

Advanced Wireless Infrastructure Solutions Guide

Ameron

POLE PRODUCTS



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The Ameron advantage

Differentiated value

Ameron™ wireless infrastructure products support the future of connectivity, strengthened by a 100-year legacy of providing street lighting for municipalities and utilities across the country. Our consultative approach and technical expertise allow you to efficiently implement small cell and smart resources. We are your trusted partner to bridge the jurisdictional, engineering, and aesthetic complexities of 5G.

Design innovation

From single carrier to multi-carrier or multi-tenant, our poles are the optimal solution for your project. With standard configurations and custom-designed solutions available in steel, concrete, and concealed, our team is experienced with jurisdictional specifications and processes. Perfectly suited for any current or future combination of commercial wireless, IoT, MEC, smart city, and private LTE, the flexibility of our solution suite evolves alongside the technology it supports.

Our commitment

We invest in your success. The Ameron dedicated account management team offers continuous support and collaborative partnership. Our sales, engineering, and customer care teams provide industry-leading account services facilitated through open communication and attentiveness to your team's unique needs. We are focused on growing your future smart infrastructure initiatives through trust, partnership, and technical collaboration.

We support the success of your wireless and smart city projects

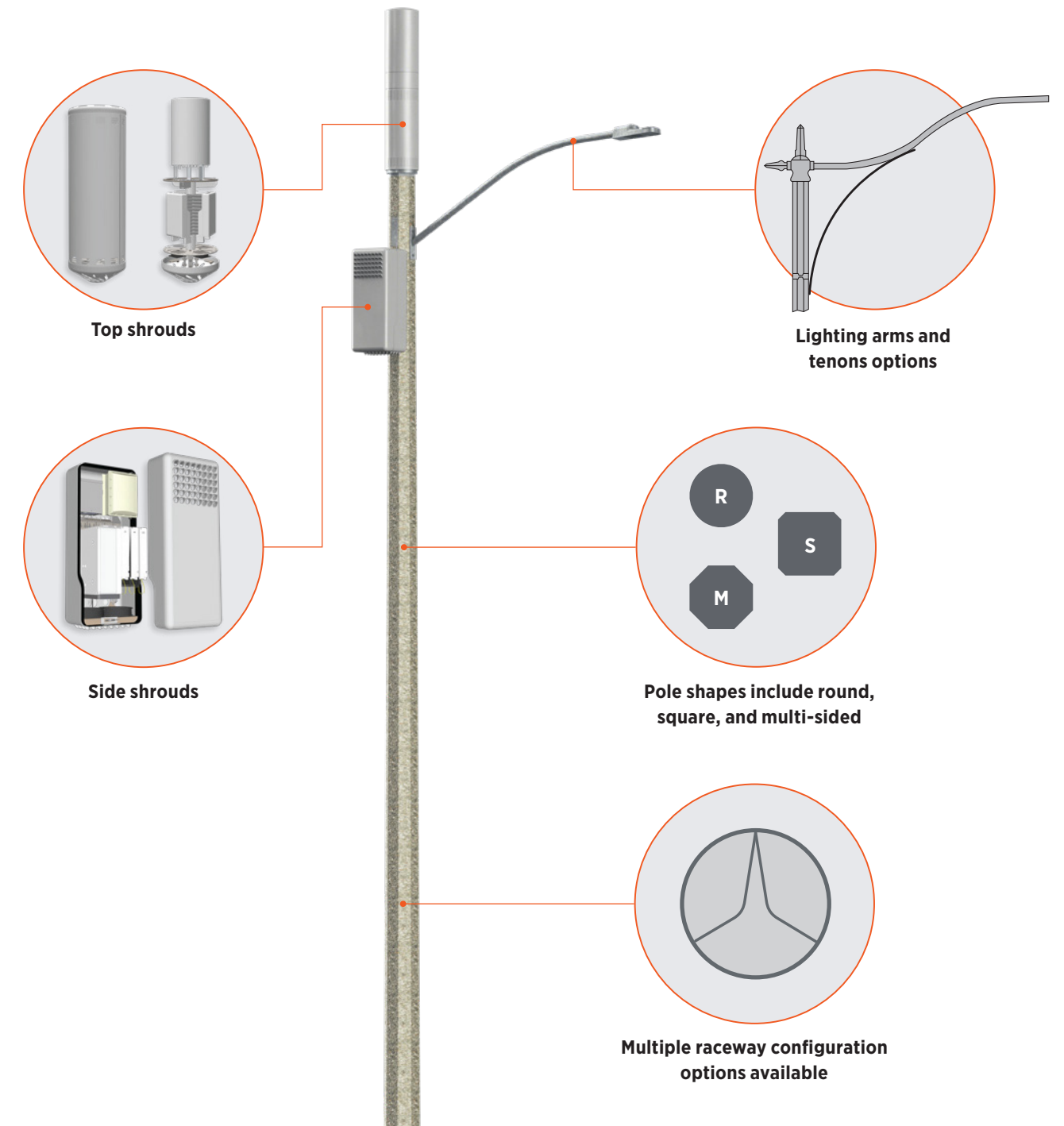
Count on us for:

- Simplified purchasing with a manufacturer capable of multiple design and material options
- Customizable, build-to-suit solutions to match project requirements
- In-house engineering and design
- Short lead times
- Expedited shipping available
- Made in the USA
- Jurisdictional relationships to ease permitting and deployment
- Specification experience and P.E. licensing across all 50 states
- Dedicated account management services



Small cell poles match aesthetic and technology deployment needs

We're here to help you select small cell poles that accommodate your design and functionality requirements. Our product suite includes standard and custom designs. With concrete, steel, and concealed options, we can match existing aesthetics in most jurisdictions. We support common radio types such as top mount shrouds and backpacks. Single and multi-carrier solutions are also available.



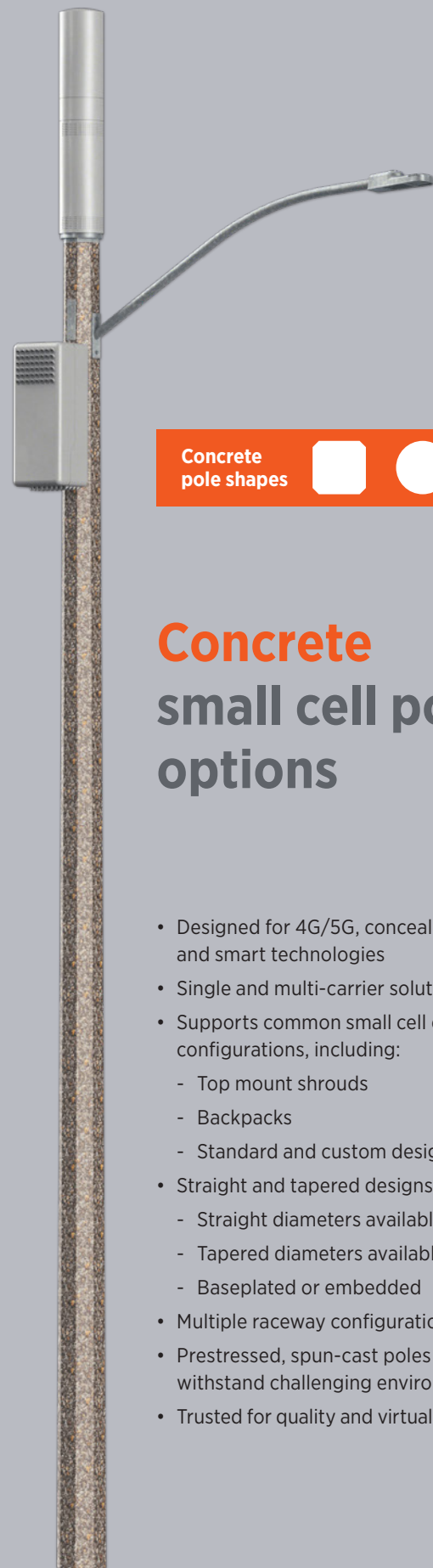


Steel pole shapes



Steel small cell pole options

- Designed for 4G/5G, concealment, and smart technologies
- Single and multi-carrier solutions
- Supports common small cell equipment configurations, including:
 - Top mount shrouds
 - Backpacks
 - Standard and custom design options
- Straight and tapered designs
 - Straight diameters available
 - Tapered diameters available
- Baseplated or embedded
- Multiple raceway configurations available
- Galvanized to ASTM A123 standards



Concrete pole shapes

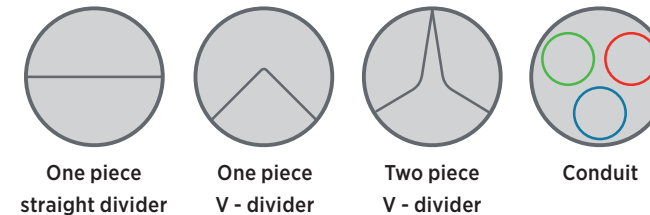


Concrete small cell pole options

- Designed for 4G/5G, concealment, and smart technologies
- Single and multi-carrier solutions
- Supports common small cell equipment configurations, including:
 - Top mount shrouds
 - Backpacks
 - Standard and custom design options
- Straight and tapered designs
 - Straight diameters available
 - Tapered diameters available
 - Baseplated or embedded
- Multiple raceway configurations available
- Prestressed, spun-cast poles are durable to withstand challenging environments
- Trusted for quality and virtually maintenance free

Raceway configurations

Several standard cable management options are shown below. We can customize to your specific requirements.



One piece straight divider

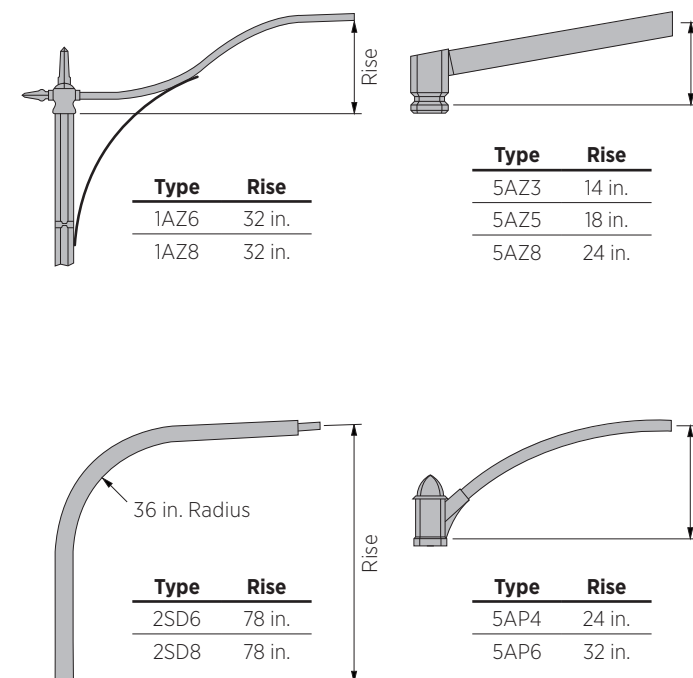
One piece V-divider

Two piece V-divider

Conduit

Lighting arms and tenons

We have a wide variety of standard lighting arms and tenons available. Our ability to match like-for-like aesthetics makes it easy for you to select your ideal lighting solution. A representative sample of what we can provide is included below. Please reference our Arms and Tenons Brochure for full suite of options.



Colors and finishes

Steel options

- Galvanized to ASTM A123 standards
- Pole color can be matched to meet municipal aesthetic requirements; available in a wide range of standard, faux finish, and custom colors
- Powder or wet coat application available
- Amerlock primer and Amershield™ topcoat premium graffiti-resistant coating available to enhance the color, protect the surface, and increase the durability of your product

Concrete options

Standard, pre-formulated, and custom aggregate colors are available. We offer Amershield, a premium graffiti-resistant coating, plus an assortment of durable sealers and protectants that further enhance colors, protect the concrete surface, and aid in the removal of graffiti. Please contact your Ameron representative for a list of additional pre-formulated colors and finishes currently available.

Standard colors



Product specifications

		Tapered	Baseplated or embedded	Decorative base available	Max height
Round Steel	Tapered Steel	Yes	Both	Custom order	50 ft*
	Straight Steel	No	Both	Custom order	50 ft*
Round Concrete	BP300/EP300	No	Both	No	32 ft-10 in.
	JBR/JER	Yes	Both	No	52 ft-6 in.
	LBBX	Yes	Baseplated	Yes	44 ft-11 in.
	LBR/LER	Yes	Both	No	49 ft-2 in.
	MBBX	Yes	Baseplated	Yes	29 ft-6 in.
	VBZRNT/VEZRNT	No	Both	Yes	14 ft-6 in.
Octagonal Concrete	BPO300/EPO300	No	Both	No	32 ft-10 in.
	CBO/CEO	Yes	Both	No	37 ft-0 in.
	CBO4	Yes	Baseplated	Yes	28 ft-7 in.
	CBO5	Yes	Baseplated	Yes	31 ft-2 in.
	CBO6	Yes	Baseplated	Yes	31 ft-3 in.
	GBO/GEO	Yes	Both	No	52 ft-6 in.
	VBD/VED	Yes	Both	Yes	29 ft-6 in.
	Square Concrete	BPQ250/EPQ250	No	Both	No
	GBQ/GEQ	Yes	Both	No	52 ft-6 in.

*Taller poles can be customized using an additional tube. Contact your sales representative for more information.



Concealed Pole

A flexible solution for connected and smart infrastructure

Thoughtfully-designed infrastructure

4G and 5G coverage is connecting communities faster and more reliably than ever before. We provide purpose-built solutions that:

- Meet municipal aesthetic requirements
- Evolve with wireless and smart city equipment needs
- Enable field installers to deploy rapidly and with ease

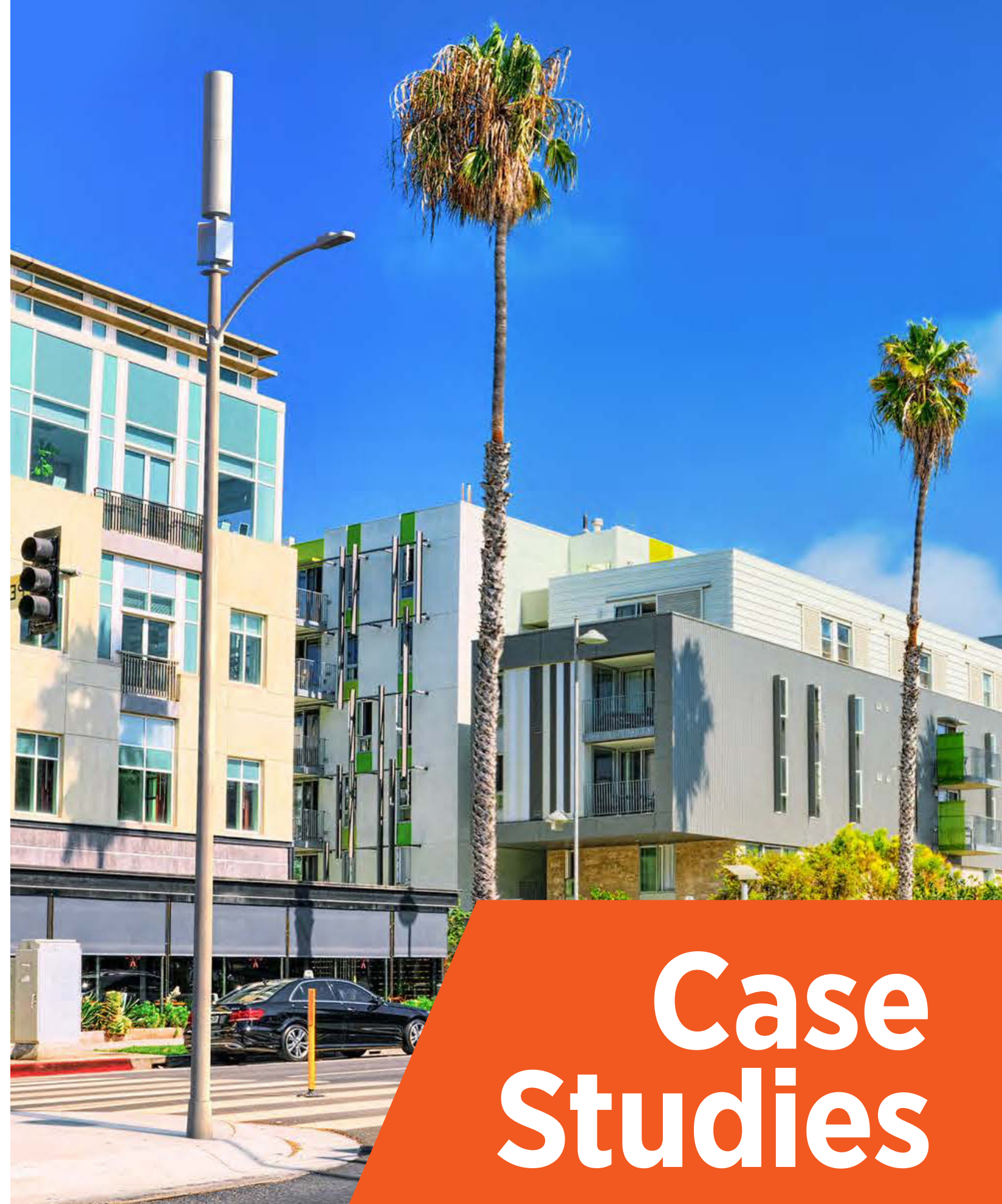
Modular. Adaptable. Discreet.

Our wireless infrastructure and technical advisory teams work closely to understand the wireless or smart city deployment strategy and the jurisdiction's aesthetic requirements. We are a partner-of-choice for hard-to-permit, historic, mixed use, and residential areas. The concealed solution allows for multiple equipment configurations, accommodating single-carrier, multi-carrier, and smart city applications. Luminaires and fixtures are customizable to match the character of the community.

Smart-ready designs

Our concealed pole is future-ready, allowing for the integration and mounting of a wide range of smart city and smart lighting capabilities to address critical functions.

- Safety
- Transportation
- Mobility
- Energy
- Data access
- Monitoring



Case Studies

Setting a small cell standard with Memphis' municipal-owned utility

As more and more people depend on connectivity to live, work, and play, the need to strengthen wireless infrastructure has grown in many ways. One significant innovation over the last few years is the use of small cells, or small radio equipment and antennas comparable in size to a backpack. This small cell equipment is frequently placed on streetlighting or freestanding poles to bolster carrier network capacity. For a small cell pole installation to occur, three things must be present:

1. Permits for installation and construction
2. Power
3. Fiber-optic cable

In Memphis, Tennessee, Memphis Light, Gas and Water (MLGW) is the municipal-owned utility (MOU) that governs small cell permitting, installation, and power to the pole. Memphis is home to the nation's oldest beautification commission – Memphis City Beautiful – which works to keep Memphis a beautiful, healthful, and safe place to live. This legacy of preserving the design and aesthetic runs deep in the Birthplace of Rock 'n Roll as evidenced by the work of multiple public services in the city. With roots dating all the way back to 1852, MLGW has a long-standing legacy of upholding the infrastructure for the city and is the nation's largest three-service utility. With the rapid expansion of wireless infrastructure through the use of poles with small cell attachments, cities and MOUs, such as Memphis and MLGW, have been proactive in developing ordinances and standards that protect their aesthetic. This has been a learning process for everyone involved.

The city of Memphis and MLGW have jurisdiction over any structure placed in their right-of-way. As a whole, city services, such as MOUs, are a lean operation. With the growth of small cell activity, these entities have experienced an unmanageable flood of permit requests, causing a strain on their limited external and internal resources. Other manufacturers struggled for nearly two years to obtain design approval from MLGW. Within five months, the Ameron Wireless Infrastructure team along with stakeholders from the city, MLGW, and the carriers partnered to develop a solution that became the design standard for concrete small cell poles.

Case study facts

Location: Memphis, Tennessee

Stakeholders: Memphis Light, Gas and Water, City of Memphis, infrastructure construction company, confidential carriers

Timeframe: September 2018 to January 2019

Problem: Carriers found it difficult to develop and submit satisfactory designs to meet requirements.

Solution: A consultative approach and manufacturing flexibility enabled Ameron to design and deliver 200 concrete small cell poles and set the standard with Memphis and MLGW, the municipal-owned utility.



How do we quickly bridge the gaps for our customers?

Consultative design and engineering

Where other manufacturers employ a one-size-fits-all approach to addressing the small cell pole needs of a city, we recognize that no two municipalities are the same. By asking important questions and listening to all stakeholders involved in the process, we provide customized solutions rooted in empowering connectivity to the community. Through this discovery exercise, we achieved technical, logistical, and aesthetic consensus between one of the largest MOUs in the US, the carrier, and its infrastructure construction company.

Manufacturing flexibility and commitment

Our Director of Manufacturing visited with the stakeholders to understand their processes and needs. In doing this, we tailored our existing tooling and process to accommodate their requirements. For example, we offered custom cable management solutions based on specific installation processes, electrical codes, and aesthetic requirements. To enable easier and more efficient access to the installation crews pulling fiber into the pole's junction box, we reconfigured our mold. Our manufacturing team also worked hand-in-hand with the city to custom mix concrete which matched the existing light pole assets in Memphis.

By adapting our tooling and processes, we were able to work with the client to deliver 200 concrete small cell poles—square and octagonal—on time and on budget. These corrosion-resistant and durable concrete small cell poles match Memphis' aesthetic, quality, and character.

Removing the guesswork, simplifying processes

By designing and manufacturing poles that met the requirements of MLGW and the carriers, Ameron has enabled MLGW and multiple carriers to deploy concrete small cell poles faster and more efficiently. There is no more guesswork around permissible designs. While MLGW will save time, money, and resources on permitting, carriers also benefit by knowing exactly what is required to provide concrete small cell poles in the second largest city in Tennessee.



Ameron facilitates faster design and permitting processes for Santa Monica 5G pole upgrades

As 4G and 5G capabilities expand across the country, cities and municipalities are working with multiple carriers to ensure their regions can handle the next wave of small cell solutions. Newly installed telecom poles must be engineered and manufactured to exact specifications, and the final product should maintain the city's standards and aesthetics while properly accommodating the telecom equipment. Ideally, the process should move quickly from the carriers' standpoint, but both parties will typically encounter delays due to logistics, engineering processes, and permitting.

Ameron provides expertise and guidance to engineers and planners in cities across the US where telecom upgrades are being implemented. Applying our knowledge of pole designs and capabilities along with our experience streamlining the permitting process, we've helped numerous cities with small cell design standards while ensuring speed to market for the carrier.

We recently implemented our small cell upgrading process in Santa Monica, California, where our Ameron pole experts were able to successfully bridge the stakeholders—the cities and the carriers. Dealing with numerous configurations, multiple heights, and pole types, our Ameron team helped the city develop an ideal approach with three different height options and one general design for the poles.

Working with city engineers, our Ameron experts refined 36 pole variations down to three standardized pole solutions that could be replicated across multiple carriers. This effective utilization of city resources, maintenance capabilities, and available specs provided a significant cost and time savings for both the carriers and the city. The standard pole design featured additional load capabilities and interior accessibility, allowing the poles to accommodate 4G and 5G upgrades and to further expand functionality for any future requirements.

Case study facts

Location: City of Santa Monica, California

Challenge

Permit requests for telecom poles from carriers continue to grow exponentially. The previous approach to process permit requests was time consuming for both cities and carriers because of the numerous configurations to review before approval.

Solution

Assisted in the creation of a small cell specification using the minimum number of pole types that yields 36 functional final configurations.

Details

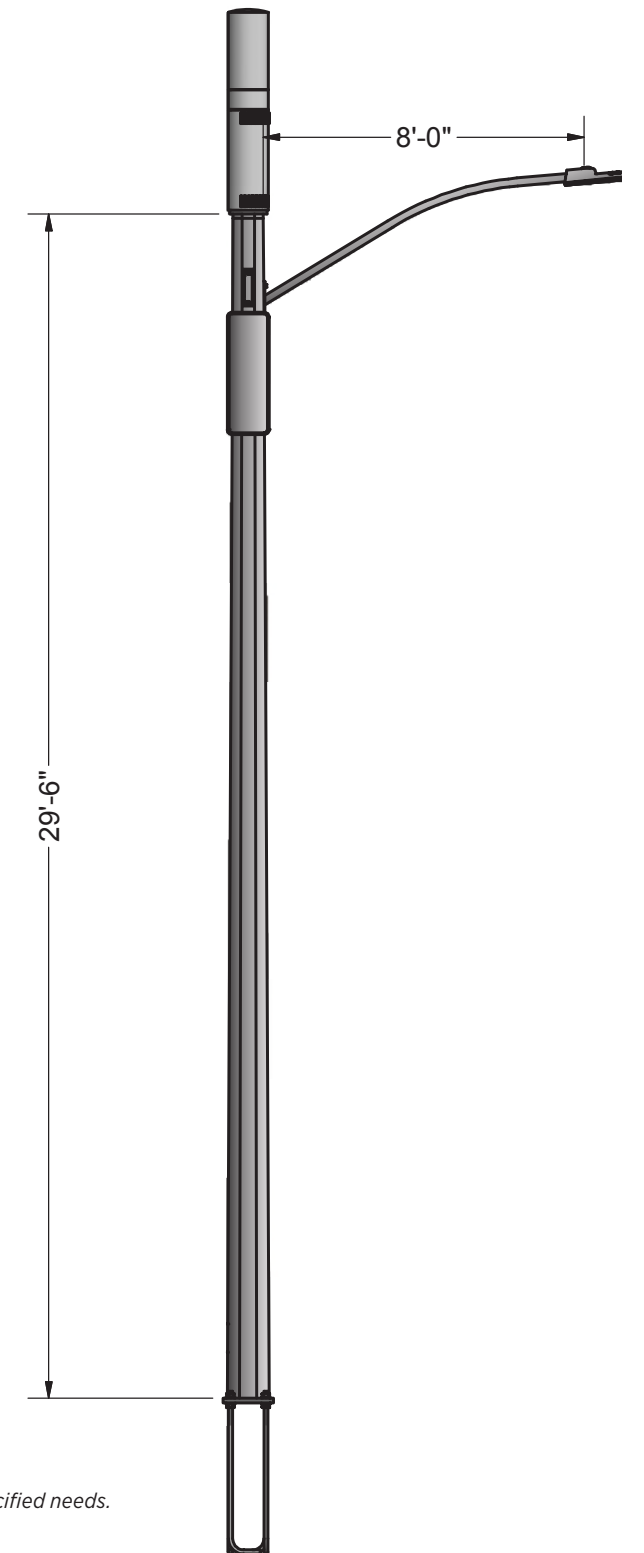
- Became an extension of their team; efficient utilization of resources, maintenance, standards/specs.
- Refined the city's design to make their process more simplified and easily replicated across multiple carriers.
- Reduced the city's review and processing time drastically—time and cost saving realized by the carrier and the city.



By successfully bridging knowledge gaps between cities and carriers, Ameron was able to help all stakeholders avoid costly delays from logistics, engineering, and permitting challenges.

In the past, cities have had to handle a minimal amount of permits per year. As 4G and 5G requirements are rapidly increasing, permit requests from carriers are expected to grow by as much as a hundredfold, making time and resource constraints a challenge for expediency. When cities and carriers have pole experts like Ameron on their side, both the design and permitting processes will be more efficient and reliable.

Our goal throughout the process is simple—avoid delays related to design and permitting while developing a pole that fulfills multiple installation and technical requirements. By knowing both the products and the processes involved, we can remove much of the stress from the city representatives and the carriers. We focus on the complete process for pole upgrades, which varies city to city and requires a customized approach from a technical, logistical, and aesthetic aspect. Further, we offer delivery and unload services, as well as lifecycle support for your poles. Our Ameron experts know how cities work, and we'll be there every step of the way, building success together.



Configured option based on city's specified needs.

Contact us
amerontelecomorders@arcosa.com

Ameron

POLE PRODUCTS

About Ameron

Founded in 1970, Ameron is a leading manufacturer of highly engineered, premium concrete and steel poles for a broad range of infrastructure applications, including lighting, traffic, electric distribution, and small cell telecom. With four manufacturing facilities strategically located in Alabama, California, and Oklahoma, Ameron serves its customers with a nationwide presence.

ARCOSA

TELECOM STRUCTURES

About Arcosa

Arcosa, Inc., headquartered in Dallas, Texas, is a provider of infrastructure-related products and solutions with leading positions in construction, engineered structures, and transportation markets.

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