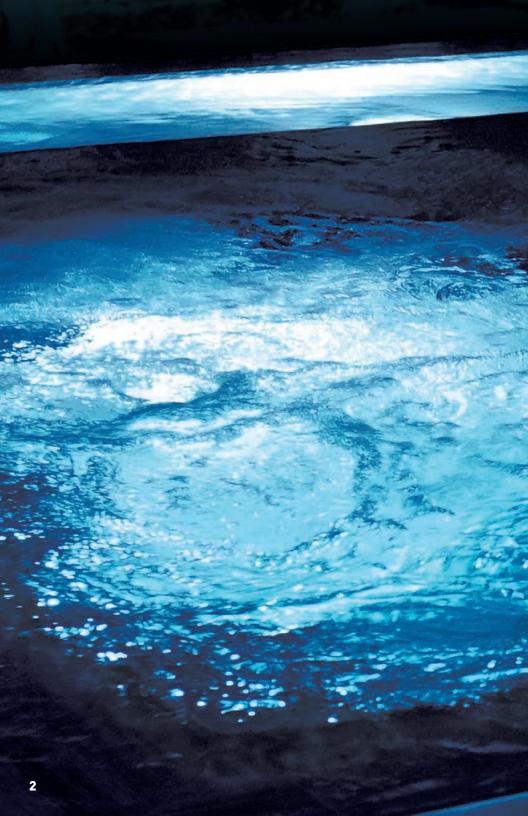
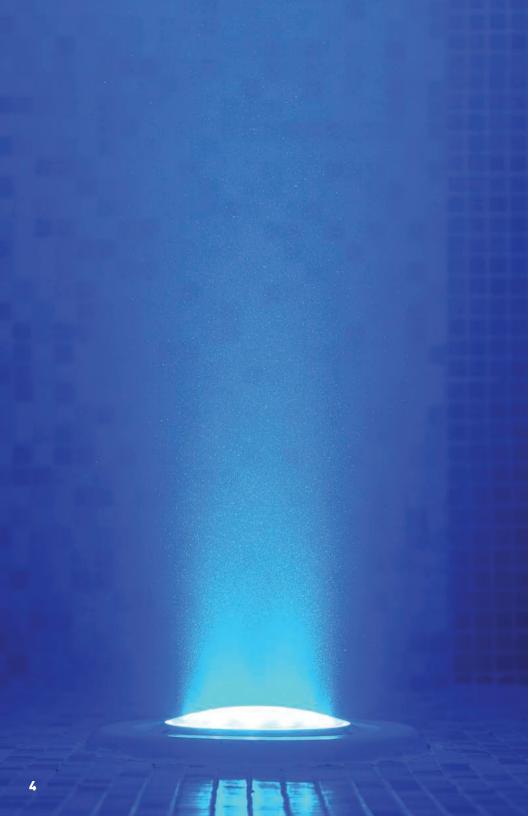
Jandy

LIGHTING DESIGN GUIDE



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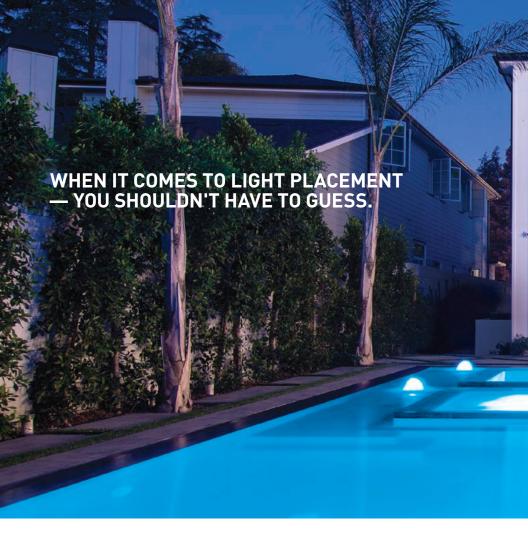


THERE WAS A TIME...

WHEN SWIMMING POOLS WERE SIMPLE.

They came as rectangles or in kidney shapes and, if they had lighting, they were equipped with a single 500-watt incandescent bulb set in one end or the other.

Those days are gone. Today's pools come with tanning shelves, swim lanes, stepping stones, vanishing edges, water features and more, making lighting design a more complicated task than was the case a generation ago. Today's LED lights are more advanced and small enough to fit into spaces that weren't possible before.



This guide is intended to assist designers and builders with basic and advanced lighting concepts to illuminate even the most complex pools.

For the purposes of this guide, we'll focus on lighting techniques using *nicheless* LED lights, since they provide the most flexibility — but demand the most thought and care — through the lighting design process.



While this guide should help you light any pool on your own, feel free to reach out to us with further questions at **lighting.design@zodiac.com**.



LIGHTING PHILOSOPHY

SAFETY FIRST

First and foremost, lighting helps prevent accidents. As internal and external configurations of swimming pools become more complex — creating blind spots and shadows — the need to address proper lighting has risen exponentially.

Ensure all safety areas, such as pool steps, entrances and exits, are properly illuminated.

MOOD AND AMBIENCE

Subtleties in lighting can drastically alter the mood of a backyard landscape, contributing to the owner's enjoyment and satisfaction with the design.

While safety is the number one concern, the ability to alter and manage mood and ambiance to suit the homeowner's needs should also be paramount in the mind of the designer as light placement is determined.



GENERAL LIGHTING PRINCIPLES

CALCULATING HOW MANY LIGHTS YOU NEED

When designing a pool with nicheless lights, the general rule is to divide the length of the pool by 8 feet and round to the nearest whole number.

For example:

The pool is 30 feet long. Since $30 \div 8 = 3.75$, place 4 lights in the pool spaced evenly apart.

On plain rectangular pools this rule is the standard, but freeform designs or pools with other features may need additional lights and will be addressed later in this guide.

LIGHTING GOALS

The goal in organizing a lighting scheme is to eliminate dark spots, avoid hot spots, and create a beautiful, even glow throughout the pool.

Generally, it is better to install a greater number of lower wattage lights than a fewer number of higher wattage lights. Although total wattage will be similar, adding more lights helps create that desired, even glow throughout.

PROTIP

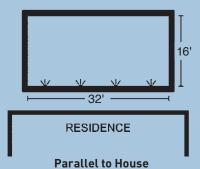
Darker finishes require more light, so we often advise rounding up after dividing the length by 8 feet.

Factors in Deciding Lighting Placement and Quantity

- Position of the residence in relation to the pool
- Size & shape of the pool
- Color of the pool finish
- Features
- Intended use

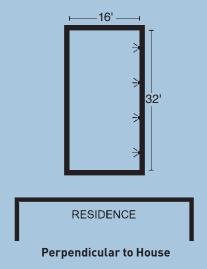
ORIENTATION

Always position lights so the beam is directed away from the residence and its primary viewpoints. The goal is to hide the source of light, giving the illusion that the pool glows on its own.



If the pool is parallel to the home

Place lights on the wall closest to the house so that the homeowner and guests are not looking directly into the beams of light.



If the pool is perpendicular to the house

Place lights facing away from the side of the yard that will be used most (i.e., patios, lawns, etc.).

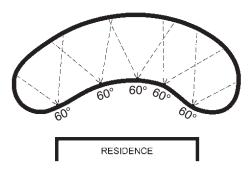
PRO TIP

We assist builders and designers with thousands of no-cost drawing/plan reviews every year. We never recommend fewer than one light per 8'. No one has ever complained that there is too much light in the pool.

PLACEMENT

In square or rectangular pools

Space lights about every 8 feet along the wall to create an even glow.



Pools with Curves

Pools with curves and turns

Map out angles assuming a 60-degree beam spread. The actual beam spread will be wider, but the light within the 60-degree arc will provide optimal intensity and even light distribution throughout the pool.

Main pool body

Place lights at a uniform depth, between 9-12 inches below the waterline, throughout the pool. Possible exceptions would be if the lights need to be placed on a step or bench or extremely deep pools (see Pro Tip).

Tanning shelves

Lights should be positioned 4 inches beneath the waterline.

Spas

Place lights below the bench or in the footwell. Doing so keeps people from resting their backs against a warm light and blocking out the light.

Benches

If a bench runs along the side of the pool where the lights need to be placed, install lights several inches below the edge of the bench to prevent shadows.

PRO TIP

Supplemental lighting is called for where intricate configurations and surfaces are involved. For example: if there's a feature that merits detailed attention like an interior mosaic, rockwork that reaches below the waterline, or lights that need to be placed on steps.

PROTIP

For deep ends greater than 12 feet place lights between 18-24 inches below the water line. In the shallow end keep lights within 9-12 inches of the surface of the water

SURFACES

The pool finish can dramatically affect how the lights perform relative to your design goals, since lighter finishes reflect light, while darker finishes absorb light. The following chart provides a guideline for determining what wattage size to use:

WATTAGE SELECTOR GUIDE

POOL FINISH	ILLUMINATION DISTANCE Color Lights
Light	Up to 12 ft
	12 – 20 ft
	20 ft +
Medium	Up to 10 ft
	10 – 16 ft
	16 ft +
Dark	Up to 8 ft
	8 – 12 ft
	12 ft +

Visit Jandy.com for part numbers and full list of available models.

NUTS AND BOLTS — SYSTEM DESIGN CONSIDERATIONS

Knowing the basic principles of how to optimize the performance of LED lighting makes all of the difference in pool illumination.

- Place all lights on the same on/off circuit.
- Always upsize the transformer with at least a 20% buffer to make certain it has the capacity to handle surges. For example: if you're installing four 24-watt LED lights, use a 300-watt transformer unit instead of a 100-watt unit.

It is not recommended to use color lights in dark finish pools. Certain colors will be absorbed and not perform as well resulting in a dimly lit pool. White lights deliver about twice the brightness (by wattage) and make your pool shine.

White Lights	RECOMMENDED POWER (Watts)
Up to 16 ft	6
16 – 24 ft	12
24 ft +	24
Up to 14 ft	6
14 – 22 ft	12
22 ft +	24
Up to 12 ft	6
12 – 20 ft	12
20 ft +	24

- Always test lights at the appropriate voltage to avoid damage to low-voltage LEDs — a jolt of 120V line-voltage current — even for a split second — will permanently damage or destroy low-voltage LEDs.
- Ensure the transformer and control system have been certified as safe for the intended application by a Nationally Recognized Testing Laboratory (NRTL).
- Be consistent using only one brand and type of lights throughout the pool to avoid syncing or colormatching issues, or other unintended results.

PRO TIP

If you are having difficulty pulling a cord through the conduit, lubricate the cord with dish soap or wire pulling lubricant. Do not use petroleum based lubricants.

Removing the halo effect

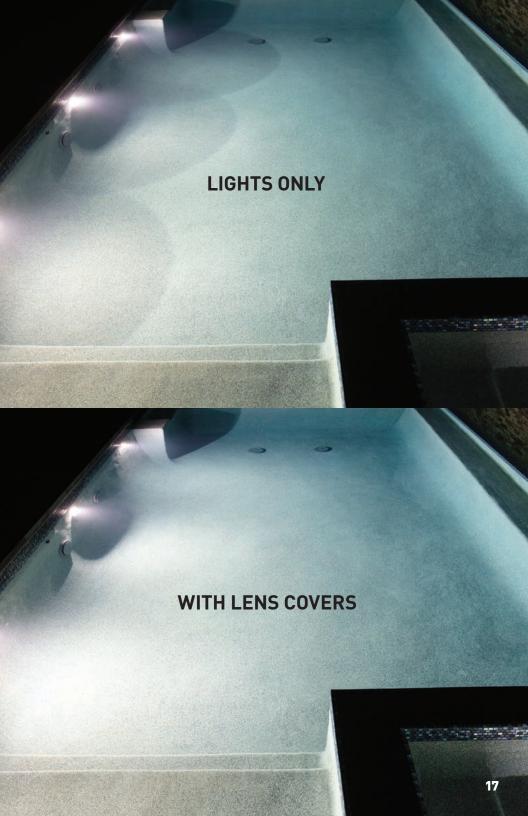
In pools with a lighter finish, a halo effect may result from light reflecting off the water's surface. To eliminate the halo effect without sacrificing illumination, use a Lens Cover. Lens covers are easily attached, and can also be used to redirect light away from the eyes on stairs, baja shelves, lap lanes, etc.

Lens covers come in ¼-moon and ½-moon sizes. Since trial and error may be needed to determine which size works best in each scenario, four of each lens cover type come in the lens cover kit. An extra installation tool will also be included. The kits are available in gray, black, or white colors.



Lens cover kit part numbers:

Gray (LENSCVRG), Black (LENSCVRB), White (LENSCVRW)





COOL BY DESIGN

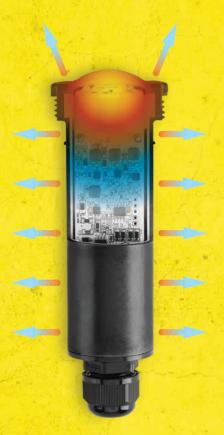
Jandy® WaterColors Nicheless LED Lights with



Technology

Engineered with

HydroCool technology to provide long-lasting performance



Jandy HydroCool lights use an innovative, energy-efficient design that harnesses the cooling power of water to create a cooler running, longer lasting* light. Designed to fit in a standard 1½" return fitting, these lights are shorter to accommodate complex pool designs, and operate at lower wattages (6w, 12w, and 24w), while providing the same brilliant illumination as previous models.



BUILT TO LAST

Triple-material, unibody construction design prevents leaks and maximizes durability under water.



A MORE EVEN GLOW

The diffuser lens provides better blending of colors for the clearest and most consistent lighting in its class.







MADE TO MATCH

Lights come standard in black with complimentary gray and white cosmetic trim ring covers to match a larger variety of pool surfaces.

HYDROCOOL LIGHT

Up to 8" shorter than our previous models for more creative design flexibility

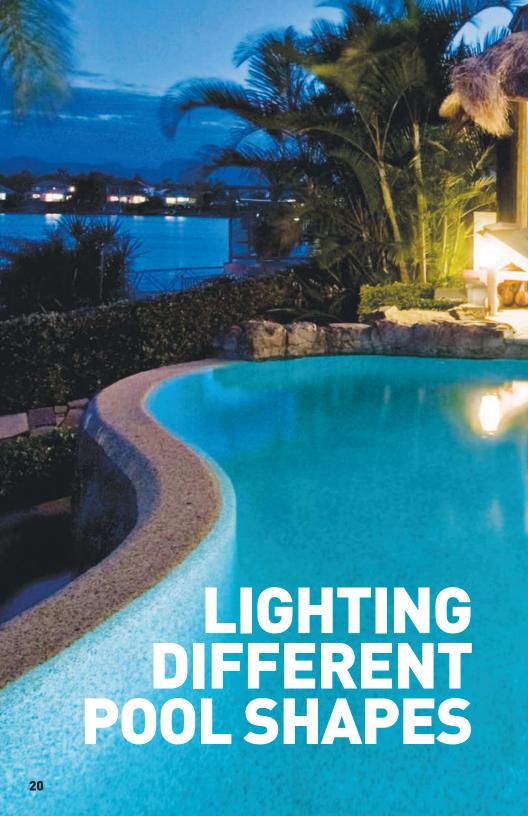


COMPATIBILITY

Color options for use with all major automation systems



PREVIOUS MODEL



RECTANGULAR POOLS

Ultimately, while all lighting options must meet required safety standards, lighting a pool comes down to a balance of desired ambiance and cost.

THREE OPTIONS:

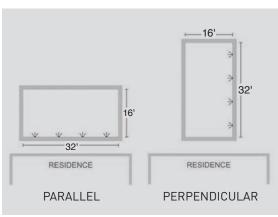
Option 1

More lights at lower wattages

This is the ideal lighting solution and results in a more even glow with fewer hot spots or dark spaces.

Space lights out at approximately 8 foot intervals along a straight wall.





PROTIP

When quoting a pool design to a prospective customer it is always best to quote the pool with the ideal lighting scenario first (more lights for a more even glow). This will give you the flexibility to remove lights from the quote if price becomes an issue, thereby allowing the customer to make the choice between price and optimal lighting.

PROTIP

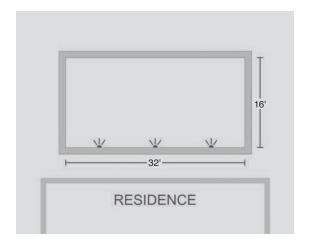
For pools that are perpendicular to the house and symmetry is a high priority there are 2 options: 1) stagger lights at 8 foot intervals on either side of the pool, or 2) double the number of lights and place them opposite each other along the length of the pool. If the latter option is chosen use the wattage guide to determine the correct power to reach halfway across the pool.

RECTANGULAR POOLS CONTINUED

Option 2

Fewer lights at higher wattages

Spaced evenly apart, this lighting strategy can lower the cost to the client while still providing sufficient light into the pool and keeping all lights facing away from the residence. Since the higher wattage affects the distance, or *throw* of the light, and not the spread angle, the result is still not as nice as using a fourth light (as shown in option 1).

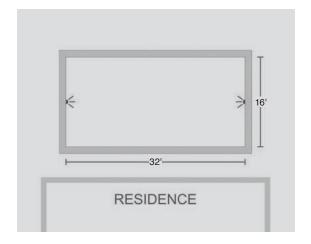






Option 3 The bare minimum

Using fewer lights with the highest wattage may provide for safe illumination, but is aesthetically undesirable.

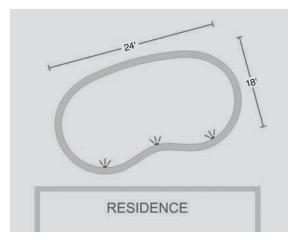


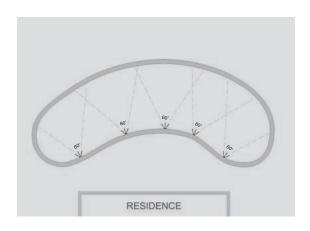


KIDNEY-SHAPED OR FREEFORM POOLS

Option 1 More lights at lower wattages

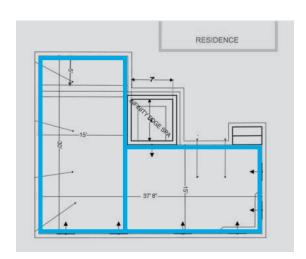
One light for roughly every 8 feet of pool is the ideal option and allows for even light distribution and ensures an even glow without hot spots or dark spaces.





PROTIP

While HydroCool lights have a true beam spread of nearly 180 degrees, the most concentrated portion of the beam on nicheless lights spans an angle of 60 degrees. Designers should ensure that the opposite wall of kidney or free-form shaped pools are evenly covered by the 60-degree beam spread.



PROTIP

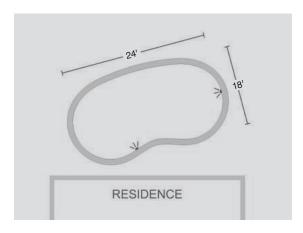
For "L" shaped pools consider the different sections as two separate bodies of water and then light them accordingly.



KIDNEY-SHAPED OR FREEFORM POOLS CONTINUED

Option 2 Fewer lights at higher wattages and different angles

This lighting solution lowers the cost to the client, while still safely lighting the pool. This option works better for a pool with a light color finish. In a dark colored pool, the light is likely to be absorbed before it has a chance to extend across the whole pool.

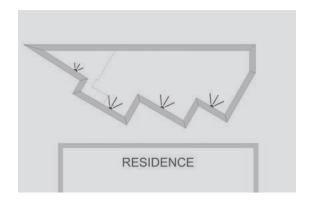


PRO TIP Using fewer LEDs at greater wattages requires placement at different angles to effectively and safely light the entire pool.

GEOMETRIC POOLS

Due to the highly angular configuration of geometric pools and an infinite number of variations in shape and size, determining lighting placement is more complex.

In these instances, nicheless lights really *shine*. Keep beam spread in mind when it comes to potential shadows and dark spots to ensure all parts of the pool are safely and adequately lit.



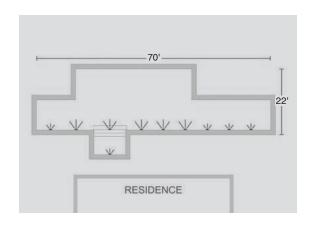




LAP POOLS OR SWIM LANES

Traditional lap pool

Space lights out evenly at 8–10 foot intervals along the lap lane section of the pool — parallel to the lap lane (as shown below). Never point lights down a lap lane into the eyes of the swimmer.

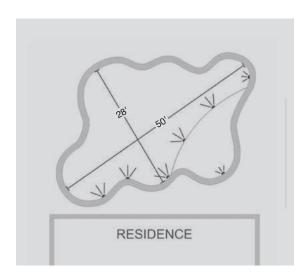


PRO TIP

To avoid creating a hot spot, it will often be necessary to adjust wattages according to the distance needed to be covered in select sections of the pool.

FREE-FORM POOLS WITH LAP LANES

Always treat a 40-foot or longer section of a freeform pool like a lap lane. Make sure to place the lights so they don't point down the "lane" into the eyes of the swimmer.



PRO TIP
Even if the customer
claims they won't use
a 40+ foot section
of the pool as a lap
lane, a guest or a
future owner of
the home may.



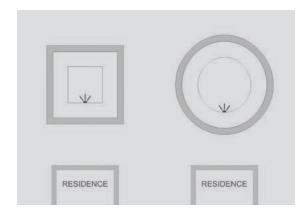


SPAS

Always place lights below the bench and never in the seat wall where someone might rest their back.

As in a pool, it's best to point lights away from the residence, however, due to the deeper placement of the lights this tends not to be as crucial a factor.

In a typical four-to-six-person spa with a light finish, one 6W light is sufficient, but for larger spas, or those with a dark finish, a 12W light or an additional light is recommended.



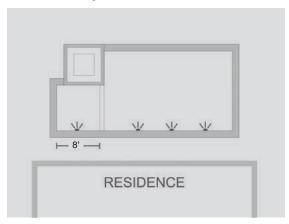


SHALLOW LOUNGING AREAS

Otherwise known as sun shelves, baja shelves or wet decks, these shallow features have increased in popularity in recent years.

To light the wet deck properly, lights should be placed at least 4 inches under the water line. (Baja shelves need to be at least 8 inches deep to have enough space for a light.)

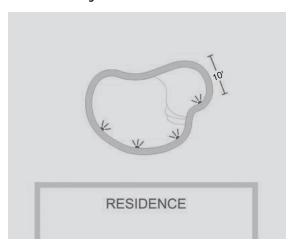
Geometric Design

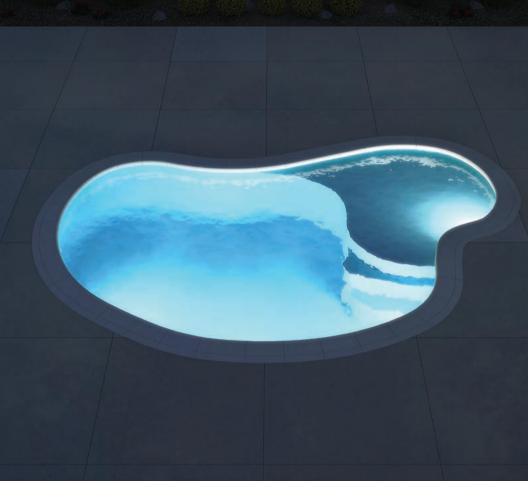


PROTIP

In most sun shelves a 6W light will be sufficient. For larger sun shelves use the wattage guide on pages 14-15 for guidance.

Freeform Design



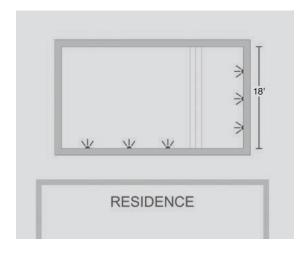


PRO TIP

Since lights in a baja shelf are closer to the surface of the water, hot spots may be unavoidable, making it imperative to place them so they shine away from the residence and not directly into it.



SHALLOW LOUNGING AREAS CONTINUED



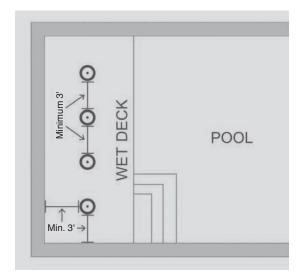
PROTIPS

- Baja shelves that are over 100 square feet may require additional lights. Use 6W, placed 6-8 feet apart.
- If budget is an issue the compromise could be to place one 12W light on the short side of the sun shelf pointing down its length. However, set the expectation that while the sun shelf will have light it will not be evenly lit along its entire length.

LIGHTING BAJA SHELVES WITH BUBBLERS

Another method to light a baja shelf is with the use of bubblers.

Be sure to place the bubblers a minimum of 3 feet from any walls and 3 feet from another bubbler to prevent the plume of the water from swirling.

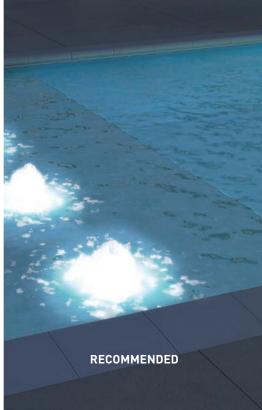


PRO TIPS

- It is not recommended to place a bubbler in small coves surrounded by 3 walls as this increases the risk of swirling.
- Consider a bubbler more as a lighting feature than a water feature. The intent being to simply agitate the surface in order to gently disperse the light.







LIGHTING BAJA SHELVES WITH BUBBLERS CONTINUED

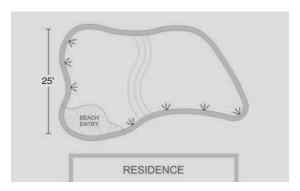
PROTIPS

- While a tall plume may be an ideal water feature, avoiding unintended swirling is often a matter of luck and a taller plume increases the risk of swirling.
- If a swirling effect occurs, reducing the flow to the bubbler(s) will lower the plume without compromising light dispersion.

 This should result in eliminating or dramatically reducing unintended swirling.

LIGHTING SHALLOW ENDS WITH BEACH ENTRIES

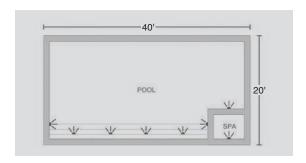
Place lights every 6-8 feet once water depth reaches 8 inches.



LIGHTING A POOL WHEN STAIRS RUN PARALLEL TO THE HOUSE

Some pools have steps that run parallel to the house on the side closest to the residence where the lights would normally be placed. In this situation if the pool is less than 30 feet long place the lights pointing down the length of the pool.

If the pool is longer than 30 feet place lights on the stairs pointing away from the house. To remove the shadows that will be caused by the stairs consider placing a light or two pointing down the length of the steps.



PRO TIP

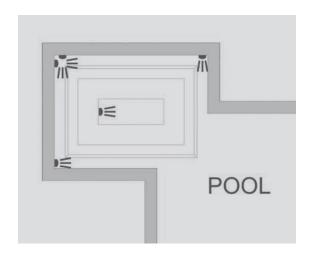
If the pool has a light to medium surface and is less than 15 feet wide the light will reflect off the back wall enough to remove the shadows caused by the steps without needing additional lights.



LIGHTING GAP EDGES AROUND POOLS AND SPAS

Similar to baja shelves, a gap edge also benefits from the modern, small LED nicheless light.

Position lights so their beam points down the narrow channels of the gap edges, highlighting this feature of the pool with a beautiful glow.



PROTIP

Make sure the gap is at least 5 inches wide (to allow room for installation/extraction) before adding lights to the plan.

NOTE

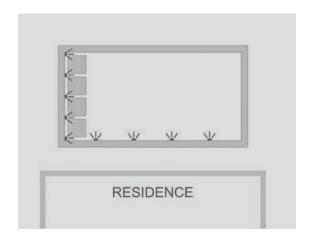
Look closely at the top-left corner of this drawing. Two lights are used, one on each wall, to ensure even lighting down the length of each gap edge.

LIGHTING STEPPING STONES

Increasingly popular, this feature creates the illusion of a stone pathway floating on the surface of the water — a magical effect that also presents lighting challenges, mainly because it requires the use of multiple lights to make it work effectively.

When the feature is close to the wall

Place 6W lights to illuminate the gaps between the stepping stones.



PRO TIP Consider serviceability and future advances in technology. Never physically block a light

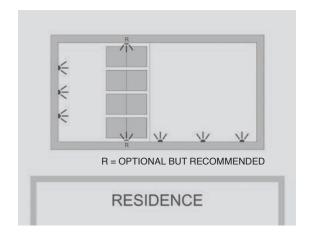
so it can't be removed.



LIGHTING STEPPING STONES CONTINUED

When the feature is away from the wall

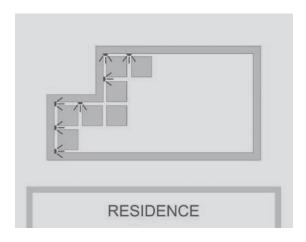
Optimal lighting may require additional 6W lights on either side of the pool pointing into the stepping stones nearest the pool walls. For serviceability reasons, this will only work if the gap between the stepping stones and the wall is at least 7 inches.





More complex stepping stone patterns

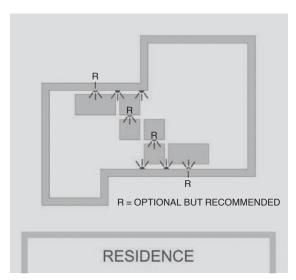
Optimal lighting may require 6W lights between stepping stones.





CAUTION

The plans on this page show lights that are potentially trapped in place. Ensure AT A MINIMUM, seven inches of space between opposite finished surfaces, as this will be needed to pull the light if future service is ever required.

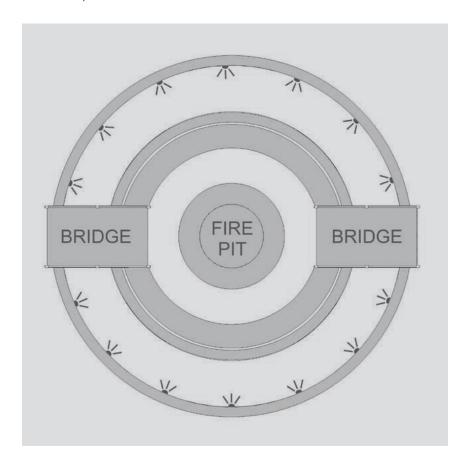


LIGHTING POOLS WITH ISLANDS

Set in the middle of a pool, these islands are true crowd pleasers — but they can be difficult to light effectively.

Simple, uniform islands

In a formal island poolscape, the feature will be centered and will include a firepit or some other seating/gathering space surrounded by water. In these cases, lighting is simply a matter of evaluating the distance, selecting the appropriate wattage and installing lights around the perimeter at 8-10 foot intervals.

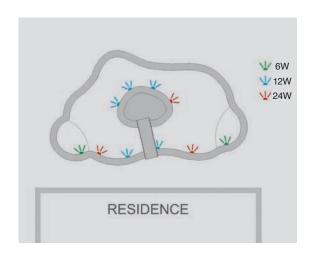




Off-center or "natural" islands

The key to lighting pools with off-center or "natural" islands is to be cognizant of the different distances that need to be covered throughout the pool.

Using the same wattage size throughout the whole pool may result in portions of the pool appearing to be over or under lit. Instead, to achieve an even glow throughout the pool, use low-wattage or mid-level lights for small to mid-distances, respectively, and higher wattage lights for greater distances.



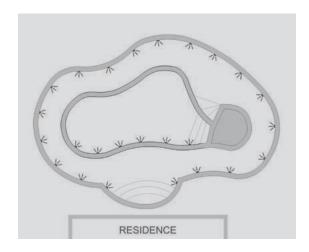
PRO TIP Natural islands interrupt ordinary lighting approaches and can create dark shadows. To avoid this, place several additional lights on the island itself.



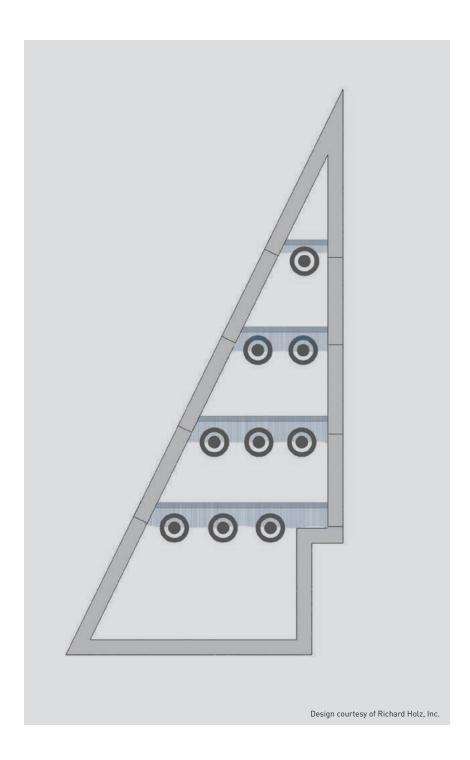
LIGHTING LAZY RIVERS

Lazy rivers present a unique set of safety considerations with the potential for various blind spots — making proper lighting an even more crucial element.

Wattage is determined by the width of the channel. The typical lazy river is 8-10 feet across, which will require no more than 6W lights. Place the lights on the outer perimeter of the river spaced 9-10 feet apart.



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LIGHTING WATERFALLS

Lighting waterfalls properly gets trickier depending on the depth of the water into which it is flowing.

Although some waterfalls come with LED or fiber lighting, the effect is not always as desired since light does not reliably follow the curved path of falling water.

Placing lights vertically directly beneath the splash zone of a waterfall will result in a larger portion of the waterfall capturing the light.

Lighting waterfalls in shallow water

When the water is shallow, as in structural waterfalls, ponds or baja shelves — your lighting strategy can be relatively simple — as illustrated in the example to the left.

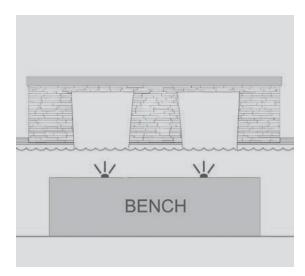


Lighting waterfalls in deeper water

When lighting a waterfall that's flowing into a deeper body of water there are two options

Option 1 Build a bench for the lights

Install 12W lights into a bench, facing up (towards the sky), directly underneath the splash zone to ensure as much light as possible is carried up the falling water.



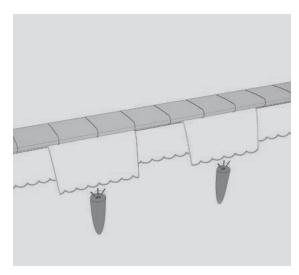
PRO TIP

When lighting waterfalls from below the splash zone it is best to use 12W lights, even though the depth is only a few feet or less. Due to the reflective nature of the water's surface, it is harder for light to escape water than to travel through it. Therefore, more wattage is required to light up the waterfall above the splash zone.



Option 2 Place lights on bump outs

If an entire bench is not desirable or possible the other option is to build bump outs that place the lights at a steep angle directing light into the splash zone.

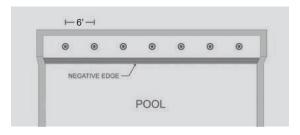


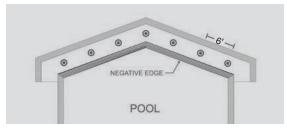
PRO TIP When trying to light a waterfall, consider installing a rain style fall. The more turbulent the water, the more bubbles there are to catch light in the falling water.

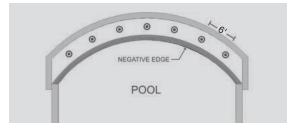


LIGHTING VANISHING EDGES

With vanishing edges you want to use 12W lights placed vertically and spaced 6 feet apart. This will not only light up the negative edge wall for those facing the wall, but also, depending on the angle at the top of the wall, light up a thread of light across the edge itself that is visible from the pool deck.

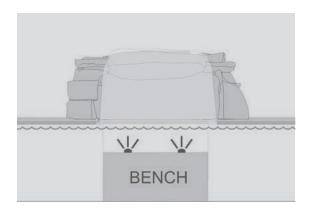


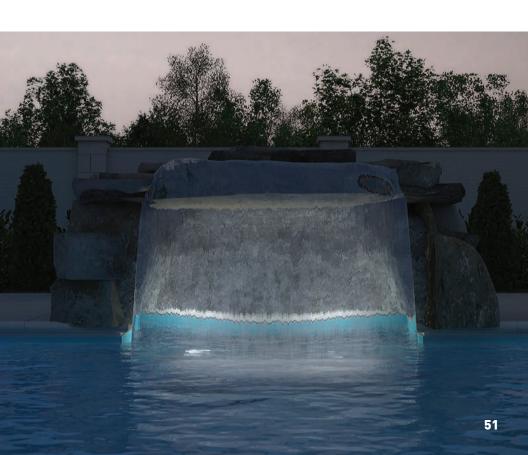


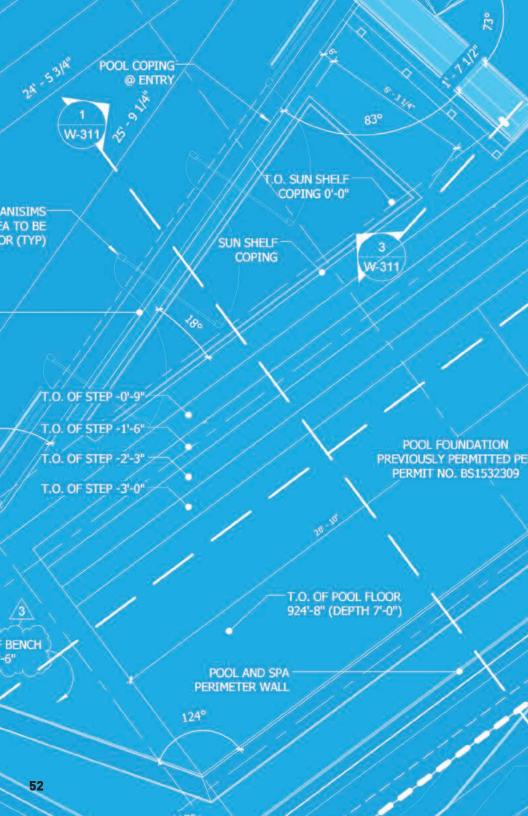


LIGHTING GROTTOS

To properly light a grotto, place 12W lights face up in the bench, allowing light to dance across the ceiling with the movement of the water.







PRINCIPLES IN PRACTICE

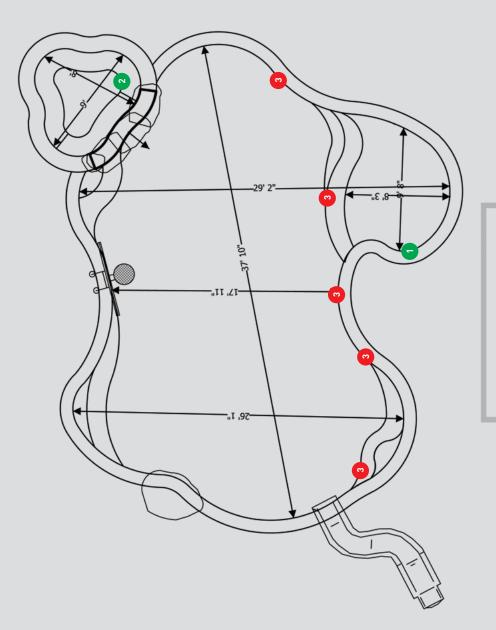
This section shows lighting plan recommendations for pools that were submitted to our Light Design Team *lighting.design@zodiac.com* for help with light placement.

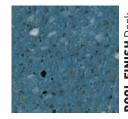
These pool plans have different features that represent the vast majority of the common challenges you will face in lighting design.

To help you understand how to put light design principles into practice you will also see the rationale behind our recommendations for the first four plans.

While there is never just one right way to light a pool, the important thing is that the main principles are followed. In doing so, we will accomplish the primary goals of every good lighting plan:

- 1 Evenly and safely light the entire pool
- 2 Highlight the unique features of the pool
- 3 Deliver a delightful nighttime ambiance that exceeds customer's expectations





POOL FINISH Dark

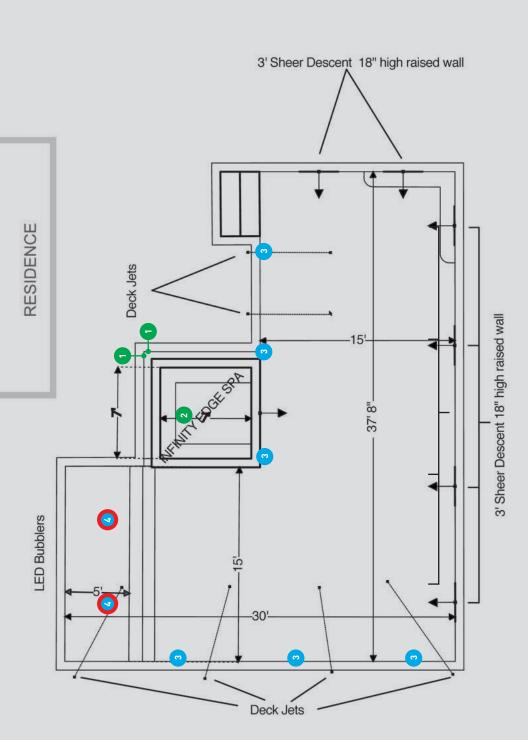
Design courtesy of Aqua Classic Pools and Spas

6W light angled to maximize light coverage of the sun shelf per the 60 degree rule (see page 13)

24W

6W light below the spa bench at an angle to light up the entire spa (see page 30)

Per the rule of placing a light about every 8 feet this pool length needs between 4 or 5 lights – with a dark finish round up to 5 (see page 11) With a width of 17 feet or more and a dark finish this pool requires 24W lights (see pages 14-15) With a length of nearly 40 feet treat this pool like a lap lane and don't place lights pointing down the length of the pool (see page 29)

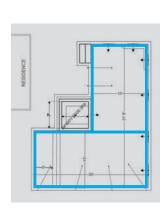


Two 6W lights pointing down the lengths of both spa edge troughs (see page 38)

) 6W light below the spa bench [see page 30]

Think of "L" shaped pools as two separate pools and place lights accordingly spaced about 8 feet apart (see page 25)

With each "section" of the pool having a width of 15 feet in a pool with a light finish 12W lights are sufficient (see pages 14-15)



4 If bubblers will be used to light the sun shelf, place them at least 3 feet from the walls and other bubblers (see page 35)

BUBBLER

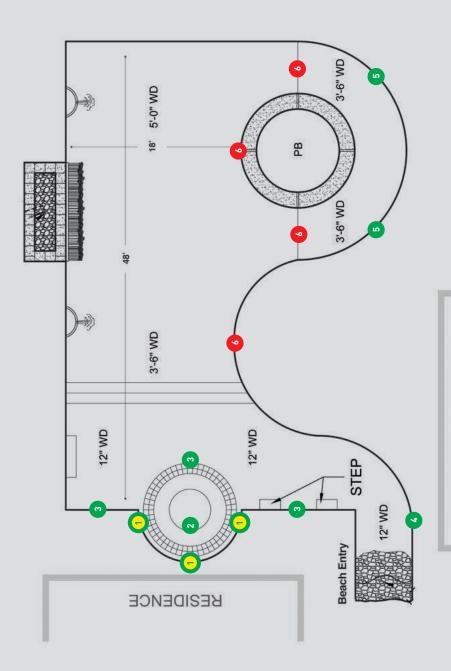
12W

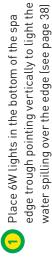
Alternatively, if lights are preferable to bubblers, (2) 6W lights on the long side of the sun shelf would work well. If budget is an issue (1) 12W light on the short side of the sun shelf, while not ideal, would be sufficient. (see pages 32-34)



POOL FINISH Light

Design courtesy of Sunshine Pools of Florida





- 2 6W light below the spa bench (see page 30)
- The large sun shelf requires multiple 6W lights (see pages 32-34)
- Lights in beach entries should be placed when the water depth reaches at least 8 inches (see page 37)
- Using the wattage guide on pages 14-15 6W lights will be sufficient to light this side of the island [see page 43]

6 Not counting the sun shelf the main body of the pool is about 32 feet long which would require 4 lights (see page 11)

With a width of 18 feet or more and a medium finish, this pool requires 24W lights (see pages 14-15)



§

VERTICAL 6W

24W

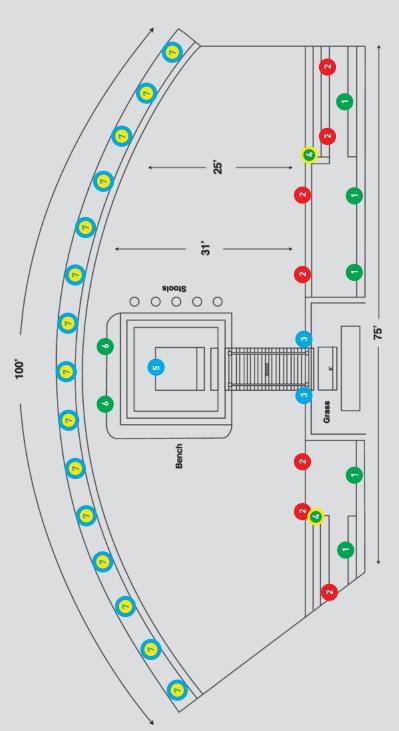
WD WATER DEPTH

PB PLANTER BOX



POOL FINISH Medium

Design courtesy of Teserra Outdoors



- Both large sun shelves require multiple 6W lights (see pages 32-34)
- A pool that is 75 feet long will need 9 lights spaced about every 8 feet (see page 11)

The width in the open sections of the pool will require 24W lights, and due to the reflective nature of the light finish on the pool, no additional lights are needed in the far corners of the pool [see pages 14-15] – even the far left corner will be covered [see the 60 degree beam spread rule on page 13]. If the pool had a dark finish, additional lights would need to be considered in the back corners of the pool.

With the shorter distance to the spa under the bridge use 12W lights to keep even lighting throughout the pool (see page 43)

Lights placed on steps will result in shadows. If desired, these shadows can be removed by placing 6W lights pointing

down the length of the steps

[see page 37]

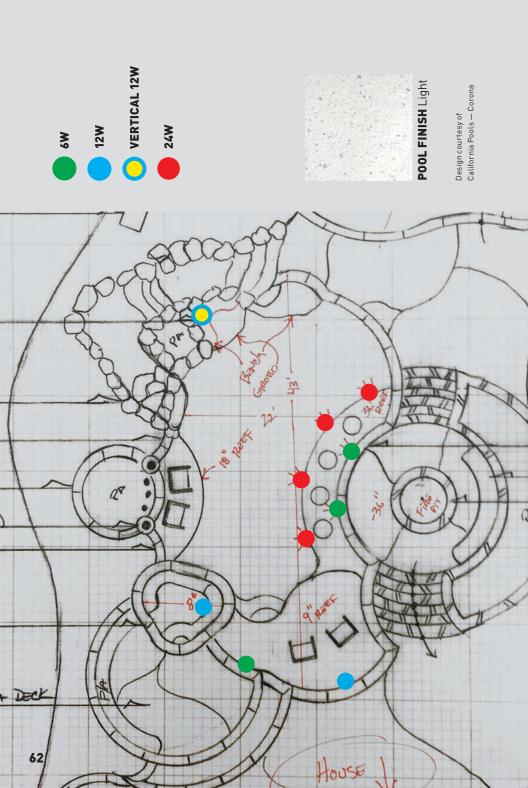
- With a larger spa, a 12W light below the spa bench is needed (see page 30)
- 6 6W lights are needed on the back side of the island to keep even light distribution throughout the pool [see page 43]
- 12W lights spaced about every 6 feet are needed to light the negative edge wall (see page 50)





POOL FINISH Light

Design courtesy of Pool Patrol





Design courtesy of Platinum Pools



POOL FINISH Light

Design courtesy of Premier Pools — Orange County

