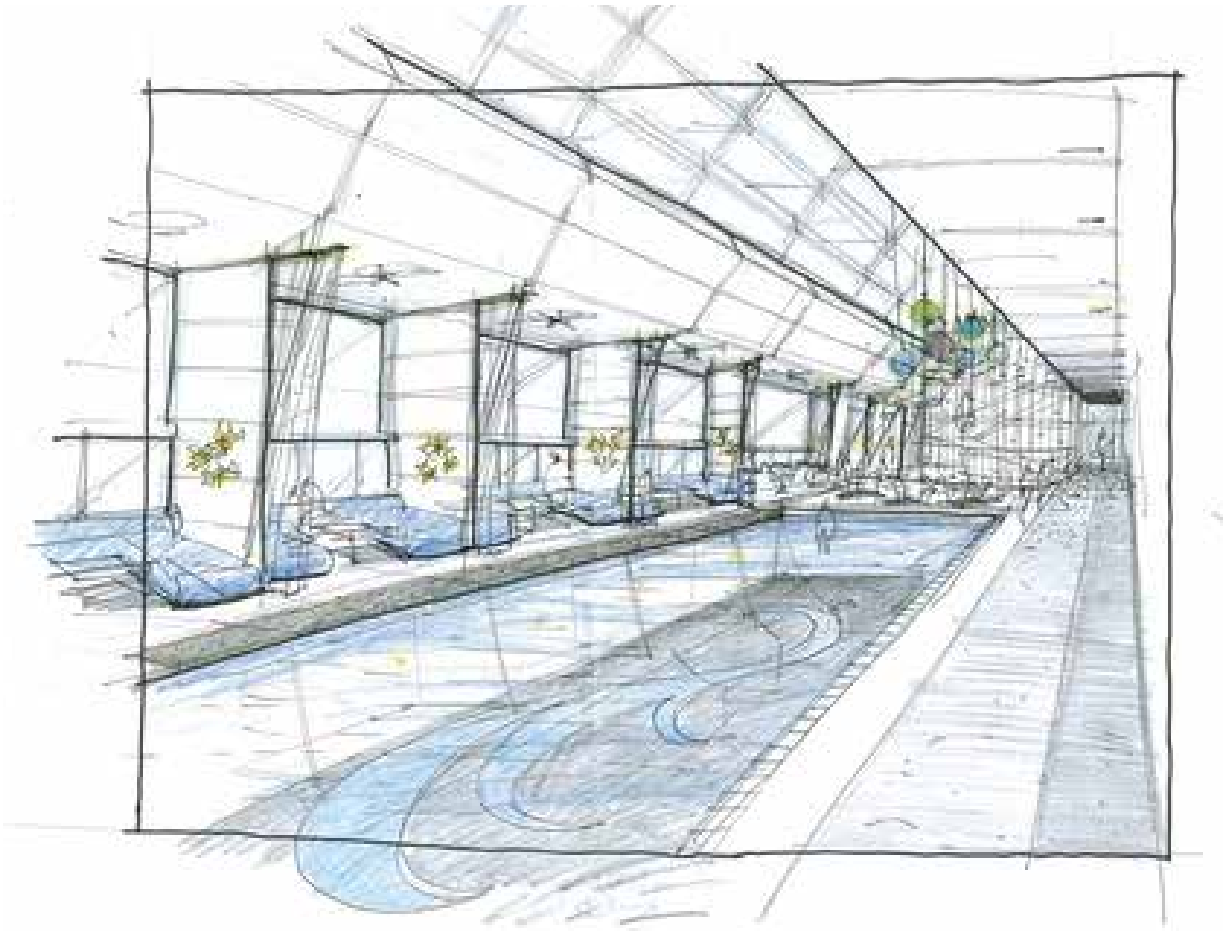
Spa Electrics

Underwater Lighting Specialists



LIGHTING DESIGN GUIDELINES

Quality, Innovation + Service Excellence

General

While every swimming pool design differs; from a simple geometric shape to an elaborate maze of lagoons and water features; the basic principles of lighting design remains the same. These key fundamentals of lighting design illustrated within will give you the knowledge and resource to accurately design even the most elaborate of swimming pools.

Spread of light

The Spa Electrics range of LED lights utilise some of the most powerful and efficient LED dies available. This, combined with key colour frequency choice has allowed us to produce some of the most effective underwater lights on the market today.

As a general rule for our LED series lights in regards to spread of light and distance; Spa Electrics recommends that ONE LED light (GK/WN/EM) will reach a distance of 10M (32ft) with an effective spread of light up to 5M (16ft) from the source.

This general rule will be effected by the choice of LED colour and interior colour of the pool - Also, steps swim outs or any obtrusion in line sight of the Light will effect the overall appearance of the illumination.

While it is true that ONE LED light will illuminate a large area, it is not recommended to only use ONE light for this size area. As displayed on the following pages, a single light should only be used in an area less than 6M (19ft) in length and 4M (13ft) in width.
This is due to the loss of light over a distance - So while a light may reach this distance effectively, the visual appearance of the pool will be inconsistent, as the light which is bright at the source, will begin to deteriorate over distance.

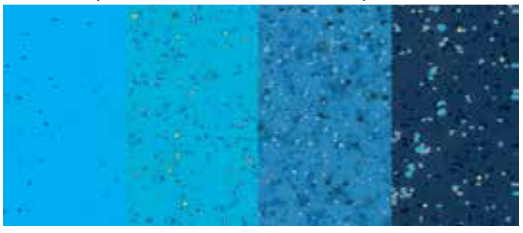
Colour Absorption

The interior colour of the pool will have an equally dramatic effect on night time illumination as quantity and colour of Lights - This is due to colour absorption.
A general rule for this factor is that the darker the interior colour of the pool, the more lights are required to achieve the same result.

A simple equation for this would be **1.5 lights** should be installed in a dark pool for every **1 light** required for an equivalent light colour pool.

example of interior colours

example of colour absorption rate

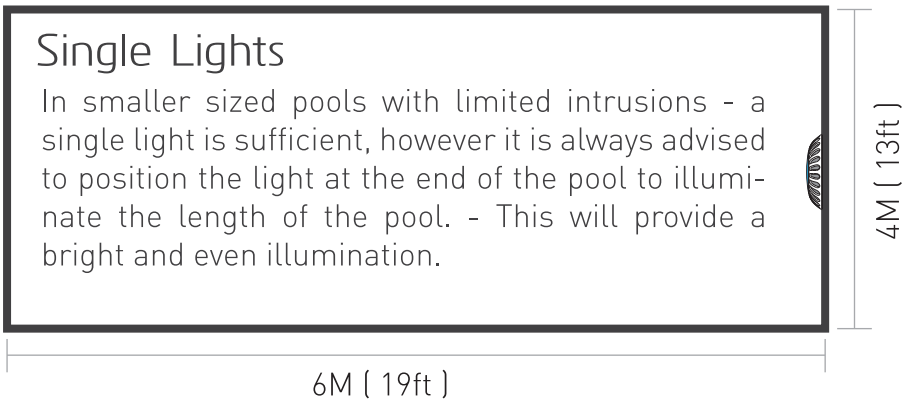


Geometric shapes

For basic geometric shapes, the following arrangements should be used wherever possible, if there are no other obtrusions within the pool which could effect the spread of light. (see following page for illuminating with obtrusions.) Further lights may be added to these designs for dark colour pool interiors. It is also assumed that the dwelling is located adjacent to the south wall of each pool.

Single Lights

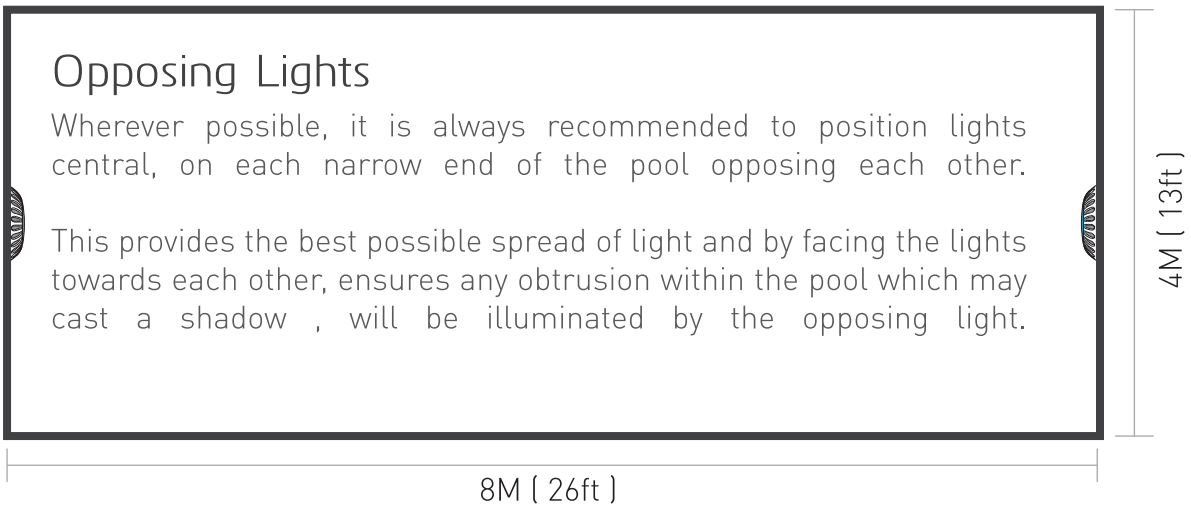
In smaller sized pools with limited intrusions - a single light is sufficient, however it is always advised to position the light at the end of the pool to illuminate the length of the pool. - This will provide a bright and even illumination.



Opposing Lights

Wherever possible, it is always recommended to position lights central, on each narrow end of the pool opposing each other.

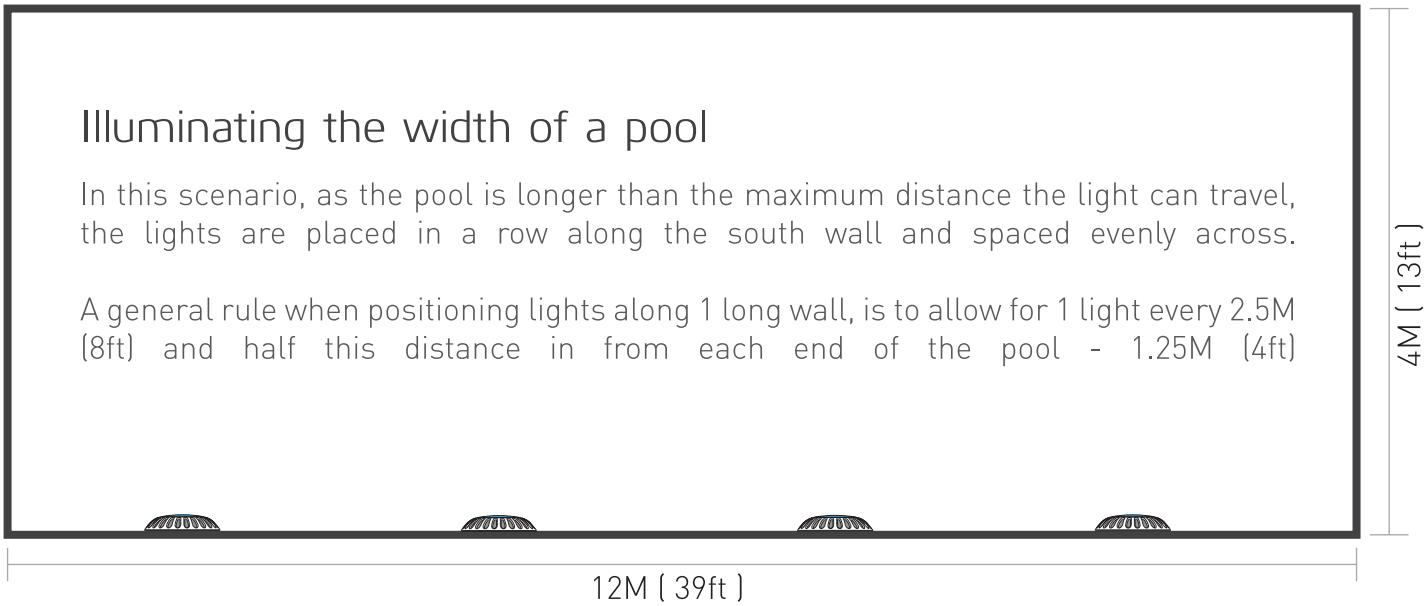
This provides the best possible spread of light and by facing the lights towards each other, ensures any obtrusion within the pool which may cast a shadow , will be illuminated by the opposing light.



Illuminating the width of a pool

In this scenario, as the pool is longer than the maximum distance the light can travel, the lights are placed in a row along the south wall and spaced evenly across.

A general rule when positioning lights along 1 long wall, is to allow for 1 light every 2.5M (8ft) and half this distance in from each end of the pool - 1.25M (4ft)

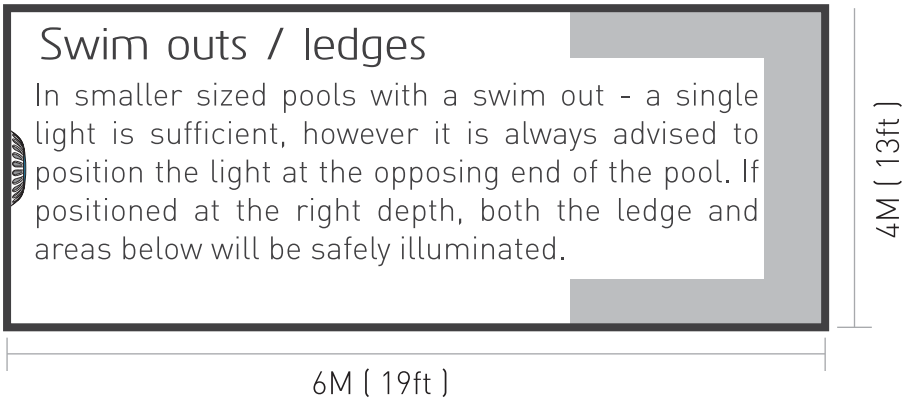


illuminating steps / swim-outs / ledges

Most pools designed today may have one or multiple types of steps, swim outs or safety ledges. All of which are designed to increase pool safety and function. To assist in pool safety it is always important to ensure these safety aspects are illuminated at night while still providing even illumination throughout the entire pool. A general rule for illuminating these features are to ensure lights are installed at a maximum depth of **300mm (12in)** from the top of the pool, as steps and ledges are usually installed at a depth of 400mm (16in). Mounting lights above the step height ensures the step will be illuminated.

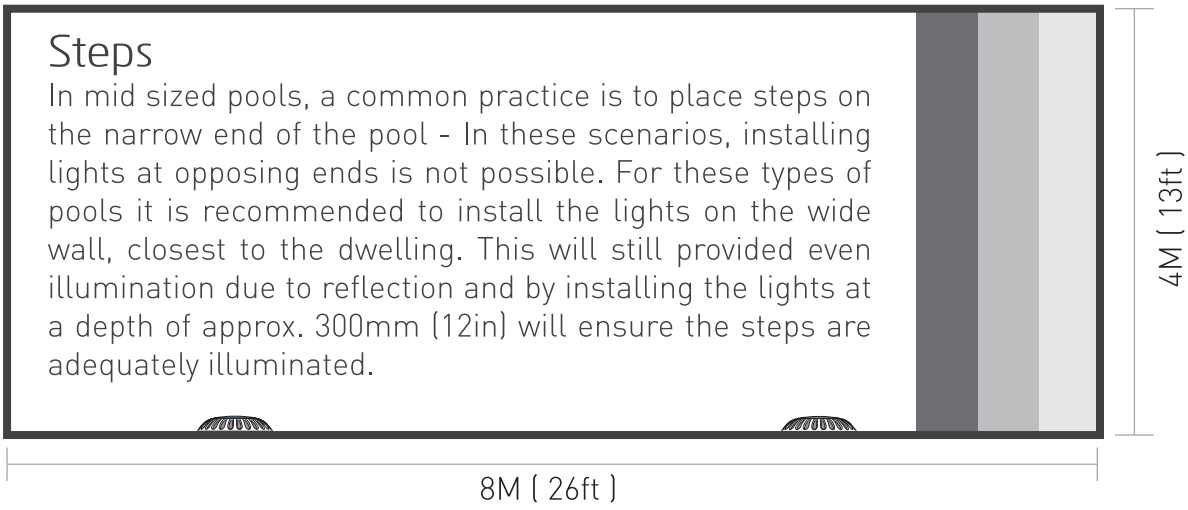
Swim outs / ledges

In smaller sized pools with a swim out - a single light is sufficient, however it is always advised to position the light at the opposing end of the pool. If positioned at the right depth, both the ledge and areas below will be safely illuminated.



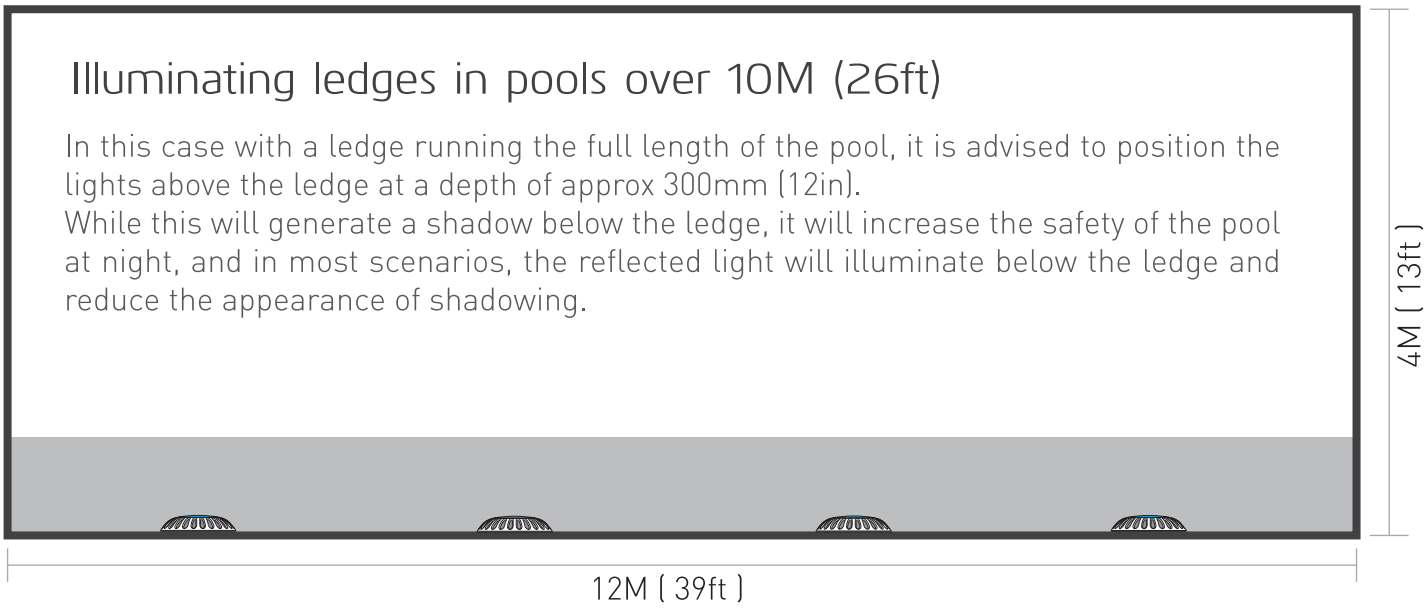
Steps

In mid sized pools, a common practice is to place steps on the narrow end of the pool - In these scenarios, installing lights at opposing ends is not possible. For these types of pools it is recommended to install the lights on the wide wall, closest to the dwelling. This will still provided even illumination due to reflection and by installing the lights at a depth of approx. 300mm (12in) will ensure the steps are adequately illuminated.



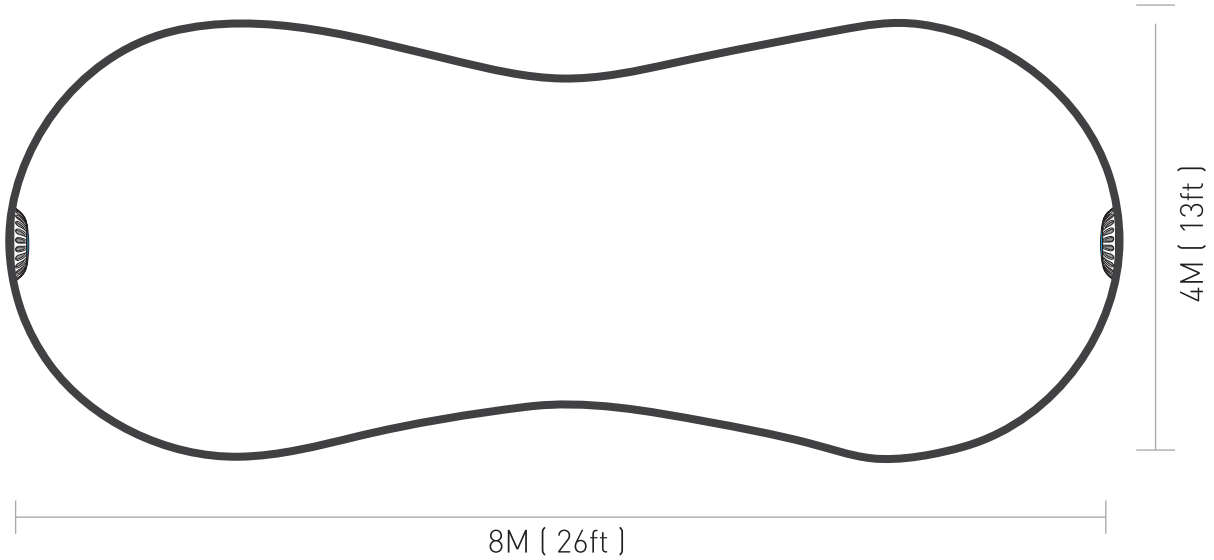
Illuminating ledges in pools over 10M (26ft)

In this case with a ledge running the full length of the pool, it is advised to position the lights above the ledge at a depth of approx 300mm (12in).
While this will generate a shadow below the ledge, it will increase the safety of the pool at night, and in most scenarios, the reflected light will illuminate below the ledge and reduce the appearance of shadowing.

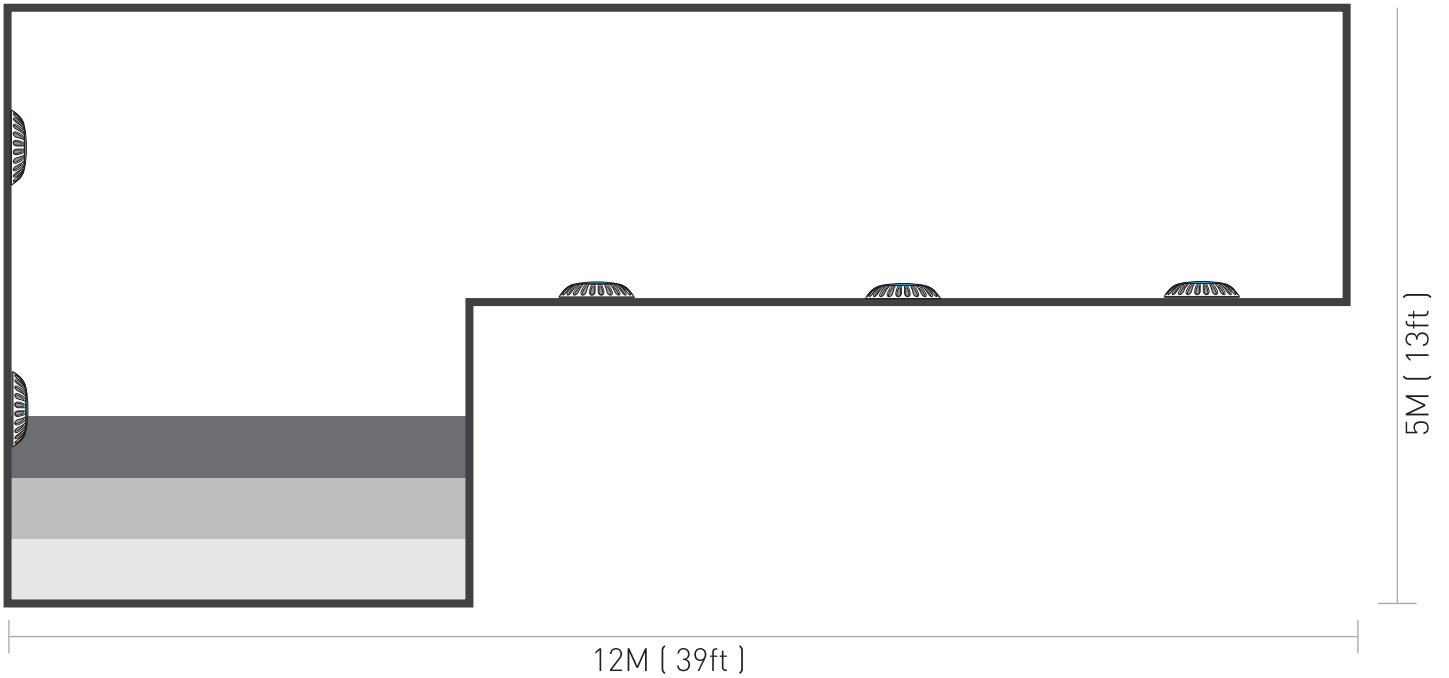


Irregular Pool shapes

While Pool designs can vary greatly, the basic principles remain the same. Illumination from opposing ends will always provide the best result in pools less than 12 meters (39ft) in length. For kidney shaped pools as seen below - Consideration should always be taken to ensure the angle of the wall on which the light is to be installed does not exceed 10-20 degrees across the diameter of the light as may cause excessive stress on the light when it is fastened to the wall. Smaller lights (such as the EM series) will be less effected by this.



When designing for pools with an 'L'' shape or extension off the main pool, it is always recommended to treat the extension as a separate pool with its own lighting requirements.
In the scenario below while 4 lights would normally be recommended for this length pool, the addition of the 'L' shape extension removes the ability to position lights evenly across one wall.
By adding a 5th light, it allows the step area to be adequately illuminated, while positioning a light on the narrow wall shining the length of the pool improves the evenness of light across the entire pool length while providing good illumination of the area above the extension.



Commercial Lighting

When designing for commercial applications, there are many aspects to consider. While an overall aesthetically pleasing result is the desired outcome, this can in some cases fall further down the requirements list in replace of night time safety for swimmers and also budget. As such there are always compromises between these factors to come to a final design which both lighting designer and architect are happy with.

In the example given on the right, careful consideration was given to ensure all of these aspects were achieved and the final result was a safe, brilliantly illuminated pool which fit comfortably within the clients budget.

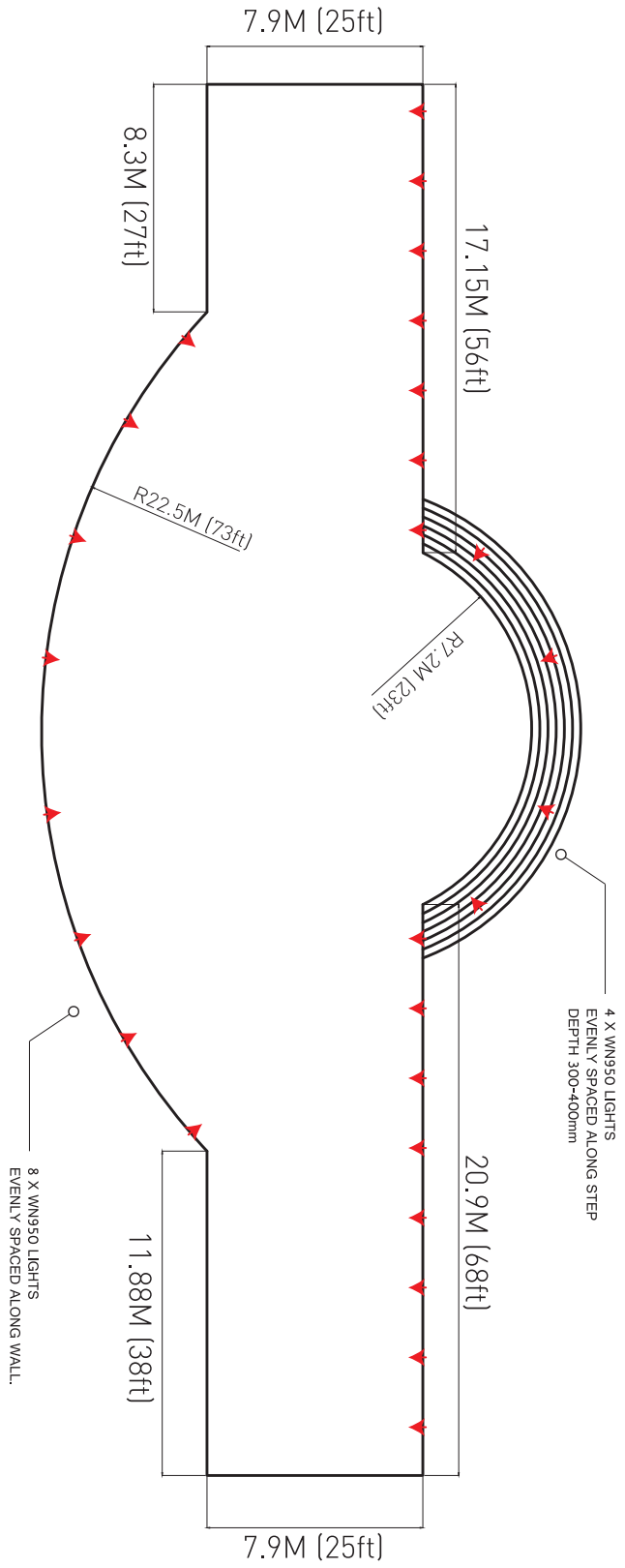
While the size of this pool is impressive, as before the principals of lighting remain in most part the same as domestic lighting.

Along the east walls, lights were positioned 2.5M (8ft) apart while Lights positioned in the step area and arc section of the west wall were positioned at a greater distance apart. This however will still achieve a pleasing result as the angle of the pool wall focuses the lights towards the centre of the pool and in effect causes the light beams to overlap.

This ensures the level of illumination remains the same while less lights have been used across the distance.

Ultimately all lighting designs, be it domestic or commercial will present its own set of requirements and obstacles, however using these key principles of underwater lighting; safe, bright and evenly illuminated lighting designs should be easily achievable.

For more information or assistance on lighting design, please contact us.



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