





Frequently Asked Questions

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What lights will be replaced with this project? Will lights at schools, ball fields and parks be replaced?

This project will convert roadway lighting in the City of Santa Fe. Specifically, all City owned and PNM owned streetlights on neighborhood roads, local, and main roads. Non-roadway lighting, such as parking lots, parks, or athletic fields, is not part of the scope of this project. Additionally, this project must be completed using the existing pole infrastructure.

The city owns 3,499 street lights in Santa Fe and PNM owns 2,057 street lights in Santa Fe. Dalkia is converting the city's 3,499 lights and PNM is in the process of planning the conversion for their 2,057, working closely with the city and Dalkia to ensure cohesiveness throughout the lighting design.

Will the lights at Frenchy's Field and St Michael's Drive demonstration sites be the same lights that are in my neighborhood?

No. Frenchy's Field and Jaguar Drive have examples of lighting for a local road and St Michael's Drive demonstrates lighting for a major road. Please head over to Governor Miles Road demonstration site to see the residential road fixtures.

The lights for residential roadways (about 3,680 lumens) are about 60% less bright than the lights at Frenchy's Field and Jaguar Drive (abut 15,500 lumens). Residential roadway lights account for about 60% of the total street lights in the city of Santa Fe. Lights on local streets account for about 17% of the street lights and lights on major roads account for the final 23%.

Since, "the primary purposes of street lighting are to help the motorist identify obstacles, provide adequate visibility of pedestrians and cyclists, and assist in visual search tasks, both on and adjacent to the street." (Illuminating Engineering Society, IES, the organization that issues the Roadway Lighting standard RP-8-18), the lighting required on each type of roadway varies.







Why are we changing the street lights anyway?

Converting the street lights to reliable, energy efficient, fully shielded LEDs dramatically reduces costs, failure rate and impact on dark skies. City ambiance will be improved by a uniform lighting look compared to the sporadic status quo. Currently, high pressure sodium, mercury vapor, and high color temperature LEDs are scattered throughout the city. These lights consume twice as much electricity as new technology, cost more than twice as much to operate, have a high failure rate and shine light up affecting our night skies. In 2020, PNM received over 1000 complaints from residents with issues about street lights and lead times on repairs can be months.

What is all the controversy about and how has the project plan changed since February 24 when Governing Body passed the contract?

The controversy is over the color temperature of the lights. The original plan was to convert residential streetlights to 3000 kelvin and local and major roadway lights to 4000 Kelvin. In response to community feedback, the Governing Body directed a community guided lighting design process be undertaken and community feedback and lighting design options come to the Governing Body for consideration.

Is the timeline for feedback being extended?

Yes, the feedback window is being extended two weeks, to May 24, 2021.



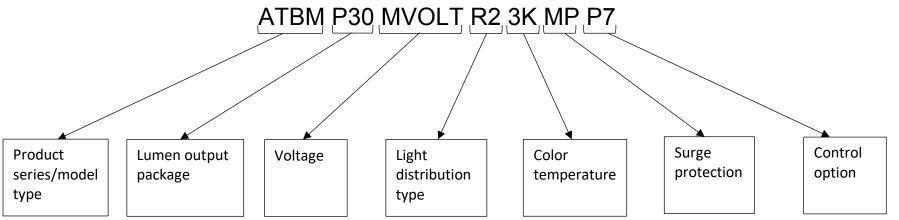




What is the color temperature, lumen output and shielding of the demonstration lights?

Fixture #	Demonstration area	Fixture location	Roadway Type	Part Number	IDA Certified	Shielding	Color Temp (Kelvin)	Lumens	Wattage
1-3	Frenchy's Field & Osage Ave	West of Osage	Local	ATBM P30 MVOLT R2 27K MP P7	YES	Full cut off	2700	14,400	127
4-6	Frenchy's Field & Osage Ave	East of Osage	Local	ATBM P30 MVOLT R2 3K MP P7	YES	Full cut off	3000	14,600	125
7-9	St Michaels Drive, immediately west of 5th St	South side of street block	Major	ATBM P70 MVOLT R2 4K MP P7	NO	Full cut off	4000	21,600	190
10-12	St Michaels Drive, immediately west of 5th St	North side of street block	Major	ATBM P70 MVOLT R2 27K MP P7	YES	Full cut off	2700	20,000	203
13-16	Jaguar Drive, between Paseo del Sol and Ave Contenta	North side of street block	Local	ATBM P30 MVOLT R2 3K MP P7	YES	Full cut off	3000	14,600	125
17-19	Governor Miles Road, west of Camino Carlos Rey	Western most	Residential	ATBX P40 MVOLT R2 27K MP P7	YES	Full cut off	2700	3,110	34
20-22	Governor Miles Road, west of Camino Carlos Rey	Eastern most	Residential	ATBX P40 MVOLT R2 3K MP P7	YES	Full cut off	3000	3,600	30

How to read these part numbers:





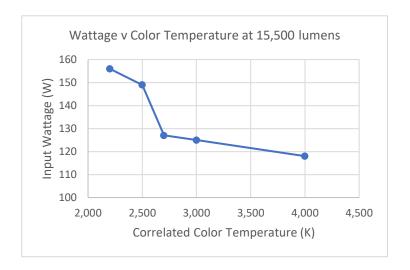




Why were only three color temperatures of light fixtures used in the demonstrations?

The three color temperatures displayed during the demonstrations are 2700, 3000, and 4000 kelvin. These were selected because they have been analyzed to meet energy savings required by the project, PNM's approved replacement equipment performance specifications issued by the Public Regulation Commission (PRC Rate 20), road lighting standards (IES RP-8-18 and NMDOT), reliability and warranty requirements, and dark sky guidelines. The 4000k is above dark sky guidelines but is specified by NMDOT regulations and by best practices for safety on larger streets and therefore should be evaluated.

The streetlight replacement project funding is via a municipal bond that requires annual cost savings meet debt repayment amounts. The technology for lower kelvin color temperature lighting requires more energy to achieve lighting levels. The chart below shows the energy consumption required to maintain lighting output of ~15,500 lumens (lighting level required on local roads) in the American Electric Lighting ATBM P30 MVOLT R2 XX MP P7.



CCT (K)	Energy (Watts)	Lighting (lumens)	Lumens per Watt
2,200	156	15,457	99.08
2,500	149	15,492	103.97
2,700	127	15,511	122.13
3,000	125	15,516	124.13
4,000	118	15,515	131.48







What feedback was received and how is the City responding?

The most common feedback from the first few nights of the demonstration has been peoples' experience of glare looking up at the new lighting fixtures and an experience of starkness of the light.

The lighting design team is researching to see if there is equipment to reduce this. At this time, a luminaire that has a visual comfort lens and additional shielding to prevent uplighting from the lens is being analyzed. The project team expects to receive a couple of these fixtures to install for evaluation by the public. Equipment cost, energy savings and lighting performance with these fixtures is being evaluated.

View the Visual Comfort Lens Guide on pages 13-16.

Why are certain lumen levels required?

Existing lights on main thoroughfares were largely designed and installed by NMDOT to meet lighting level requirements (at the time) for those roadways. Many if not most light poles in neighborhoods would have been designed and built by private developers according to City code and development plans approved by Land Use at the time.

This project is the first step of getting the street lights understood and in order. We expect there will be subsequent efforts to improve lighting in neighborhoods where it is insufficient. We are also looking into the areas where HOAs are currently responsible for streetlights. In many of these areas, the lighting is not being maintained well and we want to understand how we can improve lighting in these neighborhoods. Additionally during subsequent phases, we will have the opportunity to address existing infrastructure and if poles could be removed.

PNM's Rate 20 specifies replacing the same existing lumen output with equal lumen output, as technology is upgraded. This is how all upgrades of city infrastructure have occurred in the past, and taking a more multi-faceted approach to more holistic lighting levels is one benefit of the project.







What are the specifications of the lights used in the demonstration project and under consideration for inclusion in the City's streetlighting design?

Below is a link to various product lists under consideration for this project that have been developed by the project team after analysis and community input to date.

View the Santa Fe Street Light Equipment List on pages 10-12.

Do the LEDs displayed in the demonstrations protect the night sky?

Yes, all LED luminaires currently being considered for this project are certified by the International Dark Sky Association as "Dark Sky Approved" when operated at 3000 kelvin or less.

Figure 2-24 below from IES RP-8-18 shows the difference between up-light, backlight, and forward light for street lighting luminaires. All luminaires being considered currently for the project have a 0% up-light guarantee. Many of the existing street lights in the city don't have "full cut off" shielding, allowing light to go directly upward into the sky.

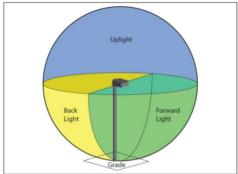


Figure 2-24. The three primary solid angles of the Luminaire Classification System (LCS).







Can streetlights be removed?

The city currently has no process for requesting the removal of existing street lights. As part of the city's initiative to regain control over its street lighting infrastructure, the city is developing a process to address this. This phase of converting the existing infrastructure to LED technology is one of many phases to improve Santa Fe's outdoor lighting infrastructure.

How does this street lighting conversion project impact the City of Santa Fe's eligibility to be a Dark Sky Designated Community?

The street lights are one of many outdoor lighting aspects that have to be controlled for the City of Santa Fe to be considered for the Dark Sky Community Designation by the IDA. Becoming an International Dark Sky Designated Community will require codes and provisions to restrict privately-owned residential and commercial lighting, along with athletic fields, parking lots, parks, schools, advertising lighting, and more. Addressing these various types of lighting will require an extensive stakeholder engagement process.

What are other cities doing for their lighting?

Tucson, Arizona selected 3000K with dimming.

Phoenix, Arizona selected 2700K.

Washington DC is selecting 2700K for residential and 3000K for interstate and arterial roadways. Grand Rapids, Michigan selected all 4000K for the energy savings provided.

The City of Los Angeles, California is using all 3000K.







How will the feedback submitted through the website, email, and phone line be shared?

A presentation is scheduled to Governing Body on May 26. Feedback will be shared as part of the presentation and the full information packet will be available to the public a week prior to the meeting, on May 19.

How is Santa Fe pursuing International Dark Sky Association International Dark Sky Community Designation?

An IDA International Dark Sky Community is a town, city, municipality or other legally organized community that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of a quality outdoor lighting ordinance, dark sky education and citizen support of dark skies. The street lighting project is one small piece of a much bigger undertaking for the city in earning this designation. The city will have to create code and policies to enforce the code for residential outdoor lighting, commercial lighting (car lots, gas stations, etc), recreational facility lighting (baseball fields, etc), sign lighting (advertising billboards), and more. It's important for the street lighting project to contribute positively to this effort, but the street lighting project alone can't achieve this goal for Santa Fe because there are so many other sources of light in the city. The International Dark Sky Association's main goal is to overall light pollution, so all sources of light pollution must be considered.

For additional information or to submit a different question, visit the project website: SantaFeLED.com







								BUG Rating		1			
	_					Lumens per					IDA		
Fixture Type	Manufacturer	Part Number	Lighting Temp	Lumen Output	Wattage	Watt	Distribution	B (backlight)	U (uplight)	G (glare)		Warranty (YRS)	
A1	American Electric	ATBS P10 MVOLT R2 NL P7 XL	4000K	5,577	40	139	Type 2	1	0	2	NO	5	100000
A2	General Electric	ERL1 0 05B3 40 A GRAY	4000K	5,000	39	128	Type 2 Wide	1	0	1	NO	5	50000
A3	Eaton	VERD C016 D U T2 4N7 10MSP AP	4000K	4,870	39	125	Type 2	1	0	1	NO	5	60000
A4	American Electric	ATBS P10 MVOLT R2 3K NL P7 XL	3000K	5,360	40	134	Type 2	1	0	2	YES	5	100000
A5	General Electric	ERL1 0 05B3 30 A GRAY	3000K	4,900	39	126	Type 2 Wide	1	0	1	YES	5 to 10	50000
A6	Eaton	VERD C016 D U T2 7030 4N7 10MSP AP	3000K	4,739	39	122	Type 2	1	0	1	NO	5	75000
A7 Alt**	American Electric	ATBS P10 MVOLT R2 27K XL NL P7	2700K	4,900*	40	123	Type 2	1	0	2*	YES	5	100000
A8 Alt**	General Electric	ERL1 0 05B3 27 A GRAY	2700K	4,700	39	121	Type 2	1	0	1	YES	5 to 10	50000
A9 Alt**	Eaton	VERD C016 D U T2 8027 4N7 10MSP AP	2700K	4,292	39	110	Type 2	1	0	1	NO	5	75000
B1	American Electric	ATBM P30 MVOLT R3 NL XL P7	4000K	15,500	118	131	Type 3	2	0	3	NO	5	100000
B2	General Electric	ERL2 0 16C3 40 A GRAY	4000K	16,000	120	133	Type 3	2	0	3	NO	5 to 10	50000
B3	Eaton	VERD CO2H D U T3 4N7 10MSP AP	4000K	14,846	120	124	Type 3	2	0	2	NO	5	75000
B4	American Electric	ATBM P30 MVOLT 3K NL XL P7	3000K	14,631	118	124	Type 3	2	0	3	YES	5	100000
B5	General Electric	ERL2 0 16C3 30 A GRAY	3000K	15,300	120	128	Type 3	2	0	3	YES	5 to 10	50000
B6	Eaton	VERD C02H D U T3 7030 4N7 10MSP AP	3000K	14,447	120	120	Type 3	2	0	2	NO	5	75000
B7	American Electric	ATBM P30 480 R3 NL P7 XL	4000K	15,500	118	131	Type 3	2	0	3	NO	5	100000
C1	American Electric	ATBL F MVOLT R3 NL P7	4000K	28,091	259	108	Type 3	3*	0*	4*	NO	5 to 10	50000
C2	General Electric	ERL2 0 28C3 40 A GRAY	4000K	28,000	251	112	Type 3	3	0	4	NO	5 to 10	60000
C3	Eaton	VERD M A04 D U T3 4N7 10MSP AP	4000K	29,537	247	120	Type 3	3	0	4	NO	5 to 10	100000
C4	American Electric	ATBL F MVOLT R3 3K NL P7	3000K	28,091	259	108	Type 3	3*	0*	4*	YES	5 to 10	50000
C5	General Electric	ERL2 0 28C3 30 A GRAY	3000K	26,900	251	107	Type 3	3	0	4	YES	5 to 10	60000
C6	Eaton	VERD M A04 D U T3 7030 4N7 10MSP AP	3000K	29,537	247	120	Type 3	3	0	4	NO	5 to 10	60000
C7	American Electric	ATBL F 480 R3 NL P7 XL	4000K	28,091	259	108	Type 3	3*	0*	4*	NO	5	60000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 27K GY MP P7	2700K	3,110	28	111	Type 2	1*	0*	1*	YES	10	100000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 3K MP P7	3000K	3,603	28	129	Type 2	1	0	1	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 27K GY MP P7	2700K	14,429	118	122	Type 2	2*	0*	3*	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 3K MP P7	3000K	14,631	118	124	Type 2	2	0	3	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 4K MP P7	4000K	21,565	190	114	Type 2	3	0	3	NO	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 27K GY MP P7	2700K	20,056	190	106	Type 2	3*	0*	3*	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 3K GY MP P7	3000K	20,190	190	106	Type 2	3	0	3	YES	10	100000



^{**} Fixture has not been approved by PRC as of 4.19.2021

This equipment has been analyzed to meet PNM Rate 20, ANSI IES RP-8-18 lighting level requirements, and energy saving requirements.







								BUG Rating					
						Lumens per					IDA		
Fixture Type	Manufacturer	Part Number	Lighting Temp	Lumen Output	Wattage	Watt	Distribution	B (backlight)	U (uplight)	G (glare)	Approved	Warranty (YRS)	Life Expectancy (HRS)
A4	American Electric	ATBS P10 MVOLT R2 3K NL P7 XL	3000K	5,360	40	134	Type 2	1	0	2	YES	5	100000
A5	General Electric	ERL1 0 05B3 30 A GRAY	3000K	4,900	39	126	Type 2 Wide	1	0	1	YES	5 to 10	50000
A6	Eaton	VERD C016 D U T2 7030 4N7 10MSP AP	3000K	4,739	39	122	Type 2	1	0	1	NO	5	75000
A7 Alt**	American Electric	ATBS P10 MVOLT R2 27K XL NL P7	2700K	4,900*	40	123	Type 2	1	0	2*	YES	5	100000
A8 Alt**	General Electric	ERL1 0 05B3 27 A GRAY	2700K	4,700	39	121	Type 2	1	0	1	YES	5 to 10	50000
A9 Alt**	Eaton	VERD C016 D U T2 8027 4N7 10MSP AP	2700K	4,292	39	110	Type 2	1	0	1	NO	5	75000
B4	American Electric	ATBM P30 MVOLT 3K NL XL P7	3000K	14,631	118	124	Type 3	2	0	3	YES	5	100000
B5	General Electric	ERL2 0 16C3 30 A GRAY	3000K	15,300	120	128	Type 3	2	0	3	YES	5 to 10	50000
B6	Eaton	VERD C02H D U T3 7030 4N7 10MSP AP	3000K	14,447	120	120	Type 3	2	0	2	NO	5	75000
C1	American Electric	ATBL F MVOLT R3 NL P7	4000K	28,091	259	108	Type 3	3*	0*	4*	NO	5 to 10	50000
C2	General Electric	ERL2 0 28C3 40 A GRAY	4000K	28,000	251	112	Type 3	3	0	4	NO	5 to 10	60000
C3	Eaton	VERD M A04 D U T3 4N7 10MSP AP	4000K	29,537	247	120	Type 3	3	0	4	NO	5 to 10	100000
C4	American Electric	ATBL F MVOLT R3 3K NL P7	3000K	28,091	259	108	Type 3	3*	0*	4*	YES	5 to 10	50000
C5	General Electric	ERL2 0 28C3 30 A GRAY	3000K	26,900	251	107	Type 3	3	0	4	YES	5 to 10	60000
C6	Eaton	VERD M A04 D U T3 7030 4N7 10MSP AP	3000K	29,537	247	120	Type 3	3	0	4	NO	5 to 10	60000
C7	American Electric	ATBL F 480 R3 NL P7 XL	4000K	28,091	259	108	Type 3	3*	0*	4*	NO	5	60000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 27K GY MP P7	2700K	3,110	28	111	Type 2	1*	0*	1*	YES	10	100000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 3K MP P7	3000K	3,603	28	129	Type 2	1	0	1	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 27K GY MP P7	2700K	14,429	118	122	Type 2	2*	0*	3*	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 3K MP P7	3000K	14,631	118	124	Type 2	2	0	3	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 4K MP P7	4000K	21,565	190	114	Type 2	3	0	3	NO	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 27K GY MP P7	2700K	20,056	190	106	Type 2	3*	0*	3*	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 3K GY MP P7	3000K	20,190	190	106	Type 2	3	0	3	YES	10	100000

^{*} Estimated Value

This equipment has been analyzed to meet PNM Rate 20, ANSI IES RP-8-18 lighting level requirements, and energy saving requirements, along with community guided design input to include dark sky friendly shielding and lower color temperature lighting options.

^{**} Fixture has not been approved by PRC as of 4.19.2021







								_ E	BUG Rating	3			
						Lumens per					IDA		
Fixture Type	Manufacturer	Part Number	Lighting Temp	Lumen Output	Wattage	Watt	Distribution	B (backlight)	U (uplight)	G (glare)	Approved	Warranty (YRS)	Life Expectancy (HRS)
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A6	Eaton	VERD C016 D U T2 7030 4N7 10MSP AP	3000K	4,739	39	122	Type 2	1	0	1	NO	5	75000
A7 Alt**	American Electric	ATBS P10 MVOLT R2 27K XL NL P7	2700K	4,900*	40	123	Type 2	1	0	2*	YES	5	100000
A8 Alt**	General Electric	ERL1 0 05B3 27 A GRAY	2700K	4,700	39	121	Type 2	1	0	1	YES	5 to 10	50000
A9 Alt**	Eaton	VERD C016 D U T2 8027 4N7 10MSP AP	2700K	4,292	39	110	Type 2	1	0	1	NO	5	75000
B4	American Electric	ATBM P30 MVOLT 3K NL XL P7	3000K	14,631	118	124	Type 3	2	0	3	YES	5	100000
B5	General Electric	ERL2 0 16C3 30 A GRAY	3000K	15,300	120	128	Type 3	2	0	3	YES	5 to 10	50000
B6	Eaton	VERD C02H D U T3 7030 4N7 10MSP AP	3000K	14,447	120	120	Type 3	2	0	2	NO	5	75000
C4	American Electric	ATBL F MVOLT R3 3K NL P7	3000K	28,091	259	108	Type 3	3*	0*	4*	YES	5 to 10	50000
C5	General Electric	ERL2 0 28C3 30 A GRAY	3000K	26,900	251	107	Type 3	3	0	4	YES	5 to 10	60000
C6	Eaton	VERD M A04 D U T3 7030 4N7 10MSP AP	3000K	29,537	247	120	Type 3	3	0	4	NO	5 to 10	60000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 27K GY MP P7	2700K	3,110	28	111	Type 2	1*	0*	1*	YES	10	100000
A - Dalkia	American Electric	ATBX P40 MVOLT R2 3K MP P7	3000K	3,603	28	129	Type 2	1	0	1	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 27K GY MP P7	2700K	14,429	118	122	Type 2	2*	0*	3*	YES	10	100000
B - Dalkia	American Electric	ATBM P30 MVOLT R2 3K MP P7	3000K	14,631	118	124	Type 2	2	0	3	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 27K GY MP P7	2700K	20,056	190	106	Type 2	3*	0*	3*	YES	10	100000
C - Dalkia	American Electric	ATBM P70 MVOLT R2 3K GY MP P7	3000K	20,190	190	106	Type 2	3	0	3	YES	10	100000

* Estimated Value

This equipment has been analyzed to meet PNM Rate 20, ANSI IES RP-8-18 lighting level requirements, and energy saving requirements, along with community guided design input to include dark sky friendly shielding. This list meets the International Dark Sky Association's 3000K color temperature limit.

^{**} Fixture has not been approved by PRC as of 4.19.2021





You don't have to compromise visual comfort to cut your energy and maintenance costs



Over a century of optical expertise teaches you a thing or two

With the advent of LED technology in roadway lighting, the debate regarding glare and visual comfort has become more and more heated. Utilities and municipalities seeking to reduce energy consumption, enhance sustainability efforts and ultimately save money have often experienced substantial complaints regarding the glare produced by many LED roadway fixtures.

American Electric Lighting® has addressed this issue with the introduction of our new DualOptix™ technology in many of our Autobahn Series products. With the DualOptix option, we incorporate over a century of roadway optics expertise into several Autobahn fixtures. This combines tremendous Autobahn performance and efficacy with a much more visually comfortable nighttime appearance.



Autobahn DualOptix Features

- Fully luminous optical cavity for visual comfort
- Reduced high angle light for lower glare
- Max candela reduction for improved visibility
- Multiple comfortable color temperatures
- High LPW in Type II and III roadway distributions





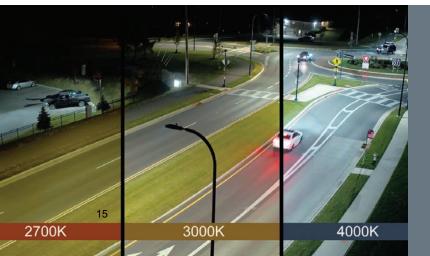


The DualOptix difference

Most conventional LED roadway lighting fixtures utilize a single refractor component to cover the bare LED source, thereby providing a means of redirecting the light for a variety of optical distribution patterns.

This alone provides very little diffusion with light that often reaches the high angles that can create unwanted glare and visual discomfort.

Autobahn DualOptix technology combines prismatic glass optic engineering with an additional secondary acrylic refractor to further diffuse the pixelation of the LED source while redirecting the extremely high angle light downward.



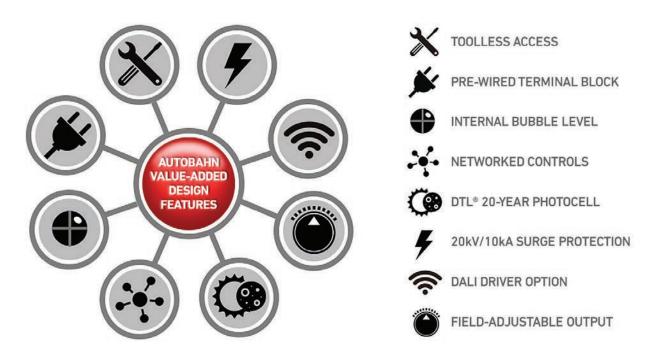
Dialing in your preference

To enhance visually comfortable roadway applications, the Autobahn DualOptix products are all available in a variety of color temperatures. Choose from 2700K, 3000K, 4000K CCT (70CRI minimum) to tailor the lighting to your specific needs.

To further "dial in" your specific lighting preferences, each Autobahn fixture can have light output adjusted in the field with the FAO adjustable lumen output module option.



More Autobahn Value Added Design Features



For more information visit:

www.americanelectriclighting.com/autobahn



Warranty Five-year limited warranty. Full warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx Visit our website at www.americanelectriclighting.com

Product specifications may change without notice. Please contact your sales representative for the latest product information.