.97	FT	19.80317 M	

ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): FALL

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.20	0.20	0.75	6.50	6.50	6.50	**NC**	21.06 kcd/ M2
2	0.20	0.20	0.20	0.20	0.34	1.85	5.93	5.94	6.50	21.36 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	0.20	0.80	0.88	1.16	4.04 kcd/ M2
4	0.20	0.20	0.20	0.70	1.44	2.06	2.23	2.32	2.32	11.68 kcd/ M2
5	0.20	2.06	2.68	2.68	2.68	2.68	2.68	2.68	2.68	21.04 kcd/ M2
6	2.43	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.22 kcd/ M2
7	2.43	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.22 kcd/ M2
8	0.20	2.06	2.68	2.68	2.68	2.68	2.68	2.68	2.68	21.04 kcd/ M2
9	0.20	0.20	0.45	2.19	2.19	2.19	3.25	2.50	2.50	15.66 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.20	0.64	0.74	0.83	3.41 kcd/ M2
11	0.20	0.20	0.20	0.20	0.34	1.79	5.64	6.50	6.50	21.58 kcd/ M2
12	0.20	0.20	0.20	0.20	0.75	6.50	6.50	6.50	**NC**	21.06 kcd/ M2
									Lij=	204.36 kcd/ M2
										x 5.131E-04
									Lseq=	104.86 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	32 cd/ M2	47 cd/ M2	69 cd/ M2	101 cd/ M2	132 cd/ M2	148 cd/ M2	217 cd/ M2	319 cd/ M2	468 cd/ M2	687 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

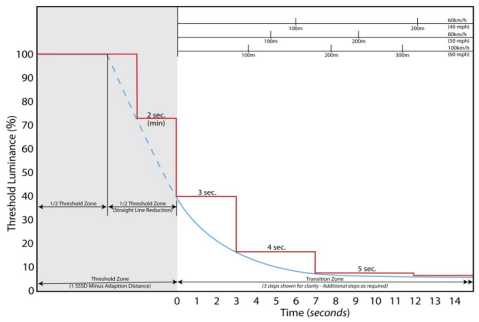
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

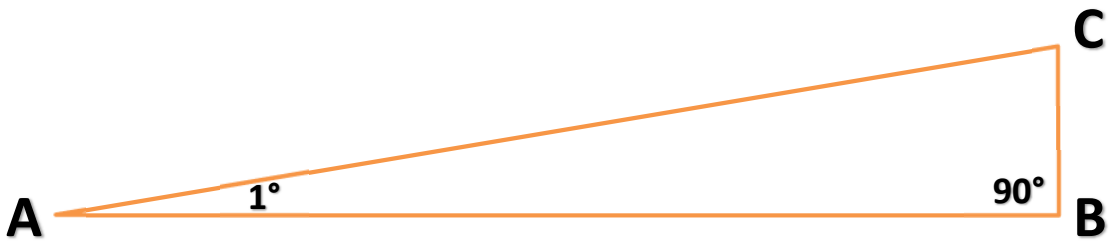
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



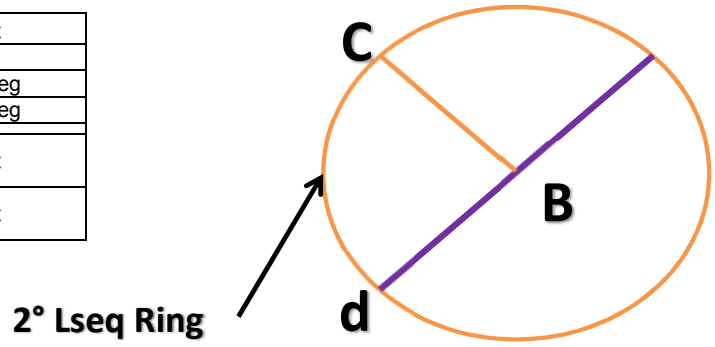
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	132 cd/ M2	221.27	67.44
Lth2	93 cd/ M2	73.76	22.48
Ltr1	54 cd/ M2	198.00	60.35
Ltr2	14 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1932.97	589.17
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	295.03
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

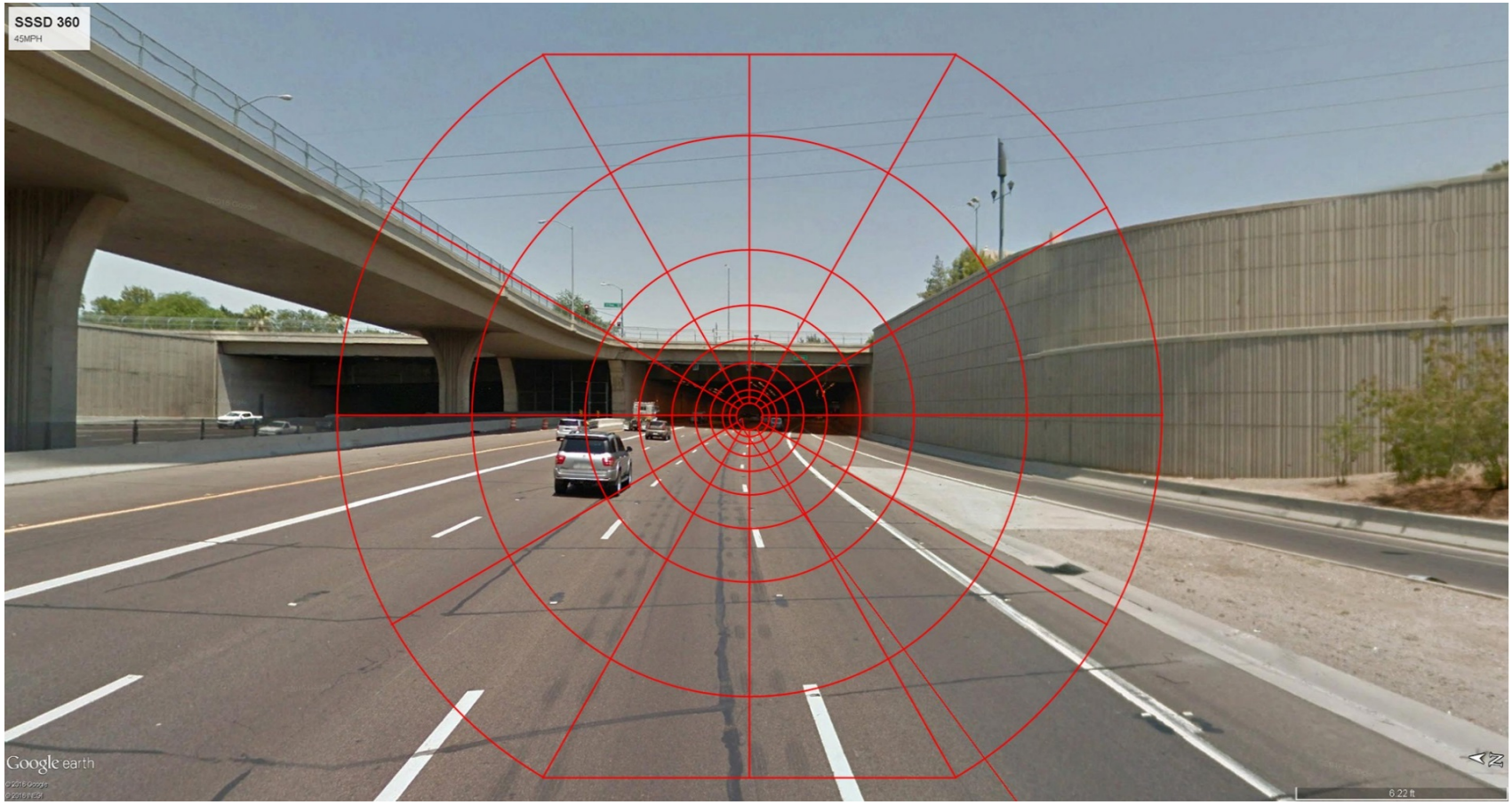
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): FALL



ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
7.866666667	4.85	0.9	0.9	0.9	1.0975	0.2	5.2	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.20		0.20		0.90		7.87		7.87		7.87		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	100%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.20		0.20		0.38		2.22		7.17		7.17		7.87	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	90%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	5%	Wall	10%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	25%	Portal Façade	70%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	75%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		0.20		0.83		0.90		1.25	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	80%	Wall	100%	Wall	95%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	10%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		1.13		2.53		3.69		3.86		4.06		4.06	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	75%	Road	75%	Road	80%	Road	80%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	25%	Wall	20%	Wall	20%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		3.69		4.85		4.85		4.85		4.85		4.85		4.85		4.85	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	75%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	4.39		4.85		4.85		4.85		4.85		4.85		4.85		4.85		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	90%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	4.39	4.85	4.85	4.85	4.85	4.85	4.85	4.85	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 90%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	0.20	3.69	4.85	4.85	4.85	4.85	4.85	4.85	4.85
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 75%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 25%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	0.67	3.92	3.92	3.92	4.06	4.46	4.46
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 10%	Road 80%	Road 80%	Road 80%	Road 80%	Road 90%	Road 90%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 10%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 20%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 90%	Tunnel 20%	Tunnel 20%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	0.20	0.20	0.76	0.74	0.83
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 80%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 60%	Misc Str 70%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 20%	Tunnel 40%	Tunnel 30%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	0.20	0.20	0.38	2.15	6.82	7.87	7.87
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 85%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 25%	Portal Façade 60%	Portal Façade 15%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 75%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.20	0.20	0.20	0.90	7.87	7.87	7.87	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 100%	Sky 100%	Sky 100%	NC:01
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 100%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	45	MPH	72.42	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.20	0.20	0.90	7.87	7.87	7.87	**NC**	25.30 kcd/ M2
2	0.20	0.20	0.20	0.20	0.38	2.22	7.17	7.17	7.87	25.61 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	0.20	0.83	0.90	1.25	4.18 kcd/ M2
4	0.20	0.20	0.20	1.13	2.53	3.69	3.86	4.06	4.06	19.93 kcd/ M2
5	0.20	3.69	4.85	4.85	4.85	4.85	4.85	4.85	4.85	37.84 kcd/ M2
6	4.39	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.34 kcd/ M2
7	4.39	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.34 kcd/ M2
8	0.20	3.69	4.85	4.85	4.85	4.85	4.85	4.85	4.85	37.84 kcd/ M2
9	0.20	0.20	0.67	3.92	3.92	3.92	4.06	4.46	4.46	25.80 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.20	0.76	0.74	0.83	3.53 kcd/ M2
11	0.20	0.20	0.20	0.20	0.38	2.15	6.82	7.87	7.87	25.88 kcd/ M2
12	0.20	0.20	0.20	0.20	0.90	7.87	7.87	7.87	**NC**	25.30 kcd/ M2
									Lij=	307.86 kcd/ M2
										x 5.131E-04
									Lseq=	157.96 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	48 cd/ M2	71 cd/ M2	104 cd/ M2	152 cd/ M2	199 cd/ M2	223 cd/ M2	328 cd/ M2	481 cd/ M2	706 cd/ M2	1,036 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

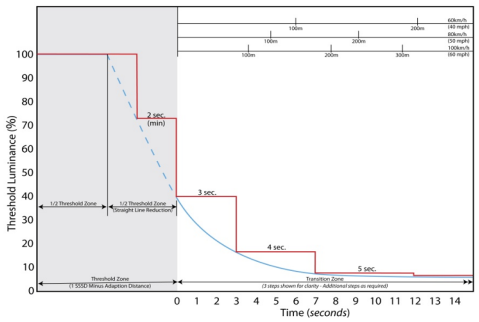
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

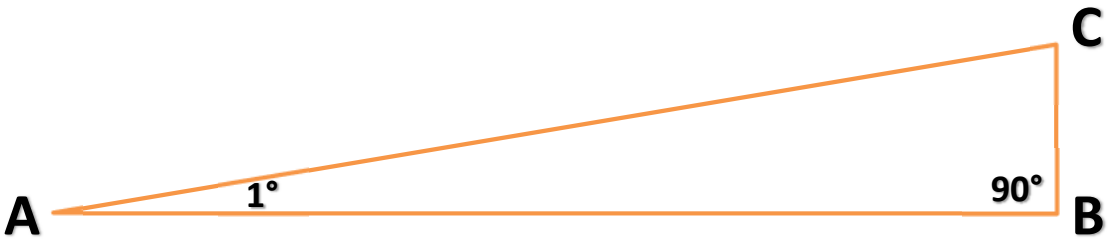
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



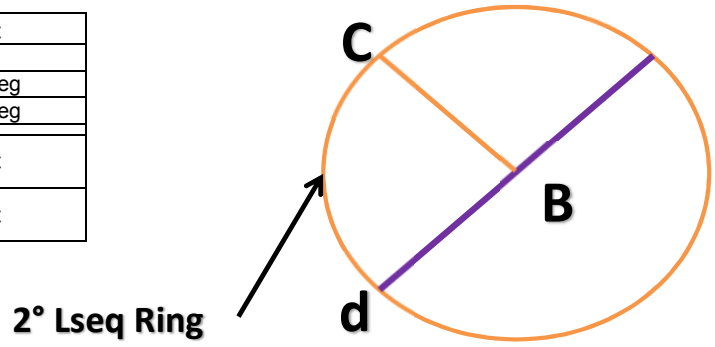
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	199 cd/ M2	221.27	67.44
Lth2	140 cd/ M2	73.76	22.48
Ltr1	81 cd/ M2	198.00	60.35
Ltr2	21 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1932.97	589.17
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	295.03
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

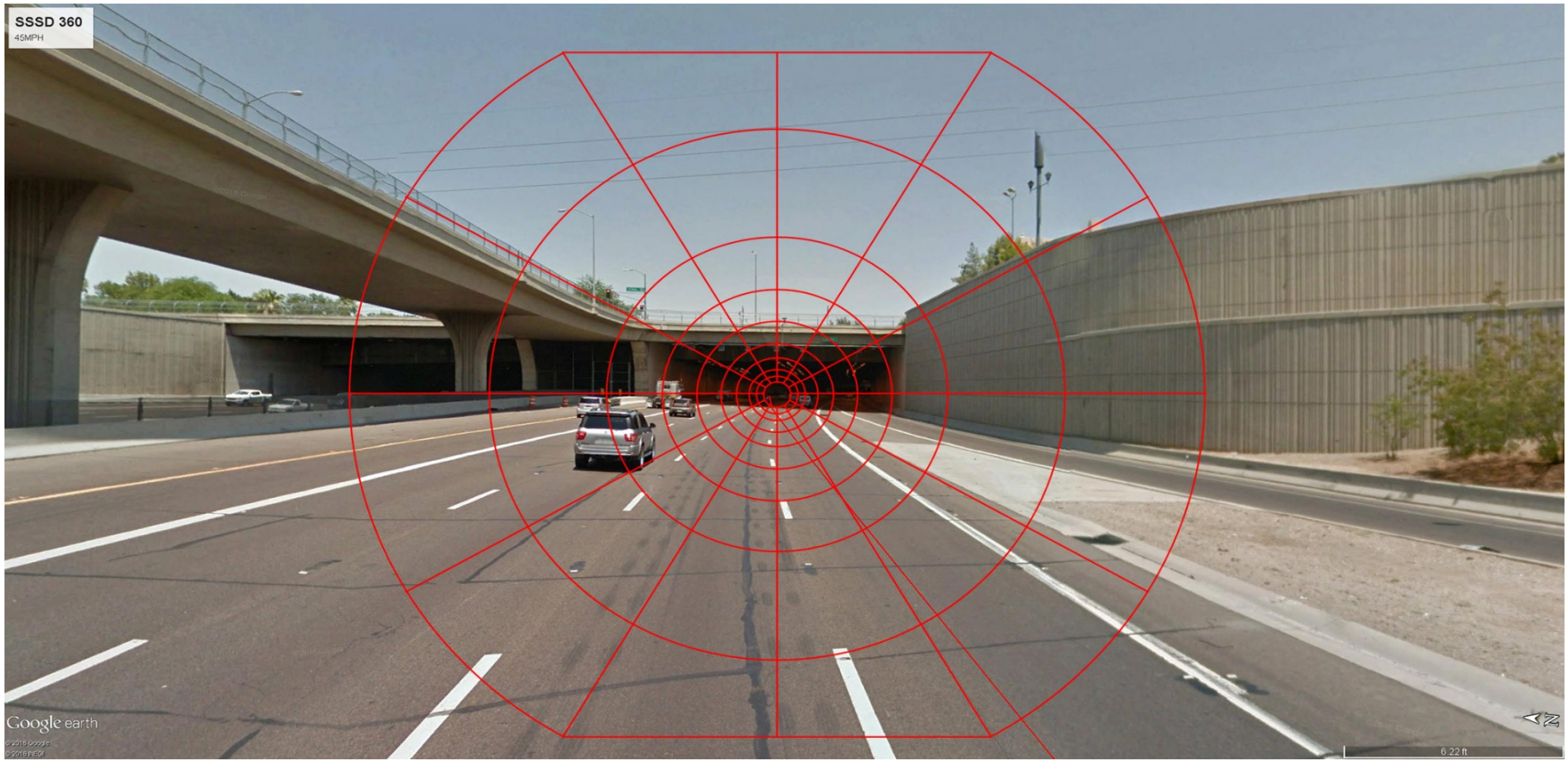
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

=

ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
5.766666667	2.4	6	6	6	1.0975	0.2	6	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.20		0.20		6.00		5.77		5.77		5.77		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	100%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.20		0.20		1.65		5.37		5.79		5.79		5.77	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	90%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	5%	Wall	10%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	25%	Portal Façade	70%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	75%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		0.20		5.42		6.00		5.99	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	80%	Wall	100%	Wall	95%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	10%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		0.64		1.30		1.85		3.30		3.12		3.12	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	75%	Road	75%	Road	80%	Road	80%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	25%	Wall	20%	Wall	20%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		1.85		2.40		2.40		2.40		2.40		2.40		2.40		2.40	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	75%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.18		2.40		2.40		2.40		2.40		2.40		2.40		2.40		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	90%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.18	2.40	2.40	2.40	2.40	2.40	2.40	2.40	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 90%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	0.20	1.85	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 75%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 25%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	0.42	1.96	1.96	1.96	3.12	2.76	2.76
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 10%	Road 80%	Road 80%	Road 80%	Road 80%	Road 90%	Road 90%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 10%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 20%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 90%	Tunnel 20%	Tunnel 20%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	0.20	0.20	4.84	0.74	0.83
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 80%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 60%	Misc Str 70%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 20%	Tunnel 40%	Tunnel 30%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	0.20	0.20	1.65	4.79	5.80	5.77	5.77
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 85%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 25%	Portal Façade 60%	Portal Façade 15%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 75%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.20	0.20	0.20	6.00	5.77	5.77	5.77	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 100%	Sky 100%	Sky 100%	NC:01
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 100%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	45	MPH	72.42	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.20	0.20	6.00	5.77	5.77	5.77	**NC**	24.10 kcd/ M2
2	0.20	0.20	0.20	0.20	1.65	5.37	5.79	5.79	5.77	25.17 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	0.20	5.42	6.00	5.99	18.61 kcd/ M2
4	0.20	0.20	0.20	0.64	1.30	1.85	3.30	3.12	3.12	13.93 kcd/ M2
5	0.20	1.85	2.40	2.40	2.40	2.40	2.40	2.40	2.40	18.85 kcd/ M2
6	2.18	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	18.98 kcd/ M2
7	2.18	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	18.98 kcd/ M2
8	0.20	1.85	2.40	2.40	2.40	2.40	2.40	2.40	2.40	18.85 kcd/ M2
9	0.20	0.20	0.42	1.96	1.96	1.96	3.12	2.76	2.76	15.34 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.20	4.84	0.74	0.83	7.61 kcd/ M2
11	0.20	0.20	0.20	0.20	1.65	4.79	5.80	5.77	5.77	24.58 kcd/ M2
12	0.20	0.20	0.20	0.20	6.00	5.77	5.77	5.77	**NC**	24.10 kcd/ M2
									Lij=	229.09 kcd/ M2
										x 5.131E-04
									Lseq=	117.55 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	36 cd/ M2	53 cd/ M2	77 cd/ M2	113 cd/ M2	148 cd/ M2	166 cd/ M2	244 cd/ M2	358 cd/ M2	525 cd/ M2	771 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

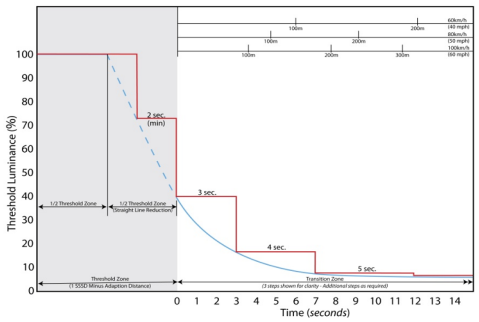
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

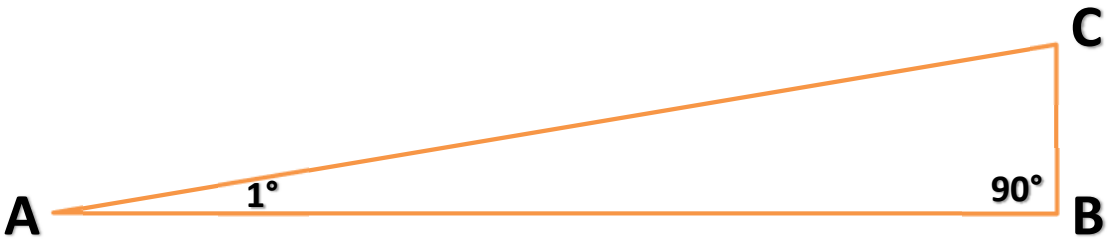
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



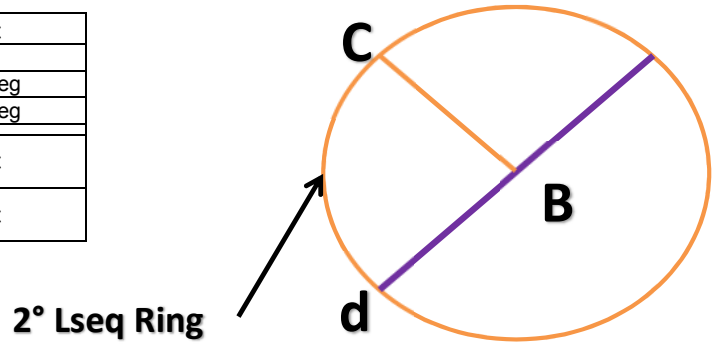
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	148 cd/ M2	221.27	67.44
Lth2	104 cd/ M2	73.76	22.48
Ltr1	60 cd/ M2	198.00	60.35
Ltr2	16 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1932.97	589.17
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	295.03
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

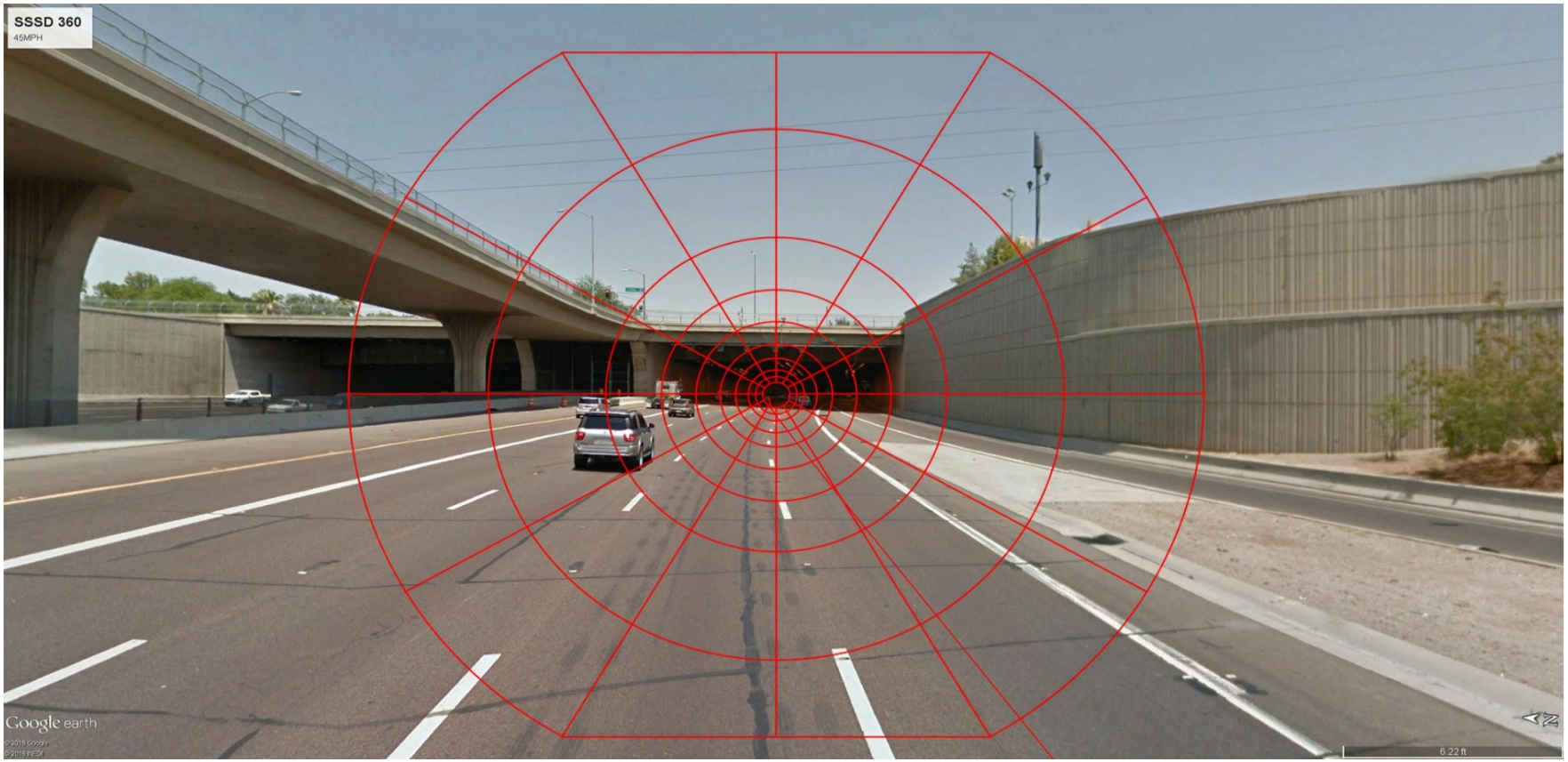
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (360FT SSSD): SUMMER PM



ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.503	2.683	0.8795	5.515	0.751	1.0975	0.2	5.634	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.48		1.33		6.50		6.50		6.50		6.50		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	90%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.20		0.48		2.67		6.12		6.31		6.04		6.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	90%	Sky	95%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	10%	Trees	5%	Trees	5%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		4.21		5.52		5.07		5.13	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	75%	Wall Light	100%	Wall Light	90%	Wall Light	65%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		0.70		1.44		4.10		3.82		3.83		3.86	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	50%	Road	60%	Road	60%	Road	40%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	50%	Wall Light	40%	Wall Light	30%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	40%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		2.68		2.68		2.68		2.68		2.68		2.68		2.68		2.68	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.68		2.68		2.68		2.68		2.68		2.68		2.68		2.68		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	NC:01
8	0.20	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.44	1.69	1.94	2.19	2.43	2.43	2.43
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 60%	Road 70%	Road 80%	Road 90%	Road 90%	Road 90%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 40%	Tunnel 30%	Tunnel 20%	Tunnel 10%	Tunnel 10%	Tunnel 10%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	0.20	0.54	0.54	0.61	1.48
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 10%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 50%	Wall Dark 50%	Wall Dark 60%	Wall Dark 60%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 40%	Tunnel 20%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	0.20	0.48	3.63	5.64	6.50	5.96	5.42
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 50%	Sky 85%	Sky 100%	Sky 90%	Sky 80%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 50%	Portal Façade 50%	Portal Façade 15%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 10%	Misc Str 20%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.20	0.48	1.33	6.50	6.50	6.50	6.50	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 10%	Sky 100%	Sky 100%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 50%	Portal Façade 90%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	NC:01

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): FALL

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.48	1.33	6.50	6.50	6.50	6.50	**NC**	28.21 kcd/ M2
2	0.20	0.20	0.20	0.48	2.67	6.12	6.31	6.04	6.50	28.72 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	4.21	5.52	5.07	5.13	20.93 kcd/ M2
4	0.20	0.20	0.20	0.70	1.44	4.10	3.82	3.83	3.86	18.34 kcd/ M2
5	0.20	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	21.66 kcd/ M2
6	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.46 kcd/ M2
7	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.46 kcd/ M2
8	0.20	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	21.66 kcd/ M2
9	0.20	0.20	1.44	1.69	1.94	2.19	2.43	2.43	2.43	14.96 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.54	0.54	0.61	1.48	4.17 kcd/ M2
11	0.20	0.20	0.20	0.48	3.63	5.64	6.50	5.96	5.42	28.23 kcd/ M2
12	0.20	0.20	0.48	1.33	6.50	6.50	6.50	6.50	**NC**	28.21 kcd/ M2
									Lij=	258.03 kcd/ M2
										x 5.131E-04
									Lseq=	132.40 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	40 cd/ M2	59 cd/ M2	87 cd/ M2	127 cd/ M2	167 cd/ M2	187 cd/ M2	275 cd/ M2	403 cd/ M2	591 cd/ M2	868 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

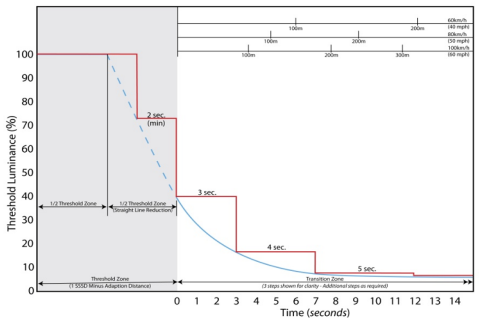
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

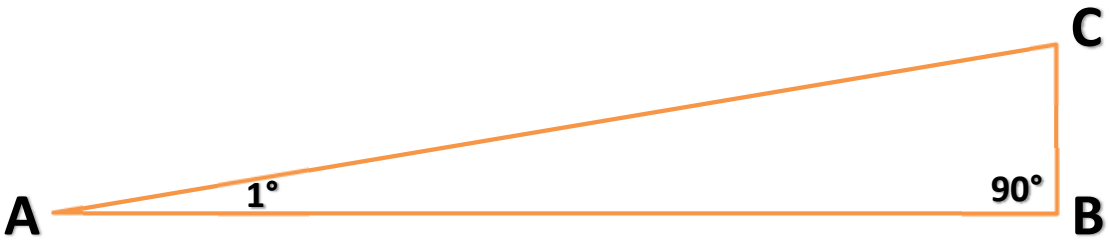
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



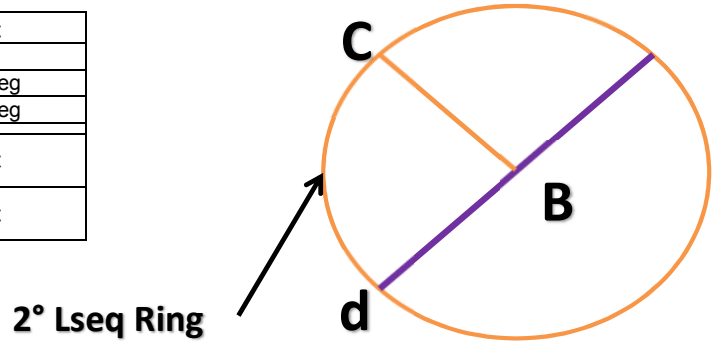
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	167 cd/ M2	322.52	98.30
Lth2	117 cd/ M2	107.51	32.77
Ltr1	68 cd/ M2	242.00	73.76
Ltr2	18 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1695.30	516.73
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	430.03
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

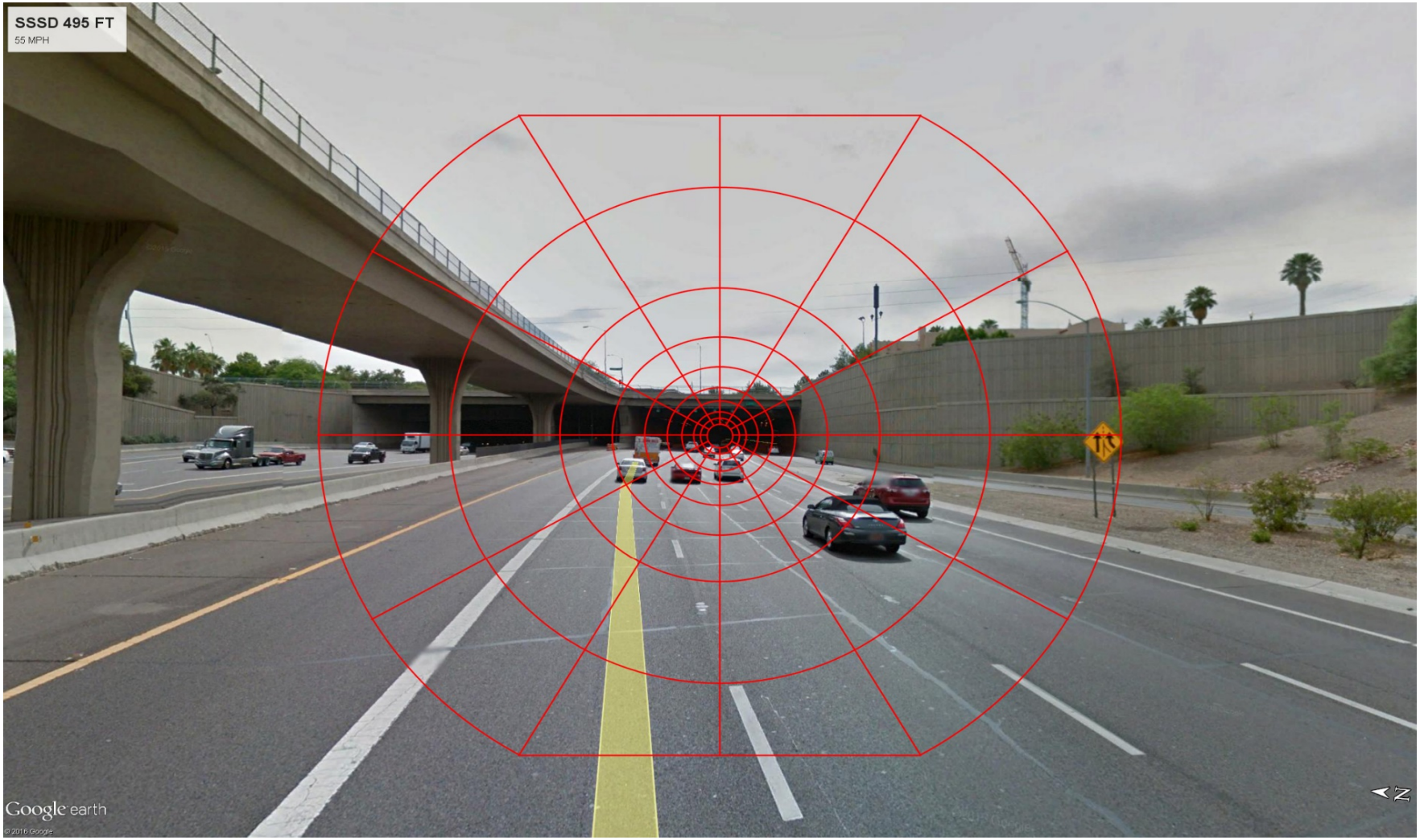
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): FALL



ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
7.866666667	4.85	0.9	0.9	0.9	1.0975	0.2	5.2	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.55		1.60		7.87		7.87		7.87		7.87			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	90%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
																	NC:01	
2	0.20		0.20		0.20		0.55		3.08		7.35		7.61		7.27			7.87
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	90%	Sky	95%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	10%	Trees	5%	Trees	5%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		0.76		0.90		0.92			2.40
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	75%	Wall	100%	Wall	90%	Wall	65%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		1.13		2.53		2.88		3.27		3.70			4.55
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	50%	Road	60%	Road	60%	Road	40%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	50%	Wall	40%	Wall	30%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	40%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		4.85		4.85		4.85		4.85		4.85		4.85		4.85			4.85
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	4.85		4.85		4.85		4.85		4.85		4.85		4.85		4.85			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
																	NC:01	

RINGS/ From Inside Out/ Center Circle Is Not Included

	1		2		3		4		5		6		7		8		9	
7		4.85		4.85		4.85		4.85		4.85		4.85		4.85		4.85		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
8		0.20		4.85		4.85		4.85		4.85		4.85		4.85		4.85		4.85
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
9		0.20		0.20		2.53		2.99		3.46		3.92		4.39		4.39		4.39
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	50%	Road	60%	Road	70%	Road	80%	Road	90%	Road	90%	Road	90%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	40%	Tunnel	30%	Tunnel	20%	Tunnel	10%	Tunnel	10%	Tunnel	10%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
10		0.20		0.20		0.20		0.20		0.20		0.55		0.55		0.62		1.63
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	10%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	50%	Wall	50%	Wall	60%	Wall	60%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	50%	Tunnel	40%	Tunnel	20%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
11		0.20		0.20		0.20		0.55		4.38		6.82		7.87		7.19		6.51
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	50%	Sky	85%	Sky	100%	Sky	90%	Sky	80%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	50%	Portal Façade	15%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	20%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
12		0.20		0.20		0.55		1.60		7.87		7.87		7.87		7.87		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	90%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.55	1.60	7.87	7.87	7.87	7.87	**NC**	34.01 kcd/ M2
2	0.20	0.20	0.20	0.55	3.08	7.35	7.61	7.27	7.87	34.32 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	0.76	0.90	0.92	2.40	5.98 kcd/ M2
4	0.20	0.20	0.20	1.13	2.53	2.88	3.27	3.70	4.55	18.65 kcd/ M2
5	0.20	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	39.00 kcd/ M2
6	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.80 kcd/ M2
7	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.80 kcd/ M2
8	0.20	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	39.00 kcd/ M2
9	0.20	0.20	2.53	2.99	3.46	3.92	4.39	4.39	4.39	26.45 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.55	0.55	0.62	1.63	4.35 kcd/ M2
11	0.20	0.20	0.20	0.55	4.38	6.82	7.87	7.19	6.51	33.92 kcd/ M2
12	0.20	0.20	0.55	1.60	7.87	7.87	7.87	7.87	**NC**	34.01 kcd/ M2
									Lij=	347.30 kcd/ M2
										x 5.131E-04
									Lseq=	178.20 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	54 cd/ M2	80 cd/ M2	117 cd/ M2	171 cd/ M2	224 cd/ M2	252 cd/ M2	369 cd/ M2	542 cd/ M2	796 cd/ M2	1,168 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

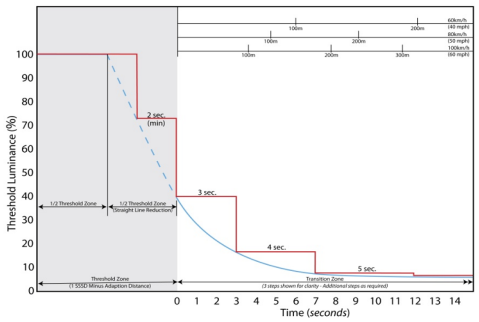
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

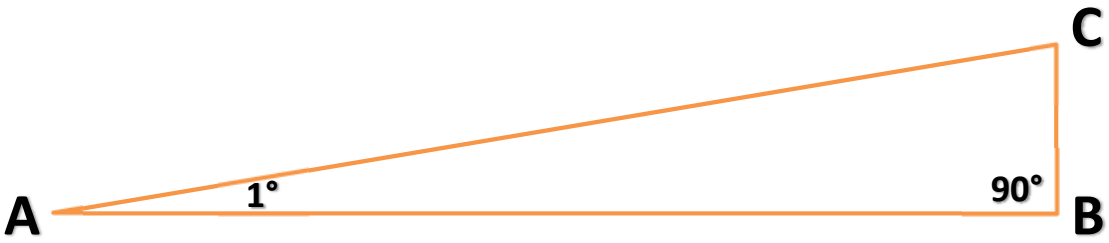
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



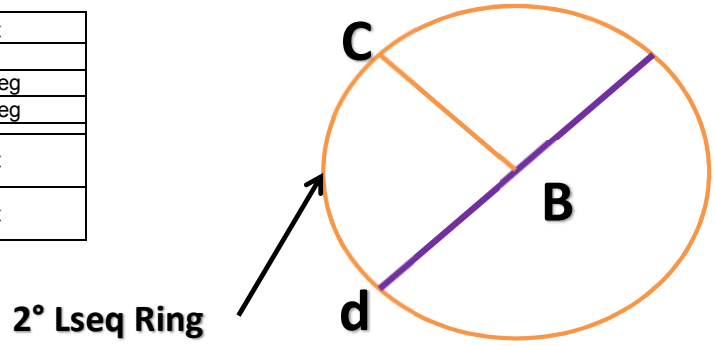
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	224 cd/ M2	322.52	98.30
Lth2	158 cd/ M2	107.51	32.77
Ltr1	91 cd/ M2	242.00	73.76
Ltr2	24 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1695.30	516.73
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	430.03
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

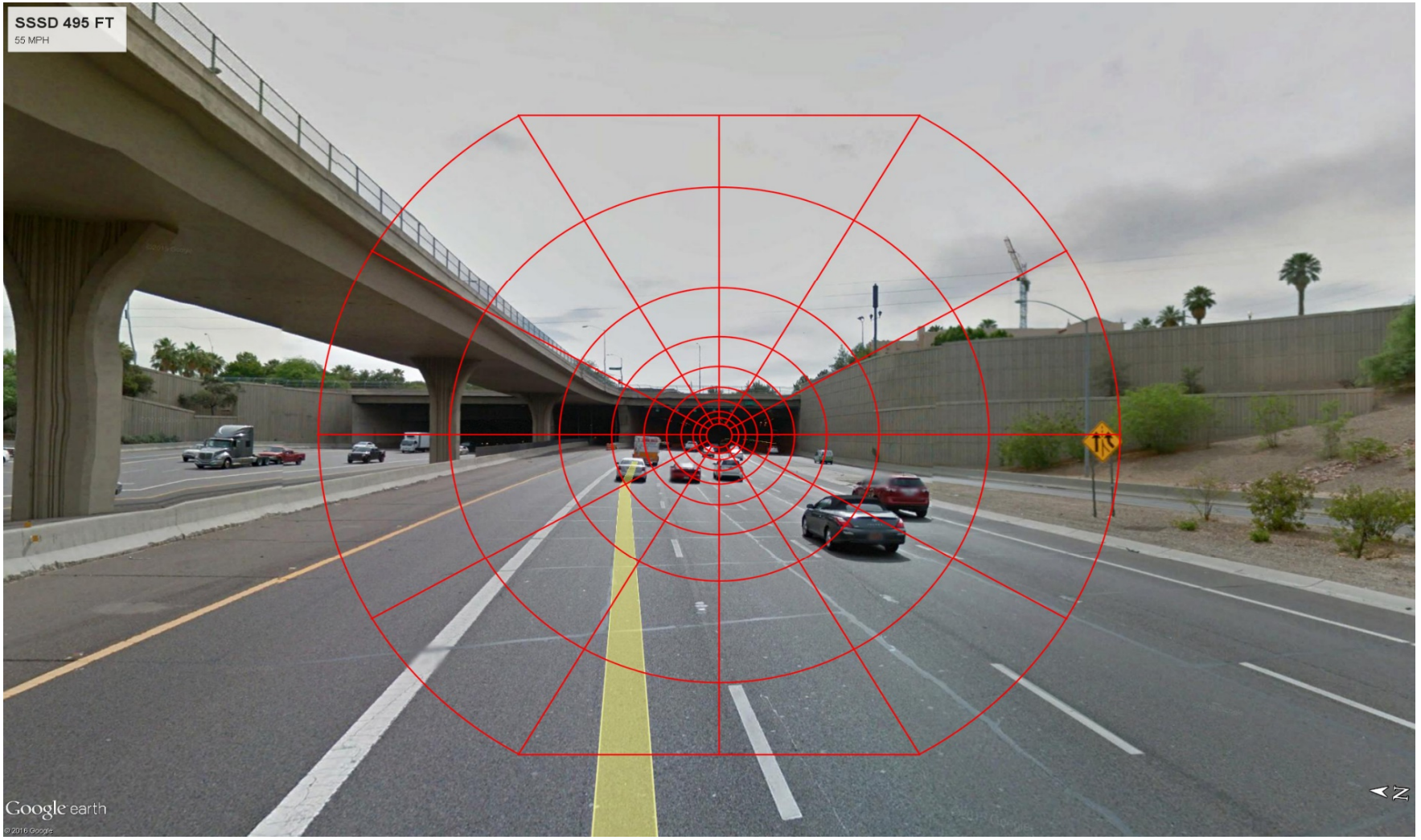
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
5.766666667	2.4	6	6	6	1.0975	0.2	6	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		3.10		5.98		5.77		5.77		5.77		5.77			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	90%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.20		3.10		5.11		5.46		5.61		5.38		5.77	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	90%	Sky	95%	Sky	90%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	10%	Trees	5%	Trees	5%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.20		4.84		6.00		5.51		5.30	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	75%	Wall	100%	Wall	90%	Wall	65%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.20		0.64		1.30		4.20		3.84		3.84		3.89	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	0%	Road	20%	Road	50%	Road	50%	Road	60%	Road	60%	Road	40%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	50%	Wall	40%	Wall	30%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	40%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.20		2.40		2.40		2.40		2.40		2.40		2.40		2.40		2.40	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.40		2.40		2.40		2.40		2.40		2.40		2.40		2.40			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

NC:01

NC:01

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	NC:01
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	0.20	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.30	1.52	1.74	1.96	2.18	2.18	2.18
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 60%	Road 70%	Road 80%	Road 90%	Road 90%	Road 90%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 40%	Tunnel 30%	Tunnel 20%	Tunnel 10%	Tunnel 10%	Tunnel 10%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	0.20	3.10	3.10	3.68	4.48
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 10%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 50%	Wall 50%	Wall 60%	Wall 60%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 40%	Tunnel 20%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	0.20	3.10	5.88	5.80	5.77	5.30	4.83
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 50%	Sky 85%	Sky 100%	Sky 90%	Sky 80%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 50%	Portal Façade 50%	Portal Façade 15%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 10%	Misc Str 20%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.20	3.10	5.98	5.77	5.77	5.77	5.77	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 10%	Sky 100%	Sky 100%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 50%	Portal Façade 90%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	NC:01
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	3.10	5.98	5.77	5.77	5.77	5.77	**NC**	32.54 kcd/ M2
2	0.20	0.20	0.20	3.10	5.11	5.46	5.61	5.38	5.77	31.02 kcd/ M2
3	0.20	0.20	0.20	0.20	0.20	4.84	6.00	5.51	5.30	22.65 kcd/ M2
4	0.20	0.20	0.20	0.64	1.30	4.20	3.84	3.84	3.89	18.31 kcd/ M2
5	0.20	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	19.40 kcd/ M2
6	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	19.20 kcd/ M2
7	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	19.20 kcd/ M2
8	0.20	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	19.40 kcd/ M2
9	0.20	0.20	1.30	1.52	1.74	1.96	2.18	2.18	2.18	13.46 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	3.10	3.10	3.68	4.48	15.36 kcd/ M2
11	0.20	0.20	0.20	3.10	5.88	5.80	5.77	5.30	4.83	31.28 kcd/ M2
12	0.20	0.20	3.10	5.98	5.77	5.77	5.77	5.77	**NC**	32.54 kcd/ M2
									Lij=	274.37 kcd/ M2
										x 5.131E-04
									Lseq=	140.78 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	43 cd/ M2	63 cd/ M2	92 cd/ M2	135 cd/ M2	177 cd/ M2	199 cd/ M2	292 cd/ M2	428 cd/ M2	629 cd/ M2	923 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

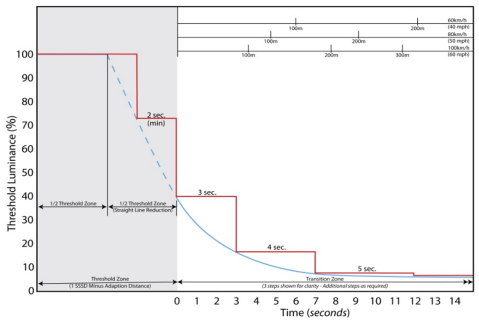
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

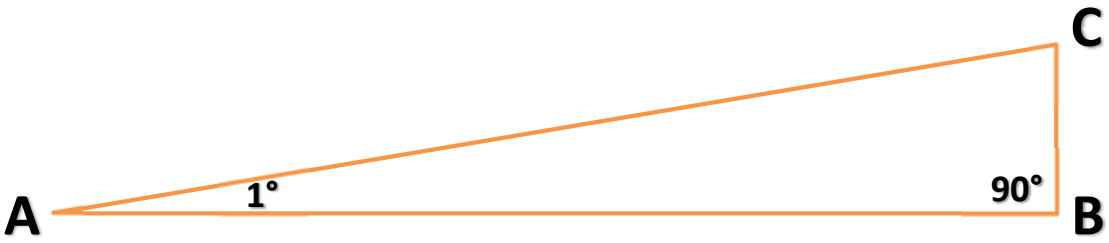
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



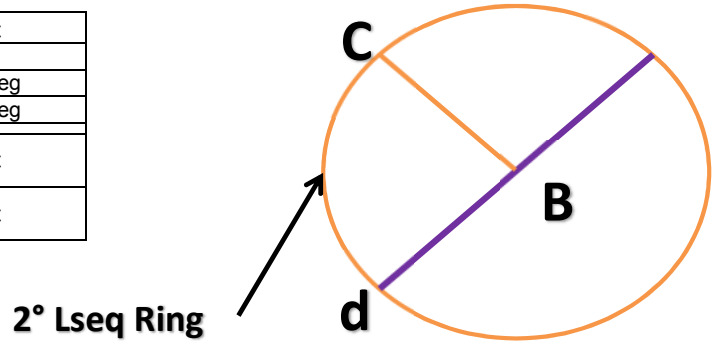
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	177 cd/ M2	322.52	98.30
Lth2	125 cd/ M2	107.51	32.77
Ltr1	72 cd/ M2	242.00	73.76
Ltr2	19 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1695.30	516.73
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	430.03
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

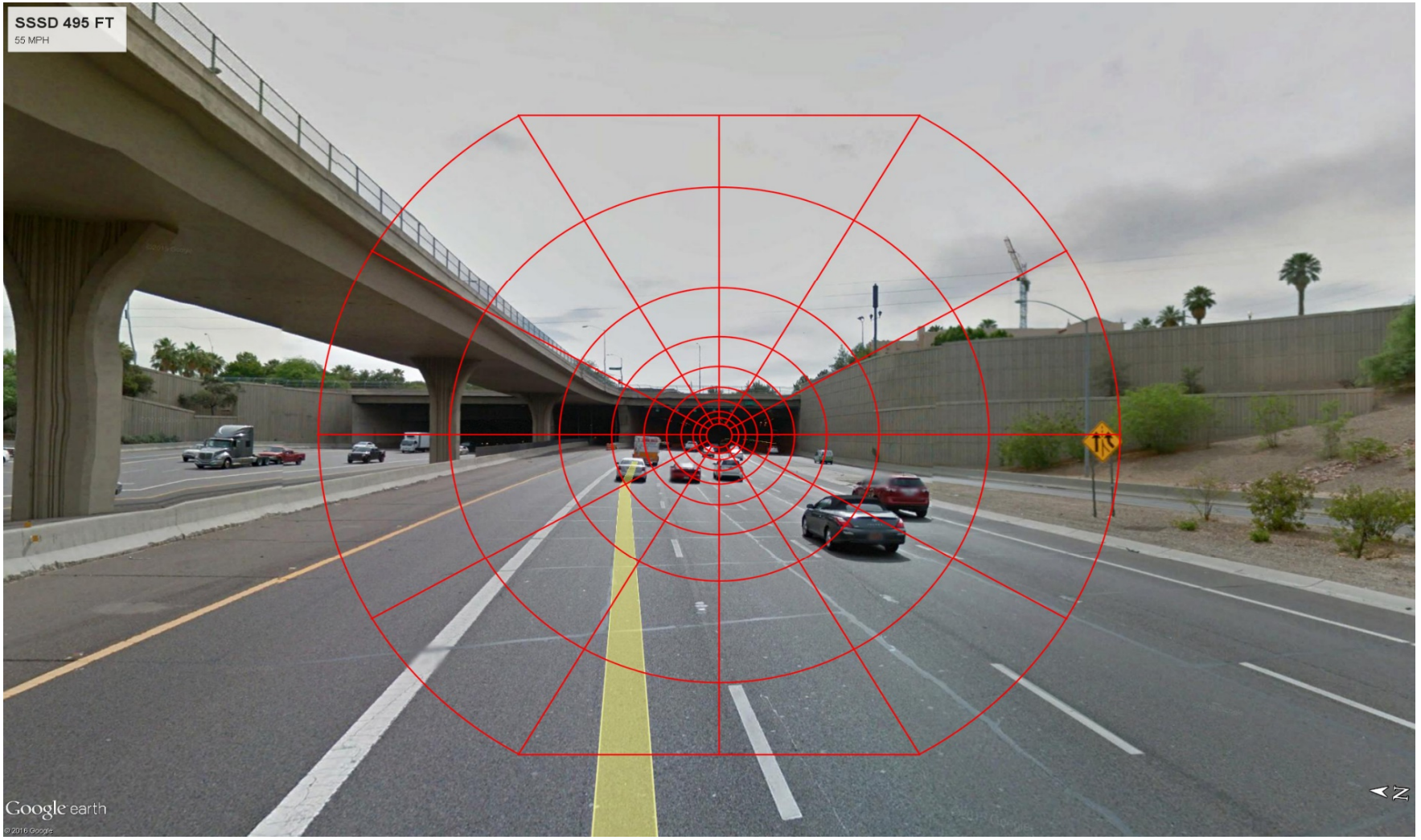
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (495FT SSSD): SUMMER PM



ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.503	2.683	0.8795	5.515	0.751	1.0975	0.2	5.634	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1		0.20		0.75		1.71		6.50		6.50		6.50		6.50		3.13		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	40%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	60%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	50%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2		0.20		0.26		0.48		2.09		5.54		6.12		6.23		5.94		2.29
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	75%	Sky	90%	Sky	95%	Sky	90%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	10%	Wall Dark	75%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	10%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	90%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	40%	Trees	25%	Trees	10%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3		0.20		0.20		0.20		0.26		4.51		5.52		5.07		4.99		4.76
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	80%	Wall Light	100%	Wall Light	90%	Wall Light	60%	Wall Light	25%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4		0.20		0.20		0.32		1.19		4.10		4.69		3.68		3.42		3.27
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	5%	Road	40%	Road	50%	Road	30%	Road	40%	Road	50%	Road	60%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	50%	Wall Light	50%	Wall Light	25%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	60%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	20%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5		1.44		2.68		2.68		2.68		2.68		2.68		2.68		2.68		2.68
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6		2.68		2.68		2.68		2.68		2.68		2.68		2.68		2.68		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9	
7	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%		
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%		
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%		
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		
8	1.44	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
9	0.20	0.20	1.44	2.06	2.19	2.72	3.11	3.25	3.39	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 0%	Road 0%	Road 50%	Road 75%	Road 80%	Road 80%	Road 85%	Road 80%	Road 75%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 10%	Wall Light 15%	Wall Light 20%	Wall Light 25%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 25%	Tunnel 20%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
10	0.20	0.20	0.20	0.26	1.44	1.70	2.14	3.33	3.01	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 5%	Sky 10%	Sky 15%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 50%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 25%	Wall Dark 25%	Wall Dark 40%	Wall Dark 45%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 25%	Wall Light 25%	Wall Light 35%	Wall Light 20%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 10%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 90%	Tunnel 50%	Tunnel 50%	Tunnel 40%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 5%	Trees 15%	Trees 20%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
11	0.20	0.31	0.64	1.03	3.80	6.50	6.50	5.94	1.44	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 50%	Sky 100%	Sky 100%	Sky 90%	Sky 10%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 10%	Wall Dark 90%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 20%	Portal Façade 80%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 50%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
12	0.20	0.75	3.71	5.96	6.50	6.50	6.50	2.00	0.00	NC:01
	Sky 0%	Sky 0%	Sky 50%	Sky 90%	Sky 100%	Sky 100%	Sky 100%	Sky 20%		
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%		
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 80%		
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%		
	Portal Façade 0%	Portal Façade 100%	Portal Façade 25%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): FALL
ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.75	1.71	6.50	6.50	6.50	6.50	3.13	**NC**	31.80 kcd/ M2
2	0.20	0.26	0.48	2.09	5.54	6.12	6.23	5.94	2.29	29.14 kcd/ M2
3	0.20	0.20	0.20	0.26	4.51	5.52	5.07	4.99	4.76	25.69 kcd/ M2
4	0.20	0.20	0.32	1.19	4.10	4.69	3.68	3.42	3.27	21.07 kcd/ M2
5	1.44	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	22.91 kcd/ M2
6	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.46 kcd/ M2
7	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	**NC**	21.46 kcd/ M2
8	1.44	2.68	2.68	2.68	2.68	2.68	2.68	2.68	2.68	22.91 kcd/ M2
9	0.20	0.20	1.44	2.06	2.19	2.72	3.11	3.25	3.39	18.56 kcd/ M2
10	0.20	0.20	0.20	0.26	1.44	1.70	2.14	3.33	3.01	12.47 kcd/ M2
11	0.20	0.31	0.64	1.03	3.80	6.50	6.50	5.94	1.44	26.37 kcd/ M2
12	0.20	0.75	3.71	5.96	6.50	6.50	6.50	2.00	**NC**	32.14 kcd/ M2
									Lij=	285.98 kcd/ M2
										x 5.131E-04
									Lseq=	146.74 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	45 cd/ M2	66 cd/ M2	96 cd/ M2	141 cd/ M2	185 cd/ M2	207 cd/ M2	304 cd/ M2	447 cd/ M2	655 cd/ M2	962 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

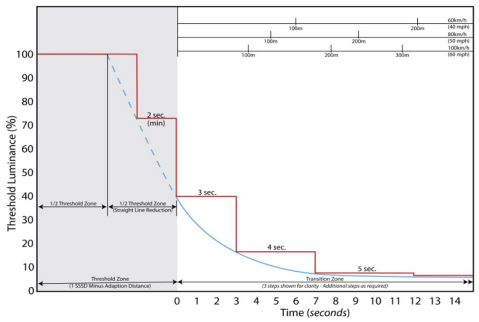
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

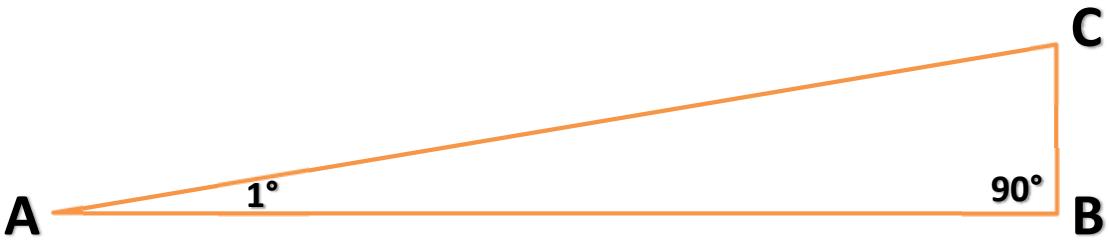
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



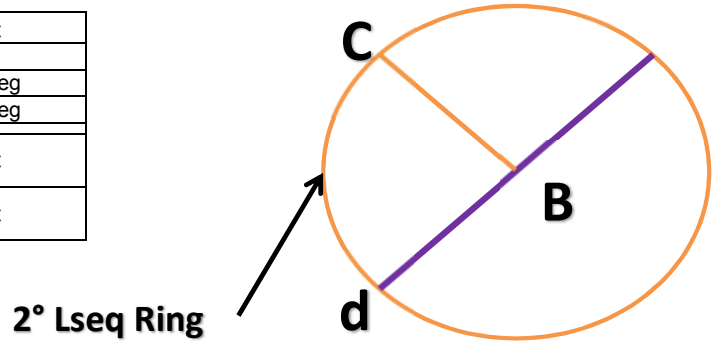
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	185 cd/ M2	435.02	132.59
Lth2	130 cd/ M2	145.01	44.20
Ltr1	75 cd/ M2	286.00	87.17
Ltr2	20 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1442.64	439.72
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	580.03
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

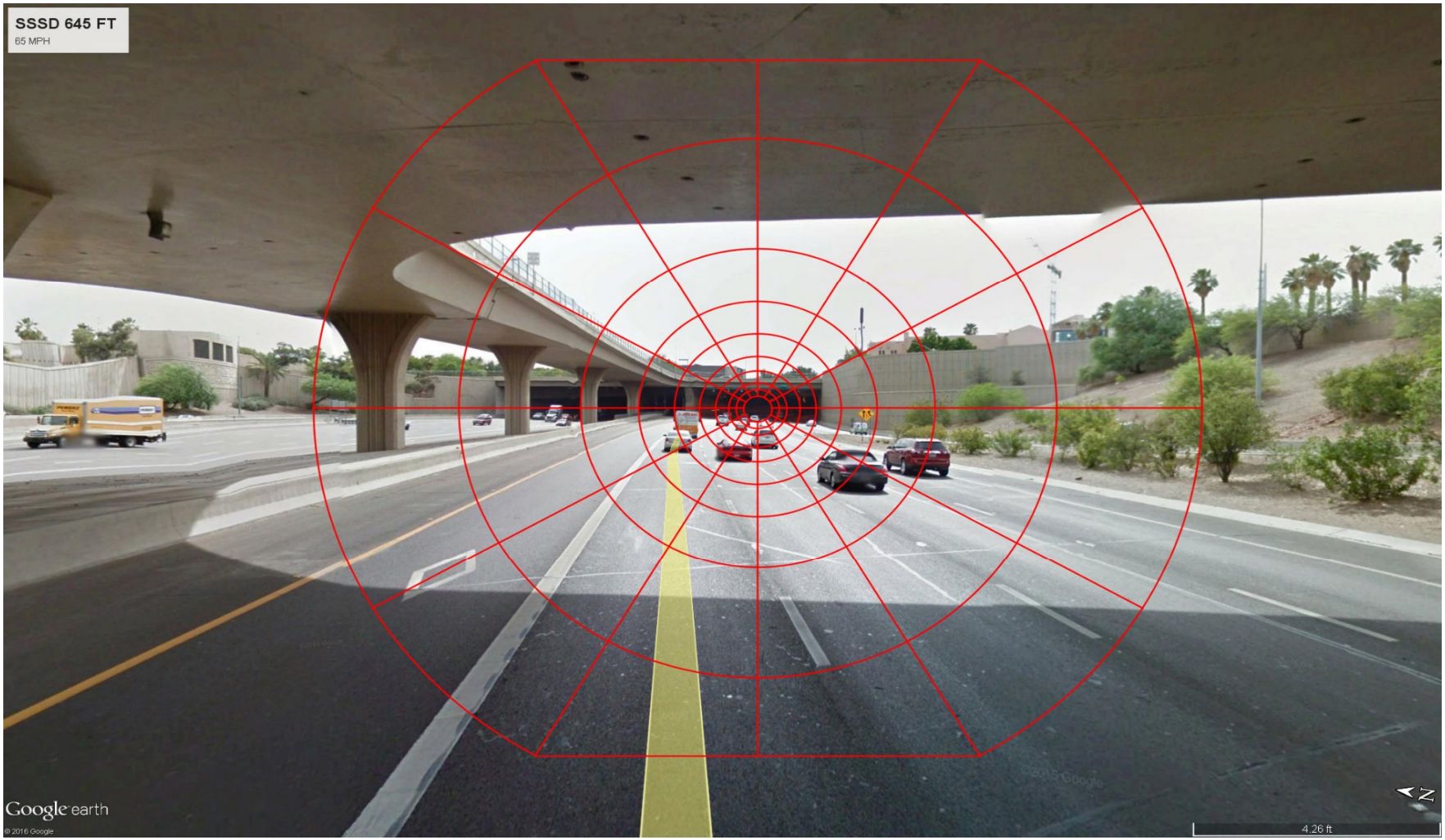
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): FALL



ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
7.866666667	4.85	0.9	0.9	0.9	1.0975	0.2	5.2	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.90		1.78		7.87		7.87		7.87		7.87		3.69		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	40%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	60%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	50%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.27		0.55		2.30		6.57		7.35		7.53		7.17		2.64	
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	75%	Sky	90%	Sky	95%	Sky	90%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	10%	Wall	75%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	10%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	90%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	40%	Trees	25%	Trees	10%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.27		0.83		0.90		0.92		2.49		4.15	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	80%	Wall	100%	Wall	90%	Wall	60%	Wall	25%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.43		2.06		2.88		2.95		3.35		4.39		4.48	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	5%	Road	40%	Road	50%	Road	30%	Road	40%	Road	50%	Road	60%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	50%	Wall	50%	Wall	25%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	60%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	20%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	2.53		4.85		4.85		4.85		4.85		4.85		4.85		4.85		4.85	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	4.85		4.85		4.85		4.85		4.85		4.85		4.85		4.85		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	NC:01
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	2.53	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	2.53	3.69	3.92	3.99	4.26	4.06	3.86
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 75%	Road 80%	Road 80%	Road 85%	Road 80%	Road 75%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 15%	Wall 20%	Wall 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 25%	Tunnel 20%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.27	2.53	0.55	1.06	1.86	2.30
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 5%	Sky 10%	Sky 15%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 50%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	Wall 40%	Wall 45%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	Wall 35%	Wall 20%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 10%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 90%	Tunnel 50%	Tunnel 50%	Tunnel 40%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 5%	Trees 15%	Trees 20%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.34	0.76	1.06	4.48	7.87	7.87	7.17	1.60
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 50%	Sky 100%	Sky 100%	Sky 90%	Sky 10%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 90%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 20%	Portal Façade 80%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 50%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.90	4.43	7.19	7.87	7.87	7.87	2.29	0.00
	Sky 0%	Sky 0%	Sky 50%	Sky 90%	Sky 100%	Sky 100%	Sky 100%	Sky 20%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 80%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 100%	Portal Façade 25%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	NC:01
	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.90	1.78	7.87	7.87	7.87	7.87	3.69	**NC**	38.04 kcd/ M2
2	0.20	0.27	0.55	2.30	6.57	7.35	7.53	7.17	2.64	34.58 kcd/ M2
3	0.20	0.20	0.20	0.27	0.83	0.90	0.92	2.49	4.15	10.16 kcd/ M2
4	0.20	0.20	0.43	2.06	2.88	2.95	3.35	4.39	4.48	20.94 kcd/ M2
5	2.53	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	41.33 kcd/ M2
6	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.80 kcd/ M2
7	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	**NC**	38.80 kcd/ M2
8	2.53	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	41.33 kcd/ M2
9	0.20	0.20	2.53	3.69	3.92	3.99	4.26	4.06	3.86	26.70 kcd/ M2
10	0.20	0.20	0.20	0.27	2.53	0.55	1.06	1.86	2.30	9.16 kcd/ M2
11	0.20	0.34	0.76	1.06	4.48	7.87	7.87	7.17	1.60	31.34 kcd/ M2
12	0.20	0.90	4.43	7.19	7.87	7.87	7.87	2.29	**NC**	38.62 kcd/ M2
									Lij=	369.78 kcd/ M2
										x 5.131E-04
									Lseq=	189.73 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	58 cd/ M2	85 cd/ M2	124 cd/ M2	183 cd/ M2	239 cd/ M2	268 cd/ M2	393 cd/ M2	577 cd/ M2	848 cd/ M2	1,244 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

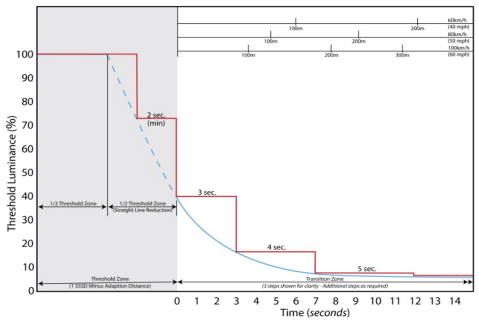
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

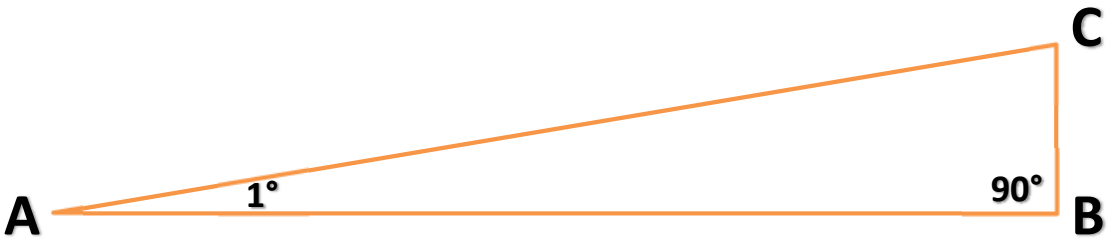
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



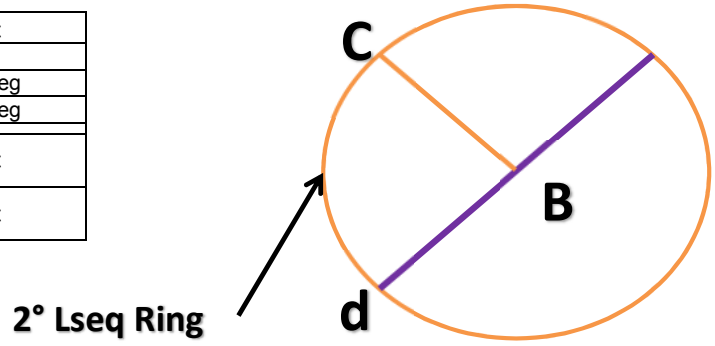
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	239 cd/ M2	435.02	132.59
Lth2	168 cd/ M2	145.01	44.20
Ltr1	97 cd/ M2	286.00	87.17
Ltr2	26 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1442.64	439.72
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	580.03
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

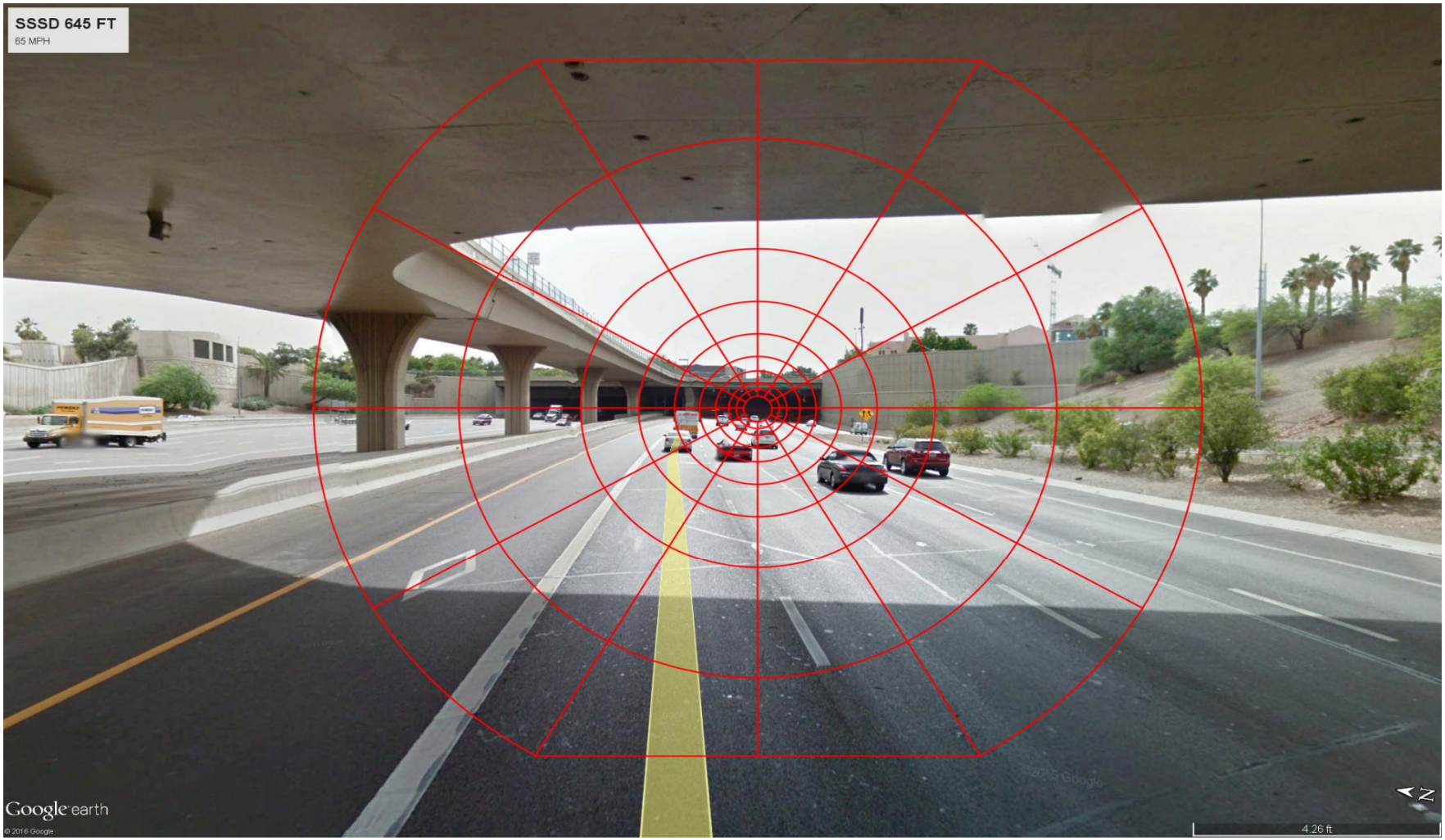
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
5.766666667	2.4	6	6	6	1.0975	0.2	6	2.665

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		6.00		4.33		5.77		5.77		5.77		5.77		5.91		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	40%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	60%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	50%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.78		3.10		4.64		4.99		5.46		5.53		5.79		5.94	
	Sky	0%	Sky	0%	Sky	0%	Sky	10%	Sky	75%	Sky	90%	Sky	95%	Sky	90%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	10%	Wall	75%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	10%	Portal Façade	50%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	5%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	90%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	40%	Trees	25%	Trees	10%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.78		5.42		6.00		5.51		5.13		4.58	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	80%	Wall	100%	Wall	90%	Wall	60%	Wall	25%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	10%	Misc Str	10%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.31		1.08		4.20		4.92		3.73		3.37		3.17	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	5%	Road	40%	Road	50%	Road	30%	Road	40%	Road	50%	Road	60%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	50%	Wall	50%	Wall	25%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	60%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	20%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	1.30		2.40		2.40		2.40		2.40		2.40		2.40		2.40		2.40	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.40		2.40		2.40		2.40		2.40		2.40		2.40		2.40		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	1.30	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.30	1.85	1.96	2.54	2.94	3.12	3.30
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 75%	Road 80%	Road 80%	Road 85%	Road 80%	Road 75%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 15%	Wall 20%	Wall 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 25%	Tunnel 20%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.78	1.30	3.10	3.50	5.48	5.30
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 5%	Sky 10%	Sky 15%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 50%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	Wall 40%	Wall 45%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	Wall 35%	Wall 20%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 10%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 90%	Tunnel 50%	Tunnel 50%	Tunnel 40%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 5%	Trees 15%	Trees 20%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	1.36	4.84	2.08	3.43	5.77	5.77	5.79	5.98
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 50%	Sky 100%	Sky 100%	Sky 90%	Sky 10%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 10%	Wall 90%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 20%	Portal Façade 80%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 50%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	6.00	4.66	5.30	5.77	5.77	5.77	5.95	0.00
	Sky 0%	Sky 0%	Sky 50%	Sky 90%	Sky 100%	Sky 100%	Sky 100%	Sky 20%	NC:01
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 80%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 100%	Portal Façade 25%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	31.00	FT	9.4488	M Estimated
Tunnel Length	2690.00	FT	819.912	M Estimated
Adaptation Distance	64.97	FT	19.80317	M

ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	6.00	4.33	5.77	5.77	5.77	5.77	5.91	**NC**	39.51 kcd/ M2
2	0.20	0.78	3.10	4.64	4.99	5.46	5.53	5.79	5.94	36.44 kcd/ M2
3	0.20	0.20	0.20	0.78	5.42	6.00	5.51	5.13	4.58	28.02 kcd/ M2
4	0.20	0.20	0.31	1.08	4.20	4.92	3.73	3.37	3.17	21.18 kcd/ M2
5	1.30	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	20.50 kcd/ M2
6	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	19.20 kcd/ M2
7	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	**NC**	19.20 kcd/ M2
8	1.30	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	20.50 kcd/ M2
9	0.20	0.20	1.30	1.85	1.96	2.54	2.94	3.12	3.30	17.41 kcd/ M2
10	0.20	0.20	0.20	0.78	1.30	3.10	3.50	5.48	5.30	20.06 kcd/ M2
11	0.20	1.36	4.84	2.08	3.43	5.77	5.77	5.79	5.98	35.21 kcd/ M2
12	0.20	6.00	4.66	5.30	5.77	5.77	5.77	5.95	**NC**	39.41 kcd/ M2
									Lij=	316.63 kcd/ M2
										x 5.131E-04
									Lseq=	162.46 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	49 cd/ M2	73 cd/ M2	107 cd/ M2	156 cd/ M2	205 cd/ M2	229 cd/ M2	337 cd/ M2	494 cd/ M2	726 cd/ M2	1,065 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

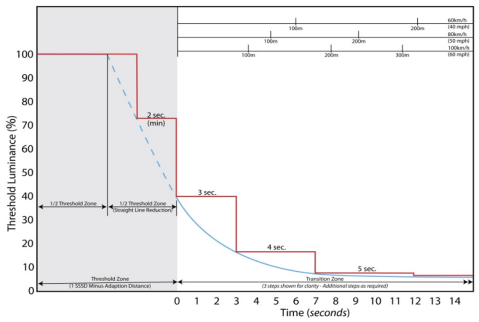
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

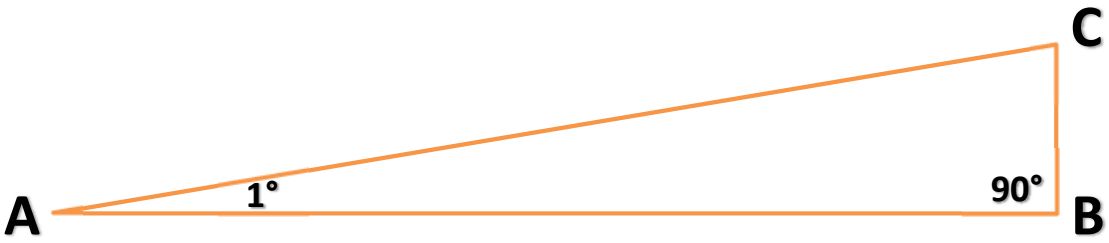
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



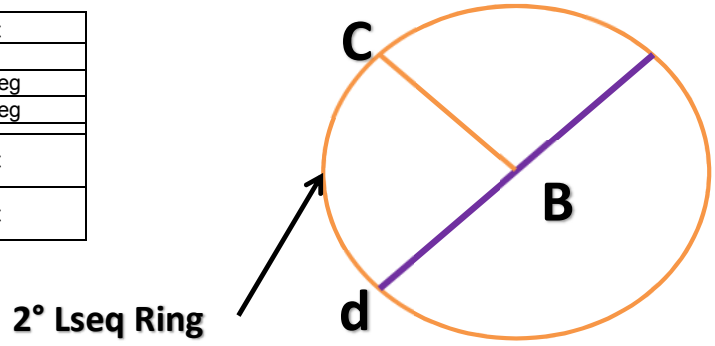
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	205 cd/ M2	435.02	132.59
Lth2	144 cd/ M2	145.01	44.20
Ltr1	83 cd/ M2	286.00	87.17
Ltr2	22 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1442.64	439.72
Int-Night	2.50 cd/ M2	2690.00	819.91

Tunnel (FT)	2690.00
Threshold (FT)	580.03
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

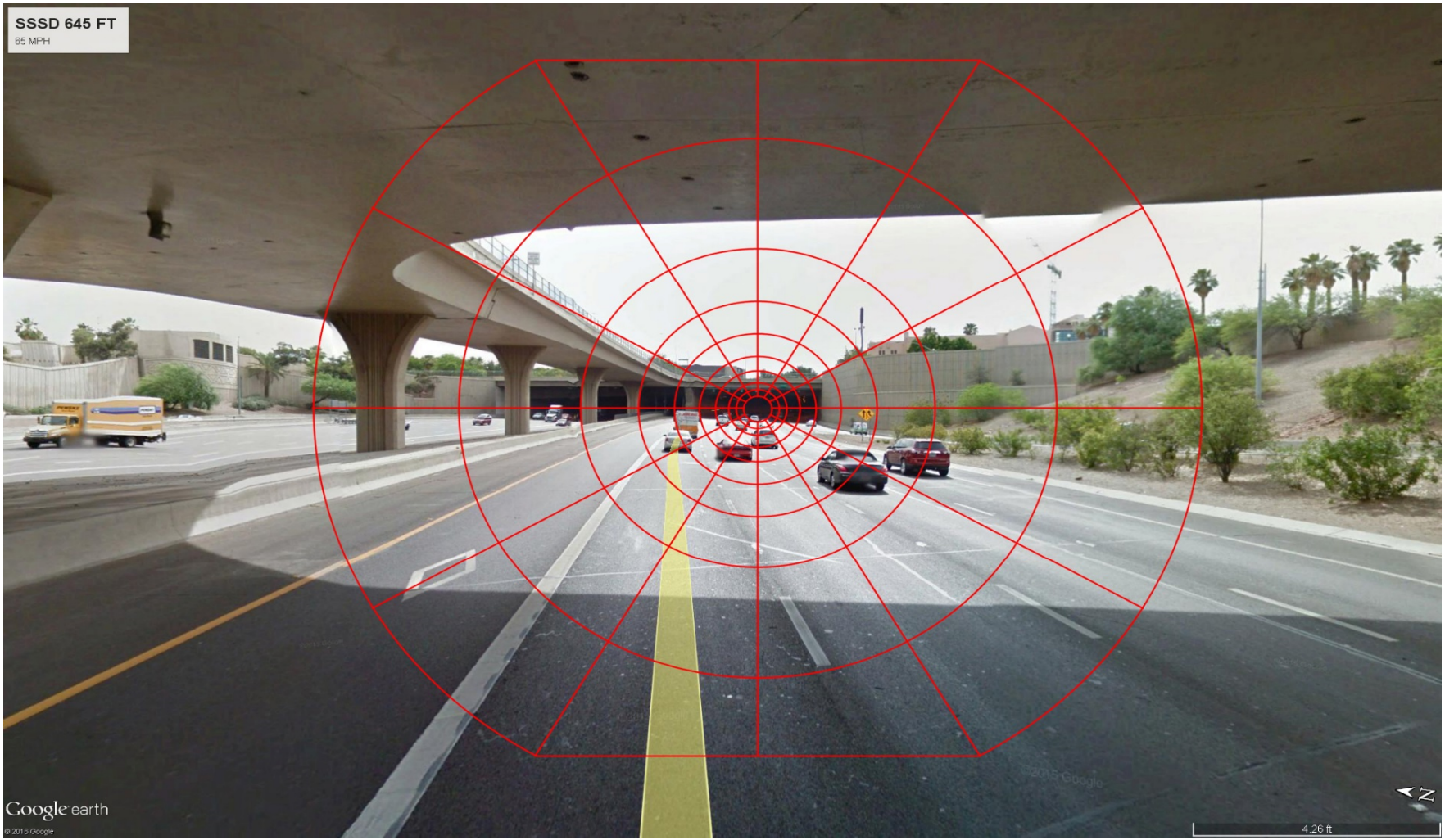
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: EASTBOUND (645FT SSSD): SUMMER PM



ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.437	3.0425	0.289	0.794	0.794	1.1	0.2	4.265	0.725

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.50		0.79		1.92		6.44		6.44		6.44		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.23		0.68		0.79		3.62		6.44		6.44		6.44	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	50%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	80%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.23		0.32		0.59		1.12		2.19	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	5%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	25%	Wall Light	55%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	20%	Portal Façade	0%	Portal Façade	30%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	80%	Tunnel	80%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	20%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.77		2.19		2.62		2.76		2.82		3.65		3.65	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	20%	Road	70%	Road	85%	Road	90%	Road	90%	Road	50%	Road	50%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	30%	Tunnel	15%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	50%	Dirt	50%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	1.62		3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9	
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
8	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	0.77	0.77	1.62	1.91	1.85	1.58	1.64	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 0%	Road 0%	Road 20%	Road 20%	Road 50%	Road 60%	Road 50%	Road 40%	Road 50%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 25%	Wall Dark 25%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 25%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 50%	Tunnel 40%	Tunnel 25%	Tunnel 10%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
10	0.20	0.20	0.20	0.20	0.20	0.35	1.81	2.21	2.21	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 25%	Sky 25%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 25%	Portal Façade 30%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 50%	Misc Str 50%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 75%	Tunnel 30%	Tunnel 25%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
11	0.20	0.20	0.20	0.56	0.73	3.04	5.29	6.44	6.44	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 80%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 60%	Portal Façade 90%	Portal Façade 50%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 40%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
12	0.20	0.20	0.32	0.79	1.92	5.29	6.44	6.44	0.00	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 80%	Sky 100%	Sky 100%	NC:01	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%		
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%		
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 100%	Portal Façade 70%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		

Assumptions				
Posted Speed Limit	45	MPH	72.42	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): FALL

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.50	0.79	1.92	6.44	6.44	6.44	**NC**	22.92 kcd/ M2
2	0.20	0.20	0.23	0.68	0.79	3.62	6.44	6.44	6.44	25.03 kcd/ M2
3	0.20	0.20	0.20	0.20	0.23	0.32	0.59	1.12	2.19	5.25 kcd/ M2
4	0.20	0.20	0.77	2.19	2.62	2.76	2.82	3.65	3.65	18.86 kcd/ M2
5	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.96 kcd/ M2
6	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
8	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.96 kcd/ M2
9	0.20	0.20	0.77	0.77	1.62	1.91	1.85	1.58	1.64	10.54 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.35	1.81	2.21	2.21	7.57 kcd/ M2
11	0.20	0.20	0.20	0.56	0.73	3.04	5.29	6.44	6.44	23.10 kcd/ M2
12	0.20	0.20	0.32	0.79	1.92	5.29	6.44	6.44	**NC**	21.60 kcd/ M2
									Lij=	235.48 kcd/ M2
										x 5.131E-04
									Lseq=	120.82 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	37 cd/ M2	54 cd/ M2	79 cd/ M2	116 cd/ M2	152 cd/ M2	171 cd/ M2	251 cd/ M2	368 cd/ M2	540 cd/ M2	792 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

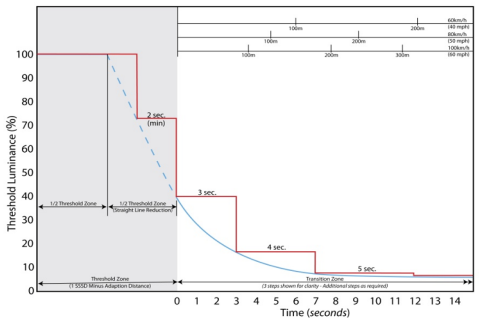
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

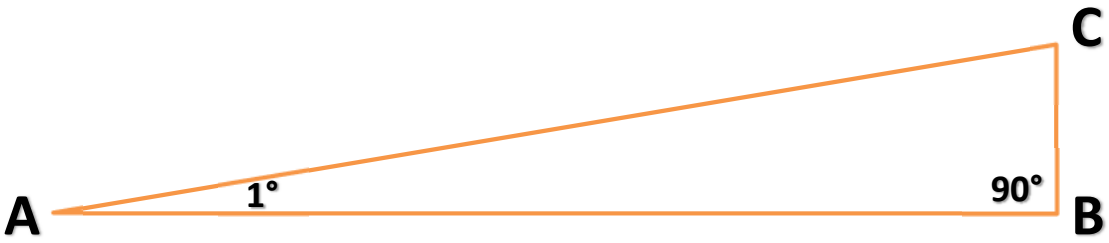
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



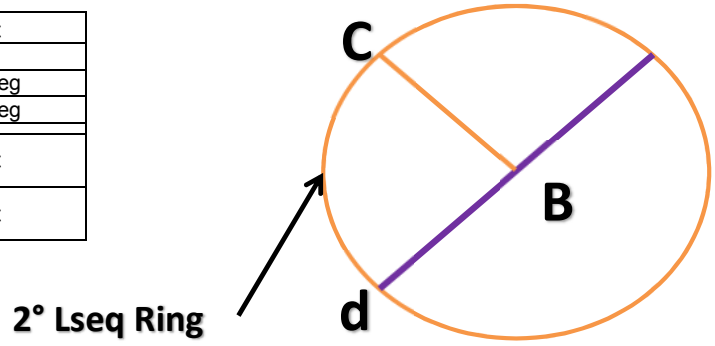
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	152 cd/ M2	234.27	71.40
Lth2	107 cd/ M2	78.09	23.80
Ltr1	62 cd/ M2	198.00	60.35
Ltr2	16 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1963.65	598.52
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	312.35
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

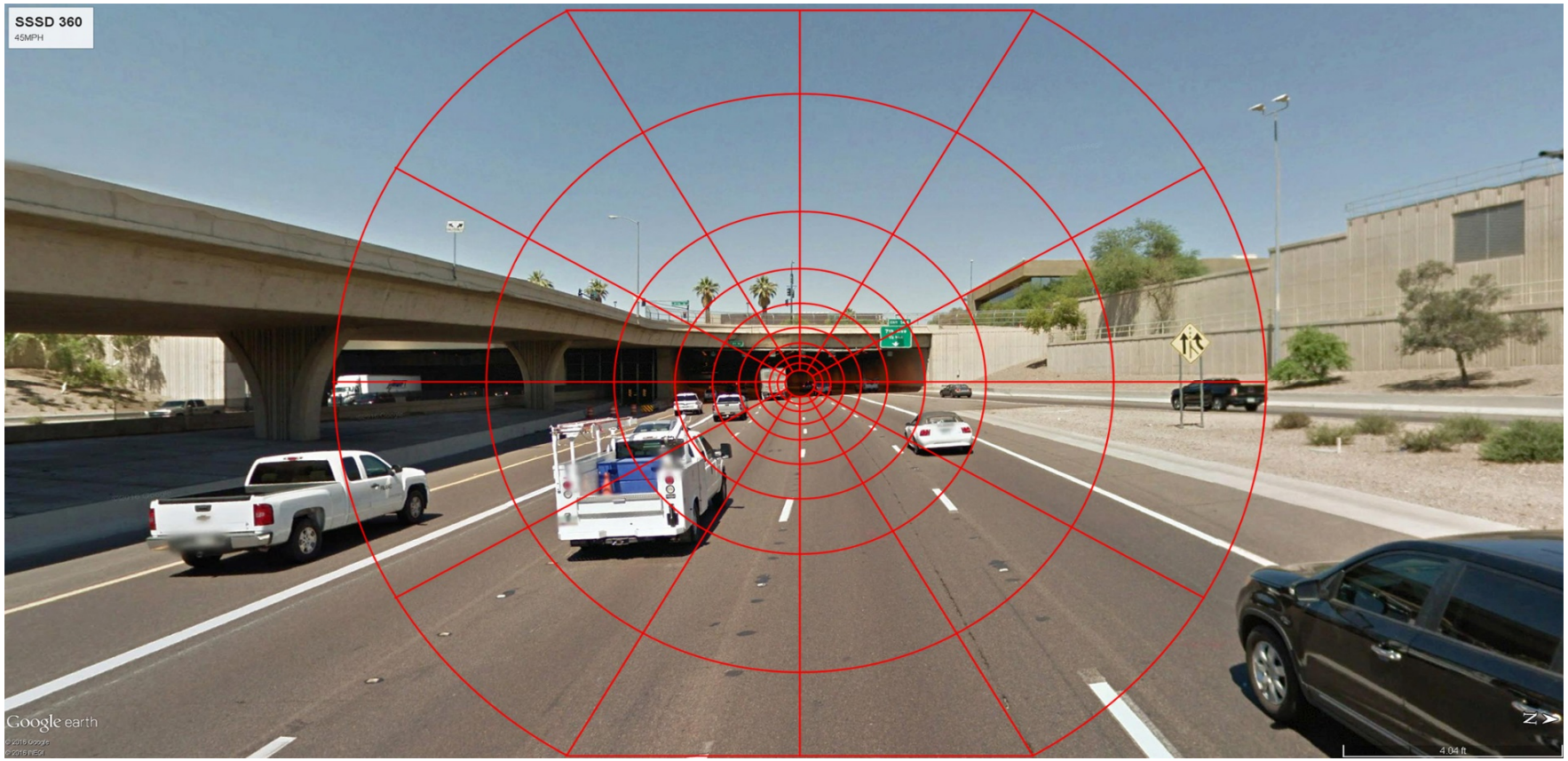
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): FALL



ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.85	2.5	7	7	7	1.9	0.2	7.1	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		3.60		7.00		6.97		6.85		6.85		6.85		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.54		5.64		7.00		6.93		6.85		6.85		6.85	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	50%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	80%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.54		1.56		0.65		4.77		5.76	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	5%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	25%	Wall	55%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	20%	Portal Façade	0%	Portal Façade	30%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	80%	Tunnel	80%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	20%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		0.66		1.81		2.16		2.27		2.95		4.80		4.80	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	20%	Road	70%	Road	85%	Road	90%	Road	90%	Road	50%	Road	50%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	30%	Tunnel	15%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	50%	Dirt	50%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	1.35		2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9	
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%		
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		
8	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
9	0.20	0.20	0.66	0.66	1.35	1.58	1.78	3.25	3.05	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 0%	Road 0%	Road 20%	Road 20%	Road 50%	Road 60%	Road 50%	Road 40%	Road 50%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 25%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 50%	Tunnel 40%	Tunnel 25%	Tunnel 10%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
10	0.20	0.20	0.20	0.20	0.20	1.90	3.91	2.71	2.71	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 25%	Sky 25%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 25%	Portal Façade 30%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 50%	Misc Str 50%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 75%	Tunnel 30%	Tunnel 25%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
11	0.20	0.20	0.20	4.28	6.32	6.34	5.68	6.85	6.85	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 80%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 60%	Portal Façade 90%	Portal Façade 50%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 40%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
12	0.20	0.20	1.56	7.00	6.37	5.68	6.85	6.85	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 80%	Sky 100%	Sky 100%		
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 100%	Portal Façade 70%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		

Assumptions				
Posted Speed Limit	45	MPH	72.42	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	3.60	7.00	6.97	6.85	6.85	6.85	**NC**	38.52 kcd/ M2
2	0.20	0.20	0.54	5.64	7.00	6.93	6.85	6.85	6.85	41.06 kcd/ M2
3	0.20	0.20	0.20	0.20	0.54	1.56	0.65	4.77	5.76	14.09 kcd/ M2
4	0.20	0.20	0.66	1.81	2.16	2.27	2.95	4.80	4.80	19.85 kcd/ M2
5	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	21.35 kcd/ M2
6	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
8	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	21.35 kcd/ M2
9	0.20	0.20	0.66	0.66	1.35	1.58	1.78	3.25	3.05	12.72 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	1.90	3.91	2.71	2.71	12.24 kcd/ M2
11	0.20	0.20	0.20	4.28	6.32	6.34	5.68	6.85	6.85	36.92 kcd/ M2
12	0.20	0.20	1.56	7.00	6.37	5.68	6.85	6.85	**NC**	34.71 kcd/ M2
									Lij=	292.79 kcd/ M2
										x 5.131E-04
									Lseq=	150.23 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	46 cd/ M2	67 cd/ M2	98 cd/ M2	145 cd/ M2	189 cd/ M2	212 cd/ M2	311 cd/ M2	457 cd/ M2	671 cd/ M2	985 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

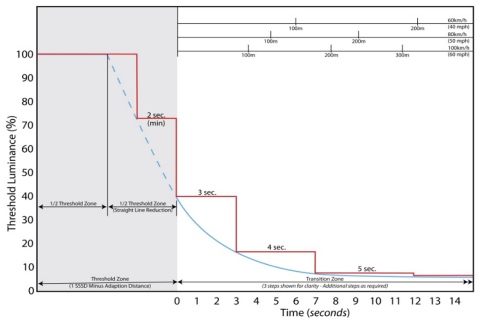
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

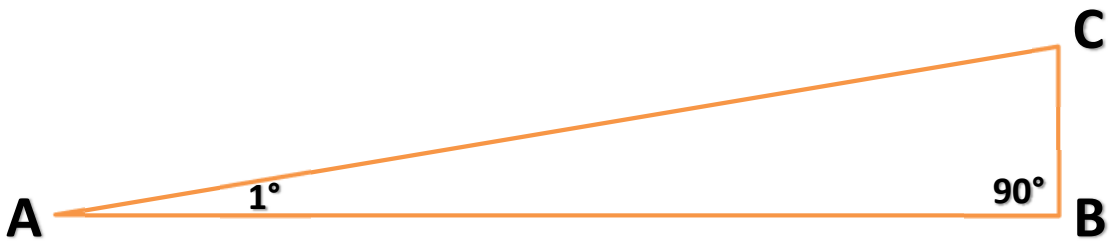
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



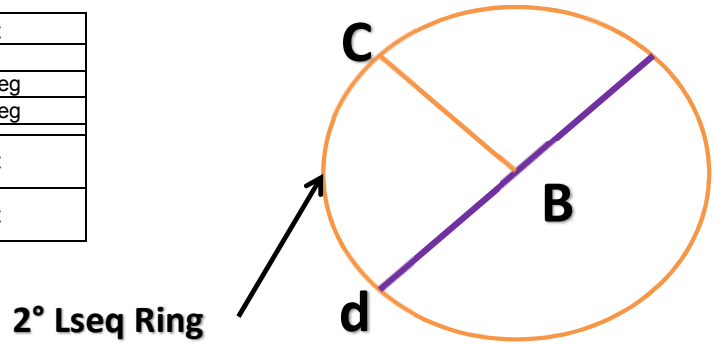
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	189 cd/ M2	234.27	71.40
Lth2	133 cd/ M2	78.09	23.80
Ltr1	77 cd/ M2	198.00	60.35
Ltr2	20 cd/ M2	264.00	80.47
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1963.65	598.52
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	312.35
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

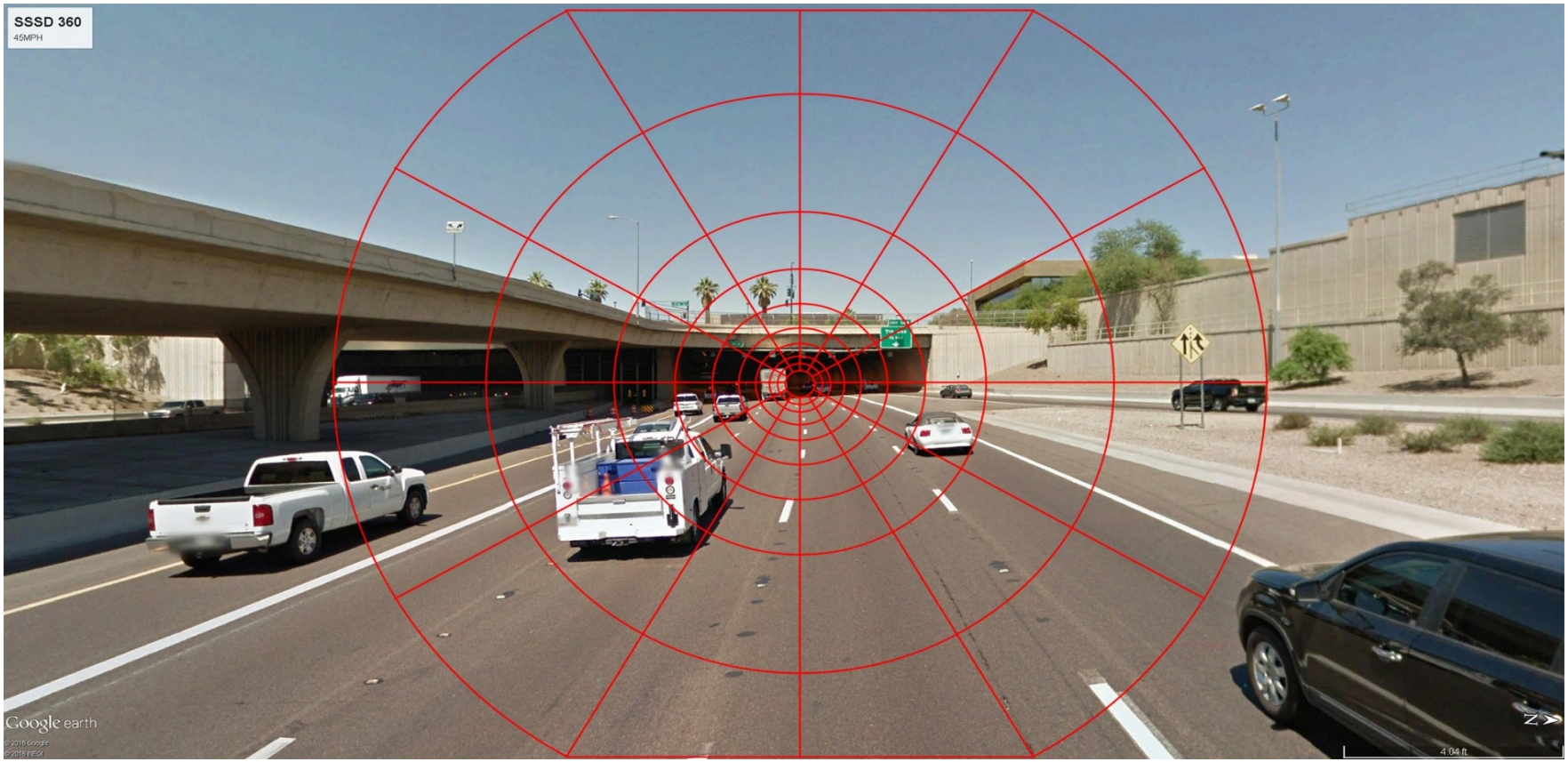
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

=

ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
12.25	11	1	1	1	0.77	0.2	4	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.20		0.60		1.00		3.25		12.25		12.25		12.25		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.24		0.84		1.00		6.63		12.25		12.25		12.25	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	50%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	80%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.24		0.36		0.92		1.52		3.81	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	5%	Sky	25%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	25%	Wall	55%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	5%	Portal Façade	20%	Portal Façade	0%	Portal Façade	30%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	95%	Tunnel	80%	Tunnel	80%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	20%	Trees	20%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		0.20		2.36		7.76		9.38		9.92		10.00		7.50		7.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	20%	Road	70%	Road	85%	Road	90%	Road	90%	Road	50%	Road	50%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	30%	Tunnel	15%	Tunnel	10%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	50%	Dirt	50%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	5.60		11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9	
7	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%		
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		
8	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
9	0.20	0.20	2.36	2.36	5.60	6.68	5.74	4.86	5.80	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 0%	Road 0%	Road 20%	Road 20%	Road 50%	Road 60%	Road 50%	Road 40%	Road 50%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 25%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 50%	Tunnel 40%	Tunnel 25%	Tunnel 10%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
10	0.20	0.20	0.20	0.20	0.20	0.40	2.96	3.50	3.50	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 25%	Sky 25%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 25%	Portal Façade 30%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 50%	Misc Str 50%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 75%	Tunnel 30%	Tunnel 25%	Tunnel 25%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
11	0.20	0.20	0.20	0.68	0.92	5.50	10.00	12.25	12.25	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 80%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 60%	Portal Façade 90%	Portal Façade 50%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 40%	Tunnel 10%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
12	0.20	0.20	0.36	1.00	3.25	10.00	12.25	12.25	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 80%	Sky 100%	Sky 100%		
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 100%	Portal Façade 70%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 20%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		

Assumptions				
Posted Speed Limit	45	MPH	72.42	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	360.00	FT	109.728	M
Tunnel Geometric Orientation	E/W -		- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.20	0.60	1.00	3.25	12.25	12.25	12.25	**NC**	42.00 kcd/ M2
2	0.20	0.20	0.24	0.84	1.00	6.63	12.25	12.25	12.25	45.86 kcd/ M2
3	0.20	0.20	0.20	0.20	0.24	0.36	0.92	1.52	3.81	7.65 kcd/ M2
4	0.20	0.20	2.36	7.76	9.38	9.92	10.00	7.50	7.50	54.82 kcd/ M2
5	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	93.60 kcd/ M2
6	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
7	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
8	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	93.60 kcd/ M2
9	0.20	0.20	2.36	2.36	5.60	6.68	5.74	4.86	5.80	33.81 kcd/ M2
10	0.20	0.20	0.20	0.20	0.20	0.40	2.96	3.50	3.50	11.36 kcd/ M2
11	0.20	0.20	0.20	0.68	0.92	5.50	10.00	12.25	12.25	42.20 kcd/ M2
12	0.20	0.20	0.36	1.00	3.25	10.00	12.25	12.25	**NC**	39.51 kcd/ M2
									Lij=	640.40 kcd/ M2
										x 5.131E-04
									Lseq=	328.59 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	100 cd/ M2	147 cd/ M2	215 cd/ M2	316 cd/ M2	414 cd/ M2	464 cd/ M2	681 cd/ M2	1,000 cd/ M2	1,468 cd/ M2	2,154 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

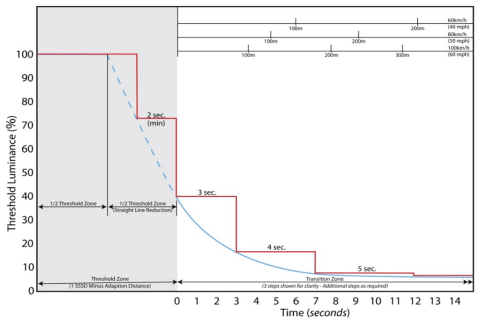
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

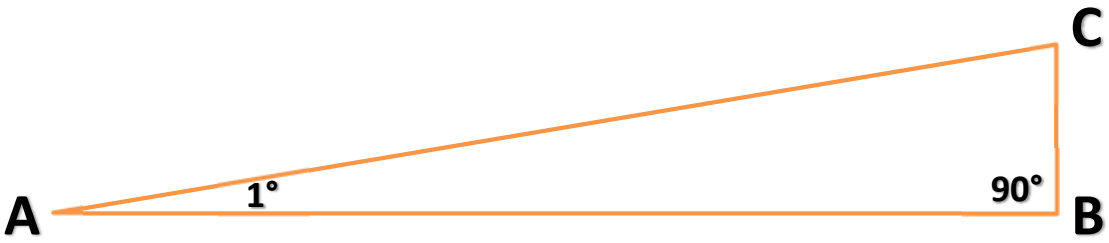
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



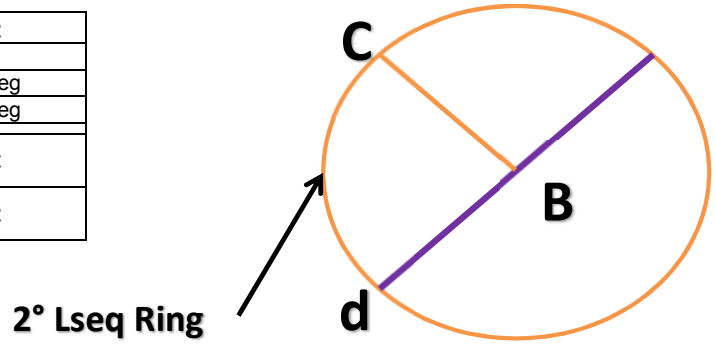
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	414 cd/ M2	234.27	71.40
Lth2	291 cd/ M2	78.09	23.80
Ltr1	168 cd/ M2	198.00	60.35
Ltr2	45 cd/ M2	264.00	80.47
Ltr3	19 cd/ M2	330.00	100.58
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1633.65	497.94
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	312.35
ft/sec	66.00

Lseq 1st Ring Size Calculator



SSSD	AB =	360	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	6.283823374	Ft
1st Ring Diameter (2 Deg)	d =	12.56764675	Ft



Other Info			
	AC =	360.0548381	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

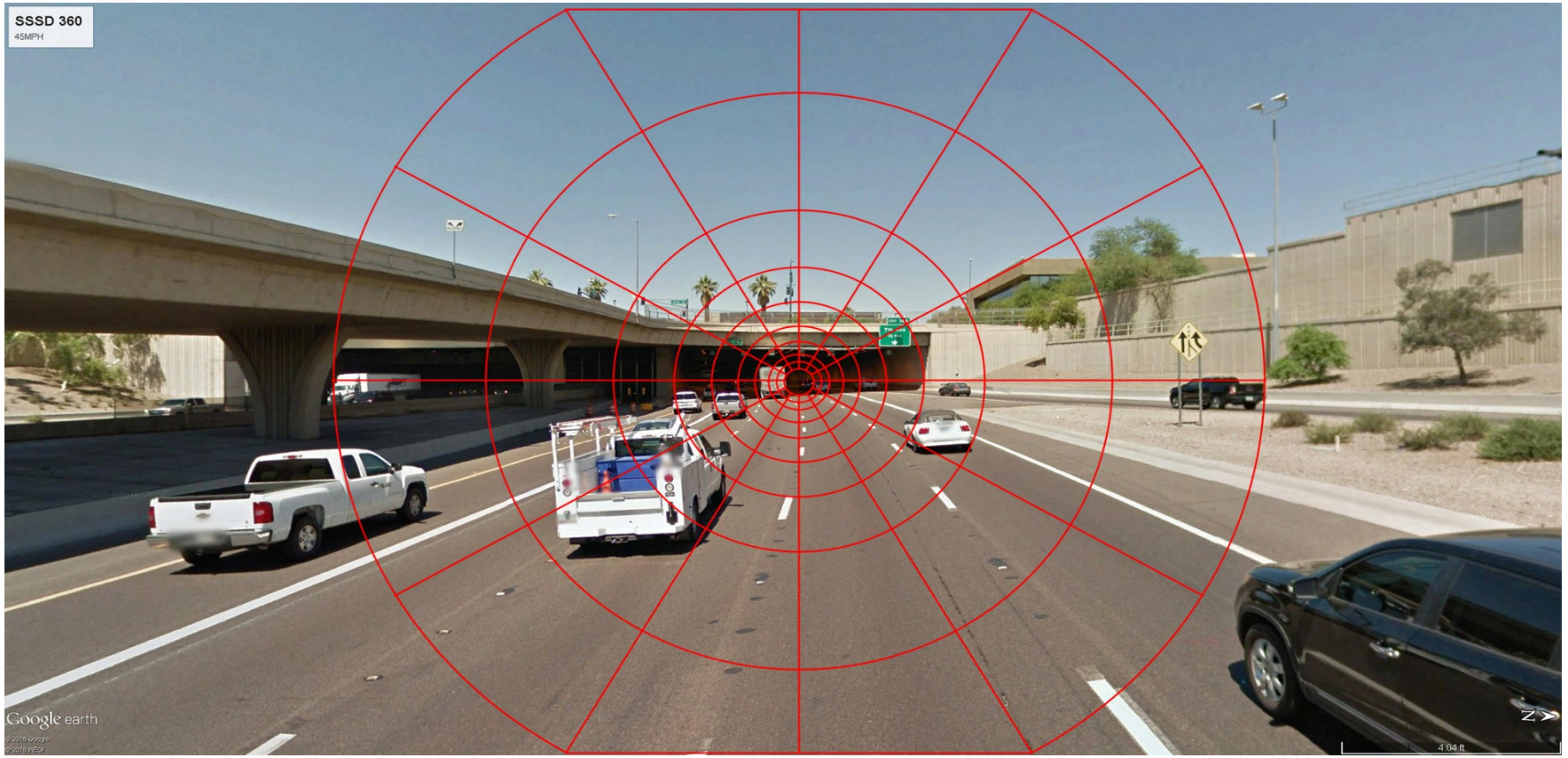
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (360FT SSSD): SUMMER PM



ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.437	3.0425	0.289	0.794	0.794	1.1	0.2	4.265	0.725

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.50		0.79		0.76		3.12		6.44		6.44		6.44		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	40%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	**NC:01**	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	30%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	50%	Trees	30%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.62		0.79		1.01		6.44		6.44		6.44		6.44	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	70%	Portal Façade	100%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	70%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.44		0.62		1.07		1.03		2.95	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	10%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	70%	Wall Dark	30%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	40%	Wall Light	80%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	40%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	20%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	60%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	10%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		1.62		2.19		2.19		2.47		2.94		2.94		3.23		3.06	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	70%	Road	70%	Road	80%	Road	80%	Road	80%	Road	70%	Road	70%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	10%	Wall Light	10%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	30%	Tunnel	30%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.77		3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	20%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	80%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	**NC:01**	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	NC:01
8	0.77	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 20%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 80%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.62	1.62	1.62	1.62	1.19	1.79	1.79
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 50%	Road 50%	Road 50%	Road 30%	Road 50%	Road 50%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 20%	Wall Dark 25%	Wall Dark 25%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 20%	Wall Light 25%	Wall Light 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 50%	Tunnel 50%	Tunnel 30%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	0.32	0.38	0.62	1.96	2.87
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 25%	Sky 40%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 25%	Wall Dark 25%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 40%	Wall Light 25%	Wall Light 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 30%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 70%	Tunnel 40%	Tunnel 20%	Tunnel 10%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 5%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	0.68	0.79	0.98	2.43	5.87	6.44	6.44
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 25%	Sky 90%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 80%	Portal Façade 100%	Portal Façade 40%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 60%	Misc Str 75%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	0.50	0.79	0.85	2.17	5.87	6.44	6.44	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 90%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 50%	Portal Façade 100%	Portal Façade 50%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 80%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 25%	Trees 0%	Trees 10%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	NC:01

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): FALL

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.50	0.79	0.76	3.12	6.44	6.44	6.44	**NC**	24.68 kcd/ M2
2	0.20	0.20	0.62	0.79	1.01	6.44	6.44	6.44	6.44	28.57 kcd/ M2
3	0.20	0.20	0.20	0.20	0.44	0.62	1.07	1.03	2.95	6.90 kcd/ M2
4	0.20	1.62	2.19	2.19	2.47	2.94	2.94	3.23	3.06	20.84 kcd/ M2
5	0.77	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.11 kcd/ M2
6	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
8	0.77	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.11 kcd/ M2
9	0.20	0.20	1.62	1.62	1.62	1.62	1.19	1.79	1.79	11.66 kcd/ M2
10	0.20	0.20	0.20	0.20	0.32	0.38	0.62	1.96	2.87	6.94 kcd/ M2
11	0.20	0.20	0.68	0.79	0.98	2.43	5.87	6.44	6.44	24.02 kcd/ M2
12	0.20	0.50	0.79	0.85	2.17	5.87	6.44	6.44	**NC**	23.25 kcd/ M2
									Lij=	245.76 kcd/ M2
										x 5.131E-04
									Lseq=	126.10 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	38 cd/ M2	56 cd/ M2	83 cd/ M2	121 cd/ M2	159 cd/ M2	178 cd/ M2	261 cd/ M2	384 cd/ M2	563 cd/ M2	827 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

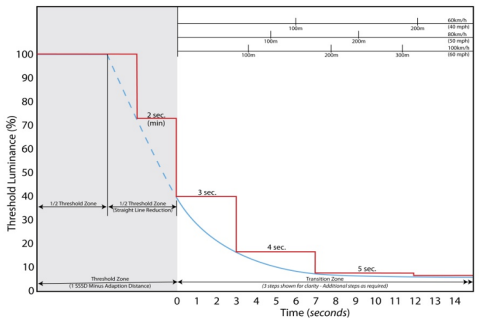
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

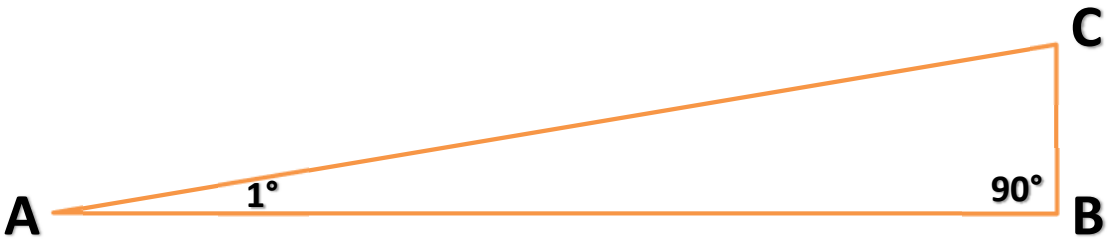
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



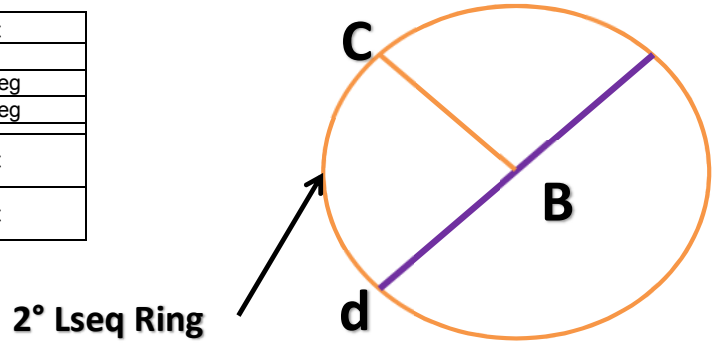
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	159 cd/ M2	335.52	102.27
Lth2	112 cd/ M2	111.84	34.09
Ltr1	65 cd/ M2	242.00	73.76
Ltr2	17 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1725.98	526.08
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	447.35
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

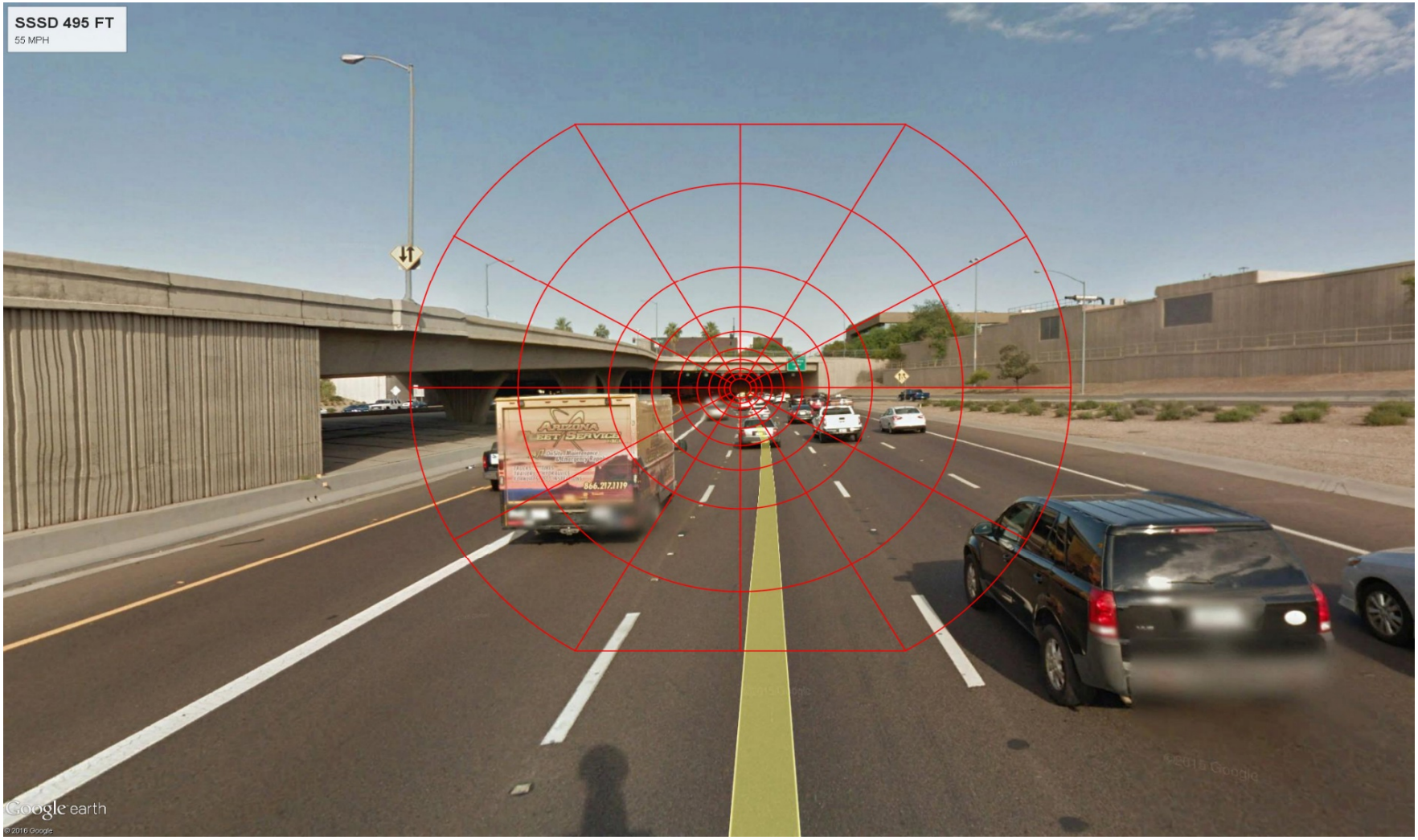
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): FALL



ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.85	2.5	7	7	7	1.9	0.2	7.1	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		3.60		7.00		4.00		3.61		6.85		6.85		6.85			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	40%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		**NC:01**
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	30%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	50%	Trees	30%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		4.96		7.00		3.43		6.85		6.85		6.85		6.85	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	70%	Portal Façade	100%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	70%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		2.92		4.96		6.09		5.88		5.32	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	10%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	70%	Wall	30%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	40%	Wall	80%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	40%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	20%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	60%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	10%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		1.35		1.81		1.81		2.04		3.41		3.41		3.58		3.27	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	70%	Road	70%	Road	80%	Road	80%	Road	80%	Road	70%	Road	70%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	10%	Wall	10%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	30%	Tunnel	30%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	0.66		2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	20%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	80%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		**NC:01**
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	0.66	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 20%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 80%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.35	1.35	1.35	1.35	3.61	4.75	4.75
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 50%	Road 50%	Road 50%	Road 30%	Road 50%	Road 50%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 20%	Wall 25%	Wall 25%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 20%	Wall 25%	Wall 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 50%	Tunnel 50%	Tunnel 30%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.20	1.56	2.24	3.26	5.30	6.26
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 25%	Sky 40%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 25%	Wall 25%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 40%	Wall 25%	Wall 25%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 30%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 70%	Tunnel 40%	Tunnel 20%	Tunnel 10%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 5%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.20	5.64	7.00	3.94	3.14	6.27	6.85	6.85
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 25%	Sky 90%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 80%	Portal Façade 100%	Portal Façade 40%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 60%	Misc Str 75%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.20	3.60	7.00	4.23	2.89	6.27	6.85	6.85	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 20%	Sky 90%	Sky 100%	Sky 100%	NC:01
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	Wall 0%	
	Portal Façade 0%	Portal Façade 50%	Portal Façade 100%	Portal Façade 50%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 25%	Misc Str 80%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 25%	Trees 0%	Trees 10%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	3.60	7.00	4.00	3.61	6.85	6.85	6.85	**NC**	38.96 kcd/ M2
2	0.20	0.20	4.96	7.00	3.43	6.85	6.85	6.85	6.85	43.19 kcd/ M2
3	0.20	0.20	0.20	0.20	2.92	4.96	6.09	5.88	5.32	25.97 kcd/ M2
4	0.20	1.35	1.81	1.81	2.04	3.41	3.41	3.58	3.27	20.88 kcd/ M2
5	0.66	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	20.66 kcd/ M2
6	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
8	0.66	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	20.66 kcd/ M2
9	0.20	0.20	1.35	1.35	1.35	1.35	3.61	4.75	4.75	18.91 kcd/ M2
10	0.20	0.20	0.20	0.20	1.56	2.24	3.26	5.30	6.26	19.42 kcd/ M2
11	0.20	0.20	5.64	7.00	3.94	3.14	6.27	6.85	6.85	40.08 kcd/ M2
12	0.20	3.60	7.00	4.23	2.89	6.27	6.85	6.85	**NC**	37.88 kcd/ M2
									Lij=	326.61 kcd/ M2
										x 5.131E-04
									Lseq=	167.58 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	51 cd/ M2	75 cd/ M2	110 cd/ M2	161 cd/ M2	211 cd/ M2	237 cd/ M2	347 cd/ M2	510 cd/ M2	749 cd/ M2	1,099 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

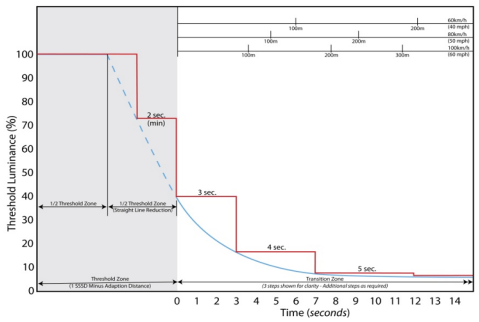
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

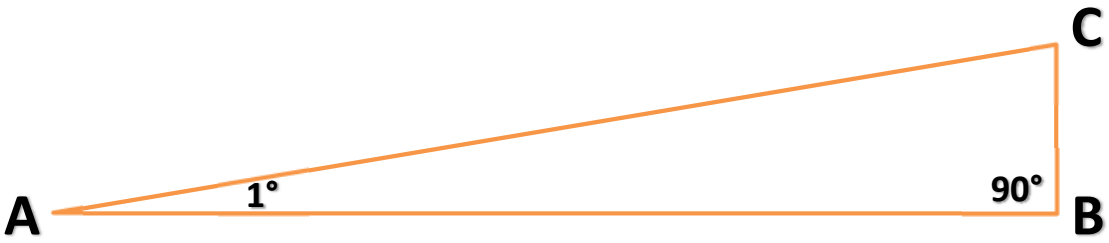
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



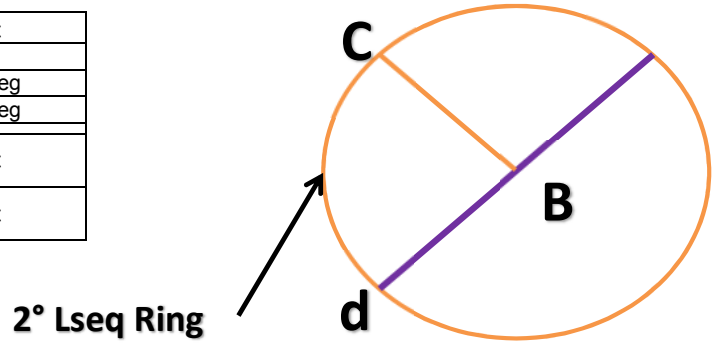
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	211 cd/ M2	335.52	102.27
Lth2	148 cd/ M2	111.84	34.09
Ltr1	86 cd/ M2	242.00	73.76
Ltr2	23 cd/ M2	322.67	98.35
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1725.98	526.08
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	447.35
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

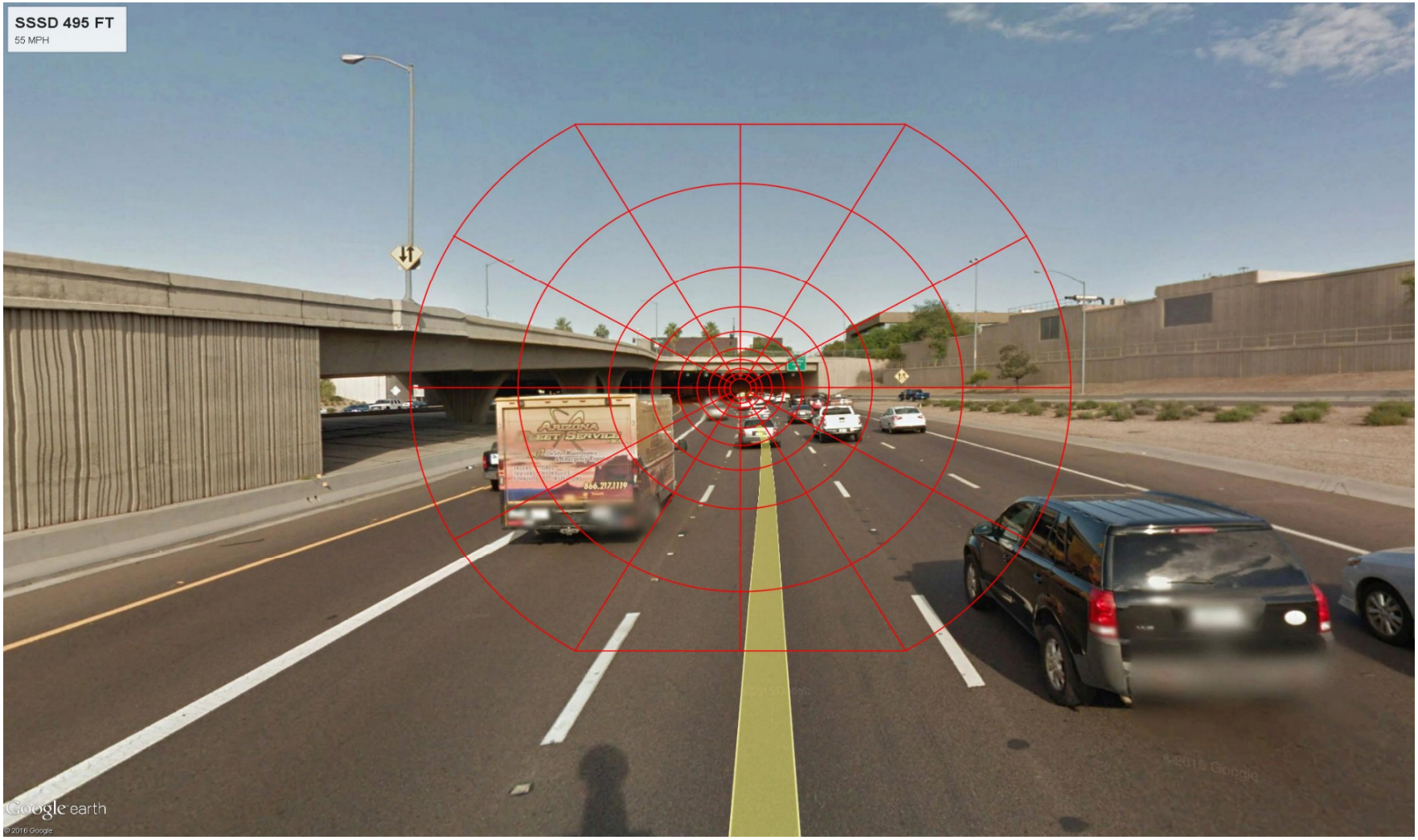
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall	Wall	Portal Façade	Misc Str	Tunnel	Dirt	Trees
12.25	11	1	1	1	0.77	0.2	4	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	0.20		0.60		1.00		1.00		5.43		12.25		12.25		12.25		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	40%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	30%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	50%	Trees	30%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2	0.20		0.20		0.76		1.00		0.84		12.25		12.25		12.25		12.25	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	70%	Portal Façade	100%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	70%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.20		0.20		0.52		0.76		1.56		2.10		5.45	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	5%	Sky	10%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	70%	Wall	30%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	40%	Wall	80%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	40%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	10%	Misc Str	20%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	60%	Tunnel	30%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	15%	Trees	10%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		5.60		7.76		7.76		8.84		9.30		9.30		8.75		8.60	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	70%	Road	70%	Road	80%	Road	80%	Road	80%	Road	70%	Road	70%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	10%	Wall	10%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	30%	Tunnel	30%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	10%	Dirt	25%	Dirt	20%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%	Trees	10%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	2.36		11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	20%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	80%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1		2		3		4		5		6		7		8		9	
7	11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
8	2.36		11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	20%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	80%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
9	0.20		0.20		5.60		5.60		5.60		5.60		3.76		6.00		6.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	0%	Road	50%	Road	50%	Road	50%	Road	50%	Road	30%	Road	50%	Road	50%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	20%	Wall	25%	Wall	25%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	20%	Wall	25%	Wall	25%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	50%	Tunnel	50%	Tunnel	50%	Tunnel	50%	Tunnel	30%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
10	0.20		0.20		0.20		0.20		0.36		0.44		0.63		3.65		5.42	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	40%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	25%	Wall	25%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	40%	Wall	25%	Wall	25%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	20%	Portal Façade	30%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	100%	Tunnel	80%	Tunnel	70%	Tunnel	40%	Tunnel	20%	Tunnel	10%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	5%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
11	0.20		0.20		0.84		1.00		0.86		3.64		11.13		12.25		12.25	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	90%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	80%	Portal Façade	100%	Portal Façade	40%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	60%	Misc Str	75%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	20%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
12	0.20		0.60		1.00		0.94		3.07		11.13		12.25		12.25		0.00	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	20%	Sky	90%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%	Wall	0%		
	Portal Façade	0%	Portal Façade	50%	Portal Façade	100%	Portal Façade	50%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	NC:01	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	25%	Misc Str	80%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	100%	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	0%	Trees	10%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

Assumptions				
Posted Speed Limit	55	MPH	88.51	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	495.00	FT	150.876	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.20	0.60	1.00	1.00	5.43	12.25	12.25	12.25	**NC**	44.98 kcd/ M2
2	0.20	0.20	0.76	1.00	0.84	12.25	12.25	12.25	12.25	52.00 kcd/ M2
3	0.20	0.20	0.20	0.20	0.52	0.76	1.56	2.10	5.45	11.20 kcd/ M2
4	0.20	5.60	7.76	7.76	8.84	9.30	9.30	8.75	8.60	66.11 kcd/ M2
5	2.36	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	90.36 kcd/ M2
6	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
7	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
8	2.36	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	90.36 kcd/ M2
9	0.20	0.20	5.60	5.60	5.60	5.60	3.76	6.00	6.00	38.56 kcd/ M2
10	0.20	0.20	0.20	0.20	0.36	0.44	0.63	3.65	5.42	11.31 kcd/ M2
11	0.20	0.20	0.84	1.00	0.86	3.64	11.13	12.25	12.25	42.37 kcd/ M2
12	0.20	0.60	1.00	0.94	3.07	11.13	12.25	12.25	**NC**	41.43 kcd/ M2
									Lij=	664.68 kcd/ M2
										x 5.131E-04
									Lseq=	341.04 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	104 cd/ M2	152 cd/ M2	224 cd/ M2	328 cd/ M2	429 cd/ M2	482 cd/ M2	707 cd/ M2	1,038 cd/ M2	1,523 cd/ M2	2,236 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

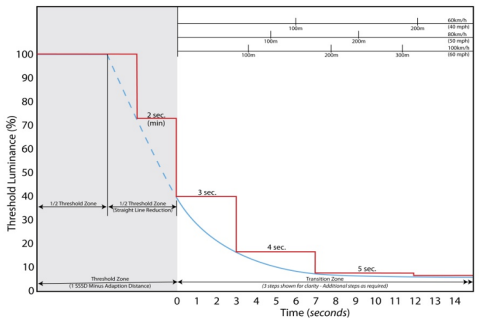
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

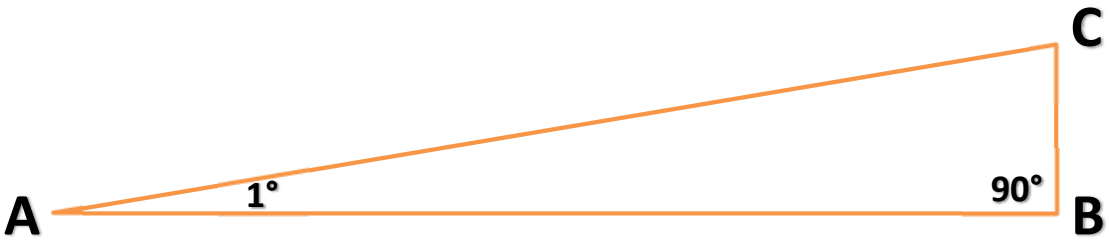
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



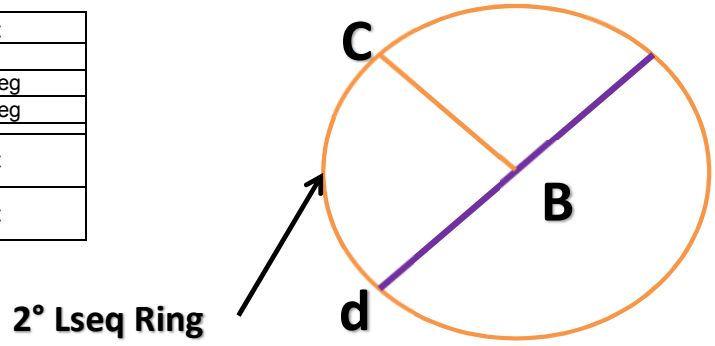
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	429 cd/ M2	335.52	102.27
Lth2	302 cd/ M2	111.84	34.09
Ltr1	175 cd/ M2	242.00	73.76
Ltr2	46 cd/ M2	322.67	98.35
Ltr3	20 cd/ M2	403.33	122.94
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1322.65	403.14
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	447.35
ft/sec	80.67

Lseq 1st Ring Size Calculator



SSSD	AB =	495	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	8.640257139	Ft
1st Ring Diameter (2 Deg)	d =	17.28051428	Ft



Other Info			
	AC =	495.0754024	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

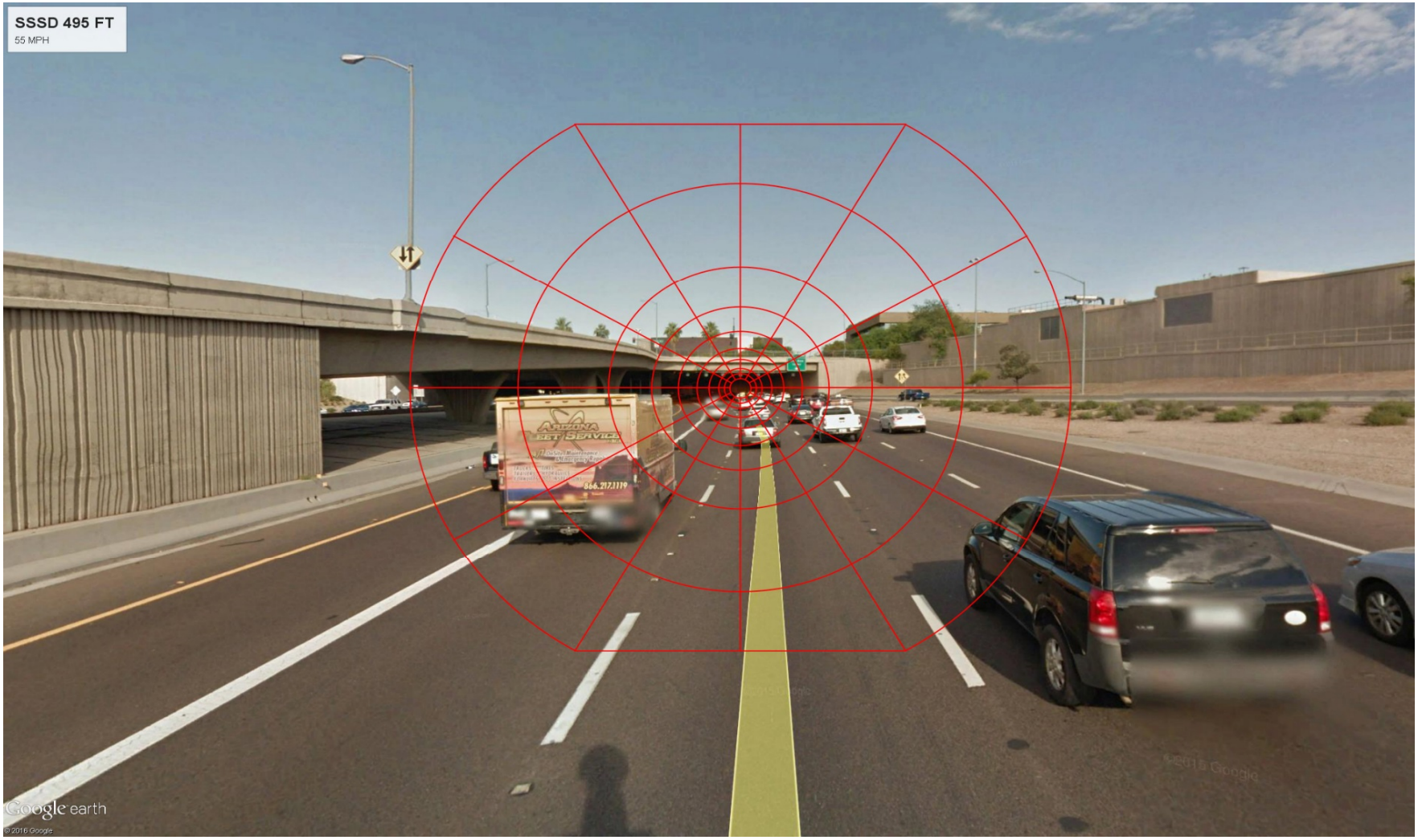
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

=

ADOT I-10 TUNNEL: WESTBOUND (495FT SSSD): SUMMER PM



ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): FALL

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.437	3.0425	0.289	0.794	0.794	0	0.2	4.265	0.725

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1		0.50		0.79		0.16		0.00		6.44		6.44		6.44		6.44		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	50%	Portal Façade	100%	Portal Façade	20%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	80%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
2		0.20		0.79		0.64		0.00		6.44		6.44		6.44		6.44		6.44
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3		0.20		0.20		0.26		0.16		0.65		0.78		0.40		1.94		3.98
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	60%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	75%	Wall Dark	50%	Wall Dark	40%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	75%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	75%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	80%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	25%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4		0.20		1.62		1.91		2.19		1.77		2.48		2.66		2.94		2.77
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	60%	Road	70%	Road	50%	Road	75%	Road	70%	Road	65%	Road	50%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	10%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	25%	Wall Light	25%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	40%	Tunnel	30%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	20%	Dirt	25%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	15%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5		1.62		3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6		3.04		3.04		3.04		3.04		3.04		3.04		3.04		3.04		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		NC:01
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	NC:01
8	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.62	1.62	2.19	2.47	1.92	1.69	1.47
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 50%	Road 70%	Road 80%	Road 50%	Road 40%	Road 30%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 50%	Wall Light 60%	Wall Light 70%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 30%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	0.32	0.32	0.42	3.04	4.18	5.23
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 60%	Sky 80%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 20%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 20%	Wall Light 50%	Wall Light 40%	Wall Light 10%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 20%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 10%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	0.68	0.79	0.00	0.64	5.15	6.44	6.44	6.44
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 10%	Sky 80%	Sky 100%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 80%	Portal Façade 100%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 100%	Misc Str 90%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	0.50	0.79	0.16	0.00	5.79	6.44	6.44	6.44	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 90%	Sky 100%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 50%	Portal Façade 100%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 100%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): FALL

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.50	0.79	0.16	0.00	6.44	6.44	6.44	6.44	**NC**	27.20 kcd/ M2
2	0.20	0.79	0.64	0.00	6.44	6.44	6.44	6.44	6.44	33.81 kcd/ M2
3	0.20	0.20	0.26	0.16	0.65	0.78	0.40	1.94	3.98	8.55 kcd/ M2
4	0.20	1.62	1.91	2.19	1.77	2.48	2.66	2.94	2.77	18.53 kcd/ M2
5	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.96 kcd/ M2
6	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
7	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	**NC**	24.34 kcd/ M2
8	1.62	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	25.96 kcd/ M2
9	0.20	0.20	1.62	1.62	2.19	2.47	1.92	1.69	1.47	13.39 kcd/ M2
10	0.20	0.20	0.20	0.32	0.32	0.42	3.04	4.18	5.23	14.11 kcd/ M2
11	0.20	0.68	0.79	0.00	0.64	5.15	6.44	6.44	6.44	26.77 kcd/ M2
12	0.50	0.79	0.16	0.00	5.79	6.44	6.44	6.44	**NC**	26.55 kcd/ M2
									Lij=	269.52 kcd/ M2
										x 5.131E-04
									Lseq=	138.29 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	42 cd/ M2	62 cd/ M2	91 cd/ M2	133 cd/ M2	174 cd/ M2	195 cd/ M2	287 cd/ M2	421 cd/ M2	618 cd/ M2	907 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

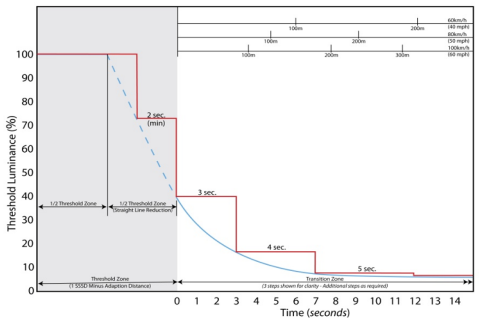
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

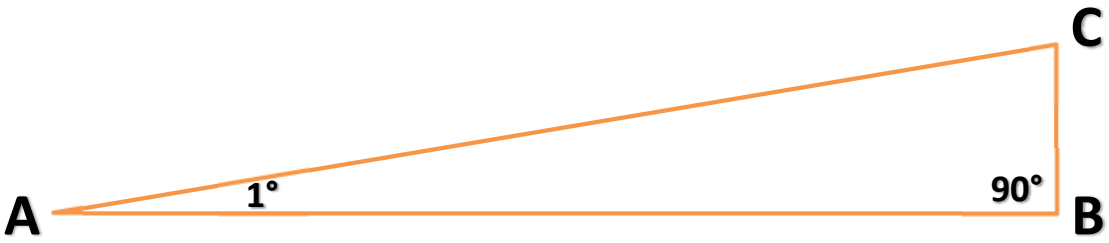
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



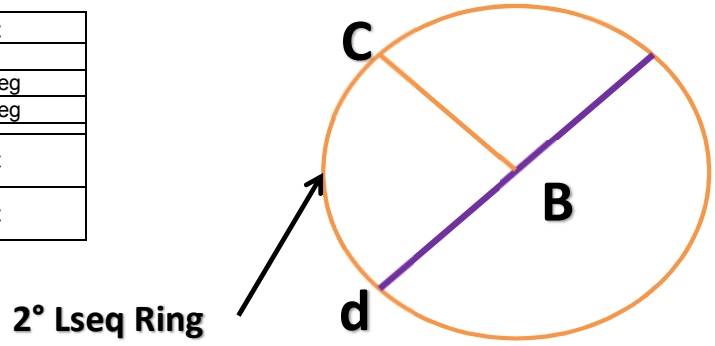
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	174 cd/ M2	448.02	136.56
Lth2	122 cd/ M2	149.34	45.52
Ltr1	71 cd/ M2	286.00	87.17
Ltr2	19 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1473.31	449.07
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	597.35
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

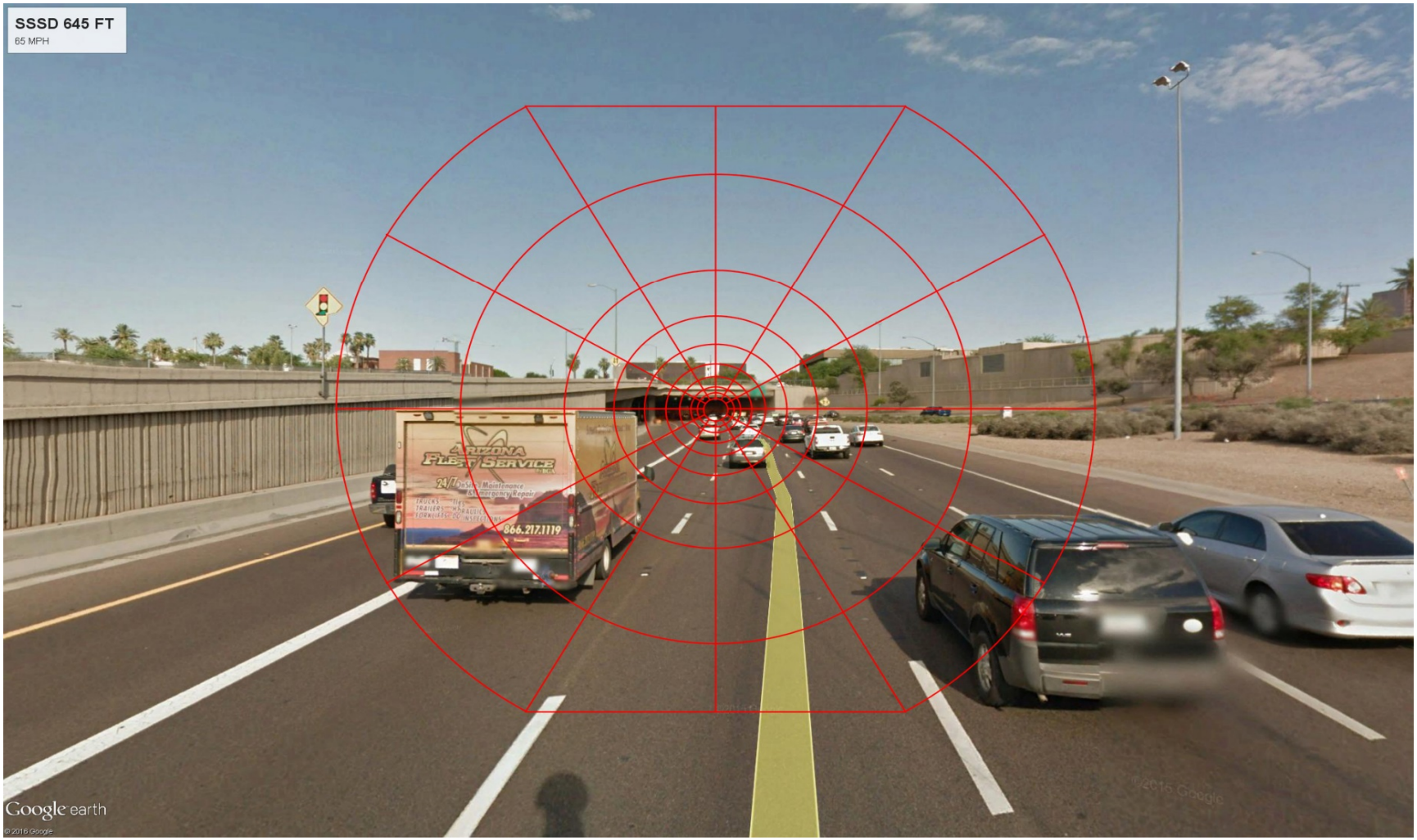
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): FALL



ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER AM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
6.85	2.5	7	7	7	1.9	0.2	7.1	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
1	3.60		7.00		2.92		1.90		6.85		6.85		6.85		6.85			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	50%	Portal Façade	100%	Portal Façade	20%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	80%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
																	NC:01	
2	0.20		7.00		5.98		1.90		6.85		6.85		6.85		6.85		6.85	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
3	0.20		0.20		0.88		0.54		5.30		5.50		5.50		5.46		6.91	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	60%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	75%	Wall Dark	50%	Wall Dark	40%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	75%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	75%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	80%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	25%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
4	0.20		1.35		1.58		1.81		3.05		3.63		3.26		3.20		3.28	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	60%	Road	70%	Road	50%	Road	75%	Road	70%	Road	65%	Road	50%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	10%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	25%	Wall Light	25%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	40%	Tunnel	30%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	20%	Dirt	25%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	15%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
5	1.35		2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50	
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
6	2.50		2.50		2.50		2.50		2.50		2.50		2.50		2.50			0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%		
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
																	NC:01	

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	NC:01
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	
8	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
9	0.20	0.20	1.35	1.35	1.81	2.04	4.75	5.20	5.65
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%
	Road 0%	Road 0%	Road 50%	Road 50%	Road 70%	Road 80%	Road 50%	Road 40%	Road 30%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 50%	Wall Light 60%	Wall Light 70%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 30%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	0.20	0.20	0.20	1.56	1.56	4.62	6.34	6.91	6.37
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 60%	Sky 80%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 20%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 20%	Wall Light 50%	Wall Light 40%	Wall Light 10%
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 20%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 10%
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
11	0.20	5.64	7.00	1.90	2.40	5.86	6.85	6.85	6.85
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 10%	Sky 80%	Sky 100%	Sky 100%	Sky 100%
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%
	Portal Façade 0%	Portal Façade 80%	Portal Façade 100%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 100%	Misc Str 90%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 0%
	Tunnel 100%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%
12	3.60	7.00	2.92	1.90	6.36	6.85	6.85	6.85	0.00
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 90%	Sky 100%	Sky 100%	Sky 100%	NC:01
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 50%	Portal Façade 100%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 100%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER AM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	3.60	7.00	2.92	1.90	6.85	6.85	6.85	6.85	**NC**	42.82 kcd/ M2
2	0.20	7.00	5.98	1.90	6.85	6.85	6.85	6.85	6.85	49.33 kcd/ M2
3	0.20	0.20	0.88	0.54	5.30	5.50	5.50	5.46	6.91	30.49 kcd/ M2
4	0.20	1.35	1.58	1.81	3.05	3.63	3.26	3.20	3.28	21.35 kcd/ M2
5	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	21.35 kcd/ M2
6	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
7	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	**NC**	20.00 kcd/ M2
8	1.35	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	21.35 kcd/ M2
9	0.20	0.20	1.35	1.35	1.81	2.04	4.75	5.20	5.65	22.55 kcd/ M2
10	0.20	0.20	0.20	1.56	1.56	4.62	6.34	6.91	6.37	27.96 kcd/ M2
11	0.20	5.64	7.00	1.90	2.40	5.86	6.85	6.85	6.85	43.55 kcd/ M2
12	3.60	7.00	2.92	1.90	6.36	6.85	6.85	6.85	**NC**	42.33 kcd/ M2
									Lij=	363.07 kcd/ M2
										x 5.131E-04
									Lseq=	186.29 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	57 cd/ M2	83 cd/ M2	122 cd/ M2	179 cd/ M2	235 cd/ M2	263 cd/ M2	386 cd/ M2	567 cd/ M2	832 cd/ M2	1,221 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

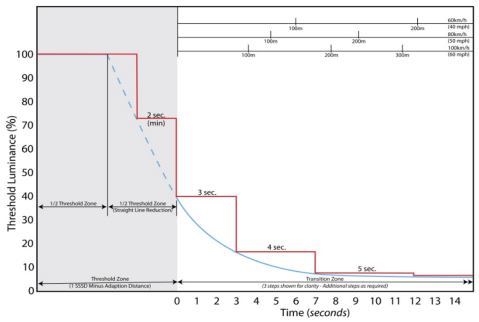
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

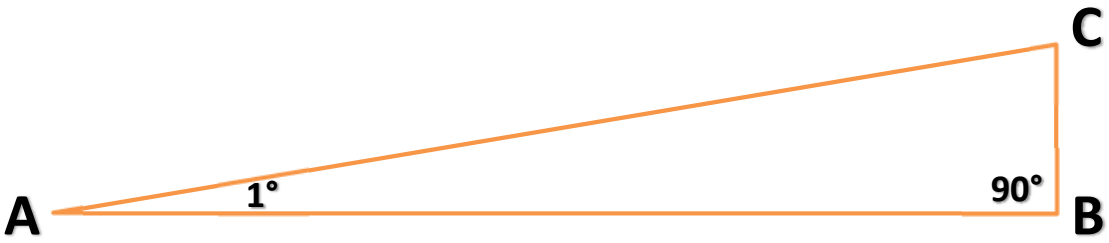
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



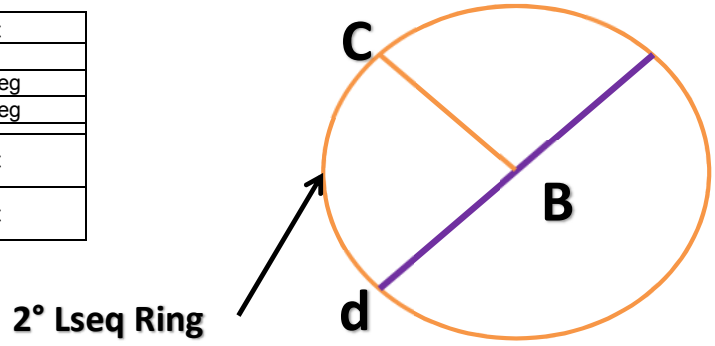
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	235 cd/ M2	448.02	136.56
Lth2	165 cd/ M2	149.34	45.52
Ltr1	95 cd/ M2	286.00	87.17
Ltr2	25 cd/ M2	381.33	116.23
Ltr3	NA	0.00	0.00
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	1473.31	449.07
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	597.35
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

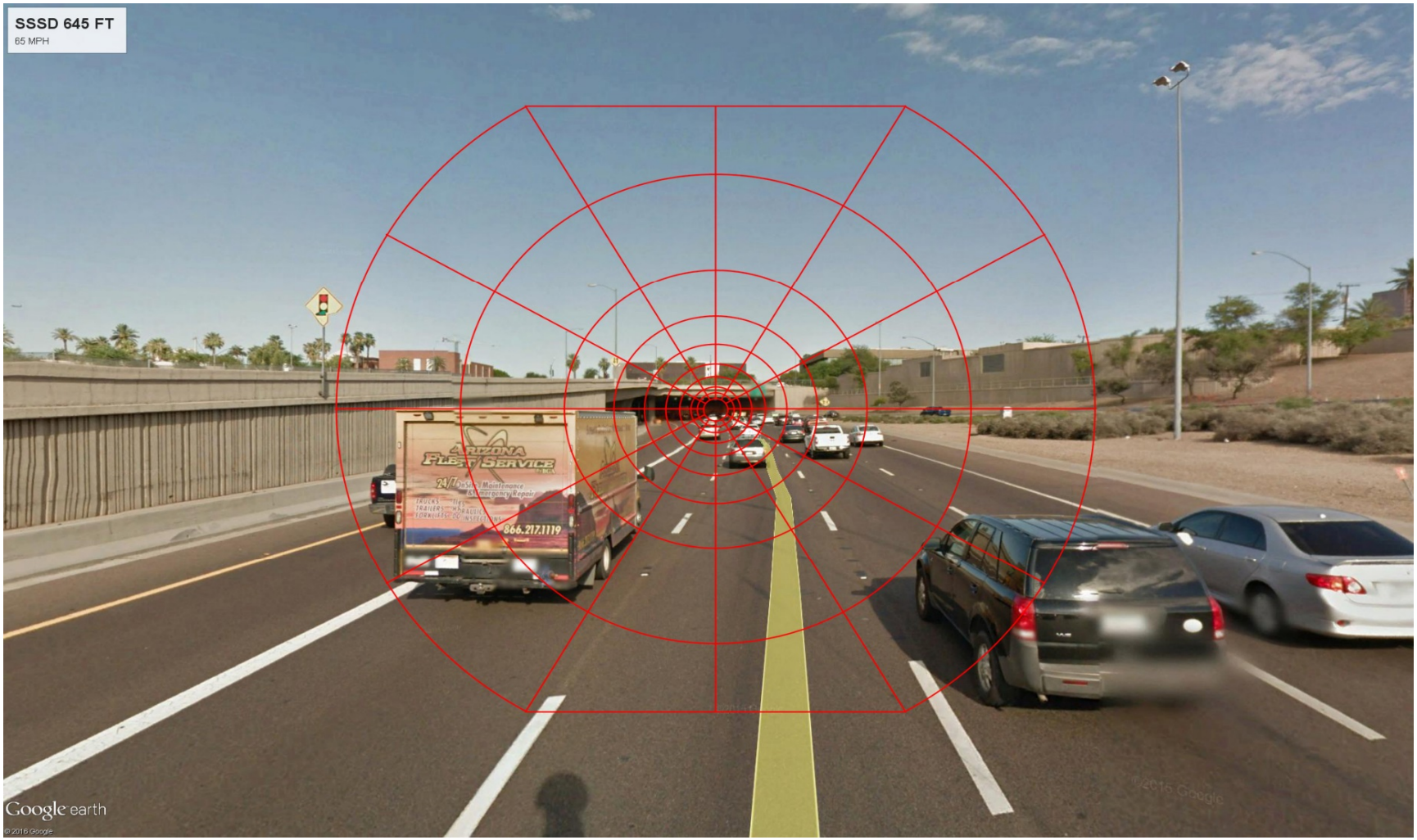
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

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ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER AM



ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER PM

Typical Luminances at Tunnel Portals (kcd/ M2)

Sky	Road	Wall Dark	Wall Light	Portal Façade	Misc Str	Tunnel	Dirt	Trees
12.25	11	1	1	1	0.77	0.2	4	1.000

RINGS/ From Inside Out/ Center Circle Is Not Included

SECTIONS: Clockwise from Noon

	1		2		3		4		5		6		7		8		9	
		0.60		1.00		0.82		0.77		12.25		12.25		12.25		12.25		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%		
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
1	Portal Façade	50%	Portal Façade	100%	Portal Façade	20%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	**NC:01**	
	Misc Str	0%	Misc Str	0%	Misc Str	80%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		
		0.20		1.00		0.95		0.77		12.25		12.25		12.25		12.25		12.25
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	100%	Sky	100%	Sky	100%	Sky	100%	Sky	100%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
2	Portal Façade	0%	Portal Façade	100%	Portal Façade	80%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	100%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
		0.20		0.20		0.28		0.31		0.80		1.00		1.00		3.81		7.75
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	25%	Sky	60%
	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%	Road	0%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	75%	Wall Dark	50%	Wall Dark	40%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	75%	Wall Light	0%	Wall Light	0%	Wall Light	0%
3	Portal Façade	0%	Portal Façade	0%	Portal Façade	10%	Portal Façade	0%	Portal Façade	75%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	20%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	100%	Tunnel	90%	Tunnel	80%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	25%	Trees	25%	Trees	25%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
		0.20		5.60		6.68		7.76		5.80		8.50		8.30		8.10		6.75
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	0%	Road	50%	Road	60%	Road	70%	Road	50%	Road	75%	Road	70%	Road	65%	Road	50%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	10%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	25%	Wall Light	25%	Wall Light	0%	Wall Light	0%	Wall Light	0%
4	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	100%	Tunnel	50%	Tunnel	40%	Tunnel	30%	Tunnel	25%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	10%	Dirt	20%	Dirt	25%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	10%	Trees	15%	Trees	25%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
		5.60		11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%
	Road	50%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%
5	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%
	Tunnel	50%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%
		100%		100%		100%		100%		100%		100%		100%		100%		100%
		11.00		11.00		11.00		11.00		11.00		11.00		11.00		11.00		0.00
	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%	Sky	0%		
	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%	Road	100%		
	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%	Wall Dark	0%		
	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%	Wall Light	0%		
6	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	Portal Façade	0%	**NC:01**	
	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%	Misc Str	0%		
	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%	Tunnel	0%		
	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%	Dirt	0%		
	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%	Trees	0%		
		100%		100%		100%		100%		100%		100%		100%		100%		

RINGS/ From Inside Out/ Center Circle Is Not Included

	1	2	3	4	5	6	7	8	9	
7	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%		
	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%		
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%		
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%		
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		
8	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 50%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	Road 100%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
9	0.20	0.20	5.60	5.60	7.76	8.84	6.00	5.00	4.00	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	
	Road 0%	Road 0%	Road 50%	Road 50%	Road 70%	Road 80%	Road 50%	Road 40%	Road 30%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 50%	Wall Light 60%	Wall Light 70%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 100%	Tunnel 50%	Tunnel 50%	Tunnel 30%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
10	0.20	0.20	0.20	0.36	0.36	0.79	5.50	7.75	9.98	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 40%	Sky 60%	Sky 80%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 20%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 20%	Wall Light 50%	Wall Light 40%	Wall Light 10%	
	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 20%	Portal Façade 20%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 10%	
	Tunnel 100%	Tunnel 100%	Tunnel 100%	Tunnel 80%	Tunnel 80%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 10%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
11	0.20	0.84	1.00	0.77	1.92	9.95	12.25	12.25	12.25	
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 10%	Sky 80%	Sky 100%	Sky 100%	Sky 100%	
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	
	Portal Façade 0%	Portal Façade 80%	Portal Façade 100%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	
	Misc Str 0%	Misc Str 0%	Misc Str 0%	Misc Str 100%	Misc Str 90%	Misc Str 20%	Misc Str 0%	Misc Str 0%	Misc Str 0%	
	Tunnel 100%	Tunnel 20%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	
12	0.60	1.00	0.82	0.77	11.10	12.25	12.25	12.25	0.00	NC:01
	Sky 0%	Sky 0%	Sky 0%	Sky 0%	Sky 90%	Sky 100%	Sky 100%	Sky 100%		
	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%	Road 0%		
	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%	Wall Dark 0%		
	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%	Wall Light 0%		
	Portal Façade 50%	Portal Façade 100%	Portal Façade 20%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%	Portal Façade 0%		
	Misc Str 0%	Misc Str 0%	Misc Str 80%	Misc Str 100%	Misc Str 10%	Misc Str 0%	Misc Str 0%	Misc Str 0%		
	Tunnel 50%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%	Tunnel 0%		
	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%	Dirt 0%		
	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%	Trees 0%		
	100%	100%	100%	100%	100%	100%	100%	100%		

Assumptions				
Posted Speed Limit	65	MPH	104.61	KMH
Traffic Volume	170,000	AADT	- -	Estimated
Safe Sight Stopping Distance (1SSD)	645.00	FT	196.596	M
Tunnel Geometric Orientation	E/W	-	- -	
Portal Height	24.00	FT	7.3152	M Estimated
Tunnel Length	2738.00	FT	834.5424	M Estimated
Adaptation Distance	47.65	FT	14.52232	M

ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER PM

ANSI RP-22-11 Tunnel Threshold Lighting Calculations

TABLE 6
AVERAGE LUMINANCE OVER EACH RING SECTION/

	RING NUMBER									
SECTION	1	2	3	4	5	6	7	8	9	SUM
1	0.60	1.00	0.82	0.77	12.25	12.25	12.25	12.25	**NC**	52.19 kcd/ M2
2	0.20	1.00	0.95	0.77	12.25	12.25	12.25	12.25	12.25	64.17 kcd/ M2
3	0.20	0.20	0.28	0.31	0.80	1.00	1.00	3.81	7.75	15.36 kcd/ M2
4	0.20	5.60	6.68	7.76	5.80	8.50	8.30	8.10	6.75	57.69 kcd/ M2
5	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	93.60 kcd/ M2
6	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
7	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	**NC**	88.00 kcd/ M2
8	5.60	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	93.60 kcd/ M2
9	0.20	0.20	5.60	5.60	7.76	8.84	6.00	5.00	4.00	43.20 kcd/ M2
10	0.20	0.20	0.20	0.36	0.36	0.79	5.50	7.75	9.98	25.34 kcd/ M2
11	0.20	0.84	1.00	0.77	1.92	9.95	12.25	12.25	12.25	51.43 kcd/ M2
12	0.60	1.00	0.82	0.77	11.10	12.25	12.25	12.25	**NC**	51.04 kcd/ M2
									Lij=	723.62 kcd/ M2
										x 5.131E-04
									Lseq=	371.29 cd/ M2

					DESIGN					
SRN=	1	2	3	4	4.7	5	6	7	8	9
C=	0.719	0.543	0.423	0.342	0.301	0.286	0.249	0.223	0.205	0.193
Lth=	113 cd/ M2	166 cd/ M2	243 cd/ M2	357 cd/ M2	467 cd/ M2	524 cd/ M2	770 cd/ M2	1,130 cd/ M2	1,658 cd/ M2	2,434 cd/ M2
Lth/ Lseq=	0.30	0.45	0.66	0.96	1.26	1.41	2.07	3.04	4.47	6.56
				Sky Factor	1.00					

CONSTANTS & EQUATIONS

Lseq=	5.13E-04 x Lij
Lth=	10 ^ ((SRN - 4.1)/ 6) x Lseq
Lth=	Lseq/ ((5.963 x C) - 1)
C=	(Lseq + Lth)/ Lth x 5.963
SRN=	6 x (log (Lth/ Lseq)) + 4.1
1kM=	0.6215 mi
1mi=	1.6090 kM

TH (Ft) =

CONVERSION FACTORS

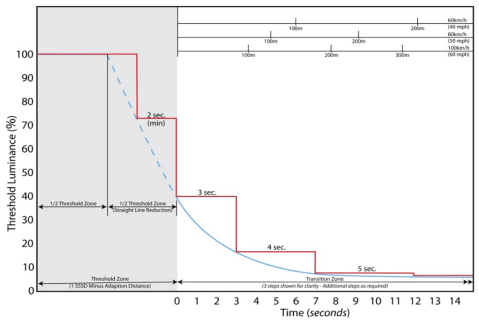
kM/h	M/s	mi/h	ft/s	Notes:
100.0	27.8	62.2	91.2	
90.0	25.0	55.9	82.0	est
80.0	22.2	49.7	72.9	
72.4	20.1	45.0	66.0	est
70.0	19.4	43.5	63.8	est
60.0	16.7	37.3	54.7	
50.0	13.9	31.1	45.6	est
40.0	11.1	24.9	36.5	est

TABLE 4 SAFETY RATING NUMBERS (SRNs) & RELATIVE SUBJECTIVE CRITERIA & PHOTOMETRIC CONTRAST

SRN NUMBER	CRITERION	Lth / Lseq Ratio	PHOTOMETRIC CONTRAST
SRN1=	Black Hole	0.3	0.719
SRN2=		0.45	0.543
SRN3=	Inadequate, Entrance Too Dark	0.66	0.423
SRN4=		0.96	0.342
SRN4.7=	Design	1.26	0.301
SRN5=	Fair, Just Sufficient For a Safe Entry	1.41	0.286
SRN6=		2.07	0.249
SRN7=	Good, Driver Feels Safe When Entering	3.04	0.222
SRN8=		4.46	0.205
SRN9=	Excellent	6.55	0.193

Notes:
1. SKY FACTOR NOT APPLIED

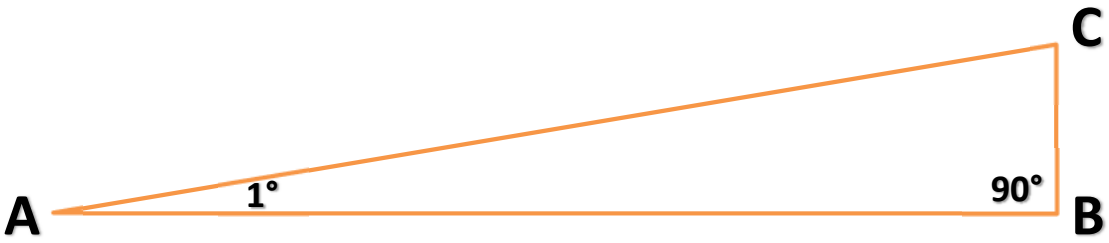
Figure 8 from RP-22-11 Reduction Curve - Base Step & Luminances



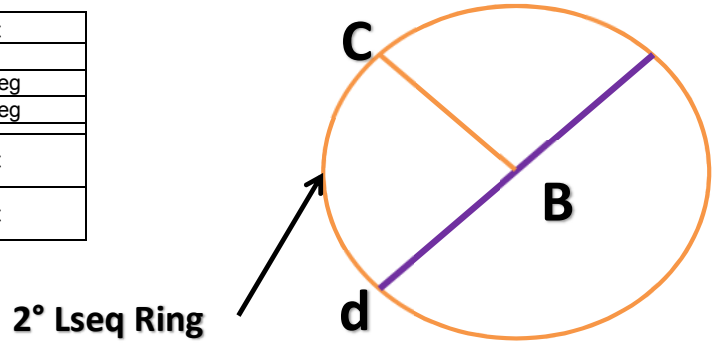
Zone	Luminance	Distance (FT) Step Method	Distance (m) Step Method
Lth1	467 cd/ M2	448.02	136.56
Lth2	329 cd/ M2	149.34	45.52
Ltr1	190 cd/ M2	286.00	87.17
Ltr2	51 cd/ M2	381.33	116.23
Ltr3	22 cd/ M2	476.67	145.29
Ltr4	NA	0.00	0.00
Ltr5	NA	0.00	0.00
Int-Day	10.00 cd/ M2	996.65	303.78
Int-Night	2.50 cd/ M2	2738.00	834.54

Tunnel (FT)	2738.00
Threshold (FT)	597.35
ft/sec	95.33

Lseq 1st Ring Size Calculator



SSSD	AB =	645	Ft
Constant	A =	1	Deg
	B =	90	Deg
1st Ring Radius (1 Deg)	CB =	11.25851688	Ft
1st Ring Diameter (2 Deg)	d =	22.51703376	Ft



Other Info			
	AC =	645.0982516	Ft
	C =	89	Deg

ANSI/IES RP-22-11

Table 1: AASHTO Stopping Sight Distance (Wet Pavement)

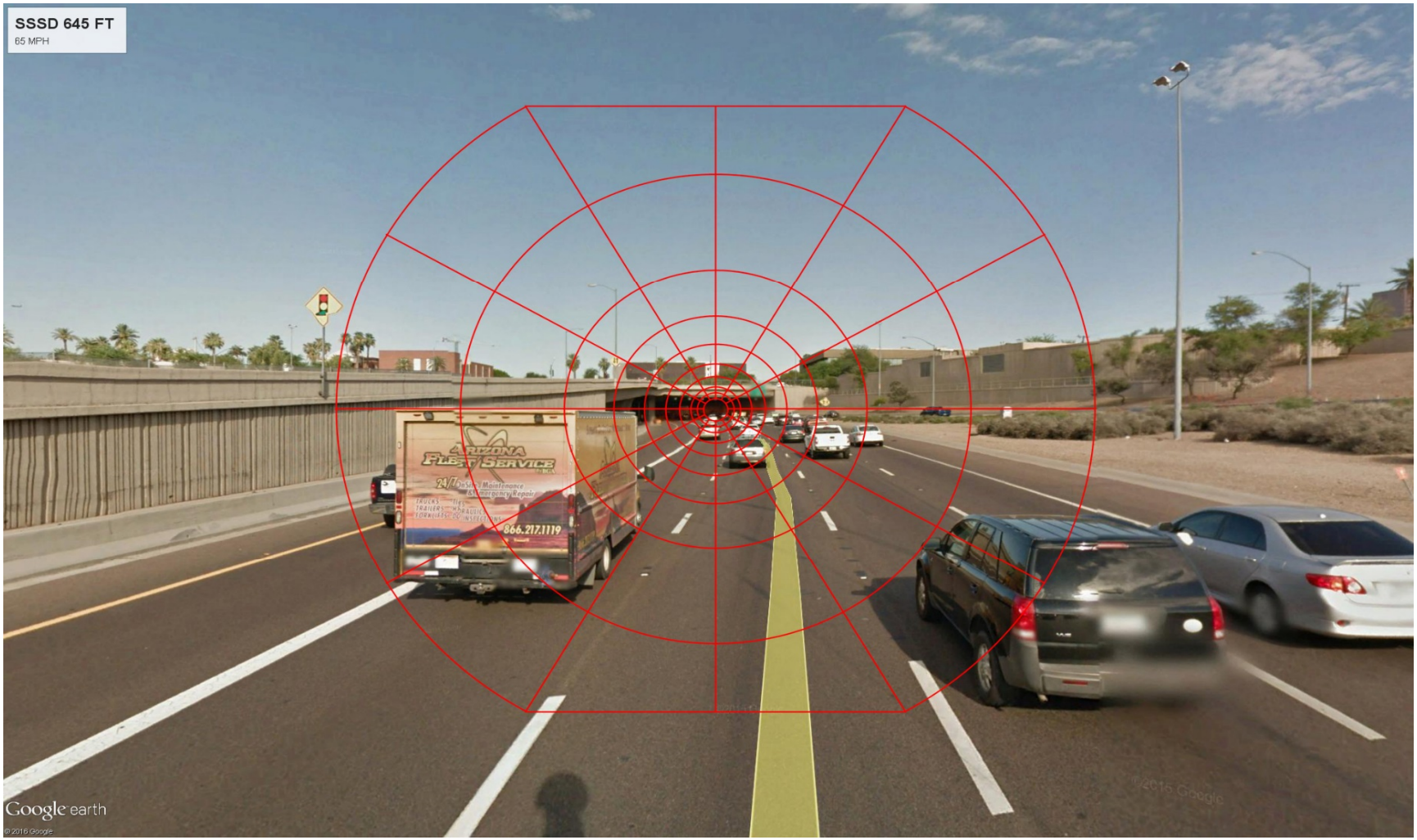
Stopping Sight Distance M (Ft) by Percent Grade (%)							
		Downgrade			Upgrade		
Traffic Speed km/h (mph)	0	3	6	9	3	6	9
35 (20)	35 (115)	35 (116)	40 (120)	40 (126)	35 (109)	35 (107)	35 (104)
40 (25)	50 (155)	50 (158)	50 (165)	55 (173)	45 (147)	45 (143)	45 (140)
50 (30)	60 (200)	65 (205)	65 (215)	70 (227)	60 (200)	60 (184)	55 (179)
60 (35)	80 (250)	80 (257)	85 (271)	90 (287)	75 (237)	70 (229)	70 (222)
65 (40)	95 (305)	95 (315)	100 (333)	110 (354)	90 (289)	85 (278)	80 (269)
75 (45)	110 (360)	115 (378)	120 (400)	130 (427)	105 (344)	100 (331)	100 (320)
80 (50)	130 (425)	135 (446)	145 (474)	155 (507)	125 (405)	120 (388)	115 (375)
90 (55)	150 (495)	160 (520)	170 (553)	180 (593)	145 (469)	140 (450)	135 (433)
100 (60)	175 (570)	185 (598)	195 (638)	210 (686)	165 (538)	160 (515)	150 (495)
105 (65)	200 (645)	210 (682)	220 (728)	240 (785)	190 (612)	180 (584)	170 (561)
115 (70)	225 (730)	235 (771)	250 (825)	275 (891)	210 (690)	200 (658)	195 (631)
120 (75)	250 (920)	265 (866)	285 (927)	305 (1003)	235 (772)	225 (736)	215 (704)

Source: A Policy on Geometric Design of Streets & Highways, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design.

The speed and distance columns only correspond to their metric or English equivalent, i.e., if determining the SSSD for a posted speed in kilometer per hour (km/h), use the value shown in m, if using miles per hour (mph), use the value shown for ft.

=

ADOT I-10 TUNNEL: WESTBOUND (645FT SSSD): SUMMER PM



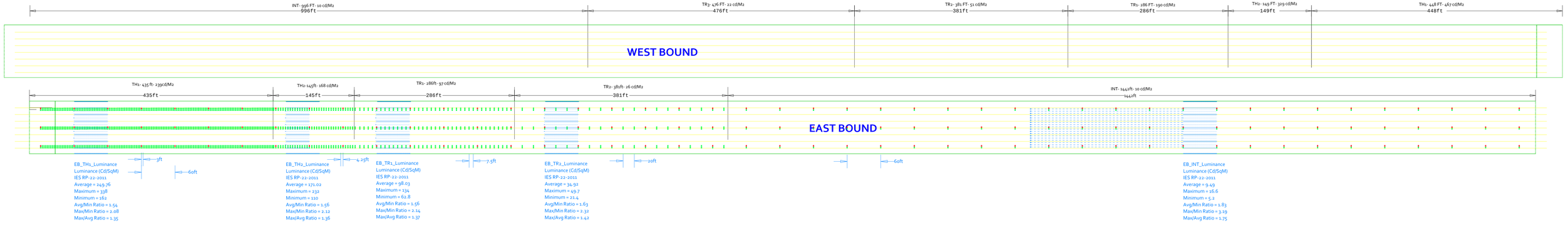
Lighting Calculations

ADOT I-10 DECK PARK TUNNEL
PRELIMINARY LIGHTING DESIGN
EASTBOUND DAY 1
JULY 28 2016

WSP | PARSONS BRINCKERHOFF

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Luminaire Schedule

Scene: DAY 1

Symbol	Qty	Tag	Label	LLF	Description	Filename	Lum. Watts	Lum. Lumens	Total Watts
+	135	A3	TNLED_3_4K_1_AS_CCB_XX_X	0.630	TNLED 3 4K 1 AS CCB XX X	TNLED_3_4K_1_AS_CCB_XX_X.ies	122.4	11019	16524
+	1389	A6	TNLED_6_4K_1_AS_CCB_XX_X	0.630	TNLED 6 4K 1 AS CCB XX X	TNLED_6_4K_1_AS_CCB_XX_X.IES	243.8	21130	338638.2

Calculation Summary

Project: GRID EB DAY

Scene: DAY 1

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	LVRatio
EB_INT_Illum	Illuminance	Fc	10.06	21.9	5.8	1.73	3.78	N.A.
EB_INT_Luminance	Luminance	Cd/Sq.m	9.49	16.6	5.2	1.83	3.19	N.A.
EB_INT_Veil_Lum	Veiling Luminance	Cd/Sq.m	1.47	2.48	1.03	1.43	2.41	0.26
EB_IN_WALL_L	Illuminance	Fc	5.11	8.9	2.8	1.83	3.18	N.A.
EB_IN_WALL_R	Illuminance	Fc	5.57	10.5	2.8	1.99	3.75	N.A.
EB_TH1_Illum	Illuminance	Fc	262.49	301	219	1.20	1.38	N.A.
EB_TH1_Luminance	Luminance	Cd/Sq.m	249.76	338	162	1.54	2.08	N.A.
EB_TH1_WALL_L	Illuminance	Fc	131.75	135	128	1.03	1.06	N.A.
EB_TH1_WALL_R	Illuminance	Fc	141.72	145	138	1.03	1.05	N.A.
EB_TH2_Illum	Illuminance	Fc	183.09	212	152	1.21	1.40	N.A.
EB_TH2_Luminance	Luminance	Cd/Sq.m	171.02	232	110	1.56	2.12	N.A.
EB_TH2_WALL_L	Illuminance	Fc	92.20	96.7	88.5	1.04	1.09	N.A.
EB_TH2_WALL_R	Illuminance	Fc	98.90	103	95.3	1.04	1.08	N.A.
EB_TR1_Illum	Illuminance	Fc	103.70	122	83.9	1.24	1.45	N.A.
EB_TR1_Luminance	Luminance	Cd/Sq.m	98.03	134	62.8	1.56	2.14	N.A.
EB_TR1_WALL_L	Illuminance	Fc	52.66	55.7	49.3	1.07	1.13	N.A.
EB_TR1_WALL_R	Illuminance	Fc	56.60	59.8	52.9	1.07	1.13	N.A.
EB_TR2_Illum	Illuminance	Fc	36.86	48.1	27.2	1.36	1.77	N.A.
EB_TR2_Luminance	Luminance	Cd/Sq.m	34.92	49.7	21.4	1.63	2.32	N.A.
EB_TR2_WALL_L	Illuminance	Fc	18.87	21.6	16.7	1.13	1.29	N.A.
EB_TR2_WALL_R	Illuminance	Fc	20.29	23.7	17.6	1.15	1.35	N.A.

ADOT I-10 DECK PARK TUNNEL
JUL 26, 2016
EASTBOUND - DAY 1



User and Job File Information

User Information

Voice Number :
Fax Number :
Email Address :

Job File Information

Filename :	AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Location :	J:\11338E ADOT I10 Deck Park Tnl Ltng\5.0 Project Data\5.0 Working Files\5.5 Calculations\5.5.2 Lighting\
Created By :	W-AMBOS-D-AME07
Created Date :	6/30/2016 1:14:52 PM
Created Version :	16.2.2
Modified By :	W-AMBOS-L-AME15
Modified Date :	7/27/2016 5:24:41 PM
Modified Version :	17.2.10
Total Time (Hrs) :	103.48
Description :	

Information :
7/26/2016 7:48:08 AM - W-AMBOS-L-AME15 :

7/11/2016 7:29:00 AM - W-AMBOS-L-AME15 :

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Luminaire Definition(s)

TNLED_3_4K_1_AS_CCB_XX_X
Tag: A3
TNLED 3 4K 1 AS CCB XX X

Filename	TNLED_3_4K_1_AS_CCB_XX_X.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	11019
Luminaire Lumens	11019
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	122.4
Arrangement Watts	122.4
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	1936.3	N.A.	17.6
LCS-FM	4760.4	N.A.	43.2
LCS-FH	2664.0	N.A.	24.2
LCS-FVH	122.8	N.A.	1.1
LCS-BL	824.2	N.A.	7.5
LCS-BM	570.7	N.A.	5.2
LCS-BH	88.6	N.A.	0.8
LCS-BVH	5.4	N.A.	0.0
LCS-UL	10.5	N.A.	0.1
LCS-UH	36.5	N.A.	0.3
Total	11019.4	N.A.	100.0

BUG Rating	B2-U2-G2
Indoor Classification	Direct
LER	90
Modal Mode Symbol	BOX DOWN
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)
Render Mode Symbol	BOX DOWN
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)
Housing Color	(R= 51 G= 51 B= 51)
Luminous Color	(R= 255 G= 255 B= 255)

Photometric File

Filename : TNLED_3_4K_1_AS_CCB_XX_X.ies

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Luminaire Definition(s) - Cont.

[Test]	501956P2
[TestLab]	SCALED PHOTOMETRY
[IssueDate]	9/30/2014
[Manufac]	Holophane
[Lumcat]	TNLED 3 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	3 LED Array

TNLED_6_4K_1_AS_CCB_XX_X
Tag: A6
TNLED 6 4K 1 AS CCB XX X

Filename	TNLED_6_4K_1_AS_CCB_XX_X.IES
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	21130
Luminaire Lumens	21130
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	243.8
Arrangement Watts	243.8
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.01

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	3712.0	N.A.	17.6
LCS-FM	9142.0	N.A.	43.3
LCS-FH	5023.8	N.A.	23.8
LCS-FVH	207.6	N.A.	1.0
LCS-BL	1545.3	N.A.	7.3
LCS-BM	1113.5	N.A.	5.3
LCS-BH	208.0	N.A.	1.0
LCS-BVH	18.8	N.A.	0.1
LCS-UL	31.4	N.A.	0.1
LCS-UH	127.8	N.A.	0.6
Total	21130.2	N.A.	100.0
BUG Rating	B3-U3-G3		

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Luminaire Definition(s) - Cont.

Indoor Classification	Direct
LER	87
Modal Mode Symbol	BOX DOWN
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)
Render Mode Symbol	BOX DOWN
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)
Housing Color	(R= 51 G= 51 B= 51)
Luminous Color	(R= 255 G= 255 B= 255)

Photometric File

Filename : TNLED_6_4K_1_AS_CCB_XX_X.IES

[Test]	501954PP2
[TestLab]	ACUITY BRANDS LIGHTING GRANVILLE LAB
[IssueDate]	8/29/2013
[Manufac]	Holophane
[Lumcat]	TNLED 6 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	6 LED Array

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Scene Summary

Scene Summary
Scene : DAY 1

Channel	Switched	Dimming	Lum. No.	Label
D1	On	1.00	7175	TNLED_6_4K_1_AS_CCB_XX_X
			7199	TNLED_6_4K_1_AS_CCB_XX_X
			7205	TNLED_6_4K_1_AS_CCB_XX_X
			7211	TNLED_6_4K_1_AS_CCB_XX_X
			7217	TNLED_6_4K_1_AS_CCB_XX_X
			7223	TNLED_6_4K_1_AS_CCB_XX_X
			7229	TNLED_6_4K_1_AS_CCB_XX_X
			7235	TNLED_6_4K_1_AS_CCB_XX_X
			7241	TNLED_6_4K_1_AS_CCB_XX_X
			7247	TNLED_6_4K_1_AS_CCB_XX_X
			7248	TNLED_6_4K_1_AS_CCB_XX_X
			7948	TNLED_6_4K_1_AS_CCB_XX_X
			7949	TNLED_6_4K_1_AS_CCB_XX_X
			7950	TNLED_6_4K_1_AS_CCB_XX_X
			7951	TNLED_6_4K_1_AS_CCB_XX_X
			7952	TNLED_6_4K_1_AS_CCB_XX_X
			7953	TNLED_6_4K_1_AS_CCB_XX_X
			7954	TNLED_6_4K_1_AS_CCB_XX_X
			7955	TNLED_6_4K_1_AS_CCB_XX_X
			8353	TNLED_6_4K_1_AS_CCB_XX_X
			8354	TNLED_6_4K_1_AS_CCB_XX_X
			8355	TNLED_6_4K_1_AS_CCB_XX_X
			8356	TNLED_6_4K_1_AS_CCB_XX_X
			8357	TNLED_6_4K_1_AS_CCB_XX_X
			8358	TNLED_6_4K_1_AS_CCB_XX_X
			8359	TNLED_6_4K_1_AS_CCB_XX_X
			8360	TNLED_6_4K_1_AS_CCB_XX_X
			8361	TNLED_6_4K_1_AS_CCB_XX_X
			8362	TNLED_6_4K_1_AS_CCB_XX_X
			8363	TNLED_6_4K_1_AS_CCB_XX_X
			8364	TNLED_6_4K_1_AS_CCB_XX_X
			8365	TNLED_6_4K_1_AS_CCB_XX_X
			8366	TNLED_6_4K_1_AS_CCB_XX_X
			8367	TNLED_6_4K_1_AS_CCB_XX_X
			8368	TNLED_6_4K_1_AS_CCB_XX_X
			8369	TNLED_6_4K_1_AS_CCB_XX_X
			8370	TNLED_6_4K_1_AS_CCB_XX_X
			8371	TNLED_6_4K_1_AS_CCB_XX_X
			8410	TNLED_6_4K_1_AS_CCB_XX_X
			8411	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8412	TNLED_6_4K_1_AS_CCB_XX_X
8413	TNLED_6_4K_1_AS_CCB_XX_X
8414	TNLED_6_4K_1_AS_CCB_XX_X
8415	TNLED_6_4K_1_AS_CCB_XX_X
8416	TNLED_6_4K_1_AS_CCB_XX_X
8417	TNLED_6_4K_1_AS_CCB_XX_X
8418	TNLED_6_4K_1_AS_CCB_XX_X
8419	TNLED_6_4K_1_AS_CCB_XX_X
8420	TNLED_6_4K_1_AS_CCB_XX_X
8421	TNLED_6_4K_1_AS_CCB_XX_X
8422	TNLED_6_4K_1_AS_CCB_XX_X
8423	TNLED_6_4K_1_AS_CCB_XX_X
8424	TNLED_6_4K_1_AS_CCB_XX_X
8425	TNLED_6_4K_1_AS_CCB_XX_X
8426	TNLED_6_4K_1_AS_CCB_XX_X
8427	TNLED_6_4K_1_AS_CCB_XX_X
8428	TNLED_6_4K_1_AS_CCB_XX_X
8429	TNLED_6_4K_1_AS_CCB_XX_X
8430	TNLED_6_4K_1_AS_CCB_XX_X
8431	TNLED_6_4K_1_AS_CCB_XX_X
8432	TNLED_6_4K_1_AS_CCB_XX_X
8433	TNLED_6_4K_1_AS_CCB_XX_X
8434	TNLED_6_4K_1_AS_CCB_XX_X
8435	TNLED_6_4K_1_AS_CCB_XX_X
8436	TNLED_6_4K_1_AS_CCB_XX_X
8437	TNLED_6_4K_1_AS_CCB_XX_X
8438	TNLED_6_4K_1_AS_CCB_XX_X
8439	TNLED_6_4K_1_AS_CCB_XX_X
8440	TNLED_6_4K_1_AS_CCB_XX_X
8441	TNLED_6_4K_1_AS_CCB_XX_X
8442	TNLED_6_4K_1_AS_CCB_XX_X
8443	TNLED_6_4K_1_AS_CCB_XX_X
8444	TNLED_6_4K_1_AS_CCB_XX_X
8445	TNLED_6_4K_1_AS_CCB_XX_X
8446	TNLED_6_4K_1_AS_CCB_XX_X
8447	TNLED_6_4K_1_AS_CCB_XX_X
8448	TNLED_6_4K_1_AS_CCB_XX_X
8449	TNLED_6_4K_1_AS_CCB_XX_X
8450	TNLED_6_4K_1_AS_CCB_XX_X
8451	TNLED_6_4K_1_AS_CCB_XX_X
8452	TNLED_6_4K_1_AS_CCB_XX_X
8453	TNLED_6_4K_1_AS_CCB_XX_X
8454	TNLED_6_4K_1_AS_CCB_XX_X
8455	TNLED_6_4K_1_AS_CCB_XX_X
8456	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8457	TNLED_6_4K_1_AS_CCB_XX_X
8458	TNLED_6_4K_1_AS_CCB_XX_X
8459	TNLED_6_4K_1_AS_CCB_XX_X
8460	TNLED_6_4K_1_AS_CCB_XX_X
8461	TNLED_6_4K_1_AS_CCB_XX_X
8462	TNLED_6_4K_1_AS_CCB_XX_X
8463	TNLED_6_4K_1_AS_CCB_XX_X
8464	TNLED_6_4K_1_AS_CCB_XX_X
8465	TNLED_6_4K_1_AS_CCB_XX_X
8466	TNLED_6_4K_1_AS_CCB_XX_X
8467	TNLED_6_4K_1_AS_CCB_XX_X
8468	TNLED_6_4K_1_AS_CCB_XX_X
8469	TNLED_6_4K_1_AS_CCB_XX_X
8470	TNLED_6_4K_1_AS_CCB_XX_X
8471	TNLED_6_4K_1_AS_CCB_XX_X
8472	TNLED_6_4K_1_AS_CCB_XX_X
8473	TNLED_6_4K_1_AS_CCB_XX_X
8474	TNLED_6_4K_1_AS_CCB_XX_X
8475	TNLED_6_4K_1_AS_CCB_XX_X
8476	TNLED_6_4K_1_AS_CCB_XX_X
8477	TNLED_6_4K_1_AS_CCB_XX_X
8478	TNLED_6_4K_1_AS_CCB_XX_X
8479	TNLED_6_4K_1_AS_CCB_XX_X
8480	TNLED_6_4K_1_AS_CCB_XX_X
8481	TNLED_6_4K_1_AS_CCB_XX_X
8482	TNLED_6_4K_1_AS_CCB_XX_X
8483	TNLED_6_4K_1_AS_CCB_XX_X
8484	TNLED_6_4K_1_AS_CCB_XX_X
8485	TNLED_6_4K_1_AS_CCB_XX_X
8486	TNLED_6_4K_1_AS_CCB_XX_X
8487	TNLED_6_4K_1_AS_CCB_XX_X
8488	TNLED_6_4K_1_AS_CCB_XX_X
8489	TNLED_6_4K_1_AS_CCB_XX_X
8490	TNLED_6_4K_1_AS_CCB_XX_X
8491	TNLED_6_4K_1_AS_CCB_XX_X
8492	TNLED_6_4K_1_AS_CCB_XX_X
8493	TNLED_6_4K_1_AS_CCB_XX_X
8494	TNLED_6_4K_1_AS_CCB_XX_X
8495	TNLED_6_4K_1_AS_CCB_XX_X
8496	TNLED_6_4K_1_AS_CCB_XX_X
8497	TNLED_6_4K_1_AS_CCB_XX_X
8498	TNLED_6_4K_1_AS_CCB_XX_X
8499	TNLED_6_4K_1_AS_CCB_XX_X
8500	TNLED_6_4K_1_AS_CCB_XX_X
8501	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8502	TNLED_6_4K_1_AS_CCB_XX_X
8503	TNLED_6_4K_1_AS_CCB_XX_X
8910	TNLED_6_4K_1_AS_CCB_XX_X
8911	TNLED_6_4K_1_AS_CCB_XX_X
8912	TNLED_6_4K_1_AS_CCB_XX_X
8913	TNLED_6_4K_1_AS_CCB_XX_X
8914	TNLED_6_4K_1_AS_CCB_XX_X
8915	TNLED_6_4K_1_AS_CCB_XX_X
8916	TNLED_6_4K_1_AS_CCB_XX_X
8917	TNLED_6_4K_1_AS_CCB_XX_X
8919	TNLED_6_4K_1_AS_CCB_XX_X
8920	TNLED_6_4K_1_AS_CCB_XX_X
8921	TNLED_6_4K_1_AS_CCB_XX_X
8922	TNLED_6_4K_1_AS_CCB_XX_X
8923	TNLED_6_4K_1_AS_CCB_XX_X
8924	TNLED_6_4K_1_AS_CCB_XX_X
8925	TNLED_6_4K_1_AS_CCB_XX_X
8926	TNLED_6_4K_1_AS_CCB_XX_X
8927	TNLED_6_4K_1_AS_CCB_XX_X
8928	TNLED_6_4K_1_AS_CCB_XX_X
8929	TNLED_6_4K_1_AS_CCB_XX_X
8930	TNLED_6_4K_1_AS_CCB_XX_X
8931	TNLED_6_4K_1_AS_CCB_XX_X
8932	TNLED_6_4K_1_AS_CCB_XX_X
8933	TNLED_6_4K_1_AS_CCB_XX_X
8934	TNLED_6_4K_1_AS_CCB_XX_X
8935	TNLED_6_4K_1_AS_CCB_XX_X
8936	TNLED_6_4K_1_AS_CCB_XX_X
8937	TNLED_6_4K_1_AS_CCB_XX_X
8938	TNLED_6_4K_1_AS_CCB_XX_X
8939	TNLED_6_4K_1_AS_CCB_XX_X
8940	TNLED_6_4K_1_AS_CCB_XX_X
8941	TNLED_6_4K_1_AS_CCB_XX_X
8942	TNLED_6_4K_1_AS_CCB_XX_X
8943	TNLED_6_4K_1_AS_CCB_XX_X
8944	TNLED_6_4K_1_AS_CCB_XX_X
8945	TNLED_6_4K_1_AS_CCB_XX_X
8946	TNLED_6_4K_1_AS_CCB_XX_X
8947	TNLED_6_4K_1_AS_CCB_XX_X
8948	TNLED_6_4K_1_AS_CCB_XX_X
8949	TNLED_6_4K_1_AS_CCB_XX_X
8950	TNLED_6_4K_1_AS_CCB_XX_X
8951	TNLED_6_4K_1_AS_CCB_XX_X
8952	TNLED_6_4K_1_AS_CCB_XX_X
8953	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8954	TNLED_6_4K_1_AS_CCB_XX_X
8955	TNLED_6_4K_1_AS_CCB_XX_X
8956	TNLED_6_4K_1_AS_CCB_XX_X
8957	TNLED_6_4K_1_AS_CCB_XX_X
8958	TNLED_6_4K_1_AS_CCB_XX_X
8959	TNLED_6_4K_1_AS_CCB_XX_X
8960	TNLED_6_4K_1_AS_CCB_XX_X
8961	TNLED_6_4K_1_AS_CCB_XX_X
8962	TNLED_6_4K_1_AS_CCB_XX_X
8963	TNLED_6_4K_1_AS_CCB_XX_X
8964	TNLED_6_4K_1_AS_CCB_XX_X
8965	TNLED_6_4K_1_AS_CCB_XX_X
8966	TNLED_6_4K_1_AS_CCB_XX_X
8967	TNLED_6_4K_1_AS_CCB_XX_X
8968	TNLED_6_4K_1_AS_CCB_XX_X
8969	TNLED_6_4K_1_AS_CCB_XX_X
8970	TNLED_6_4K_1_AS_CCB_XX_X
8971	TNLED_6_4K_1_AS_CCB_XX_X
8972	TNLED_6_4K_1_AS_CCB_XX_X
8973	TNLED_6_4K_1_AS_CCB_XX_X
8974	TNLED_6_4K_1_AS_CCB_XX_X
8975	TNLED_6_4K_1_AS_CCB_XX_X
8976	TNLED_6_4K_1_AS_CCB_XX_X
8977	TNLED_6_4K_1_AS_CCB_XX_X
8978	TNLED_6_4K_1_AS_CCB_XX_X
8979	TNLED_6_4K_1_AS_CCB_XX_X
8980	TNLED_6_4K_1_AS_CCB_XX_X
8981	TNLED_6_4K_1_AS_CCB_XX_X
8982	TNLED_6_4K_1_AS_CCB_XX_X
8983	TNLED_6_4K_1_AS_CCB_XX_X
8984	TNLED_6_4K_1_AS_CCB_XX_X
8985	TNLED_6_4K_1_AS_CCB_XX_X
8986	TNLED_6_4K_1_AS_CCB_XX_X
8987	TNLED_6_4K_1_AS_CCB_XX_X
8988	TNLED_6_4K_1_AS_CCB_XX_X
8989	TNLED_6_4K_1_AS_CCB_XX_X
8990	TNLED_6_4K_1_AS_CCB_XX_X
8991	TNLED_6_4K_1_AS_CCB_XX_X
8992	TNLED_6_4K_1_AS_CCB_XX_X
8993	TNLED_6_4K_1_AS_CCB_XX_X
8994	TNLED_6_4K_1_AS_CCB_XX_X
8995	TNLED_6_4K_1_AS_CCB_XX_X
8996	TNLED_6_4K_1_AS_CCB_XX_X
8997	TNLED_6_4K_1_AS_CCB_XX_X
8998	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8999	TNLED_6_4K_1_AS_CCB_XX_X
9000	TNLED_6_4K_1_AS_CCB_XX_X
9001	TNLED_6_4K_1_AS_CCB_XX_X
9002	TNLED_6_4K_1_AS_CCB_XX_X
9003	TNLED_6_4K_1_AS_CCB_XX_X
9004	TNLED_6_4K_1_AS_CCB_XX_X
9005	TNLED_6_4K_1_AS_CCB_XX_X
9006	TNLED_6_4K_1_AS_CCB_XX_X
9007	TNLED_6_4K_1_AS_CCB_XX_X
9008	TNLED_6_4K_1_AS_CCB_XX_X
9009	TNLED_6_4K_1_AS_CCB_XX_X
9010	TNLED_6_4K_1_AS_CCB_XX_X
9011	TNLED_6_4K_1_AS_CCB_XX_X
9012	TNLED_6_4K_1_AS_CCB_XX_X
9013	TNLED_6_4K_1_AS_CCB_XX_X
9014	TNLED_6_4K_1_AS_CCB_XX_X
9015	TNLED_6_4K_1_AS_CCB_XX_X
9016	TNLED_6_4K_1_AS_CCB_XX_X
9017	TNLED_6_4K_1_AS_CCB_XX_X
9018	TNLED_6_4K_1_AS_CCB_XX_X
9019	TNLED_6_4K_1_AS_CCB_XX_X
9020	TNLED_6_4K_1_AS_CCB_XX_X
9021	TNLED_6_4K_1_AS_CCB_XX_X
9022	TNLED_6_4K_1_AS_CCB_XX_X
9023	TNLED_6_4K_1_AS_CCB_XX_X
9024	TNLED_6_4K_1_AS_CCB_XX_X
9025	TNLED_6_4K_1_AS_CCB_XX_X
9026	TNLED_6_4K_1_AS_CCB_XX_X
9027	TNLED_6_4K_1_AS_CCB_XX_X
9028	TNLED_6_4K_1_AS_CCB_XX_X
9029	TNLED_6_4K_1_AS_CCB_XX_X
9030	TNLED_6_4K_1_AS_CCB_XX_X
9031	TNLED_6_4K_1_AS_CCB_XX_X
9032	TNLED_6_4K_1_AS_CCB_XX_X
9033	TNLED_6_4K_1_AS_CCB_XX_X
9034	TNLED_6_4K_1_AS_CCB_XX_X
9035	TNLED_6_4K_1_AS_CCB_XX_X
9036	TNLED_6_4K_1_AS_CCB_XX_X
9037	TNLED_6_4K_1_AS_CCB_XX_X
9038	TNLED_6_4K_1_AS_CCB_XX_X
9039	TNLED_6_4K_1_AS_CCB_XX_X
9040	TNLED_6_4K_1_AS_CCB_XX_X
9041	TNLED_6_4K_1_AS_CCB_XX_X
9042	TNLED_6_4K_1_AS_CCB_XX_X
9088	TNLED_6_4K_1_AS_CCB_XX_X

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9089	TNLED_6_4K_1_AS_CCB_XX_X
9090	TNLED_6_4K_1_AS_CCB_XX_X
9091	TNLED_6_4K_1_AS_CCB_XX_X
9092	TNLED_6_4K_1_AS_CCB_XX_X
9093	TNLED_6_4K_1_AS_CCB_XX_X
9094	TNLED_6_4K_1_AS_CCB_XX_X
9095	TNLED_6_4K_1_AS_CCB_XX_X
9097	TNLED_6_4K_1_AS_CCB_XX_X
9098	TNLED_6_4K_1_AS_CCB_XX_X
9099	TNLED_6_4K_1_AS_CCB_XX_X
9100	TNLED_6_4K_1_AS_CCB_XX_X
9101	TNLED_6_4K_1_AS_CCB_XX_X
9102	TNLED_6_4K_1_AS_CCB_XX_X
9103	TNLED_6_4K_1_AS_CCB_XX_X
9104	TNLED_6_4K_1_AS_CCB_XX_X
9105	TNLED_6_4K_1_AS_CCB_XX_X
9106	TNLED_6_4K_1_AS_CCB_XX_X
9107	TNLED_6_4K_1_AS_CCB_XX_X
9108	TNLED_6_4K_1_AS_CCB_XX_X
9109	TNLED_6_4K_1_AS_CCB_XX_X
9110	TNLED_6_4K_1_AS_CCB_XX_X
9111	TNLED_6_4K_1_AS_CCB_XX_X
9112	TNLED_6_4K_1_AS_CCB_XX_X
9113	TNLED_6_4K_1_AS_CCB_XX_X
9114	TNLED_6_4K_1_AS_CCB_XX_X
9115	TNLED_6_4K_1_AS_CCB_XX_X
9116	TNLED_6_4K_1_AS_CCB_XX_X
9117	TNLED_6_4K_1_AS_CCB_XX_X
9118	TNLED_6_4K_1_AS_CCB_XX_X
9119	TNLED_6_4K_1_AS_CCB_XX_X
9120	TNLED_6_4K_1_AS_CCB_XX_X
9121	TNLED_6_4K_1_AS_CCB_XX_X
9122	TNLED_6_4K_1_AS_CCB_XX_X
9123	TNLED_6_4K_1_AS_CCB_XX_X
9124	TNLED_6_4K_1_AS_CCB_XX_X
9125	TNLED_6_4K_1_AS_CCB_XX_X
9126	TNLED_6_4K_1_AS_CCB_XX_X
9127	TNLED_6_4K_1_AS_CCB_XX_X
9128	TNLED_6_4K_1_AS_CCB_XX_X
9129	TNLED_6_4K_1_AS_CCB_XX_X
9130	TNLED_6_4K_1_AS_CCB_XX_X
9131	TNLED_6_4K_1_AS_CCB_XX_X
9132	TNLED_6_4K_1_AS_CCB_XX_X
9133	TNLED_6_4K_1_AS_CCB_XX_X
9134	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

9135	TNLED_6_4K_1_AS_CCB_XX_X
9136	TNLED_6_4K_1_AS_CCB_XX_X
9137	TNLED_6_4K_1_AS_CCB_XX_X
9138	TNLED_6_4K_1_AS_CCB_XX_X
9139	TNLED_6_4K_1_AS_CCB_XX_X
9140	TNLED_6_4K_1_AS_CCB_XX_X
9141	TNLED_6_4K_1_AS_CCB_XX_X
9142	TNLED_6_4K_1_AS_CCB_XX_X
9143	TNLED_6_4K_1_AS_CCB_XX_X
9144	TNLED_6_4K_1_AS_CCB_XX_X
9145	TNLED_6_4K_1_AS_CCB_XX_X
9146	TNLED_6_4K_1_AS_CCB_XX_X
9147	TNLED_6_4K_1_AS_CCB_XX_X
9148	TNLED_6_4K_1_AS_CCB_XX_X
9149	TNLED_6_4K_1_AS_CCB_XX_X
9150	TNLED_6_4K_1_AS_CCB_XX_X
9151	TNLED_6_4K_1_AS_CCB_XX_X
9152	TNLED_6_4K_1_AS_CCB_XX_X
9153	TNLED_6_4K_1_AS_CCB_XX_X
9154	TNLED_6_4K_1_AS_CCB_XX_X
9155	TNLED_6_4K_1_AS_CCB_XX_X
9156	TNLED_6_4K_1_AS_CCB_XX_X
9157	TNLED_6_4K_1_AS_CCB_XX_X
9158	TNLED_6_4K_1_AS_CCB_XX_X
9159	TNLED_6_4K_1_AS_CCB_XX_X
9160	TNLED_6_4K_1_AS_CCB_XX_X
9161	TNLED_6_4K_1_AS_CCB_XX_X
9162	TNLED_6_4K_1_AS_CCB_XX_X
9163	TNLED_6_4K_1_AS_CCB_XX_X
9164	TNLED_6_4K_1_AS_CCB_XX_X
9165	TNLED_6_4K_1_AS_CCB_XX_X
9166	TNLED_6_4K_1_AS_CCB_XX_X
9167	TNLED_6_4K_1_AS_CCB_XX_X
9168	TNLED_6_4K_1_AS_CCB_XX_X
9169	TNLED_6_4K_1_AS_CCB_XX_X
9170	TNLED_6_4K_1_AS_CCB_XX_X
9171	TNLED_6_4K_1_AS_CCB_XX_X
9172	TNLED_6_4K_1_AS_CCB_XX_X
9173	TNLED_6_4K_1_AS_CCB_XX_X
9174	TNLED_6_4K_1_AS_CCB_XX_X
9175	TNLED_6_4K_1_AS_CCB_XX_X
9176	TNLED_6_4K_1_AS_CCB_XX_X
9177	TNLED_6_4K_1_AS_CCB_XX_X
9178	TNLED_6_4K_1_AS_CCB_XX_X
9179	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9180	TNLED_6_4K_1_AS_CCB_XX_X
9181	TNLED_6_4K_1_AS_CCB_XX_X
9182	TNLED_6_4K_1_AS_CCB_XX_X
9183	TNLED_6_4K_1_AS_CCB_XX_X
9184	TNLED_6_4K_1_AS_CCB_XX_X
9185	TNLED_6_4K_1_AS_CCB_XX_X
9186	TNLED_6_4K_1_AS_CCB_XX_X
9187	TNLED_6_4K_1_AS_CCB_XX_X
9188	TNLED_6_4K_1_AS_CCB_XX_X
9189	TNLED_6_4K_1_AS_CCB_XX_X
9190	TNLED_6_4K_1_AS_CCB_XX_X
9191	TNLED_6_4K_1_AS_CCB_XX_X
9192	TNLED_6_4K_1_AS_CCB_XX_X
9193	TNLED_6_4K_1_AS_CCB_XX_X
9194	TNLED_6_4K_1_AS_CCB_XX_X
9195	TNLED_6_4K_1_AS_CCB_XX_X
9196	TNLED_6_4K_1_AS_CCB_XX_X
9197	TNLED_6_4K_1_AS_CCB_XX_X
9198	TNLED_6_4K_1_AS_CCB_XX_X
9199	TNLED_6_4K_1_AS_CCB_XX_X
9200	TNLED_6_4K_1_AS_CCB_XX_X
9201	TNLED_6_4K_1_AS_CCB_XX_X
9202	TNLED_6_4K_1_AS_CCB_XX_X
9203	TNLED_6_4K_1_AS_CCB_XX_X
9204	TNLED_6_4K_1_AS_CCB_XX_X
9205	TNLED_6_4K_1_AS_CCB_XX_X
9206	TNLED_6_4K_1_AS_CCB_XX_X
9207	TNLED_6_4K_1_AS_CCB_XX_X
9208	TNLED_6_4K_1_AS_CCB_XX_X
9209	TNLED_6_4K_1_AS_CCB_XX_X
9210	TNLED_6_4K_1_AS_CCB_XX_X
9211	TNLED_6_4K_1_AS_CCB_XX_X
9212	TNLED_6_4K_1_AS_CCB_XX_X
9213	TNLED_6_4K_1_AS_CCB_XX_X
9214	TNLED_6_4K_1_AS_CCB_XX_X
9215	TNLED_6_4K_1_AS_CCB_XX_X
9216	TNLED_6_4K_1_AS_CCB_XX_X
9217	TNLED_6_4K_1_AS_CCB_XX_X
9218	TNLED_6_4K_1_AS_CCB_XX_X
9219	TNLED_6_4K_1_AS_CCB_XX_X
9220	TNLED_6_4K_1_AS_CCB_XX_X
9267	TNLED_6_4K_1_AS_CCB_XX_X
9268	TNLED_6_4K_1_AS_CCB_XX_X
9269	TNLED_6_4K_1_AS_CCB_XX_X
9270	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9271	TNLED_6_4K_1_AS_CCB_XX_X
9272	TNLED_6_4K_1_AS_CCB_XX_X
9273	TNLED_6_4K_1_AS_CCB_XX_X
9274	TNLED_6_4K_1_AS_CCB_XX_X
9275	TNLED_6_4K_1_AS_CCB_XX_X
9276	TNLED_6_4K_1_AS_CCB_XX_X
9277	TNLED_6_4K_1_AS_CCB_XX_X
9278	TNLED_6_4K_1_AS_CCB_XX_X
9279	TNLED_6_4K_1_AS_CCB_XX_X
9280	TNLED_6_4K_1_AS_CCB_XX_X
9281	TNLED_6_4K_1_AS_CCB_XX_X
9282	TNLED_6_4K_1_AS_CCB_XX_X
9283	TNLED_6_4K_1_AS_CCB_XX_X
9284	TNLED_6_4K_1_AS_CCB_XX_X
9286	TNLED_6_4K_1_AS_CCB_XX_X
9287	TNLED_6_4K_1_AS_CCB_XX_X
9288	TNLED_6_4K_1_AS_CCB_XX_X
9289	TNLED_6_4K_1_AS_CCB_XX_X
9290	TNLED_6_4K_1_AS_CCB_XX_X
9291	TNLED_6_4K_1_AS_CCB_XX_X
9292	TNLED_6_4K_1_AS_CCB_XX_X
9293	TNLED_6_4K_1_AS_CCB_XX_X
9294	TNLED_6_4K_1_AS_CCB_XX_X
9295	TNLED_6_4K_1_AS_CCB_XX_X
9296	TNLED_6_4K_1_AS_CCB_XX_X
9297	TNLED_6_4K_1_AS_CCB_XX_X
9298	TNLED_6_4K_1_AS_CCB_XX_X
9299	TNLED_6_4K_1_AS_CCB_XX_X
9300	TNLED_6_4K_1_AS_CCB_XX_X
9301	TNLED_6_4K_1_AS_CCB_XX_X
9302	TNLED_6_4K_1_AS_CCB_XX_X
9303	TNLED_6_4K_1_AS_CCB_XX_X
9304	TNLED_6_4K_1_AS_CCB_XX_X
9305	TNLED_6_4K_1_AS_CCB_XX_X
9306	TNLED_6_4K_1_AS_CCB_XX_X
9307	TNLED_6_4K_1_AS_CCB_XX_X
9308	TNLED_6_4K_1_AS_CCB_XX_X
9309	TNLED_6_4K_1_AS_CCB_XX_X
9310	TNLED_6_4K_1_AS_CCB_XX_X
9311	TNLED_6_4K_1_AS_CCB_XX_X
9312	TNLED_6_4K_1_AS_CCB_XX_X
9313	TNLED_6_4K_1_AS_CCB_XX_X
9314	TNLED_6_4K_1_AS_CCB_XX_X
9315	TNLED_6_4K_1_AS_CCB_XX_X
9316	TNLED_6_4K_1_AS_CCB_XX_X

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Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9317	TNLED_6_4K_1_AS_CCB_XX_X
9318	TNLED_6_4K_1_AS_CCB_XX_X
9319	TNLED_6_4K_1_AS_CCB_XX_X
9320	TNLED_6_4K_1_AS_CCB_XX_X
9321	TNLED_6_4K_1_AS_CCB_XX_X
9322	TNLED_6_4K_1_AS_CCB_XX_X
9323	TNLED_6_4K_1_AS_CCB_XX_X
9324	TNLED_6_4K_1_AS_CCB_XX_X
9325	TNLED_6_4K_1_AS_CCB_XX_X
9326	TNLED_6_4K_1_AS_CCB_XX_X
9327	TNLED_6_4K_1_AS_CCB_XX_X
9328	TNLED_6_4K_1_AS_CCB_XX_X
9329	TNLED_6_4K_1_AS_CCB_XX_X
9330	TNLED_6_4K_1_AS_CCB_XX_X
9331	TNLED_6_4K_1_AS_CCB_XX_X
9332	TNLED_6_4K_1_AS_CCB_XX_X
9333	TNLED_6_4K_1_AS_CCB_XX_X
9334	TNLED_6_4K_1_AS_CCB_XX_X
9335	TNLED_6_4K_1_AS_CCB_XX_X
9336	TNLED_6_4K_1_AS_CCB_XX_X
9337	TNLED_6_4K_1_AS_CCB_XX_X
9338	TNLED_6_4K_1_AS_CCB_XX_X
9339	TNLED_6_4K_1_AS_CCB_XX_X
9340	TNLED_6_4K_1_AS_CCB_XX_X
9341	TNLED_6_4K_1_AS_CCB_XX_X
9342	TNLED_6_4K_1_AS_CCB_XX_X
9343	TNLED_6_4K_1_AS_CCB_XX_X
9344	TNLED_6_4K_1_AS_CCB_XX_X
9345	TNLED_6_4K_1_AS_CCB_XX_X
9346	TNLED_6_4K_1_AS_CCB_XX_X
9347	TNLED_6_4K_1_AS_CCB_XX_X
9348	TNLED_6_4K_1_AS_CCB_XX_X
9349	TNLED_6_4K_1_AS_CCB_XX_X
9350	TNLED_6_4K_1_AS_CCB_XX_X
9351	TNLED_6_4K_1_AS_CCB_XX_X
9352	TNLED_6_4K_1_AS_CCB_XX_X
9353	TNLED_6_4K_1_AS_CCB_XX_X
9354	TNLED_6_4K_1_AS_CCB_XX_X
9355	TNLED_6_4K_1_AS_CCB_XX_X
9356	TNLED_6_4K_1_AS_CCB_XX_X
9357	TNLED_6_4K_1_AS_CCB_XX_X
9358	TNLED_6_4K_1_AS_CCB_XX_X
9359	TNLED_6_4K_1_AS_CCB_XX_X
9360	TNLED_6_4K_1_AS_CCB_XX_X
9361	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

9362	TNLED_6_4K_1_AS_CCB_XX_X
9363	TNLED_6_4K_1_AS_CCB_XX_X
9364	TNLED_6_4K_1_AS_CCB_XX_X
9365	TNLED_6_4K_1_AS_CCB_XX_X
9366	TNLED_6_4K_1_AS_CCB_XX_X
9367	TNLED_6_4K_1_AS_CCB_XX_X
9368	TNLED_6_4K_1_AS_CCB_XX_X
9369	TNLED_6_4K_1_AS_CCB_XX_X
9370	TNLED_6_4K_1_AS_CCB_XX_X
9371	TNLED_6_4K_1_AS_CCB_XX_X
9372	TNLED_6_4K_1_AS_CCB_XX_X
9373	TNLED_6_4K_1_AS_CCB_XX_X
9374	TNLED_6_4K_1_AS_CCB_XX_X
9375	TNLED_6_4K_1_AS_CCB_XX_X
9376	TNLED_6_4K_1_AS_CCB_XX_X
9377	TNLED_6_4K_1_AS_CCB_XX_X
9378	TNLED_6_4K_1_AS_CCB_XX_X
9379	TNLED_6_4K_1_AS_CCB_XX_X
9380	TNLED_6_4K_1_AS_CCB_XX_X
9381	TNLED_6_4K_1_AS_CCB_XX_X
9382	TNLED_6_4K_1_AS_CCB_XX_X
9383	TNLED_6_4K_1_AS_CCB_XX_X
9384	TNLED_6_4K_1_AS_CCB_XX_X
9385	TNLED_6_4K_1_AS_CCB_XX_X
9386	TNLED_6_4K_1_AS_CCB_XX_X
9387	TNLED_6_4K_1_AS_CCB_XX_X
9388	TNLED_6_4K_1_AS_CCB_XX_X
9389	TNLED_6_4K_1_AS_CCB_XX_X
9390	TNLED_6_4K_1_AS_CCB_XX_X
9391	TNLED_6_4K_1_AS_CCB_XX_X
9392	TNLED_6_4K_1_AS_CCB_XX_X
9393	TNLED_6_4K_1_AS_CCB_XX_X
9394	TNLED_6_4K_1_AS_CCB_XX_X
9395	TNLED_6_4K_1_AS_CCB_XX_X
9396	TNLED_6_4K_1_AS_CCB_XX_X
9397	TNLED_6_4K_1_AS_CCB_XX_X
9398	TNLED_6_4K_1_AS_CCB_XX_X
9399	TNLED_6_4K_1_AS_CCB_XX_X
9444	TNLED_6_4K_1_AS_CCB_XX_X
9445	TNLED_6_4K_1_AS_CCB_XX_X
9446	TNLED_6_4K_1_AS_CCB_XX_X
9447	TNLED_6_4K_1_AS_CCB_XX_X
9448	TNLED_6_4K_1_AS_CCB_XX_X
9449	TNLED_6_4K_1_AS_CCB_XX_X
9450	TNLED_6_4K_1_AS_CCB_XX_X

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9451	TNLED_6_4K_1_AS_CCB_XX_X
9453	TNLED_6_4K_1_AS_CCB_XX_X
9454	TNLED_6_4K_1_AS_CCB_XX_X
9455	TNLED_6_4K_1_AS_CCB_XX_X
9456	TNLED_6_4K_1_AS_CCB_XX_X
9457	TNLED_6_4K_1_AS_CCB_XX_X
9458	TNLED_6_4K_1_AS_CCB_XX_X
9459	TNLED_6_4K_1_AS_CCB_XX_X
9460	TNLED_6_4K_1_AS_CCB_XX_X
9461	TNLED_6_4K_1_AS_CCB_XX_X
9462	TNLED_6_4K_1_AS_CCB_XX_X
9463	TNLED_6_4K_1_AS_CCB_XX_X
9464	TNLED_6_4K_1_AS_CCB_XX_X
9465	TNLED_6_4K_1_AS_CCB_XX_X
9466	TNLED_6_4K_1_AS_CCB_XX_X
9467	TNLED_6_4K_1_AS_CCB_XX_X
9468	TNLED_6_4K_1_AS_CCB_XX_X
9469	TNLED_6_4K_1_AS_CCB_XX_X
9470	TNLED_6_4K_1_AS_CCB_XX_X
9471	TNLED_6_4K_1_AS_CCB_XX_X
9472	TNLED_6_4K_1_AS_CCB_XX_X
9473	TNLED_6_4K_1_AS_CCB_XX_X
9474	TNLED_6_4K_1_AS_CCB_XX_X
9475	TNLED_6_4K_1_AS_CCB_XX_X
9476	TNLED_6_4K_1_AS_CCB_XX_X
9477	TNLED_6_4K_1_AS_CCB_XX_X
9478	TNLED_6_4K_1_AS_CCB_XX_X
9479	TNLED_6_4K_1_AS_CCB_XX_X
9480	TNLED_6_4K_1_AS_CCB_XX_X
9481	TNLED_6_4K_1_AS_CCB_XX_X
9482	TNLED_6_4K_1_AS_CCB_XX_X
9483	TNLED_6_4K_1_AS_CCB_XX_X
9484	TNLED_6_4K_1_AS_CCB_XX_X
9485	TNLED_6_4K_1_AS_CCB_XX_X
9486	TNLED_6_4K_1_AS_CCB_XX_X
9487	TNLED_6_4K_1_AS_CCB_XX_X
9488	TNLED_6_4K_1_AS_CCB_XX_X
9489	TNLED_6_4K_1_AS_CCB_XX_X
9490	TNLED_6_4K_1_AS_CCB_XX_X
9491	TNLED_6_4K_1_AS_CCB_XX_X
9492	TNLED_6_4K_1_AS_CCB_XX_X
9493	TNLED_6_4K_1_AS_CCB_XX_X
9494	TNLED_6_4K_1_AS_CCB_XX_X
9495	TNLED_6_4K_1_AS_CCB_XX_X
9496	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

9497	TNLED_6_4K_1_AS_CCB_XX_X
9498	TNLED_6_4K_1_AS_CCB_XX_X
9499	TNLED_6_4K_1_AS_CCB_XX_X
9500	TNLED_6_4K_1_AS_CCB_XX_X
9501	TNLED_6_4K_1_AS_CCB_XX_X
9502	TNLED_6_4K_1_AS_CCB_XX_X
9503	TNLED_6_4K_1_AS_CCB_XX_X
9504	TNLED_6_4K_1_AS_CCB_XX_X
9505	TNLED_6_4K_1_AS_CCB_XX_X
9506	TNLED_6_4K_1_AS_CCB_XX_X
9507	TNLED_6_4K_1_AS_CCB_XX_X
9508	TNLED_6_4K_1_AS_CCB_XX_X
9509	TNLED_6_4K_1_AS_CCB_XX_X
9510	TNLED_6_4K_1_AS_CCB_XX_X
9511	TNLED_6_4K_1_AS_CCB_XX_X
9512	TNLED_6_4K_1_AS_CCB_XX_X
9513	TNLED_6_4K_1_AS_CCB_XX_X
9514	TNLED_6_4K_1_AS_CCB_XX_X
9515	TNLED_6_4K_1_AS_CCB_XX_X
9516	TNLED_6_4K_1_AS_CCB_XX_X
9517	TNLED_6_4K_1_AS_CCB_XX_X
9518	TNLED_6_4K_1_AS_CCB_XX_X
9519	TNLED_6_4K_1_AS_CCB_XX_X
9520	TNLED_6_4K_1_AS_CCB_XX_X
9521	TNLED_6_4K_1_AS_CCB_XX_X
9522	TNLED_6_4K_1_AS_CCB_XX_X
9523	TNLED_6_4K_1_AS_CCB_XX_X
9524	TNLED_6_4K_1_AS_CCB_XX_X
9525	TNLED_6_4K_1_AS_CCB_XX_X
9526	TNLED_6_4K_1_AS_CCB_XX_X
9527	TNLED_6_4K_1_AS_CCB_XX_X
9528	TNLED_6_4K_1_AS_CCB_XX_X
9529	TNLED_6_4K_1_AS_CCB_XX_X
9530	TNLED_6_4K_1_AS_CCB_XX_X
9531	TNLED_6_4K_1_AS_CCB_XX_X
9532	TNLED_6_4K_1_AS_CCB_XX_X
9533	TNLED_6_4K_1_AS_CCB_XX_X
9534	TNLED_6_4K_1_AS_CCB_XX_X
9535	TNLED_6_4K_1_AS_CCB_XX_X
9536	TNLED_6_4K_1_AS_CCB_XX_X
9537	TNLED_6_4K_1_AS_CCB_XX_X
9538	TNLED_6_4K_1_AS_CCB_XX_X
9539	TNLED_6_4K_1_AS_CCB_XX_X
9540	TNLED_6_4K_1_AS_CCB_XX_X
9541	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9542	TNLED_6_4K_1_AS_CCB_XX_X
9543	TNLED_6_4K_1_AS_CCB_XX_X
9544	TNLED_6_4K_1_AS_CCB_XX_X
9545	TNLED_6_4K_1_AS_CCB_XX_X
9546	TNLED_6_4K_1_AS_CCB_XX_X
9547	TNLED_6_4K_1_AS_CCB_XX_X
9548	TNLED_6_4K_1_AS_CCB_XX_X
9549	TNLED_6_4K_1_AS_CCB_XX_X
9550	TNLED_6_4K_1_AS_CCB_XX_X
9551	TNLED_6_4K_1_AS_CCB_XX_X
9552	TNLED_6_4K_1_AS_CCB_XX_X
9553	TNLED_6_4K_1_AS_CCB_XX_X
9554	TNLED_6_4K_1_AS_CCB_XX_X
9555	TNLED_6_4K_1_AS_CCB_XX_X
9556	TNLED_6_4K_1_AS_CCB_XX_X
9557	TNLED_6_4K_1_AS_CCB_XX_X
9558	TNLED_6_4K_1_AS_CCB_XX_X
9559	TNLED_6_4K_1_AS_CCB_XX_X
9560	TNLED_6_4K_1_AS_CCB_XX_X
9561	TNLED_6_4K_1_AS_CCB_XX_X
9562	TNLED_6_4K_1_AS_CCB_XX_X
9563	TNLED_6_4K_1_AS_CCB_XX_X
9564	TNLED_6_4K_1_AS_CCB_XX_X
9565	TNLED_6_4K_1_AS_CCB_XX_X
9566	TNLED_6_4K_1_AS_CCB_XX_X
9567	TNLED_6_4K_1_AS_CCB_XX_X
9568	TNLED_6_4K_1_AS_CCB_XX_X
9569	TNLED_6_4K_1_AS_CCB_XX_X
9570	TNLED_6_4K_1_AS_CCB_XX_X
9571	TNLED_6_4K_1_AS_CCB_XX_X
9572	TNLED_6_4K_1_AS_CCB_XX_X
9573	TNLED_6_4K_1_AS_CCB_XX_X
9574	TNLED_6_4K_1_AS_CCB_XX_X
9575	TNLED_6_4K_1_AS_CCB_XX_X
9576	TNLED_6_4K_1_AS_CCB_XX_X
9623	TNLED_6_4K_1_AS_CCB_XX_X
9624	TNLED_6_4K_1_AS_CCB_XX_X
9625	TNLED_6_4K_1_AS_CCB_XX_X
9626	TNLED_6_4K_1_AS_CCB_XX_X
9627	TNLED_6_4K_1_AS_CCB_XX_X
9628	TNLED_6_4K_1_AS_CCB_XX_X
9629	TNLED_6_4K_1_AS_CCB_XX_X
9630	TNLED_6_4K_1_AS_CCB_XX_X
9631	TNLED_6_4K_1_AS_CCB_XX_X
9632	TNLED_6_4K_1_AS_CCB_XX_X

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Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9633	TNLED_6_4K_1_AS_CCB_XX_X
9634	TNLED_6_4K_1_AS_CCB_XX_X
9635	TNLED_6_4K_1_AS_CCB_XX_X
9636	TNLED_6_4K_1_AS_CCB_XX_X
9637	TNLED_6_4K_1_AS_CCB_XX_X
9638	TNLED_6_4K_1_AS_CCB_XX_X
9639	TNLED_6_4K_1_AS_CCB_XX_X
9640	TNLED_6_4K_1_AS_CCB_XX_X
9642	TNLED_6_4K_1_AS_CCB_XX_X
9643	TNLED_6_4K_1_AS_CCB_XX_X
9644	TNLED_6_4K_1_AS_CCB_XX_X
9645	TNLED_6_4K_1_AS_CCB_XX_X
9646	TNLED_6_4K_1_AS_CCB_XX_X
9647	TNLED_6_4K_1_AS_CCB_XX_X
9648	TNLED_6_4K_1_AS_CCB_XX_X
9649	TNLED_6_4K_1_AS_CCB_XX_X
9650	TNLED_6_4K_1_AS_CCB_XX_X
9651	TNLED_6_4K_1_AS_CCB_XX_X
9652	TNLED_6_4K_1_AS_CCB_XX_X
9653	TNLED_6_4K_1_AS_CCB_XX_X
9654	TNLED_6_4K_1_AS_CCB_XX_X
9655	TNLED_6_4K_1_AS_CCB_XX_X
9656	TNLED_6_4K_1_AS_CCB_XX_X
9657	TNLED_6_4K_1_AS_CCB_XX_X
9658	TNLED_6_4K_1_AS_CCB_XX_X
9659	TNLED_6_4K_1_AS_CCB_XX_X
9660	TNLED_6_4K_1_AS_CCB_XX_X
9661	TNLED_6_4K_1_AS_CCB_XX_X
9662	TNLED_6_4K_1_AS_CCB_XX_X
9663	TNLED_6_4K_1_AS_CCB_XX_X
9664	TNLED_6_4K_1_AS_CCB_XX_X
9665	TNLED_6_4K_1_AS_CCB_XX_X
9666	TNLED_6_4K_1_AS_CCB_XX_X
9667	TNLED_6_4K_1_AS_CCB_XX_X
9668	TNLED_6_4K_1_AS_CCB_XX_X
9669	TNLED_6_4K_1_AS_CCB_XX_X
9670	TNLED_6_4K_1_AS_CCB_XX_X
9671	TNLED_6_4K_1_AS_CCB_XX_X
9672	TNLED_6_4K_1_AS_CCB_XX_X
9673	TNLED_6_4K_1_AS_CCB_XX_X
9674	TNLED_6_4K_1_AS_CCB_XX_X
9675	TNLED_6_4K_1_AS_CCB_XX_X
9676	TNLED_6_4K_1_AS_CCB_XX_X
9677	TNLED_6_4K_1_AS_CCB_XX_X
9678	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

9679	TNLED_6_4K_1_AS_CCB_XX_X
9680	TNLED_6_4K_1_AS_CCB_XX_X
9681	TNLED_6_4K_1_AS_CCB_XX_X
9682	TNLED_6_4K_1_AS_CCB_XX_X
9683	TNLED_6_4K_1_AS_CCB_XX_X
9684	TNLED_6_4K_1_AS_CCB_XX_X
9685	TNLED_6_4K_1_AS_CCB_XX_X
9686	TNLED_6_4K_1_AS_CCB_XX_X
9687	TNLED_6_4K_1_AS_CCB_XX_X
9688	TNLED_6_4K_1_AS_CCB_XX_X
9689	TNLED_6_4K_1_AS_CCB_XX_X
9690	TNLED_6_4K_1_AS_CCB_XX_X
9691	TNLED_6_4K_1_AS_CCB_XX_X
9692	TNLED_6_4K_1_AS_CCB_XX_X
9693	TNLED_6_4K_1_AS_CCB_XX_X
9694	TNLED_6_4K_1_AS_CCB_XX_X
9695	TNLED_6_4K_1_AS_CCB_XX_X
9696	TNLED_6_4K_1_AS_CCB_XX_X
9697	TNLED_6_4K_1_AS_CCB_XX_X
9698	TNLED_6_4K_1_AS_CCB_XX_X
9699	TNLED_6_4K_1_AS_CCB_XX_X
9700	TNLED_6_4K_1_AS_CCB_XX_X
9701	TNLED_6_4K_1_AS_CCB_XX_X
9702	TNLED_6_4K_1_AS_CCB_XX_X
9703	TNLED_6_4K_1_AS_CCB_XX_X
9704	TNLED_6_4K_1_AS_CCB_XX_X
9705	TNLED_6_4K_1_AS_CCB_XX_X
9706	TNLED_6_4K_1_AS_CCB_XX_X
9707	TNLED_6_4K_1_AS_CCB_XX_X
9708	TNLED_6_4K_1_AS_CCB_XX_X
9709	TNLED_6_4K_1_AS_CCB_XX_X
9710	TNLED_6_4K_1_AS_CCB_XX_X
9711	TNLED_6_4K_1_AS_CCB_XX_X
9712	TNLED_6_4K_1_AS_CCB_XX_X
9713	TNLED_6_4K_1_AS_CCB_XX_X
9714	TNLED_6_4K_1_AS_CCB_XX_X
9715	TNLED_6_4K_1_AS_CCB_XX_X
9716	TNLED_6_4K_1_AS_CCB_XX_X
9717	TNLED_6_4K_1_AS_CCB_XX_X
9718	TNLED_6_4K_1_AS_CCB_XX_X
9719	TNLED_6_4K_1_AS_CCB_XX_X
9720	TNLED_6_4K_1_AS_CCB_XX_X
9721	TNLED_6_4K_1_AS_CCB_XX_X
9722	TNLED_6_4K_1_AS_CCB_XX_X
9723	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

			9724	TNLED_6_4K_1_AS_CCB_XX_X
			9725	TNLED_6_4K_1_AS_CCB_XX_X
			9726	TNLED_6_4K_1_AS_CCB_XX_X
			9727	TNLED_6_4K_1_AS_CCB_XX_X
			9728	TNLED_6_4K_1_AS_CCB_XX_X
			9729	TNLED_6_4K_1_AS_CCB_XX_X
			9730	TNLED_6_4K_1_AS_CCB_XX_X
			9731	TNLED_6_4K_1_AS_CCB_XX_X
			9732	TNLED_6_4K_1_AS_CCB_XX_X
			9733	TNLED_6_4K_1_AS_CCB_XX_X
			9734	TNLED_6_4K_1_AS_CCB_XX_X
			9735	TNLED_6_4K_1_AS_CCB_XX_X
			9736	TNLED_6_4K_1_AS_CCB_XX_X
			9737	TNLED_6_4K_1_AS_CCB_XX_X
			9738	TNLED_6_4K_1_AS_CCB_XX_X
			9739	TNLED_6_4K_1_AS_CCB_XX_X
			9740	TNLED_6_4K_1_AS_CCB_XX_X
			9741	TNLED_6_4K_1_AS_CCB_XX_X
			9742	TNLED_6_4K_1_AS_CCB_XX_X
			9743	TNLED_6_4K_1_AS_CCB_XX_X
			9744	TNLED_6_4K_1_AS_CCB_XX_X
			9745	TNLED_6_4K_1_AS_CCB_XX_X
			9746	TNLED_6_4K_1_AS_CCB_XX_X
			9747	TNLED_6_4K_1_AS_CCB_XX_X
			9748	TNLED_6_4K_1_AS_CCB_XX_X
			9749	TNLED_6_4K_1_AS_CCB_XX_X
			9750	TNLED_6_4K_1_AS_CCB_XX_X
			9751	TNLED_6_4K_1_AS_CCB_XX_X
			9752	TNLED_6_4K_1_AS_CCB_XX_X
			9753	TNLED_6_4K_1_AS_CCB_XX_X
			9754	TNLED_6_4K_1_AS_CCB_XX_X
			9755	TNLED_6_4K_1_AS_CCB_XX_X
			10488	TNLED_6_4K_1_AS_CCB_XX_X
			10489	TNLED_6_4K_1_AS_CCB_XX_X
			10490	TNLED_6_4K_1_AS_CCB_XX_X
			10491	TNLED_6_4K_1_AS_CCB_XX_X
			10492	TNLED_6_4K_1_AS_CCB_XX_X
			10493	TNLED_6_4K_1_AS_CCB_XX_X
D5		On	1.00	8866 TNLED_6_4K_1_AS_CCB_XX_X
				8867 TNLED_6_4K_1_AS_CCB_XX_X
				8868 TNLED_6_4K_1_AS_CCB_XX_X
				8869 TNLED_6_4K_1_AS_CCB_XX_X
				8870 TNLED_6_4K_1_AS_CCB_XX_X
				8871 TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

8872	TNLED_6_4K_1_AS_CCB_XX_X
8873	TNLED_6_4K_1_AS_CCB_XX_X
8874	TNLED_6_4K_1_AS_CCB_XX_X
8875	TNLED_6_4K_1_AS_CCB_XX_X
8876	TNLED_6_4K_1_AS_CCB_XX_X
8877	TNLED_6_4K_1_AS_CCB_XX_X
8878	TNLED_6_4K_1_AS_CCB_XX_X
8879	TNLED_6_4K_1_AS_CCB_XX_X
8880	TNLED_6_4K_1_AS_CCB_XX_X
8881	TNLED_6_4K_1_AS_CCB_XX_X
8882	TNLED_6_4K_1_AS_CCB_XX_X
8883	TNLED_6_4K_1_AS_CCB_XX_X
8884	TNLED_6_4K_1_AS_CCB_XX_X
8885	TNLED_6_4K_1_AS_CCB_XX_X
8886	TNLED_6_4K_1_AS_CCB_XX_X
8887	TNLED_6_4K_1_AS_CCB_XX_X
8888	TNLED_6_4K_1_AS_CCB_XX_X
8889	TNLED_6_4K_1_AS_CCB_XX_X
8890	TNLED_6_4K_1_AS_CCB_XX_X
8891	TNLED_6_4K_1_AS_CCB_XX_X
8892	TNLED_6_4K_1_AS_CCB_XX_X
8893	TNLED_6_4K_1_AS_CCB_XX_X
8894	TNLED_6_4K_1_AS_CCB_XX_X
8895	TNLED_6_4K_1_AS_CCB_XX_X
8896	TNLED_6_4K_1_AS_CCB_XX_X
8897	TNLED_6_4K_1_AS_CCB_XX_X
8898	TNLED_6_4K_1_AS_CCB_XX_X
8899	TNLED_6_4K_1_AS_CCB_XX_X
8900	TNLED_6_4K_1_AS_CCB_XX_X
8901	TNLED_6_4K_1_AS_CCB_XX_X
8902	TNLED_6_4K_1_AS_CCB_XX_X
8903	TNLED_6_4K_1_AS_CCB_XX_X
8904	TNLED_6_4K_1_AS_CCB_XX_X
8905	TNLED_6_4K_1_AS_CCB_XX_X
8906	TNLED_6_4K_1_AS_CCB_XX_X
8907	TNLED_6_4K_1_AS_CCB_XX_X
8908	TNLED_6_4K_1_AS_CCB_XX_X
8909	TNLED_6_4K_1_AS_CCB_XX_X
8918	TNLED_6_4K_1_AS_CCB_XX_X
9222	TNLED_6_4K_1_AS_CCB_XX_X
9223	TNLED_6_4K_1_AS_CCB_XX_X
9224	TNLED_6_4K_1_AS_CCB_XX_X
9225	TNLED_6_4K_1_AS_CCB_XX_X
9226	TNLED_6_4K_1_AS_CCB_XX_X
9227	TNLED_6_4K_1_AS_CCB_XX_X

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9228	TNLED_6_4K_1_AS_CCB_XX_X
9229	TNLED_6_4K_1_AS_CCB_XX_X
9230	TNLED_6_4K_1_AS_CCB_XX_X
9231	TNLED_6_4K_1_AS_CCB_XX_X
9232	TNLED_6_4K_1_AS_CCB_XX_X
9233	TNLED_6_4K_1_AS_CCB_XX_X
9234	TNLED_6_4K_1_AS_CCB_XX_X
9235	TNLED_6_4K_1_AS_CCB_XX_X
9236	TNLED_6_4K_1_AS_CCB_XX_X
9237	TNLED_6_4K_1_AS_CCB_XX_X
9238	TNLED_6_4K_1_AS_CCB_XX_X
9239	TNLED_6_4K_1_AS_CCB_XX_X
9240	TNLED_6_4K_1_AS_CCB_XX_X
9241	TNLED_6_4K_1_AS_CCB_XX_X
9242	TNLED_6_4K_1_AS_CCB_XX_X
9243	TNLED_6_4K_1_AS_CCB_XX_X
9244	TNLED_6_4K_1_AS_CCB_XX_X
9245	TNLED_6_4K_1_AS_CCB_XX_X
9246	TNLED_6_4K_1_AS_CCB_XX_X
9247	TNLED_6_4K_1_AS_CCB_XX_X
9248	TNLED_6_4K_1_AS_CCB_XX_X
9249	TNLED_6_4K_1_AS_CCB_XX_X
9250	TNLED_6_4K_1_AS_CCB_XX_X
9251	TNLED_6_4K_1_AS_CCB_XX_X
9252	TNLED_6_4K_1_AS_CCB_XX_X
9253	TNLED_6_4K_1_AS_CCB_XX_X
9254	TNLED_6_4K_1_AS_CCB_XX_X
9255	TNLED_6_4K_1_AS_CCB_XX_X
9256	TNLED_6_4K_1_AS_CCB_XX_X
9257	TNLED_6_4K_1_AS_CCB_XX_X
9258	TNLED_6_4K_1_AS_CCB_XX_X
9259	TNLED_6_4K_1_AS_CCB_XX_X
9260	TNLED_6_4K_1_AS_CCB_XX_X
9261	TNLED_6_4K_1_AS_CCB_XX_X
9262	TNLED_6_4K_1_AS_CCB_XX_X
9263	TNLED_6_4K_1_AS_CCB_XX_X
9264	TNLED_6_4K_1_AS_CCB_XX_X
9265	TNLED_6_4K_1_AS_CCB_XX_X
9266	TNLED_6_4K_1_AS_CCB_XX_X
9578	TNLED_6_4K_1_AS_CCB_XX_X
9579	TNLED_6_4K_1_AS_CCB_XX_X
9580	TNLED_6_4K_1_AS_CCB_XX_X
9581	TNLED_6_4K_1_AS_CCB_XX_X
9582	TNLED_6_4K_1_AS_CCB_XX_X
9583	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9584	TNLED_6_4K_1_AS_CCB_XX_X
9585	TNLED_6_4K_1_AS_CCB_XX_X
9586	TNLED_6_4K_1_AS_CCB_XX_X
9587	TNLED_6_4K_1_AS_CCB_XX_X
9588	TNLED_6_4K_1_AS_CCB_XX_X
9589	TNLED_6_4K_1_AS_CCB_XX_X
9590	TNLED_6_4K_1_AS_CCB_XX_X
9591	TNLED_6_4K_1_AS_CCB_XX_X
9592	TNLED_6_4K_1_AS_CCB_XX_X
9593	TNLED_6_4K_1_AS_CCB_XX_X
9594	TNLED_6_4K_1_AS_CCB_XX_X
9595	TNLED_6_4K_1_AS_CCB_XX_X
9596	TNLED_6_4K_1_AS_CCB_XX_X
9597	TNLED_6_4K_1_AS_CCB_XX_X
9598	TNLED_6_4K_1_AS_CCB_XX_X
9599	TNLED_6_4K_1_AS_CCB_XX_X
9600	TNLED_6_4K_1_AS_CCB_XX_X
9601	TNLED_6_4K_1_AS_CCB_XX_X
9602	TNLED_6_4K_1_AS_CCB_XX_X
9603	TNLED_6_4K_1_AS_CCB_XX_X
9604	TNLED_6_4K_1_AS_CCB_XX_X
9605	TNLED_6_4K_1_AS_CCB_XX_X
9606	TNLED_6_4K_1_AS_CCB_XX_X
9607	TNLED_6_4K_1_AS_CCB_XX_X
9608	TNLED_6_4K_1_AS_CCB_XX_X
9609	TNLED_6_4K_1_AS_CCB_XX_X
9610	TNLED_6_4K_1_AS_CCB_XX_X
9611	TNLED_6_4K_1_AS_CCB_XX_X
9612	TNLED_6_4K_1_AS_CCB_XX_X
9613	TNLED_6_4K_1_AS_CCB_XX_X
9614	TNLED_6_4K_1_AS_CCB_XX_X
9615	TNLED_6_4K_1_AS_CCB_XX_X
9616	TNLED_6_4K_1_AS_CCB_XX_X
9617	TNLED_6_4K_1_AS_CCB_XX_X
9618	TNLED_6_4K_1_AS_CCB_XX_X
9619	TNLED_6_4K_1_AS_CCB_XX_X
9620	TNLED_6_4K_1_AS_CCB_XX_X
9621	TNLED_6_4K_1_AS_CCB_XX_X
9622	TNLED_6_4K_1_AS_CCB_XX_X
10409	TNLED_6_4K_1_AS_CCB_XX_X
10410	TNLED_6_4K_1_AS_CCB_XX_X
10411	TNLED_6_4K_1_AS_CCB_XX_X
10412	TNLED_6_4K_1_AS_CCB_XX_X
10413	TNLED_6_4K_1_AS_CCB_XX_X
10414	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10415	TNLED_6_4K_1_AS_CCB_XX_X
10416	TNLED_6_4K_1_AS_CCB_XX_X
10417	TNLED_6_4K_1_AS_CCB_XX_X
10418	TNLED_6_4K_1_AS_CCB_XX_X
10419	TNLED_6_4K_1_AS_CCB_XX_X
10420	TNLED_6_4K_1_AS_CCB_XX_X
10421	TNLED_6_4K_1_AS_CCB_XX_X
10423	TNLED_6_4K_1_AS_CCB_XX_X
10424	TNLED_6_4K_1_AS_CCB_XX_X
10425	TNLED_6_4K_1_AS_CCB_XX_X
10426	TNLED_6_4K_1_AS_CCB_XX_X
10427	TNLED_6_4K_1_AS_CCB_XX_X
10428	TNLED_6_4K_1_AS_CCB_XX_X
10429	TNLED_6_4K_1_AS_CCB_XX_X
10430	TNLED_6_4K_1_AS_CCB_XX_X
10431	TNLED_6_4K_1_AS_CCB_XX_X
10432	TNLED_6_4K_1_AS_CCB_XX_X
10433	TNLED_6_4K_1_AS_CCB_XX_X
10434	TNLED_6_4K_1_AS_CCB_XX_X
10435	TNLED_6_4K_1_AS_CCB_XX_X
10436	TNLED_6_4K_1_AS_CCB_XX_X
10437	TNLED_6_4K_1_AS_CCB_XX_X
10438	TNLED_6_4K_1_AS_CCB_XX_X
10439	TNLED_6_4K_1_AS_CCB_XX_X
10440	TNLED_6_4K_1_AS_CCB_XX_X
10441	TNLED_6_4K_1_AS_CCB_XX_X
10442	TNLED_6_4K_1_AS_CCB_XX_X
10443	TNLED_6_4K_1_AS_CCB_XX_X
10444	TNLED_6_4K_1_AS_CCB_XX_X
10445	TNLED_6_4K_1_AS_CCB_XX_X
10446	TNLED_6_4K_1_AS_CCB_XX_X
10447	TNLED_6_4K_1_AS_CCB_XX_X
10448	TNLED_6_4K_1_AS_CCB_XX_X
10449	TNLED_6_4K_1_AS_CCB_XX_X
10450	TNLED_6_4K_1_AS_CCB_XX_X
10451	TNLED_6_4K_1_AS_CCB_XX_X
10452	TNLED_6_4K_1_AS_CCB_XX_X
10453	TNLED_6_4K_1_AS_CCB_XX_X
10454	TNLED_6_4K_1_AS_CCB_XX_X
10455	TNLED_6_4K_1_AS_CCB_XX_X
10456	TNLED_6_4K_1_AS_CCB_XX_X
10457	TNLED_6_4K_1_AS_CCB_XX_X
10458	TNLED_6_4K_1_AS_CCB_XX_X
10459	TNLED_6_4K_1_AS_CCB_XX_X
10460	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

10461	TNLED_6_4K_1_AS_CCB_XX_X
10462	TNLED_6_4K_1_AS_CCB_XX_X
10463	TNLED_6_4K_1_AS_CCB_XX_X
10464	TNLED_6_4K_1_AS_CCB_XX_X
10465	TNLED_6_4K_1_AS_CCB_XX_X
10466	TNLED_6_4K_1_AS_CCB_XX_X
10467	TNLED_6_4K_1_AS_CCB_XX_X
10468	TNLED_6_4K_1_AS_CCB_XX_X
10469	TNLED_6_4K_1_AS_CCB_XX_X
10470	TNLED_6_4K_1_AS_CCB_XX_X
10471	TNLED_6_4K_1_AS_CCB_XX_X
10472	TNLED_6_4K_1_AS_CCB_XX_X
10473	TNLED_6_4K_1_AS_CCB_XX_X
10474	TNLED_6_4K_1_AS_CCB_XX_X
10475	TNLED_6_4K_1_AS_CCB_XX_X
10476	TNLED_6_4K_1_AS_CCB_XX_X
10477	TNLED_6_4K_1_AS_CCB_XX_X
10478	TNLED_6_4K_1_AS_CCB_XX_X
10479	TNLED_6_4K_1_AS_CCB_XX_X
10480	TNLED_6_4K_1_AS_CCB_XX_X
10481	TNLED_6_4K_1_AS_CCB_XX_X
10482	TNLED_6_4K_1_AS_CCB_XX_X
10483	TNLED_6_4K_1_AS_CCB_XX_X
10484	TNLED_6_4K_1_AS_CCB_XX_X
10485	TNLED_6_4K_1_AS_CCB_XX_X
10486	TNLED_6_4K_1_AS_CCB_XX_X
10487	TNLED_6_4K_1_AS_CCB_XX_X
10494	TNLED_6_4K_1_AS_CCB_XX_X
10495	TNLED_6_4K_1_AS_CCB_XX_X
10496	TNLED_6_4K_1_AS_CCB_XX_X
10497	TNLED_6_4K_1_AS_CCB_XX_X
10498	TNLED_6_4K_1_AS_CCB_XX_X
10499	TNLED_6_4K_1_AS_CCB_XX_X
10500	TNLED_6_4K_1_AS_CCB_XX_X
10501	TNLED_6_4K_1_AS_CCB_XX_X
10502	TNLED_6_4K_1_AS_CCB_XX_X
10503	TNLED_6_4K_1_AS_CCB_XX_X
10504	TNLED_6_4K_1_AS_CCB_XX_X
10505	TNLED_6_4K_1_AS_CCB_XX_X
10506	TNLED_6_4K_1_AS_CCB_XX_X
10507	TNLED_6_4K_1_AS_CCB_XX_X
10508	TNLED_6_4K_1_AS_CCB_XX_X
10509	TNLED_6_4K_1_AS_CCB_XX_X
10510	TNLED_6_4K_1_AS_CCB_XX_X
10511	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10512	TNLED_6_4K_1_AS_CCB_XX_X
10513	TNLED_6_4K_1_AS_CCB_XX_X
10514	TNLED_6_4K_1_AS_CCB_XX_X
10515	TNLED_6_4K_1_AS_CCB_XX_X
10516	TNLED_6_4K_1_AS_CCB_XX_X
10517	TNLED_6_4K_1_AS_CCB_XX_X
10518	TNLED_6_4K_1_AS_CCB_XX_X
10519	TNLED_6_4K_1_AS_CCB_XX_X
10520	TNLED_6_4K_1_AS_CCB_XX_X
10521	TNLED_6_4K_1_AS_CCB_XX_X
10522	TNLED_6_4K_1_AS_CCB_XX_X
10523	TNLED_6_4K_1_AS_CCB_XX_X
10524	TNLED_6_4K_1_AS_CCB_XX_X
10525	TNLED_6_4K_1_AS_CCB_XX_X
10526	TNLED_6_4K_1_AS_CCB_XX_X
10527	TNLED_6_4K_1_AS_CCB_XX_X
10528	TNLED_6_4K_1_AS_CCB_XX_X
10529	TNLED_6_4K_1_AS_CCB_XX_X
10530	TNLED_6_4K_1_AS_CCB_XX_X
10531	TNLED_6_4K_1_AS_CCB_XX_X
10532	TNLED_6_4K_1_AS_CCB_XX_X
10533	TNLED_6_4K_1_AS_CCB_XX_X
10534	TNLED_6_4K_1_AS_CCB_XX_X
10535	TNLED_6_4K_1_AS_CCB_XX_X
10536	TNLED_6_4K_1_AS_CCB_XX_X
10537	TNLED_6_4K_1_AS_CCB_XX_X
10538	TNLED_6_4K_1_AS_CCB_XX_X
10539	TNLED_6_4K_1_AS_CCB_XX_X
10540	TNLED_6_4K_1_AS_CCB_XX_X
10541	TNLED_6_4K_1_AS_CCB_XX_X
10542	TNLED_6_4K_1_AS_CCB_XX_X
10543	TNLED_6_4K_1_AS_CCB_XX_X
10544	TNLED_6_4K_1_AS_CCB_XX_X
10545	TNLED_6_4K_1_AS_CCB_XX_X
10546	TNLED_6_4K_1_AS_CCB_XX_X
10547	TNLED_6_4K_1_AS_CCB_XX_X
10548	TNLED_6_4K_1_AS_CCB_XX_X
10549	TNLED_6_4K_1_AS_CCB_XX_X
10550	TNLED_6_4K_1_AS_CCB_XX_X
10551	TNLED_6_4K_1_AS_CCB_XX_X
10552	TNLED_6_4K_1_AS_CCB_XX_X
10553	TNLED_6_4K_1_AS_CCB_XX_X
10554	TNLED_6_4K_1_AS_CCB_XX_X
10555	TNLED_6_4K_1_AS_CCB_XX_X
10556	TNLED_6_4K_1_AS_CCB_XX_X

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Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

10557	TNLED_6_4K_1_AS_CCB_XX_X
10558	TNLED_6_4K_1_AS_CCB_XX_X
10559	TNLED_6_4K_1_AS_CCB_XX_X
10560	TNLED_6_4K_1_AS_CCB_XX_X
10561	TNLED_6_4K_1_AS_CCB_XX_X
10562	TNLED_6_4K_1_AS_CCB_XX_X
10563	TNLED_6_4K_1_AS_CCB_XX_X
10564	TNLED_6_4K_1_AS_CCB_XX_X
10565	TNLED_6_4K_1_AS_CCB_XX_X
10566	TNLED_6_4K_1_AS_CCB_XX_X
10567	TNLED_6_4K_1_AS_CCB_XX_X
10568	TNLED_6_4K_1_AS_CCB_XX_X
10569	TNLED_6_4K_1_AS_CCB_XX_X
10570	TNLED_6_4K_1_AS_CCB_XX_X
10571	TNLED_6_4K_1_AS_CCB_XX_X
10580	TNLED_6_4K_1_AS_CCB_XX_X
10581	TNLED_6_4K_1_AS_CCB_XX_X
10582	TNLED_6_4K_1_AS_CCB_XX_X
10583	TNLED_6_4K_1_AS_CCB_XX_X
10584	TNLED_6_4K_1_AS_CCB_XX_X
10593	TNLED_6_4K_1_AS_CCB_XX_X
10594	TNLED_6_4K_1_AS_CCB_XX_X
10595	TNLED_6_4K_1_AS_CCB_XX_X
10596	TNLED_6_4K_1_AS_CCB_XX_X
10597	TNLED_6_4K_1_AS_CCB_XX_X
10606	TNLED_6_4K_1_AS_CCB_XX_X
10607	TNLED_6_4K_1_AS_CCB_XX_X
10608	TNLED_6_4K_1_AS_CCB_XX_X
10609	TNLED_6_4K_1_AS_CCB_XX_X
10610	TNLED_6_4K_1_AS_CCB_XX_X
10619	TNLED_6_4K_1_AS_CCB_XX_X
10620	TNLED_6_4K_1_AS_CCB_XX_X
10621	TNLED_6_4K_1_AS_CCB_XX_X
10622	TNLED_6_4K_1_AS_CCB_XX_X
10623	TNLED_6_4K_1_AS_CCB_XX_X
10632	TNLED_6_4K_1_AS_CCB_XX_X
10633	TNLED_6_4K_1_AS_CCB_XX_X
10634	TNLED_6_4K_1_AS_CCB_XX_X
10635	TNLED_6_4K_1_AS_CCB_XX_X
10636	TNLED_6_4K_1_AS_CCB_XX_X
10645	TNLED_6_4K_1_AS_CCB_XX_X
10646	TNLED_6_4K_1_AS_CCB_XX_X
10647	TNLED_6_4K_1_AS_CCB_XX_X
10648	TNLED_6_4K_1_AS_CCB_XX_X
10649	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10658	TNLED_6_4K_1_AS_CCB_XX_X
10659	TNLED_6_4K_1_AS_CCB_XX_X
10660	TNLED_6_4K_1_AS_CCB_XX_X
10661	TNLED_6_4K_1_AS_CCB_XX_X
10662	TNLED_6_4K_1_AS_CCB_XX_X
10663	TNLED_6_4K_1_AS_CCB_XX_X
10664	TNLED_6_4K_1_AS_CCB_XX_X
10666	TNLED_6_4K_1_AS_CCB_XX_X
10667	TNLED_6_4K_1_AS_CCB_XX_X
10668	TNLED_6_4K_1_AS_CCB_XX_X
10669	TNLED_6_4K_1_AS_CCB_XX_X
10670	TNLED_6_4K_1_AS_CCB_XX_X
10671	TNLED_6_4K_1_AS_CCB_XX_X
10672	TNLED_6_4K_1_AS_CCB_XX_X
10673	TNLED_6_4K_1_AS_CCB_XX_X
10674	TNLED_6_4K_1_AS_CCB_XX_X
10675	TNLED_6_4K_1_AS_CCB_XX_X
10676	TNLED_6_4K_1_AS_CCB_XX_X
10677	TNLED_6_4K_1_AS_CCB_XX_X
10678	TNLED_6_4K_1_AS_CCB_XX_X
10679	TNLED_6_4K_1_AS_CCB_XX_X
10680	TNLED_6_4K_1_AS_CCB_XX_X
10681	TNLED_6_4K_1_AS_CCB_XX_X
10682	TNLED_6_4K_1_AS_CCB_XX_X
10683	TNLED_6_4K_1_AS_CCB_XX_X
10684	TNLED_6_4K_1_AS_CCB_XX_X
10685	TNLED_6_4K_1_AS_CCB_XX_X
10686	TNLED_6_4K_1_AS_CCB_XX_X
10687	TNLED_6_4K_1_AS_CCB_XX_X
10688	TNLED_6_4K_1_AS_CCB_XX_X
10689	TNLED_6_4K_1_AS_CCB_XX_X
10690	TNLED_6_4K_1_AS_CCB_XX_X
10691	TNLED_6_4K_1_AS_CCB_XX_X
10692	TNLED_6_4K_1_AS_CCB_XX_X
10693	TNLED_6_4K_1_AS_CCB_XX_X
10694	TNLED_6_4K_1_AS_CCB_XX_X
10695	TNLED_6_4K_1_AS_CCB_XX_X
10696	TNLED_6_4K_1_AS_CCB_XX_X
10697	TNLED_6_4K_1_AS_CCB_XX_X
10698	TNLED_6_4K_1_AS_CCB_XX_X
10699	TNLED_6_4K_1_AS_CCB_XX_X
10700	TNLED_6_4K_1_AS_CCB_XX_X
10701	TNLED_6_4K_1_AS_CCB_XX_X
10702	TNLED_6_4K_1_AS_CCB_XX_X
10703	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10704	TNLED_6_4K_1_AS_CCB_XX_X
10705	TNLED_6_4K_1_AS_CCB_XX_X
10706	TNLED_6_4K_1_AS_CCB_XX_X
10707	TNLED_6_4K_1_AS_CCB_XX_X
10708	TNLED_6_4K_1_AS_CCB_XX_X
10709	TNLED_6_4K_1_AS_CCB_XX_X
10710	TNLED_6_4K_1_AS_CCB_XX_X
10711	TNLED_6_4K_1_AS_CCB_XX_X
10712	TNLED_6_4K_1_AS_CCB_XX_X
10713	TNLED_6_4K_1_AS_CCB_XX_X
10714	TNLED_6_4K_1_AS_CCB_XX_X
10715	TNLED_6_4K_1_AS_CCB_XX_X
10716	TNLED_6_4K_1_AS_CCB_XX_X
10717	TNLED_6_4K_1_AS_CCB_XX_X
10718	TNLED_6_4K_1_AS_CCB_XX_X
10719	TNLED_6_4K_1_AS_CCB_XX_X
10720	TNLED_6_4K_1_AS_CCB_XX_X
10721	TNLED_6_4K_1_AS_CCB_XX_X
10722	TNLED_6_4K_1_AS_CCB_XX_X
10723	TNLED_6_4K_1_AS_CCB_XX_X
10724	TNLED_6_4K_1_AS_CCB_XX_X
10725	TNLED_6_4K_1_AS_CCB_XX_X
10726	TNLED_6_4K_1_AS_CCB_XX_X
10727	TNLED_6_4K_1_AS_CCB_XX_X
10728	TNLED_6_4K_1_AS_CCB_XX_X
10729	TNLED_6_4K_1_AS_CCB_XX_X
10730	TNLED_6_4K_1_AS_CCB_XX_X
10731	TNLED_6_4K_1_AS_CCB_XX_X
10732	TNLED_6_4K_1_AS_CCB_XX_X
10733	TNLED_6_4K_1_AS_CCB_XX_X
10734	TNLED_6_4K_1_AS_CCB_XX_X
10735	TNLED_6_4K_1_AS_CCB_XX_X
10736	TNLED_6_4K_1_AS_CCB_XX_X
10737	TNLED_6_4K_1_AS_CCB_XX_X
10738	TNLED_6_4K_1_AS_CCB_XX_X
10739	TNLED_6_4K_1_AS_CCB_XX_X
10740	TNLED_6_4K_1_AS_CCB_XX_X
10741	TNLED_6_4K_1_AS_CCB_XX_X
10742	TNLED_6_4K_1_AS_CCB_XX_X
10743	TNLED_6_4K_1_AS_CCB_XX_X
10744	TNLED_6_4K_1_AS_CCB_XX_X
10745	TNLED_6_4K_1_AS_CCB_XX_X
10746	TNLED_6_4K_1_AS_CCB_XX_X
10747	TNLED_6_4K_1_AS_CCB_XX_X
10748	TNLED_6_4K_1_AS_CCB_XX_X

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

10749	TNLED_6_4K_1_AS_CCB_XX_X
10750	TNLED_6_4K_1_AS_CCB_XX_X
10751	TNLED_6_4K_1_AS_CCB_XX_X
10752	TNLED_6_4K_1_AS_CCB_XX_X
10753	TNLED_6_4K_1_AS_CCB_XX_X
10754	TNLED_6_4K_1_AS_CCB_XX_X
10755	TNLED_6_4K_1_AS_CCB_XX_X
10756	TNLED_6_4K_1_AS_CCB_XX_X
10757	TNLED_6_4K_1_AS_CCB_XX_X
10758	TNLED_6_4K_1_AS_CCB_XX_X
10759	TNLED_6_4K_1_AS_CCB_XX_X
10760	TNLED_6_4K_1_AS_CCB_XX_X
10761	TNLED_6_4K_1_AS_CCB_XX_X
10762	TNLED_6_4K_1_AS_CCB_XX_X
10763	TNLED_6_4K_1_AS_CCB_XX_X
10764	TNLED_6_4K_1_AS_CCB_XX_X
10765	TNLED_6_4K_1_AS_CCB_XX_X
10766	TNLED_6_4K_1_AS_CCB_XX_X
10767	TNLED_6_4K_1_AS_CCB_XX_X
10768	TNLED_6_4K_1_AS_CCB_XX_X
10769	TNLED_6_4K_1_AS_CCB_XX_X
10770	TNLED_6_4K_1_AS_CCB_XX_X
10771	TNLED_6_4K_1_AS_CCB_XX_X
10772	TNLED_6_4K_1_AS_CCB_XX_X
10773	TNLED_6_4K_1_AS_CCB_XX_X
10774	TNLED_6_4K_1_AS_CCB_XX_X
10775	TNLED_6_4K_1_AS_CCB_XX_X
10776	TNLED_6_4K_1_AS_CCB_XX_X
10777	TNLED_6_4K_1_AS_CCB_XX_X
10778	TNLED_6_4K_1_AS_CCB_XX_X
10779	TNLED_6_4K_1_AS_CCB_XX_X
10780	TNLED_6_4K_1_AS_CCB_XX_X
10781	TNLED_6_4K_1_AS_CCB_XX_X
10782	TNLED_6_4K_1_AS_CCB_XX_X
10783	TNLED_6_4K_1_AS_CCB_XX_X
10784	TNLED_6_4K_1_AS_CCB_XX_X
10785	TNLED_6_4K_1_AS_CCB_XX_X
10786	TNLED_6_4K_1_AS_CCB_XX_X
10787	TNLED_6_4K_1_AS_CCB_XX_X
10788	TNLED_6_4K_1_AS_CCB_XX_X
10789	TNLED_6_4K_1_AS_CCB_XX_X
10790	TNLED_6_4K_1_AS_CCB_XX_X
10791	TNLED_6_4K_1_AS_CCB_XX_X
10792	TNLED_6_4K_1_AS_CCB_XX_X
10793	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10794	TNLED_6_4K_1_AS_CCB_XX_X
10795	TNLED_6_4K_1_AS_CCB_XX_X
10796	TNLED_6_4K_1_AS_CCB_XX_X
10797	TNLED_6_4K_1_AS_CCB_XX_X
10798	TNLED_6_4K_1_AS_CCB_XX_X
10799	TNLED_6_4K_1_AS_CCB_XX_X
10800	TNLED_6_4K_1_AS_CCB_XX_X
10801	TNLED_6_4K_1_AS_CCB_XX_X
10802	TNLED_6_4K_1_AS_CCB_XX_X
10803	TNLED_6_4K_1_AS_CCB_XX_X
10804	TNLED_6_4K_1_AS_CCB_XX_X
10805	TNLED_6_4K_1_AS_CCB_XX_X
10806	TNLED_6_4K_1_AS_CCB_XX_X
10807	TNLED_6_4K_1_AS_CCB_XX_X
10808	TNLED_6_4K_1_AS_CCB_XX_X
10809	TNLED_6_4K_1_AS_CCB_XX_X
10810	TNLED_6_4K_1_AS_CCB_XX_X
10811	TNLED_6_4K_1_AS_CCB_XX_X
10812	TNLED_6_4K_1_AS_CCB_XX_X
10813	TNLED_6_4K_1_AS_CCB_XX_X
10814	TNLED_6_4K_1_AS_CCB_XX_X
10815	TNLED_6_4K_1_AS_CCB_XX_X
10816	TNLED_6_4K_1_AS_CCB_XX_X
10817	TNLED_6_4K_1_AS_CCB_XX_X
10818	TNLED_6_4K_1_AS_CCB_XX_X
10819	TNLED_6_4K_1_AS_CCB_XX_X
10820	TNLED_6_4K_1_AS_CCB_XX_X
10821	TNLED_6_4K_1_AS_CCB_XX_X
10822	TNLED_6_4K_1_AS_CCB_XX_X
10823	TNLED_6_4K_1_AS_CCB_XX_X
10824	TNLED_6_4K_1_AS_CCB_XX_X
10825	TNLED_6_4K_1_AS_CCB_XX_X
10826	TNLED_6_4K_1_AS_CCB_XX_X
10827	TNLED_6_4K_1_AS_CCB_XX_X
10828	TNLED_6_4K_1_AS_CCB_XX_X
10829	TNLED_6_4K_1_AS_CCB_XX_X
10830	TNLED_6_4K_1_AS_CCB_XX_X
10831	TNLED_6_4K_1_AS_CCB_XX_X
10832	TNLED_6_4K_1_AS_CCB_XX_X
10833	TNLED_6_4K_1_AS_CCB_XX_X
10834	TNLED_6_4K_1_AS_CCB_XX_X
10835	TNLED_6_4K_1_AS_CCB_XX_X
10836	TNLED_6_4K_1_AS_CCB_XX_X
10837	TNLED_6_4K_1_AS_CCB_XX_X
10838	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10839	TNLED_6_4K_1_AS_CCB_XX_X
10840	TNLED_6_4K_1_AS_CCB_XX_X
10841	TNLED_6_4K_1_AS_CCB_XX_X
10842	TNLED_6_4K_1_AS_CCB_XX_X
10843	TNLED_6_4K_1_AS_CCB_XX_X
10844	TNLED_6_4K_1_AS_CCB_XX_X
10845	TNLED_6_4K_1_AS_CCB_XX_X
10846	TNLED_6_4K_1_AS_CCB_XX_X
10847	TNLED_6_4K_1_AS_CCB_XX_X
10848	TNLED_6_4K_1_AS_CCB_XX_X
10849	TNLED_6_4K_1_AS_CCB_XX_X
10850	TNLED_6_4K_1_AS_CCB_XX_X
10851	TNLED_6_4K_1_AS_CCB_XX_X
10852	TNLED_6_4K_1_AS_CCB_XX_X
10854	TNLED_6_4K_1_AS_CCB_XX_X
10855	TNLED_6_4K_1_AS_CCB_XX_X
10856	TNLED_6_4K_1_AS_CCB_XX_X
10857	TNLED_6_4K_1_AS_CCB_XX_X
10858	TNLED_6_4K_1_AS_CCB_XX_X
10859	TNLED_6_4K_1_AS_CCB_XX_X
10860	TNLED_6_4K_1_AS_CCB_XX_X
10861	TNLED_6_4K_1_AS_CCB_XX_X
10862	TNLED_6_4K_1_AS_CCB_XX_X
10863	TNLED_6_4K_1_AS_CCB_XX_X
10864	TNLED_6_4K_1_AS_CCB_XX_X
10865	TNLED_6_4K_1_AS_CCB_XX_X
10866	TNLED_6_4K_1_AS_CCB_XX_X
10867	TNLED_6_4K_1_AS_CCB_XX_X
10868	TNLED_6_4K_1_AS_CCB_XX_X
10869	TNLED_6_4K_1_AS_CCB_XX_X
10870	TNLED_6_4K_1_AS_CCB_XX_X
10871	TNLED_6_4K_1_AS_CCB_XX_X
10872	TNLED_6_4K_1_AS_CCB_XX_X
10873	TNLED_6_4K_1_AS_CCB_XX_X
10874	TNLED_6_4K_1_AS_CCB_XX_X
10875	TNLED_6_4K_1_AS_CCB_XX_X
10876	TNLED_6_4K_1_AS_CCB_XX_X
10877	TNLED_6_4K_1_AS_CCB_XX_X
10878	TNLED_6_4K_1_AS_CCB_XX_X
10879	TNLED_6_4K_1_AS_CCB_XX_X
10880	TNLED_6_4K_1_AS_CCB_XX_X
10881	TNLED_6_4K_1_AS_CCB_XX_X
10882	TNLED_6_4K_1_AS_CCB_XX_X
10883	TNLED_6_4K_1_AS_CCB_XX_X
10884	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

10885	TNLED_6_4K_1_AS_CCB_XX_X
10886	TNLED_6_4K_1_AS_CCB_XX_X
10887	TNLED_6_4K_1_AS_CCB_XX_X
10888	TNLED_6_4K_1_AS_CCB_XX_X
10889	TNLED_6_4K_1_AS_CCB_XX_X
10890	TNLED_6_4K_1_AS_CCB_XX_X
10891	TNLED_6_4K_1_AS_CCB_XX_X
10892	TNLED_6_4K_1_AS_CCB_XX_X
10893	TNLED_6_4K_1_AS_CCB_XX_X
10894	TNLED_6_4K_1_AS_CCB_XX_X
10895	TNLED_6_4K_1_AS_CCB_XX_X
10896	TNLED_6_4K_1_AS_CCB_XX_X
10897	TNLED_6_4K_1_AS_CCB_XX_X
10898	TNLED_6_4K_1_AS_CCB_XX_X
10899	TNLED_6_4K_1_AS_CCB_XX_X
10900	TNLED_6_4K_1_AS_CCB_XX_X
10901	TNLED_6_4K_1_AS_CCB_XX_X
10902	TNLED_6_4K_1_AS_CCB_XX_X
10903	TNLED_6_4K_1_AS_CCB_XX_X
10904	TNLED_6_4K_1_AS_CCB_XX_X
10905	TNLED_6_4K_1_AS_CCB_XX_X
10906	TNLED_6_4K_1_AS_CCB_XX_X
10907	TNLED_6_4K_1_AS_CCB_XX_X
10908	TNLED_6_4K_1_AS_CCB_XX_X
10909	TNLED_6_4K_1_AS_CCB_XX_X
10910	TNLED_6_4K_1_AS_CCB_XX_X
10911	TNLED_6_4K_1_AS_CCB_XX_X
10912	TNLED_6_4K_1_AS_CCB_XX_X
10914	TNLED_6_4K_1_AS_CCB_XX_X
10916	TNLED_6_4K_1_AS_CCB_XX_X
10918	TNLED_6_4K_1_AS_CCB_XX_X
10920	TNLED_6_4K_1_AS_CCB_XX_X
10922	TNLED_6_4K_1_AS_CCB_XX_X
10924	TNLED_6_4K_1_AS_CCB_XX_X
10925	TNLED_6_4K_1_AS_CCB_XX_X
10926	TNLED_6_4K_1_AS_CCB_XX_X
10927	TNLED_6_4K_1_AS_CCB_XX_X
10928	TNLED_6_4K_1_AS_CCB_XX_X
10929	TNLED_6_4K_1_AS_CCB_XX_X
10930	TNLED_6_4K_1_AS_CCB_XX_X
10931	TNLED_6_4K_1_AS_CCB_XX_X
10932	TNLED_6_4K_1_AS_CCB_XX_X
10933	TNLED_6_4K_1_AS_CCB_XX_X
10934	TNLED_6_4K_1_AS_CCB_XX_X
10935	TNLED_6_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

EM	On	1.00	7809	TNLED_3_4K_1_AS_CCB_XX_X
			7811	TNLED_3_4K_1_AS_CCB_XX_X
			7813	TNLED_3_4K_1_AS_CCB_XX_X
			7815	TNLED_3_4K_1_AS_CCB_XX_X
			7817	TNLED_3_4K_1_AS_CCB_XX_X
			7819	TNLED_3_4K_1_AS_CCB_XX_X
			7821	TNLED_3_4K_1_AS_CCB_XX_X
			7823	TNLED_3_4K_1_AS_CCB_XX_X
			7825	TNLED_3_4K_1_AS_CCB_XX_X
			7863	TNLED_3_4K_1_AS_CCB_XX_X
			7865	TNLED_3_4K_1_AS_CCB_XX_X
			7867	TNLED_3_4K_1_AS_CCB_XX_X
			7869	TNLED_3_4K_1_AS_CCB_XX_X
			7871	TNLED_3_4K_1_AS_CCB_XX_X
			7873	TNLED_3_4K_1_AS_CCB_XX_X
			7875	TNLED_3_4K_1_AS_CCB_XX_X
			7877	TNLED_3_4K_1_AS_CCB_XX_X
			7879	TNLED_3_4K_1_AS_CCB_XX_X
			7881	TNLED_3_4K_1_AS_CCB_XX_X
			7883	TNLED_3_4K_1_AS_CCB_XX_X
			7885	TNLED_3_4K_1_AS_CCB_XX_X
			7887	TNLED_3_4K_1_AS_CCB_XX_X
			9044	TNLED_3_4K_1_AS_CCB_XX_X
			9046	TNLED_3_4K_1_AS_CCB_XX_X
			9048	TNLED_3_4K_1_AS_CCB_XX_X
			9050	TNLED_3_4K_1_AS_CCB_XX_X
			9052	TNLED_3_4K_1_AS_CCB_XX_X
			9054	TNLED_3_4K_1_AS_CCB_XX_X
			9056	TNLED_3_4K_1_AS_CCB_XX_X
			9058	TNLED_3_4K_1_AS_CCB_XX_X
			9060	TNLED_3_4K_1_AS_CCB_XX_X
			9062	TNLED_3_4K_1_AS_CCB_XX_X
			9064	TNLED_3_4K_1_AS_CCB_XX_X
			9066	TNLED_3_4K_1_AS_CCB_XX_X
			9068	TNLED_3_4K_1_AS_CCB_XX_X
			9070	TNLED_3_4K_1_AS_CCB_XX_X
			9072	TNLED_3_4K_1_AS_CCB_XX_X
			9074	TNLED_3_4K_1_AS_CCB_XX_X
			9076	TNLED_3_4K_1_AS_CCB_XX_X
			9078	TNLED_3_4K_1_AS_CCB_XX_X
			9080	TNLED_3_4K_1_AS_CCB_XX_X
			9082	TNLED_3_4K_1_AS_CCB_XX_X
			9084	TNLED_3_4K_1_AS_CCB_XX_X
			9086	TNLED_3_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

			9400	TNLED_3_4K_1_AS_CCB_XX_X
			9402	TNLED_3_4K_1_AS_CCB_XX_X
			9404	TNLED_3_4K_1_AS_CCB_XX_X
			9406	TNLED_3_4K_1_AS_CCB_XX_X
			9408	TNLED_3_4K_1_AS_CCB_XX_X
			9410	TNLED_3_4K_1_AS_CCB_XX_X
			9412	TNLED_3_4K_1_AS_CCB_XX_X
			9414	TNLED_3_4K_1_AS_CCB_XX_X
			9416	TNLED_3_4K_1_AS_CCB_XX_X
			9418	TNLED_3_4K_1_AS_CCB_XX_X
			9420	TNLED_3_4K_1_AS_CCB_XX_X
			9422	TNLED_3_4K_1_AS_CCB_XX_X
			9424	TNLED_3_4K_1_AS_CCB_XX_X
			9426	TNLED_3_4K_1_AS_CCB_XX_X
			9428	TNLED_3_4K_1_AS_CCB_XX_X
			9430	TNLED_3_4K_1_AS_CCB_XX_X
			9432	TNLED_3_4K_1_AS_CCB_XX_X
			9434	TNLED_3_4K_1_AS_CCB_XX_X
			9436	TNLED_3_4K_1_AS_CCB_XX_X
			9438	TNLED_3_4K_1_AS_CCB_XX_X
			9440	TNLED_3_4K_1_AS_CCB_XX_X
			9442	TNLED_3_4K_1_AS_CCB_XX_X
N		On	1.00	7806 TNLED_3_4K_1_AS_CCB_XX_X
				7810 TNLED_3_4K_1_AS_CCB_XX_X
				7812 TNLED_3_4K_1_AS_CCB_XX_X
				7814 TNLED_3_4K_1_AS_CCB_XX_X
				7816 TNLED_3_4K_1_AS_CCB_XX_X
				7818 TNLED_3_4K_1_AS_CCB_XX_X
				7820 TNLED_3_4K_1_AS_CCB_XX_X
				7822 TNLED_3_4K_1_AS_CCB_XX_X
				7824 TNLED_3_4K_1_AS_CCB_XX_X
				7826 TNLED_3_4K_1_AS_CCB_XX_X
				7864 TNLED_3_4K_1_AS_CCB_XX_X
				7866 TNLED_3_4K_1_AS_CCB_XX_X
				7868 TNLED_3_4K_1_AS_CCB_XX_X
				7870 TNLED_3_4K_1_AS_CCB_XX_X
				7872 TNLED_3_4K_1_AS_CCB_XX_X
				7874 TNLED_3_4K_1_AS_CCB_XX_X
				7876 TNLED_3_4K_1_AS_CCB_XX_X
				7878 TNLED_3_4K_1_AS_CCB_XX_X
				7880 TNLED_3_4K_1_AS_CCB_XX_X
				7882 TNLED_3_4K_1_AS_CCB_XX_X
				7884 TNLED_3_4K_1_AS_CCB_XX_X
				7886 TNLED_3_4K_1_AS_CCB_XX_X

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Scene Summary - Cont.

7888	TNLED_3_4K_1_AS_CCB_XX_X
9045	TNLED_3_4K_1_AS_CCB_XX_X
9047	TNLED_3_4K_1_AS_CCB_XX_X
9049	TNLED_3_4K_1_AS_CCB_XX_X
9051	TNLED_3_4K_1_AS_CCB_XX_X
9053	TNLED_3_4K_1_AS_CCB_XX_X
9055	TNLED_3_4K_1_AS_CCB_XX_X
9057	TNLED_3_4K_1_AS_CCB_XX_X
9059	TNLED_3_4K_1_AS_CCB_XX_X
9061	TNLED_3_4K_1_AS_CCB_XX_X
9063	TNLED_3_4K_1_AS_CCB_XX_X
9065	TNLED_3_4K_1_AS_CCB_XX_X
9067	TNLED_3_4K_1_AS_CCB_XX_X
9069	TNLED_3_4K_1_AS_CCB_XX_X
9071	TNLED_3_4K_1_AS_CCB_XX_X
9073	TNLED_3_4K_1_AS_CCB_XX_X
9075	TNLED_3_4K_1_AS_CCB_XX_X
9077	TNLED_3_4K_1_AS_CCB_XX_X
9079	TNLED_3_4K_1_AS_CCB_XX_X
9081	TNLED_3_4K_1_AS_CCB_XX_X
9083	TNLED_3_4K_1_AS_CCB_XX_X
9085	TNLED_3_4K_1_AS_CCB_XX_X
9087	TNLED_3_4K_1_AS_CCB_XX_X
9096	TNLED_3_4K_1_AS_CCB_XX_X
9401	TNLED_3_4K_1_AS_CCB_XX_X
9403	TNLED_3_4K_1_AS_CCB_XX_X
9405	TNLED_3_4K_1_AS_CCB_XX_X
9407	TNLED_3_4K_1_AS_CCB_XX_X
9409	TNLED_3_4K_1_AS_CCB_XX_X
9411	TNLED_3_4K_1_AS_CCB_XX_X
9413	TNLED_3_4K_1_AS_CCB_XX_X
9415	TNLED_3_4K_1_AS_CCB_XX_X
9417	TNLED_3_4K_1_AS_CCB_XX_X
9419	TNLED_3_4K_1_AS_CCB_XX_X
9421	TNLED_3_4K_1_AS_CCB_XX_X
9423	TNLED_3_4K_1_AS_CCB_XX_X
9425	TNLED_3_4K_1_AS_CCB_XX_X
9427	TNLED_3_4K_1_AS_CCB_XX_X
9429	TNLED_3_4K_1_AS_CCB_XX_X
9431	TNLED_3_4K_1_AS_CCB_XX_X
9433	TNLED_3_4K_1_AS_CCB_XX_X
9435	TNLED_3_4K_1_AS_CCB_XX_X
9437	TNLED_3_4K_1_AS_CCB_XX_X
9439	TNLED_3_4K_1_AS_CCB_XX_X
9441	TNLED_3_4K_1_AS_CCB_XX_X

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Scene Summary - Cont.

9443	TNLED_3_4K_1_AS_CCB_XX_X
9452	TNLED_3_4K_1_AS_CCB_XX_X

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Calculation Summary

EB_INT_Illum

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	10.06
Maximum	21.9
Minimum	5.8
Avg/Min	1.73
Max/Min	3.78
Max/Avg	2.18

EB_INT_Luminance

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	9.49
Maximum	16.6
Minimum	5.2
Avg/Min	1.83
Max/Min	3.19
Max/Avg	1.75

EB_INT_Veil_Lum

Project: GRID EB DAY

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Veiling Luminance (Cd/SqM)		
Average	1.47	
Maximum	2.48	
Minimum	1.03	
Avg/Min	1.43	
Max/Min	2.41	
Max/Avg	1.69	
Maximum Lv/Lavg Ratio		0.26

EB_IN_WALL_L

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	5.11
Maximum	8.9
Minimum	2.8
Avg/Min	1.83
Max/Min	3.18

EB_IN_WALL_R

Project: GRID EB DAY
2 Pt. Grid

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	5.57
Maximum	10.5
Minimum	2.8
Avg/Min	1.99
Max/Min	3.75

EB_TH1_Illum

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	262.49
Maximum	301
Minimum	219
Avg/Min	1.20
Max/Min	1.38
Max/Avg	1.15

EB_TH1_Luminance

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64

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Calculation Summary - Cont.

Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	249.76
Maximum	338
Minimum	162
Avg/Min	1.54
Max/Min	2.08
Max/Avg	1.35

EB_TH1_WALL_L

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	131.75
Maximum	135
Minimum	128
Avg/Min	1.03
Max/Min	1.06

EB_TH1_WALL_R

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90

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Calculation Summary - Cont.

Meter Type	Normal to grid

Illuminance (Fc)	
Average	141.72
Maximum	145
Minimum	138
Avg/Min	1.03
Max/Min	1.05

EB_TH2_Illum

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	183.09
Maximum	212
Minimum	152
Avg/Min	1.21
Max/Min	1.40
Max/Avg	1.16

EB_TH2_Luminance

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	171.02

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Calculation Summary - Cont.

Maximum	232
Minimum	110
Avg/Min	1.56
Max/Min	2.12
Max/Avg	1.36

EB_TH2_WALL_L

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	92.20
Maximum	96.7
Minimum	88.5
Avg/Min	1.04
Max/Min	1.09

EB_TH2_WALL_R

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	98.90
Maximum	103
Minimum	95.3

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Calculation Summary - Cont.

Avg/Min	1.04
Max/Min	1.08

EB_TR1_Illum

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	103.70
Maximum	122
Minimum	83.9
Avg/Min	1.24
Max/Min	1.45
Max/Avg	1.18

EB_TR1_Luminance

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	98.03
Maximum	134
Minimum	62.8
Avg/Min	1.56
Max/Min	2.14
Max/Avg	1.37

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Calculation Summary - Cont.

EB_TR1_WALL_L

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	52.66
Maximum	55.7
Minimum	49.3
Avg/Min	1.07
Max/Min	1.13

EB_TR1_WALL_R

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	56.60
Maximum	59.8
Minimum	52.9
Avg/Min	1.07
Max/Min	1.13

EB_TR2_Illum

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Calculation Summary - Cont.

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	36.86
Maximum	48.1
Minimum	27.2
Avg/Min	1.36
Max/Min	1.77
Max/Avg	1.30

EB_TR2_Luminance

Project: GRID EB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	34.92
Maximum	49.7
Minimum	21.4
Avg/Min	1.63
Max/Min	2.32
Max/Avg	1.42

EB_TR2_WALL_L

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	18.87
Maximum	21.6
Minimum	16.7
Avg/Min	1.13
Max/Min	1.29

EB_TR2_WALL_R

Project: GRID EB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	20.29
Maximum	23.7
Minimum	17.6
Avg/Min	1.15
Max/Min	1.35

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Room(s):

EB pt10

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

EB pt7

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt7_1

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt9

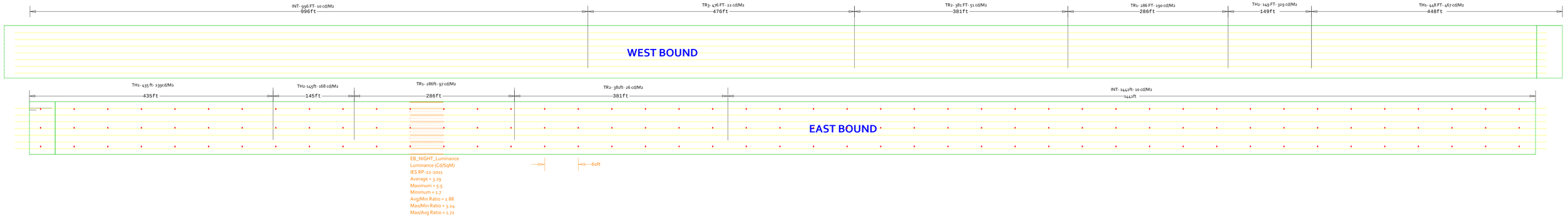
Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

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ADOT I-10 DECK PARK TUNNEL
PRELIMINARY LIGHTING DESIGN
EASTBOUND NIGHT
JULY 28 2016

WSP | PARSONS BRINCKERHOFF

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7/28/2016
Job File: AZDOT I-10 Tunnels_V002_CJL_EB-N.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Luminaire Schedule									
Scene: NIGHT									
Symbol	Qty	Tag	Label	LLF	Description	Filename	Lum. Watts	Lum. Lumens	Total Watts
	135	A3	TNLED_3_4K_1_AS_CCB_XX_X	0.630	TNLED 3 4K 1 AS CCB XX X	TNLED_3_4K_1_AS_CCB_XX_X.ies	122.4	11019	16524

Calculation Summary								
Project: GRID EB NIGHT								
Scene: NIGHT								
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	LVRatio
EB_NIGHT_Illum	Illuminance	Fc	3.44	7.4	2.0	1.72	3.70	N.A.
EB_NIGHT_Luminance	Luminance	Cd/Sq.m	3.19	5.5	1.7	1.88	3.24	N.A.
EB_NIGHT_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.66	1.00	0.49	1.35	2.04	0.31
EB_N_WALL_L	Illuminance	Fc	1.90	3.1	1.0	1.90	3.10	N.A.
EB_N_WALL_R	Illuminance	Fc	1.84	3.1	1.0	1.84	3.10	N.A.

ADOT I-10 DECK PARK TUNNEL
JUL 28, 2016
EASTBOUND - NIGHT



User and Job File Information

User Information

Voice Number :
Fax Number :
Email Address :

Job File Information

Filename :	AZDOT I-10 Tunnels_V002_CJL_EB-N.AGI
Location :	J:\11338E ADOT I10 Deck Park Tnl Ltng\5.0 Project Data\5.0 Working Files\5.5 Calculations\5.5.2 Lighting\
Created By :	W-AMBOS-D-AME07
Created Date :	6/30/2016 1:14:52 PM
Created Version :	16.2.2
Modified By :	W-AMBOS-L-AME15
Modified Date :	7/27/2016 5:58:27 PM
Modified Version :	17.2.10
Total Time (Hrs) :	101.75
Description :	

Information :
7/26/2016 7:48:08 AM - W-AMBOS-L-AME15 :

7/11/2016 7:29:00 AM - W-AMBOS-L-AME15 :

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Luminaire Definition(s)

TNLED_3_4K_1_AS_CCB_XX_X
Tag: A3
TNLED 3 4K 1 AS CCB XX X

Filename	TNLED_3_4K_1_AS_CCB_XX_X.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	11019
Luminaire Lumens	11019
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	122.4
Arrangement Watts	122.4
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	1936.3	N.A.	17.6
LCS-FM	4760.4	N.A.	43.2
LCS-FH	2664.0	N.A.	24.2
LCS-FVH	122.8	N.A.	1.1
LCS-BL	824.2	N.A.	7.5
LCS-BM	570.7	N.A.	5.2
LCS-BH	88.6	N.A.	0.8
LCS-BVH	5.4	N.A.	0.0
LCS-UL	10.5	N.A.	0.1
LCS-UH	36.5	N.A.	0.3
Total	11019.4	N.A.	100.0

BUG Rating	B2-U2-G2
Indoor Classification	Direct
LER	90
Modal Mode Symbol	BOX DOWN
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)
Render Mode Symbol	BOX DOWN
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)
Housing Color	(R= 51 G= 51 B= 51)
Luminous Color	(R= 255 G= 255 B= 255)

Photometric File

Filename : TNLED_3_4K_1_AS_CCB_XX_X.ies

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Luminaire Definition(s) - Cont.

[Test]	501956P2
[TestLab]	SCALED PHOTOMETRY
[IssueDate]	9/30/2014
[Manufac]	Holophane
[Lumcat]	TNLED 3 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	3 LED Array

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Calculation Summary

EB_NIGHT_Illum

Project: GRID EB NIGHT
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	3.44
Maximum	7.4
Minimum	2.0
Avg/Min	1.72
Max/Min	3.70
Max/Avg	2.15

EB_NIGHT_Luminance

Project: GRID EB NIGHT
Roadway Standard: IES RP-22-2011
R_3 (Slightly Specular), Q_0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Luminance (Cd/SqM)	
Average	3.19
Maximum	5.5
Minimum	1.7
Avg/Min	1.88
Max/Min	3.24
Max/Avg	1.72

EB_NIGHT_Veil_Lum

Project: GRID EB NIGHT

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-N.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	0
Grid Tilt	0

Veiling Luminance (Cd/SqM)		
Average	0.66	
Maximum	1.00	
Minimum	0.49	
Avg/Min	1.35	
Max/Min	2.04	
Max/Avg	1.52	
Maximum Lv/Lavg Ratio		0.31

EB_N_WALL_L

Project: GRID EB NIGHT
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	1.90
Maximum	3.1
Minimum	1.0
Avg/Min	1.90
Max/Min	3.10

EB_N_WALL_R

Project: GRID EB NIGHT
2 Pt. Grid

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Calculation Summary - Cont.

Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	1.84
Maximum	3.1
Minimum	1.0
Avg/Min	1.84
Max/Min	3.10

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Job File: AZDOT I-10 Tunnels_V002_CJL_EB-N.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Room(s):

EB pt10

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

EB pt7

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt7_1

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt9

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

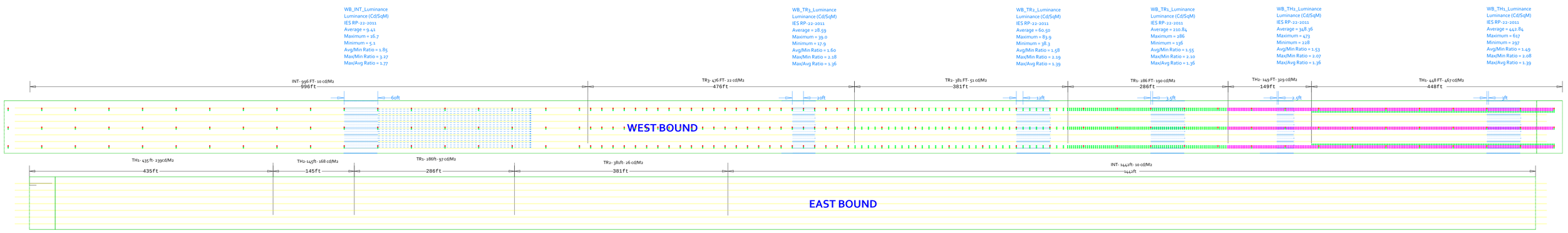
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ADOT I-10 DECK PARK TUNNEL
PRELIMINARY LIGHTING DESIGN
WESTBOUND DAY 1
JULY 28 2016

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Job File: AZDOT I-10 Tunnels_V002_CJL_WB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Luminaire Schedule

Scene: DAY 1

Symbol	Qty	Tag	Label	LLF	Description	Filename	Lum. Watts	Lum. Lumens	Total Watts
+	189	A3	TNLED_3_4K_1_AS_CCB_XX_X	0.630	TNLED 3 4K 1 AS CCB XX X	TNLED_3_4K_1_AS_CCB_XX_X.ies	122.4	11019	23133.6
+	1110	A9	TNLED_9_4K_1_AS_CCB_XX_X	0.630	TNLED 9 4K 1 AS CCB XX X	TNLED_9_4K_1_AS_CCB_XX_X.ies	366.1	31114	406371
+	1091	A6	TNLED_6_4K_1_AS_CCB_XX_X	0.630	TNLED 6 4K 1 AS CCB XX X	TNLED_6_4K_1_AS_CCB_XX_X.IES	243.8	21130	265985.8

Calculation Summary

Project: GRID WB DAY

Scene: DAY 1

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	LVRatio
WB_INT_Illum	Illuminance	Fc	9.90	22.0	5.6	1.77	3.93	N.A.
WB_INT_Luminance	Luminance	Cd/Sq.m	9.41	16.7	5.1	1.85	3.27	N.A.
WB_INT_Veil_Lum	Veiling Luminance	Cd/Sq.m	1.48	2.52	1.03	1.44	2.45	0.27
WB_INT_WALL_L	Illuminance	Fc	5.45	10.4	2.7	2.02	3.85	N.A.
WB_INT_WALL_R	Illuminance	Fc	4.89	8.5	2.7	1.81	3.15	N.A.
WB_TH1_Illum	Illuminance	Fc	468.13	528	400	1.17	1.32	N.A.
WB_TH1_Luminance	Luminance	Cd/Sq.m	442.84	617	297	1.49	2.08	N.A.
WB_TH1_WALL_L	Illuminance	Fc	265.14	276	255	1.04	1.08	N.A.
WB_TH1_WALL_R	Illuminance	Fc	239.88	248	232	1.03	1.07	N.A.
WB_TH2_Illum	Illuminance	Fc	379.71	423	318	1.19	1.33	N.A.
WB_TH2_Luminance	Luminance	Cd/Sq.m	348.36	473	228	1.53	2.07	N.A.
WB_TH2_WALL_L	Illuminance	Fc	210.00	219	202	1.04	1.08	N.A.
WB_TH2_WALL_R	Illuminance	Fc	191.02	198	184	1.04	1.08	N.A.
WB_TR1_Illum	Illuminance	Fc	223.37	258	185	1.21	1.40	N.A.
WB_TR1_Luminance	Luminance	Cd/Sq.m	210.84	286	136	1.55	2.10	N.A.
WB_TR1_WALL_L	Illuminance	Fc	119.62	125	114	1.05	1.09	N.A.
WB_TR1_WALL_R	Illuminance	Fc	110.78	114	107	1.04	1.07	N.A.
WB_TR2_Illum	Illuminance	Fc	64.13	78.4	49.6	1.29	1.58	N.A.
WB_TR2_Luminance	Luminance	Cd/Sq.m	60.50	83.9	38.3	1.58	2.19	N.A.
WB_TR2_WALL_L	Illuminance	Fc	35.18	40.9	31.0	1.13	1.32	N.A.
WB_TR2_WALL_R	Illuminance	Fc	32.56	36.5	29.2	1.12	1.25	N.A.
WB_TR3_Illum	Illuminance	Fc	30.35	39.3	23.6	1.29	1.67	N.A.
WB_TR3_Luminance	Luminance	Cd/Sq.m	28.59	39.0	17.9	1.60	2.18	N.A.
WB_TR3_WALL_L	Illuminance	Fc	16.73	19.0	15.3	1.09	1.24	N.A.
WB_TR3_WALL_R	Illuminance	Fc	15.14	16.2	14.0	1.08	1.16	N.A.

ADOT I-10 DECK PARK TUNNEL
JUL 26, 2016
WESTBOUND - DAY 1



User and Job File Information

User Information

Voice Number :
Fax Number :
Email Address :

Job File Information

Filename :	AZDOT I-10 Tunnels_V002_CJL_WB-D1.AGI
Location :	J:\11338E ADOT I10 Deck Park Tnl Ltng\5.0 Project Data\5.0 Working Files\5.5 Calculations\5.5.2 Lighting\
Created By :	W-AMBOS-D-AME07
Created Date :	6/30/2016 1:14:52 PM
Created Version :	16.2.2
Modified By :	W-AMBOS-L-AME15
Modified Date :	7/27/2016 8:37:53 PM
Modified Version :	17.2.10
Total Time (Hrs) :	103.78
Description :	

Information :
7/26/2016 7:48:08 AM - W-AMBOS-L-AME15 :

7/11/2016 7:29:00 AM - W-AMBOS-L-AME15 :

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Luminaire Definition(s)

TNLED_3_4K_1_AS_CCB_XX_X
Tag: A3
TNLED 3 4K 1 AS CCB XX X

Filename	TNLED_3_4K_1_AS_CCB_XX_X.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	11019
Luminaire Lumens	11019
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	122.4
Arrangement Watts	122.4
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	1936.3	N.A.	17.6
LCS-FM	4760.4	N.A.	43.2
LCS-FH	2664.0	N.A.	24.2
LCS-FVH	122.8	N.A.	1.1
LCS-BL	824.2	N.A.	7.5
LCS-BM	570.7	N.A.	5.2
LCS-BH	88.6	N.A.	0.8
LCS-BVH	5.4	N.A.	0.0
LCS-UL	10.5	N.A.	0.1
LCS-UH	36.5	N.A.	0.3
Total	11019.4	N.A.	100.0

BUG Rating	B2-U2-G2
Indoor Classification	Direct
LER	90
Modal Mode Symbol	BOX DOWN
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)
Render Mode Symbol	BOX DOWN
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)
Housing Color	(R= 51 G= 51 B= 51)
Luminous Color	(R= 255 G= 255 B= 255)

Photometric File

Filename : TNLED_3_4K_1_AS_CCB_XX_X.ies

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Job File: AZDOT I-10 Tunnels_V002_CJL_WB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Luminaire Definition(s) - Cont.

[Test]	501956P2
[TestLab]	SCALED PHOTOMETRY
[IssueDate]	9/30/2014
[Manufac]	Holophane
[Lumcat]	TNLED 3 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	3 LED Array

TNLED_9_4K_1_AS_CCB_XX_X
Tag: A9
TNLED 9 4K 1 AS CCB XX X

Filename	TNLED_9_4K_1_AS_CCB_XX_X.ies
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	31114
Luminaire Lumens	31114
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	366.1
Arrangement Watts	366.1
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type IV, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.01

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	5482.1	N.A.	17.6
LCS-FM	13381.8	N.A.	43.0
LCS-FH	7365.4	N.A.	23.7
LCS-FVH	325.6	N.A.	1.0
LCS-BL	2326.6	N.A.	7.5
LCS-BM	1718.5	N.A.	5.5
LCS-BH	302.7	N.A.	1.0
LCS-BVH	26.3	N.A.	0.1
LCS-UL	38.5	N.A.	0.1
LCS-UH	146.2	N.A.	0.5
Total	31113.7	N.A.	100.0
BUG Rating	B3-U3-G3		

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Luminaire Definition(s) - Cont.

Indoor Classification	Direct
LER	85
Modal Mode Symbol	BOX DOWN
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)
Render Mode Symbol	BOX DOWN
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)
Housing Color	(R= 51 G= 51 B= 51)
Luminous Color	(R= 255 G= 255 B= 255)

Photometric File

Filename : TNLED_9_4K_1_AS_CCB_XX_X.ies

[Test]	501971P1
[TestLab]	SCALED PHOTOMETRY
[IssueDate]	8/29/2013
[Manufac]	Holophane
[Lumcat]	TNLED 9 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	9 LED ARRAY

TNLED_6_4K_1_AS_CCB_XX_X

Tag: A6

TNLED 6 4K 1 AS CCB XX X

Filename	TNLED_6_4K_1_AS_CCB_XX_X.IES
Lumens Per Lamp	N.A.
Number of Lamps	1
Total Lamp Lumens	N.A.
Arrangement Lamp Lumens	N.A.
Arrangement Luminaire Lumens	21130
Luminaire Lumens	21130
Luminaire Efficiency (%)	N.A.
Total Light Loss Factor	0.630
Luminaire Watts	243.8
Arrangement Watts	243.8
Arrangement	SINGLE
Arm Length	0
Offset	0
Road Classification	Type III, Very Short, N.A. (deprecated)
Upward Waste Light Ratio	0.01

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	3712.0	N.A.	17.6

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Luminaire Definition(s) - Cont.

LCS-FM	9142.0	N.A.	43.3
LCS-FH	5023.8	N.A.	23.8
LCS-FVH	207.6	N.A.	1.0
LCS-BL	1545.3	N.A.	7.3
LCS-BM	1113.5	N.A.	5.3
LCS-BH	208.0	N.A.	1.0
LCS-BVH	18.8	N.A.	0.1
LCS-UL	31.4	N.A.	0.1
LCS-UH	127.8	N.A.	0.6
Total	21130.2	N.A.	100.0
BUG Rating	B3-U3-G3		
Indoor Classification	Direct		
LER	87		
Modal Mode Symbol	BOX DOWN		
Modal Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2)		
Render Mode Symbol	BOX DOWN		
Render Mode Symbol Scaling	(X= 1.45 Y= 2 Z= 2.5)		
Housing Color	(R= 51 G= 51 B= 51)		
Luminous Color	(R= 255 G= 255 B= 255)		

Photometric File

Filename : TNLED_6_4K_1_AS_CCB_XX_X.IES

[Test]	501954PP2
[TestLab]	ACUITY BRANDS LIGHTING GRANVILLE LAB
[IssueDate]	8/29/2013
[Manufac]	Holophane
[Lumcat]	TNLED 6 4K 1 AS CCB XX X
[Lampcat]	LED 4000K
[Lamp]	6 LED Array

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Calculation Summary

WB_INT_Illum

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	9.90
Maximum	22.0
Minimum	5.6
Avg/Min	1.77
Max/Min	3.93
Max/Avg	2.22

WB_INT_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	9.41
Maximum	16.7
Minimum	5.1
Avg/Min	1.85
Max/Min	3.27
Max/Avg	1.77

WB_INT_Veil_Lum

Project: GRID WB DAY

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Calculation Summary - Cont.

Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Veiling Luminance (Cd/SqM)		
Average	1.48	
Maximum	2.52	
Minimum	1.03	
Avg/Min	1.44	
Max/Min	2.45	
Max/Avg	1.70	
Maximum Lv/Lavg Ratio		0.27

WB_INT_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	5.45
Maximum	10.4
Minimum	2.7
Avg/Min	2.02
Max/Min	3.85

WB_INT_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

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Calculation Summary - Cont.

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	4.89
Maximum	8.5
Minimum	2.7
Avg/Min	1.81
Max/Min	3.15

WB_TH1_Illum

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	468.13
Maximum	528
Minimum	400
Avg/Min	1.17
Max/Min	1.32
Max/Avg	1.13

WB_TH1_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64

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Calculation Summary - Cont.

Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	442.84
Maximum	617
Minimum	297
Avg/Min	1.49
Max/Min	2.08
Max/Avg	1.39

WB_TH1_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	265.14
Maximum	276
Minimum	255
Avg/Min	1.04
Max/Min	1.08

WB_TH1_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90

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Calculation Summary - Cont.

Meter Tilt	90

Illuminance (Fc)	
Average	239.88
Maximum	248
Minimum	232
Avg/Min	1.03
Max/Min	1.07

WB_TH2_Illum

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	379.71
Maximum	423
Minimum	318
Avg/Min	1.19
Max/Min	1.33
Max/Avg	1.11

WB_TH2_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	348.36

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Calculation Summary - Cont.

Maximum	473
Minimum	228
Avg/Min	1.53
Max/Min	2.07
Max/Avg	1.36

WB_TH2_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	210.00
Maximum	219
Minimum	202
Avg/Min	1.04
Max/Min	1.08

WB_TH2_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	191.02
Maximum	198
Minimum	184

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Calculation Summary - Cont.

Avg/Min	1.04
Max/Min	1.08

WB_TR1_Illum

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	223.37
Maximum	258
Minimum	185
Avg/Min	1.21
Max/Min	1.40
Max/Avg	1.15

WB_TR1_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	210.84
Maximum	286
Minimum	136
Avg/Min	1.55
Max/Min	2.10
Max/Avg	1.36

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Calculation Summary - Cont.

WB_TR1_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	119.62
Maximum	125
Minimum	114
Avg/Min	1.05
Max/Min	1.09

WB_TR1_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	110.78
Maximum	114
Minimum	107
Avg/Min	1.04
Max/Min	1.07

WB_TR2_Illum

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Calculation Summary - Cont.

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	64.13
Maximum	78.4
Minimum	49.6
Avg/Min	1.29
Max/Min	1.58
Max/Avg	1.22

WB_TR2_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	60.50
Maximum	83.9
Minimum	38.3
Avg/Min	1.58
Max/Min	2.19
Max/Avg	1.39

WB_TR2_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

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Job File: AZDOT I-10 Tunnels_V002_CJL_WB-D1.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

Illuminance (Fc)	
Average	35.18
Maximum	40.9
Minimum	31.0
Avg/Min	1.13
Max/Min	1.32

WB_TR2_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	32.56
Maximum	36.5
Minimum	29.2
Avg/Min	1.12
Max/Min	1.25

WB_TR3_Illum

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4

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Calculation Summary - Cont.

Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	30.35
Maximum	39.3
Minimum	23.6
Avg/Min	1.29
Max/Min	1.67
Max/Avg	1.29

WB_TR3_Luminance

Project: GRID WB DAY
Roadway Standard: IES RP-22-2011
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	1.64
Point Spacing T-B	4
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	28.59
Maximum	39.0
Minimum	17.9
Avg/Min	1.60
Max/Min	2.18
Max/Avg	1.36

WB_TR3_WALL_L

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Normal to grid

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Calculation Summary - Cont.

Illuminance (Fc)	
Average	16.73
Maximum	19.0
Minimum	15.3
Avg/Min	1.09
Max/Min	1.24

WB_TR3_WALL_R

Project: GRID WB DAY
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	1.5
Point Spacing T-B	3.25
Grid Orient	0
Grid Tilt	-90
Meter Type	Fixed orient and tilt
Meter Orient	90
Meter Tilt	90

Illuminance (Fc)	
Average	15.14
Maximum	16.2
Minimum	14.0
Avg/Min	1.08
Max/Min	1.16

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Room(s):

EB pt10

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

EB pt7

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt7_1

Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 31 ft

EB pt9

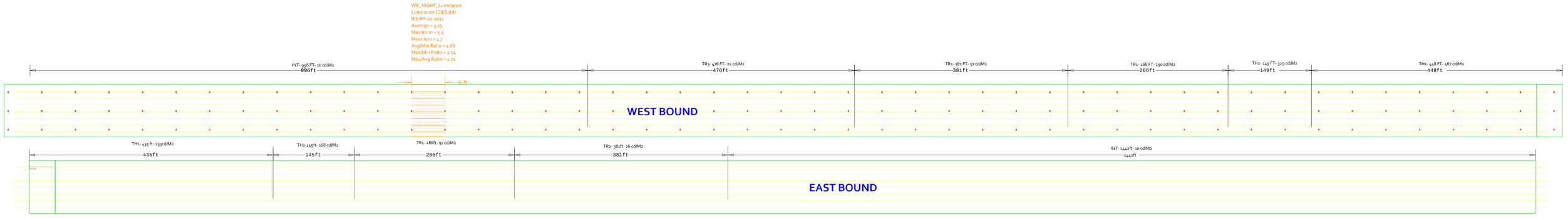
Project: Project_1
Room Type: Rectangular Floor - Flat Ceiling
Wall Height 24 ft

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ADOT I-10 DECK PARK TUNNEL
PRELIMINARY LIGHTING DESIGN
WESTBOUND NIGHT
JULY 28 2016

WSP | PARSONS BRINCKERHOFF

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7/28/2016
Job File: AZDOT I-10 Tunnels_V002_CJL_WB-N.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Luminaire Schedule									
Scene: NIGHT									
Symbol	Qty	Tag	Label	LLF	Description	Filename	Lum. Watts	Lum. Lumens	Total Watts
+	141	A3	TNLED_3_4K_1_AS_CCB_XX_X	0.630	TNLED 3 4K 1 AS CCB XX X	TNLED_3_4K_1_AS_CCB_XX_X.ies	122.4	11019	17258.4

Calculation Summary								
Project: GRID WB NIGHT								
Scene: NIGHT								
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	LVRatio
WB_NIGHT_Illum	Illuminance	Fc	3.45	7.4	2.0	1.73	3.70	N.A.
WB_NIGHT_Luminance	Luminance	Cd/Sq.m	3.19	5.5	1.7	1.88	3.24	N.A.
WB_NIGHT_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.53	0.84	0.37	1.43	2.27	0.26
WB_N_WALL_L	Illuminance	Fc	1.88	3.1	1.0	1.88	3.10	N.A.
WB_N_WALL_R	Illuminance	Fc	1.83	3.1	1.0	1.83	3.10	N.A.

ADOT I-10 DECK PARK TUNNEL
JUL 26, 2016
WESTBOUND - NIGHT



Cost Estimate

DRAFT PROJECT ASSESSMENT
65 MPH ESTIMATE

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
-	Demolition of Existing Tunnel Luminaires	LS	1	$650,400.00	$650,400.00
-	Maintance of Traffic	LS	1	$1,951,200.00	$1,951,200.00
-	LUMINAIRE (TUNNEL, LED, Type A3 120W)	EA	324	$3,002.40	$972,777.60
-	LUMINAIRE (TUNNEL, LED, Type A6 240W)	EA	2,480	$3,720.00	$9,225,600.00
-	LUMINAIRE (TUNNEL, LED, Type A9 380W)	EA	1,110	$4,399.20	$4,883,112.00
	Tunnel Control System	LS	1	$500,000.00	$500,000.00
-	MOBILIZATION	L.SUM	1	-	$1,770,000.00
-	FORCE ACCOUNT WORK (PROVIDE ELECTRIC SERVICE)	L.SUM	1		
-	MISCELLANEOUS WORK (TUNNEL WALL WASHING)	L SUM	1		
-	MISCELLANEOUS WORK (ELECTRICAL)	L SUM	1	$16,000.00	$16,000.00
-	CONSTRUCTION SURVEYING AND LAYOUT	L.SUM	1	$30,000.00	$30,000.00
CONSTRUCTION SUBTOTAL					**$19,999,089.60**
-	PUBLIC RELATIONS			0.40%	$79,996.36
-	INTEGRATION			5.0%	$999,954.48
-	CONSTRUCTION ENGINEERING			14.0%	$2,799,872.54
-	CONSTRUCTION CONTINGENCIES			5.0%	$999,954.48
CONSTRUCTION TOTAL					**$24,878,867.46**
PROJECT SUBTOTAL					**$24,878,867.46**
-	INDIRECT COST ALLOCATION			10.39%	$2,584,914.33
PROJECT TOTAL					**$27,463,781.79**

DRAFT PROJECT ASSESSMENT
55 MPH ESTIMATE

ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
-	Demolition of Existing Tunnel Luminaires	LS	1	$650,400.00	$650,400.00
-	Maintance of Traffic	LS	1	$1,951,200.00	$1,951,200.00
-	LUMINAIRE (TUNNEL, LED, Type A3 120W)	EA	324	$3,002.40	$972,777.60
-	LUMINAIRE (TUNNEL, LED, Type A6 240W)	EA	1,874	$3,720.00	$6,971,280.00
-	LUMINAIRE (TUNNEL, LED, Type A9 380W)	EA	759	$4,399.20	$3,338,992.80
	Tunnel Control System	LS	1	$500,000.00	$500,000.00
-	MOBILIZATION	L.SUM	1	-	$1,390,000.00
-	FORCE ACCOUNT WORK (PROVIDE ELECTRIC SERVICE)	L.SUM	1		
-	MISCELLANEOUS WORK (TUNNEL WALL WASHING)	L SUM	1		
-	MISCELLANEOUS WORK (ELECTRICAL)	L SUM	1	$16,000.00	$16,000.00
-	CONSTRUCTION SURVEYING AND LAYOUT	L.SUM	1	$30,000.00	$30,000.00
CONSTRUCTION SUBTOTAL					**$15,820,650.40**
-	PUBLIC RELATIONS			0.40%	$63,282.60
-	INTEGRATION			5.0%	$791,032.52
-	CONSTRUCTION ENGINEERING			14.0%	$2,214,891.06
-	CONSTRUCTION CONTINGENCIES			5.0%	$791,032.52
CONSTRUCTION TOTAL					**$19,680,889.10**
PROJECT SUBTOTAL					**$19,680,889.10**
-	INDIRECT COST ALLOCATION			10.39%	$2,044,844.38
PROJECT TOTAL					**$21,725,733.47**

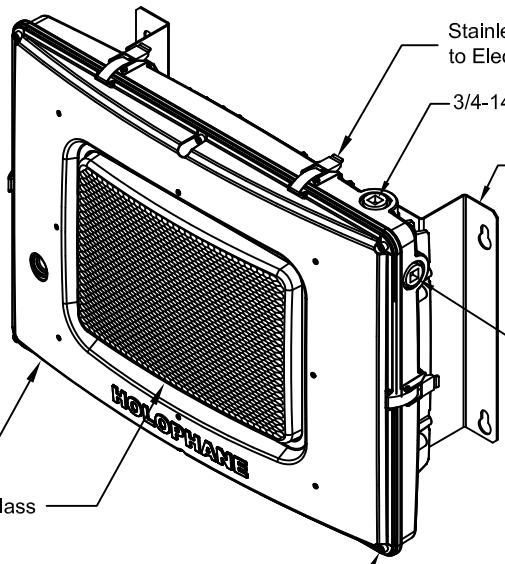
DRAFT PROJECT ASSESSMENT
VSL ESTIMATE

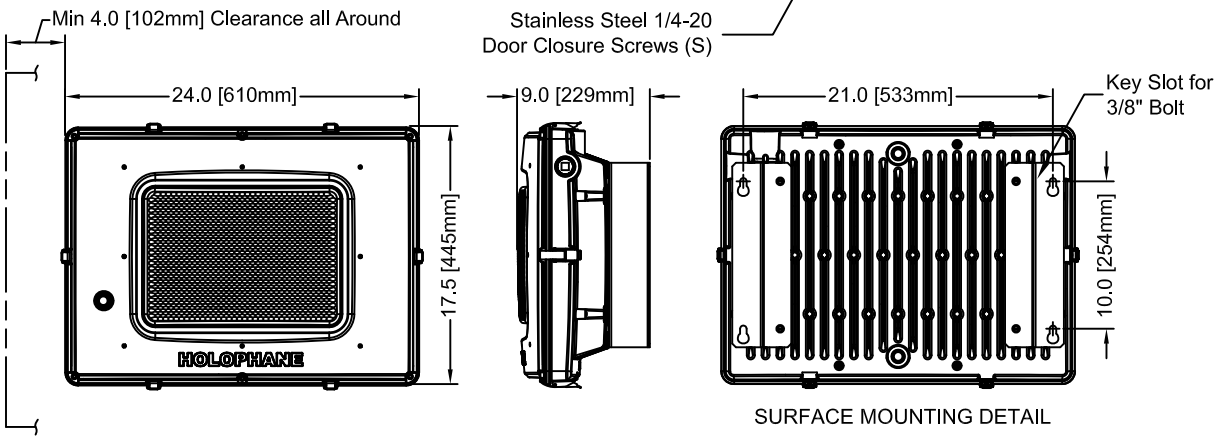
ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
-	Demolition of Existing Tunnel Luminaires	LS	1	$650,400.00	$650,400.00
-	Maintance of Traffic	LS	1	$1,951,200.00	$1,951,200.00
-	LUMINAIRE (TUNNEL, LED, Type A3 120W)	EA	324	$3,002.40	$972,777.60
-	LUMINAIRE (TUNNEL, LED, Type A6 240W)	EA	2,079	$3,720.00	$7,733,880.00
-	LUMINAIRE (TUNNEL, LED, Type A9 380W)	EA	968	$4,399.20	$4,258,425.60
	Tunnel Control System	LS	1	$500,000.00	$500,000.00
-	MOBILIZATION	L.SUM	1	-	$1,560,000.00
-	FORCE ACCOUNT WORK (PROVIDE ELECTRIC SERVICE)	L.SUM	1		$0.00
-	MISCELLANEOUS WORK (TUNNEL WALL WASHING)	L SUM	1		$0.00
-	MISCELLANEOUS WORK (ELECTRICAL)	L SUM	1	$16,000.00	$16,000.00
-	CONSTRUCTION SURVEYING AND LAYOUT	L.SUM	1	$30,000.00	$30,000.00
CONSTRUCTION SUBTOTAL					**$17,672,683.20**
-	PUBLIC RELATIONS			0.40%	$70,690.73
-	INTEGRATION			5.0%	$883,634.16
-	CONSTRUCTION ENGINEERING			14.0%	$2,474,175.65
-	CONSTRUCTION CONTINGENCIES			5.0%	$883,634.16
CONSTRUCTION TOTAL					**$21,984,817.90**
PROJECT SUBTOTAL					**$21,984,817.90**
-	INDIRECT COST ALLOCATION			10.39%	$2,284,222.58
PROJECT TOTAL					**$24,269,040.48**

Luminaire Catalog Cuts and Photometric Data

Max Weight = 60 lbs (27.2 kg)
Max EPA = 3.5 ft² (.325 m²)
UL Certified to U.S. and Canadian Standards
Wet Location
Ambient Rating: 40°C, 30°C TW OPTION

A3





SURFACE MOUNTING DETAIL

Customer Preferred: (Most Frequently Ordered Catalog Numbers)
TNLED 9 5K 1 AH WCR DGRA L

ORDERING INFORMATION:

TNLED

Series
TunnelPass LED ™

Number of LED'S
3 = 3 Modules
6 = 6 Modules
9 = 9 Modules

Color Temperature
3K = 3,000 K CCT +/-250K
4K = 4,000 K CCT +/-250K
5K = 5,000 K CCT +/-250K

Drive Current
1 = 1050mA Driver
[1] 7 = 700mA Driver

Voltage
AS = Auto-Sensing Voltage (120 thru 277)
AH = Auto-Sensing Voltage (347 thru 480)

Optics
CCB = Ceiling Mount Counterbeam
CLN = Ceiling Mount Long and Narrow
WCR = Wall Mount Crossbeam

Color
[2] A = As specified
DBKA = Black
DBZA = Bronze
DGRA = Gray
DWHA = White

Door Closure
L = Latched
S = Screws

Options
[3,4] BM = Box Mount
DM = 0-10V Dimming Control
[4] F1 = Single Fusing
[4] F2 = Double Fusing
TW = Through Wiring Raceway

Notes:
1. Not Available with 9 Modules
2. Handled as Custom
3. Not Available with TW Option. See Sheet 2 for Box Mounting Detail
4. Not available with Marine Listing

TunnelPass LED ™

Infrastructure Specialty

HOLOPHANE® LEADER IN LIGHTING SOLUTIONS
An AcuityBrandsCompany

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ORDER #:	
TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

Specifications

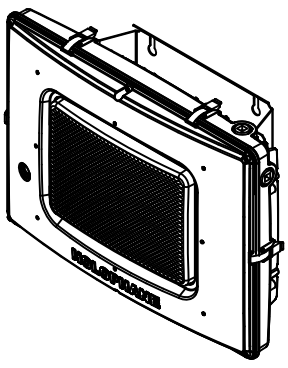
General Construction
Low copper content diecast aluminum A360 alloy electrical and optical housing. Diecast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Stainless steel bolted or latched door closure options disengages top electrical cover for easy access to LED drivers, surge devices, luminaire disconnect plug and terminal block. Vibration rated to 3G applications per ANSI C136.31-2001. IP 66 rated luminaire per IEC 60529. Superdurable TGIC thermoset powder coat finish over anodized aluminum pre-finish. Finish shall pass 5000 hour salt fog test per ASTMB117 and D1654. Suitable for Continuous Row Mounting and optionally as a Raceway. 3/4-14 NPT top entry and two 3/4-14 NPT side entries. 316 grade stainless steel mounting brackets for ceiling, wall, or optional box mount.

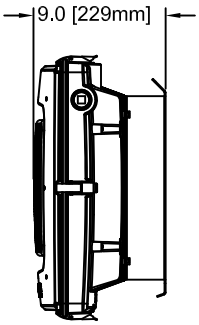
Electrical
Quick disconnect connectors for ease of installation and maintenance. Class 1 drivers rated for 100,000 hours life. Surge protection meets 10KV/5KA per ANSI/IEEEC62.41. Driver power factor is 90% minimum. Driver meets maximum total harmonic distortion (THD) of 20%.

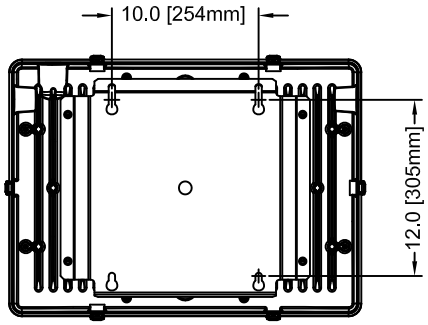
Optical
Multi die LED chip on board (COB) technology, with color temperature options of 4000K and 5000K and a CRI of 70 minimum. Segmented Miro 4 internal reflectors are designed for superior optical control in Counterbeam, Crossbeam, and Long and Narrow distributions. Optical enclosure shall be of borosilicate prismatic glass.

Testing Compliance
Luminaire conforms to following standards:
IEC 61000 - Electromagnetic Compatibility Test (EMC)
FCC Title 47 CFR Part 18 - Federal Communications Commission
ANSI/IEEE C62.41.2-2002 Surge Protection
IEEE 519 - Harmonic control in Electrical Power systems. ANSI C82.77:2002 - Harmonic distortion.
ANSI C136.31:2001 - Luminaire vibration.
ASTM B 117:2003 - Salt spray test.
IEC 60529 - Degrees of protection provided by enclosure (IP).

Regulatory
The luminaire is safety listed to UL/CUL 1598, 40°C, wet location. 30°C when used as a Raceway. Listed to UL/CUL UL1598A, Marine Outside Type (Salt Water).
Key components including surge protection device, LED drivers, and COB arrays are ROHS compliant.







BOX MOUNTING DETAIL

TunnelPass LED™

Infrastructure Specialty

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ORDER #:	
TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

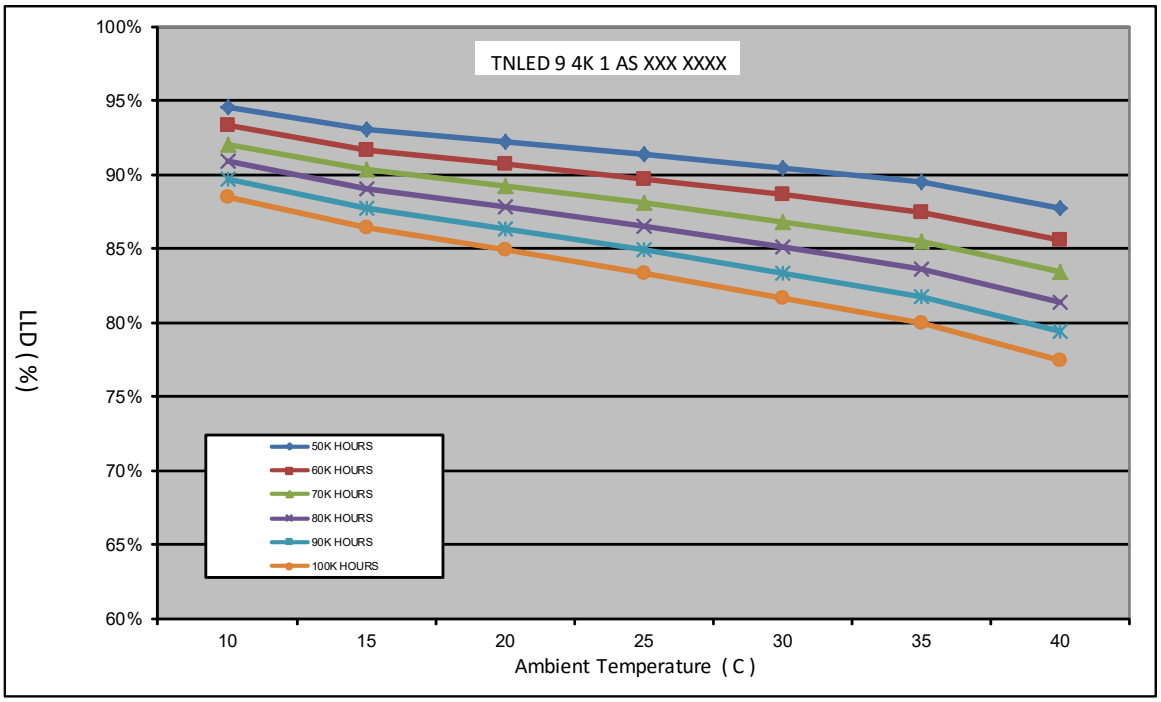
Operating Characteristics

Number of LED's	Drive Current	CCT	Delivered Lumens (WCR)	Input Operating Amps						120-277V		347-480V		L70 @25°C	Driver Life @25°C
				120V	208V	240V	277V	347V	480V	Input Watts	LPW	Input Watts	LPW		
9	1050mA	5000K	31,440	2.98	1.73	1.51	1.33	1.08	0.81	359	88	377	83	>100,000	100,000
6	1050mA	5000K	21,021	2.01	1.15	1.00	0.89	0.73	0.55	239	88	255	82	>100,000	100,000
3	1050mA	5000K	11,063	1.00	0.58	0.51	0.45	0.38	0.33	120	92	136	81	>100,000	100,000
6	700mA	5000K	14,294	1.34	0.78	0.69	0.63	0.47	0.35	159	90	161	89	>100,000	100,000
3	700mA	5000K	7,522	0.66	0.39	0.35	0.31	0.24	0.18	79	95	81	93	>100,000	100,000

Lumen Ambient Temperature (LAT) Factors

10° C	15° C	20° C	25° C	30° C	35° C	40° C
1.05	1.03	1.02	1.00	0.99	0.97	0.95

Lumen Depreciation Curve



Warranty

Five Year Limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note

Actual performance may differ as a result of end-user environment and application.
Actual wattage may differ by +/- 8% when operating between 120-480V +/-10%.
Specifications subject to change without notice.

TunnelPass LED™

Infrastructure Specialty

HOLOPHANE® LEADER IN LIGHTING SOLUTIONS
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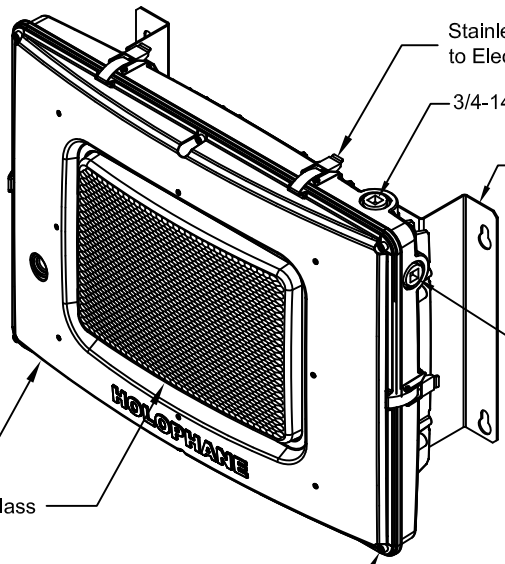
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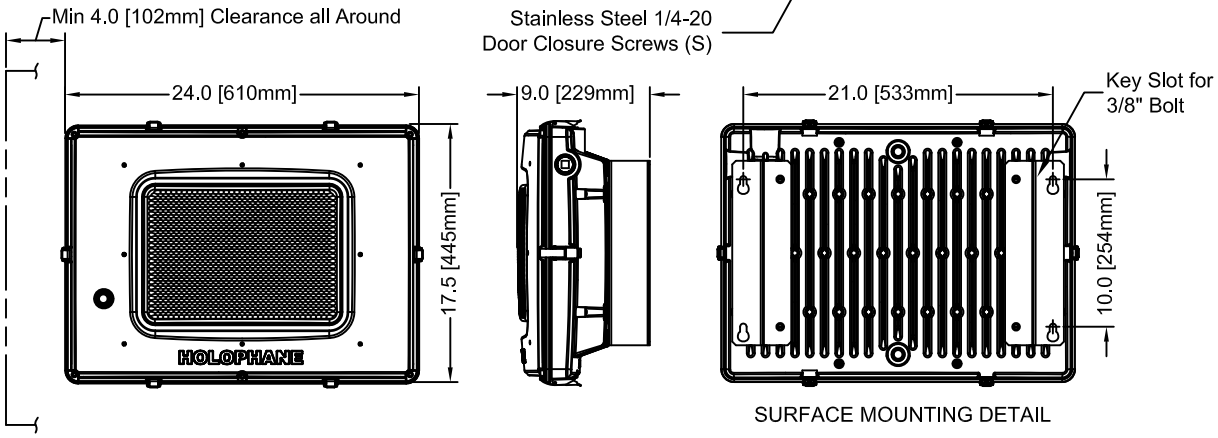
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ORDER #:
TYPE:
DRAWN: BGW
DATE: 6/23/16
DWG #: LUM_TNLED

Max Weight = 60 lbs (27.2 kg)
Max EPA = 3.5 ft² (.325 m²)
UL Certified to U.S. and Canadian Standards
Wet Location
Ambient Rating: 40°C, 30°C TW OPTION

A6





SURFACE MOUNTING DETAIL

Customer Preferred: (Most Frequently Ordered Catalog Numbers)
TNLED 9 5K 1 AH WCR DGRA L

ORDERING INFORMATION:

TNLED — Series
- TunnelPass LED ™

Number of LED'S
- 3 = 3 Modules
- 6 = 6 Modules
- 9 = 9 Modules

Color Temperature
- 3K = 3,000 K CCT +/-250K
- 4K = 4,000 K CCT +/-250K
- 5K = 5,000 K CCT +/-250K

Drive Current
- 1 = 1050mA Driver
- [1] 7 = 700mA Driver

Voltage
- AS = Auto-Sensing Voltage (120 thru 277)
- AH = Auto-Sensing Voltage (347 thru 480)

Optics
- CCB = Ceiling Mount Counterbeam
- CLN = Ceiling Mount Long and Narrow
- WCR = Wall Mount Crossbeam

Color
- [2] A = As specified
- DBKA = Black
- DBZA = Bronze
- DGRA = Gray
- DWHA = White

Door Closure
- L = Latched
- S = Screws

Options
- [3,4] BM = Box Mount
- DM = 0-10V Dimming Control
- [4] F1 = Single Fusing
- [4] F2 = Double Fusing
- TW = Through Wiring Raceway

Notes:
1. Not Available with 9 Modules
2. Handled as Custom
3. Not Available with TW Option. See Sheet 2 for Box Mounting Detail
4. Not available with Marine Listing

TunnelPass LED ™

Infrastructure Specialty

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ORDER #:	
TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

Specifications

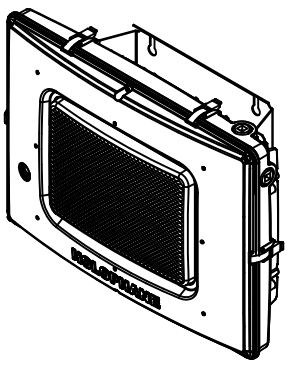
General Construction
Low copper content diecast aluminum A360 alloy electrical and optical housing. Diecast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Stainless steel bolted or latched door closure options disengages top electrical cover for easy access to LED drivers, surge devices, luminaire disconnect plug and terminal block. Vibration rated to 3G applications per ANSI C136.31-2001. IP 66 rated luminaire per IEC 60529. Superdurable TGIC thermoset powder coat finish over anodized aluminum pre-finish. Finish shall pass 5000 hour salt fog test per ASTMB117 and D1654. Suitable for Continuous Row Mounting and optionally as a Raceway. 3/4-14 NPT top entry and two 3/4-14 NPT side entries. 316 grade stainless steel mounting brackets for ceiling, wall, or optional box mount.

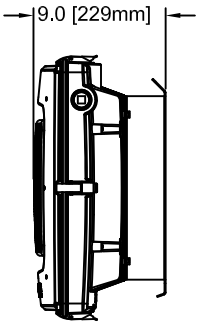
Electrical
Quick disconnect connectors for ease of installation and maintenance. Class 1 drivers rated for 100,000 hours life. Surge protection meets 10KV/5KA per ANSI/IEEEC62.41. Driver power factor is 90% minimum. Driver meets maximum total harmonic distortion (THD) of 20%.

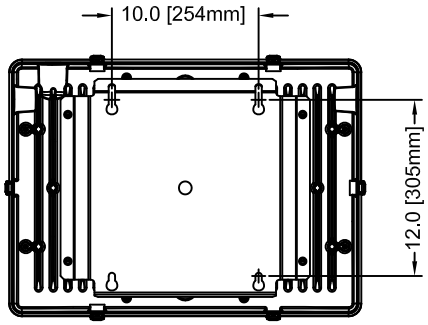
Optical
Multi die LED chip on board (COB) technology, with color temperature options of 4000K and 5000K and a CRI of 70 minimum. Segmented Miro 4 internal reflectors are designed for superior optical control in Counterbeam, Crossbeam, and Long and Narrow distributions. Optical enclosure shall be of borosilicate prismatic glass.

Testing Compliance
Luminaire conforms to following standards:
IEC 61000 - Electromagnetic Compatibility Test (EMC)
FCC Title 47 CFR Part 18 - Federal Communications Commission
ANSI/IEEE C62.41.2-2002 Surge Protection
IEEE 519 - Harmonic control in Electrical Power systems. ANSI C82.77:2002 - Harmonic distortion.
ANSI C136.31:2001 - Luminaire vibration.
ASTM B 117:2003 - Salt spray test.
IEC 60529 - Degrees of protection provided by enclosure (IP).

Regulatory
The luminaire is safety listed to UL/CUL 1598, 40°C, wet location. 30°C when used as a Raceway. Listed to UL/CUL UL1598A, Marine Outside Type (Salt Water).
Key components including surge protection device, LED drivers, and COB arrays are ROHS compliant.







BOX MOUNTING DETAIL

TunnelPass LED™

Infrastructure Specialty

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ORDER #:	
TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

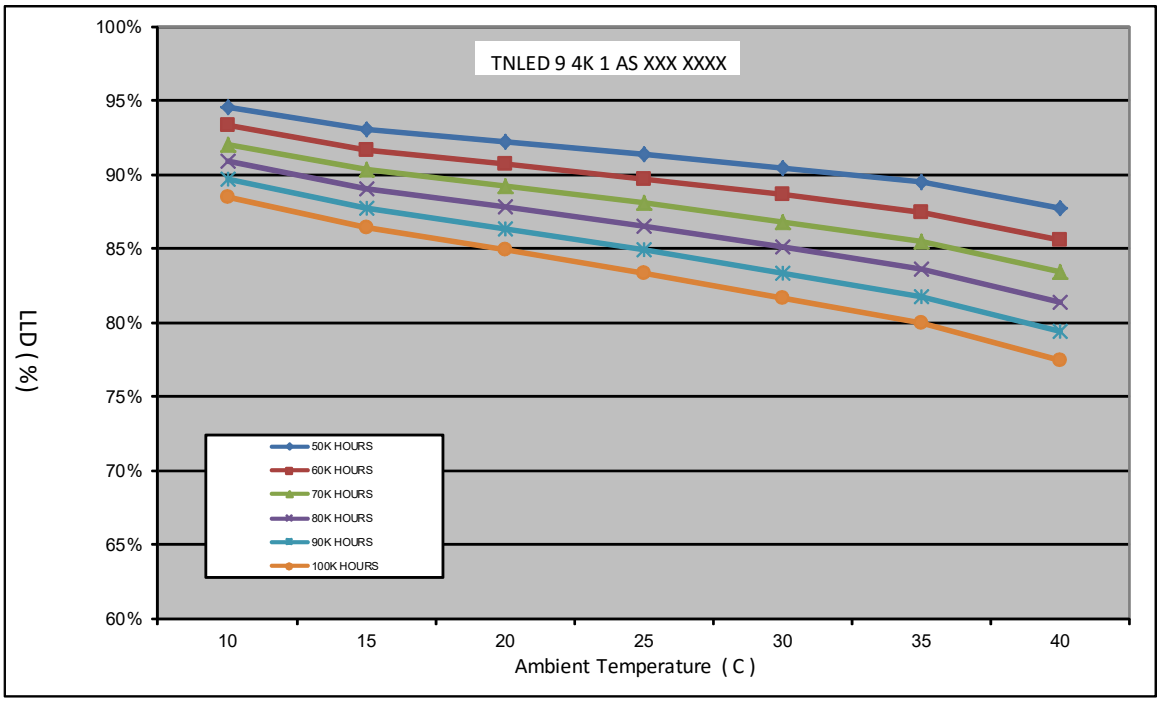
Operating Characteristics

Number of LED's	Drive Current	CCT	Delivered Lumens (WCR)	Input Operating Amps						120-277V		347-480V		L70 @25°C	Driver Life @25°C
				120V	208V	240V	277V	347V	480V	Input Watts	LPW	Input Watts	LPW		
9	1050mA	5000K	31,440	2.98	1.73	1.51	1.33	1.08	0.81	359	88	377	83	>100,000	100,000
6	1050mA	5000K	21,021	2.01	1.15	1.00	0.89	0.73	0.55	239	88	255	82	>100,000	100,000
3	1050mA	5000K	11,063	1.00	0.58	0.51	0.45	0.38	0.33	120	92	136	81	>100,000	100,000
6	700mA	5000K	14,294	1.34	0.78	0.69	0.63	0.47	0.35	159	90	161	89	>100,000	100,000
3	700mA	5000K	7,522	0.66	0.39	0.35	0.31	0.24	0.18	79	95	81	93	>100,000	100,000

Lumen Ambient Temperature (LAT) Factors

10° C	15° C	20° C	25° C	30° C	35° C	40° C
1.05	1.03	1.02	1.00	0.99	0.97	0.95

Lumen Depreciation Curve



Warranty

Five Year Limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note

Actual performance may differ as a result of end-user environment and application.
Actual wattage may differ by +/- 8% when operating between 120-480V +/-10%.
Specifications subject to change without notice.

TunnelPass LED™

Infrastructure Specialty

HOLOPHANE® LEADER IN LIGHTING SOLUTIONS
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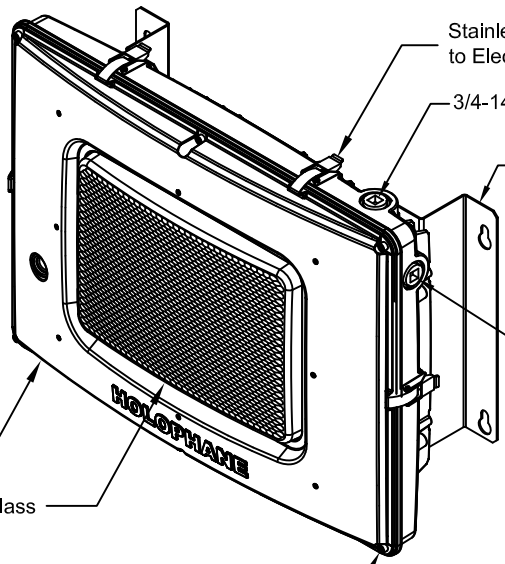
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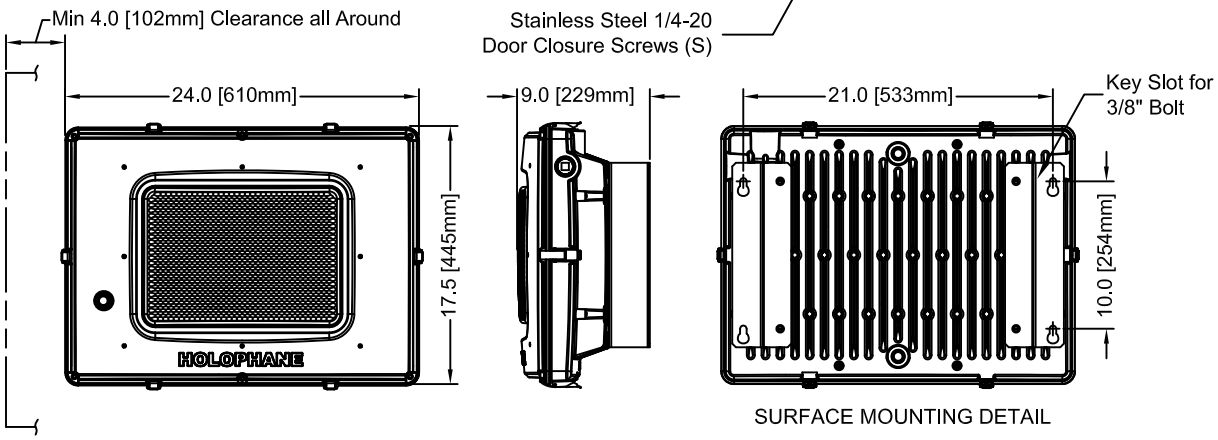
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ORDER #:
TYPE:
DRAWN: BGW
DATE: 6/23/16
DWG #: LUM_TNLED

Max Weight = 60 lbs (27.2 kg)
Max EPA = 3.5 ft² (.325 m²)
UL Certified to U.S. and Canadian Standards
Wet Location
Ambient Rating: 40°C, 30°C TW OPTION

A9





SURFACE MOUNTING DETAIL

Customer Preferred: (Most Frequently Ordered Catalog Numbers)
TNLED 9 5K 1 AH WCR DGRA L

ORDERING INFORMATION:

TNLED

Series
TunnelPass LED ™

Number of LED'S
3 = 3 Modules
6 = 6 Modules
9 = 9 Modules

Color Temperature
3K = 3,000 K CCT +/-250K
4K = 4,000 K CCT +/-250K
5K = 5,000 K CCT +/-250K

Drive Current
1 = 1050mA Driver
[1] 7 = 700mA Driver

Voltage
AS = Auto-Sensing Voltage (120 thru 277)
AH = Auto-Sensing Voltage (347 thru 480)

Optics
CCB = Ceiling Mount Counterbeam
CLN = Ceiling Mount Long and Narrow
WCR = Wall Mount Crossbeam

Color
[2] A = As specified
DBKA = Black
DBZA = Bronze
DGRA = Gray
DWHA = White

Door Closure
L = Latched
S = Screws

Options
[3,4] BM = Box Mount
DM = 0-10V Dimming Control
[4] F1 = Single Fusing
[4] F2 = Double Fusing
TW = Through Wiring Raceway

Notes:
1. Not Available with 9 Modules
2. Handled as Custom
3. Not Available with TW Option. See Sheet 2 for Box Mounting Detail
4. Not available with Marine Listing

TunnelPass LED ™

Infrastructure Specialty

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ORDER #:	
TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

Specifications

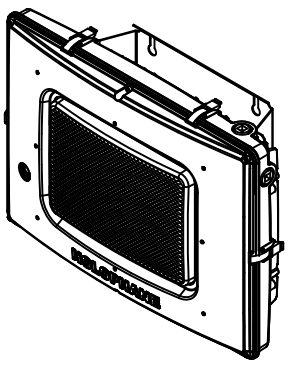
General Construction
Low copper content diecast aluminum A360 alloy electrical and optical housing. Diecast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Stainless steel bolted or latched door closure options disengages top electrical cover for easy access to LED drivers, surge devices, luminaire disconnect plug and terminal block. Vibration rated to 3G applications per ANSI C136.31-2001. IP 66 rated luminaire per IEC 60529. Superdurable TGIC thermoset powder coat finish over anodized aluminum pre-finish. Finish shall pass 5000 hour salt fog test per ASTMB117 and D1654. Suitable for Continuous Row Mounting and optionally as a Raceway. 3/4-14 NPT top entry and two 3/4-14 NPT side entries. 316 grade stainless steel mounting brackets for ceiling, wall, or optional box mount.

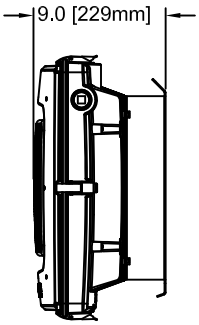
Electrical
Quick disconnect connectors for ease of installation and maintenance. Class 1 drivers rated for 100,000 hours life. Surge protection meets 10KV/5KA per ANSI/IEEEC62.41. Driver power factor is 90% minimum. Driver meets maximum total harmonic distortion (THD) of 20%.

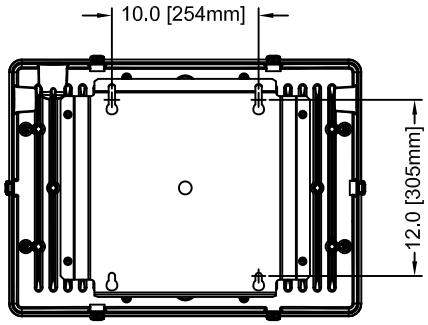
Optical
Multi die LED chip on board (COB) technology, with color temperature options of 4000K and 5000K and a CRI of 70 minimum. Segmented Miro 4 internal reflectors are designed for superior optical control in Counterbeam, Crossbeam, and Long and Narrow distributions. Optical enclosure shall be of borosilicate prismatic glass.

Testing Compliance
Luminaire conforms to following standards:
IEC 61000 - Electromagnetic Compatibility Test (EMC)
FCC Title 47 CFR Part 18 - Federal Communications Commission
ANSI/IEEE C62.41.2-2002 Surge Protection
IEEE 519 - Harmonic control in Electrical Power systems. ANSI C82.77:2002 - Harmonic distortion.
ANSI C136.31:2001 - Luminaire vibration.
ASTM B 117:2003 - Salt spray test.
IEC 60529 - Degrees of protection provided by enclosure (IP).

Regulatory
The luminaire is safety listed to UL/CUL 1598, 40°C, wet location. 30°C when used as a Raceway. Listed to UL/CUL UL1598A, Marine Outside Type (Salt Water).
Key components including surge protection device, LED drivers, and COB arrays are ROHS compliant.







BOX MOUNTING DETAIL

TunnelPass LED™

Infrastructure Specialty

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TYPE:	
DRAWN:	BGW
DATE:	6/23/16
DWG #:	LUM_TNLED

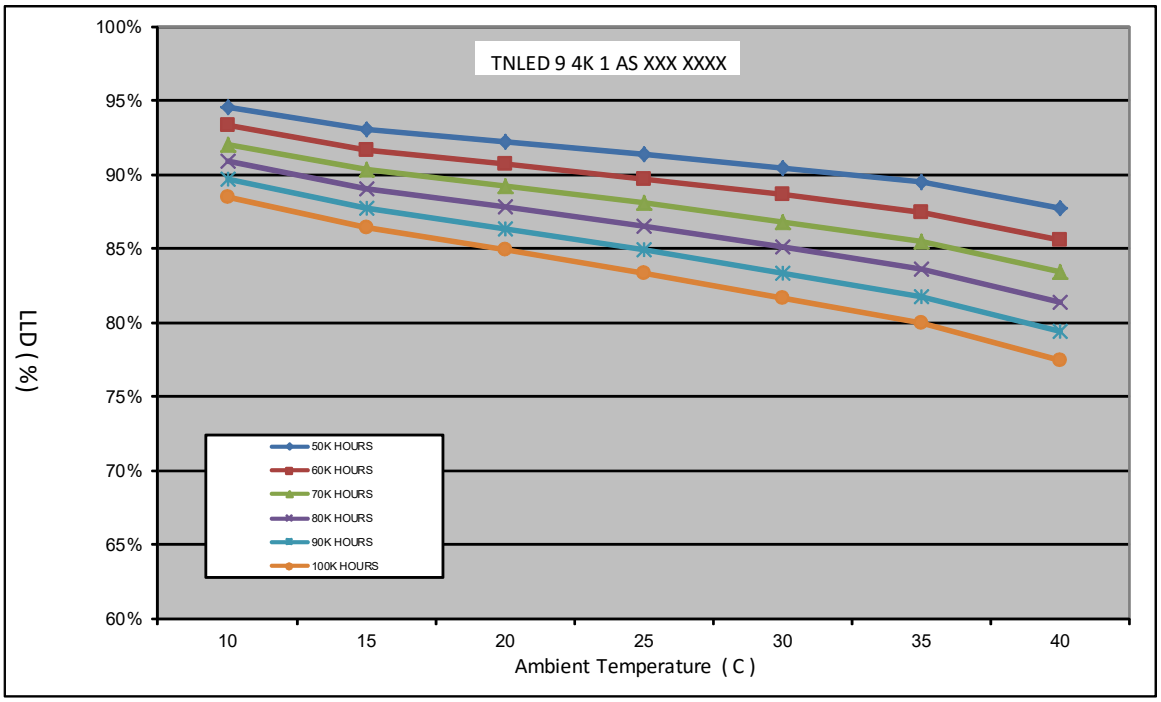
Operating Characteristics

Number of LED's	Drive Current	CCT	Delivered Lumens (WCR)	Input Operating Amps						120-277V		347-480V		L70 @25°C	Driver Life @25°C
				120V	208V	240V	277V	347V	480V	Input Watts	LPW	Input Watts	LPW		
9	1050mA	5000K	31,440	2.98	1.73	1.51	1.33	1.08	0.81	359	88	377	83	>100,000	100,000
6	1050mA	5000K	21,021	2.01	1.15	1.00	0.89	0.73	0.55	239	88	255	82	>100,000	100,000
3	1050mA	5000K	11,063	1.00	0.58	0.51	0.45	0.38	0.33	120	92	136	81	>100,000	100,000
6	700mA	5000K	14,294	1.34	0.78	0.69	0.63	0.47	0.35	159	90	161	89	>100,000	100,000
3	700mA	5000K	7,522	0.66	0.39	0.35	0.31	0.24	0.18	79	95	81	93	>100,000	100,000

Lumen Ambient Temperature (LAT) Factors

10° C	15° C	20° C	25° C	30° C	35° C	40° C
1.05	1.03	1.02	1.00	0.99	0.97	0.95

Lumen Depreciation Curve



Warranty

Five Year Limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note

Actual performance may differ as a result of end-user environment and application.
Actual wattage may differ by +/- 8% when operating between 120-480V +/-10%.
Specifications subject to change without notice.

TunnelPass LED™

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ORDER #:
TYPE:
DRAWN: BGW
DATE: 6/23/16
DWG #: LUM_TNLED

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_3_4K_1_AS_CCB_XX_X-AGI32.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] 501956P2
[TESTLAB] SCALED PHOTOMETRY
[ISSUEDATE] 9/30/2014
[MANUFAC] Holophane
[LUMCAT] TNLED 3 4K 1 AS CCB XX X
[LUMINAIRE] TunnelPass LED
[LAMPCAT] LED 4000K
[LAMP] 3 LED Array
[BALLAST] 1 x 150W DRIVER, 120v-277vm 1050mA
[_AGI32] File was generated from AGi32

CHARACTERISTICS

IES Classification	Type III
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	11019
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	90
Total Luminaire Watts	122.4
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	11354.101
Maximum Candela Angle	350H 61V
Maximum Candela (<90 Degrees Vertical)	11354.101
Maximum Candela Angle (<90 Degrees Vertical)	350H 61V
Maximum Candela At 90 Degrees Vertical	85.457 (0.8% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	1159.493 (10.5% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

Photometric Toolbox Professional Edition - Copyright 2002-2015 by Lighting Analysts, Inc.
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

IES ROAD REPORT
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LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1936.3	N.A.	17.6
FM - Front-Medium (30-60)	4760.4	N.A.	43.2
FH - Front-High (60-80)	2664.0	N.A.	24.2
FVH - Front-Very High (80-90)	122.8	N.A.	1.1
BL - Back-Low (0-30)	824.2	N.A.	7.5
BM - Back-Medium (30-60)	570.7	N.A.	5.2
BH - Back-High (60-80)	88.6	N.A.	0.8
BVH - Back-Very High (80-90)	5.4	N.A.	0.0
UL - Uplight-Low (90-100)	10.5	N.A.	0.1
UH - Uplight-High (100-180)	36.5	N.A.	0.3
Total	11019.4	N.A.	100.0
BUG Rating	B2-U2-G2		

IES ROAD REPORT
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CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	5	10	15	20	25	30	35	40	45
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2613.230	2615.172	2649.161	2637.508	2614.201	2587.981	2594.779	2592.837	2590.895	2562.733
2	3056.052	3055.081	3073.531	3052.167	3016.237	2959.913	2948.260	2918.155	2905.531	2829.785
3	3424.099	3417.301	3430.896	3399.821	3344.468	3295.913	3279.405	3251.243	3223.081	3135.682
4	3741.648	3735.822	3722.226	3661.047	3593.070	3527.035	3515.382	3487.220	3441.578	3361.948
5	4188.354	4164.077	4152.423	4066.967	3980.539	3897.995	3866.920	3794.088	3708.631	3562.966
6	4498.135	4475.800	4446.667	4378.690	4305.857	4239.822	4237.880	4160.192	4043.660	3862.065
7	4761.303	4733.141	4709.835	4609.812	4532.124	4463.175	4441.811	4390.343	4286.435	4136.886
8	5015.731	4997.280	4976.887	4887.546	4805.003	4728.286	4681.673	4559.314	4423.360	4309.742
9	5142.945	5140.032	5136.148	5084.679	5027.385	4979.801	4916.679	4780.725	4630.205	4508.817
10	5233.258	5237.142	5229.373	5204.125	5131.292	5096.333	5049.720	4969.119	4869.095	4736.055
11	5274.044	5267.246	5256.564	5248.795	5200.240	5163.339	5121.581	5076.911	5006.020	4918.621
12	5221.605	5206.067	5204.125	5208.980	5214.807	5208.009	5199.269	5157.512	5074.968	5028.356
13	5151.685	5149.743	5159.454	5181.789	5172.078	5176.934	5201.211	5191.500	5121.581	5103.130
14	5116.726	5118.668	5137.119	5189.558	5159.454	5142.945	5193.443	5194.414	5163.339	5184.703
15	5059.431	5073.997	5095.362	5141.974	5104.101	5125.466	5188.587	5165.281	5201.211	5228.402
16	5003.107	5009.905	5035.153	5074.968	5042.922	5098.275	5120.610	5158.483	5207.038	5280.842
17	4920.564	4935.130	4967.176	5024.471	4978.830	5038.067	5039.038	5132.263	5240.055	5334.252
18	4812.771	4822.482	4865.211	4936.101	4896.286	4966.205	4968.147	5108.957	5237.142	5406.114
19	4785.581	4799.176	4847.731	4869.095	4811.800	4873.951	4914.737	5076.911	5261.420	5429.420
20	4678.760	4702.066	4773.927	4802.089	4796.263	4805.003	4861.326	5018.645	5260.449	5431.362
21	4596.216	4598.158	4648.656	4654.482	4689.442	4734.112	4824.425	4995.338	5235.200	5416.796
22	4472.886	4463.175	4536.008	4539.892	4562.228	4617.580	4800.147	5012.818	5227.431	5396.403
23	4291.291	4281.580	4350.528	4364.123	4435.014	4544.748	4758.390	4985.627	5228.402	5367.270
24	4210.689	4214.574	4250.505	4217.487	4277.695	4461.233	4716.633	4925.419	5157.512	5349.790
25	4093.186	4100.955	4125.233	4144.655	4190.296	4337.904	4646.713	4882.691	5078.853	5352.703
26	4024.238	3987.336	4018.412	4027.152	4091.244	4312.655	4554.459	4812.771	5014.760	5279.871
27	3936.839	3892.169	3940.724	3954.319	3991.221	4274.782	4517.557	4725.372	5009.905	5199.269
28	3816.423	3805.741	3832.932	3889.255	3988.308	4221.372	4462.204	4693.326	4983.685	5189.558
29	3763.983	3750.388	3756.215	3801.856	3941.695	4224.285	4402.967	4629.234	4933.188	5184.703
30	3720.284	3692.122	3712.515	3757.186	3893.140	4197.094	4394.227	4536.979	4916.679	5144.888
31	3682.411	3624.145	3642.596	3702.804	3912.562	4172.817	4368.979	4575.823	4893.373	5057.489
32	3707.660	3666.873	3657.162	3687.267	3894.111	4181.556	4364.123	4632.147	4860.355	4954.552
33	3687.267	3648.423	3653.278	3729.995	3915.475	4149.510	4377.719	4636.031	4810.829	4831.222
34	3723.197	3661.047	3671.729	3716.400	3983.452	4203.892	4425.303	4662.251	4721.488	4676.817
35	3715.428	3648.423	3683.382	3769.810	4050.458	4288.377	4520.470	4662.251	4642.829	4534.066
36	3743.590	3696.978	3712.515	3854.296	4173.788	4360.239	4637.002	4645.742	4575.823	4409.765
37	3763.012	3708.631	3760.099	3989.279	4314.597	4526.297	4726.344	4635.060	4514.644	4248.562
38	3766.897	3687.267	3786.319	4104.840	4513.673	4728.286	4838.991	4688.471	4486.482	4128.146
39	3758.157	3662.018	3792.145	4266.042	4722.459	4965.234	4990.483	4794.321	4511.730	4032.007
40	3725.139	3591.128	3765.926	4417.534	4965.234	5212.865	5149.743	4911.824	4531.152	4018.412
41	3726.111	3538.688	3763.983	4535.037	5235.200	5481.859	5331.339	5061.373	4564.170	4018.412
42	3695.035	3489.162	3792.145	4693.326	5504.195	5781.929	5529.443	5233.258	4664.193	4001.903
43	3741.648	3494.989	3797.972	4843.847	5812.033	6068.404	5730.461	5387.663	4833.165	4022.296
44	3820.307	3582.388	3899.937	4968.147	6040.242	6350.994	5995.571	5557.605	4961.350	4052.400
45	3920.331	3698.920	4016.469	5079.824	6185.907	6576.289	6228.635	5665.397	5059.431	4083.475
46	4180.585	3991.221	4228.169	5163.339	6270.393	6672.428	6386.925	5788.727	5127.408	4148.539
47	4412.678	4247.591	4530.181	5316.772	6283.017	6650.093	6399.549	5893.606	5202.183	4242.736
48	4653.511	4526.297	4765.188	5477.975	6345.167	6575.318	6270.393	5926.623	5241.998	4374.805
49	4935.130	4851.615	5053.604	5645.975	6363.618	6470.439	6071.317	5817.860	5242.969	4546.690
50	5330.368	5286.668	5465.351	5893.606	6369.445	6368.474	5825.629	5568.287	5178.876	4680.702
51	5845.051	5825.629	6017.907	6295.641	6457.815	6223.780	5582.854	5288.610	5073.997	4748.679
52	6272.335	6300.497	6529.676	6731.665	6641.353	6115.988	5348.819	5010.876	4968.147	4746.737

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_3_4K_1_AS_CCB_XX_X-AGI32.IES

CANDELA TABULATION - (Cont.)

53	6770.509	6768.567	6993.862	7111.365	6888.983	6079.086	5129.350	4777.812	4845.789	4670.991
54	7361.909	7288.105	7507.574	7483.296	7098.741	6034.415	4945.812	4579.707	4681.673	4569.996
55	8083.436	7984.384	8125.193	7889.216	7291.990	5990.716	4755.477	4353.441	4486.482	4470.944
56	8776.802	8693.287	8829.241	8420.408	7541.562	5941.190	4559.314	4100.955	4293.233	4327.221
57	9394.421	9307.993	9451.716	8979.761	7833.863	5890.692	4310.713	3852.354	4083.475	4124.262
58	9995.532	9895.509	10009.1279527.462		8198.997	5867.386	4052.400	3561.024	3846.527	3937.810
59	10533.52110459.71810527.69510015.9258549.564					5909.143	3770.781	3225.023	3555.197	3731.937
60	10934.58610882.14610932.64310432.5278866.143					6009.167	3537.717	2884.167	3249.301	3533.833
61	10855.92710826.79410974.40110626.7479084.640					6102.392	3387.197	2584.097	2950.202	3310.480
62	10484.96610515.07110704.43510524.7829120.571					6144.150	3305.624	2353.946	2703.542	3112.375
63	10174.21410192.66510367.46310319.8799060.363					6115.988	3216.283	2176.235	2487.958	2912.329
64	9679.925	9741.104	9898.422	9959.601	8826.328	6029.560	3087.127	1983.957	2301.507	2711.311
65	9159.415	9229.334	9343.924	9503.184	8608.801	5939.247	2988.075	1820.812	2108.258	2522.918
66	8624.339	8681.634	8776.802	8991.415	8300.963	5802.322	2895.820	1701.367	1936.373	2345.206
67	7929.031	7946.511	8061.101	8403.899	7918.349	5647.917	2810.363	1590.662	1781.968	2170.408
68	6989.978	6990.949	7184.198	7706.649	7453.192	5487.686	2735.589	1487.725	1637.275	1987.842
69	5990.716	5961.583	6196.589	6849.168	6831.688	5235.200	2649.161	1411.008	1509.089	1813.044
70	5003.107	5009.905	5266.275	5964.496	6130.554	4874.922	2508.351	1340.118	1389.644	1669.321
71	4153.395	4154.366	4396.170	5127.408	5388.634	4422.389	2352.975	1247.863	1271.170	1530.454
72	3406.619	3427.012	3673.671	4361.210	4690.413	3980.539	2177.206	1151.725	1142.985	1389.644
73	2755.011	2781.230	3025.948	3675.613	4015.498	3521.209	1983.957	1043.932	1008.973	1230.384
74	2211.195	2228.674	2449.114	3042.456	3394.966	3071.589	1779.055	937.111	879.817	1075.008
75	1760.604	1768.373	1972.304	2478.247	2840.467	2627.797	1574.153	851.655	779.793	949.736
76	1377.991	1381.875	1555.702	1989.784	2320.929	2203.426	1365.367	765.227	692.394	841.944
77	1094.430	1102.198	1222.615	1579.980	1874.223	1814.015	1167.262	672.001	605.966	739.007
78	890.499	885.643	978.869	1259.517	1507.147	1478.985	991.493	587.515	522.452	639.955
79	731.238	722.498	792.418	1020.626	1220.673	1213.875	822.522	509.827	450.590	549.643
80	602.082	595.284	648.695	834.175	988.580	998.291	690.452	436.995	383.584	461.272
81	495.261	486.521	524.394	672.972	794.360	809.897	565.180	369.018	317.550	370.960
82	406.891	395.238	427.284	539.932	632.186	643.839	455.446	310.752	260.255	297.157
83	332.116	321.434	342.798	429.226	497.203	506.914	364.162	252.486	208.786	241.804
84	270.937	261.226	274.821	338.914	386.498	391.353	288.417	198.104	168.971	188.393
85	219.469	207.815	217.526	264.139	295.214	301.041	219.469	156.347	134.983	144.694
86	178.682	168.000	169.942	203.931	225.295	224.324	162.174	121.387	107.792	108.763
87	141.781	132.070	133.041	154.405	162.174	161.203	118.474	91.283	80.601	81.572
88	110.705	103.908	101.965	115.561	116.532	113.619	85.457	66.035	58.266	56.324
89	83.515	77.688	76.717	82.543	80.601	76.717	55.353	46.613	39.815	36.902
90	60.208	54.382	51.468	54.382	49.526	45.642	33.017	27.191	23.306	19.422
91	42.728	38.844	36.902	35.931	31.075	27.191	18.451	14.566	11.653	5.827
92	28.162	26.220	23.306	21.364	13.595	13.595	7.769	4.855	0.971	0.000
93	17.480	15.538	13.595	9.711	4.855	2.913	0.000	0.000	0.000	0.000
94	9.711	7.769	5.827	2.913	0.000	0.000	0.000	0.000	0.000	0.000
95	5.827	3.884	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	2.913	0.971	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2554.964	2540.398	2530.687	2508.351	2495.727	2485.045	2472.421	2461.738	2449.114	2452.027
2	2803.566	2737.531	2690.918	2620.028	2571.473	2523.889	2480.189	2442.316	2417.068	2407.357
3	3085.185	2991.959	2907.473	2793.855	2704.513	2597.692	2501.554	2430.663	2388.906	2375.311
4	3301.740	3209.485	3101.693	2952.144	2820.074	2666.641	2522.918	2423.866	2366.571	2354.917
5	3466.827	3358.064	3249.301	3102.664	2959.913	2767.635	2574.386	2423.866	2343.264	2324.813
6	3696.978	3512.469	3362.919	3224.052	3105.578	2913.300	2691.889	2475.334	2359.773	2318.016
7	3972.770	3743.590	3542.573	3360.977	3264.838	3093.925	2843.381	2571.473	2395.704	2330.640
8	4229.140	4041.718	3795.059	3527.035	3370.688	3200.746	2938.549	2605.461	2392.790	2323.842
9	4415.592	4254.389	4018.412	3698.920	3454.203	3255.127	3009.439	2650.132	2391.819	2334.524
10	4564.170	4377.719	4187.383	3911.591	3593.070	3319.220	3084.214	2706.456	2407.357	2346.178
11	4744.794	4524.355	4331.106	4117.464	3764.955	3409.532	3171.613	2779.288	2443.288	2374.339
12	4935.130	4708.864	4440.840	4251.476	3940.724	3502.758	3257.069	2865.716	2485.045	2405.415
13	5056.518	4882.691	4597.187	4376.748	4113.579	3642.596	3321.162	2952.144	2548.166	2453.970
14	5131.292	5028.356	4808.887	4534.066	4285.464	3816.423	3416.330	3054.109	2620.999	2503.496
15	5209.951	5153.628	5022.529	4735.083	4432.100	3988.308	3503.729	3154.133	2686.063	2543.311
16	5329.397	5285.697	5196.356	4947.754	4500.077	4126.204	3574.619	3234.734	2744.329	2585.068
17	5437.189	5401.258	5297.350	5128.379	4601.072	4253.418	3668.816	3303.682	2807.450	2621.970
18	5525.559	5510.992	5375.038	5230.344	4710.806	4312.655	3715.428	3345.439	2827.843	2606.432
19	5593.536	5578.969	5447.871	5302.206	4835.107	4357.326	3760.099	3352.237	2817.161	2548.166
20	5616.842	5612.958	5510.021	5339.108	4896.286	4395.198	3795.059	3349.324	2764.722	2481.160
21	5622.669	5623.640	5568.287	5353.674	4970.090	4374.805	3805.741	3314.364	2691.889	2410.270
22	5598.391	5637.235	5568.287	5341.050	4997.280	4349.557	3780.492	3231.821	2577.299	2308.305
23	5561.490	5634.322	5544.010	5308.032	4950.668	4264.100	3688.238	3081.300	2435.519	2179.148
24	5540.125	5594.507	5514.877	5294.437	4877.835	4232.054	3612.492	2945.346	2307.334	2047.079
25	5475.062	5530.414	5489.628	5255.593	4876.864	4223.314	3501.787	2802.595	2158.755	1924.720
26	5414.853	5488.657	5452.726	5216.749	4804.032	4117.464	3340.584	2615.172	1998.524	1792.651
27	5382.807	5444.958	5417.767	5108.957	4637.973	3941.695	3139.566	2386.964	1830.523	1632.419
28	5318.715	5377.952	5280.842	4939.014	4413.649	3713.486	2946.317	2157.784	1674.176	1478.985
29	5236.171	5272.102	5086.622	4756.448	4208.747	3538.688	2739.473	1961.622	1528.511	1355.656
30	5178.876	5099.246	4890.459	4532.124	3987.336	3357.093	2550.109	1794.593	1368.280	1243.008
31	5046.807	4879.777	4646.713	4310.713	3823.221	3205.601	2350.062	1633.390	1239.124	1113.852
32	4868.124	4650.598	4390.343	4119.406	3655.220	3024.976	2184.975	1502.292	1150.753	990.522
33	4710.806	4400.054	4141.741	3905.764	3485.278	2866.687	2084.952	1381.875	1064.326	907.007
34	4535.037	4218.458	3903.822	3701.833	3322.133	2744.329	1991.726	1283.794	987.609	857.481
35	4322.366	4028.123	3674.642	3523.151	3151.219	2636.536	1886.847	1228.441	917.689	818.637

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CANDELA TABULATION - (Cont.)

36	4075.707	3792.145	3441.578	3331.844	3006.526	2546.224	1842.177	1209.991	874.961	804.071
37	3902.851	3584.330	3262.896	3164.815	2936.606	2516.120	1814.015	1189.597	847.770	789.504
38	3779.521	3363.890	3124.029	3059.936	2883.196	2489.900	1800.419	1183.771	832.233	785.620
39	3619.290	3173.555	3016.237	2993.901	2845.323	2493.785	1819.841	1179.886	823.493	791.446
40	3457.116	3020.121	2928.838	2969.624	2875.427	2540.398	1881.992	1189.597	834.175	806.984
41	3317.278	2924.953	2877.369	2996.815	2944.375	2595.750	1933.460	1191.540	845.828	821.551
42	3258.040	2889.994	2893.878	3011.381	3022.063	2658.872	1964.535	1198.337	851.655	833.204
43	3243.474	2898.733	2932.722	3086.156	3079.358	2704.513	1969.391	1214.846	865.250	849.712
44	3291.058	2958.942	2979.335	3156.075	3100.722	2732.675	2006.293	1232.326	889.528	871.077
45	3370.688	3025.948	3026.919	3164.815	3106.549	2766.664	2021.830	1238.152	909.921	882.730
46	3503.729	3110.433	3074.503	3164.815	3139.566	2797.739	2051.934	1237.181	929.343	908.950
47	3646.480	3202.688	3122.086	3154.133	3171.613	2861.832	2083.981	1252.719	938.083	926.429
48	3813.510	3319.220	3152.191	3173.555	3217.254	2908.444	2141.275	1254.661	940.025	935.169
49	3964.030	3458.087	3203.659	3196.861	3250.272	2931.751	2190.802	1254.661	930.314	935.169
50	4071.822	3547.428	3265.809	3246.387	3242.503	2925.924	2184.975	1257.574	915.747	926.429
51	4148.539	3641.625	3330.873	3278.434	3223.081	2878.340	2168.466	1224.557	905.065	913.805
52	4226.227	3743.590	3370.688	3272.607	3158.017	2827.843	2115.056	1197.366	884.672	892.441
53	4220.400	3818.365	3402.734	3224.052	3084.214	2757.924	2086.894	1173.089	858.452	869.134
54	4173.788	3846.527	3414.388	3154.133	2998.757	2690.918	2045.137	1147.840	841.944	854.568
55	4105.811	3823.221	3412.445	3088.098	2905.531	2642.363	1991.726	1111.909	820.579	829.319
56	4038.805	3778.550	3393.994	3025.948	2841.439	2580.213	1933.460	1064.326	788.533	798.244
57	3946.550	3715.428	3358.064	2957.971	2770.548	2503.496	1871.310	1016.742	739.978	756.487
58	3840.700	3631.914	3304.653	2921.069	2684.120	2408.328	1797.506	966.244	679.770	707.932
59	3671.729	3520.237	3247.358	2859.889	2579.242	2269.461	1715.934	900.210	620.533	664.232
60	3515.382	3403.705	3168.699	2760.837	2464.652	2161.669	1628.535	855.539	567.122	615.677
61	3350.295	3270.665	3064.792	2665.669	2349.091	2083.009	1562.500	814.753	527.307	578.776
62	3176.468	3142.480	2960.884	2572.444	2240.328	1959.680	1447.910	736.094	470.983	519.538
63	3023.034	3017.208	2865.716	2454.941	2097.576	1787.795	1310.985	652.579	418.544	466.128
64	2872.514	2895.820	2765.693	2321.900	1949.969	1615.910	1184.742	581.689	378.729	425.342
65	2724.907	2765.693	2648.190	2192.744	1792.651	1468.303	1074.037	518.567	343.769	385.527
66	2561.762	2605.461	2496.698	2059.703	1643.101	1332.349	957.505	461.272	307.839	345.712
67	2378.224	2415.126	2312.189	1918.894	1487.725	1194.453	852.626	416.602	270.937	308.810
68	2200.513	2234.501	2142.247	1793.622	1363.424	1059.470	766.198	381.642	236.948	274.821
69	2030.570	2060.674	1990.755	1690.685	1261.459	946.822	684.625	341.827	209.758	248.602
70	1876.165	1899.472	1848.003	1593.575	1175.031	842.915	613.735	298.128	184.509	222.382
71	1738.269	1753.807	1717.876	1481.899	1079.863	755.516	537.018	261.226	165.087	200.047
72	1607.170	1618.824	1569.298	1392.557	998.291	683.654	469.041	228.208	143.723	173.827
73	1452.766	1491.610	1461.505	1311.956	924.487	617.620	409.804	194.220	124.301	150.520
74	1290.592	1365.367	1363.424	1223.586	842.915	546.729	361.249	166.058	104.879	125.272
75	1153.667	1227.470	1233.297	1098.314	734.152	459.330	294.243	135.954	86.428	101.965
76	1017.713	1089.574	1087.632	965.273	632.186	384.556	239.862	113.619	72.832	85.457
77	906.036	964.302	949.736	836.117	543.816	312.694	192.278	94.197	59.237	70.890
78	797.273	847.770	820.579	713.758	470.983	262.197	159.260	77.688	48.555	55.353
79	688.510	728.325	702.105	622.475	412.717	220.440	131.098	62.150	37.873	42.728
80	580.718	617.620	612.764	548.671	361.249	184.509	106.821	49.526	31.075	33.988
81	475.839	524.394	524.394	471.955	310.752	152.463	84.486	36.902	23.306	25.249
82	383.584	429.226	435.053	399.122	260.255	121.387	62.150	27.191	16.509	17.480
83	307.839	345.712	355.423	334.058	220.440	100.023	46.613	17.480	8.740	8.740
84	243.746	275.792	286.474	278.706	182.567	78.659	33.017	9.711	2.913	2.913
85	186.451	211.700	228.208	225.295	147.607	56.324	19.422	2.913	0.000	0.000
86	134.983	158.289	177.711	177.711	113.619	41.757	11.653	0.000	0.000	0.000
87	93.226	114.590	133.041	133.041	83.515	27.191	2.913	0.000	0.000	0.000
88	63.121	81.572	95.168	93.226	56.324	15.538	0.000	0.000	0.000	0.000
89	39.815	51.468	59.237	57.295	33.017	3.884	0.000	0.000	0.000	0.000
90	18.451	26.220	30.104	27.191	10.682	0.000	0.000	0.000	0.000	0.000
91	5.827	8.740	11.653	7.769	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	100	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2437.461	2435.519	2434.548	2419.981	2423.866	2419.010	2423.866	2430.663	2425.808	2423.866
2	2385.022	2381.137	2380.166	2360.744	2360.744	2341.322	2333.553	2324.813	2302.478	2287.912
3	2354.917	2356.860	2339.380	2299.565	2259.750	2199.541	2150.015	2095.634	2061.645	2024.743
4	2343.264	2345.206	2306.362	2204.397	2134.478	2046.108	1991.726	1964.535	1962.593	1982.986
5	2312.189	2292.767	2199.541	2066.501	1995.610	1949.969	1975.217	2021.830	2048.050	2069.414
6	2293.738	2216.050	2072.327	1944.142	1930.547	1975.217	2019.888	2038.339	2049.992	2029.599
7	2275.287	2133.507	1968.420	1923.749	1979.102	2010.177	2014.061	1969.391	1949.969	1972.304
8	2236.443	2048.050	1912.096	1961.622	2017.946	1996.582	1940.258	1924.720	1982.015	2030.570
9	2226.732	2002.408	1933.460	2002.408	2011.148	1952.882	1944.142	2001.437	2013.090	1973.275
10	2207.310	1982.986	1994.639	2027.657	1974.246	1950.940	2011.148	2001.437	1968.420	1938.316
11	2184.975	1995.610	2054.848	2023.772	1965.506	2005.321	1992.697	1951.911	1938.316	1936.373
12	2175.264	2043.194	2099.518	2006.293	2008.235	2027.657	1975.217	1941.229	1937.344	1890.732
13	2173.322	2111.171	2109.229	2015.032	2070.385	2023.772	1963.564	1960.651	1898.500	1855.772
14	2178.177	2139.333	2083.009	2044.165	2089.807	2020.859	1969.391	1927.633	1875.194	1850.917
15	2184.004	2161.669	2056.790	2096.605	2094.663	2037.368	1965.506	1899.472	1871.310	1844.119
16	2196.628	2187.888	2065.530	2136.420	2110.200	2072.327	1947.055	1920.836	1876.165	1841.206
17	2219.935	2178.177	2076.212	2145.160	2105.345	2049.021	1968.420	1924.720	1872.281	1834.408
18	2240.328	2141.275	2082.038	2121.853	2089.807	1988.813	1975.217	1904.327	1857.714	1832.466

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CANDELA TABULATION - (Cont.)

19	2228.674	2106.316	2071.356	2076.212	2048.050	1962.593	1942.200	1874.223	1837.321	1835.379
20	2200.513	2074.270	2046.108	2010.177	1977.160	1941.229	1901.414	1834.408	1832.466	1851.888
21	2197.599	2062.616	2018.917	1948.027	1911.125	1913.067	1856.743	1836.350	1856.743	1840.234
22	2184.975	2037.368	1996.582	1878.107	1869.367	1876.165	1817.899	1855.772	1869.367	1873.252
23	2105.345	1980.073	1917.922	1816.928	1840.234	1827.610	1801.390	1880.050	1884.905	1962.593
24	1984.928	1898.500	1808.188	1708.165	1797.506	1765.460	1805.275	1881.021	1953.853	1986.871
25	1848.974	1779.055	1692.627	1610.084	1715.934	1695.541	1788.766	1879.078	1990.755	1983.957
26	1709.136	1616.881	1567.355	1504.234	1623.679	1624.650	1730.500	1897.529	1970.362	2051.934
27	1549.876	1466.361	1433.344	1444.997	1518.800	1566.384	1671.263	1877.136	1964.535	2051.934
28	1378.962	1345.945	1322.638	1385.760	1428.488	1526.569	1631.448	1823.726	2000.466	1945.113
29	1243.008	1248.835	1219.702	1298.361	1337.205	1430.430	1608.142	1779.055	1916.951	1905.298
30	1104.141	1155.609	1132.303	1195.424	1245.921	1333.320	1533.367	1750.893	1778.084	1885.876
31	1002.175	1068.210	1080.834	1099.285	1160.464	1251.748	1435.286	1633.390	1685.830	1758.662
32	931.285	987.609	1025.482	1008.002	1090.545	1211.933	1380.904	1485.783	1601.344	1617.853
33	876.903	921.574	958.476	922.545	1015.771	1157.551	1337.205	1366.338	1453.737	1524.627
34	830.290	855.539	894.383	870.106	961.389	1110.938	1234.268	1271.170	1325.551	1358.569
35	803.100	806.984	839.030	856.510	916.718	1077.921	1097.343	1154.638	1207.077	1142.014
36	790.475	769.111	801.157	837.088	882.730	1035.193	997.320	1025.482	1074.037	1020.626
37	775.909	747.747	771.053	819.608	853.597	964.302	901.181	909.921	885.643	866.221
38	772.024	746.776	758.429	803.100	828.348	876.903	814.753	817.666	760.371	624.417
39	766.198	733.180	742.891	777.851	797.273	800.186	744.834	712.787	672.001	431.168
40	773.967	735.123	736.094	760.371	773.967	748.718	689.481	615.677	538.960	369.989
41	787.562	750.660	733.180	732.209	743.863	698.221	620.533	534.105	413.689	340.856
42	800.186	764.256	728.325	701.134	712.787	638.013	557.411	469.041	351.538	309.781
43	819.608	778.822	717.643	672.001	660.348	587.515	505.943	403.978	321.434	282.590
44	848.741	788.533	715.701	644.810	610.822	543.816	453.504	351.538	298.128	259.284
45	868.163	778.822	712.787	608.880	564.209	496.232	401.064	310.752	271.908	232.093
46	874.961	778.822	700.163	585.573	513.712	439.908	353.480	285.503	248.602	208.786
47	879.817	774.938	681.712	552.556	466.128	387.469	302.012	257.341	223.353	186.451
48	878.845	765.227	653.550	519.538	431.168	339.885	262.197	230.151	200.047	167.029
49	878.845	753.574	626.359	489.434	399.122	299.099	235.006	205.873	178.682	150.520
50	872.048	741.920	594.313	461.272	355.423	256.370	207.815	181.596	156.347	134.012
51	857.481	730.267	562.267	423.400	313.665	222.382	184.509	161.203	136.925	119.445
52	843.886	707.932	543.816	378.729	270.937	190.336	162.174	139.838	120.416	104.879
53	828.348	686.568	519.538	337.943	231.122	167.029	141.781	122.359	104.879	95.168
54	804.071	668.117	501.088	297.157	198.104	145.665	125.272	107.792	94.197	85.457
55	779.793	654.521	472.926	257.341	168.000	126.243	108.763	95.168	83.515	78.659
56	744.834	629.273	439.908	213.642	136.925	107.792	94.197	83.515	74.775	71.861
57	713.758	600.140	403.006	174.798	113.619	94.197	82.543	75.746	67.006	66.035
58	681.712	556.440	367.076	143.723	96.139	82.543	72.832	67.006	62.150	61.179
59	651.608	530.221	324.347	118.474	83.515	72.832	65.064	59.237	57.295	58.266
60	620.533	495.261	288.417	100.023	74.775	64.093	58.266	54.382	53.410	55.353
61	589.458	452.533	255.399	84.486	66.035	58.266	52.439	50.497	51.468	52.439
62	544.787	413.689	218.497	73.804	58.266	51.468	46.613	45.642	46.613	49.526
63	500.116	362.220	184.509	64.093	52.439	45.642	41.757	41.757	42.728	47.584
64	460.301	318.521	150.520	56.324	47.584	41.757	38.844	38.844	39.815	44.671
65	420.486	289.388	125.272	52.439	45.642	39.815	36.902	37.873	39.815	42.728
66	378.729	259.284	100.994	45.642	39.815	34.960	32.046	32.046	34.960	38.844
67	337.943	233.064	81.572	39.815	33.988	30.104	28.162	29.133	30.104	33.988
68	302.012	210.729	67.006	35.931	31.075	28.162	26.220	26.220	28.162	33.017
69	268.995	184.509	57.295	31.075	28.162	25.249	23.306	24.277	26.220	29.133
70	233.064	162.174	48.555	28.162	24.277	22.335	21.364	22.335	24.277	27.191
71	201.989	134.012	41.757	24.277	22.335	18.451	18.451	19.422	21.364	24.277
72	173.827	109.734	34.960	20.393	19.422	17.480	15.538	16.509	18.451	21.364
73	145.665	89.341	29.133	18.451	16.509	13.595	13.595	13.595	15.538	18.451
74	116.532	71.861	23.306	15.538	12.624	11.653	10.682	11.653	12.624	14.566

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CANDELA TABULATION - (Cont.)

75	92.254	57.295	19.422	11.653	9.711	8.740	7.769	9.711	11.653	11.653
76	76.717	46.613	16.509	9.711	7.769	6.798	4.855	7.769	8.740	9.711
77	61.179	36.902	12.624	5.827	5.827	3.884	3.884	4.855	6.798	8.740
78	48.555	28.162	6.798	1.942	1.942	0.000	0.971	0.971	2.913	4.855
79	36.902	19.422	2.913	0.000	0.000	0.000	0.000	0.000	0.000	0.971
80	28.162	14.566	1.942	0.000	0.000	0.000	0.000	0.000	0.000	0.000
81	21.364	8.740	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	12.624	2.913	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	3.884	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
89	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	150	**155**	**160**	**165**	**170**	**175**	**180**	**185**	**190**	**195**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2428.721	2410.270	2402.501	2398.617	2399.588	2413.183	2427.750	2425.808	2419.010	2429.692

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CANDELA TABULATION - (Cont.)

2	2271.403	2236.443	2216.050	2203.426	2205.368	2207.310	2211.195	2218.963	2222.848	2242.270
3	2006.293	1990.755	1981.044	1978.131	1985.899	2002.408	2011.148	2014.061	2017.946	2023.772
4	2003.379	2017.946	2033.483	2030.570	2038.339	2043.194	2046.108	2045.137	2049.992	2054.848
5	2066.501	2053.876	2036.397	2004.350	1989.784	1986.871	1987.842	1991.726	2002.408	2022.801
6	2006.293	1984.928	1971.333	1963.564	1972.304	1982.986	1999.495	1996.582	2005.321	2001.437
7	2019.888	2049.992	2055.819	2037.368	2036.397	2044.165	2048.050	2052.905	2064.559	2079.125
8	2037.368	2019.888	2000.466	1984.928	1992.697	2009.206	2018.917	2018.917	2021.830	2036.397
9	1959.680	1970.362	1972.304	1965.506	1982.986	2009.206	2027.657	2024.743	2020.859	2024.743
10	1931.518	1955.795	1955.795	1921.807	1922.778	1953.853	1974.246	1971.333	1965.506	1978.131
11	1914.038	1896.558	1901.414	1883.934	1889.761	1921.807	1948.027	1937.344	1931.518	1944.142
12	1861.599	1858.685	1870.339	1877.136	1880.050	1901.414	1920.836	1915.009	1919.865	1931.518
13	1858.685	1845.090	1844.119	1853.830	1854.801	1865.483	1883.934	1878.107	1884.905	1894.616
14	1855.772	1837.321	1814.015	1830.523	1848.974	1836.350	1843.148	1848.003	1864.512	1869.367
15	1833.437	1836.350	1792.651	1794.593	1832.466	1812.073	1807.217	1821.784	1850.917	1849.945
16	1815.957	1823.726	1781.968	1777.113	1829.552	1820.812	1832.466	1844.119	1867.425	1854.801
17	1800.419	1811.101	1803.333	1792.651	1821.784	1813.044	1839.263	1847.032	1871.310	1888.789
18	1806.246	1819.841	1808.188	1772.257	1808.188	1812.073	1870.339	1856.743	1868.396	1867.425
19	1825.668	1794.593	1785.853	1795.564	1850.917	1865.483	1935.402	1927.633	1946.084	1919.865
20	1808.188	1808.188	1838.292	1829.552	1866.454	1870.339	1918.894	1918.894	1955.795	1957.738
21	1818.870	1870.339	1858.685	1812.073	1816.928	1831.495	1883.934	1882.963	1918.894	1935.402
22	1878.107	1884.905	1827.610	1831.495	1851.888	1871.310	1894.616	1897.529	1948.998	1976.188
23	1901.414	1879.078	1901.414	1878.107	1780.026	1765.460	1732.442	1769.344	1837.321	1967.449
24	1923.749	1977.160	1900.443	1784.882	1679.032	1710.107	1690.685	1738.269	1772.257	1849.945
25	2016.004	1977.160	1814.015	1784.882	1728.558	1742.153	1721.760	1791.679	1838.292	1891.703
26	1990.755	1933.460	1862.570	1817.899	1675.147	1643.101	1661.552	1729.529	1759.633	1858.685
27	1912.096	1978.131	1848.974	1669.321	1602.315	1601.344	1654.754	1702.338	1730.500	1756.720
28	1930.547	1942.200	1695.541	1638.246	1595.517	1576.095	1618.824	1662.523	1704.280	1744.096
29	1943.171	1788.766	1662.523	1591.633	1455.679	1407.124	1406.153	1460.534	1544.049	1643.101
30	1796.535	1762.546	1555.702	1401.297	1300.303	1300.303	1299.332	1338.176	1372.164	1431.401
31	1739.240	1642.130	1355.656	1282.823	1187.655	1142.985	1098.314	1149.782	1220.673	1317.783
32	1671.263	1402.268	1250.777	1092.487	842.915	734.152	692.394	738.036	824.464	1063.354
33	1449.852	1292.534	998.291	687.539	562.267	531.192	532.163	555.469	584.602	680.741
34	1289.621	1069.181	613.735	511.770	494.290	480.694	489.434	504.001	518.567	553.527
35	1144.927	655.492	485.550	461.272	450.590	437.966	440.879	455.446	472.926	501.088
36	777.851	474.868	440.879	420.486	405.920	403.006	405.920	418.544	435.053	454.475
37	487.492	422.428	401.064	382.613	369.989	368.047	369.018	381.642	397.180	414.660
38	411.746	380.671	362.220	349.596	336.972	334.058	336.972	347.654	362.220	381.642
39	374.845	345.712	329.203	314.636	305.896	303.954	304.925	315.607	331.145	347.654
40	338.914	313.665	296.185	282.590	274.821	271.908	269.966	281.619	298.128	314.636
41	307.839	284.532	265.110	251.515	242.775	237.919	236.948	246.659	263.168	281.619
42	278.706	254.428	235.977	221.411	212.671	207.815	209.758	216.555	231.122	246.659
43	249.573	224.324	207.815	193.249	186.451	181.596	183.538	190.336	202.960	216.555
44	224.324	198.104	183.538	171.885	168.971	166.058	166.058	171.885	181.596	195.191
45	198.104	174.798	161.203	153.434	150.520	148.578	150.520	154.405	163.145	174.798
46	176.740	157.318	145.665	140.809	138.867	137.896	138.867	141.781	151.492	159.260
47	158.289	138.867	132.070	128.185	128.185	129.156	131.098	134.012	139.838	145.665
48	140.809	126.243	121.387	120.416	122.359	123.330	126.243	128.185	133.041	135.954
49	126.243	115.561	114.590	115.561	117.503	119.445	122.359	125.272	129.156	131.098
50	115.561	108.763	107.792	108.763	112.648	115.561	118.474	121.387	124.301	125.272
51	106.821	101.965	102.937	105.850	110.705	113.619	116.532	119.445	121.387	122.359
52	97.110	96.139	99.052	101.965	107.792	111.676	113.619	116.532	118.474	119.445
53	91.283	91.283	96.139	100.023	104.879	109.734	112.648	113.619	115.561	117.503
54	85.457	89.341	94.197	98.081	102.937	107.792	109.734	110.705	113.619	113.619
55	80.601	86.428	91.283	94.197	100.023	102.937	105.850	107.792	109.734	109.734
56	74.775	81.572	88.370	91.283	97.110	99.052	100.994	103.908	105.850	105.850
57	71.861	77.688	84.486	87.399	93.226	96.139	99.052	100.023	102.937	103.908

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CANDELA TABULATION - (Cont.)

58	66.035	73.804	80.601	83.515	88.370	92.254	95.168	96.139	99.052	99.052
59	63.121	70.890	76.717	80.601	84.486	88.370	90.312	91.283	96.139	95.168
60	61.179	66.035	73.804	76.717	81.572	84.486	87.399	88.370	92.254	91.283
61	59.237	65.064	71.861	75.746	79.630	82.543	85.457	86.428	90.312	92.254
62	55.353	62.150	66.035	70.890	75.746	79.630	80.601	83.515	86.428	87.399
63	53.410	59.237	64.093	67.006	72.832	75.746	78.659	79.630	82.543	84.486
64	50.497	56.324	62.150	65.064	69.919	72.832	74.775	76.717	80.601	82.543
65	49.526	56.324	62.150	65.064	69.919	71.861	74.775	76.717	80.601	81.572
66	44.671	50.497	57.295	61.179	65.064	67.006	69.919	72.832	76.717	77.688
67	40.786	46.613	52.439	57.295	61.179	64.093	65.064	67.977	72.832	73.804
68	37.873	43.699	50.497	55.353	60.208	63.121	64.093	67.006	72.832	71.861
69	35.931	41.757	47.584	53.410	58.266	60.208	63.121	65.064	70.890	70.890
70	32.046	38.844	44.671	52.439	57.295	59.237	60.208	64.093	67.977	67.006
71	29.133	35.931	42.728	49.526	55.353	57.295	59.237	61.179	66.035	66.035
72	26.220	33.017	39.815	46.613	53.410	55.353	57.295	59.237	62.150	62.150
73	23.306	30.104	36.902	43.699	51.468	54.382	55.353	55.353	60.208	60.208
74	20.393	27.191	34.960	41.757	47.584	51.468	52.439	53.410	56.324	54.382
75	17.480	24.277	31.075	37.873	42.728	46.613	47.584	49.526	51.468	51.468
76	15.538	21.364	28.162	33.988	39.815	42.728	43.699	45.642	47.584	47.584
77	12.624	18.451	26.220	31.075	35.931	37.873	39.815	41.757	43.699	43.699
78	9.711	14.566	20.393	26.220	30.104	32.046	33.988	34.960	37.873	37.873
79	5.827	10.682	16.509	21.364	24.277	26.220	26.220	30.104	32.046	31.075
80	3.884	8.740	14.566	17.480	19.422	21.364	23.306	24.277	28.162	28.162
81	0.000	5.827	9.711	12.624	14.566	16.509	18.451	20.393	23.306	23.306
82	0.000	2.913	5.827	8.740	10.682	11.653	13.595	13.595	17.480	19.422
83	0.000	0.000	2.913	3.884	6.798	8.740	9.711	9.711	13.595	15.538
84	0.000	0.000	0.000	0.000	2.913	4.855	5.827	7.769	10.682	12.624
85	0.000	0.000	0.000	0.000	0.000	0.971	2.913	4.855	6.798	8.740
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971	4.855	5.827
87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.942	2.913
88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.942	3.884
89	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971	1.942
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.971
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	200	**205**	**210**	**215**	**220**	**225**	**230**	**235**	**240**	**245**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2428.721	2452.999	2461.738	2464.652	2463.681	2465.623	2459.796	2455.912	2458.825	2462.710
2	2240.328	2285.969	2303.449	2341.322	2360.744	2386.964	2412.212	2423.866	2440.374	2456.883
3	2033.483	2051.934	2070.385	2092.720	2123.796	2174.293	2231.588	2293.738	2356.860	2416.097
4	2064.559	2067.472	2071.356	2060.674	2053.876	2053.876	2068.443	2120.882	2198.570	2303.449
5	2040.281	2072.327	2085.923	2082.038	2076.212	2068.443	2067.472	2065.530	2094.663	2187.888
6	2002.408	2002.408	2005.321	2026.686	2054.848	2080.096	2087.865	2085.923	2100.489	2134.478
7	2094.663	2096.605	2075.241	2024.743	2001.437	2019.888	2081.067	2127.680	2141.275	2162.640
8	2058.732	2078.154	2091.749	2096.605	2090.778	2049.021	2040.281	2096.605	2160.697	2181.091
9	2038.339	2050.963	2067.472	2071.356	2096.605	2116.027	2088.836	2066.501	2128.651	2205.368
10	2021.830	2062.616	2078.154	2064.559	2071.356	2091.749	2125.738	2116.027	2107.287	2194.686
11	1987.842	2018.917	2040.281	2047.079	2058.732	2081.067	2118.940	2166.524	2153.900	2185.946
12	1966.477	1979.102	1983.957	2000.466	2046.108	2095.634	2123.796	2156.813	2217.992	2227.703
13	1932.489	1951.911	1957.738	1967.449	2023.772	2092.720	2120.882	2158.755	2242.270	2286.940
14	1895.587	1928.605	1941.229	1961.622	2000.466	2058.732	2109.229	2164.582	2238.385	2342.293
15	1868.396	1902.385	1922.778	1937.344	1998.524	2036.397	2087.865	2157.784	2240.328	2353.946
16	1856.743	1881.021	1912.096	1924.720	1990.755	2040.281	2071.356	2153.900	2236.443	2334.524
17	1886.847	1894.616	1915.980	1928.605	1981.044	2028.628	2063.587	2116.998	2221.877	2282.085
18	1855.772	1915.980	1949.969	1952.882	1985.899	2024.743	2052.905	2114.085	2180.119	2224.790
19	1861.599	1895.587	1969.391	1984.928	2004.350	2030.570	2053.876	2110.200	2127.680	2197.599
20	1920.836	1943.171	1971.333	2005.321	2036.397	2041.252	2060.674	2089.807	2096.605	2182.062
21	1922.778	1999.495	2038.339	2016.975	2064.559	2069.414	2031.541	2068.443	2081.067	2139.333
22	1932.489	1987.842	2102.431	2083.981	2076.212	2086.894	2005.321	2046.108	2065.530	2097.576
23	2015.032	2032.512	2112.142	2157.784	2111.171	2067.472	2014.061	2016.004	2032.512	2052.905
24	1959.680	2093.692	2169.437	2180.119	2164.582	2064.559	2016.975	1976.188	2000.466	2015.032
25	1922.778	2043.194	2201.484	2226.732	2168.466	2084.952	1998.524	1957.738	1958.709	1940.258
26	1982.015	2045.137	2112.142	2251.010	2152.929	2094.663	1983.957	1943.171	1873.252	1850.917
27	1876.165	2083.009	2084.952	2138.362	2164.582	2068.443	1993.668	1914.038	1784.882	1769.344
28	1821.784	1964.535	2109.229	2054.848	2077.183	2049.021	1989.784	1875.194	1716.905	1684.858
29	1787.795	1906.269	1994.639	2044.165	1980.073	2055.819	1938.316	1833.437	1652.812	1573.182
30	1601.344	1842.177	1893.645	1978.131	1915.980	2002.408	1869.367	1783.911	1595.517	1465.390
31	1414.893	1629.506	1801.390	1825.668	1848.974	1872.281	1814.015	1713.020	1526.569	1362.453
32	1269.228	1406.153	1621.737	1732.442	1733.413	1756.720	1745.067	1612.997	1424.604	1248.835
33	931.285	1241.066	1396.442	1581.922	1589.691	1648.928	1617.853	1505.205	1318.754	1157.551
34	615.677	923.516	1239.124	1374.106	1507.147	1522.685	1480.927	1408.095	1232.326	1072.094
35	527.307	620.533	992.464	1188.626	1378.962	1367.309	1381.875	1315.840	1149.782	1013.828
36	478.752	526.336	679.770	1027.424	1199.308	1256.603	1269.228	1197.366	1065.297	971.100
37	434.082	474.868	526.336	801.157	1034.221	1142.014	1131.331	1083.748	1004.117	928.372
38	399.122	428.255	468.070	582.660	899.239	1006.060	1002.175	984.695	958.476	890.499
39	363.191	386.498	418.544	474.868	704.047	873.019	873.990	886.614	911.863	848.741
40	328.232	348.625	377.758	423.400	516.625	733.180	744.834	799.215	856.510	818.637

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CANDELA TABULATION - (Cont.)

41	296.185	312.694	339.885	380.671	427.284	607.909	638.984	720.556	791.446	785.620
42	264.139	283.561	305.896	340.856	383.584	478.752	555.469	659.377	735.123	770.082
43	232.093	253.457	273.850	305.896	345.712	397.180	488.463	601.111	676.857	760.371
44	208.786	226.266	247.630	277.735	313.665	353.480	423.400	537.989	624.417	731.238
45	184.509	198.104	221.411	247.630	283.561	322.405	373.873	479.723	578.776	704.047
46	165.087	179.653	197.133	225.295	261.226	299.099	338.914	435.053	535.076	650.637
47	151.492	161.203	177.711	201.989	237.919	278.706	312.694	393.295	476.810	590.429
48	140.809	147.607	160.231	184.509	218.497	256.370	288.417	343.769	414.660	540.903
49	132.070	136.925	147.607	168.971	199.075	234.035	264.139	299.099	364.162	488.463
50	124.301	127.214	134.983	151.492	179.653	209.758	237.919	266.081	321.434	436.024
51	122.359	121.387	127.214	139.838	161.203	187.422	215.584	241.804	287.446	389.411
52	116.532	115.561	118.474	128.185	144.694	165.087	192.278	217.526	254.428	338.914
53	113.619	110.705	111.676	116.532	129.156	147.607	169.942	191.307	226.266	289.388
54	110.705	106.821	105.850	109.734	117.503	130.127	151.492	169.942	199.075	242.775
55	106.821	103.908	101.965	100.994	107.792	118.474	134.983	151.492	173.827	201.018
56	101.965	98.081	97.110	94.197	99.052	106.821	120.416	134.012	149.549	167.029
57	98.081	96.139	92.254	91.283	93.226	99.052	108.763	120.416	131.098	144.694
58	95.168	92.254	89.341	86.428	87.399	91.283	99.052	107.792	116.532	128.185
59	92.254	88.370	85.457	81.572	83.515	84.486	91.283	98.081	104.879	114.590
60	89.341	85.457	81.572	79.630	79.630	76.717	83.515	88.370	95.168	105.850
61	87.399	84.486	80.601	78.659	76.717	75.746	78.659	83.515	89.341	100.994
62	85.457	80.601	76.717	72.832	73.804	69.919	72.832	76.717	81.572	93.226
63	81.572	77.688	74.775	70.890	69.919	67.006	67.006	71.861	75.746	87.399
64	79.630	75.746	71.861	66.035	65.064	62.150	65.064	67.006	73.804	82.543
65	79.630	74.775	71.861	67.006	65.064	60.208	63.121	67.006	72.832	81.572
66	72.832	71.861	67.006	62.150	59.237	56.324	58.266	61.179	66.035	73.804
67	71.861	67.006	63.121	57.295	55.353	51.468	54.382	57.295	61.179	67.006
68	67.977	64.093	60.208	54.382	53.410	48.555	53.410	55.353	59.237	67.006
69	67.006	62.150	56.324	53.410	50.497	49.526	50.497	52.439	56.324	62.150
70	64.093	58.266	53.410	49.526	48.555	46.613	47.584	49.526	53.410	60.208
71	61.179	54.382	50.497	46.613	45.642	43.699	45.642	47.584	51.468	57.295
72	58.266	51.468	47.584	44.671	42.728	38.844	42.728	44.671	47.584	53.410
73	54.382	47.584	43.699	40.786	40.786	36.902	39.815	42.728	46.613	51.468
74	51.468	45.642	41.757	38.844	36.902	34.960	37.873	40.786	43.699	48.555
75	46.613	41.757	38.844	34.960	34.960	33.988	35.931	37.873	40.786	42.728
76	43.699	39.815	35.931	32.046	33.017	32.046	33.988	35.931	38.844	39.815
77	40.786	35.931	33.017	31.075	32.046	28.162	33.017	33.988	35.931	39.815
78	35.931	31.075	29.133	27.191	28.162	26.220	29.133	31.075	33.988	34.960
79	31.075	29.133	25.249	24.277	23.306	22.335	25.249	28.162	29.133	33.017
80	28.162	25.249	24.277	22.335	21.364	21.364	24.277	25.249	28.162	30.104
81	23.306	23.306	21.364	19.422	18.451	17.480	21.364	24.277	25.249	28.162
82	19.422	19.422	15.538	14.566	14.566	15.538	17.480	20.393	22.335	24.277
83	15.538	14.566	13.595	11.653	12.624	13.595	15.538	17.480	19.422	22.335
84	11.653	11.653	10.682	9.711	10.682	10.682	14.566	15.538	16.509	18.451
85	8.740	7.769	7.769	7.769	7.769	9.711	11.653	13.595	14.566	16.509
86	5.827	5.827	5.827	6.798	7.769	5.827	11.653	13.595	14.566	14.566
87	3.884	3.884	3.884	4.855	5.827	4.855	10.682	11.653	12.624	12.624
88	2.913	4.855	4.855	2.913	6.798	8.740	10.682	12.624	14.566	12.624
89	1.942	2.913	3.884	3.884	6.798	7.769	9.711	11.653	13.595	14.566
90	0.000	0.000	0.971	0.971	3.884	2.913	6.798	8.740	9.711	9.711
91	0.000	0.000	0.971	1.942	3.884	3.884	7.769	10.682	10.682	11.653
92	0.000	0.000	0.000	0.000	3.884	3.884	7.769	9.711	10.682	10.682
93	0.000	0.000	0.000	0.000	2.913	2.913	7.769	9.711	10.682	10.682
94	0.000	0.000	0.000	0.971	3.884	4.855	8.740	9.711	11.653	10.682
95	0.000	0.000	0.000	0.000	3.884	3.884	6.798	8.740	11.653	12.624
96	0.000	0.000	0.000	0.000	4.855	4.855	8.740	10.682	11.653	10.682

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CANDELA TABULATION - (Cont.)

97	0.000	0.000	0.971	0.971	4.855	5.827	8.740	10.682	11.653	13.595
98	0.000	0.000	1.942	2.913	5.827	5.827	8.740	11.653	12.624	13.595
99	0.000	0.000	0.971	1.942	4.855	6.798	9.711	11.653	12.624	11.653
100	0.000	0.000	1.942	2.913	4.855	6.798	8.740	11.653	11.653	14.566
101	0.000	0.000	0.971	1.942	5.827	7.769	8.740	11.653	12.624	13.595
102	0.000	0.000	0.971	2.913	6.798	5.827	10.682	11.653	13.595	14.566
103	0.000	0.971	1.942	3.884	5.827	5.827	8.740	11.653	12.624	12.624
104	0.000	0.000	1.942	3.884	5.827	6.798	9.711	11.653	13.595	12.624
105	0.000	0.971	0.971	1.942	5.827	6.798	9.711	10.682	12.624	12.624
106	0.000	0.000	1.942	2.913	5.827	5.827	9.711	11.653	12.624	14.566
107	0.000	0.971	3.884	5.827	7.769	5.827	10.682	12.624	14.566	15.538
108	0.971	1.942	2.913	3.884	7.769	5.827	10.682	13.595	14.566	14.566
109	0.000	0.000	1.942	2.913	6.798	6.798	9.711	11.653	12.624	13.595
110	0.000	0.000	1.942	2.913	5.827	4.855	8.740	11.653	11.653	12.624
111	0.000	0.971	1.942	1.942	6.798	5.827	10.682	11.653	12.624	14.566
112	0.000	0.000	2.913	2.913	6.798	5.827	9.711	12.624	12.624	12.624
113	0.000	0.000	1.942	3.884	6.798	5.827	9.711	11.653	13.595	12.624
114	0.000	0.971	1.942	2.913	5.827	6.798	8.740	12.624	12.624	13.595
115	0.000	0.000	1.942	0.971	4.855	6.798	9.711	10.682	12.624	12.624
116	0.000	0.971	2.913	3.884	5.827	6.798	9.711	11.653	13.595	12.624
117	0.000	0.000	1.942	2.913	5.827	6.798	8.740	12.624	13.595	13.595
118	0.000	2.913	3.884	2.913	7.769	6.798	11.653	13.595	14.566	15.538
119	0.971	2.913	2.913	5.827	7.769	8.740	12.624	13.595	14.566	14.566
120	0.000	0.000	2.913	3.884	7.769	8.740	10.682	12.624	12.624	15.538
121	0.000	0.000	1.942	2.913	5.827	4.855	8.740	11.653	13.595	13.595
122	0.000	0.971	1.942	1.942	6.798	5.827	10.682	12.624	13.595	12.624
123	0.000	0.971	1.942	4.855	5.827	4.855	10.682	12.624	12.624	12.624
124	0.000	0.971	3.884	2.913	6.798	7.769	10.682	12.624	13.595	13.595
125	0.000	0.971	2.913	4.855	7.769	8.740	11.653	12.624	14.566	15.538
126	0.000	0.971	1.942	2.913	5.827	5.827	9.711	11.653	12.624	12.624
127	0.000	0.000	1.942	2.913	5.827	5.827	9.711	12.624	11.653	14.566
128	0.000	0.971	2.913	2.913	6.798	7.769	10.682	12.624	13.595	15.538
129	0.000	0.971	1.942	2.913	6.798	5.827	9.711	11.653	13.595	14.566
130	0.971	0.971	2.913	2.913	7.769	6.798	10.682	12.624	14.566	14.566
131	0.000	0.971	2.913	4.855	5.827	7.769	11.653	12.624	13.595	14.566
132	0.000	1.942	2.913	5.827	6.798	5.827	10.682	12.624	14.566	14.566
133	0.971	1.942	2.913	1.942	7.769	6.798	10.682	12.624	14.566	13.595
134	0.000	0.971	3.884	2.913	6.798	6.798	9.711	11.653	13.595	13.595
135	0.971	2.913	3.884	4.855	7.769	9.711	10.682	13.595	13.595	14.566
136	0.000	1.942	3.884	3.884	6.798	8.740	10.682	13.595	13.595	15.538
137	1.942	1.942	2.913	3.884	6.798	5.827	12.624	12.624	13.595	15.538
138	0.000	0.971	2.913	3.884	6.798	6.798	10.682	11.653	12.624	14.566
139	0.000	2.913	4.855	2.913	7.769	8.740	10.682	12.624	14.566	15.538
140	0.971	1.942	4.855	4.855	7.769	8.740	10.682	12.624	13.595	14.566
141	0.971	2.913	4.855	4.855	6.798	6.798	10.682	13.595	13.595	14.566
142	0.971	1.942	2.913	4.855	6.798	5.827	9.711	11.653	12.624	12.624
143	1.942	1.942	2.913	3.884	7.769	6.798	10.682	12.624	13.595	11.653
144	2.913	3.884	4.855	4.855	7.769	6.798	11.653	12.624	14.566	14.566
145	1.942	3.884	3.884	4.855	5.827	8.740	9.711	12.624	13.595	14.566
146	1.942	3.884	3.884	5.827	7.769	8.740	11.653	13.595	13.595	12.624
147	0.971	0.971	2.913	2.913	6.798	5.827	10.682	11.653	13.595	13.595
148	0.000	1.942	2.913	3.884	5.827	4.855	10.682	11.653	12.624	13.595
149	1.942	1.942	3.884	4.855	7.769	6.798	10.682	11.653	13.595	13.595
150	3.884	2.913	4.855	3.884	7.769	8.740	11.653	13.595	13.595	14.566
151	0.971	0.971	3.884	3.884	7.769	8.740	10.682	12.624	13.595	14.566
152	0.000	1.942	1.942	3.884	7.769	7.769	9.711	12.624	13.595	13.595

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CANDELA TABULATION - (Cont.)

153	0.000	2.913	3.884	4.855	7.769	8.740	10.682	12.624	13.595	14.566
154	0.000	0.971	2.913	3.884	5.827	6.798	9.711	12.624	12.624	13.595
155	0.971	2.913	3.884	5.827	6.798	8.740	10.682	13.595	13.595	14.566
156	0.000	0.971	1.942	4.855	6.798	5.827	9.711	12.624	12.624	12.624
157	0.971	0.971	3.884	3.884	6.798	7.769	9.711	12.624	13.595	15.538
158	0.000	0.971	1.942	1.942	4.855	5.827	9.711	11.653	11.653	12.624
159	0.000	0.000	3.884	2.913	6.798	4.855	11.653	12.624	12.624	13.595
160	0.000	0.000	0.971	1.942	5.827	6.798	9.711	10.682	11.653	11.653
161	0.000	0.971	0.971	3.884	5.827	6.798	9.711	11.653	12.624	11.653
162	0.000	0.971	1.942	3.884	6.798	6.798	10.682	11.653	12.624	14.566
163	0.000	0.971	1.942	1.942	5.827	7.769	8.740	11.653	12.624	12.624
164	0.000	0.000	0.971	1.942	4.855	5.827	8.740	11.653	10.682	12.624
165	0.000	0.000	2.913	2.913	5.827	6.798	9.711	11.653	13.595	12.624
166	0.000	0.000	1.942	2.913	5.827	5.827	9.711	11.653	12.624	13.595
167	0.000	0.000	0.971	0.971	3.884	4.855	8.740	10.682	10.682	13.595
168	0.000	0.000	1.942	1.942	5.827	6.798	10.682	11.653	12.624	12.624
169	0.000	0.000	1.942	1.942	4.855	6.798	9.711	12.624	12.624	14.566
170	0.000	0.000	0.000	0.971	3.884	3.884	8.740	10.682	11.653	10.682
171	0.000	0.000	0.000	0.000	3.884	2.913	7.769	10.682	11.653	11.653
172	0.000	0.000	0.000	0.971	4.855	4.855	9.711	11.653	12.624	14.566
173	0.000	0.000	1.942	1.942	5.827	8.740	10.682	12.624	14.566	14.566
174	0.000	0.000	0.000	0.971	4.855	2.913	8.740	10.682	11.653	12.624
175	0.000	0.000	0.000	0.971	3.884	2.913	7.769	10.682	11.653	11.653
176	0.000	0.000	0.000	1.942	2.913	4.855	6.798	10.682	12.624	11.653
177	0.000	0.000	0.000	1.942	4.855	6.798	9.711	11.653	11.653	12.624
178	0.000	0.000	0.000	0.000	3.884	5.827	8.740	10.682	12.624	13.595
179	0.000	0.000	0.000	0.971	4.855	3.884	7.769	10.682	12.624	12.624
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	250	**255**	**260**	**265**	**270**	**275**	**280**	**285**	**290**	**295**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2453.970	2463.681	2463.681	2457.854	2473.392	2476.305	2486.987	2490.871	2510.293	2528.744
2	2452.027	2470.478	2479.218	2475.334	2495.727	2506.409	2524.860	2552.051	2586.039	2632.652
3	2448.143	2482.132	2505.438	2509.322	2537.484	2560.791	2598.664	2654.987	2723.935	2798.710
4	2387.935	2468.536	2523.889	2550.109	2583.126	2613.230	2678.294	2787.057	2908.444	3046.341
5	2305.391	2438.432	2540.398	2583.126	2617.114	2654.987	2765.693	2920.098	3091.982	3262.896
6	2235.472	2399.588	2544.282	2606.432	2637.508	2691.889	2841.439	3037.601	3248.329	3431.867
7	2193.715	2329.669	2522.918	2606.432	2640.421	2719.080	2910.387	3160.930	3393.023	3584.330
8	2197.599	2272.374	2485.045	2616.143	2655.958	2754.040	2993.901	3274.549	3505.671	3702.804
9	2223.819	2255.865	2436.490	2627.797	2695.774	2822.017	3121.115	3437.694	3652.307	3855.267
10	2253.923	2288.883	2418.039	2643.334	2744.329	2901.647	3262.896	3588.214	3805.741	4070.851
11	2301.507	2327.727	2418.039	2667.612	2804.537	3007.497	3407.590	3739.706	3978.597	4327.221
12	2324.813	2378.224	2424.837	2688.976	2859.889	3111.404	3549.370	3897.024	4156.308	4567.083
13	2330.640	2416.097	2449.114	2689.947	2919.127	3207.543	3679.498	4013.556	4332.077	4754.505
14	2352.004	2446.201	2494.756	2698.687	2968.653	3279.405	3781.463	4099.013	4485.511	4870.066
15	2364.628	2452.027	2528.744	2714.224	3010.410	3333.786	3860.122	4192.239	4668.078	4996.309
16	2368.513	2423.866	2555.935	2722.964	3048.283	3365.833	3919.359	4334.019	4833.165	5153.628
17	2343.264	2368.513	2539.426	2725.878	3092.953	3436.723	3984.423	4459.291	4991.454	5350.761
18	2309.276	2350.062	2526.802	2686.063	3111.404	3475.567	4019.383	4562.228	5102.159	5549.836
19	2305.391	2344.235	2512.236	2645.276	3078.387	3474.596	4032.978	4628.262	5180.818	5635.293
20	2291.796	2328.698	2466.594	2611.288	3029.832	3443.521	4020.354	4658.367	5215.778	5680.935
21	2250.039	2284.027	2374.339	2557.877	2989.046	3397.879	3965.001	4667.106	5239.084	5703.270
22	2209.252	2226.732	2292.767	2469.507	2910.387	3293.971	3875.660	4662.251	5294.437	5721.721
23	2167.495	2158.755	2184.004	2352.004	2774.433	3192.006	3754.272	4634.089	5304.148	5709.097

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CANDELA TABULATION - (Cont.)

24	2078.154	2067.472	2086.894	2242.270	2603.519	3091.011	3677.556	4572.910	5259.477	5678.993
25	1979.102	1984.928	1987.842	2132.536	2463.681	2968.653	3595.983	4495.222	5226.460	5666.368
26	1879.078	1909.183	1881.021	1967.449	2315.102	2784.144	3454.203	4366.065	5158.483	5640.149
27	1784.882	1818.870	1739.240	1792.651	2134.478	2588.953	3297.856	4186.412	5031.269	5583.825
28	1667.379	1665.436	1575.124	1624.650	1933.460	2413.183	3131.797	4044.631	4889.488	5487.686
29	1524.627	1486.754	1425.575	1476.072	1711.078	2188.859	2953.115	3897.024	4728.286	5313.859
30	1395.471	1320.696	1285.736	1322.638	1491.610	1982.986	2724.907	3683.382	4528.239	5163.339
31	1266.314	1166.291	1155.609	1169.204	1307.101	1759.633	2512.236	3441.578	4307.799	4972.032
32	1144.927	1036.164	1054.615	1027.424	1142.014	1562.500	2309.276	3193.948	4084.446	4678.760
33	1043.932	937.111	960.418	927.400	1004.117	1384.789	2105.345	2948.260	3809.625	4342.759
34	971.100	864.279	881.759	856.510	885.643	1237.181	1899.472	2744.329	3517.324	4004.816
35	914.776	834.175	831.262	797.273	810.868	1123.563	1725.645	2560.791	3284.260	3714.457
36	872.048	825.435	798.244	768.140	780.764	1061.412	1663.494	2435.519	3061.878	3500.815
37	838.059	812.811	787.562	763.285	780.764	1043.932	1650.870	2360.744	2932.722	3262.896
38	814.753	806.984	788.533	777.851	795.331	1048.788	1650.870	2316.073	2838.525	3105.578
39	807.955	819.608	788.533	806.984	814.753	1056.557	1641.159	2323.842	2754.040	2996.815
40	807.955	809.897	792.418	820.579	826.406	1063.354	1645.043	2342.293	2740.444	2892.907
41	804.071	805.042	802.129	841.944	850.684	1083.748	1676.119	2365.600	2744.329	2881.254
42	793.389	797.273	821.551	860.395	869.134	1108.025	1731.471	2425.808	2785.115	2896.791
43	776.880	791.446	842.915	875.932	896.325	1133.274	1796.535	2505.438	2852.121	2897.762
44	767.169	797.273	854.568	898.267	917.689	1148.811	1829.552	2551.080	2900.676	2935.635
45	749.689	802.129	864.279	910.892	928.372	1146.869	1855.772	2595.750	2956.028	2974.479
46	718.614	791.446	869.134	921.574	940.996	1154.638	1866.454	2606.432	3024.005	3031.774
47	681.712	775.909	866.221	925.458	937.111	1153.667	1867.425	2590.895	3061.878	3082.271
48	654.521	760.371	851.655	918.661	925.458	1134.245	1840.234	2563.704	3049.254	3114.318
49	616.648	741.920	838.059	904.094	907.978	1103.170	1800.419	2528.744	3024.005	3106.549
50	582.660	710.845	823.493	885.643	882.730	1056.557	1763.518	2491.843	2981.277	3087.127
51	550.614	673.943	797.273	862.337	862.337	1016.742	1718.847	2441.345	2924.953	3053.138
52	505.943	653.550	765.227	835.146	843.886	984.695	1666.408	2385.022	2835.612	3010.410
53	454.475	630.244	742.891	812.811	829.319	948.765	1599.402	2305.391	2743.357	2934.664
54	406.891	592.371	718.614	798.244	805.042	905.065	1541.136	2225.761	2657.901	2839.496
55	360.278	551.585	693.365	769.111	769.111	854.568	1463.448	2140.304	2550.109	2745.300
56	317.550	512.741	659.377	731.238	727.354	796.302	1371.193	2037.368	2460.767	2656.930
57	286.474	478.752	622.475	690.452	680.741	736.094	1280.881	1933.460	2349.091	2596.721
58	256.370	441.850	581.689	646.753	634.128	687.539	1200.280	1814.015	2200.513	2526.802
59	232.093	408.833	544.787	609.851	594.313	654.521	1141.042	1698.454	2051.934	2402.501
60	207.815	382.613	518.567	580.718	563.238	634.128	1110.938	1637.275	1944.142	2264.605
61	186.451	364.162	491.377	554.498	538.960	612.764	1096.372	1586.777	1866.454	2171.380
62	163.145	345.712	466.128	527.307	501.088	561.296	1023.539	1495.494	1780.997	2088.836
63	146.636	327.261	439.908	501.088	466.128	511.770	942.938	1383.817	1662.523	1975.217
64	133.041	303.954	411.746	474.868	436.995	475.839	888.556	1299.332	1562.500	1851.888
65	122.359	284.532	391.353	450.590	412.717	443.793	832.233	1217.759	1469.274	1752.835
66	109.734	261.226	364.162	415.631	385.527	410.775	771.053	1129.389	1352.742	1632.419
67	98.081	239.862	336.972	382.613	356.394	379.700	708.903	1046.846	1255.632	1504.234
68	91.283	220.440	311.723	351.538	326.290	347.654	655.492	970.129	1177.944	1407.124
69	85.457	199.075	285.503	324.347	297.157	318.521	608.880	892.441	1107.054	1324.580
70	79.630	178.682	261.226	296.185	270.937	293.272	559.354	823.493	1034.221	1253.690
71	74.775	158.289	238.891	268.995	246.659	266.081	512.741	755.516	965.273	1190.569
72	70.890	139.838	218.497	241.804	223.353	242.775	468.070	701.134	910.892	1140.071
73	65.064	124.301	196.162	216.555	201.018	220.440	424.371	638.013	840.973	1081.805
74	59.237	109.734	178.682	192.278	180.625	195.191	385.527	566.151	752.602	994.406
75	55.353	100.023	158.289	171.885	163.145	178.682	348.625	505.943	673.943	901.181
76	51.468	86.428	140.809	155.376	146.636	163.145	308.810	445.735	599.169	811.840
77	49.526	78.659	125.272	137.896	131.098	149.549	271.908	386.498	531.192	731.238
78	43.699	67.006	107.792	121.387	115.561	134.012	238.891	336.001	452.533	630.244
79	39.815	58.266	93.226	103.908	100.994	116.532	207.815	291.330	406.891	554.498

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CANDELA TABULATION - (Cont.)

80	36.902	54.382	81.572	91.283	89.341	101.965	177.711	247.630	362.220	498.174
81	33.988	46.613	67.977	75.746	75.746	86.428	147.607	205.873	304.925	439.908
82	30.104	39.815	56.324	64.093	63.121	72.832	120.416	166.058	250.544	369.989
83	26.220	32.046	48.555	53.410	55.353	62.150	98.081	133.041	195.191	304.925
84	23.306	28.162	40.786	45.642	47.584	55.353	82.543	108.763	157.318	233.064
85	20.393	25.249	35.931	37.873	41.757	48.555	69.919	89.341	128.185	183.538
86	19.422	23.306	29.133	33.988	37.873	40.786	57.295	75.746	107.792	148.578
87	17.480	20.393	26.220	28.162	32.046	35.931	51.468	63.121	88.370	120.416
88	17.480	20.393	24.277	27.191	29.133	33.988	43.699	56.324	77.688	99.052
89	17.480	17.480	22.335	20.393	26.220	29.133	36.902	44.671	61.179	78.659
90	12.624	12.624	17.480	17.480	21.364	22.335	29.133	35.931	45.642	55.353
91	13.595	12.624	16.509	17.480	20.393	22.335	26.220	29.133	35.931	40.786
92	12.624	12.624	15.538	15.538	17.480	20.393	23.306	25.249	28.162	33.988
93	12.624	12.624	16.509	16.509	18.451	18.451	21.364	23.306	24.277	28.162
94	13.595	14.566	17.480	14.566	19.422	19.422	21.364	24.277	24.277	25.249
95	13.595	14.566	17.480	15.538	19.422	19.422	22.335	23.306	25.249	25.249
96	14.566	13.595	17.480	17.480	20.393	18.451	23.306	24.277	25.249	27.191
97	15.538	14.566	18.451	17.480	20.393	20.393	24.277	24.277	26.220	25.249
98	15.538	16.509	18.451	18.451	21.364	22.335	24.277	25.249	27.191	27.191
99	15.538	15.538	19.422	17.480	20.393	20.393	23.306	24.277	27.191	26.220
100	15.538	17.480	18.451	18.451	21.364	21.364	24.277	24.277	27.191	27.191
101	15.538	16.509	18.451	18.451	21.364	21.364	24.277	22.335	26.220	28.162
102	15.538	16.509	17.480	18.451	21.364	23.306	24.277	26.220	27.191	28.162
103	16.509	15.538	18.451	17.480	21.364	21.364	23.306	24.277	28.162	26.220
104	15.538	15.538	18.451	18.451	21.364	20.393	24.277	25.249	27.191	26.220
105	16.509	14.566	18.451	17.480	21.364	22.335	24.277	24.277	28.162	26.220
106	14.566	16.509	19.422	19.422	21.364	22.335	24.277	22.335	27.191	27.191
107	17.480	16.509	20.393	20.393	22.335	24.277	26.220	25.249	29.133	29.133
108	17.480	16.509	19.422	19.422	23.306	23.306	25.249	25.249	28.162	30.104
109	16.509	15.538	19.422	18.451	21.364	20.393	23.306	24.277	29.133	29.133
110	15.538	16.509	18.451	18.451	21.364	21.364	24.277	24.277	27.191	26.220
111	17.480	17.480	18.451	19.422	22.335	22.335	25.249	25.249	27.191	29.133
112	15.538	16.509	19.422	19.422	21.364	21.364	24.277	24.277	27.191	28.162
113	16.509	16.509	19.422	18.451	22.335	22.335	24.277	24.277	27.191	28.162
114	16.509	15.538	19.422	18.451	21.364	21.364	23.306	24.277	27.191	26.220
115	15.538	16.509	17.480	16.509	20.393	21.364	23.306	24.277	26.220	26.220
116	16.509	16.509	18.451	17.480	21.364	23.306	24.277	26.220	27.191	27.191
117	16.509	16.509	19.422	18.451	21.364	21.364	25.249	24.277	27.191	28.162
118	17.480	18.451	19.422	19.422	22.335	22.335	26.220	26.220	29.133	29.133
119	17.480	18.451	20.393	19.422	23.306	24.277	26.220	26.220	29.133	29.133
120	16.509	16.509	18.451	17.480	22.335	23.306	25.249	26.220	27.191	29.133
121	15.538	14.566	18.451	16.509	21.364	21.364	23.306	24.277	26.220	28.162
122	16.509	15.538	19.422	18.451	21.364	22.335	25.249	24.277	28.162	28.162
123	16.509	15.538	18.451	17.480	21.364	20.393	24.277	25.249	27.191	27.191
124	16.509	16.509	19.422	19.422	22.335	23.306	25.249	27.191	28.162	28.162
125	16.509	17.480	19.422	18.451	22.335	20.393	25.249	26.220	28.162	28.162
126	15.538	16.509	17.480	18.451	21.364	19.422	24.277	25.249	27.191	27.191
127	16.509	16.509	18.451	17.480	21.364	21.364	25.249	24.277	28.162	26.220
128	16.509	18.451	18.451	20.393	22.335	23.306	26.220	24.277	28.162	28.162
129	16.509	15.538	19.422	17.480	21.364	21.364	24.277	24.277	27.191	28.162
130	17.480	18.451	19.422	18.451	22.335	22.335	24.277	24.277	28.162	27.191
131	16.509	17.480	19.422	19.422	22.335	21.364	24.277	24.277	28.162	28.162
132	16.509	17.480	18.451	18.451	22.335	22.335	24.277	25.249	28.162	28.162
133	17.480	18.451	20.393	19.422	21.364	23.306	25.249	27.191	28.162	28.162
134	15.538	15.538	19.422	17.480	21.364	23.306	25.249	25.249	27.191	28.162
135	15.538	16.509	20.393	19.422	22.335	24.277	26.220	27.191	26.220	28.162

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CANDELA TABULATION - (Cont.)

136	17.480	17.480	20.393	19.422	22.335	22.335	26.220	26.220	28.162	28.162
137	17.480	17.480	19.422	18.451	22.335	21.364	27.191	24.277	29.133	29.133
138	16.509	15.538	19.422	18.451	21.364	22.335	25.249	26.220	28.162	28.162
139	16.509	17.480	20.393	20.393	22.335	23.306	25.249	27.191	29.133	30.104
140	17.480	16.509	20.393	18.451	23.306	24.277	26.220	27.191	29.133	28.162
141	16.509	17.480	19.422	19.422	23.306	22.335	26.220	26.220	29.133	28.162
142	16.509	16.509	19.422	17.480	21.364	22.335	25.249	26.220	28.162	29.133
143	16.509	17.480	19.422	18.451	22.335	22.335	24.277	26.220	28.162	28.162
144	17.480	17.480	20.393	19.422	23.306	24.277	26.220	25.249	28.162	28.162
145	17.480	16.509	19.422	18.451	22.335	23.306	26.220	26.220	29.133	27.191
146	16.509	16.509	19.422	19.422	22.335	21.364	26.220	26.220	29.133	29.133
147	16.509	16.509	19.422	19.422	21.364	23.306	25.249	26.220	28.162	29.133
148	16.509	16.509	18.451	18.451	22.335	21.364	26.220	25.249	28.162	29.133
149	15.538	17.480	19.422	18.451	22.335	22.335	26.220	28.162	28.162	30.104
150	16.509	18.451	21.364	20.393	23.306	23.306	26.220	26.220	29.133	30.104
151	17.480	16.509	20.393	18.451	23.306	22.335	25.249	26.220	29.133	29.133
152	16.509	16.509	19.422	19.422	22.335	22.335	25.249	26.220	29.133	28.162
153	16.509	14.566	19.422	20.393	22.335	23.306	26.220	28.162	29.133	30.104
154	14.566	15.538	19.422	18.451	21.364	21.364	24.277	24.277	28.162	29.133
155	16.509	16.509	20.393	18.451	22.335	22.335	26.220	26.220	29.133	29.133
156	15.538	16.509	18.451	17.480	21.364	20.393	25.249	26.220	29.133	28.162
157	16.509	16.509	19.422	19.422	23.306	23.306	25.249	25.249	30.104	29.133
158	15.538	16.509	17.480	18.451	21.364	21.364	25.249	25.249	29.133	29.133
159	16.509	15.538	19.422	18.451	21.364	22.335	26.220	26.220	29.133	29.133
160	15.538	15.538	18.451	16.509	21.364	21.364	25.249	26.220	28.162	28.162
161	14.566	15.538	19.422	17.480	21.364	20.393	24.277	26.220	29.133	30.104
162	15.538	14.566	19.422	17.480	21.364	22.335	23.306	26.220	29.133	29.133
163	16.509	14.566	19.422	17.480	21.364	21.364	25.249	26.220	27.191	30.104
164	15.538	14.566	18.451	17.480	20.393	20.393	25.249	25.249	27.191	28.162
165	15.538	16.509	19.422	18.451	22.335	21.364	26.220	26.220	29.133	26.220
166	15.538	16.509	19.422	18.451	22.335	21.364	24.277	25.249	29.133	28.162
167	15.538	16.509	18.451	17.480	20.393	19.422	24.277	26.220	28.162	27.191
168	15.538	15.538	18.451	17.480	22.335	22.335	25.249	25.249	28.162	27.191
169	15.538	15.538	19.422	19.422	22.335	23.306	25.249	27.191	28.162	30.104
170	14.566	16.509	18.451	16.509	20.393	20.393	24.277	25.249	27.191	26.220
171	14.566	13.595	17.480	16.509	20.393	20.393	24.277	22.335	27.191	28.162
172	16.509	16.509	19.422	17.480	21.364	20.393	24.277	27.191	29.133	27.191
173	17.480	18.451	20.393	17.480	23.306	20.393	26.220	25.249	30.104	31.075
174	15.538	15.538	19.422	18.451	21.364	19.422	24.277	25.249	28.162	29.133
175	14.566	16.509	18.451	18.451	21.364	20.393	24.277	25.249	27.191	27.191
176	14.566	15.538	18.451	17.480	21.364	20.393	23.306	23.306	27.191	27.191
177	15.538	16.509	18.451	18.451	21.364	21.364	24.277	26.220	28.162	29.133
178	15.538	16.509	17.480	16.509	21.364	22.335	22.335	25.249	27.191	28.162
179	14.566	16.509	18.451	17.480	21.364	22.335	24.277	25.249	26.220	29.133
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**									
	300	**305**	**310**	**315**	**320**	**325**	**330**	**335**	**340**	**345**
0	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132	2482.132
1	2536.513	2545.253	2560.791	2580.213	2585.068	2577.299	2578.270	2598.664	2617.114	2595.750
2	2669.554	2729.762	2767.635	2831.728	2870.572	2889.022	2911.358	2965.739	3020.121	3026.919
3	2905.531	3011.381	3074.503	3162.873	3234.734	3260.954	3284.260	3333.786	3382.341	3409.532
4	3176.468	3297.856	3377.486	3456.145	3506.642	3537.717	3562.966	3631.914	3679.498	3726.111
5	3394.966	3491.104	3571.706	3654.249	3744.561	3819.336	3886.342	4003.845	4102.897	4148.539
6	3556.168	3663.960	3778.550	3934.897	4087.360	4187.383	4263.129	4364.123	4441.811	4484.540

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CANDELA TABULATION - (Cont.)

7	3711.544	3876.631	4072.793	4279.638	4434.042	4499.106	4517.557	4562.228	4627.291	4695.268
8	3892.169	4158.250	4387.430	4551.546	4659.338	4730.228	4765.188	4821.511	4889.488	4953.581
9	4132.030	4426.274	4599.129	4735.083	4874.922	4969.119	5018.645	5064.286	5097.304	5114.784
10	4398.112	4620.494	4762.274	4952.610	5104.101	5191.500	5176.934	5181.789	5196.356	5194.414
11	4617.580	4780.725	4984.656	5174.992	5278.899	5301.235	5284.726	5262.391	5279.871	5260.449
12	4815.685	5013.789	5241.027	5351.732	5376.009	5397.374	5401.258	5376.009	5322.599	5264.333
13	4985.627	5269.188	5439.131	5481.859	5470.206	5499.339	5491.570	5410.969	5293.466	5213.836
14	5131.292	5459.524	5570.229	5600.334	5578.969	5537.212	5430.391	5335.223	5237.142	5174.021
15	5343.963	5600.334	5673.166	5708.126	5653.744	5519.732	5408.056	5311.917	5195.385	5115.755
16	5528.472	5693.559	5784.843	5780.958	5662.484	5526.530	5400.287	5274.044	5143.917	5057.489
17	5678.993	5813.004	5862.531	5800.380	5674.137	5541.096	5380.865	5237.142	5120.610	5040.980
18	5791.640	5937.305	5900.403	5783.871	5695.501	5524.588	5359.501	5199.269	5119.639	5000.194
19	5861.559	6031.502	5906.230	5816.889	5678.993	5474.091	5315.801	5181.789	5053.604	4932.217
20	5929.536	6061.606	5946.045	5860.588	5645.975	5442.044	5301.235	5115.755	4985.627	4914.737
21	6022.762	6050.924	5986.831	5841.166	5622.669	5411.940	5249.766	5076.911	4901.142	4793.349
22	6050.924	6056.751	5991.687	5817.860	5618.784	5355.616	5226.460	4997.280	4810.829	4728.286
23	6015.964	6039.271	5955.756	5783.871	5622.669	5359.501	5150.714	4927.361	4734.112	4565.141
24	5937.305	6027.618	5896.519	5761.536	5585.767	5351.732	5097.304	4866.182	4563.199	4381.603
25	5899.432	5945.074	5860.588	5722.692	5560.518	5296.379	5056.518	4745.766	4447.638	4267.984
26	5905.259	5891.664	5846.022	5709.097	5512.935	5291.524	4973.003	4666.135	4395.198	4146.597
27	5899.432	5868.357	5774.160	5709.097	5496.426	5277.928	4930.275	4630.205	4318.482	4117.464
28	5812.033	5825.629	5698.415	5657.628	5511.963	5254.622	4915.708	4576.794	4334.019	4098.042
29	5646.946	5724.634	5678.993	5586.738	5480.888	5244.911	4838.020	4592.332	4324.308	4013.556
30	5463.408	5611.016	5615.871	5559.547	5442.044	5198.298	4874.922	4590.390	4276.724	4005.787
31	5247.824	5418.738	5453.697	5489.628	5385.720	5138.090	4941.928	4575.823	4293.233	3998.990
32	4945.812	5129.350	5271.131	5369.212	5294.437	5145.859	4937.072	4637.973	4307.799	3988.308
33	4627.291	4840.933	5089.535	5239.084	5189.558	5105.073	4944.841	4703.037	4346.643	4059.198
34	4333.048	4547.661	4821.511	5093.419	5103.130	5063.315	4989.512	4759.361	4429.187	4124.262
35	4066.967	4287.406	4550.574	4920.564	5004.078	5040.980	5049.720	4833.165	4516.586	4217.487
36	3771.752	4051.429	4338.875	4709.835	4906.968	5030.298	5088.564	4941.928	4654.482	4334.990
37	3510.526	3802.827	4134.944	4535.037	4816.656	5043.893	5129.350	5052.633	4817.627	4492.308
38	3290.087	3553.255	3950.435	4382.574	4750.621	5103.130	5178.876	5221.605	4994.367	4704.008
39	3094.896	3337.671	3771.752	4230.111	4679.731	5185.674	5289.582	5360.472	5223.547	4884.633
40	3009.439	3158.988	3598.896	4113.579	4622.436	5234.229	5409.998	5538.183	5458.553	5071.084
41	2934.664	3032.745	3427.012	4050.458	4630.205	5256.564	5533.328	5697.444	5679.964	5303.177
42	2892.907	2997.786	3323.104	3975.683	4672.933	5309.004	5647.917	5865.444	5913.028	5569.258
43	2870.572	2994.872	3291.058	3904.793	4701.095	5323.570	5751.825	6039.271	6164.543	5807.178
44	2868.629	2990.017	3322.133	3876.631	4724.401	5319.686	5812.033	6182.994	6386.925	5965.467
45	2903.589	3014.294	3409.532	3948.492	4758.390	5299.293	5880.981	6350.023	6465.584	6045.097
46	2972.537	3059.936	3517.324	4084.446	4832.193	5306.090	5954.785	6387.896	6498.601	6079.086
47	3051.196	3121.115	3610.550	4208.747	4870.066	5309.004	5943.132	6322.832	6399.549	6149.005
48	3125.000	3225.023	3710.573	4322.366	4883.662	5317.743	5821.744	6150.947	6312.150	6232.520
49	3187.150	3334.757	3852.354	4420.447	4905.997	5269.188	5587.709	5949.930	6228.635	6262.624
50	3217.254	3452.260	3968.886	4527.268	4910.853	5132.263	5338.137	5721.721	6149.976	6284.959
51	3228.907	3556.168	4099.013	4628.262	4909.881	4987.569	5180.818	5557.605	6063.548	6474.324
52	3231.821	3634.827	4218.458	4679.731	4878.806	4908.910	5018.645	5420.680	6113.074	6843.342
53	3200.746	3681.440	4301.973	4678.760	4828.309	4808.887	4873.951	5352.703	6334.485	7252.175
54	3140.537	3684.353	4340.817	4655.453	4777.812	4600.101	4768.101	5384.749	6595.711	7640.615
55	3102.664	3707.660	4317.510	4600.101	4720.517	4617.580	4731.199	5468.264	6860.821	8090.234
56	3060.907	3715.428	4233.996	4548.632	4652.540	4561.257	4689.442	5539.154	7114.278	8578.697
57	2988.075	3681.440	4117.464	4504.933	4561.257	4433.071	4598.158	5621.698	7374.533	9068.132
58	2941.462	3612.492	3989.279	4417.534	4439.869	4240.794	4472.886	5659.571	7640.615	9532.317
59	2878.340	3485.278	3872.747	4289.349	4259.244	4015.498	4331.106	5698.415	7942.627	9954.746
60	2765.693	3322.133	3708.631	4099.984	4032.978	3757.186	4197.094	5756.681	8156.269	10293.660
61	2649.161	3131.797	3503.729	3903.822	3802.827	3541.602	4087.360	5846.022	8340.778	10428.643
62	2539.426	2945.346	3296.884	3671.729	3585.301	3329.902	4014.527	5930.508	8355.344	10307.255

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CANDELA TABULATION - (Cont.)

63	2425.808	2780.259	3095.867	3431.867	3346.411	3121.115	3900.909	5895.548	8244.639	10091.671
64	2295.680	2620.028	2905.531	3196.861	3105.578	2877.369	3745.533	5810.091	8070.812	9764.410
65	2179.148	2438.432	2692.860	2986.132	2850.178	2619.057	3604.723	5709.097	7810.557	9307.022
66	2042.223	2221.877	2468.536	2750.155	2590.895	2372.397	3463.914	5568.287	7554.187	8873.912
67	1864.512	1994.639	2233.530	2498.640	2323.842	2132.536	3319.220	5437.189	7280.336	8379.622
68	1705.252	1787.795	2029.599	2255.865	2062.616	1922.778	3191.035	5257.535	6958.902	7818.326
69	1565.413	1630.477	1841.206	2016.975	1816.928	1738.269	3020.121	5037.096	6482.092	7048.244
70	1463.448	1489.667	1680.974	1792.651	1613.968	1567.355	2821.045	4697.211	5865.444	6222.809
71	1373.135	1364.395	1538.222	1599.402	1422.661	1395.471	2589.924	4311.684	5248.795	5445.929
72	1297.390	1262.430	1408.095	1402.268	1232.326	1210.962	2337.438	3894.111	4655.453	4723.430
73	1229.413	1179.886	1259.517	1204.164	1045.875	1048.788	2089.807	3480.422	4093.186	4040.747
74	1142.985	1086.661	1117.736	1036.164	888.556	908.950	1852.859	3067.705	3494.989	3391.081
75	1040.048	970.129	981.782	904.094	768.140	806.984	1643.101	2631.681	2973.508	2825.901
76	949.736	877.874	865.250	776.880	664.232	707.932	1422.661	2256.836	2468.536	2320.929
77	854.568	799.215	761.342	669.088	564.209	611.793	1223.586	1897.529	2040.281	1872.281
78	744.834	710.845	665.203	576.833	478.752	525.365	1050.730	1595.517	1683.887	1531.425
79	637.042	606.937	574.891	503.030	404.949	448.648	897.296	1335.262	1402.268	1264.372
80	565.180	525.365	483.608	422.428	346.683	382.613	761.342	1115.794	1159.493	1039.077
81	491.377	457.388	405.920	338.914	280.648	328.232	638.013	924.487	949.736	853.597
82	425.342	392.324	338.914	277.735	227.237	276.763	531.192	753.574	770.082	695.308
83	369.018	329.203	283.561	234.035	187.422	225.295	440.879	608.880	622.475	559.354
84	302.012	286.474	239.862	194.220	158.289	180.625	353.480	490.405	489.434	446.706
85	230.151	236.948	201.018	163.145	132.070	143.723	271.908	384.556	384.556	352.509
86	178.682	180.625	168.971	138.867	113.619	118.474	209.758	290.359	298.128	276.763
87	139.838	135.954	132.070	116.532	97.110	98.081	159.260	218.497	227.237	211.700
88	112.648	110.705	106.821	96.139	84.486	81.572	122.359	163.145	169.942	160.231
89	88.370	86.428	82.543	77.688	70.890	67.977	92.254	117.503	122.359	118.474
90	66.035	67.006	64.093	60.208	55.353	53.410	67.006	83.515	85.457	84.486
91	52.439	54.382	52.439	50.497	46.613	44.671	51.468	58.266	61.179	60.208
92	39.815	41.757	42.728	41.757	40.786	37.873	38.844	41.757	43.699	39.815
93	32.046	33.017	34.960	35.931	33.988	31.075	31.075	32.046	31.075	29.133
94	29.133	30.104	31.075	30.104	30.104	28.162	26.220	23.306	22.335	20.393
95	27.191	27.191	29.133	27.191	26.220	24.277	21.364	19.422	17.480	12.624
96	28.162	26.220	27.191	26.220	25.249	21.364	19.422	14.566	14.566	9.711
97	28.162	27.191	28.162	26.220	24.277	22.335	18.451	14.566	7.769	7.769
98	28.162	27.191	29.133	27.191	25.249	21.364	19.422	14.566	9.711	6.798
99	28.162	27.191	29.133	27.191	24.277	22.335	18.451	13.595	10.682	4.855
100	29.133	29.133	29.133	28.162	24.277	21.364	18.451	14.566	9.711	6.798
101	29.133	28.162	28.162	28.162	24.277	22.335	18.451	14.566	9.711	5.827
102	30.104	28.162	28.162	28.162	26.220	21.364	18.451	14.566	9.711	4.855
103	29.133	28.162	28.162	28.162	24.277	21.364	18.451	14.566	10.682	5.827
104	29.133	29.133	28.162	27.191	25.249	22.335	17.480	13.595	9.711	4.855
105	29.133	28.162	28.162	27.191	24.277	21.364	17.480	12.624	9.711	5.827
106	29.133	28.162	29.133	28.162	24.277	21.364	18.451	13.595	9.711	6.798
107	30.104	30.104	30.104	29.133	25.249	23.306	19.422	15.538	11.653	7.769
108	31.075	29.133	29.133	29.133	24.277	22.335	19.422	14.566	11.653	7.769
109	29.133	29.133	29.133	27.191	25.249	21.364	18.451	14.566	9.711	7.769
110	29.133	28.162	28.162	27.191	23.306	22.335	17.480	13.595	8.740	4.855
111	29.133	30.104	28.162	27.191	25.249	21.364	18.451	13.595	9.711	6.798
112	29.133	29.133	29.133	27.191	25.249	21.364	17.480	14.566	9.711	4.855
113	29.133	28.162	28.162	27.191	26.220	21.364	18.451	13.595	8.740	5.827
114	29.133	29.133	30.104	27.191	24.277	21.364	17.480	13.595	9.711	5.827
115	29.133	28.162	28.162	26.220	23.306	21.364	17.480	12.624	8.740	3.884
116	30.104	28.162	29.133	27.191	25.249	22.335	18.451	13.595	9.711	4.855
117	29.133	28.162	29.133	27.191	25.249	22.335	18.451	14.566	9.711	4.855
118	30.104	30.104	29.133	28.162	26.220	22.335	20.393	14.566	10.682	4.855

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CANDELA TABULATION - (Cont.)

119	31.075	29.133	30.104	29.133	26.220	22.335	19.422	15.538	10.682	5.827
120	30.104	29.133	30.104	28.162	25.249	22.335	18.451	15.538	10.682	6.798
121	28.162	28.162	28.162	26.220	24.277	21.364	17.480	13.595	9.711	3.884
122	29.133	30.104	27.191	28.162	25.249	21.364	17.480	13.595	9.711	4.855
123	30.104	28.162	28.162	28.162	25.249	21.364	18.451	13.595	9.711	3.884
124	30.104	29.133	30.104	27.191	25.249	22.335	19.422	14.566	8.740	5.827
125	29.133	30.104	29.133	26.220	26.220	22.335	19.422	14.566	9.711	6.798
126	29.133	28.162	28.162	26.220	24.277	20.393	17.480	13.595	8.740	3.884
127	30.104	26.220	28.162	27.191	23.306	20.393	16.509	13.595	9.711	4.855
128	30.104	29.133	28.162	29.133	25.249	21.364	19.422	13.595	10.682	6.798
129	29.133	28.162	28.162	26.220	24.277	20.393	18.451	13.595	9.711	3.884
130	29.133	29.133	30.104	28.162	26.220	22.335	19.422	14.566	9.711	3.884
131	30.104	28.162	29.133	28.162	25.249	20.393	18.451	14.566	10.682	6.798
132	29.133	28.162	29.133	27.191	24.277	21.364	18.451	14.566	10.682	4.855
133	30.104	27.191	29.133	28.162	25.249	22.335	18.451	14.566	10.682	6.798
134	29.133	28.162	29.133	27.191	25.249	21.364	18.451	13.595	8.740	5.827
135	30.104	28.162	30.104	29.133	25.249	22.335	19.422	15.538	10.682	5.827
136	30.104	29.133	29.133	27.191	25.249	22.335	19.422	15.538	10.682	6.798
137	30.104	30.104	30.104	27.191	26.220	23.306	19.422	15.538	11.653	5.827
138	30.104	27.191	29.133	27.191	25.249	20.393	18.451	14.566	9.711	4.855
139	31.075	28.162	29.133	28.162	25.249	22.335	17.480	14.566	11.653	6.798
140	31.075	30.104	29.133	28.162	25.249	22.335	19.422	14.566	10.682	6.798
141	30.104	29.133	29.133	28.162	24.277	21.364	19.422	15.538	10.682	5.827
142	29.133	29.133	29.133	27.191	24.277	21.364	18.451	14.566	8.740	4.855
143	30.104	28.162	29.133	28.162	25.249	21.364	18.451	14.566	9.711	5.827
144	31.075	30.104	30.104	28.162	26.220	23.306	19.422	15.538	11.653	5.827
145	31.075	29.133	30.104	27.191	24.277	22.335	18.451	15.538	9.711	4.855
146	31.075	28.162	28.162	28.162	25.249	21.364	18.451	14.566	9.711	6.798
147	29.133	27.191	28.162	28.162	24.277	21.364	17.480	13.595	9.711	5.827
148	29.133	28.162	28.162	27.191	25.249	20.393	17.480	13.595	8.740	4.855
149	31.075	30.104	29.133	27.191	25.249	21.364	19.422	13.595	10.682	5.827
150	32.046	29.133	31.075	28.162	26.220	23.306	19.422	16.509	10.682	6.798
151	32.046	28.162	29.133	28.162	24.277	23.306	18.451	14.566	10.682	4.855
152	30.104	28.162	29.133	28.162	25.249	21.364	17.480	14.566	9.711	3.884
153	30.104	29.133	30.104	29.133	26.220	21.364	19.422	13.595	10.682	5.827
154	31.075	29.133	29.133	27.191	25.249	20.393	18.451	13.595	8.740	5.827
155	32.046	29.133	31.075	29.133	25.249	22.335	18.451	15.538	10.682	5.827
156	31.075	30.104	30.104	27.191	25.249	22.335	17.480	14.566	9.711	6.798
157	31.075	30.104	31.075	29.133	26.220	23.306	19.422	14.566	11.653	7.769
158	30.104	28.162	29.133	27.191	24.277	21.364	18.451	14.566	9.711	5.827
159	31.075	30.104	30.104	29.133	25.249	22.335	19.422	14.566	10.682	4.855
160	31.075	29.133	30.104	28.162	25.249	22.335	18.451	14.566	9.711	4.855
161	30.104	29.133	30.104	29.133	25.249	22.335	19.422	14.566	9.711	6.798
162	30.104	29.133	30.104	29.133	25.249	23.306	18.451	14.566	10.682	6.798
163	31.075	29.133	30.104	29.133	25.249	23.306	19.422	15.538	8.740	5.827
164	31.075	28.162	30.104	27.191	24.277	21.364	18.451	14.566	9.711	5.827
165	32.046	30.104	31.075	29.133	27.191	22.335	19.422	15.538	11.653	5.827
166	32.046	30.104	30.104	28.162	26.220	23.306	18.451	15.538	10.682	6.798
167	30.104	29.133	28.162	28.162	24.277	22.335	18.451	14.566	9.711	5.827
168	30.104	29.133	29.133	29.133	26.220	23.306	19.422	15.538	10.682	5.827
169	32.046	30.104	31.075	28.162	26.220	22.335	20.393	16.509	11.653	6.798
170	30.104	28.162	29.133	28.162	25.249	21.364	18.451	13.595	9.711	4.855
171	29.133	28.162	29.133	27.191	25.249	21.364	18.451	14.566	9.711	5.827
172	31.075	31.075	30.104	29.133	25.249	22.335	20.393	14.566	10.682	6.798
173	32.046	31.075	31.075	31.075	26.220	23.306	20.393	16.509	12.624	6.798
174	29.133	28.162	29.133	28.162	24.277	22.335	18.451	14.566	9.711	6.798

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CANDELA TABULATION - (Cont.)

175	29.133	30.104	29.133	28.162	25.249	20.393	18.451	14.566	9.711	6.798
176	30.104	28.162	28.162	27.191	25.249	22.335	18.451	13.595	9.711	5.827
177	31.075	29.133	31.075	29.133	26.220	22.335	19.422	14.566	11.653	7.769
178	29.133	29.133	29.133	28.162	26.220	22.335	19.422	14.566	11.653	4.855
179	31.075	29.133	29.133	29.133	25.249	22.335	18.451	15.538	10.682	3.884
180	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798	6.798

Vert. Angles	**Horizontal Angles**		
	350	**355**	**360**
0	2482.132	2482.132	2482.132
1	2620.999	2620.028	2613.230
2	3066.734	3062.849	3056.052
3	3428.954	3425.070	3424.099
4	3750.388	3759.128	3741.648
5	4214.574	4209.718	4188.354
6	4515.615	4520.470	4498.135
7	4756.448	4758.390	4761.303
8	5008.934	5014.760	5015.731
9	5161.396	5159.454	5142.945
10	5237.142	5248.795	5233.258
11	5278.899	5291.524	5274.044
12	5248.795	5243.940	5221.605
13	5189.558	5189.558	5151.685
14	5146.830	5133.234	5116.726
15	5070.113	5054.575	5059.431
16	5000.194	4981.743	5003.107
17	4963.292	4927.361	4920.564
18	4900.170	4838.991	4812.771
19	4870.066	4829.280	4785.581
20	4795.292	4716.633	4678.760
21	4706.922	4654.482	4596.216
22	4621.465	4545.719	4472.886
23	4418.505	4361.210	4291.291
24	4285.464	4255.360	4210.689
25	4193.210	4142.712	4093.186
26	4093.186	4069.880	4024.238
27	4049.487	3997.047	3936.839
28	3932.955	3869.833	3816.423
29	3859.151	3802.827	3763.983
30	3850.411	3783.405	3720.284
31	3823.221	3773.694	3682.411
32	3844.585	3792.145	3707.660
33	3856.238	3772.723	3687.267
34	3870.804	3809.625	3723.197
35	3947.521	3859.151	3715.428
36	4023.267	3916.446	3743.590
37	4141.741	3965.001	3763.012
38	4253.418	3992.192	3766.897
39	4381.603	4031.036	3758.157
40	4511.730	4059.198	3725.139
41	4674.875	4125.233	3726.111
42	4854.529	4189.325	3695.035
43	4989.512	4266.042	3741.648
44	5143.917	4365.094	3820.307
45	5235.200	4438.898	3920.331

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CANDELA TABULATION - (Cont.)

46	5366.298	4667.106	4180.585
47	5559.547	4841.904	4412.678
48	5704.241	5000.194	4653.511
49	5840.195	5264.333	4935.130
50	6114.045	5610.045	5330.368
51	6542.301	6111.132	5845.051
52	7028.822	6584.058	6272.335
53	7518.256	7082.232	6770.509
54	8023.228	7655.181	7361.909
55	8635.021	8324.269	8083.436
56	9306.051	9030.259	8776.802
57	9897.451	9632.341	9394.421
58	10412.13	410173.24	39995.532
59	10896.71	310744.25	010533.521
60	11285.15	311130.748	10934.586
61	11354.10	111113.268	10855.927
62	11133.661	10776.296	10484.966
63	10840.38	910448.06	510174.214
64	10379.11	79968.341	9679.925
65	9839.185	9465.311	9159.415
66	9328.386	8983.646	8624.339
67	8707.853	8284.454	7929.031
68	7906.696	7398.811	6989.978
69	6952.105	6401.491	5990.716
70	5972.265	5406.114	5003.107
71	5108.957	4526.297	4153.395
72	4326.250	3760.099	3406.619
73	3603.752	3079.358	2755.011
74	2969.624	2490.871	2211.195
75	2421.923	2016.975	1760.604
76	1947.055	1600.373	1377.991
77	1556.673	1270.199	1094.430
78	1267.285	1029.366	890.499
79	1044.904	847.770	731.238
80	864.279	701.134	602.082
81	712.787	580.718	495.261
82	584.602	478.752	406.891
83	479.723	393.295	332.116
84	389.411	324.347	270.937
85	312.694	263.168	219.469
86	250.544	214.613	178.682
87	196.162	169.942	141.781
88	152.463	134.012	110.705
89	115.561	103.908	83.515
90	84.486	73.804	60.208
91	61.179	51.468	42.728
92	43.699	35.931	28.162
93	30.104	23.306	17.480
94	19.422	14.566	9.711
95	12.624	6.798	5.827
96	8.740	4.855	2.913
97	4.855	0.000	0.000
98	3.884	0.000	0.000
99	3.884	0.000	0.000
100	4.855	0.000	0.000
101	3.884	0.000	0.000

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CANDELA TABULATION - (Cont.)

102	3.884	0.000	0.000
103	3.884	0.000	0.000
104	3.884	0.000	0.000
105	3.884	0.000	0.000
106	3.884	0.000	0.000
107	4.855	1.942	0.000
108	4.855	0.000	0.000
109	3.884	0.000	0.000
110	2.913	0.000	0.000
111	2.913	0.000	0.000
112	3.884	0.000	0.000
113	2.913	0.000	0.000
114	2.913	0.000	0.000
115	1.942	0.000	0.000
116	2.913	0.000	0.000
117	2.913	0.000	0.000
118	4.855	0.000	0.000
119	5.827	0.000	0.000
120	3.884	0.000	0.000
121	2.913	0.000	0.000
122	2.913	0.000	0.000
123	2.913	0.000	0.000
124	3.884	0.000	0.000
125	3.884	0.000	0.000
126	2.913	0.000	0.000
127	3.884	0.000	0.000
128	3.884	0.000	0.000
129	2.913	0.000	0.000
130	3.884	0.000	0.000
131	3.884	0.000	0.000
132	4.855	0.971	0.000
133	4.855	0.000	0.000
134	3.884	0.000	0.000
135	3.884	0.971	0.000
136	4.855	0.000	0.000
137	4.855	0.000	0.000
138	2.913	0.000	0.000
139	4.855	0.971	0.000
140	3.884	0.000	0.000
141	4.855	0.000	0.000
142	2.913	0.000	0.000
143	3.884	0.000	0.000
144	4.855	0.000	0.000
145	3.884	0.000	0.000
146	3.884	0.000	0.000
147	2.913	0.000	0.000
148	2.913	0.000	0.000
149	4.855	0.000	0.000
150	4.855	0.971	0.000
151	3.884	0.000	0.000
152	3.884	0.000	0.000
153	4.855	0.971	0.000
154	3.884	0.000	0.000
155	4.855	0.000	0.000
156	3.884	0.000	0.000
157	3.884	0.000	0.000

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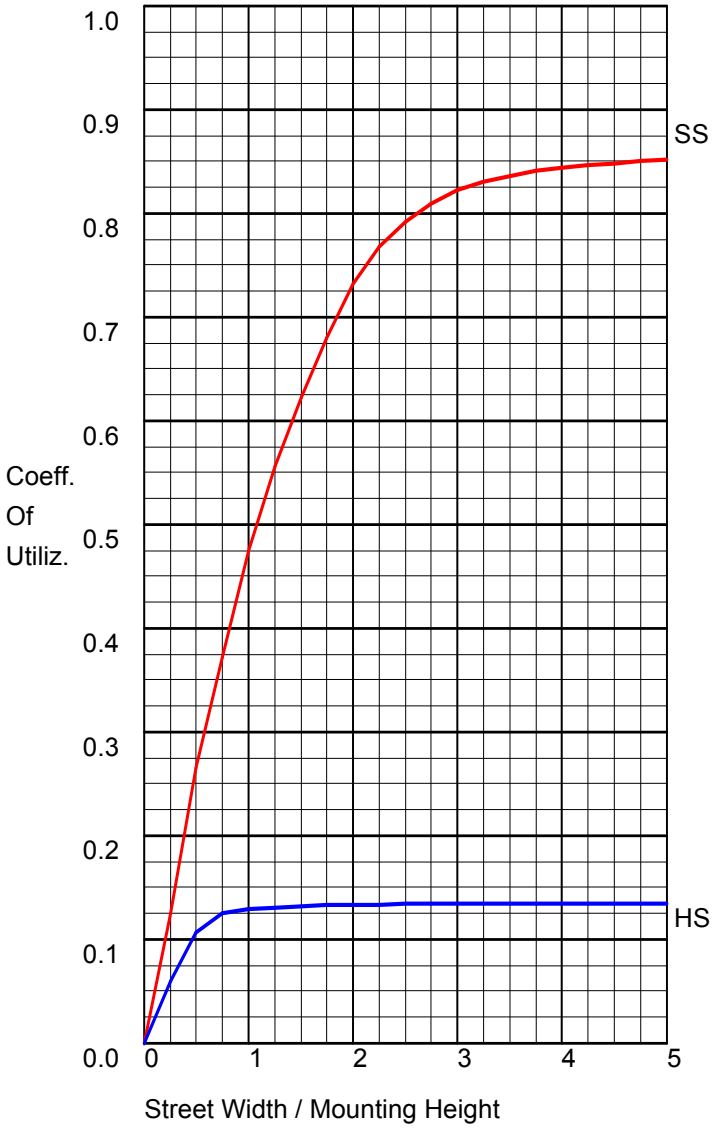
CANDELA TABULATION - (Cont.)

158	2.913	0.000	0.000
159	4.855	0.971	0.000
160	4.855	0.000	0.000
161	3.884	0.000	0.000
162	4.855	0.000	0.000
163	4.855	0.000	0.000
164	3.884	0.000	0.000
165	4.855	0.000	0.000
166	4.855	0.971	0.000
167	2.913	0.000	0.000
168	3.884	0.000	0.000
169	4.855	1.942	0.000
170	3.884	0.000	0.000
171	3.884	0.000	0.000
172	4.855	0.000	0.000
173	5.827	0.971	0.000
174	2.913	0.000	0.000
175	2.913	0.971	0.000
176	3.884	0.000	0.000
177	3.884	1.942	0.000
178	3.884	0.000	0.000
179	4.855	0.000	0.000
180	6.798	6.798	6.798

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_3_4K_1_AS_CCB_XX_X-AGI32.IES

COEFFICIENTS OF UTILIZATION



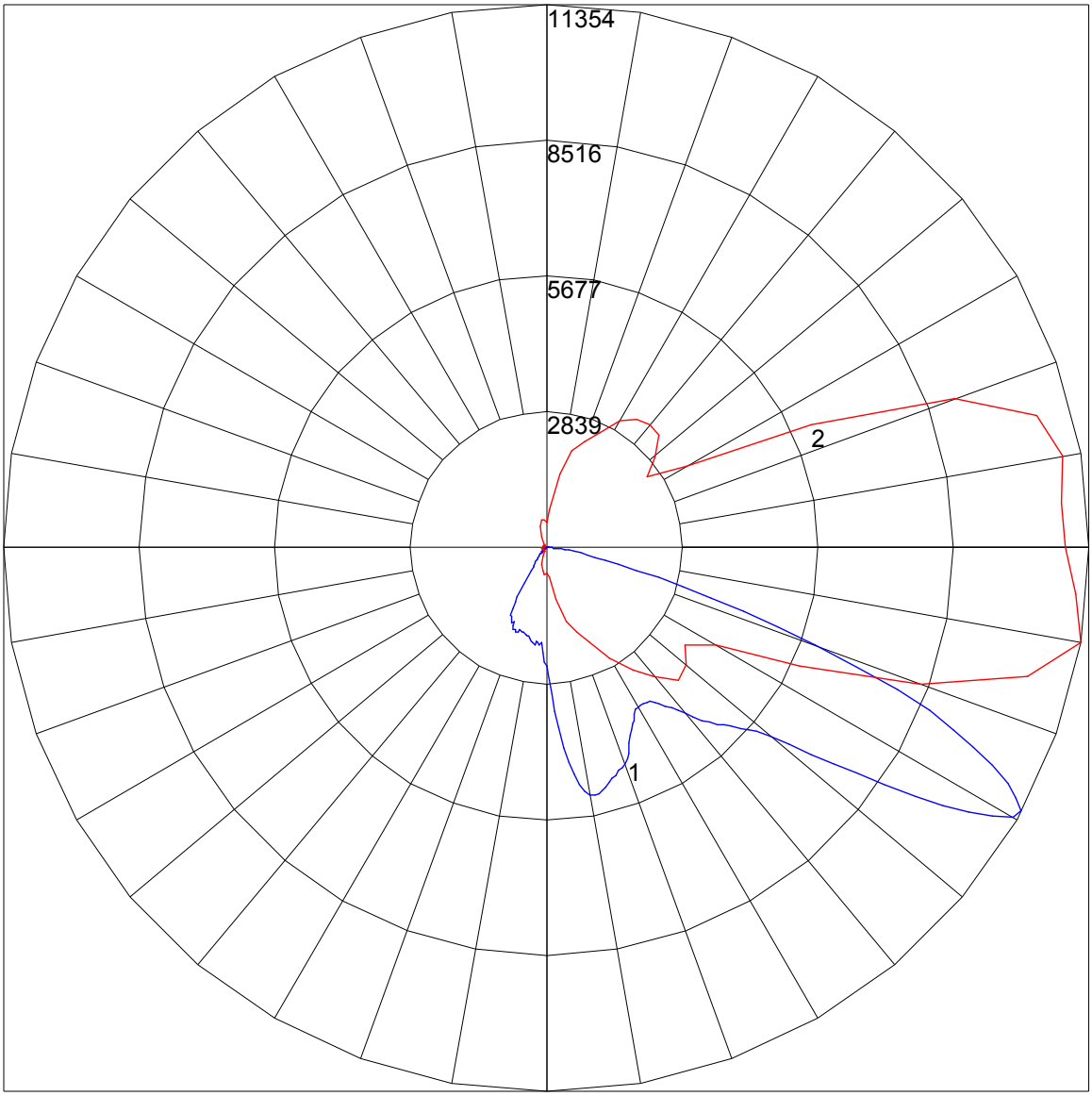
FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	9483.5	86.1
Downward House Side	1488.9	13.5
Downward Total	10972.4	99.6
Upward Street Side	34.1	0.3
Upward House Side	12.9	0.1
Upward Total	47.0	0.4
Total Flux	11019.4	100.0

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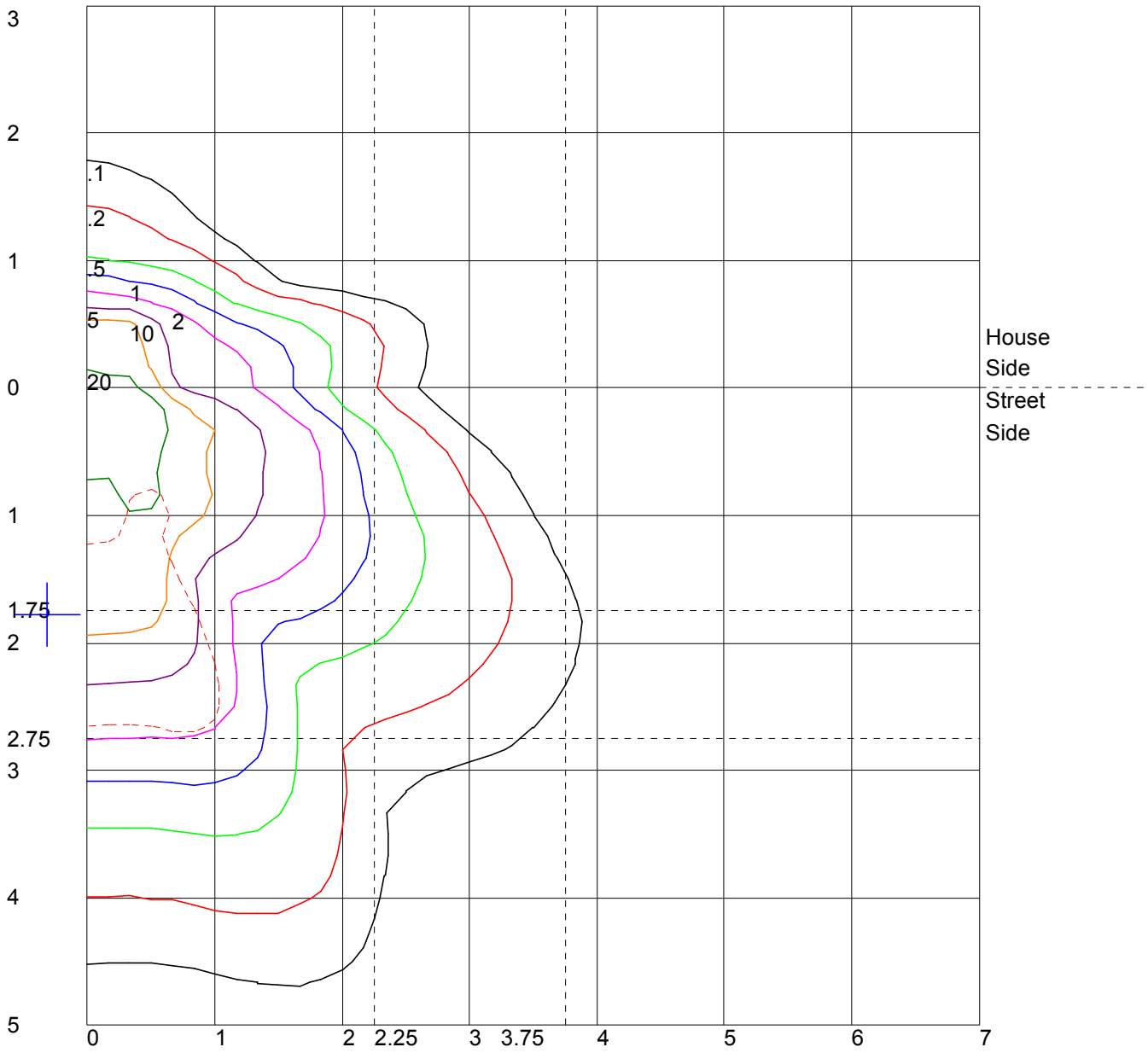
POLAR GRAPH



Maximum Candela = 11354.101 Located At Horizontal Angle = 350, Vertical Angle = 61
1 - Vertical Plane Through Horizontal Angles (350 - 170) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (61) (Through Max. Cd.)

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_3_4K_1_AS_CCB_XX_X-AGI32.IES

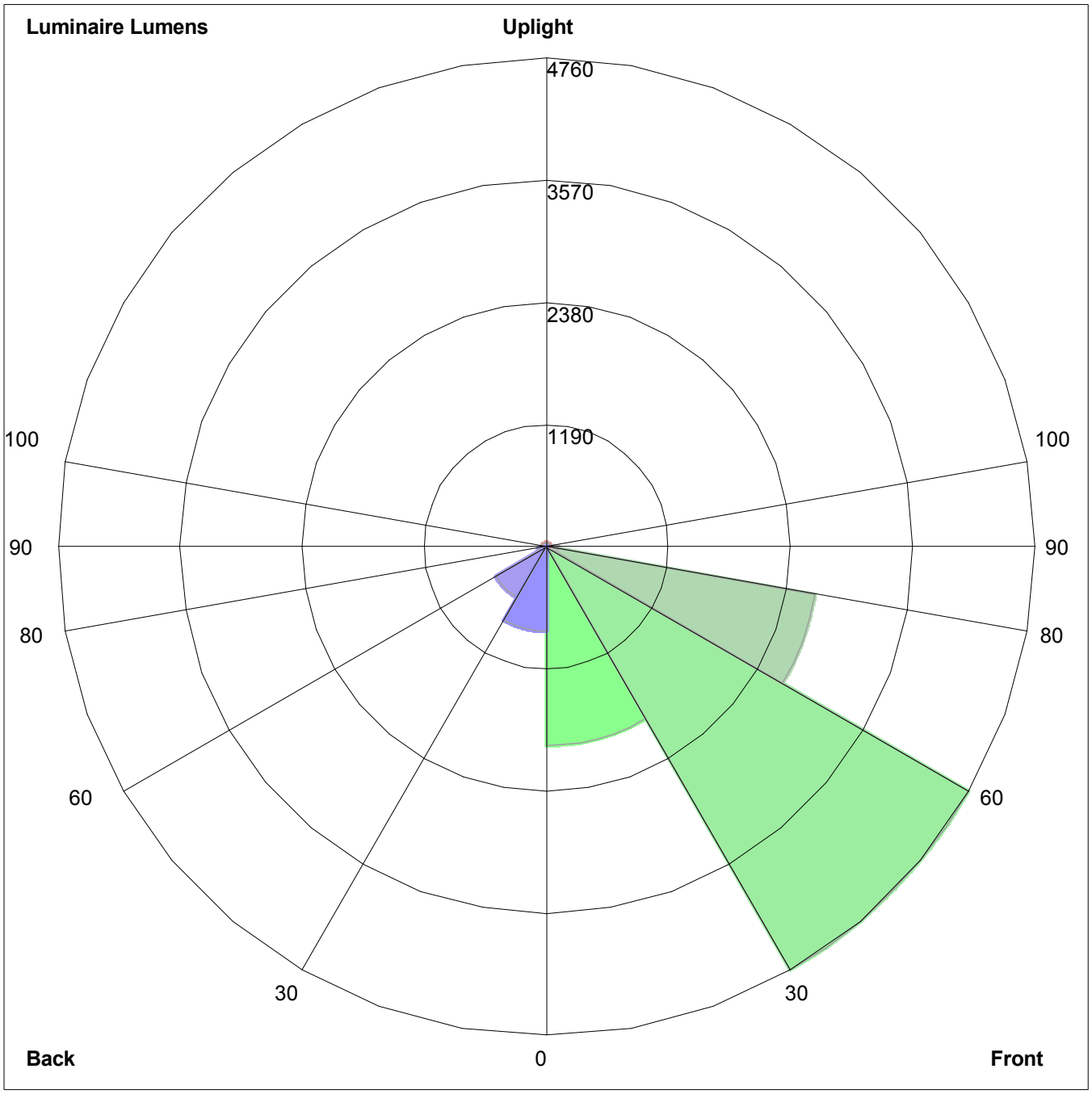
ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height
Values Based On 10 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_3_4K_1_AS_CCB_XX_X-AGI32.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=1936.3, Medium=4760.4, High= 2664.0, Very High=122.8
Back: Low=824.2, Medium=570.7, High=88.6, Very High=5.4
Uplight: Low=10.5, High=36.5

BUG Rating : B2-U2-G2

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] 501954PP2
[TESTLAB] ACUITY BRANDS LIGHTING GRANVILLE LAB
[ISSUEDATE] 8/29/2013
[MANUFAC] Holophane
[LUMCAT] TNLED 6 4K 1 AS CCB XX X
[LUMINAIRE] TunnelPass LED
[LAMPCAT] LED 4000K
[LAMP] 6 LED Array
[BALLAST] 2 X 150W DRIVER, 120V-277V, 1050mA
[_AGI32] File was generated from AGi32

CHARACTERISTICS

IES Classification	Type III
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	21130
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	87
Total Luminaire Watts	243.8
Ballast Factor	1.00
Upward Waste Light Ratio	0.01
Maximum Candela	24379.273
Maximum Candela Angle	355H 61V
Maximum Candela (<90 Degrees Vertical)	24379.273
Maximum Candela Angle (<90 Degrees Vertical)	355H 61V
Maximum Candela At 90 Degrees Vertical	156.929 (0.7% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	2034.27 (9.6% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	3712.0	N.A.	17.6
FM - Front-Medium (30-60)	9142.0	N.A.	43.3
FH - Front-High (60-80)	5023.8	N.A.	23.8
FVH - Front-Very High (80-90)	207.6	N.A.	1.0
BL - Back-Low (0-30)	1545.3	N.A.	7.3
BM - Back-Medium (30-60)	1113.5	N.A.	5.3
BH - Back-High (60-80)	208.0	N.A.	1.0
BVH - Back-Very High (80-90)	18.8	N.A.	0.1
UL - Uplight-Low (90-100)	31.4	N.A.	0.1
UH - Uplight-High (100-180)	127.8	N.A.	0.6
Total	21130.2	N.A.	100.0
BUG Rating	B3-U3-G3		

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	5	10	15	20	25	30	35	40	45
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4732.099	4709.819	4696.258	4719.506	4706.913	4676.884	4667.197	4660.416	4624.574	4618.762
2	5478.967	5452.812	5436.344	5465.405	5414.064	5364.661	5283.290	5237.761	5120.548	5065.332
3	6424.418	6362.422	6336.267	6369.202	6283.957	6205.492	6117.340	6030.157	5866.447	5713.393
4	7108.321	7020.169	7007.576	7040.512	6978.515	6886.488	6792.524	6701.467	6518.382	6372.109
5	7893.936	7796.098	7786.411	7802.878	7681.791	7545.204	7379.557	7255.563	7056.011	6893.269
6	8849.074	8718.300	8686.333	8696.020	8545.871	8340.507	8139.017	7943.340	7626.575	7401.837
7	9436.107	9328.581	9312.113	9315.019	9174.558	9005.035	8846.168	8660.178	8343.413	7998.556
8	9966.954	9866.209	9852.648	9830.368	9663.751	9503.916	9347.955	9197.806	8944.007	8650.491
9	10361.21	510273.06	310318.59	210341.84	110201.38	010088.04	29875.896	9680.219	9409.952	9194.900
10	10472.61	610452.27	310553.98	610609.20	210530.73	810468.74	110348.62	210211.06	79902.051	9621.128
11	10576.26	710592.73	410697.35	410778.72	510716.72	810667.32	410592.73	410576.26	710377.68	310103.541
12	10576.26	710606.29	610697.35	410769.03	810774.85	010778.72	510739.00	810752.57	010615.98	310494.896
13	10537.51	910570.45	410647.95	010716.72	810774.85	010850.40	910869.78	310866.87	710785.50	610774.850
14	10452.27	310508.45	810612.10	810687.66	710755.47	610912.40	510948.24	710977.30	810951.15	310984.089
15	10370.90	210504.58	310628.57	610716.72	810774.85	010905.62	510964.71	511091.61	511075.14	711104.208
16	10237.22	210423.21	210580.14	110680.88	610762.25	710836.84	710879.47	011091.61	511179.76	711156.518
17	10149.07	010358.30	910459.05	410583.04	710661.51	210716.72	810807.78	611039.30	511211.73	411228.202
18	10035.73	210211.06	710335.06	010468.74	110573.36	010677.98	010771.94	410990.87	011185.57	911232.076
19	9875.896	10041.54	410162.63	210286.62	510478.42	810654.73	110733.19	610847.50	311101.30	211110.989
20	9816.806	10002.79	610113.22	810191.69	310325.37	310530.73	810654.73	110683.79	210886.25	110964.715
21	9631.784	9823.587	9934.018	10045.41	910172.31	910354.43	410508.45	810615.98	310674.10	510745.789
22	9474.855	9598.848	9716.061	9830.368	9957.267	10182.00	610416.43	110501.67	710497.80	210497.802
23	9214.274	9272.396	9390.578	9673.438	9836.180	9966.954	10231.40	910377.68	310325.37	310244.002
24	8825.826	8865.542	8944.007	9272.396	9615.316	9842.961	10019.26	410110.32	210184.91	210048.325
25	8598.181	8698.926	8774.485	8937.226	9221.055	9673.438	9902.051	9869.116	10022.17	09892.364
26	8343.413	8451.907	8493.562	8666.959	8985.661	9451.606	9728.654	9699.593	9790.651	9758.684
27	8285.291	8363.756	8347.288	8435.440	8806.452	9269.490	9527.164	9543.632	9563.006	9585.286
28	8128.362	8239.762	8278.510	8402.504	8715.394	9057.345	9324.706	9422.545	9386.703	9350.861
29	7991.775	8115.769	8154.517	8246.543	8705.707	8949.819	9070.907	9383.797	9223.961	9135.810
30	7809.659	7975.307	8041.179	8141.923	8581.713	8897.509	8946.913	9217.180	9077.688	8904.290
31	7678.885	7822.252	7877.468	8066.365	8474.188	8731.862	8901.384	9011.816	9037.971	8676.646
32	7522.924	7616.888	7750.569	8020.836	8343.413	8640.804	8858.761	8846.168	8927.539	8497.436
33	7451.240	7499.675	7645.949	7958.839	8333.726	8559.433	8836.481	8725.081	8712.488	8392.817
34	7303.998	7379.557	7581.046	7926.872	8337.601	8526.497	8825.826	8708.613	8510.029	8359.881
35	7170.317	7245.876	7528.736	7922.997	8337.601	8588.494	8789.984	8741.549	8373.443	8379.255
36	7024.044	7112.195	7532.611	7991.775	8399.598	8692.145	8836.481	8705.707	8321.133	8330.820
37	6890.363	7036.637	7616.888	8141.923	8526.497	8904.290	8982.755	8650.491	8288.197	8259.136
38	6763.463	7000.795	7711.821	8373.443	8822.920	9097.062	9149.371	8663.084	8363.756	8220.388
39	6730.528	7062.792	7884.249	8643.710	9200.713	9377.016	9243.335	8767.704	8383.130	8210.701
40	6753.776	7167.411	8079.927	9035.065	9592.067	9810.994	9350.861	8891.697	8373.443	8168.078
41	6753.776	7225.533	8307.571	9445.794	10100.63	510221.72	29565.912	8989.536	8431.565	7972.401
42	6864.208	7385.369	8588.494	9836.180	10628.57	610642.13	89869.116	9064.126	8562.339	7793.191
43	6870.989	7444.459	8825.826	10296.31	211163.29	911232.07	610267.25	19185.213	8627.242	7652.730
44	6974.640	7600.420	9005.035	10615.98	311698.02	111818.14	010667.32	49393.484	8627.242	7561.672
45	7203.253	7835.814	9236.554	10771.94	412010.91	112343.17	511225.29	69722.842	8559.433	7542.298
46	7392.150	8030.523	9422.545	10908.53	112137.81	112620.22	311641.83	710110.32	28601.087	7587.827
47	7711.821	8354.069	9660.845	10948.24	712131.03	012574.69	511822.01	510400.93	28705.707	7633.356
48	8223.294	8780.297	9918.519	11000.55	711958.60	112281.17	811753.23	710618.88	98851.981	7692.447
49	8861.668	9305.332	10244.00	211130.36	311729.98	811958.60	111603.08	910631.48	28969.193	7796.098
50	9748.997	10120.00	910801.00	511414.19	211648.61	711554.65	411355.10	110534.61	29005.035	7943.340
51	10733.19	611087.74	011655.39	811867.54	411684.45	911261.13	711120.67	610465.83	59005.035	8096.395
52	11805.54	712212.40	112577.60	112505.91	711942.13	311146.83	110872.68	910299.21	89057.345	8262.042

CANDELA TABULATION - (Cont.)

53	13105.54	213473.64	813637.35	813236.31	712287.95	911127.45	710661.51	210100.63	59207.493	8389.911
54	14461.72	214810.45	414796.89	214044.21	212620.22	311091.61	510523.95	79921.425	9360.548	8471.281
55	15895.39	816186.00	815961.27	014915.07	412962.17	511016.05	610370.90	29758.684	9341.174	8500.342
56	17450.16	217652.62	017208.95	515830.49	513334.15	510970.52	710139.38	39594.973	9152.278	8405.410
57	19047.54	819152.16	818454.70	416746.88	513688.70	010902.71	89859.429	9374.110	8832.607	8203.920
58	20576.15	720547.09	619627.79	917636.15	214048.08	710713.82	29510.697	8979.849	8467.407	7867.781
59	21925.55	621720.19	120654.62	118418.86	214347.41	610488.11	59037.971	8445.127	8056.678	7516.143
60	23056.02	922668.54	921419.89	419066.92	214614.77	710286.62	58552.652	7848.407	7581.046	7203.253
61	23636.28	023066.68	421729.87	819360.43	814751.36	310071.57	48077.021	7327.247	7134.475	6916.518
62	23053.12	222417.65	521292.99	519164.76	114729.08	39852.648	7695.353	6902.956	6733.434	6629.783
63	22388.59	421713.41	020683.68	218786.96	814614.77	79644.377	7379.557	6518.382	6375.015	6322.705
64	21540.98	220918.10	820031.74	718418.86	214442.34	89507.790	7053.105	6117.340	5987.535	6000.128
65	20399.85	319819.60	219033.98	617805.67	514145.92	69383.797	6805.117	5753.109	5599.086	5742.454
66	19383.68	718835.40	318187.34	217117.89	813676.10	69207.493	6551.318	5400.502	5270.697	5527.402
67	17815.36	217368.79	117026.84	016250.91	113098.76	18975.974	6281.051	4999.461	4931.652	5240.667
68	15833.40	115634.81	815540.85	415195.02	812479.76	28731.862	6045.657	4696.258	4573.233	4771.816
69	13591.83	013444.58	713724.54	113738.10	311612.77	68366.662	5824.793	4455.051	4198.346	4184.784
70	11417.09	811423.87	911834.60	812225.96	310566.58	07838.720	5524.496	4126.662	3738.213	3578.378
71	9422.545	9503.916	10067.69	10671.19	99474.855	7215.846	5133.141	3659.749	3190.898	3060.123
72	7681.791	7809.659	8448.033	9188.119	8418.972	6584.254	4696.258	3135.682	2620.333	2529.276
73	6163.838	6290.738	6997.889	7789.317	7389.244	5899.383	4237.094	2669.737	2128.234	2082.705
74	4905.497	4996.555	5700.799	6515.476	6378.889	5214.512	3771.149	2290.975	1779.502	1766.909
75	3809.897	3933.891	4595.513	5361.754	5400.502	4523.829	3317.797	1987.772	1545.076	1535.389
76	2937.098	3060.123	3659.749	4299.091	4487.987	3868.988	2875.102	1724.286	1349.399	1290.308
77	2290.975	2402.376	2907.069	3438.885	3670.404	3229.646	2476.966	1509.235	1141.129	1059.758
78	1815.344	1913.182	2330.692	2780.169	2995.220	2724.953	2118.547	1290.308	958.044	879.580
79	1456.925	1528.609	1880.247	2245.447	2464.373	2297.756	1782.408	1082.038	795.303	730.400
80	1167.283	1225.405	1525.702	1822.125	2034.270	1910.276	1495.673	905.734	654.841	609.312
81	935.764	984.199	1215.718	1469.518	1652.602	1577.044	1228.312	752.680	544.409	501.787
82	749.774	795.303	977.418	1170.190	1326.150	1270.934	997.761	625.780	453.352	417.510
83	596.719	635.467	782.710	935.764	1049.102	1013.260	807.896	511.474	374.887	345.826
84	475.632	508.567	622.874	733.306	824.364	798.209	642.248	410.729	309.984	279.954
85	377.793	407.823	492.100	573.470	638.373	618.999	498.880	332.264	247.987	224.738
86	303.203	325.483	391.355	446.571	489.193	475.632	384.574	264.455	202.458	179.209
87	238.300	257.674	303.203	339.045	365.200	348.732	279.954	198.583	153.055	136.587
88	185.990	198.583	231.519	253.799	267.361	257.674	205.364	146.274	117.213	100.745
89	143.368	150.148	176.303	185.990	192.771	182.116	143.368	104.620	84.277	68.778
90	107.526	114.307	126.900	133.681	133.681	123.994	97.839	71.684	59.091	45.529
91	81.371	81.371	91.058	94.933	91.058	81.371	61.997	45.529	35.842	26.155
92	59.091	61.997	61.997	64.903	59.091	52.310	38.748	26.155	19.374	9.687
93	48.435	45.529	45.529	45.529	42.623	32.936	23.249	12.593	9.687	0.000
94	35.842	32.936	32.936	29.061	23.249	19.374	9.687	2.906	0.000	0.000
95	26.155	23.249	19.374	16.468	9.687	6.781	0.000	0.000	0.000	0.000
96	23.249	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000
97	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
98	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
99	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
100	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
101	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
102	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
103	19.374	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
104	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
105	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
106	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
107	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
108	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

109	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
110	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
112	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
113	16.468	12.593	6.781	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	16.468	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
116	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
117	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
118	19.374	16.468	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
119	19.374	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
120	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
121	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
122	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
123	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
124	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
125	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
126	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
127	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
128	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
129	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
130	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
131	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
132	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
133	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
134	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
135	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
136	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
137	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
138	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
139	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
140	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
141	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
142	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
143	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
144	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
145	19.374	12.593	6.781	6.781	0.000	0.000	0.000	0.000	0.000	0.000
146	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
147	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
148	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
149	19.374	12.593	9.687	2.906	2.906	0.000	0.000	0.000	0.000	0.000
150	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
151	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
152	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
153	16.468	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
154	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
155	19.374	16.468	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
156	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
157	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
158	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
159	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
160	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
161	16.468	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
162	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
163	19.374	16.468	9.687	9.687	2.906	0.000	0.000	0.000	0.000	0.000
164	19.374	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

165	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
166	16.468	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
167	19.374	12.593	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
168	19.374	16.468	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
169	19.374	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
170	19.374	12.593	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
171	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
172	19.374	16.468	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000
173	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
174	19.374	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000
175	16.468	12.593	6.781	2.906	0.000	0.000	0.000	0.000	0.000	0.000
176	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
177	19.374	16.468	9.687	6.781	2.906	0.000	0.000	0.000	0.000	0.000
178	19.374	12.593	9.687	2.906	0.000	0.000	0.000	0.000	0.000	0.000
179	19.374	16.468	9.687	9.687	2.906	0.000	0.000	0.000	0.000	0.000
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4585.826	4585.826	4537.391	4520.923	4501.549	4481.206	4471.519	4429.865	4413.397	4383.367
2	4957.807	4908.403	4791.190	4732.099	4667.197	4602.294	4552.890	4475.394	4429.865	4367.868
3	5514.809	5368.535	5137.016	4983.961	4824.126	4700.132	4614.887	4501.549	4429.865	4344.619
4	6114.434	5906.164	5599.086	5332.693	5061.457	4836.719	4671.071	4526.735	4435.677	4325.245
5	6684.999	6437.011	6085.373	5762.796	5390.815	5035.303	4762.129	4540.297	4425.990	4296.184
6	7121.882	6883.582	6548.412	6192.899	5753.109	5296.852	4895.810	4588.732	4458.926	4296.184
7	7620.763	7287.530	6922.330	6593.941	6104.747	5589.399	5091.487	4686.571	4507.361	4299.091
8	8246.543	7789.317	7297.217	6900.050	6427.324	5863.541	5283.290	4781.503	4547.078	4315.558
9	8842.294	8337.601	7711.821	7222.627	6723.747	6169.650	5534.183	4905.497	4628.449	4361.087
10	9295.645	8933.351	8242.668	7633.356	7036.637	6463.166	5756.015	5025.616	4693.351	4399.835
11	9742.216	9386.703	8822.920	8112.862	7363.089	6749.902	5964.286	5123.454	4755.348	4458.926
12	10224.628	9820.681	9318.894	8636.929	7760.256	7007.576	6169.650	5237.761	4833.813	4501.549
13	10671.199	10286.625	9703.468	9116.436	8168.078	7297.217	6401.170	5374.348	4891.935	4501.549
14	10951.153	10654.731	10071.574	9501.010	8526.497	7509.362	6567.786	5469.280	4879.342	4423.084
15	11110.989	10967.621	10446.461	9699.593	8789.984	7656.605	6675.312	5543.870	4869.655	4351.400
16	11137.144	11029.618	10631.482	9816.806	8956.600	7805.785	6773.150	5563.244	4859.968	4322.339
17	11146.831	10970.527	10664.418	9859.429	9031.190	7965.620	6811.898	5521.590	4771.816	4227.407
18	11127.457	10919.186	10606.296	9902.051	8975.974	8008.243	6782.837	5495.435	4638.136	4093.726
19	11084.834	10814.567	10501.677	9918.519	8940.132	7994.681	6730.528	5481.873	4517.048	3953.265
20	10964.715	10683.792	10348.622	9875.896	8882.010	7939.465	6658.844	5423.751	4409.522	3836.052
21	10847.503	10530.738	10169.413	9742.216	8846.168	7812.565	6501.914	5257.135	4249.687	3709.152
22	10719.634	10377.683	10026.045	9618.222	8829.700	7620.763	6283.957	5019.803	4070.477	3542.536
23	10446.461	10201.380	9862.335	9419.639	8646.616	7310.779	5997.222	4791.190	3885.456	3353.639
24	10100.635	10026.045	9677.313	9067.032	8301.759	6978.515	5664.958	4533.516	3712.058	3187.992
25	9780.964	9856.522	9374.110	8708.613	7917.185	6658.844	5387.909	4318.465	3549.317	3033.968
26	9536.851	9520.384	9051.533	8389.911	7578.140	6407.950	5166.077	4074.352	3379.794	2916.756
27	9288.864	9077.688	8731.862	8164.204	7418.305	6274.270	5042.083	3933.891	3252.895	2825.698
28	9054.439	8705.707	8448.033	7984.994	7411.524	6281.051	4951.026	3833.146	3135.682	2715.266
29	8897.509	8471.281	8282.385	7991.775	7502.581	6369.202	4931.652	3692.684	2975.846	2610.646
30	8631.117	8307.571	8210.701	8141.923	7561.672	6394.389	4898.716	3546.411	2789.856	2500.215
31	8392.817	8200.045	8177.765	8184.546	7643.043	6437.011	4856.093	3367.201	2574.805	2323.911
32	8347.288	8223.294	8235.887	8177.765	7610.107	6362.422	4671.071	3119.214	2314.224	2108.860
33	8318.227	8324.039	8242.668	8141.923	7437.679	6127.996	4435.677	2858.634	2070.112	1906.402
34	8324.039	8369.568	8194.233	7962.714	7177.098	5938.131	4220.626	2649.394	1864.747	1731.067
35	8350.194	8359.881	8089.614	7666.292	6962.047	5775.389	4012.355	2474.060	1707.818	1597.386

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CANDELA TABULATION - (Cont.)

36	8327.914	8249.449	7861.969	7353.402	6749.902	5560.338	3839.927	2326.817	1612.885	1512.141
37	8249.449	8011.149	7532.611	7053.105	6486.415	5397.596	3728.526	2223.166	1574.137	1466.612
38	8082.833	7681.791	7186.785	6773.150	6274.270	5270.697	3725.620	2226.073	1557.670	1440.457
39	7864.875	7330.153	6926.205	6534.850	6101.841	5192.232	3751.775	2264.821	1597.386	1450.144
40	7590.733	7017.263	6717.934	6348.860	5977.848	5127.329	3774.055	2321.005	1623.541	1483.080
41	7287.530	6778.963	6525.163	6186.118	5866.447	5051.770	3768.243	2392.689	1688.444	1541.202
42	7108.321	6563.911	6319.799	6078.592	5798.638	4948.120	3771.149	2457.592	1757.222	1603.198
43	7040.512	6450.573	6169.650	5987.535	5619.429	4865.780	3757.587	2483.747	1812.438	1652.602
44	6971.734	6348.860	6097.966	5788.951	5543.870	4836.719	3764.368	2509.902	1870.560	1704.912
45	6932.986	6303.331	5918.757	5664.958	5521.590	4859.968	3783.742	2555.431	1965.492	1772.721
46	6952.360	6251.021	5732.767	5638.803	5570.025	5019.803	3947.452	2708.485	2085.611	1860.873
47	6955.266	6173.525	5726.954	5723.080	5827.699	5292.977	4142.161	2858.634	2161.170	1939.337
48	6984.327	6228.741	5886.790	5911.976	6042.751	5449.906	4198.346	2842.166	2075.924	1919.963
49	7056.011	6434.105	6101.841	6088.279	6075.686	5332.693	4034.635	2656.175	1906.402	1841.499
50	7215.846	6746.995	6391.483	6235.522	5961.380	5142.828	3878.675	2490.528	1795.970	1776.596
51	7466.740	7050.199	6623.002	6163.838	5756.015	5022.709	3695.590	2314.224	1707.818	1714.599
52	7681.791	7268.156	6632.689	5911.976	5491.560	4794.096	3467.946	2177.638	1659.383	1655.508
53	7812.565	7284.624	6430.231	5605.867	5214.512	4514.142	3311.017	2095.298	1619.666	1612.885
54	7819.346	7102.508	6124.121	5352.067	4908.403	4275.842	3203.491	2020.708	1567.357	1567.357
55	7737.976	6818.679	5850.948	5113.767	4635.229	4093.726	3093.059	1936.431	1489.861	1521.828
56	7489.988	6499.008	5645.584	4898.716	4406.616	3933.891	2956.472	1815.344	1404.615	1459.831
57	7177.098	6179.337	5452.812	4722.412	4217.720	3742.088	2796.637	1698.131	1332.931	1388.147
58	6929.111	5935.225	5292.977	4543.203	4031.729	3604.533	2718.172	1681.663	1320.338	1346.493
59	6678.218	5772.483	5168.983	4439.552	3953.265	3621.001	2813.105	1815.344	1414.302	1375.554
60	6437.011	5638.803	5035.303	4425.990	4024.948	3783.742	3024.281	2027.489	1561.544	1450.144
61	6183.212	5478.967	4986.868	4504.455	4204.158	3969.733	3197.679	2151.483	1633.228	1505.360
62	5958.474	5368.535	5048.864	4664.290	4383.367	4048.197	3181.211	2053.644	1531.515	1440.457
63	5736.641	5290.071	5168.983	4758.254	4341.713	3771.149	2786.950	1685.538	1248.654	1228.312
64	5563.244	5309.445	5214.512	4599.388	3914.517	3174.430	2216.386	1261.247	935.764	967.731
65	5459.593	5257.135	4948.120	4152.817	3308.110	2574.805	1766.909	1000.667	740.087	778.835
66	5332.693	4963.619	4409.522	3568.691	2695.892	2043.957	1427.864	814.677	618.999	651.935
67	4986.868	4416.303	3806.991	3044.624	2239.634	1698.131	1192.470	687.777	534.722	557.002
68	4455.051	3852.520	3357.514	2711.391	1975.179	1505.360	1059.758	613.187	475.632	485.319
69	3898.049	3389.481	2992.314	2441.124	1795.970	1342.618	941.576	557.002	427.197	436.884
70	3419.511	2985.533	2660.050	2199.918	1633.228	1192.470	834.051	495.006	377.793	387.480
71	3011.688	2627.114	2350.066	2013.927	1483.080	1059.758	733.306	433.009	325.483	339.045
72	2617.427	2314.224	2079.799	1822.125	1323.244	922.202	632.561	371.981	283.829	289.641
73	2223.166	2043.957	1851.186	1629.353	1170.190	795.303	551.190	322.577	244.112	253.799
74	1922.869	1779.502	1609.979	1440.457	1010.354	684.871	475.632	283.829	215.051	221.832
75	1612.885	1480.174	1372.648	1254.466	876.673	596.719	410.729	247.987	185.990	192.771
76	1326.150	1232.186	1160.503	1095.600	778.835	521.161	355.513	215.051	159.835	162.742
77	1101.412	1039.415	1007.448	971.606	694.558	456.258	303.203	182.116	136.587	140.461
78	931.889	902.828	883.454	854.393	609.312	391.355	257.674	156.929	114.307	114.307
79	782.710	775.929	769.148	749.774	530.848	336.139	215.051	130.774	97.839	94.933
80	661.622	661.622	651.935	654.841	469.819	286.735	182.116	110.432	81.371	78.465
81	544.409	554.096	551.190	547.315	403.948	247.987	150.148	91.058	64.903	61.997
82	446.571	449.477	459.164	459.164	339.045	205.364	120.119	68.778	48.435	45.529
83	361.325	361.325	371.981	374.887	283.829	166.616	94.933	55.216	35.842	32.936
84	293.516	293.516	300.297	300.297	228.613	130.774	71.684	38.748	26.155	23.249
85	234.425	234.425	238.300	238.300	179.209	100.745	52.310	26.155	12.593	9.687
86	185.990	188.896	185.990	188.896	143.368	78.465	38.748	16.468	6.781	6.781
87	143.368	140.461	136.587	140.461	107.526	55.216	23.249	2.906	0.000	0.000
88	107.526	97.839	97.839	94.933	71.684	35.842	9.687	0.000	0.000	0.000
89	74.590	68.778	64.903	59.091	42.623	16.468	2.906	0.000	0.000	0.000
90	45.529	42.623	35.842	29.061	16.468	0.000	0.000	0.000	0.000	0.000
91	26.155	19.374	12.593	6.781	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

92	9.687	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	100	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4377.555	4347.526	4318.465	4315.558	4305.871	4289.404	4275.842	4279.717	4246.781	4272.936
2	4332.026	4263.249	4201.252	4152.817	4093.726	4041.416	3960.046	3917.423	3819.584	3806.991
3	4279.717	4178.003	4057.884	3943.578	3804.085	3680.091	3549.317	3487.320	3432.104	3432.104
4	4230.313	4064.665	3871.894	3685.903	3527.037	3444.697	3415.636	3435.010	3470.852	3510.569
5	4155.723	3930.985	3680.091	3500.882	3448.572	3467.946	3520.256	3582.253	3653.936	3653.936
6	4084.039	3783.742	3549.317	3470.852	3520.256	3585.159	3634.562	3637.468	3582.253	3542.536
7	4024.948	3680.091	3529.943	3552.223	3640.375	3659.749	3565.785	3523.162	3546.411	3614.220
8	3960.046	3618.094	3594.846	3663.623	3702.371	3585.159	3520.256	3601.627	3774.055	3933.891
9	3930.985	3644.249	3712.058	3787.617	3653.936	3559.004	3659.749	3862.207	4015.261	3998.794
10	3927.110	3744.994	3849.614	3793.429	3623.907	3689.778	3914.517	4034.635	3976.513	3898.049
11	3911.611	3813.772	3904.830	3735.307	3721.745	3921.298	4093.726	4019.136	3989.107	4074.352
12	3927.110	3871.894	3833.146	3663.623	3855.426	4103.413	4054.978	4051.103	4162.504	4103.413
13	3917.423	3895.143	3715.933	3670.404	3983.294	4067.571	4057.884	4198.346	4139.255	4034.635
14	3921.298	3911.611	3656.842	3783.742	4051.103	4009.449	4184.784	4175.097	4126.662	4116.975
15	3936.797	3927.110	3659.749	3911.611	4012.355	4106.319	4208.033	4158.629	4198.346	4122.787
16	3933.891	3898.049	3715.933	3947.452	3921.298	4168.316	4165.410	4217.720	4181.878	4034.635
17	3911.611	3787.617	3761.462	3914.517	3898.049	4081.133	4201.252	4175.097	4074.352	4015.261
18	3862.207	3676.216	3764.368	3833.146	3895.143	3998.794	4165.410	4054.978	3995.887	3989.107

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CANDELA TABULATION - (Cont.)

19	3790.523	3582.253	3728.526	3721.745	3839.927	3979.420	4067.571	3950.359	3957.139	3957.139
20	3666.529	3461.165	3644.249	3623.907	3742.088	3911.611	3947.452	3933.891	3930.985	3859.301
21	3516.381	3314.891	3470.852	3480.539	3630.688	3787.617	3829.271	3921.298	3829.271	3819.584
22	3311.017	3152.150	3281.956	3259.675	3487.320	3594.846	3747.900	3813.772	3702.371	3917.423
23	3090.153	3008.782	3102.746	3073.685	3281.956	3412.730	3650.062	3630.688	3673.310	3989.107
24	2940.004	2897.382	2916.756	2952.598	3044.624	3259.675	3503.788	3484.414	3689.778	3881.581
25	2822.792	2835.385	2773.388	2829.573	2829.573	3105.652	3298.423	3399.168	3614.220	3871.894
26	2701.704	2777.263	2660.050	2711.391	2653.269	2942.911	3069.810	3373.013	3516.381	3995.887
27	2669.737	2731.734	2588.366	2584.492	2516.683	2747.233	2916.756	3239.333	3556.098	3953.265
28	2630.020	2689.111	2545.744	2460.498	2408.188	2532.182	2818.917	3044.624	3611.314	3836.052
29	2526.370	2562.211	2486.653	2388.814	2350.066	2352.972	2695.892	2952.598	3506.694	3836.052
30	2376.221	2402.376	2350.066	2300.662	2323.911	2261.914	2562.211	2901.256	3363.326	3793.429
31	2183.450	2223.166	2219.292	2193.137	2242.540	2228.979	2454.686	2773.388	3262.582	3494.101
32	2004.240	2030.395	2092.392	2079.799	2082.705	2219.292	2392.689	2613.553	3080.466	3135.682
33	1854.092	1851.186	1936.431	1951.930	1942.243	2161.170	2343.285	2486.653	2767.576	2861.540
34	1736.879	1714.599	1776.596	1822.125	1808.563	2066.237	2275.476	2366.534	2500.215	2552.524
35	1626.447	1600.292	1639.040	1710.724	1698.131	1955.805	2164.076	2202.824	2252.227	2245.447
36	1561.544	1509.235	1499.548	1603.198	1587.699	1828.906	2004.240	2073.018	1991.647	1936.431
37	1505.360	1466.612	1418.177	1483.080	1485.986	1681.663	1838.593	1926.744	1746.566	1547.983
38	1440.457	1414.302	1342.618	1392.022	1408.490	1561.544	1642.915	1740.754	1547.983	1114.974
39	1404.615	1339.712	1287.402	1316.463	1342.618	1476.299	1454.019	1499.548	1316.463	831.145
40	1394.928	1316.463	1254.466	1241.873	1299.995	1404.615	1316.463	1268.028	1036.509	700.370
41	1421.083	1303.870	1244.779	1182.783	1232.186	1323.244	1215.718	1079.132	769.148	618.999
42	1483.080	1323.244	1251.560	1153.722	1156.628	1212.812	1095.600	909.609	613.187	544.409
43	1521.828	1361.992	1261.247	1131.442	1101.412	1075.257	955.138	736.212	527.941	475.632
44	1564.450	1388.147	1280.621	1111.099	1069.445	984.199	821.458	589.938	465.945	417.510
45	1623.541	1423.989	1284.496	1101.412	1013.260	905.734	710.057	511.474	420.416	368.106
46	1671.976	1454.019	1277.715	1088.819	951.263	828.238	609.312	465.945	381.668	325.483
47	1731.067	1512.141	1287.402	1059.758	876.673	740.087	537.628	427.197	348.732	293.516
48	1763.034	1547.983	1316.463	1020.041	795.303	658.716	469.819	381.668	312.890	260.580
49	1714.599	1538.296	1320.338	977.418	723.619	587.032	430.103	348.732	286.735	241.206
50	1649.696	1466.612	1299.995	919.296	661.622	521.161	394.261	322.577	260.580	224.738
51	1612.885	1408.490	1244.779	860.206	599.625	465.945	365.200	293.516	238.300	208.270
52	1580.918	1382.335	1199.251	792.397	547.315	423.322	336.139	270.267	217.957	195.677
53	1571.231	1359.086	1167.283	730.400	501.787	387.480	312.890	247.987	205.364	185.990
54	1561.544	1342.618	1137.254	678.090	459.164	355.513	283.829	228.613	192.771	179.209
55	1547.983	1323.244	1098.506	618.999	413.635	329.358	260.580	208.270	182.116	172.429
56	1509.235	1294.183	1046.196	557.002	374.887	303.203	241.206	195.677	172.429	166.616
57	1450.144	1251.560	990.980	498.880	341.951	279.954	221.832	182.116	162.742	162.742
58	1404.615	1212.812	919.296	453.352	315.796	257.674	202.458	172.429	156.929	156.929
59	1392.022	1186.657	860.206	410.729	289.641	238.300	185.990	159.835	150.148	150.148
60	1427.864	1203.125	831.145	374.887	270.267	217.957	176.303	153.055	146.274	146.274
61	1459.831	1228.312	818.551	361.325	250.893	202.458	162.742	143.368	140.461	143.368
62	1414.302	1206.031	775.929	345.826	231.519	188.896	153.055	140.461	136.587	140.461
63	1261.247	1105.287	687.777	312.890	215.051	172.429	143.368	133.681	133.681	136.587
64	1033.603	935.764	573.470	270.267	195.677	159.835	133.681	126.900	126.900	130.774
65	854.393	782.710	469.819	234.425	179.209	146.274	126.900	120.119	120.119	126.900
66	733.306	680.996	397.167	205.364	162.742	136.587	117.213	114.307	114.307	117.213
67	632.561	596.719	332.264	182.116	143.368	123.994	110.432	107.526	107.526	114.307
68	551.190	525.035	283.829	162.742	133.681	114.307	104.620	100.745	100.745	107.526
69	485.319	465.945	241.206	146.274	120.119	104.620	94.933	94.933	94.933	100.745
70	427.197	410.729	212.145	133.681	107.526	97.839	88.152	88.152	91.058	94.933
71	368.106	358.419	185.990	120.119	104.620	91.058	84.277	84.277	84.277	91.058
72	315.796	309.984	162.742	107.526	91.058	81.371	78.465	78.465	81.371	84.277
73	274.142	264.455	140.461	97.839	84.277	74.590	71.684	71.684	74.590	78.465
74	238.300	228.613	123.994	91.058	74.590	71.684	64.903	68.778	71.684	74.590

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CANDELA TABULATION - (Cont.)

75	205.364	195.677	107.526	78.465	68.778	61.997	59.091	61.997	64.903	68.778
76	176.303	162.742	91.058	68.778	59.091	52.310	52.310	55.216	59.091	61.997
77	150.148	136.587	74.590	59.091	48.435	45.529	45.529	45.529	52.310	55.216
78	126.900	114.307	61.997	48.435	42.623	38.748	35.842	38.748	42.623	48.435
79	104.620	91.058	52.310	42.623	35.842	32.936	29.061	32.936	35.842	38.748
80	84.277	74.590	45.529	35.842	32.936	29.061	29.061	29.061	32.936	35.842
81	64.903	55.216	32.936	26.155	23.249	23.249	19.374	23.249	26.155	29.061
82	52.310	42.623	23.249	16.468	16.468	12.593	12.593	16.468	19.374	23.249
83	35.842	29.061	12.593	9.687	6.781	6.781	6.781	9.687	12.593	16.468
84	23.249	16.468	6.781	2.906	0.000	0.000	0.000	2.906	6.781	9.687
85	9.687	6.781	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.906
86	2.906	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
89	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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CANDELA TABULATION - (Cont.)

131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	150	**155**	**160**	**165**	**170**	**175**	**180**	**185**	**190**	**195**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4246.781	4256.468	4227.407	4237.094	4224.501	4227.407	4210.939	4230.313	4227.407	4227.407

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CANDELA TABULATION - (Cont.)

2	3728.526	3715.933	3663.623	3650.062	3647.155	3634.562	3637.468	3634.562	3640.375	3656.842
3	3435.010	3444.697	3441.791	3448.572	3461.165	3461.165	3474.727	3474.727	3470.852	3480.539
4	3582.253	3614.220	3630.688	3621.001	3611.314	3588.065	3588.065	3591.940	3585.159	3604.533
5	3647.155	3621.001	3568.691	3520.256	3477.633	3438.885	3425.323	3412.730	3405.949	3438.885
6	3542.536	3546.411	3568.691	3578.378	3585.159	3585.159	3591.940	3575.472	3549.317	3542.536
7	3738.213	3833.146	3924.204	3947.452	3940.672	3933.891	3933.891	3914.517	3878.675	3891.268
8	4038.510	4002.668	3960.046	3904.830	3859.301	3836.052	3819.584	3797.304	3757.587	3777.930
9	3950.359	3865.113	3868.988	3898.049	3914.517	3940.672	3940.672	3911.611	3849.614	3836.052
10	3953.265	3992.981	3989.107	3947.452	3891.268	3888.362	3885.456	3888.362	3891.268	3927.110
11	4100.507	3995.887	3852.520	3768.243	3738.213	3783.742	3797.304	3800.210	3774.055	3780.836
12	3986.200	3911.611	3878.675	3839.927	3797.304	3804.085	3806.991	3800.210	3819.584	3826.365
13	4045.291	3989.107	3878.675	3761.462	3666.529	3634.562	3640.375	3659.749	3685.903	3699.465
14	4067.571	3911.611	3780.836	3685.903	3601.627	3582.253	3591.940	3608.407	3614.220	3594.846
15	3914.517	3839.927	3742.088	3666.529	3608.407	3621.001	3634.562	3640.375	3627.781	3614.220
16	3862.207	3809.897	3771.149	3702.371	3614.220	3594.846	3604.533	3608.407	3604.533	3644.249
17	3888.362	3855.426	3764.368	3640.375	3503.788	3491.195	3523.162	3491.195	3474.727	3552.223
18	3907.736	3806.991	3670.404	3591.940	3497.007	3510.569	3542.536	3491.195	3484.414	3546.411
19	3809.897	3764.368	3725.620	3666.529	3611.314	3601.627	3623.907	3591.940	3591.940	3623.907
20	3774.055	3862.207	3891.268	3747.900	3608.407	3546.411	3539.630	3556.098	3598.720	3640.375
21	3859.301	3976.513	3885.456	3728.526	3637.468	3640.375	3630.688	3666.529	3634.562	3591.940
22	3960.046	3957.139	3943.578	3900.955	3836.052	3780.836	3771.149	3823.459	3793.429	3764.368
23	3933.891	4090.820	4142.161	3976.513	3738.213	3585.159	3562.879	3644.249	3656.842	3754.681
24	4028.823	4266.155	4045.291	3790.523	3653.936	3608.407	3630.688	3699.465	3594.846	3637.468
25	4142.161	4122.787	3940.672	3947.452	3930.985	3855.426	3845.739	3904.830	3826.365	3842.833
26	4051.103	4054.978	4165.410	4142.161	3849.614	3623.907	3630.688	3699.465	3738.213	3950.359
27	3972.639	4213.845	4158.629	3855.426	3630.688	3529.943	3565.785	3591.940	3582.253	3757.587
28	4074.352	4081.133	3898.049	3804.085	3702.371	3647.155	3647.155	3673.310	3663.623	3793.429
29	3950.359	3809.897	3878.675	3797.304	3621.001	3405.949	3327.484	3370.107	3520.256	3816.678
30	3604.533	3735.307	3764.368	3467.946	3226.740	3093.059	3037.843	3080.466	3155.056	3448.572
31	3408.855	3546.411	3405.949	3155.056	2916.756	2662.956	2555.431	2610.646	2777.263	3076.591
32	3217.053	3193.804	3076.591	2653.269	2111.766	1793.064	1704.912	1766.909	1987.772	2424.656
33	2920.630	2880.914	2428.531	1750.441	1469.518	1365.867	1352.305	1356.180	1423.989	1639.040
34	2603.866	2307.443	1597.386	1330.025	1235.092	1167.283	1160.503	1176.970	1222.499	1290.308
35	2193.137	1554.763	1222.499	1095.600	987.105	948.357	945.451	958.044	1000.667	1082.038
36	1541.202	1111.099	993.886	864.080	824.364	821.458	821.458	818.551	824.364	860.206
37	1062.664	915.421	785.616	730.400	723.619	726.525	730.400	723.619	723.619	723.619
38	834.051	742.993	661.622	638.373	645.154	649.029	651.935	649.029	642.248	632.561
39	700.370	613.187	580.251	570.564	577.345	583.157	583.157	583.157	573.470	563.783
40	589.938	530.848	518.254	511.474	515.348	511.474	515.348	511.474	511.474	505.661
41	508.567	472.726	459.164	453.352	446.571	439.790	439.790	439.790	443.665	443.665
42	449.477	423.322	410.729	397.167	387.480	381.668	381.668	381.668	384.574	387.480
43	403.948	381.668	365.200	348.732	341.951	332.264	332.264	336.139	339.045	339.045
44	368.106	341.951	325.483	309.984	303.203	300.297	296.422	300.297	303.203	306.109
45	336.139	309.984	289.641	277.048	274.142	270.267	270.267	274.142	277.048	279.954
46	300.297	277.048	264.455	257.674	253.799	250.893	250.893	253.799	257.674	257.674
47	270.267	253.799	244.112	238.300	238.300	238.300	241.206	241.206	241.206	244.112
48	241.206	231.519	224.738	221.832	228.613	228.613	228.613	228.613	231.519	231.519
49	217.957	217.957	215.051	215.051	217.957	217.957	221.832	221.832	224.738	221.832
50	205.364	205.364	205.364	205.364	212.145	215.051	217.957	217.957	221.832	217.957
51	192.771	195.677	198.583	202.458	208.270	212.145	215.051	215.051	215.051	215.051
52	185.990	185.990	192.771	198.583	202.458	208.270	212.145	212.145	212.145	212.145
53	179.209	179.209	188.896	192.771	198.583	205.364	208.270	208.270	208.270	208.270
54	172.429	176.303	185.990	188.896	195.677	202.458	208.270	205.364	208.270	205.364
55	166.616	172.429	182.116	185.990	192.771	198.583	202.458	202.458	205.364	202.458
56	162.742	166.616	176.303	182.116	185.990	195.677	195.677	195.677	195.677	195.677
57	159.835	166.616	169.522	176.303	182.116	188.896	188.896	188.896	192.771	188.896

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CANDELA TABULATION - (Cont.)

58	156.929	159.835	162.742	172.429	176.303	182.116	182.116	182.116	185.990	185.990
59	153.055	156.929	159.835	166.616	169.522	176.303	176.303	176.303	179.209	182.116
60	146.274	153.055	153.055	159.835	162.742	169.522	172.429	172.429	176.303	176.303
61	143.368	150.148	150.148	156.929	159.835	162.742	166.616	166.616	169.522	169.522
62	143.368	146.274	150.148	153.055	156.929	159.835	162.742	162.742	169.522	169.522
63	140.461	143.368	143.368	146.274	153.055	156.929	159.835	159.835	162.742	166.616
64	133.681	136.587	140.461	143.368	150.148	153.055	156.929	156.929	159.835	159.835
65	130.774	133.681	136.587	140.461	146.274	150.148	150.148	150.148	153.055	156.929
66	123.994	126.900	130.774	133.681	140.461	143.368	146.274	150.148	153.055	153.055
67	117.213	120.119	123.994	130.774	136.587	143.368	143.368	143.368	150.148	150.148
68	110.432	117.213	120.119	126.900	133.681	140.461	143.368	143.368	146.274	143.368
69	104.620	110.432	117.213	123.994	130.774	136.587	143.368	143.368	143.368	140.461
70	97.839	104.620	110.432	117.213	126.900	133.681	140.461	143.368	140.461	136.587
71	94.933	100.745	107.526	117.213	126.900	136.587	143.368	143.368	140.461	136.587
72	88.152	94.933	104.620	110.432	123.994	130.774	140.461	140.461	136.587	130.774
73	81.371	88.152	97.839	104.620	117.213	126.900	133.681	136.587	130.774	123.994
74	78.465	84.277	91.058	100.745	114.307	123.994	130.774	130.774	130.774	123.994
75	71.684	78.465	84.277	94.933	107.526	114.307	120.119	120.119	120.119	114.307
76	64.903	68.778	78.465	88.152	97.839	104.620	114.307	114.307	110.432	107.526
77	59.091	64.903	71.684	81.371	91.058	97.839	100.745	100.745	104.620	100.745
78	52.310	55.216	64.903	71.684	81.371	84.277	91.058	91.058	94.933	91.058
79	45.529	52.310	55.216	61.997	71.684	74.590	81.371	81.371	84.277	81.371
80	38.748	45.529	52.310	59.091	64.903	68.778	71.684	71.684	74.590	74.590
81	32.936	35.842	42.623	48.435	55.216	59.091	61.997	64.903	64.903	64.903
82	26.155	29.061	35.842	38.748	45.529	48.435	52.310	52.310	55.216	55.216
83	19.374	23.249	29.061	32.936	35.842	38.748	45.529	42.623	48.435	48.435
84	12.593	16.468	23.249	26.155	32.936	32.936	35.842	38.748	42.623	42.623
85	6.781	12.593	16.468	19.374	23.249	26.155	29.061	32.936	35.842	35.842
86	2.906	9.687	12.593	16.468	19.374	23.249	26.155	29.061	32.936	32.936
87	0.000	2.906	6.781	9.687	12.593	16.468	19.374	23.249	26.155	26.155
88	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468	23.249	23.249
89	0.000	0.000	0.000	2.906	6.781	9.687	9.687	16.468	19.374	19.374
90	0.000	0.000	0.000	0.000	2.906	6.781	6.781	9.687	16.468	16.468
91	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593
92	0.000	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593
93	0.000	0.000	0.000	0.000	0.000	2.906	6.781	6.781	12.593	12.593
94	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.781	9.687	9.687
96	0.000	0.000	0.000	0.000	0.000	0.000	6.781	9.687	9.687	12.593
97	0.000	0.000	0.000	0.000	0.000	0.000	6.781	6.781	12.593	12.593
98	0.000	0.000	0.000	0.000	0.000	0.000	2.906	9.687	9.687	12.593
99	0.000	0.000	0.000	0.000	0.000	2.906	2.906	9.687	12.593	12.593
100	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593
101	0.000	0.000	0.000	0.000	0.000	2.906	6.781	6.781	12.593	16.468
102	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
103	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
104	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
105	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468
106	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468
107	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
108	0.000	0.000	0.000	0.000	2.906	2.906	6.781	12.593	16.468	16.468
109	0.000	0.000	0.000	0.000	0.000	2.906	6.781	12.593	12.593	16.468
110	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
111	0.000	0.000	0.000	0.000	2.906	6.781	12.593	12.593	16.468	19.374
112	0.000	0.000	0.000	0.000	2.906	9.687	9.687	12.593	16.468	19.374
113	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	16.468	16.468

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CANDELA TABULATION - (Cont.)

114	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
115	0.000	0.000	0.000	0.000	2.906	6.781	12.593	12.593	19.374	19.374
116	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468	19.374
117	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	16.468	16.468
118	0.000	0.000	0.000	2.906	6.781	6.781	12.593	12.593	19.374	19.374
119	0.000	0.000	0.000	2.906	6.781	6.781	9.687	12.593	16.468	19.374
120	0.000	0.000	0.000	0.000	2.906	2.906	9.687	12.593	16.468	16.468
121	0.000	0.000	0.000	0.000	2.906	2.906	9.687	12.593	16.468	16.468
122	0.000	0.000	0.000	0.000	2.906	6.781	9.687	9.687	12.593	16.468
123	0.000	0.000	0.000	0.000	2.906	2.906	9.687	12.593	12.593	16.468
124	0.000	0.000	0.000	2.906	6.781	6.781	12.593	16.468	19.374	19.374
125	0.000	0.000	0.000	0.000	2.906	6.781	9.687	9.687	16.468	16.468
126	0.000	0.000	0.000	2.906	6.781	6.781	12.593	16.468	19.374	19.374
127	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
128	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
129	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
130	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
131	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468	16.468
132	0.000	0.000	0.000	0.000	6.781	6.781	9.687	12.593	16.468	16.468
133	0.000	0.000	0.000	2.906	6.781	6.781	9.687	12.593	16.468	16.468
134	0.000	0.000	0.000	2.906	6.781	9.687	9.687	12.593	16.468	19.374
135	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468	19.374
136	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593	16.468	19.374
137	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468	19.374
138	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593	19.374	19.374
139	0.000	0.000	0.000	2.906	6.781	9.687	12.593	12.593	19.374	19.374
140	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	19.374	19.374
141	0.000	0.000	0.000	2.906	9.687	9.687	12.593	16.468	19.374	19.374
142	0.000	0.000	0.000	2.906	9.687	9.687	12.593	19.374	19.374	23.249
143	0.000	0.000	0.000	2.906	9.687	9.687	12.593	16.468	23.249	23.249
144	0.000	0.000	0.000	2.906	9.687	9.687	12.593	16.468	19.374	23.249
145	0.000	0.000	2.906	6.781	9.687	12.593	12.593	16.468	23.249	23.249
146	0.000	0.000	0.000	6.781	6.781	9.687	16.468	16.468	19.374	23.249
147	0.000	0.000	0.000	2.906	6.781	12.593	16.468	16.468	23.249	19.374
148	0.000	0.000	2.906	2.906	6.781	12.593	16.468	16.468	23.249	23.249
149	0.000	0.000	2.906	2.906	9.687	9.687	12.593	16.468	19.374	23.249
150	0.000	0.000	0.000	2.906	9.687	9.687	12.593	16.468	19.374	23.249
151	0.000	0.000	0.000	0.000	6.781	6.781	9.687	12.593	16.468	19.374
152	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	16.468
153	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468	19.374	19.374
154	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468	19.374	19.374
155	0.000	0.000	0.000	0.000	6.781	9.687	12.593	16.468	19.374	19.374
156	0.000	0.000	0.000	2.906	6.781	6.781	12.593	12.593	19.374	19.374
157	0.000	0.000	0.000	0.000	2.906	6.781	6.781	9.687	12.593	16.468
158	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	16.468	16.468
159	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468
160	0.000	0.000	0.000	2.906	6.781	6.781	9.687	12.593	16.468	16.468
161	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593	16.468
162	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	12.593
163	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593	16.468	16.468
164	0.000	0.000	0.000	0.000	2.906	0.000	6.781	9.687	12.593	12.593
165	0.000	0.000	0.000	0.000	0.000	0.000	6.781	6.781	9.687	12.593
166	0.000	0.000	0.000	0.000	0.000	0.000	6.781	6.781	12.593	12.593
167	0.000	0.000	0.000	0.000	0.000	2.906	2.906	6.781	12.593	12.593
168	0.000	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593
169	0.000	0.000	0.000	0.000	0.000	0.000	6.781	6.781	9.687	12.593

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CANDELA TABULATION - (Cont.)

170	0.000	0.000	0.000	0.000	0.000	0.000	6.781	6.781	9.687	12.593
171	0.000	0.000	0.000	0.000	0.000	2.906	6.781	6.781	12.593	12.593
172	0.000	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593
173	0.000	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593
174	0.000	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687	12.593
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687
176	0.000	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593
177	0.000	0.000	0.000	0.000	0.000	2.906	6.781	6.781	9.687	12.593
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.906	6.781	9.687
179	0.000	0.000	0.000	0.000	0.000	2.906	2.906	6.781	9.687	12.593
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	200	**205**	**210**	**215**	**220**	**225**	**230**	**235**	**240**	**245**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4230.313	4217.720	4240.000	4237.094	4256.468	4256.468	4282.623	4289.404	4305.871	4322.339
2	3682.997	3685.903	3744.994	3771.149	3845.739	3885.456	3979.420	4045.291	4119.881	4188.659
3	3484.414	3477.633	3477.633	3477.633	3491.195	3506.694	3572.566	3637.468	3744.994	3898.049
4	3614.220	3594.846	3575.472	3542.536	3480.539	3438.885	3405.949	3408.855	3465.040	3585.159
5	3474.727	3497.007	3520.256	3559.004	3578.378	3572.566	3520.256	3448.572	3415.636	3448.572
6	3506.694	3448.572	3389.481	3396.262	3425.323	3480.539	3565.785	3601.627	3539.630	3494.101
7	3845.739	3768.243	3640.375	3556.098	3435.010	3405.949	3477.633	3598.720	3699.465	3644.249
8	3804.085	3849.614	3895.143	3885.456	3735.307	3604.533	3529.943	3549.317	3695.590	3790.523
9	3790.523	3793.429	3806.991	3871.894	3927.110	3907.736	3768.243	3653.936	3676.216	3852.520
10	3921.298	3927.110	3891.268	3842.833	3845.739	3969.733	4041.416	3900.955	3793.429	3878.675
11	3777.930	3842.833	3924.204	3947.452	3914.517	3979.420	4148.942	4204.158	4067.571	3979.420
12	3783.742	3783.742	3793.429	3895.143	4051.103	4126.662	4230.313	4370.774	4347.526	4175.097
13	3721.745	3800.210	3833.146	3895.143	4031.729	4237.094	4361.087	4432.771	4569.358	4380.461
14	3598.720	3712.058	3855.426	3972.639	4081.133	4237.094	4468.613	4511.236	4647.823	4588.732
15	3601.627	3699.465	3819.584	3957.139	4191.565	4341.713	4468.613	4611.981	4660.416	4700.132
16	3663.623	3738.213	3839.927	3976.513	4230.313	4403.710	4458.926	4624.574	4671.071	4624.574
17	3621.001	3768.243	3940.672	4090.820	4246.781	4367.868	4442.458	4507.361	4592.607	4468.613
18	3527.037	3718.839	4022.042	4240.000	4279.717	4296.184	4347.526	4403.710	4487.987	4305.871
19	3568.691	3747.900	4019.136	4279.717	4341.713	4243.875	4220.626	4272.936	4358.181	4113.100
20	3663.623	3888.362	4103.413	4237.094	4361.087	4237.094	4045.291	4070.477	4165.410	3888.362
21	3650.062	3966.826	4253.562	4292.310	4279.717	4191.565	3878.675	3806.991	3914.517	3670.404
22	3780.836	3992.981	4299.091	4419.209	4230.313	4034.635	3764.368	3611.314	3630.688	3461.165
23	3940.672	4191.565	4341.713	4390.148	4263.249	3875.769	3637.468	3448.572	3343.952	3279.049
24	3885.456	4275.842	4507.361	4322.339	4263.249	3842.833	3474.727	3275.175	3112.433	3102.746
25	3917.423	4155.723	4514.142	4396.929	4146.036	3813.772	3295.517	3128.901	2910.943	2930.317
26	4181.878	4256.468	4296.184	4399.835	4086.945	3699.465	3187.992	2959.378	2751.108	2744.327
27	4168.316	4416.303	4275.842	4129.568	4012.355	3516.381	3122.120	2777.263	2594.179	2552.524
28	4024.948	4263.249	4344.619	3936.797	3793.429	3389.481	3002.001	2620.333	2476.966	2428.531
29	4064.665	4142.161	4146.036	3868.988	3467.946	3219.959	2825.698	2532.182	2379.127	2323.911
30	3852.520	4077.258	3888.362	3673.310	3291.643	2966.159	2662.956	2431.437	2268.695	2209.605
31	3382.700	3656.842	3728.526	3389.481	3105.652	2724.953	2552.524	2356.847	2164.076	2118.547
32	2880.914	3135.682	3350.733	3157.962	2792.762	2607.740	2395.595	2300.662	2085.611	2004.240
33	2170.857	2594.179	2835.385	2829.573	2574.805	2450.811	2281.288	2239.634	2008.115	1887.028
34	1518.922	1919.963	2333.598	2352.972	2352.972	2259.008	2206.699	2144.702	1906.402	1793.064
35	1222.499	1375.554	1727.192	1968.398	2059.456	2111.766	2118.547	2001.334	1831.812	1701.037
36	997.761	1101.412	1244.779	1551.857	1763.034	1955.805	1978.085	1831.812	1757.222	1609.979
37	788.522	899.922	990.980	1124.661	1528.609	1733.973	1789.189	1681.663	1669.070	1538.296
38	654.841	723.619	828.238	890.235	1270.934	1521.828	1607.073	1583.824	1587.699	1495.673
39	573.470	596.719	684.871	769.148	1013.260	1336.806	1440.457	1485.986	1512.141	1466.612
40	508.567	525.035	583.157	674.215	843.738	1120.786	1280.621	1382.335	1437.551	1440.457

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CANDELA TABULATION - (Cont.)

41	449.477	459.164	505.661	602.531	726.525	893.141	1137.254	1280.621	1349.399	1397.834
42	401.042	413.635	453.352	547.315	642.248	720.713	1010.354	1189.564	1274.809	1349.399
43	358.419	371.981	413.635	495.006	563.783	609.312	893.141	1101.412	1196.344	1299.995
44	315.796	336.139	381.668	449.477	492.100	547.315	782.710	1010.354	1127.567	1254.466
45	289.641	306.109	348.732	397.167	439.790	508.567	680.996	909.609	1049.102	1189.564
46	267.361	279.954	315.796	351.638	394.261	472.726	599.625	807.896	945.451	1098.506
47	250.893	264.455	289.641	312.890	358.419	430.103	525.035	707.151	834.051	1017.135
48	238.300	244.112	260.580	277.048	319.671	381.668	459.164	616.093	752.680	951.263
49	228.613	231.519	241.206	253.799	289.641	345.826	423.322	547.315	690.683	909.609
50	217.957	221.832	224.738	238.300	267.361	319.671	394.261	492.100	632.561	854.393
51	215.051	215.051	215.051	224.738	250.893	293.516	365.200	449.477	573.470	792.397
52	208.270	208.270	208.270	215.051	234.425	274.142	336.139	413.635	521.161	726.525
53	205.364	202.458	202.458	205.364	221.832	253.799	312.890	381.668	475.632	658.716
54	202.458	198.583	198.583	202.458	212.145	238.300	289.641	351.638	433.009	592.844
55	202.458	195.677	192.771	195.677	205.364	224.738	270.267	325.483	401.042	537.628
56	195.677	192.771	188.896	188.896	195.677	212.145	250.893	303.203	368.106	485.319
57	192.771	185.990	185.990	185.990	192.771	205.364	234.425	283.829	339.045	446.571
58	182.116	182.116	182.116	182.116	185.990	195.677	221.832	260.580	315.796	410.729
59	182.116	176.303	179.209	176.303	182.116	188.896	212.145	247.987	296.422	387.480
60	172.429	172.429	172.429	172.429	176.303	182.116	198.583	231.519	277.048	377.793
61	169.522	169.522	169.522	169.522	169.522	176.303	192.771	217.957	260.580	365.200
62	169.522	166.616	166.616	169.522	169.522	176.303	185.990	212.145	247.987	339.045
63	166.616	162.742	162.742	166.616	166.616	169.522	179.209	198.583	231.519	293.516
64	159.835	159.835	159.835	159.835	162.742	162.742	172.429	188.896	215.051	253.799
65	156.929	153.055	156.929	156.929	156.929	156.929	166.616	176.303	198.583	228.613
66	150.148	150.148	150.148	150.148	150.148	150.148	156.929	169.522	185.990	208.270
67	146.274	143.368	146.274	146.274	146.274	146.274	150.148	159.835	176.303	195.677
68	140.461	140.461	140.461	140.461	136.587	140.461	143.368	150.148	166.616	179.209
69	136.587	133.681	133.681	133.681	133.681	133.681	136.587	143.368	156.929	169.522
70	133.681	130.774	130.774	130.774	126.900	126.900	130.774	136.587	146.274	156.929
71	133.681	126.900	126.900	123.994	123.994	123.994	130.774	136.587	143.368	153.055
72	126.900	120.119	120.119	117.213	117.213	117.213	123.994	126.900	136.587	143.368
73	123.994	114.307	114.307	110.432	110.432	114.307	114.307	120.119	126.900	133.681
74	117.213	110.432	110.432	107.526	107.526	107.526	114.307	117.213	120.119	126.900
75	110.432	104.620	104.620	100.745	104.620	104.620	107.526	114.307	117.213	120.119
76	104.620	97.839	97.839	97.839	94.933	97.839	100.745	104.620	107.526	110.432
77	94.933	91.058	91.058	88.152	88.152	94.933	94.933	97.839	100.745	107.526
78	88.152	84.277	84.277	81.371	81.371	84.277	88.152	91.058	97.839	97.839
79	78.465	78.465	74.590	74.590	78.465	78.465	81.371	84.277	88.152	91.058
80	71.684	71.684	71.684	71.684	74.590	74.590	78.465	81.371	84.277	88.152
81	64.903	64.903	78.465	64.903	68.778	68.778	71.684	74.590	78.465	81.371
82	59.091	55.216	61.997	59.091	59.091	61.997	64.903	64.903	71.684	74.590
83	52.310	52.310	55.216	52.310	52.310	55.216	59.091	61.997	64.903	68.778
84	42.623	42.623	48.435	48.435	45.529	48.435	55.216	55.216	59.091	61.997
85	35.842	38.748	42.623	38.748	42.623	42.623	48.435	52.310	55.216	55.216
86	35.842	35.842	45.529	38.748	38.748	42.623	45.529	48.435	52.310	55.216
87	29.061	29.061	42.623	35.842	38.748	38.748	42.623	45.529	48.435	52.310
88	26.155	26.155	35.842	32.936	32.936	35.842	38.748	42.623	45.529	48.435
89	23.249	26.155	29.061	29.061	29.061	32.936	35.842	38.748	45.529	45.529
90	19.374	23.249	23.249	26.155	29.061	29.061	35.842	38.748	42.623	42.623
91	16.468	19.374	23.249	26.155	29.061	29.061	35.842	35.842	42.623	42.623
92	16.468	19.374	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623
93	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
94	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
95	12.593	16.468	19.374	19.374	26.155	29.061	29.061	35.842	38.748	42.623
96	16.468	16.468	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529

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CANDELA TABULATION - (Cont.)

97	16.468	19.374	23.249	23.249	29.061	29.061	35.842	38.748	42.623	45.529
98	19.374	16.468	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
99	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	42.623
100	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
101	19.374	19.374	23.249	26.155	29.061	29.061	35.842	38.748	42.623	45.529
102	19.374	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
103	23.249	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435
104	19.374	19.374	23.249	26.155	32.936	32.936	35.842	42.623	42.623	45.529
105	16.468	19.374	26.155	26.155	29.061	32.936	35.842	38.748	42.623	45.529
106	19.374	19.374	26.155	26.155	32.936	32.936	35.842	38.748	45.529	45.529
107	19.374	19.374	26.155	26.155	29.061	32.936	35.842	38.748	45.529	45.529
108	19.374	19.374	26.155	29.061	29.061	32.936	38.748	38.748	45.529	45.529
109	19.374	23.249	26.155	29.061	29.061	32.936	35.842	38.748	45.529	45.529
110	19.374	19.374	23.249	29.061	29.061	32.936	35.842	38.748	42.623	45.529
111	23.249	23.249	26.155	29.061	35.842	35.842	42.623	42.623	48.435	48.435
112	23.249	26.155	29.061	32.936	32.936	38.748	38.748	45.529	48.435	48.435
113	16.468	23.249	26.155	26.155	32.936	32.936	35.842	38.748	45.529	45.529
114	19.374	23.249	26.155	26.155	32.936	32.936	38.748	42.623	45.529	45.529
115	23.249	26.155	29.061	29.061	32.936	35.842	42.623	42.623	48.435	48.435
116	23.249	26.155	29.061	32.936	35.842	35.842	42.623	42.623	48.435	48.435
117	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
118	23.249	26.155	29.061	32.936	35.842	38.748	42.623	42.623	48.435	52.310
119	23.249	26.155	29.061	32.936	35.842	35.842	38.748	42.623	48.435	48.435
120	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
121	19.374	23.249	26.155	29.061	29.061	32.936	38.748	42.623	45.529	48.435
122	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
123	19.374	19.374	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
124	23.249	26.155	29.061	32.936	35.842	38.748	42.623	42.623	48.435	52.310
125	23.249	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
126	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435	48.435
127	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
128	19.374	23.249	26.155	29.061	32.936	35.842	35.842	38.748	45.529	45.529
129	19.374	19.374	26.155	29.061	32.936	32.936	38.748	42.623	45.529	48.435
130	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
131	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
132	19.374	23.249	26.155	29.061	32.936	32.936	38.748	42.623	45.529	48.435
133	23.249	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435
134	23.249	26.155	26.155	29.061	32.936	35.842	38.748	42.623	45.529	45.529
135	23.249	26.155	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435
136	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435
137	23.249	23.249	29.061	29.061	32.936	35.842	38.748	42.623	45.529	45.529
138	23.249	26.155	29.061	32.936	32.936	35.842	38.748	42.623	45.529	48.435
139	23.249	26.155	29.061	32.936	32.936	38.748	38.748	42.623	45.529	45.529
140	23.249	26.155	29.061	32.936	32.936	35.842	38.748	42.623	45.529	45.529
141	23.249	26.155	29.061	32.936	32.936	35.842	38.748	42.623	45.529	45.529
142	23.249	26.155	29.061	32.936	35.842	35.842	38.748	42.623	45.529	48.435
143	26.155	26.155	29.061	32.936	32.936	35.842	38.748	42.623	45.529	48.435
144	23.249	29.061	32.936	32.936	35.842	35.842	42.623	42.623	48.435	48.435
145	23.249	26.155	29.061	32.936	35.842	38.748	38.748	42.623	48.435	48.435
146	23.249	26.155	29.061	32.936	35.842	35.842	42.623	42.623	45.529	48.435
147	26.155	26.155	29.061	32.936	35.842	35.842	42.623	42.623	45.529	48.435
148	26.155	29.061	29.061	32.936	35.842	38.748	42.623	45.529	48.435	48.435
149	23.249	26.155	32.936	32.936	35.842	38.748	42.623	45.529	48.435	45.529
150	23.249	26.155	29.061	32.936	35.842	38.748	42.623	42.623	45.529	48.435
151	23.249	23.249	26.155	29.061	32.936	35.842	38.748	38.748	45.529	45.529
152	23.249	23.249	26.155	29.061	32.936	35.842	38.748	38.748	45.529	45.529

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CANDELA TABULATION - (Cont.)

153	26.155	26.155	29.061	32.936	35.842	38.748	42.623	45.529	48.435	48.435
154	23.249	26.155	29.061	32.936	35.842	35.842	42.623	45.529	45.529	48.435
155	23.249	26.155	26.155	29.061	32.936	35.842	42.623	42.623	45.529	45.529
156	23.249	23.249	29.061	32.936	32.936	35.842	42.623	42.623	45.529	48.435
157	19.374	19.374	23.249	26.155	32.936	32.936	35.842	42.623	45.529	42.623
158	19.374	19.374	26.155	29.061	29.061	35.842	38.748	38.748	42.623	42.623
159	19.374	19.374	23.249	26.155	29.061	32.936	35.842	38.748	45.529	45.529
160	23.249	23.249	26.155	29.061	35.842	35.842	42.623	42.623	45.529	48.435
161	19.374	19.374	26.155	26.155	32.936	32.936	35.842	38.748	45.529	45.529
162	16.468	19.374	23.249	29.061	29.061	32.936	35.842	38.748	45.529	45.529
163	19.374	23.249	26.155	29.061	32.936	35.842	42.623	42.623	45.529	48.435
164	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
165	16.468	16.468	23.249	26.155	26.155	32.936	35.842	38.748	42.623	45.529
166	16.468	19.374	23.249	26.155	29.061	32.936	38.748	38.748	45.529	42.623
167	16.468	19.374	23.249	26.155	29.061	32.936	38.748	38.748	45.529	45.529
168	16.468	19.374	23.249	26.155	29.061	32.936	35.842	38.748	42.623	45.529
169	16.468	19.374	23.249	26.155	29.061	32.936	38.748	42.623	45.529	48.435
170	16.468	19.374	23.249	26.155	29.061	32.936	38.748	38.748	45.529	45.529
171	16.468	19.374	23.249	26.155	29.061	32.936	38.748	42.623	45.529	45.529
172	16.468	19.374	23.249	26.155	29.061	32.936	38.748	42.623	45.529	45.529
173	16.468	19.374	23.249	26.155	29.061	32.936	38.748	42.623	45.529	45.529
174	16.468	19.374	23.249	26.155	29.061	35.842	35.842	38.748	45.529	45.529
175	12.593	16.468	19.374	23.249	26.155	32.936	35.842	38.748	42.623	45.529
176	16.468	19.374	23.249	26.155	32.936	32.936	38.748	42.623	48.435	48.435
177	16.468	19.374	23.249	26.155	29.061	32.936	35.842	42.623	45.529	48.435
178	12.593	16.468	19.374	23.249	26.155	29.061	35.842	38.748	42.623	45.529
179	16.468	19.374	23.249	26.155	29.061	32.936	38.748	42.623	45.529	48.435
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	250	**255**	**260**	**265**	**270**	**275**	**280**	**285**	**290**	**295**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4334.932	4358.181	4373.680	4387.242	4423.084	4452.145	4465.707	4504.455	4511.236	4530.610
2	4243.875	4299.091	4337.839	4370.774	4425.990	4481.206	4514.142	4588.732	4614.887	4664.290
3	4034.635	4165.410	4272.936	4325.245	4413.397	4497.674	4562.577	4654.603	4726.287	4833.813
4	3771.149	3986.200	4184.784	4301.997	4423.084	4543.203	4635.229	4774.722	4944.245	5146.703
5	3565.785	3771.149	4067.571	4266.155	4425.990	4579.045	4709.819	4957.807	5273.603	5596.180
6	3497.007	3653.936	3960.046	4237.094	4432.771	4611.981	4807.658	5163.171	5602.961	6000.128
7	3578.378	3614.220	3898.049	4246.781	4485.081	4690.445	4934.558	5387.909	5942.006	6394.389
8	3725.620	3680.091	3878.675	4289.404	4569.358	4810.564	5113.767	5667.864	6307.206	6799.305
9	3885.456	3797.304	3914.517	4370.774	4742.755	5009.148	5404.377	6062.125	6763.463	7222.627
10	4038.510	3986.200	4028.823	4478.300	4934.558	5234.855	5723.080	6476.728	7160.630	7626.575
11	4139.255	4191.565	4148.942	4573.233	5130.235	5459.593	6045.657	6854.521	7516.143	8041.179
12	4152.817	4299.091	4246.781	4664.290	5335.600	5691.112	6369.202	7196.472	7841.626	8542.965
13	4165.410	4344.619	4334.932	4706.913	5478.967	5892.602	6687.905	7487.082	8168.078	9061.220
14	4246.781	4334.932	4394.023	4719.506	5583.587	6055.344	6962.047	7707.946	8493.562	9481.636
15	4334.932	4256.468	4409.522	4667.197	5579.712	6114.434	7141.256	7903.623	8855.855	9856.522
16	4325.245	4048.197	4279.717	4526.735	5514.809	6088.279	7153.849	7979.182	9171.652	10117.103
17	4234.188	3826.365	4110.194	4387.242	5423.751	6023.377	7082.166	8005.337	9295.645	10260.470
18	4132.474	3732.401	3943.578	4230.313	5250.354	5932.319	6991.108	8027.617	9364.423	10312.780
19	3983.294	3663.623	3804.085	4057.884	5048.864	5775.389	6850.646	7946.246	9295.645	10296.312
20	3783.742	3572.566	3634.562	3881.581	4774.722	5527.402	6665.625	7822.252	9119.342	10162.632
21	3572.566	3461.165	3422.417	3702.371	4465.707	5225.168	6352.735	7587.827	8813.233	9892.364
22	3360.420	3321.672	3243.208	3536.724	4175.097	4918.090	6006.909	7294.311	8425.753	9481.636
23	3148.275	3184.117	3095.965	3386.575	3943.578	4644.916	5694.019	7026.950	8112.862	9070.907

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CANDELA TABULATION - (Cont.)

24	2988.439	3040.749	2949.691	3219.959	3732.401	4377.555	5407.283	6740.215	7874.562	8663.084
25	2861.540	2884.789	2825.698	3060.123	3542.536	4139.255	5116.673	6427.324	7656.605	8483.875
26	2734.640	2756.920	2763.701	2952.598	3373.013	3900.955	4869.655	6212.273	7327.247	8278.510
27	2660.050	2649.394	2698.798	2880.914	3252.895	3725.620	4680.758	6068.905	7131.569	8041.179
28	2591.272	2522.495	2574.805	2763.701	3112.433	3588.065	4592.607	5994.316	7086.040	7994.681
29	2474.060	2402.376	2428.531	2633.895	2940.004	3451.478	4547.078	5951.693	7131.569	7975.307
30	2314.224	2281.288	2290.975	2493.434	2763.701	3311.017	4481.206	5958.474	7258.469	8053.772
31	2137.921	2137.921	2180.544	2347.160	2568.024	3122.120	4394.023	5882.915	7251.688	8112.862
32	1965.492	2023.614	2075.924	2199.918	2379.127	2894.476	4256.468	5801.544	7225.533	8115.769
33	1848.280	1910.276	1978.085	2034.270	2190.231	2685.236	4067.571	5687.238	7167.411	7979.182
34	1746.566	1818.250	1884.121	1906.402	2004.240	2503.121	3833.146	5511.903	6984.327	7740.882
35	1649.696	1776.596	1769.815	1798.876	1854.092	2343.285	3650.062	5306.539	6704.373	7480.301
36	1557.670	1714.599	1678.757	1733.973	1776.596	2232.853	3510.569	5101.174	6384.702	7131.569
37	1495.673	1639.040	1623.541	1701.037	1740.754	2166.982	3448.572	4944.245	6192.899	6838.053
38	1469.518	1590.605	1612.885	1681.663	1750.441	2161.170	3405.949	4901.622	6097.966	6635.595
39	1469.518	1561.544	1616.760	1685.538	1798.876	2235.760	3441.791	4898.716	6085.373	6541.631
40	1469.518	1538.296	1623.541	1724.286	1877.341	2330.692	3536.724	4973.306	6078.592	6512.570
41	1444.332	1535.389	1662.289	1779.502	1939.337	2383.002	3568.691	5044.990	6153.182	6518.382
42	1411.396	1554.763	1701.037	1838.593	1994.553	2428.531	3562.879	5003.335	6052.438	6567.786
43	1375.554	1554.763	1727.192	1900.589	2043.957	2454.686	3549.317	4983.961	5911.976	6450.573
44	1352.305	1564.450	1776.596	1962.586	2125.328	2512.808	3582.253	5025.616	5902.289	6322.705
45	1332.931	1597.386	1834.718	2046.863	2261.914	2630.020	3653.936	5101.174	6000.128	6336.267
46	1310.651	1616.760	1880.247	2128.234	2388.814	2786.950	3871.894	5276.509	6104.747	6437.011
47	1290.308	1652.602	1936.431	2180.544	2424.656	2884.789	4060.790	5481.873	6307.206	6534.850
48	1299.995	1717.505	1994.553	2206.699	2347.160	2783.075	4057.884	5619.429	6479.634	6671.437
49	1316.463	1769.815	2030.395	2197.012	2219.292	2571.898	3823.459	5472.186	6394.389	6753.776
50	1313.557	1793.064	1984.866	2125.328	2131.140	2385.908	3562.879	5137.016	6143.495	6609.440
51	1310.651	1750.441	1932.556	2059.456	2066.237	2288.069	3370.107	4839.625	5853.854	6322.705
52	1248.654	1678.757	1860.873	1991.647	1972.273	2173.763	3184.117	4573.233	5527.402	6026.283
53	1170.190	1600.292	1772.721	1922.869	1889.934	2075.924	3069.810	4332.026	5225.168	5742.454
54	1111.099	1535.389	1717.505	1838.593	1789.189	1955.805	2937.098	4116.975	4872.561	5449.906
55	1055.883	1480.174	1639.040	1750.441	1674.882	1818.250	2747.233	3888.362	4543.203	5178.670
56	997.761	1414.302	1561.544	1665.195	1577.044	1685.538	2571.898	3670.404	4289.404	4856.093
57	922.202	1342.618	1516.015	1580.918	1516.015	1619.666	2470.185	3516.381	4090.820	4621.668
58	847.612	1303.870	1489.861	1561.544	1541.202	1691.350	2519.589	3484.414	4022.042	4475.394
59	798.209	1303.870	1499.548	1574.137	1609.979	1844.405	2675.549	3604.533	4074.352	4445.364
60	769.148	1294.183	1495.673	1541.202	1583.824	1896.715	2760.795	3721.745	4181.878	4547.078
61	720.713	1228.312	1397.834	1392.022	1388.147	1695.225	2568.024	3614.220	4155.723	4605.200
62	635.467	1075.257	1160.503	1127.567	1062.664	1277.715	2073.018	3157.962	3904.830	4523.829
63	505.661	843.738	902.828	866.986	769.148	869.893	1483.080	2441.124	3324.578	4172.191
64	384.574	635.467	700.370	674.215	592.844	649.029	1069.445	1786.283	2548.650	3516.381
65	319.671	511.474	577.345	563.783	505.661	544.409	864.080	1385.241	1958.711	2875.102
66	274.142	433.009	495.006	489.193	449.477	485.319	759.461	1170.190	1612.885	2388.814
67	241.206	374.887	436.884	436.884	403.948	439.790	687.777	1046.196	1427.864	2046.863
68	215.051	332.264	397.167	397.167	374.887	407.823	625.780	935.764	1294.183	1808.563
69	198.583	296.422	361.325	358.419	345.826	381.668	573.470	840.832	1167.283	1639.040
70	182.116	264.455	325.483	319.671	309.984	341.951	518.254	752.680	1043.290	1485.986
71	172.429	241.206	293.516	286.735	277.048	306.109	459.164	671.309	928.983	1356.180
72	159.835	217.957	264.455	260.580	250.893	277.048	413.635	596.719	824.364	1235.092
73	150.148	195.677	234.425	234.425	228.613	247.987	371.981	527.941	723.619	1111.099
74	143.368	182.116	215.051	217.957	208.270	228.613	336.139	472.726	649.029	990.980
75	130.774	166.616	195.677	198.583	192.771	208.270	303.203	427.197	592.844	893.141
76	123.994	150.148	179.209	179.209	179.209	195.677	274.142	384.574	541.503	818.551
77	114.307	136.587	159.835	159.835	162.742	179.209	244.112	345.826	492.100	749.774
78	104.620	126.900	143.368	146.274	146.274	162.742	221.832	312.890	449.477	680.996
79	97.839	114.307	130.774	133.681	133.681	150.148	202.458	283.829	407.823	616.093

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CANDELA TABULATION - (Cont.)

80	94.933	107.526	120.119	120.119	123.994	136.587	185.990	257.674	371.981	554.096
81	84.277	94.933	107.526	110.432	114.307	126.900	166.616	231.519	336.139	489.193
82	78.465	84.277	97.839	97.839	104.620	114.307	146.274	205.364	296.422	433.009
83	71.684	78.465	88.152	91.058	94.933	104.620	133.681	182.116	260.580	374.887
84	68.778	71.684	78.465	81.371	84.277	94.933	120.119	159.835	224.738	319.671
85	59.091	61.997	71.684	74.590	78.465	88.152	107.526	143.368	195.677	270.267
86	59.091	61.997	68.778	71.684	74.590	81.371	100.745	130.774	172.429	231.519
87	55.216	59.091	61.997	64.903	68.778	74.590	88.152	114.307	150.148	192.771
88	52.310	52.310	59.091	59.091	61.997	71.684	81.371	100.745	126.900	159.835
89	48.435	52.310	55.216	55.216	59.091	64.903	74.590	88.152	107.526	130.774
90	45.529	48.435	52.310	52.310	55.216	59.091	68.778	78.465	91.058	107.526
91	45.529	45.529	52.310	48.435	52.310	59.091	64.903	71.684	78.465	88.152
92	42.623	48.435	48.435	48.435	52.310	55.216	59.091	64.903	71.684	78.465
93	48.435	48.435	52.310	52.310	55.216	59.091	61.997	64.903	71.684	78.465
94	48.435	48.435	52.310	52.310	55.216	59.091	61.997	68.778	71.684	74.590
95	45.529	48.435	48.435	52.310	52.310	55.216	59.091	61.997	68.778	68.778
96	48.435	48.435	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590
97	48.435	52.310	52.310	55.216	55.216	59.091	61.997	68.778	71.684	71.684
98	48.435	48.435	55.216	52.310	59.091	61.997	61.997	68.778	71.684	74.590
99	48.435	48.435	55.216	55.216	55.216	61.997	61.997	68.778	71.684	74.590
100	48.435	52.310	55.216	52.310	55.216	59.091	64.903	68.778	71.684	74.590
101	48.435	52.310	55.216	55.216	55.216	61.997	64.903	68.778	71.684	74.590
102	48.435	48.435	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
103	52.310	52.310	55.216	59.091	59.091	64.903	68.778	71.684	74.590	78.465
104	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
105	48.435	52.310	55.216	52.310	59.091	61.997	64.903	68.778	71.684	74.590
106	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
107	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
108	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
109	48.435	48.435	55.216	55.216	55.216	61.997	64.903	68.778	71.684	78.465
110	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	71.684	74.590
111	52.310	55.216	59.091	59.091	61.997	64.903	68.778	71.684	74.590	78.465
112	52.310	55.216	59.091	59.091	61.997	64.903	68.778	71.684	74.590	81.371
113	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
114	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	71.684	74.590
115	52.310	55.216	59.091	55.216	61.997	64.903	68.778	71.684	78.465	78.465
116	52.310	55.216	59.091	59.091	61.997	64.903	71.684	71.684	78.465	78.465
117	48.435	52.310	55.216	55.216	59.091	61.997	64.903	68.778	74.590	74.590
118	52.310	55.216	59.091	59.091	61.997	64.903	68.778	71.684	74.590	78.465
119	52.310	52.310	59.091	59.091	61.997	64.903	68.778	71.684	78.465	81.371
120	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	71.684	78.465
121	48.435	52.310	55.216	59.091	59.091	61.997	64.903	71.684	74.590	74.590
122	52.310	52.310	55.216	52.310	59.091	61.997	64.903	71.684	71.684	74.590
123	52.310	52.310	55.216	55.216	59.091	61.997	64.903	71.684	71.684	74.590
124	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	74.590	78.465
125	52.310	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465
126	52.310	55.216	59.091	59.091	61.997	64.903	71.684	74.590	78.465	81.371
127	48.435	52.310	55.216	59.091	59.091	61.997	64.903	68.778	71.684	78.465
128	48.435	52.310	59.091	55.216	59.091	61.997	64.903	71.684	74.590	78.465
129	48.435	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	74.590
130	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	74.590
131	48.435	52.310	59.091	55.216	59.091	61.997	64.903	68.778	74.590	74.590
132	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	71.684	78.465
133	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
134	52.310	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
135	52.310	52.310	55.216	55.216	59.091	64.903	68.778	71.684	74.590	78.465

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CANDELA TABULATION - (Cont.)

136	48.435	52.310	59.091	55.216	61.997	61.997	68.778	71.684	74.590	78.465
137	48.435	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	74.590
138	52.310	52.310	55.216	55.216	59.091	64.903	68.778	71.684	74.590	78.465
139	48.435	52.310	55.216	59.091	59.091	61.997	64.903	71.684	74.590	78.465
140	48.435	52.310	55.216	55.216	61.997	61.997	68.778	71.684	74.590	78.465
141	52.310	48.435	55.216	55.216	61.997	61.997	68.778	71.684	74.590	78.465
142	48.435	52.310	55.216	55.216	61.997	64.903	68.778	71.684	74.590	78.465
143	52.310	52.310	55.216	59.091	61.997	64.903	68.778	71.684	74.590	78.465
144	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465	78.465
145	52.310	52.310	59.091	59.091	61.997	64.903	68.778	74.590	74.590	78.465
146	52.310	52.310	59.091	59.091	61.997	64.903	68.778	71.684	78.465	78.465
147	52.310	52.310	59.091	59.091	61.997	64.903	68.778	74.590	74.590	78.465
148	52.310	52.310	59.091	59.091	59.091	64.903	68.778	74.590	78.465	78.465
149	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465	81.371
150	52.310	55.216	59.091	55.216	61.997	64.903	71.684	74.590	78.465	78.465
151	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	74.590
152	48.435	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
153	52.310	55.216	59.091	59.091	61.997	68.778	68.778	74.590	78.465	81.371
154	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465	81.371
155	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465	78.465
156	52.310	55.216	55.216	59.091	61.997	64.903	68.778	74.590	78.465	81.371
157	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
158	48.435	48.435	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
159	48.435	48.435	55.216	52.310	55.216	61.997	64.903	71.684	74.590	78.465
160	52.310	55.216	59.091	59.091	61.997	64.903	68.778	74.590	78.465	81.371
161	48.435	48.435	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
162	48.435	48.435	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
163	52.310	52.310	59.091	59.091	61.997	64.903	68.778	74.590	78.465	81.371
164	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
165	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
166	48.435	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
167	48.435	52.310	55.216	55.216	59.091	61.997	64.903	71.684	74.590	78.465
168	48.435	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	78.465
169	52.310	48.435	55.216	55.216	59.091	61.997	68.778	71.684	74.590	81.371
170	48.435	52.310	55.216	59.091	59.091	64.903	64.903	71.684	78.465	78.465
171	52.310	52.310	59.091	59.091	59.091	61.997	68.778	71.684	74.590	81.371
172	52.310	52.310	55.216	55.216	59.091	61.997	68.778	71.684	74.590	81.371
173	52.310	52.310	59.091	59.091	61.997	64.903	68.778	71.684	74.590	78.465
174	52.310	52.310	59.091	55.216	59.091	64.903	68.778	74.590	74.590	81.371
175	48.435	48.435	55.216	52.310	55.216	61.997	64.903	71.684	74.590	78.465
176	52.310	52.310	59.091	55.216	61.997	64.903	68.778	71.684	78.465	81.371
177	52.310	55.216	59.091	59.091	61.997	64.903	68.778	71.684	74.590	81.371
178	48.435	48.435	52.310	55.216	55.216	61.997	64.903	71.684	74.590	78.465
179	52.310	52.310	59.091	59.091	61.997	64.903	68.778	71.684	78.465	81.371
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**									
	300	**305**	**310**	**315**	**320**	**325**	**330**	**335**	**340**	**345**
0	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458	4442.458
1	4576.139	4592.607	4631.355	4641.042	4683.664	4696.258	4686.571	4700.132	4752.442	4726.287
2	4732.099	4807.658	4898.716	4957.807	5065.332	5139.922	5211.606	5270.697	5361.754	5393.722
3	4999.461	5172.858	5390.815	5543.870	5753.109	5886.790	6006.909	6114.434	6251.021	6296.550
4	5446.031	5710.486	5973.973	6166.744	6424.418	6593.941	6737.308	6835.147	6938.798	6981.421
5	5947.818	6245.209	6531.944	6711.154	6935.892	7124.788	7317.560	7480.301	7652.730	7734.101
6	6394.389	6723.747	6971.734	7212.940	7506.456	7783.504	8073.146	8275.604	8512.936	8614.649

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CANDELA TABULATION - (Cont.)

7	6802.211	7141.256	7502.581	7829.033	8230.075	8539.090	8806.452	8969.193	9155.184	9243.335
8	7210.034	7623.669	8128.362	8545.871	8913.977	9142.591	9328.581	9445.794	9594.973	9732.529
9	7692.447	8232.981	8770.610	9129.029	9390.578	9608.535	9820.681	9976.641	10123.88	410237.222
10	8223.294	8861.668	9344.080	9559.132	9840.055	10100.63	510289.53	110358.30	910432.89	910465.835
11	8728.956	9324.706	9778.058	10067.69	910365.09	010511.36	410589.82	810566.58	010589.82	810615.983
12	9272.396	9745.122	10253.68	910621.79	510804.88	010847.50	310840.72	210762.25	710687.66	710703.166
13	9732.529	10191.69	310774.85	011051.89	811134.23	811160.39	311087.74	010895.93	810755.47	610723.509
14	10117.10	310625.67	011108.08	311316.35	311397.72	411368.66	311257.26	310996.68	210769.03	810707.041
15	10468.74	110944.37	311261.13	711502.34	411524.62	411528.49	911345.41	411003.46	310762.25	710680.886
16	10817.47	311068.36	611378.35	011616.65	011632.15	011580.80	811381.25	611075.14	710781.63	110642.138
17	11087.74	011202.04	711502.34	411688.33	411681.55	311580.80	811447.12	811130.36	310742.88	310523.957
18	11055.77	311335.72	711622.46	311662.17	911564.34	111560.46	611375.44	410984.08	910625.67	010406.744
19	10895.93	811303.76	011638.93	011502.34	411390.94	311482.97	011211.73	410895.93	810491.99	010201.380
20	10667.32	411208.82	811443.25	311355.10	111296.97	911323.13	411130.36	310774.85	010377.68	310071.574
21	10527.83	211051.89	811185.57	911241.76	311264.04	411254.35	710984.08	910700.26	010446.46	110045.419
22	10332.15	410866.87	710948.24	711013.15	011244.67	011110.98	910836.84	710774.85	010397.05	799907.864
23	10005.70	210534.61	210707.04	110827.16	011029.61	810843.62	810729.32	110654.73	110276.93	89780.964
24	9647.283	10188.78	710387.37	010719.63	410677.98	010700.26	010645.04	410559.79	910126.79	09533.945
25	9262.709	9748.997	10097.72	910482.30	310456.14	810589.82	810631.48	210420.30	69878.803	9341.174
26	8944.007	9315.019	9830.368	10149.07	010270.15	710518.14	510573.36	010191.69	39840.055	9207.493
27	8653.397	8992.442	9517.477	9885.583	10107.41	610442.58	610325.37	310081.26	19699.593	8992.442
28	8399.598	8767.704	9174.558	9543.632	9966.954	10208.16	110149.07	09983.422	9563.006	8927.539
29	8318.227	8562.339	8937.226	9210.400	9826.493	9993.109	10022.17	09950.486	9510.697	8813.233
30	8249.449	8425.753	8767.704	9090.281	9637.596	9790.651	9969.860	9918.519	9400.265	8754.142
31	8307.571	8366.662	8574.932	8933.351	9324.706	9536.851	9846.835	9709.280	9354.736	8686.333
32	8333.726	8376.349	8405.410	8725.081	8973.068	9364.423	9589.161	9598.848	9341.174	8636.929
33	8333.726	8402.504	8379.255	8529.403	8672.771	9197.806	9377.016	9611.441	9374.110	8598.181
34	8170.984	8402.504	8405.410	8392.817	8477.094	8891.697	9269.490	9585.286	9357.642	8607.868
35	7962.714	8343.413	8441.252	8262.042	8314.352	8591.400	9159.058	9507.790	9360.548	8666.959
36	7666.292	8108.988	8467.407	8232.981	8151.610	8438.346	9070.907	9429.326	9432.232	8754.142
37	7349.527	7867.781	8376.349	8373.443	8027.617	8359.881	8946.913	9455.481	9592.067	8940.132
38	7040.512	7574.265	8135.143	8451.907	8082.833	8294.978	8787.078	9549.445	9728.654	9221.055
39	6766.369	7336.934	7819.346	8418.972	8268.823	8232.981	8712.488	9582.380	9957.267	9539.758
40	6655.938	7072.479	7545.204	8246.543	8548.777	8230.075	8767.704	9631.784	10260.47	09966.954
41	6584.254	6886.488	7343.715	8017.930	8722.175	8409.285	8908.165	9780.964	10654.73	110384.464
42	6658.844	6763.463	7219.721	7864.875	8748.330	8748.330	9035.065	10026.04	511101.30	210843.628
43	6694.686	6799.305	7150.943	7815.472	8689.239	9185.213	9240.429	10397.05	711531.40	511371.569
44	6561.005	6935.892	7167.411	7789.317	8607.868	9530.071	9549.445	10804.88	011994.44	311837.514
45	6450.573	6873.895	7333.059	7779.630	8610.774	9689.906	10038.63	811244.67	012329.61	312075.814
46	6544.537	6773.150	7434.772	7809.659	8636.929	9761.590	10602.42	111550.77	912414.85	912206.589
47	6642.376	6828.366	7444.459	8024.711	8666.959	9790.651	11098.39	611645.71	112242.43	012190.121
48	6785.743	6981.421	7460.927	8226.200	8751.236	9823.587	11332.82	111590.49	511975.06	912056.440
49	6955.266	7177.098	7502.581	8327.914	8887.822	9907.864	11303.76	011394.81	811629.24	311918.885
50	7014.357	7401.837	7695.353	8435.440	9073.813	9950.486	11098.39	611127.45	711332.82	111903.385
51	6962.047	7561.672	7955.933	8441.252	9204.587	9980.516	10833.94	110941.46	611208.82	812121.343
52	6720.841	7528.736	8154.517	8507.123	9207.493	9980.516	10621.79	510948.24	711267.91	812486.543
53	6381.796	7320.466	8161.297	8607.868	9149.371	9928.206	10426.11	810977.30	811437.44	112968.955
54	6088.279	7024.044	7991.775	8660.178	9129.029	9810.994	10303.09	310967.62	111619.55	613591.830
55	5788.951	6687.905	7678.885	8539.090	9077.688	9739.310	10120.00	910866.87	711870.45	014295.106
56	5540.964	6332.392	7274.937	8210.701	8930.445	9569.787	9892.364	10762.25	712140.71	715006.132
57	5328.819	6049.531	6922.330	7825.159	8545.871	9214.274	9579.474	10628.57	612427.45	215837.276
58	5159.296	5844.167	6577.473	7404.743	8056.678	8748.330	9168.745	10384.46	412672.53	316622.892
59	5077.925	5703.706	6254.896	7040.512	7590.733	8203.920	8718.300	10045.41	912900.17	817320.356
60	5104.080	5629.116	5994.316	6697.592	7174.192	7656.605	8252.355	9728.654	13083.26	217916.106
61	5195.138	5632.022	5827.699	6391.483	6782.837	7210.034	7767.037	9441.919	13134.60	318285.181
62	5266.822	5670.770	5756.015	6147.370	6443.792	6805.117	7307.873	9256.897	13040.63	918161.187

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63	5137.016	5674.645	5729.860	5951.693	6130.902	6424.418	6926.205	9031.190	12776.18	17825.049
64	4673.977	5514.809	5684.332	5824.793	5902.289	6055.344	6567.786	8796.765	12479.76	17378.478
65	4024.948	5068.238	5517.715	5706.612	5717.267	5710.486	6274.270	8529.403	12059.34	16736.230
66	3467.946	4520.923	5137.016	5521.590	5550.651	5414.064	5961.380	8220.388	11574.02	16038.766
67	3057.217	3936.797	4654.603	5156.390	5290.071	5116.673	5677.551	7922.997	11055.77	15113.657
68	2701.704	3497.007	4184.784	4654.603	4882.248	4807.658	5446.031	7633.356	10511.36	14096.522
69	2359.753	3090.153	3725.620	4126.662	4390.148	4442.458	5168.983	7301.092	9849.742	12847.868
70	2079.799	2695.892	3291.643	3680.091	3911.611	4009.449	4788.284	6838.053	8963.381	11375.444
71	1854.092	2372.346	2904.163	3285.830	3432.104	3487.320	4292.310	6238.428	8077.021	9888.490
72	1669.070	2111.766	2565.118	2861.540	2901.256	2940.004	3771.149	5567.119	7160.630	8464.501
73	1485.986	1854.092	2252.227	2486.653	2509.902	2516.683	3295.517	4898.716	6245.209	7174.192
74	1313.557	1590.605	1939.337	2183.450	2223.166	2199.918	2878.008	4263.249	5371.441	5951.693
75	1163.409	1359.086	1633.228	1854.092	1955.805	1968.398	2532.182	3680.091	4549.984	4905.497
76	1049.102	1189.564	1411.396	1561.544	1669.070	1750.441	2213.479	3109.527	3783.742	3943.578
77	945.451	1052.977	1222.499	1323.244	1418.177	1521.828	1929.650	2624.208	3073.685	3142.463
78	850.519	941.576	1065.570	1127.567	1196.344	1303.870	1649.696	2223.166	2538.963	2512.808
79	762.367	828.238	922.202	958.044	1013.260	1108.193	1404.615	1857.967	2102.079	2034.270
80	674.215	726.525	798.209	821.458	850.519	938.670	1186.657	1551.857	1736.879	1655.508
81	592.844	635.467	674.215	684.871	713.932	798.209	997.761	1280.621	1401.709	1339.712
82	515.348	541.503	566.689	577.345	602.531	674.215	834.051	1046.196	1134.348	1072.351
83	436.884	456.258	475.632	482.413	501.787	566.689	697.464	854.393	912.515	854.393
84	368.106	384.574	394.261	401.042	420.416	472.726	573.470	680.996	730.400	678.090
85	309.984	322.577	325.483	336.139	345.826	391.355	469.819	541.503	577.345	537.628
86	260.580	270.267	274.142	279.954	289.641	325.483	381.668	430.103	456.258	420.416
87	217.957	224.738	224.738	231.519	241.206	267.361	303.203	336.139	348.732	329.358
88	179.209	182.116	185.990	188.896	198.583	215.051	241.206	260.580	267.361	250.893
89	146.274	153.055	153.055	156.929	166.616	176.303	192.771	202.458	202.458	192.771
90	120.119	126.900	130.774	130.774	136.587	143.368	150.148	153.055	156.929	146.274
91	100.745	107.526	110.432	114.307	117.213	117.213	120.119	120.119	117.213	110.432
92	84.277	91.058	94.933	97.839	97.839	97.839	97.839	94.933	91.058	84.277
93	81.371	84.277	88.152	88.152	91.058	88.152	88.152	81.371	71.684	68.778
94	78.465	78.465	81.371	81.371	81.371	74.590	71.684	68.778	61.997	55.216
95	71.684	71.684	74.590	74.590	71.684	64.903	59.091	55.216	48.435	42.623
96	74.590	74.590	74.590	74.590	68.778	61.997	59.091	52.310	45.529	38.748
97	74.590	74.590	74.590	74.590	68.778	61.997	55.216	45.529	42.623	35.842
98	78.465	74.590	78.465	74.590	71.684	64.903	55.216	48.435	42.623	35.842
99	74.590	78.465	78.465	74.590	71.684	64.903	59.091	48.435	42.623	32.936
100	74.590	78.465	78.465	74.590	71.684	61.997	55.216	48.435	42.623	32.936
101	74.590	74.590	78.465	74.590	71.684	61.997	59.091	48.435	38.748	32.936
102	78.465	74.590	78.465	74.590	71.684	64.903	55.216	48.435	42.623	32.936
103	81.371	78.465	78.465	81.371	74.590	68.778	59.091	52.310	45.529	35.842
104	78.465	78.465	78.465	74.590	71.684	61.997	55.216	48.435	42.623	32.936
105	78.465	78.465	78.465	78.465	68.778	64.903	59.091	48.435	42.623	32.936
106	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
107	78.465	78.465	78.465	74.590	71.684	64.903	59.091	48.435	42.623	35.842
108	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
109	78.465	78.465	78.465	78.465	71.684	61.997	59.091	48.435	42.623	35.842
110	78.465	78.465	78.465	74.590	68.778	64.903	55.216	48.435	42.623	35.842
111	81.371	81.371	81.371	81.371	74.590	64.903	61.997	52.310	45.529	38.748
112	81.371	81.371	81.371	81.371	74.590	68.778	59.091	52.310	45.529	38.748
113	78.465	78.465	78.465	78.465	71.684	64.903	55.216	48.435	42.623	32.936
114	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
115	81.371	81.371	81.371	78.465	74.590	68.778	59.091	52.310	45.529	35.842
116	81.371	81.371	81.371	81.371	71.684	68.778	61.997	52.310	45.529	35.842
117	78.465	78.465	78.465	78.465	71.684	64.903	55.216	48.435	42.623	32.936
118	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	45.529	35.842

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CANDELA TABULATION - (Cont.)

119	81.371	81.371	81.371	78.465	74.590	68.778	61.997	52.310	45.529	38.748
120	78.465	78.465	78.465	78.465	71.684	64.903	55.216	48.435	42.623	32.936
121	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
122	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
123	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
124	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	42.623	35.842
125	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
126	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	45.529	35.842
127	78.465	78.465	78.465	78.465	71.684	64.903	59.091	52.310	42.623	32.936
128	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
129	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
130	78.465	78.465	78.465	78.465	71.684	61.997	59.091	48.435	42.623	35.842
131	78.465	78.465	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
132	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
133	78.465	78.465	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
134	78.465	81.371	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
135	81.371	81.371	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
136	78.465	81.371	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
137	78.465	81.371	81.371	78.465	71.684	64.903	59.091	48.435	42.623	35.842
138	81.371	78.465	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
139	81.371	81.371	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
140	81.371	81.371	81.371	78.465	71.684	64.903	59.091	52.310	42.623	35.842
141	81.371	81.371	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
142	78.465	81.371	78.465	78.465	71.684	64.903	59.091	52.310	45.529	35.842
143	81.371	81.371	81.371	81.371	71.684	68.778	59.091	52.310	45.529	35.842
144	81.371	81.371	81.371	78.465	74.590	64.903	59.091	52.310	45.529	35.842
145	81.371	81.371	81.371	78.465	74.590	64.903	59.091	52.310	42.623	35.842
146	81.371	81.371	81.371	78.465	71.684	64.903	59.091	52.310	42.623	35.842
147	81.371	81.371	81.371	78.465	71.684	68.778	61.997	52.310	42.623	35.842
148	81.371	81.371	81.371	78.465	74.590	68.778	59.091	52.310	42.623	35.842
149	81.371	81.371	81.371	78.465	71.684	68.778	61.997	52.310	42.623	35.842
150	81.371	81.371	81.371	81.371	74.590	64.903	59.091	52.310	45.529	35.842
151	81.371	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
152	81.371	81.371	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
153	81.371	84.277	81.371	81.371	74.590	68.778	61.997	52.310	45.529	38.748
154	81.371	84.277	81.371	81.371	74.590	68.778	61.997	52.310	45.529	38.748
155	81.371	84.277	81.371	81.371	74.590	68.778	59.091	52.310	45.529	38.748
156	84.277	81.371	81.371	81.371	74.590	64.903	61.997	52.310	45.529	35.842
157	78.465	78.465	78.465	78.465	71.684	64.903	59.091	48.435	42.623	32.936
158	81.371	81.371	78.465	78.465	71.684	64.903	55.216	48.435	42.623	32.936
159	81.371	81.371	81.371	78.465	71.684	64.903	59.091	52.310	42.623	35.842
160	84.277	81.371	84.277	81.371	74.590	68.778	61.997	55.216	45.529	38.748
161	81.371	81.371	81.371	78.465	74.590	64.903	59.091	52.310	42.623	35.842
162	81.371	81.371	81.371	78.465	71.684	64.903	59.091	52.310	42.623	35.842
163	84.277	84.277	84.277	81.371	78.465	68.778	61.997	52.310	48.435	38.748
164	81.371	81.371	81.371	78.465	74.590	64.903	59.091	52.310	42.623	35.842
165	81.371	81.371	81.371	78.465	71.684	64.903	59.091	52.310	42.623	35.842
166	81.371	81.371	81.371	78.465	74.590	68.778	59.091	52.310	45.529	35.842
167	78.465	81.371	81.371	78.465	74.590	68.778	61.997	52.310	45.529	35.842
168	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	45.529	35.842
169	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	45.529	38.748
170	81.371	81.371	84.277	81.371	78.465	68.778	59.091	52.310	45.529	38.748
171	81.371	81.371	81.371	78.465	74.590	68.778	61.997	52.310	45.529	38.748
172	81.371	84.277	81.371	81.371	74.590	68.778	61.997	52.310	45.529	38.748
173	81.371	81.371	81.371	81.371	74.590	68.778	61.997	52.310	45.529	38.748
174	81.371	81.371	81.371	81.371	74.590	68.778	59.091	55.216	45.529	38.748

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CANDELA TABULATION - (Cont.)

175	78.465	81.371	78.465	78.465	71.684	64.903	59.091	52.310	42.623	35.842
176	84.277	84.277	84.277	81.371	74.590	68.778	61.997	55.216	48.435	38.748
177	81.371	81.371	84.277	81.371	74.590	68.778	61.997	55.216	45.529	38.748
178	78.465	81.371	78.465	78.465	71.684	64.903	59.091	48.435	42.623	35.842
179	81.371	81.371	84.277	81.371	78.465	71.684	61.997	55.216	45.529	38.748
180	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186

Vert. Angles	**Horizontal Angles**		
	350	**355**	**360**
0	4442.458	4442.458	4442.458
1	4700.132	4722.412	4732.099
2	5407.283	5472.186	5478.967
3	6313.018	6375.015	6424.418
4	7004.670	7069.573	7108.321
5	7760.256	7867.781	7893.936
6	8660.178	8796.765	8849.074
7	9276.271	9403.171	9436.107
8	9790.651	9924.331	9966.954
9	10257.56	410338.93	510361.215
10	10436.77	410491.99	010472.616
11	10556.89	310585.95	410576.267
12	10609.20	210599.51	510576.267
13	10618.88	910559.79	910537.519
14	10585.95	410494.89	610452.273
15	10511.36	410410.61	910370.902
16	10365.09	010257.56	410237.222
17	10246.90	910100.63	510149.070
18	10136.47	79999.890	10035.732
19	9986.328	9888.490	9875.896
20	9928.206	9833.274	9816.806
21	9758.684	9598.848	9631.784
22	9543.632	9377.016	9474.855
23	9344.080	9097.062	9214.274
24	8992.442	8770.610	8825.826
25	8793.859	8555.558	8598.181
26	8569.120	8226.200	8343.413
27	8435.440	8066.365	8285.291
28	8350.194	7946.246	8128.362
29	8177.765	7855.188	7991.775
30	8044.085	7724.414	7809.659
31	7897.811	7538.423	7678.885
32	7789.317	7375.682	7522.924
33	7728.289	7323.372	7451.240
34	7666.292	7219.721	7303.998
35	7633.356	7102.508	7170.317
36	7662.417	6984.327	7024.044
37	7776.724	6962.047	6890.363
38	7946.246	6974.640	6763.463
39	8252.355	7026.950	6730.528
40	8584.619	7189.691	6753.776
41	9018.597	7359.214	6753.776
42	9517.477	7666.292	6864.208
43	10002.79	67877.468	6870.989
44	10374.77	78194.233	6974.640
45	10736.10	28552.652	7203.253

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CANDELA TABULATION - (Cont.)

46	10974.40	28851.98	1 7392.150
47	11124.55	19226.86	7 7711.821
48	11254.35	79618.22	2 8223.294
49	11462.62	710159.72	68861.668
50	11867.54	410990.87	09748.997
51	12486.54	311922.75	910733.196
52	13298.31	313014.48	411805.547
53	14268.95	114357.10	313105.542
54	15357.77	015761.71	814461.722
55	16498.89	817179.89	415895.398
56	17669.08	818718.19	017450.162
57	18858.65	120275.86	019047.548
58	20034.65	321667.88	120576.157
59	21113.78	522831.29	021925.556
60	21968.17	823910.42	223056.029
61	22345.97	124379.27	323636.280
62	21925.55	623776.74	123053.122
63	21325.93	023066.68	422388.594
64	20563.56	322176.44	921540.982
65	19542.55	420993.66	620399.853
66	18630.03	819947.47	019383.687
67	17397.85	218347.17	817815.362
68	15911.86	616433.99	515833.401
69	14197.26	714289.29	413591.830
70	12323.80	112082.59	511417.098
71	10488.11	510071.57	49422.545
72	8806.452	8311.446	7681.791
73	7287.530	6717.934	6163.838
74	5958.474	5342.380	4905.497
75	4807.658	4224.501	3809.897
76	3806.991	3317.797	2937.098
77	3028.156	2598.053	2290.975
78	2412.063	2053.644	1815.344
79	1932.556	1639.040	1456.925
80	1561.544	1306.776	1167.283
81	1251.560	1046.196	935.764
82	997.761	828.238	749.774
83	795.303	661.622	596.719
84	625.780	521.161	475.632
85	492.100	410.729	377.793
86	387.480	329.358	303.203
87	303.203	257.674	238.300
88	234.425	202.458	185.990
89	179.209	156.929	143.368
90	136.587	120.119	107.526
91	104.620	91.058	81.371
92	78.465	68.778	59.091
93	61.997	55.216	48.435
94	48.435	42.623	35.842
95	35.842	29.061	26.155
96	32.936	29.061	23.249
97	29.061	23.249	16.468
98	29.061	23.249	16.468
99	26.155	19.374	16.468
100	26.155	23.249	16.468
101	26.155	19.374	16.468

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CANDELA TABULATION - (Cont.)

102	26.155	19.374	16.468
103	32.936	23.249	19.374
104	29.061	19.374	12.593
105	29.061	19.374	16.468
106	32.936	23.249	16.468
107	32.936	19.374	16.468
108	32.936	19.374	16.468
109	29.061	19.374	16.468
110	26.155	19.374	12.593
111	29.061	23.249	19.374
112	29.061	23.249	19.374
113	26.155	19.374	16.468
114	26.155	19.374	16.468
115	29.061	23.249	19.374
116	29.061	23.249	16.468
117	26.155	19.374	16.468
118	29.061	23.249	19.374
119	29.061	23.249	19.374
120	26.155	19.374	16.468
121	26.155	19.374	12.593
122	26.155	23.249	12.593
123	26.155	19.374	16.468
124	29.061	23.249	19.374
125	26.155	19.374	16.468
126	29.061	23.249	19.374
127	26.155	19.374	16.468
128	26.155	19.374	16.468
129	29.061	19.374	16.468
130	26.155	19.374	16.468
131	26.155	19.374	16.468
132	26.155	19.374	16.468
133	26.155	19.374	16.468
134	29.061	23.249	16.468
135	29.061	19.374	16.468
136	26.155	23.249	16.468
137	26.155	19.374	16.468
138	26.155	19.374	16.468
139	29.061	19.374	16.468
140	29.061	23.249	16.468
141	29.061	23.249	16.468
142	29.061	23.249	16.468
143	29.061	23.249	19.374
144	29.061	23.249	16.468
145	29.061	23.249	19.374
146	29.061	23.249	16.468
147	29.061	23.249	16.468
148	29.061	23.249	16.468
149	29.061	23.249	19.374
150	29.061	23.249	16.468
151	26.155	19.374	12.593
152	29.061	19.374	12.593
153	32.936	23.249	16.468
154	29.061	23.249	19.374
155	29.061	23.249	19.374
156	29.061	23.249	19.374
157	26.155	19.374	16.468

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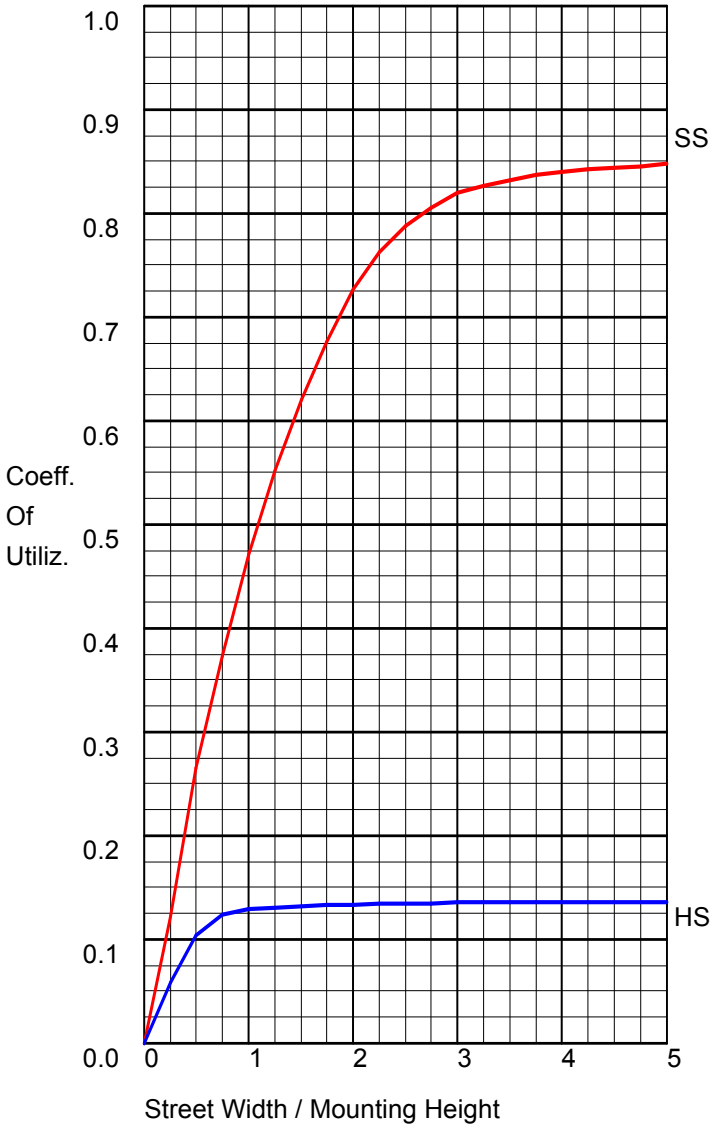
CANDELA TABULATION - (Cont.)

158	29.061	23.249	16.468
159	26.155	19.374	16.468
160	32.936	23.249	19.374
161	29.061	23.249	16.468
162	29.061	23.249	16.468
163	32.936	26.155	19.374
164	29.061	23.249	19.374
165	29.061	23.249	16.468
166	29.061	23.249	16.468
167	29.061	23.249	19.374
168	29.061	23.249	19.374
169	29.061	23.249	19.374
170	32.936	23.249	19.374
171	32.936	23.249	19.374
172	32.936	26.155	19.374
173	32.936	23.249	19.374
174	32.936	26.155	19.374
175	29.061	23.249	16.468
176	32.936	26.155	19.374
177	32.936	26.155	19.374
178	29.061	23.249	19.374
179	32.936	26.155	19.374
180	25.186	25.186	25.186

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

COEFFICIENTS OF UTILIZATION



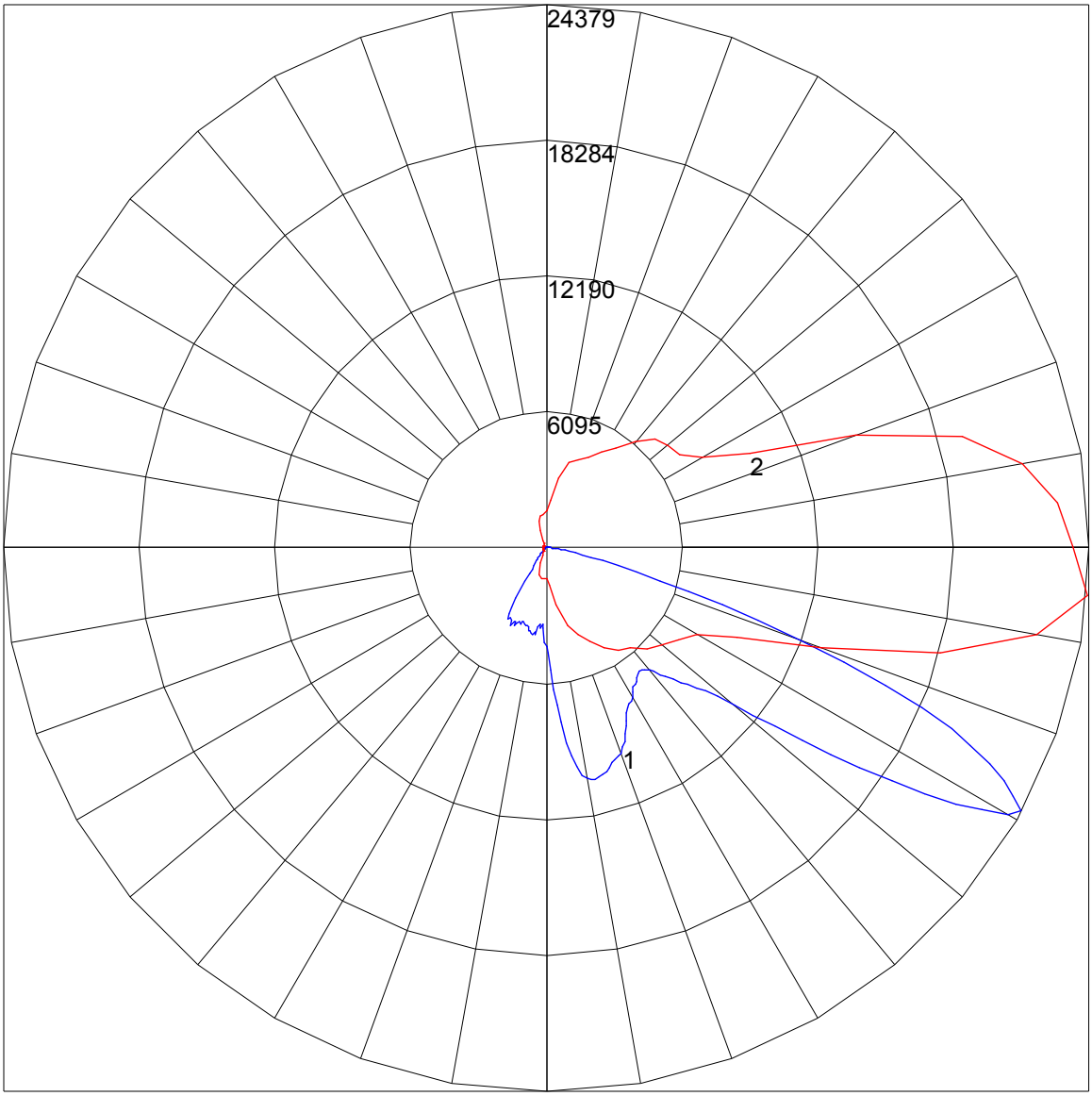
FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	18085.3	85.6
Downward House Side	2885.5	13.7
Downward Total	20970.8	99.2
Upward Street Side	103.4	0.5
Upward House Side	55.8	0.3
Upward Total	159.2	0.8
Total Flux	21130.0	100.0

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PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

POLAR GRAPH

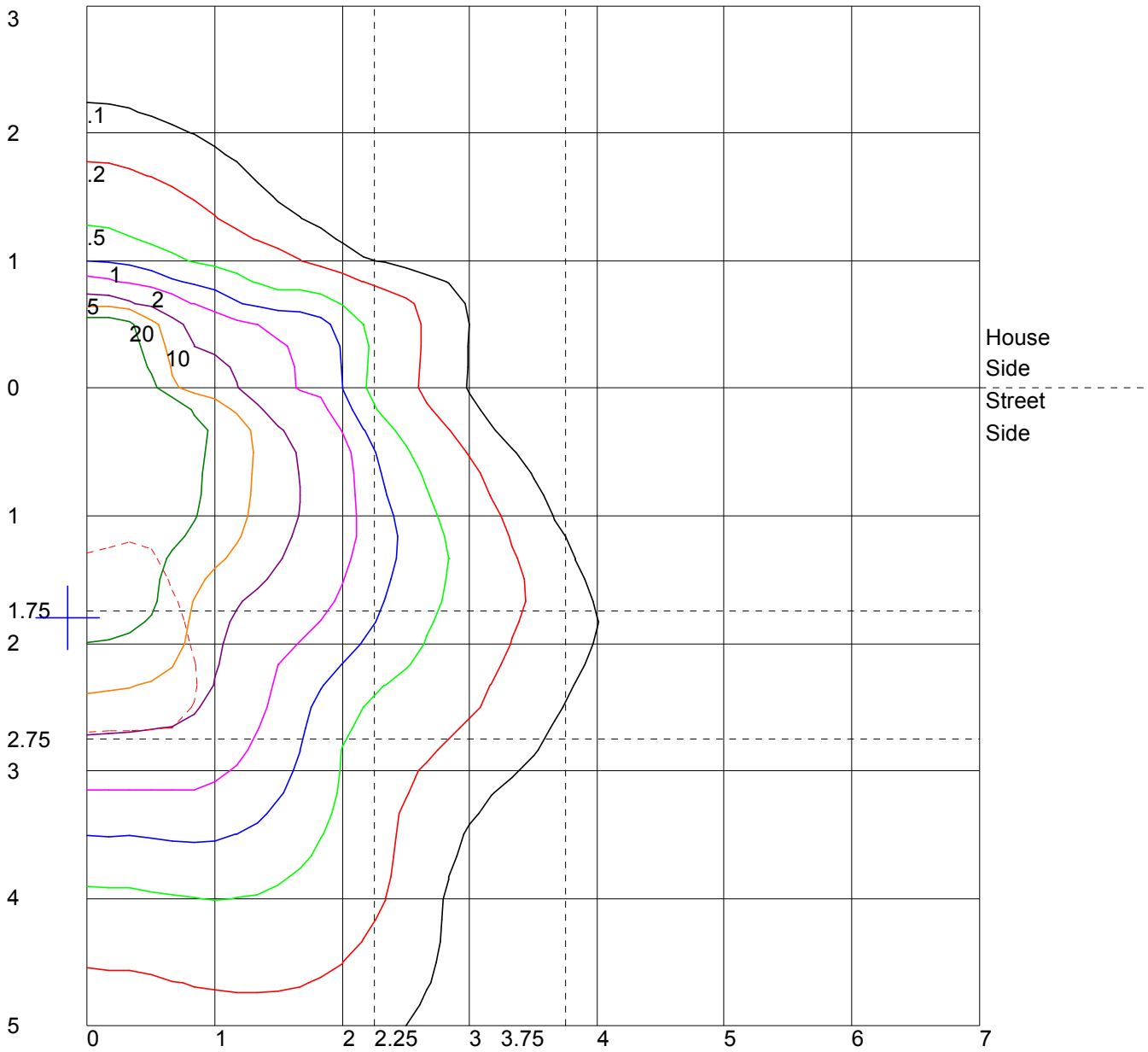


Maximum Candela = 24379.273 Located At Horizontal Angle = 355, Vertical Angle = 61
1 - Vertical Plane Through Horizontal Angles (355 - 175) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (61) (Through Max. Cd.)

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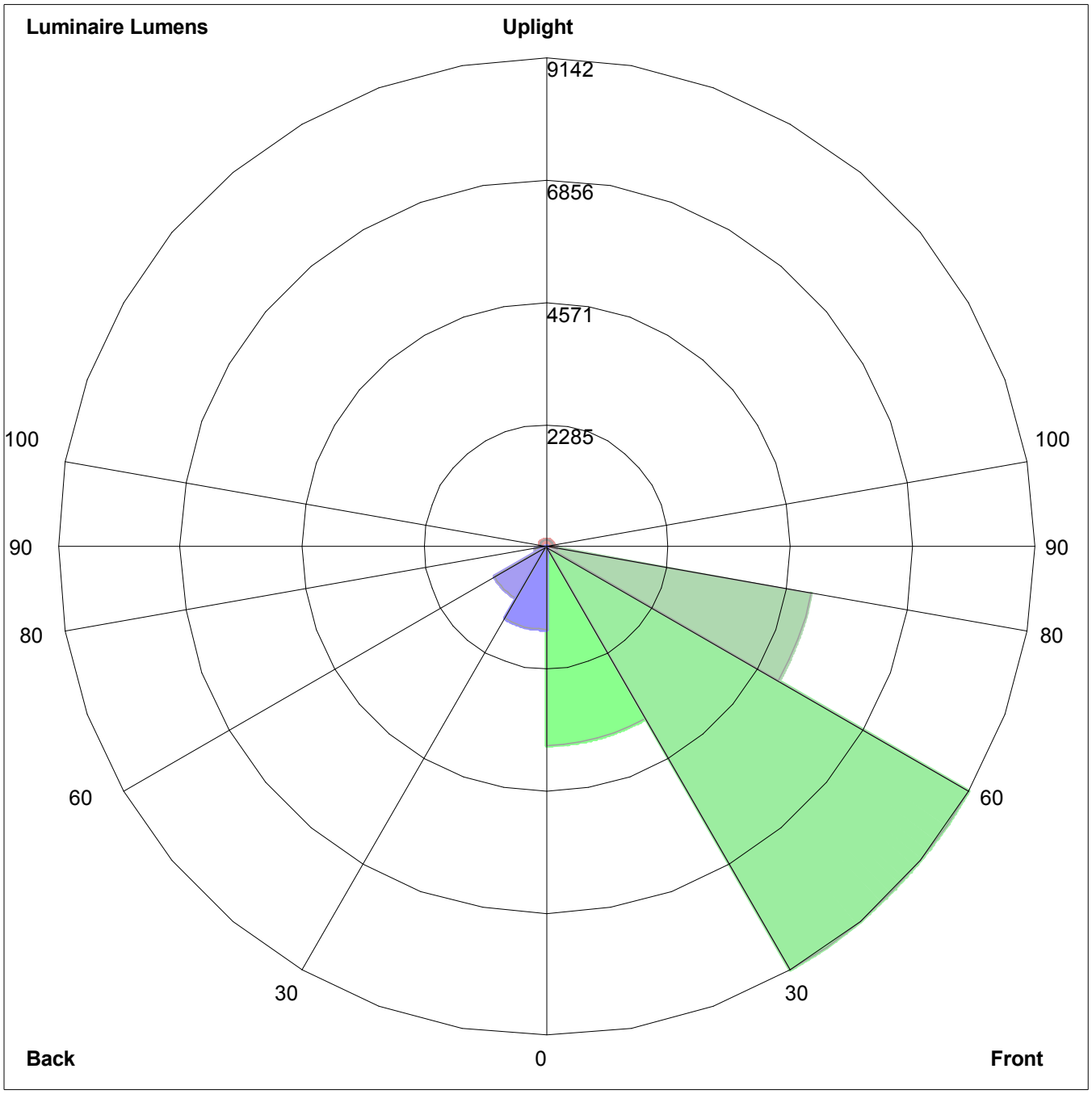
ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height
Values Based On 10 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_6_4K_1_AS_CCB_XX_X-AGI32.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low= 3712.0, Medium= 9142.0, High=5023.8, Very High=207.6
Back: Low=1545.3, Medium=1113.5, High=208.0, Very High=18.8
Uplight: Low=31.4, High=127.8

BUG Rating : B3-U3-G3

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_9_4K_1_AS_CCB_XX_X-AGI32.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] 501971P1
[TESTLAB] SCALED PHOTOMETRY
[ISSUEDATE] 8/29/2013
[MANUFAC] Holophane
[LUMCAT] TNLED 9 4K 1 AS CCB XX X
[LUMINAIRE] TunnelPass LED
[LAMPCAT] LED 4000K
[LAMP] 9 LED ARRAY
[BALLAST] 3 X 150W DRIVER, 120V-277V, 1050mA
[_AGI32] File was generated from AGi32

CHARACTERISTICS

IES Classification	Type IV
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	31114
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	85
Total Luminaire Watts	366.1
Ballast Factor	1.00
Upward Waste Light Ratio	0.01
Maximum Candela	32107.732
Maximum Candela Angle	0H 60V
Maximum Candela (<90 Degrees Vertical)	32107.732
Maximum Candela Angle (<90 Degrees Vertical)	0H 60V
Maximum Candela At 90 Degrees Vertical	187.967 (0.6% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	2516.779 (8.1% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_9_4K_1_AS_CCB_XX_X-AGI32.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	5482.1	N.A.	17.6
FM - Front-Medium (30-60)	13381.8	N.A.	43.0
FH - Front-High (60-80)	7365.4	N.A.	23.7
FVH - Front-Very High (80-90)	325.6	N.A.	1.0
BL - Back-Low (0-30)	2326.6	N.A.	7.5
BM - Back-Medium (30-60)	1718.5	N.A.	5.5
BH - Back-High (60-80)	302.7	N.A.	1.0
BVH - Back-Very High (80-90)	26.3	N.A.	0.1
UL - Uplight-Low (90-100)	38.5	N.A.	0.1
UH - Uplight-High (100-180)	146.2	N.A.	0.5
Total	31113.7	N.A.	100.0
BUG Rating	B3-U3-G3		

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_9_4K_1_AS_CCB_XX_X-AGI32.IES

CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	5	15	25	35	45	55	65	75	85
0.0	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591
2.5	9390.436	9381.532	9230.169	9118.378	8830.492	8527.766	8141.939	7727.422	7383.146	7076.463
5.0	12056.59	12036.81	11849.83	11533.26	10993.10	10442.06	29736.691	8905.679	8073.677	7331.702
7.5	14293.40	14273.62	14135.11	13752.25	913239.80	212469.13	711388.82	210198.69	48966.026	7683.893
10.0	15228.29	15198.61	15171.90	15049.23	214795.97	114210.30	513083.49	311566.89	69829.685	8231.965
12.5	15425.16	15369.76	15389.55	15115513.21	315539.92	515283.69	614567.44	312845.07	110954.51	98817.631
15.0	15225.32	15173.88	15184.76	15551.79	615887.16	916020.72	415340.08	613932.31	211822.13	59335.035
17.5	14818.72	14793.99	14774.20	15264.89	915809.01	416313.55	715955.43	114637.68	312199.05	89531.906
20.0	14393.32	14352.76	14288.46	14901.82	615581.47	516022.70	315862.43	614747.49	512372.18	69344.928
22.5	13440.63	13482.18	13707.74	14594.15	415188.72	315559.71	115496.39	514424.98	311920.07	68785.973
25.0	12389.00	12412.66	12956.86	14079.71	814630.75	814950.30	214874.12	613671.13	710816.01	77782.823
27.5	11769.70	11984.38	12485.95	13454.48	014030.25	314334.95	714176.66	912574.00	39862.332	6946.865
30.0	11327.48	11508.52	12712286.11	713221.00	513669.15	813901.64	413379.29	311906.22	69327.121	6269.194
32.5	10930.77	11122.70	012112.98	913041.94	213335.76	413330.81	812722.39	811462.03	08536.670	5349.145
35.0	10721.04	10954.51	912044.72	813044.91	013106.24	712881.67	512067.48	210485.59	17549.348	4697.196
37.5	11003.98	11329.46	412586.86	413357.52	913216.05	912274.24	511215.69	49510.141	6934.993	4335.113
40.0	11503.58	11988.33	813825.46	814396.29	413569.23	911700.45	110162.09	08932.390	6803.416	4293.562
42.5	11640.10	12274.24	514996.79	915915.85	914022.33	811498.63	49800.995	8824.556	6612.481	4295.541
45.0	12049.67	12657.10	415761.52	817174.24	814440.81	211525.34	59878.161	8689.022	6737.133	4513.187
47.5	12915.31	13383.25	115930.69	817365.18	314723.75	211700.45	110074.04	29103.539	7249.590	4803.052
50.0	15062.09	15115.51	516180.99	116891.30	814356.72	211954.70	110701.25	89652.600	6943.897	4385.567
52.5	18763.06	18452.42	417718.36	316535.16	014086.64	312390.98	310878.34	39044.181	6219.729	3968.082
55.0	23114.00	22506.57	520098.61	916767.64	613610.79	012066.49	210265.96	68291.323	5555.909	3595.116
57.5	28329.59	27218.61	122904.27	417298.90	012947.95	910949.57	39406.265	7669.054	4985.083	3324.048
60.0	32107.73	30765.25	224818.56	917474.00	611856.76	19761.423	8722.658	7154.618	4937.596	3398.246
62.5	31126.34	29953.03	624033.06	516608.36	910796.23	18820.599	8228.008	7051.730	4551.769	2636.485
65.0	28506.68	27585.64	222413.58	115320.30	09774.284	7990.576	7505.819	5556.898	3025.279	1654.110
67.5	23952.93	23352.42	719512.95	313652.34	08820.599	6737.133	5717.165	4072.948	2248.679	1226.732
70.0	16856.68	16666.73	714998.77	711183.04	77249.590	5100.831	4358.856	3195.439	1807.451	951.707
72.5	10751.71	10732.91	610554.84	28208.222	5325.402	3627.763	3305.251	2465.336	1395.902	697.457
75.0	6310.745	6369.113	6820.234	5566.791	3753.404	2606.806	2443.571	1836.141	1046.679	494.650
77.5	3605.009	3651.506	4127.360	3539.715	2511.833	1799.537	1767.879	1336.544	753.847	346.255
80.0	2133.920	2161.621	2516.779	2239.775	1614.538	1219.807	1223.764	928.953	544.115	239.411
82.5	1231.679	1253.443	1476.036	1358.309	968.525	788.472	807.269	615.345	366.041	158.288
85.0	688.553	704.382	824.087	763.740	551.040	477.832	485.746	363.073	221.603	96.951
87.5	369.009	374.945	421.442	387.806	289.865	266.122	264.143	199.839	119.705	60.347
90.0	176.095	178.074	187.967	173.128	136.523	129.598	128.609	90.026	61.337	43.529
92.5	73.208	75.187	76.176	71.230	60.347	60.347	58.369	51.444	44.519	39.572
95.0	12.861	12.861	16.818	26.711	34.626	41.551	46.497	46.497	43.529	39.572
97.5	0.000	2.968	11.872	19.786	29.679	39.572	46.497	46.497	44.519	39.572
100.0	0.000	1.979	11.872	19.786	29.679	41.551	46.497	48.476	44.519	39.572
102.5	0.000	2.968	12.861	23.743	33.636	41.551	49.465	49.465	46.497	43.529
105.0	0.000	2.968	11.872	26.711	31.658	43.529	49.465	49.465	46.497	43.529
107.5	2.968	2.968	11.872	24.733	31.658	43.529	51.444	51.444	48.476	43.529
110.0	2.968	2.968	11.872	23.743	31.658	43.529	51.444	53.422	46.497	43.529
112.5	0.000	2.968	9.893	21.765	31.658	41.551	51.444	51.444	46.497	43.529
115.0	2.968	2.968	11.872	21.765	31.658	43.529	49.465	51.444	48.476	43.529
117.5	0.000	2.968	11.872	19.786	31.658	41.551	49.465	51.444	46.497	43.529
120.0	2.968	2.968	11.872	21.765	33.636	41.551	49.465	51.444	46.497	43.529
122.5	2.968	4.947	11.872	21.765	31.658	43.529	49.465	49.465	46.497	43.529
125.0	0.000	1.979	9.893	19.786	31.658	41.551	48.476	48.476	46.497	41.551
127.5	0.000	2.968	11.872	21.765	31.658	43.529	49.465	51.444	48.476	43.529
130.0	2.968	4.947	11.872	23.743	33.636	43.529	49.465	51.444	48.476	43.529

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CANDELA TABULATION - (Cont.)

132.5	2.968	4.947	11.872	21.765	31.658	43.529	49.465	51.444	48.476	44.519
135.0	0.000	2.968	11.872	19.786	31.658	41.551	48.476	49.465	46.497	41.551
137.5	2.968	4.947	12.861	23.743	31.658	43.529	49.465	51.444	48.476	43.529
140.0	0.000	2.968	9.893	19.786	31.658	41.551	49.465	49.465	48.476	43.529
142.5	0.000	4.947	11.872	21.765	31.658	41.551	49.465	49.465	48.476	43.529
145.0	2.968	4.947	11.872	21.765	31.658	43.529	49.465	51.444	48.476	44.519
147.5	0.000	2.968	9.893	19.786	31.658	41.551	48.476	49.465	46.497	43.529
150.0	2.968	4.947	11.872	21.765	31.658	43.529	49.465	51.444	49.465	44.519
152.5	0.000	2.968	9.893	21.765	31.658	41.551	49.465	51.444	48.476	43.529
155.0	2.968	2.968	9.893	21.765	31.658	43.529	49.465	49.465	48.476	43.529
157.5	6.925	4.947	12.861	23.743	33.636	43.529	51.444	53.422	49.465	44.519
160.0	0.000	2.968	11.872	21.765	31.658	43.529	49.465	51.444	48.476	43.529
162.5	2.968	4.947	11.872	23.743	33.636	43.529	51.444	51.444	48.476	44.519
165.0	2.968	4.947	12.861	23.743	33.636	44.519	51.444	51.444	49.465	44.519
167.5	6.925	6.925	12.861	23.743	33.636	44.519	51.444	51.444	49.465	44.519
170.0	2.968	6.925	12.861	23.743	34.626	44.519	53.422	53.422	49.465	44.519
172.5	6.925	7.914	12.861	23.743	34.626	44.519	51.444	53.422	49.465	44.519
175.0	2.968	4.947	12.861	23.743	33.636	43.529	51.444	51.444	48.476	43.529
177.5	6.925	6.925	12.861	23.743	33.636	44.519	51.444	53.422	48.476	43.529
180.0	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722

Vert. Angles	**Horizontal Angles**									
	90	**95**	**105**	**115**	**125**	**135**	**145**	**155**	**165**	**175**
0.0	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591	7064.591
2.5	6965.661	6863.763	6687.668	6522.455	6342.402	6137.617	5988.233	5822.031	5746.844	5686.496
5.0	7075.474	6825.181	6379.006	5853.688	5500.508	5383.771	5417.407	5414.439	5393.664	5366.953
7.5	7195.179	6717.347	6017.912	5566.791	5403.557	5324.413	5347.167	5507.433	5634.064	5678.582
10.0	7539.455	6818.256	6105.960	5639.999	5620.213	5625.160	5705.293	5688.475	5705.293	5708.261
12.5	7832.288	6975.554	6263.258	6024.837	5864.570	5910.078	5776.523	5720.133	5598.449	5571.738
15.0	8122.153	7146.703	6307.777	6287.991	6219.729	5954.597	5780.480	5535.134	5339.252	5257.140
17.5	8158.757	7134.832	6312.723	6163.339	6091.120	5880.399	5681.550	5497.540	5315.509	5187.889
20.0	7934.186	6805.395	5919.971	5827.966	5802.245	5891.282	5690.454	5520.294	5385.749	5319.466
22.5	7312.906	6144.542	5297.702	5293.744	5363.985	5700.347	5786.416	5592.513	5524.251	5475.776
25.0	6363.178	5366.953	4597.277	4480.540	4846.581	5498.529	5831.924	5666.710	5624.171	5412.460
27.5	5566.791	4680.378	4046.237	3929.500	4310.380	5087.970	5597.459	5833.902	5587.566	5266.044
30.0	4900.003	4037.333	3481.347	3470.464	3897.842	4493.401	5329.359	5548.984	4936.607	4588.373
32.5	4049.205	3282.497	2807.633	3010.440	3417.042	4085.809	4488.454	4242.118	3307.230	2532.608
35.0	3456.614	2763.115	2416.860	2614.720	2939.210	3417.042	3165.760	2561.298	1712.478	1514.618
37.5	3217.204	2543.490	2278.358	2311.994	2556.351	2470.282	2027.076	1375.127	1148.577	1078.337
40.0	3234.022	2538.544	2276.379	2119.081	2098.305	1707.532	1281.144	928.953	855.745	824.087
42.5	3265.679	2594.934	2278.358	2024.108	1672.906	1278.176	836.948	704.382	627.216	592.591
45.0	3495.197	2785.869	2319.909	1893.520	1312.801	946.760	648.981	531.254	472.885	442.217
47.5	3544.662	2768.061	2297.155	1722.371	1036.786	685.585	510.479	411.549	380.881	369.009
50.0	3290.412	2626.592	2146.781	1531.436	817.162	534.222	405.613	348.234	341.309	341.309
52.5	3031.215	2443.571	1948.921	1324.673	632.163	426.388	334.383	311.630	319.544	326.469
55.0	2736.404	2203.171	1694.671	1129.781	490.693	348.234	289.865	287.886	300.747	309.651
57.5	2559.319	2058.733	1461.196	934.889	392.752	295.801	264.143	275.025	287.886	294.811
60.0	2556.351	2024.108	1322.694	814.194	326.469	254.250	241.389	254.250	268.100	277.993
62.5	1914.296	1572.987	1015.022	624.248	276.015	229.518	226.550	239.411	253.261	259.197
65.0	1270.261	1076.358	709.328	436.281	227.539	201.817	204.785	219.625	234.464	244.357
67.5	938.846	767.697	516.415	324.490	194.892	181.042	189.946	202.807	219.625	231.496
70.0	722.189	582.698	394.731	249.304	170.160	161.256	171.149	187.967	206.764	221.603
72.5	537.190	429.356	289.865	189.946	143.449	134.545	148.395	166.202	185.988	201.817
75.0	395.720	316.576	209.732	144.438	119.705	112.780	124.652	141.470	160.267	173.128
77.5	287.886	227.539	149.384	111.791	96.951	94.973	101.898	116.737	133.556	144.438

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CANDELA TABULATION - (Cont.)

80.0	202.807	160.267	106.844	80.133	71.230	71.230	76.176	88.048	97.941	104.866
82.5	133.556	104.866	71.230	53.422	49.465	48.476	53.422	60.347	68.262	70.240
85.0	80.133	61.337	46.497	39.572	33.636	29.679	31.658	34.626	41.551	43.529
87.5	49.465	43.529	36.604	31.658	28.690	24.733	19.786	19.786	23.743	23.743
90.0	38.583	34.626	31.658	28.690	24.733	19.786	16.818	11.872	9.893	9.893
92.5	36.604	34.626	31.658	28.690	24.733	19.786	14.840	11.872	6.925	4.947
95.0	36.604	34.626	31.658	28.690	24.733	19.786	14.840	9.893	6.925	1.979
97.5	36.604	34.626	31.658	28.690	24.733	21.765	14.840	9.893	4.947	0.000
100.0	38.583	36.604	31.658	29.679	24.733	21.765	16.818	9.893	6.925	2.968
102.5	39.572	38.583	34.626	31.658	26.711	23.743	18.797	11.872	7.914	6.925
105.0	39.572	36.604	34.626	31.658	26.711	23.743	18.797	12.861	7.914	2.968
107.5	39.572	38.583	34.626	31.658	28.690	23.743	18.797	12.861	7.914	6.925
110.0	39.572	38.583	34.626	33.636	28.690	23.743	18.797	12.861	7.914	6.925
112.5	39.572	38.583	34.626	31.658	28.690	23.743	18.797	12.861	7.914	2.968
115.0	39.572	38.583	34.626	31.658	26.711	23.743	18.797	12.861	7.914	6.925
117.5	39.572	38.583	34.626	31.658	28.690	23.743	19.786	12.861	9.893	6.925
120.0	39.572	38.583	34.626	31.658	28.690	23.743	18.797	14.840	9.893	7.914
122.5	39.572	38.583	34.626	31.658	28.690	23.743	18.797	14.840	9.893	6.925
125.0	38.583	36.604	33.636	29.679	26.711	21.765	18.797	12.861	7.914	2.968
127.5	39.572	38.583	34.626	31.658	28.690	23.743	18.797	14.840	9.893	7.914
130.0	41.551	38.583	34.626	31.658	28.690	23.743	19.786	14.840	9.893	7.914
132.5	41.551	38.583	34.626	31.658	28.690	24.733	19.786	14.840	9.893	7.914
135.0	41.551	38.583	33.636	29.679	26.711	21.765	18.797	11.872	7.914	6.925
137.5	41.551	39.572	34.626	31.658	28.690	24.733	19.786	14.840	11.872	11.872
140.0	41.551	38.583	34.626	31.658	26.711	23.743	18.797	12.861	9.893	11.872
142.5	41.551	38.583	34.626	31.658	26.711	21.765	19.786	14.840	11.872	11.872
145.0	41.551	38.583	34.626	31.658	28.690	24.733	19.786	14.840	11.872	12.861
147.5	41.551	38.583	33.636	29.679	26.711	21.765	18.797	14.840	9.893	9.893
150.0	41.551	39.572	34.626	33.636	28.690	24.733	19.786	14.840	11.872	9.893
152.5	41.551	36.604	34.626	29.679	26.711	21.765	18.797	12.861	7.914	6.925
155.0	39.572	36.604	33.636	29.679	26.711	23.743	18.797	11.872	7.914	6.925
157.5	41.551	39.572	34.626	33.636	28.690	24.733	19.786	14.840	9.893	9.893
160.0	39.572	36.604	33.636	29.679	26.711	23.743	16.818	11.872	7.914	2.968
162.5	39.572	38.583	33.636	31.658	26.711	21.765	18.797	11.872	6.925	2.968
165.0	41.551	38.583	34.626	31.658	26.711	23.743	16.818	11.872	6.925	2.968
167.5	39.572	38.583	34.626	31.658	26.711	23.743	18.797	11.872	6.925	2.968
170.0	41.551	38.583	34.626	33.636	28.690	21.765	18.797	11.872	6.925	2.968
172.5	41.551	39.572	36.604	31.658	28.690	23.743	18.797	11.872	6.925	1.979
175.0	39.572	38.583	34.626	31.658	28.690	21.765	16.818	9.893	4.947	0.000
177.5	39.572	38.583	34.626	31.658	26.711	21.765	16.818	9.893	4.947	1.979
180.0	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722	25.722

Vert. Angles	**Horizontal Angles**
	180
0.0	7064.591
2.5	5675.614
5.0	5349.145
7.5	5681.550
10.0	5702.325
12.5	5585.588
15.0	5295.723
17.5	5178.986
20.0	5295.723
22.5	5482.701
25.0	5395.642

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CANDELA TABULATION - (Cont.)

27.5	5256.151
30.0	4570.566
32.5	2422.796
35.0	1497.800
37.5	1071.412
40.0	825.076
42.5	592.591
45.0	442.217
47.5	369.009
50.0	343.287
52.5	326.469
55.0	312.619
57.5	299.758
60.0	276.015
62.5	263.154
65.0	246.336
67.5	233.475
70.0	219.625
72.5	202.807
75.0	176.095
77.5	146.416
80.0	106.844
82.5	70.240
85.0	43.529
87.5	26.711
90.0	9.893
92.5	2.968
95.0	0.000
97.5	0.000
100.0	2.968
102.5	6.925
105.0	2.968
107.5	6.925
110.0	6.925
112.5	6.925
115.0	6.925
117.5	6.925
120.0	6.925
122.5	6.925
125.0	2.968
127.5	6.925
130.0	9.893
132.5	6.925
135.0	9.893
137.5	9.893
140.0	9.893
142.5	12.861
145.0	12.861
147.5	9.893
150.0	12.861
152.5	6.925
155.0	6.925
157.5	9.893
160.0	2.968
162.5	2.968
165.0	2.968

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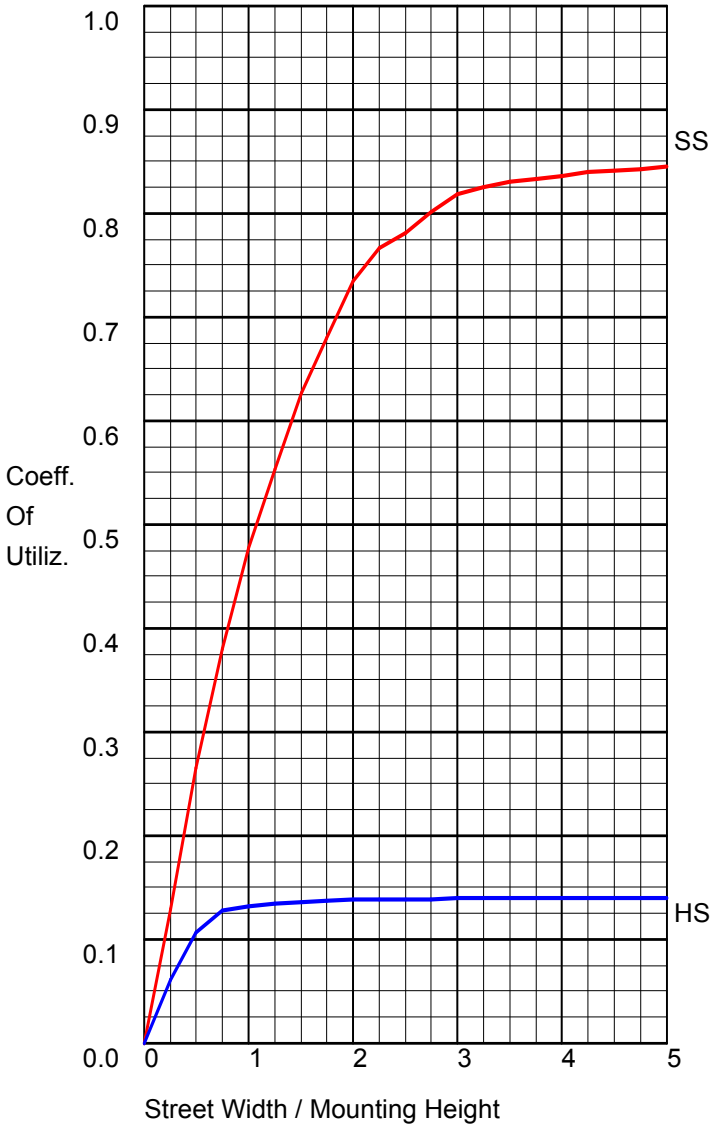
CANDELA TABULATION - (Cont.)

167.5	0.000
170.0	0.000
172.5	0.000
175.0	0.000
177.5	0.000
180.0	25.722

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IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_9_4K_1_AS_CCB_XX_X-AGI32.IES

COEFFICIENTS OF UTILIZATION



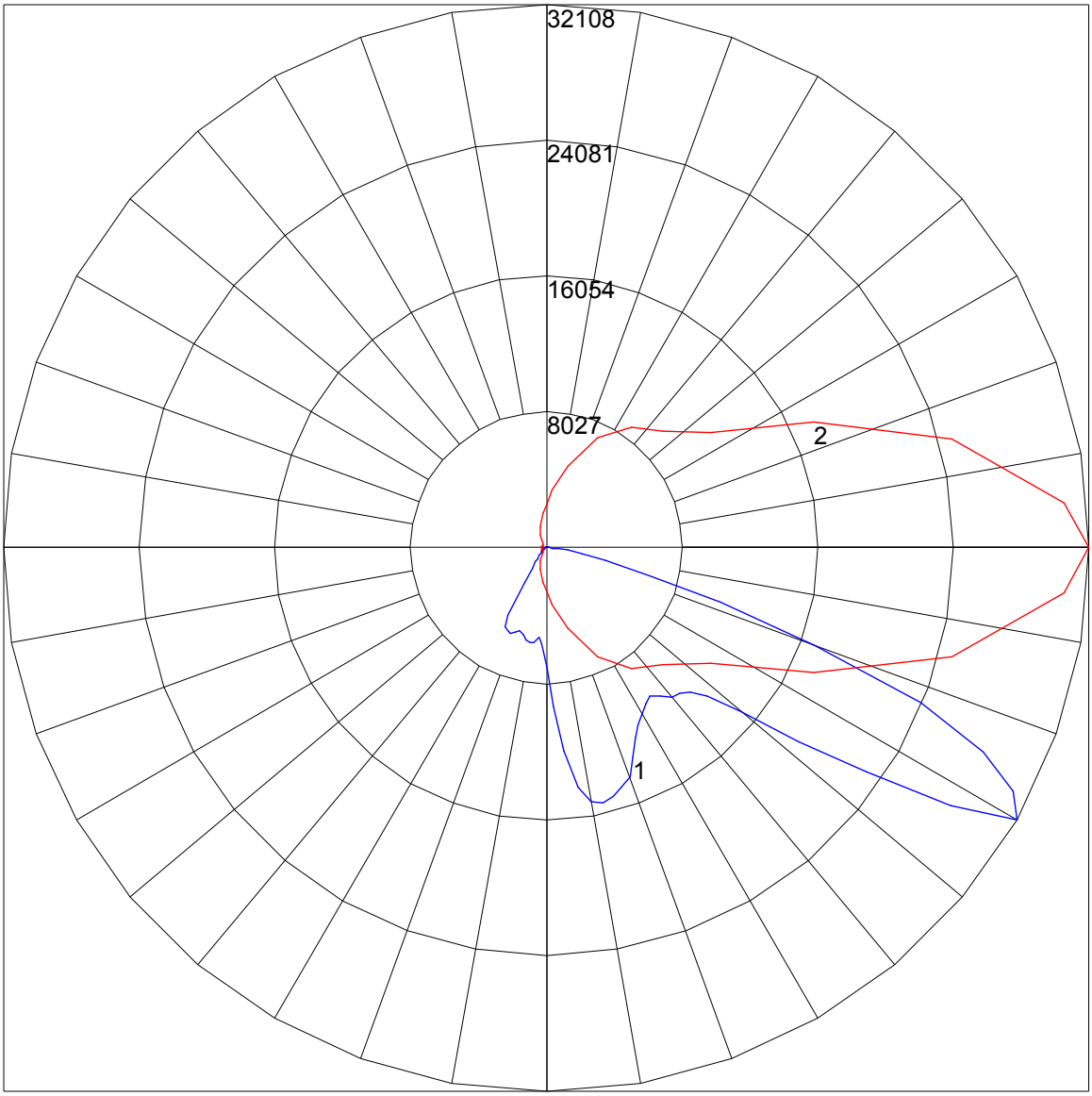
FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	26554.9	85.3
Downward House Side	4374.1	14.1
Downward Total	30929.0	99.4
Upward Street Side	115.0	0.4
Upward House Side	69.6	0.2
Upward Total	184.6	0.6
Total Flux	31113.6	100.0

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POLAR GRAPH

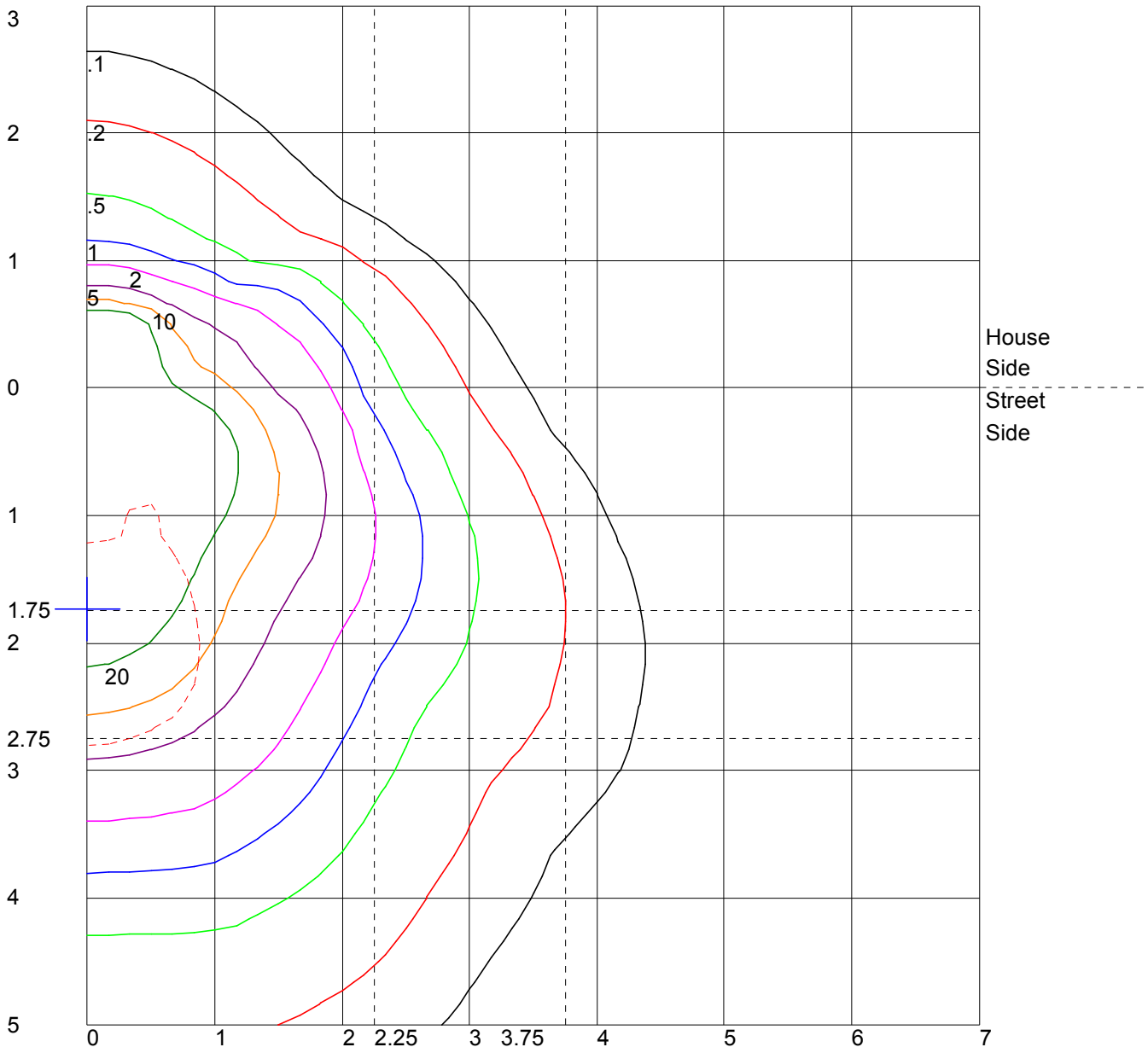


Maximum Candela = 32107.732 Located At Horizontal Angle = 0, Vertical Angle = 60
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (60) (Through Max. Cd.)

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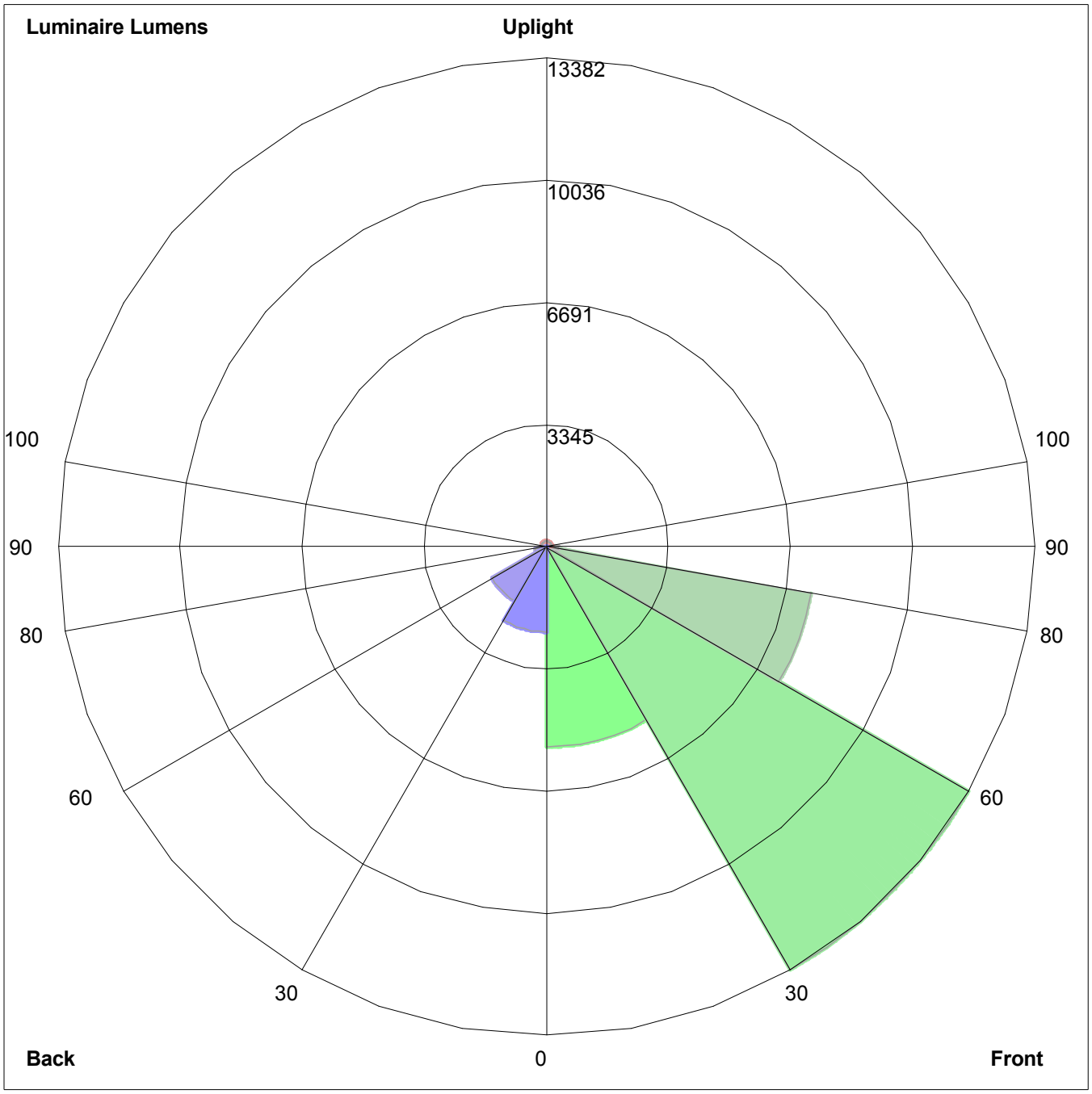
ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height
Values Based On 10 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

IES ROAD REPORT
PHOTOMETRIC FILENAME : TNLED_9_4K_1_AS_CCB_XX_X-AGI32.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=5482.1, Medium=13381.8, High=7365.4, Very High=325.6
Back: Low=2326.6, Medium=1718.5, High=302.7, Very High=26.3
Uplight: Low=38.5, High=146.2

BUG Rating : B3-U3-G3

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