YOUR CHALLENGES
DRIVE OUR SMART
SOLUTIONS

inspire

TUNNELS AND UNDERPASSES

Schréder

YOUR PARTNER BEYOND LIGHT

YOUR CHALLENGES **DRIVE OUR SMART SOLUTIONS**

WHY MOBILITY 2.0 AND SOCIETAL CHALLENGES

A **BETTER** AND **MORE** SUSTAINABLE MOBILITY NETWORK

Road, train and underground tunnels play a crucial role in developing a more efficient and sustainable mobility system. Tunnels help to solve traffic congestion, improve air quality, preserve green space and give the city back to the people.

Underground transport lines can free local roads, boost public transport services as well as provide safer environments for walking and cycling to improve living conditions in urban areas.

Tunnels reduce noise, reconquer land for the local community and create more attractive landscapes.

A SUPPORT FOR **ECONOMIC GROWTH**

Tunnels shorten routes and create direct connections between two regions or two countries, improving the efficiency of trade and commerce. The reduction in the number of hours that vehicles travel has a positive impact on the competitiveness of a company. It opens up new markets as the company becomes more interesting to new customers.

Less time spent travelling and reduced vehicle operating costs reinforces the relevancy of local industries while providing new opportunities on the global market.

DOORWAY FOR **MULTI-MODAL TRANSPORT**

Tunnels are not only beneficial for small vehicles and lorries. They can provide the same benefits for railways or other types of public transport.

More and more tunnels include a dedicated bore for public transport even if the tunnel was not built for this purpose. By doing so, tunnels provide a powerful means of modern, fast and efficient multi-modal transport.

IMPROVED **SAFETY**

Junctions and crossroads are critical for safety as this is where most interactions between users and thus most accidents tend to occur. The headlights of on-coming cars is a source of fatigue and stress and can cause collisions.

In tunnels, motorists are guided in straight lines and gentle bends. They do not cross each other.

As safety is the first priority in tunnels, they can offer the safest environment for users. Thanks to proper lighting, a tunnel monitoring system and clear marking, they ensure a smooth and safe journey.

WHERE

ANALYSIS OF THE ENVIRONMENT

ANALYSING UNDERGROUND MOBILITY LED TO THE CONCLUSION THAT TUNNELS ARE MUCH MORE COMPLEX ENVIRONMENTS THAN THEY APPEAR. TO FIND THE BEST WAY TO EQUIP A TUNNEL, WE NEED TO UNDERSTAND WHY IT EXISTS AND HOW IT INTEGRATES INTO THE MOBILITY NETWORK.

UNDERPASSES AND SMALL TUNNELS

Tunnels can be short underground passages in the city or longer ones on secondary roads going through natural barriers such as mountains. These tunnels can also protect users from geographical dangers, like snowsheds in the mountains. As they can be quite short or even open on one side, natural light is quite important. Underpasses can be used exclusively for active mobility, whether it is for cyclists or pedestrians.

URBAN AND SUBURBAN TUNNELS

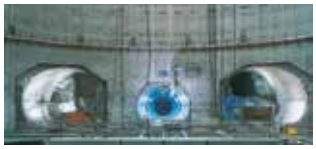
They contribute to a fluid mobility by reducing the number of crossroads and by preventing traffic bottlenecks. As they are located in the city or in the nearby suburbs, they often include exits and junctions.

These short urban tunnels can be discontinuous with a return to the surface before returning to the next section of tunnel. The successive transitions from the outside to the inside means that special attention must be given to the visual comfort of the users. In tunnel bends, motorists need clear visual guidance.

When these tunnels are parts of the city centre, they are included in the city's integrated traffic management system incorporating traffic supervision and dynamic signage.

MOTORWAY AND FAST MOBILITY TUNNELS

These tunnels are a crucial part of a wider road or rail network. They can link major junctions and improve mobility. Most of the time, these tunnels are bored in the mountains, in the hills or under the sea and rivers to create a shortcut and to ensure that the route is as direct as possible. As the speed is quite high inside these tunnels, perfect visibility both by day and night is key to ensure smooth traffic.

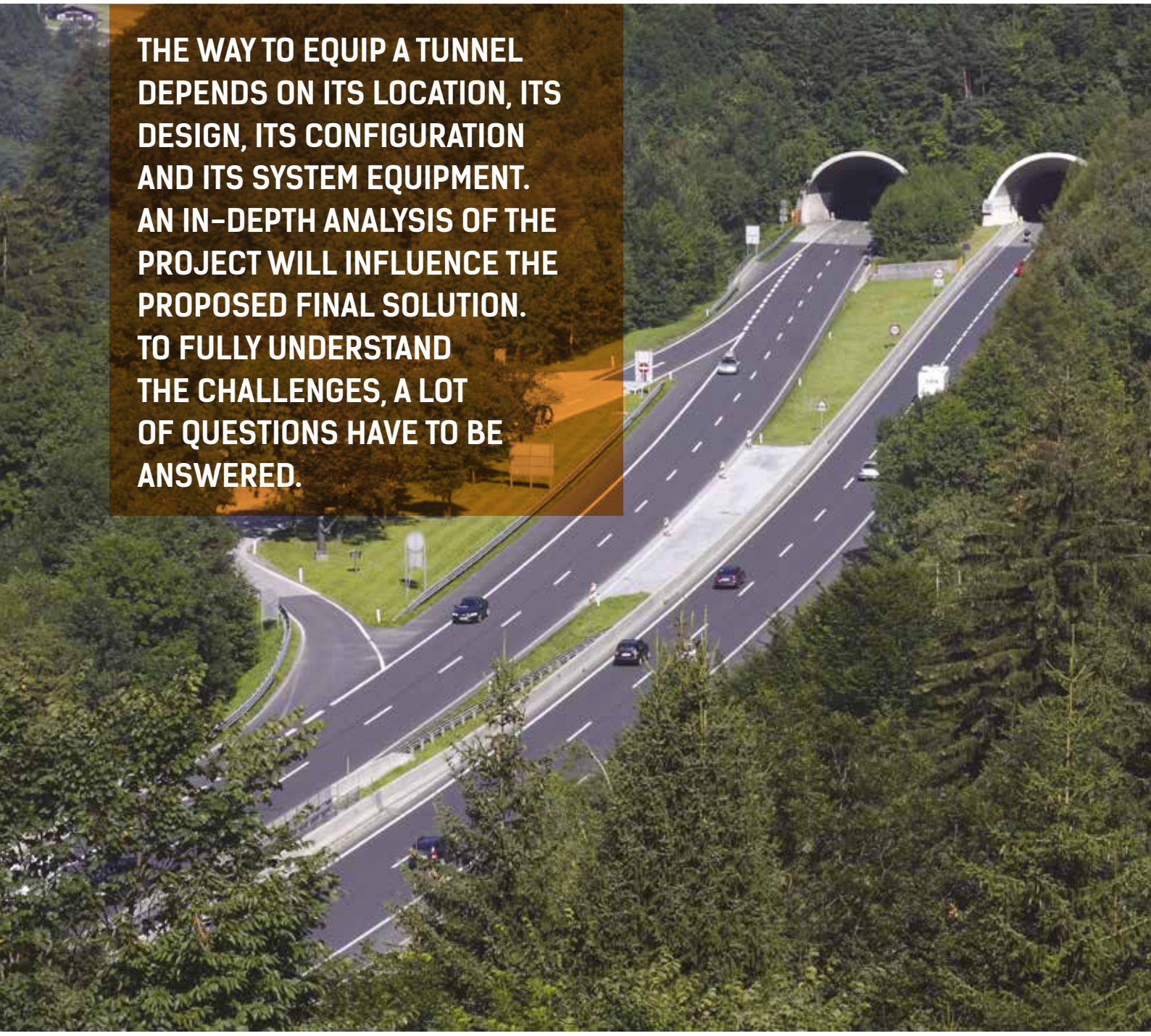


With a high traffic density, it is important to choose solutions with little maintenance needs to reduce the frequency of tunnel closures.

These fast mobility tunnels can be long and thus need to be equipped with emergency facilities such as dedicated signage, shelters, exits and safety corridors.

WHERE

KEY TOPOLOGY / CONFIGURATION FACTORS



THE WAY TO EQUIP A TUNNEL DEPENDS ON ITS LOCATION, ITS DESIGN, ITS CONFIGURATION AND ITS SYSTEM EQUIPMENT. AN IN-DEPTH ANALYSIS OF THE PROJECT WILL INFLUENCE THE PROPOSED FINAL SOLUTION. TO FULLY UNDERSTAND THE CHALLENGES, A LOT OF QUESTIONS HAVE TO BE ANSWERED.

HEIGHT / LENGTH / WIDTH / SHAPE

- What is the height of the tunnel?
- What is the length?
- What is the width?
- What shape is it?

USE

- Is this tunnel/underpass dedicated to a specific category of users or is it multi-modal?
- Does it have restrictions such as maximum vehicle weight or height?

CONFIGURATION

- Is it a bi-directional or a one-way tunnel?
- How many lanes does it have?
- Are there many entries and exits?
- Is it a straight line tunnel or does it have bends?
- Does it start with a slope?

SURFACES

- What material is used for the tunnel walls?
- What is the road surface?

LAYOUT

- Are there constraints on the position of the luminaires?
- Does some installed or future equipment prevent a certain lighting layout?
- Is a continuous or discontinuous lighting installation foreseen?

SURROUNDINGS

- In what type of environment is the tunnel located?
- Is it north or south facing?
- What are the weather conditions outside the tunnel?

SPEED

- What is the speed limit?
- Does the tunnel incorporate dynamic speed traffic management?

EQUIPMENT

- Does the tunnel already incorporate other material (fans, sound system, fire detection...)?
- Does it include shelters and other emergency facilities?
- Is it managed with a control management system?

STANDARDS AND NORMS

- What are the applicable standards and recommendations?
- How free is the lighting regimes program?
- Can the lighting be dimmed depending on traffic density/speed?

SOLUTIONS

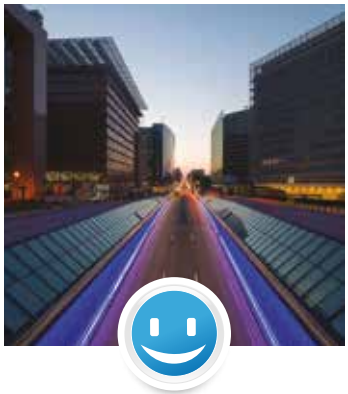
SAFE AND RELIABLE SOLUTIONS WITH HIGH ADDED-VALUE

Schréder provides efficient lighting solutions for tunnels and underpasses. Our offer covers the full scope of the project from design to after-sales services, including smart technology for a fast and easy installation, adaptive lighting, intelligent control systems and safety equipment.

Our dedicated solutions transform tunnels and underpasses into safe, comfortable, sustainable and intelligent routes with engaging experiences for the users and operational benefits for the managers.

SAFETY

An efficient lighting solution allows people to avoid obstacles, to see and be seen, prevents accidents and facilitates travel for emergency services. An interactive monitoring system can detect failures to isolate repairs and facilitate maintenance operations to ensure a efficient network at all times.



WELL-BEING

Adjusting the luminance at the entrance according to the outside ambient light creates comfort for users. It decreases the adaptation time that the human eye needs to go from daylight to artificial light.

Lighting solutions incorporating flat glass LED luminaires and control systems ensure reliability and reduce maintenance operations and thus the frequency of tunnel closures.

SUSTAINABILITY

Preserving the environment is a collective obligation. Schréder uses recyclable materials for its efficient solutions. Our smart tunnel solutions enable the quantity of luminaires to be reduced and incorporate the most efficient high-quality LEDs and control systems to dim the light when the tunnel is being used less or not at all.
They generate huge energy savings and an impressive reduction in CO_2 emissions.

SAVINGS

Schréder's offer incorporates the most efficient high-quality LED luminaires with lighting control systems. They are designed to meet the rigorous day to day demands whilst delivering the ultimate tunnel lighting experience with a minimum total cost of ownership. They reduce energy and maintenance costs and can be quickly installed thanks to their mechanical design, quick-on cabling and wide range of mounting options available.

COMPONENTS AND FEATURES WE OFFER

LUMINAIRES

ADAPTED TO DIFFERENT TUNNEL ZONES

Tunnel lighting must always guarantee that the visual perception of a driver is maintained, both during the day and night, by avoiding excessive variations in lighting levels when entering and exiting a tunnel.

At night, the level of luminance in a tunnel should be constant and equivalent to the level on the road leading into the tunnel.

By day however, since there is a high level of external light, it is necessary to avoid a black hole effect and thus a reduction in visual perception. At the tunnel exit, the level of luminance should also be increased to avoid drivers being subjected to glare effects by the light outside.

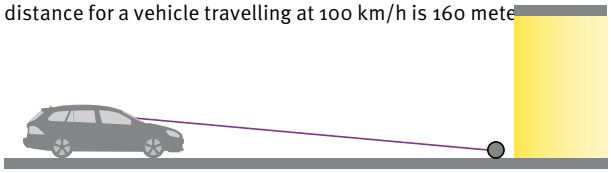
To help drivers eyes adapt easily and quickly, the first part of the tunnel, called the threshold zone, is strongly lit over a distance equal to the safe stopping distance. Thus a driver can see a possible obstacle situated inside the tunnel from outside the tunnel. For this zone, Schréder offers symmetrical and counter-beam lighting solutions.

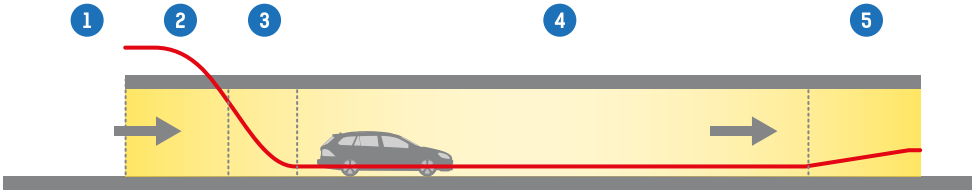
The threshold zone is followed by a transition zone in which the level of luminance is gradually reduced over a distance that is always determined by the authorised speed limit. At the end of the transition zone, luminance is reduced to the value chosen for the lighting of the interior zone of the tunnel. For the interior zone, the Schréder portfolio includes discontinuous or point source lighting as well as continuous line lighting systems.

The exit zone - less critical in terms of visual adaptation - is lit in such a way as to prepare drivers for the return to external luminance and the perception of obstacles in the exit zone. As for the access zone, the exit zone can be equipped with Schréder wall-mounted luminaires or ceiling fittings.

SAFE STOPPING DISTANCE?

The safe stopping distance is the distance the driver needs to identify an obstacle, start braking and stop his vehicle. It is directly correlated to the speed. For example, the stopping distance for a vehicle travelling at 100 km/h is 160 mete

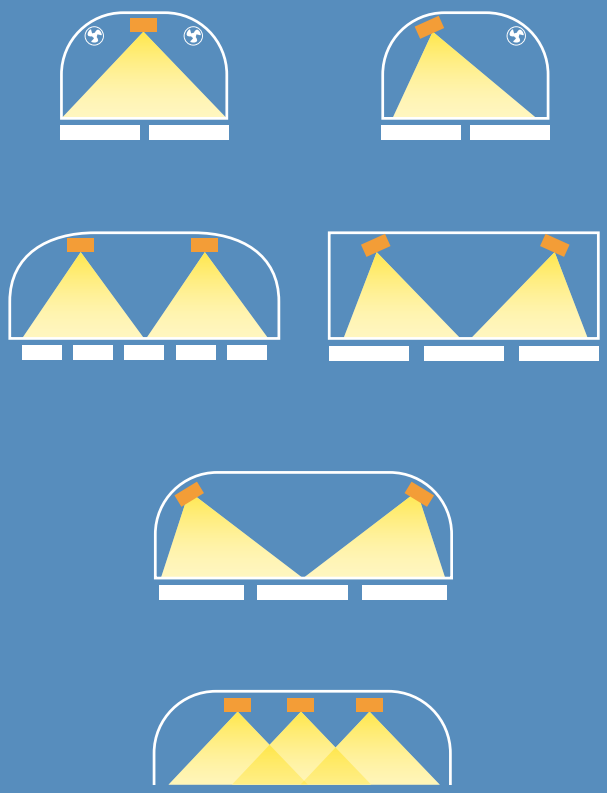




ZONE	DEFINITION	REQUIREMENTS	CHALLENGE IN TERMS OF LIGHTING	LEVEL OF RISK
1. Access	Area leading to the tunnel entrance	Drivers must be able to identify obstacles	- Light uniformity - Lay-out restrictions (wall mounting)	MEDIUM
2. Threshold	Tunnel entrance	Maintaining the uniformity in luminance between the entrance and this zone	- Avoiding the black hole effect coming from the contrast - Luminaires can create a glare effect	HIGH
3. Transition	Second part of the tunnel coming directly after the threshold zone	Progressively reducing the luminance to allow the human eye to adapt	Providing the right levels to enable the adaptation	MEDIUM
4. Interior	Interior zone of the tunnel leading to the exit zone	High uniformity to ensure safety	Avoiding the flickering effect	LOW
5. Exit	Last section of tunnel before the exterior	Increasing the luminance level to prepare the human eye to adapt to the external brightness	Avoiding the glare effect	HIGH

DESIGNED TO SUIT ALL TUNNEL GEOMETRIES/CONDITIONS

Thanks to a wide range of mounting systems, lumen packages and photometries, Schréder can offer solutions adapted to all tunnel geometries, taking into account the needs of each zone of the tunnel.



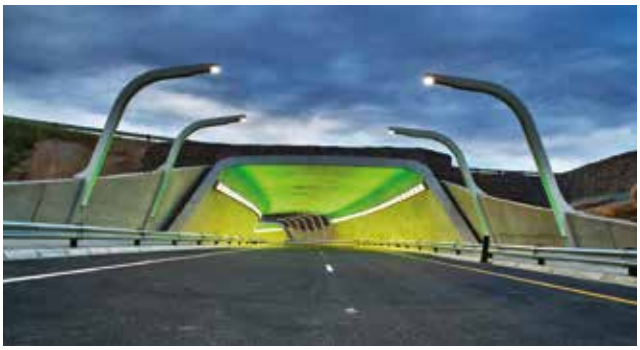
The Schréder range of lighting solutions encompasses robust and performing luminaires in aluminium, stainless steel and polyester to withstand all conditions.

MAXIMISING SAFETY IN TUNNELS

In tunnels, marker lights provide visual guidance to help motorists find reference points and better estimate distances. In case of accidents, marker lights show - through fumes - drivers, passengers and emergency services the way to the sheltered areas and exit.

Specific lighting for shelters and emergency exits makes evacuation operations more efficient and safer. Schréder's complete solutions encompass safety lighting.

CREATING IDENTITY AND IMPROVING THE DRIVING EXPERIENCE



As tunnels are designed to be as straight and uniform as possible, they can be monotonous. This can be a source of danger as motorists may lose concentration. In tunnels, the first cause of accidents is a lack of attention.

Schréder proposes a wide range of robust LED floodlights to create identity and enrich the driving experience with colours and dynamic scenarios.

COMPONENTS AND FEATURES WE OFFER

SENSORS

LUMINANCE METER

The luminance meter measures the luminance provided by natural light in the access zone from the safe stopping distance. It sends the data to a computer that adjusts the lighting levels to avoid any visual adaptation problems.

PHOTOCELL

Our solutions can be managed by photoelectric sensors that switch the luminaires on exactly when natural light becomes insufficient (cloudy day, night fall...).

MOTION, PRESENCE AND SPEED DETECTION

Motion/presence detection is compatible with any type of control or dimming system. It will enhance the efficacy of the installation by increasing the light level only when a user is detected.

The precise detection area depends on the type of sensor, how it is installed (height and orientation) and possible restrictions in the area (obstacles).



	PIR sensor	Radar	Camera
Typical applications	Underpasses for pedestrians/cyclists. Several PIR sensors can be installed so that the light comes on as the user advances.	Short road tunnels. Radars are used to trigger the road lighting as well as the tunnel lighting.	› Security (with local recording) › Detection is an additional benefit
Layout	Multiple, on walls or poles outside the underpass	On selected poles for a cluster of luminaires	In selected luminaires for specific areas
Technical principle	Detects moving heat (infrared rays)	Detects movement (Doppler detection)	Detects direction of movement (digital analysis)
Max. operating range/detection area	14m (length) per 8m (width)	100m	30m
Selective detection	By physical zone masking	By determining a speed range	By image treatment

DRIVER BOXES

To ease installation, reduce costs and facilitate maintenance operations, Schréder can provide driver boxes that enable the luminaires and drivers to be separated. Driver boxes can be installed in the tunnel itself or in the service gallery.


SMART CABLES AND CONNECTORS

Whether for main power or for bus communication, Schréder offers fire resistant cables with easy click-on impact resistant connectors. These connectors ensure a fast tool free installation - reducing the installation time by up to 50% compared to conventional systems - as the luminaires do not need to be opened.

The `T' junction connectors include an automatic phase shift.

These cables can be ordered with customised lengths to perfectly fit the tunnel layout.

LUMGATE

The Lumgate is an interbus device connected to the luminaire drivers to control the light intensity. It includes an internal current measurement probe that checks if the luminaires are working properly. In case of a problem, a signal is sent to the central management system. If the Lumgate loses the interbus connection, it sets the light intensity at a predefined value (safety). The Lumgate is integrated into the luminaire or remote driver box. One Lumgate can run up to 8 LED drivers.

ATS CONTROLLER CABINET

The ATS controller is a control system communicating with local controllers (Lumgates) via the proprietary INTERBUS protocol. It manages up to 240 Lumgates placed within a distance of up to 400m from each other. The ATS controller provides reports and feedback on the local surge protection devices and light status (on/off, dimming level, energy consumption, burning hours, failure detection...) and performs a safety scenario. In case of failure, the lighting level is switched to 100%.

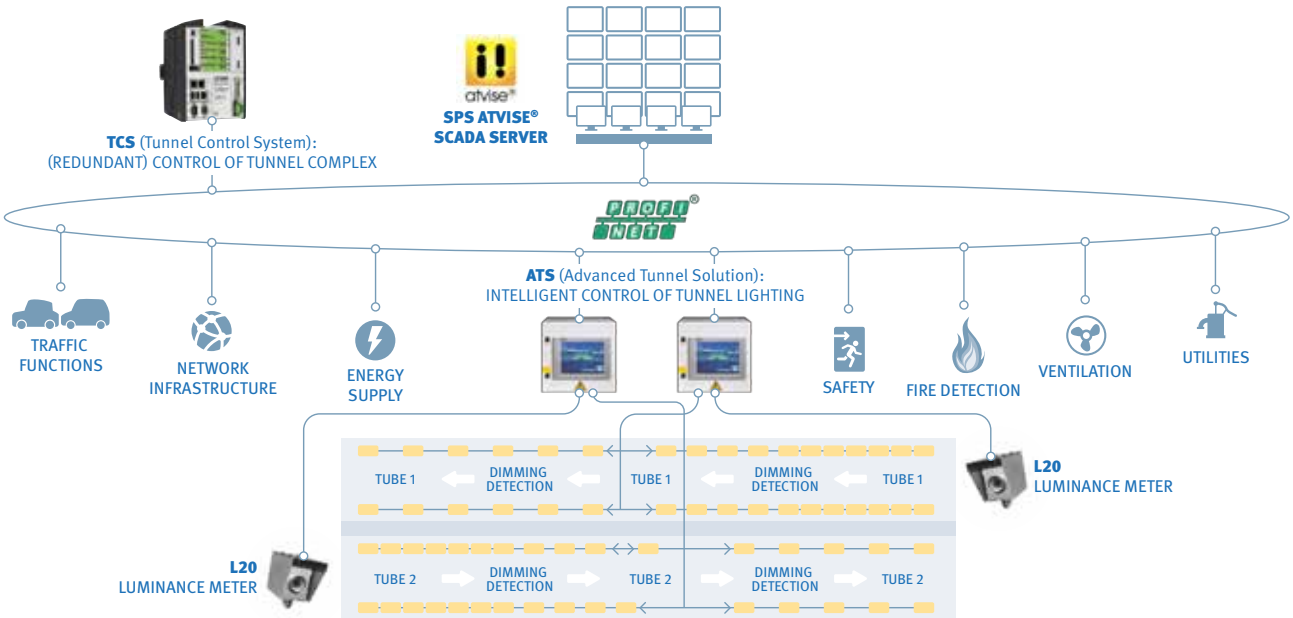
Multiple variants of the ATS controller cabinet exist.

The ATS controller can operate as a stand-alone unit or can be linked to the main tunnel control system.

TUNNEL CONTROL SYSTEM (TCS)

The Tunnel Control System (TCS) is a gateway ensuring the connection/control of the multiple ATS controllers as well as the communication with the central management system of the tunnel infrastructure (SCADA) if applicable.

The TCS acts as the master system where all the data from all the individual ATS controllers is interpreted and commands are sent. Optionally, a redundant TCS provides full operational reliability.



WHAT

SCHRÉDER
OPTIMISED SOLUTIONS

SCHRÉDER IS YOUR TRUSTED PARTNER TO MANAGE YOUR TUNNEL PROJECTS IN THE MOST EFFICIENT WAY. OUR TEAMS OF TUNNEL LIGHTING ENGINEERS PROVIDE COMPLETE SOLUTIONS TO RISE TO YOUR CHALLENGES IN TUNNEL AND UNDERPASS LIGHTING, ENSURING PERFECTLY SAFE AND COMFORTABLE ENVIRONMENTS WITH A MINIMISED TOTAL COST OF OWNERSHIP. WE OFFER THREE RANGES OF DEDICATED SOLUTIONS.

ENTRY / TUNNEL SOLUTION

FOR SMALL TUNNELS AND UNDERPASSES

BASIC / TUNNEL SOLUTION

FOR URBAN AND SUBURBAN TUNNELS

ADVANCED / TUNNEL SOLUTION

FOR MULTI-MODAL AND FAST MOBILITY TUNNELS

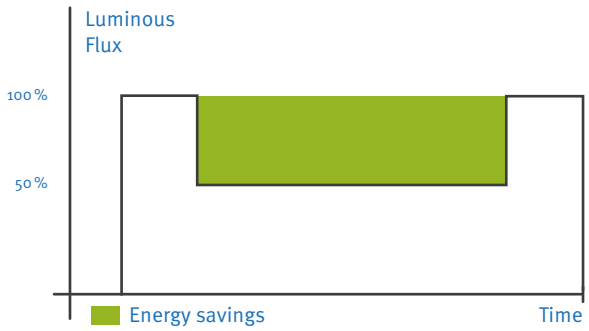
ENTRY / TUNNEL SOLUTION

A BALANCE BETWEEN **SAFETY** AND **ENERGY SAVINGS**

IN THESE SECONDARY ROAD TUNNELS AND SMALL UNDERPASSES WITH VERY SPORADIC USE, THE OBJECTIVE IS TO OFFER SAFETY WHEN PEOPLE ENTER THE ENVIRONMENT WHILE ENSURING ENERGY SAVINGS.

THE ENTRY TUNNEL SOLUTION IS BASED ON STAND-ALONE SYSTEMS WITH FIXED SCENARIOS BY PROGRAMMING INTELLIGENT DRIVERS.

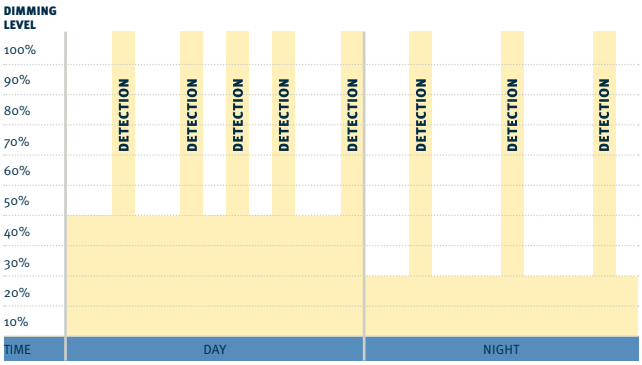
› BI-POWER FUNCTIONALITY



The bi-power feature is a rather basic dimming method, lacking flexibility, but it generates energy savings for night time periods when less light is required.

During the day, the lighting installation runs at a high level to ensure safety for motorists entering the tunnel. When night falls, the bi-power driver receives a command from an astronomical clock to lower the lighting levels, usually from 30 to 50% of its full capacity.

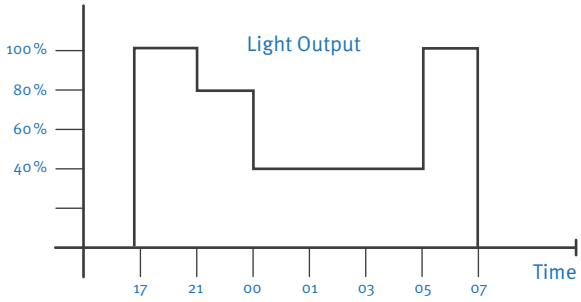
› DETECTION FEATURES



Via an integrated PIR, a radar or a camera, the luminaires are triggered to increase the lighting level when a user arrives. After a pre-programmed hold time, the lighting reverts to its initial level.

› CUSTOM DIMMING PROFILE

Intelligent drivers can be programmed in the factory with complex dimming profiles. Up to 5 combinations of time intervals and light levels are possible. This feature does not require any extra wiring. The customised dimming system generates energy savings while respecting the required lighting levels and uniformity throughout the night.



ENERGY

–40%

DUE TO THE NECESSARY BALANCE BETWEEN SAFETY AND SAVINGS, THE FIXED SCENARIO PROVIDES LIMITED OPTIONS FOR REDUCING THE ENERGY SAVINGS.

MAINTENANCE

–60%

WITH ROBUST AND LONG LASTING LUMINAIRES, THE MAINTENANCE IS EFFECTIVELY REDUCED TO SPORADIC INTERVENTIONS CAUSED BY EXTERNAL FACTORS. BUT WITHOUT ANY MONITORING, FAILURES MUST BE CHECKED BY AN ON-SITE VISIT.

KEY ELEMENTS

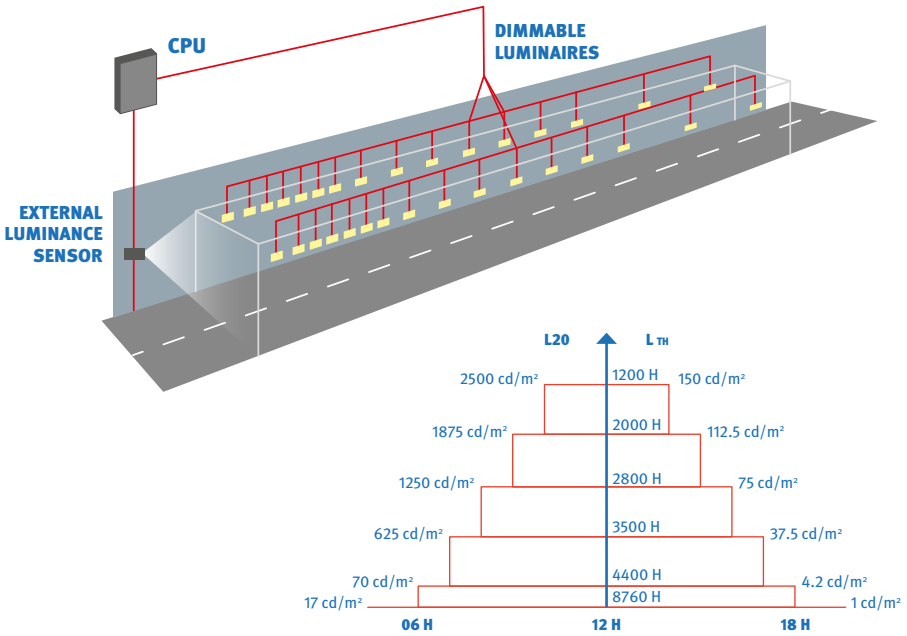
- Tunnel LED lighting
- Fixed dimming scenarios
- Basic detection features
- No real flexibility (not adaptative)

BASIC / TUNNEL SOLUTION

AUTONOMOUS DIMMING FOR A SAFE ENVIRONMENT AT ALL TIMES

IN URBAN AND SUBURBAN TUNNELS, SAFETY IS CRUCIAL TO ENSURE A FLUID MOBILITY. THE TUNNEL LIGHTING MUST ADAPT TO GUARANTEE OPTIMISED VISUAL CONDITIONS FOR USERS WHILE MAXIMISING ENERGY SAVINGS.

OUTSIDE TUNNEL	**INSIDE** TUNNEL ENTRANCE
BRIGHT SUN OUTSIDE	**HIGH LUMINANCE INSIDE**
CLOUDY OUTSIDE	**LOW LUMINANCE INSIDE**



Based on the information received from the luminance meter, the Central Processing Unit (CPU) of the tunnel switches luminaires or clusters of luminaires ON or OFF to carry out a simple and primary reduction of the flux. This unidirectional system is able to create up to 8 different levels of lighting in the tunnel by using different combinations of luminaires for each level.

› VISUAL GUIDANCE

Marker lights provide visual guidance without glare and act as reference points for the safety distance between vehicles. In case of fire with dense smoke, these LED marker lights clearly show drivers, passengers and the emergency services the way to the exit and sheltered areas.

› EMERGENCY EXITS/SHELTERS

Emergency exits and shelters must be easily identifiable by means of appropriate emergency lighting, signage and distinctive green linear strip lighting.

› TRAIN TUNNEL: SAFETY LIGHTING

In train or underground tunnels, small emergency platforms need safety lighting that can be dimmed most of the time to offer minimal lighting and increased to the maximum level in emergency situations or during tunnel maintenance operations.

› CABLING

Thanks to quick-on connectors both on luminaires and on fire resistant cables, the installation time is reduced by 50% and the reliability of the installation is improved.

IDENTITY

Dynamic lighting with coloured scenarios can enhance the identity of a tunnel to make it iconic. It can be triggered by a motion detection unit or any other sensor.

ENERGY
–60%

THANKS TO PRE-PROGRAMMED DIMMED LED LIGHTING, ENERGY SAVINGS OF UP TO 60% CAN BE ACHIEVED COMPARED WITH CONSTANT LIGHTING WITH CONVENTIONAL LAMPS.

INSTALLATION
–50%

THE EASY MOUNTING SPEEDS UP THE INSTALLATION AND REDUCES THE SIZE OF THE WORKFORCE NEEDED.

MAINTENANCE
–60%

WITH ROBUST AND LONG LASTING LUMINAIRES, THE MAINTENANCE IS EFFECTIVELY REDUCED TO SPORADIC INTERVENTIONS CAUSED BY EXTERNAL FACTORS. HOWEVER AS THE COMMUNICATION IS UNIDIRECTIONAL TO THE LUMINAIRES, FAILURES ARE NOT AUTOMATICALLY REPORTED BY THE LIGHTING SYSTEM.

KEY ELEMENTS

- Tunnel, emergency and ambiance LED lighting
- Autonomous adaptive dimming
- Maximised safety and savings
- Low flexibility (on-site intervention is necessary for any adaptation)

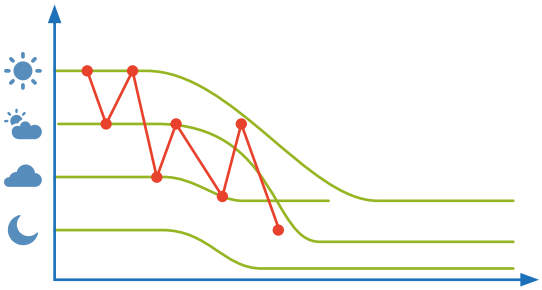
ADVANCED / TUNNEL SOLUTION

FLEXIBLE DIMMING FOR MAXIMISED SAFETY AND SAVINGS

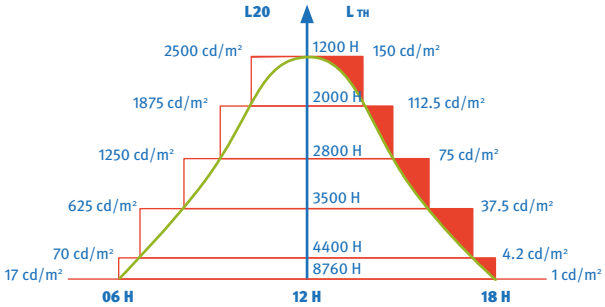
JOINTLY DEVELOPED BY SCHRÉDER AND PHOENIX CONTACT, THIS ADVANCED SOLUTION WAS DESIGNED FOR STRATEGIC TUNNELS (MOTORWAY OR HIGH TRAFFIC DENSITY) TO CONTROL EVERY LIGHTING POINT OR CLUSTERS OF LUMINAIRES TO PERFECTLY ADAPT THE LIGHTING LEVEL ACCORDING TO CONDITIONS IN THE TUNNEL, TO MONITOR THE POWER CONSUMPTION AND TO REPORT THE BURNING HOURS OR ANY FAILURE TO FACILITATE MAINTENANCE.

THANKS TO BI-DIRECTIONAL COMMUNICATION, THE SCENARIO CAN BE ADAPTED AT ANY MOMENT. THANKS TO ITS OPEN PROTOCOL, THIS ADVANCED SOLUTION CAN INTERACT WITH OTHER TUNNEL EQUIPMENT SUCH AS FIRE DETECTION DEVICES, WATER PUMPS, TRAFFIC MANAGEMENT SYSTEMS OR EMERGENCY EXITS TO PROGRAMME RESPONSIVE SAFETY SCENARIOS.

› **PRECISE AND CONTINUOUS DIMMING** – 25 levels to precisely adapt the lighting to the real needs. Without any over-lighting, the energy consumption is limited to exactly what is absolutely necessary to ensure safe and comfortable driving conditions.



— : lighting levels are constantly adapted with the Advanced Tunnel Solution
— : conventional step-dimming



› Flexible redundancy offers security on multi-level applications, not just in the lighting.

› **PLUG AND PLAY COMMISSIONING:** the system automatically attributes addresses to lighting points.

› **SYSTEM UPDATES ARE MANAGED CENTRALLY**, therefore no action is needed locally.

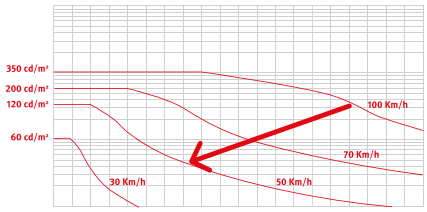
› **INTERACTIONS:** every command or signal sent to or coming from a tunnel component (emergency exit, smoke extraction system, traffic management system…) can be used to trigger a responsive lighting scenario. All the tunnel equipment can be controlled through the same bus command.

› Easy to set-up emergency and disaster management scenarios.

› Remote system updates mean that the latest version of the software can be easily deployed.

ADAPTIVE LIGHTING FOR TRAFFIC SPEED

The Advanced Tunnel Solution can be linked to a traffic monitoring system to obtain data regarding speed or density to adapt the lighting level in accordance to safety standards. This option further reduces energy consumption and increases the lifetime of the installation while ensuring the best driving conditions for motorists.



ENERGY
–70%

THANKS TO CONTINUOUS PROGRESSIVELY DIMMED LED LIGHTING, ENERGY SAVINGS OF UP TO 70% CAN BE ACHIEVED COMPARED WITH CONSTANT LIGHTING WITH CONVENTIONAL LAMPS. THE FLEXIBILTY OF THIS SYSTEM ALLOWS THE LIGHTING LEVELS TO BE ADAPTED BETWEEN CLEANING OPERATIONS, THUS REDUCING OPERATING COSTS.

INSTALLATION
–80%

THE FIRE-RESISTANT CABLING FITTED WITH CLICK-ON CONNECTORS CAN BE USED NOT ONLY FOR LIGHTING EQUIPMENT BUT ALSO FOR ALL OTHER ELECTRIC DEVICES IN THE TUNNEL. IT REDUCES THE INSTALLATION TIME AND COSTS.

MAINTENANCE
–80%

WITH ROBUST AND LONG LASTING LUMINAIRES, THE MAINTENANCE IS EFFECTIVELY REDUCED TO SPORADIC INTERVENTIONS THAT CAN BE PROGRAMMED IN ADVANCE THANKS TO THE FEEDBACK RECEIVED FROM THE CONTROL SYSTEM.

KEY ELEMENTS

- Tunnel, emergency and ambiance lighting
- Constant adaptive dimming (safety and savings)
- Lighting scenario adapts to external triggers
- High flexibility (remote control)

WHICH PRODUCT SELECTION

DESIGNED TO PROVIDE SUSTAINABLE PERFORMANCE

AS TUNNELS AND UNDERPASSES CAN BE AGGRESSIVE ENVIRONMENTS,
OUR PRODUCTS ARE DESIGNED AND TESTED TO WITHSTAND HARSH CONDITIONS.

› CORROSION

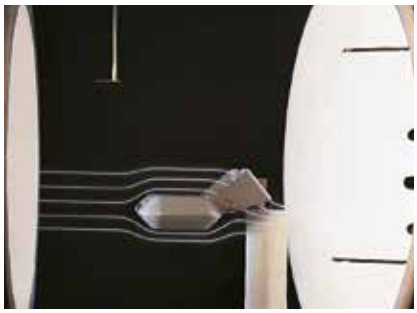
All Schréder tunnel products undergo corrosion tests in laboratories and on-site.

› FIRE

Our products are composed of non-flammable materials to comply with the most demanding requirements (M1, V0, etc) and do not give off toxic fumes (0% halogen, F1, etc).

› TIGHTNESS

Schréder products offer a high level of protection against micro-particles and water splashes (cleaning with high-pressure jets).

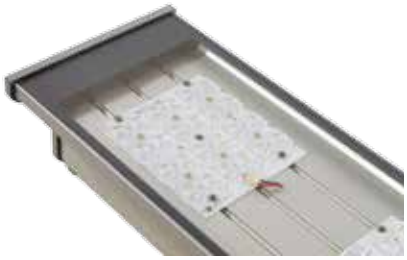


› VIBRATIONS AND WIND

Each time vehicles pass, the luminaires are subjected to intense vibrations and gusts of air. In collaboration with universities, Schréder rigorously tests its tunnel products and mountings in laboratories and wind tunnels.

› SHOCKS

Stones and unsecured truck loads can hit devices installed in a tunnel. Our products are duly tested to resist violent shocks.



› PROTECTION

Schréder LED tunnel luminaires sealed with flat glass guarantee a more constant efficiency than luminaires where the lenses are in direct contact with the atmosphere. They minimise the amount of material needed, ensure better safety for users, reduce maintenance requirements and contribute to energy efficiency.

› **EMBELLISHMENT** AND **CREATION** OF **IDENTITY**

The SCULP collection is a complete family of floodlights incorporating 3 sizes and a linear version. It offers reliable, discrete, harmonious and easy-to-integrate solutions for highlighting structures and creating identity through static or dynamic scenarios.

SCULPdot

SCULPflood 60

SCULPflood 150

SCULPline

PRODUCT SELECTION

ZONE									LAYOUT		
Access/slope	Threshold	Transition	Interior	Exit	Underpasses	Pedestrian underpasses	Technical galleries and areas	Signage / emergency lighting	Continuous line	Discontinuous line	Pole
V	X	X	X	X	X	X	X	X	X	V	V
V	X	X	X	X	X	V	X	X	X	V	X
V	V	V	V	V	V	V	V	X	X	V	V
V	X	X	V	X	V	V	V	X	V	V	X
X	V	V	X	V	X	X	X	X	X	V	X
X	V	V	V	V	V	X	X	X	X	V	X
X	V	V	V	V	V	V	V	X	X	V	X
X	V	V	V	V	V	V	V	X	X	V	X
X	V	V	V	V	X	X	X	X	X	V	X
X	X	X	X	X	V	V	V	X	X	V	X
X	X	X	V	X	V	V	V	X	V	V	V
X	X	X	X	X	X	X	X	V	V	X	X
X	V	V	V	V	V	V	V	V	X	V	X
X	V	V	V	V	V	V	V	V	X	V	X

MOUNTING			MATERIAL				DRIVERS	
Wall-mounted	Ceiling	Corner	Aluminium/glass	Stainless steel/ glass	Polyester/ glass	Aluminium/ polycarbonate	Integrated	
V	X	X	V	X	X	X	V	**Ampera*** 1,000 to 27,600lm 
V	V	X	V	X	X	X	V	**Percepto** 3,500 to 9,100lm 
V	V	V	V	X	X	X	V	**OMNIflood** 2,000 to 23,000lm 
V	V	V	V	X	X	X	X	**ContiLED** 1,000 to 13,600lm 
X	V	V	V	X	X	X	X	**OMNIstar** 12,000 to 52,500lm 
V	V	V	V	X	X	X	V	**FV32 LED** 8,500 to 41,600lm 
V	V	V	V	X	X	X	V	**GL2 Compact** 2,100 to 22,300lm 
X	V	V	X	V	X	X	V	**TLI 1-4 Range** 2,300 to 25,000lm 
V	V	V	X	X	V	X	V	**PF5** 4,500lm 
V	V	V	V	X	X	X	V	**LEDNova** 4,100 to 8,200lm 
V	V	V	X	X	X	V	V	**MY1/2** 2,000 to 12,000lm 
V	X	X	X	X	X	V	X	**Limark** 60 or 120 low-power LEDs 
V	X	X	V	X	X	V	V	**Baljal** 12 amber or blue LEDs 
V	X	X	X	X	V	X	V	**Balplast** 12 amber or blue LEDs

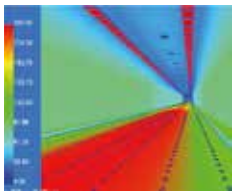
* Visit www.schreder.com to discover our complete range of LED luminaires.

HOW YOUR **PERSONAL SOLUTION**

SERVICES
SOFTWARE
HARDWARE
CONFIGURATION

OUR EXPERTISE AND OUR PROJECT APPROACH IS YOUR GUARANTEE TO RECEIVE THE BEST SOLUTION FOR YOUR ENVIRONMENT BASED ON AN EFFICIENT COMBINATION OF STANDARD, PERFORMING AND RELIABLE PRODUCTS.

SERVICES



OUR TEAM OF EXPERTS ANALYSES YOUR ENVIRONMENT, GIVES ADVICE AND CARRIES OUT APPLICATION STUDIES TO DESIGN THE BEST SOLUTION. OUR SIMULATION TOOLS PROVIDE PRECISE INFORMATION ABOUT THE EFFICIENCY, THE COMPLIANCE, THE LAYOUT OF THE INSTALLATION, THE SUSTAINABILITY AND THE TOTAL COST OF OWNERSHIP.

With your consent, we define a plan and manage the entire project with third parties, incorporating the installation, commissioning, testing and validation. Our offer also includes training, after-sales services, maintenance and optimisation over time.

SOFTWARE/HARDWARE

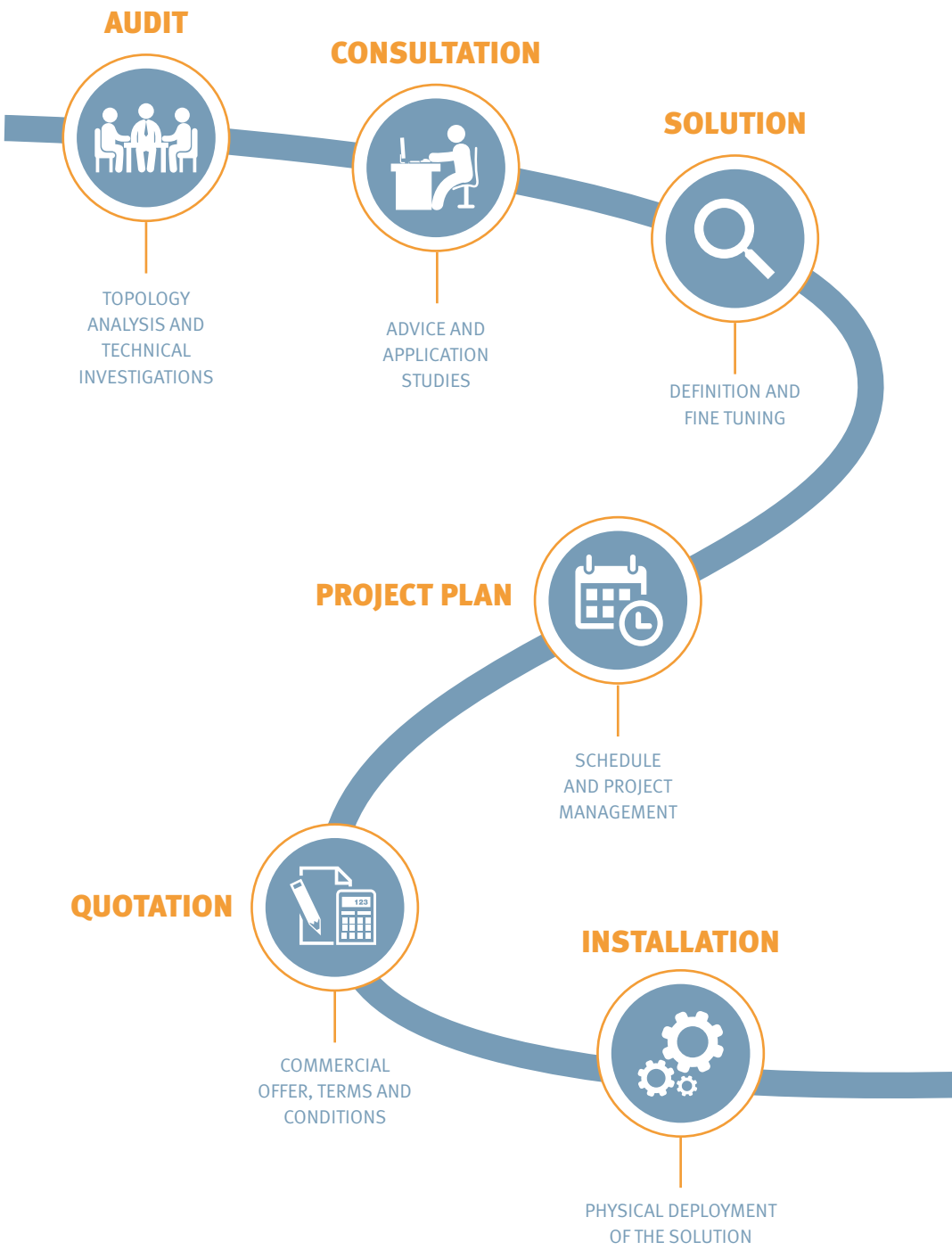
We propose cutting-edge LED luminaires, state-of-the-art control systems, sensors, robust and fireproof cables and connectors.

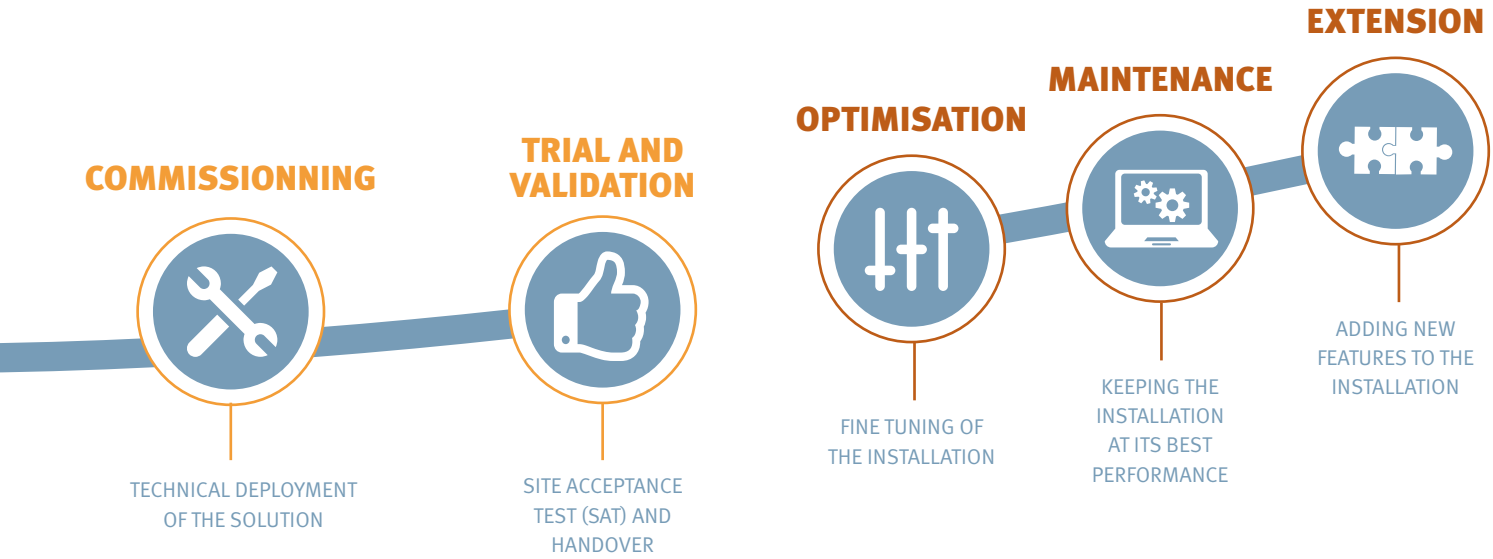
CONFIGURATION

We take on board the factory (FAT) and on-site configuration/ tests (SAT) of the whole system, including driver programming (dimming profile), lighting network development (controls), detection and architectural lighting scenarios.

WHEN **PROJECT** SEQUENCE

FROM THE FIRST TOPOLOGY ANALYSIS TO THE HANDOVER AND EVEN THEREAFTER, SCHRÉDER TAKES CHARGE OF THE PROJECT MANAGEMENT OF YOUR SCHEME. WE ARE YOUR PARTNER OF CHOICE TO MAKE THE MOST OF YOUR ENVIRONMENT, TODAY AND TOMORROW.




COMMISSIONNING
TECHNICAL DEPLOYMENT OF THE SOLUTION
TRIAL AND VALIDATION
SITE ACCEPTANCE TEST (SAT) AND HANDOVER
OPTIMISATION
FINE TUNING OF THE INSTALLATION
MAINTENANCE
KEEPING THE INSTALLATION AT ITS BEST PERFORMANCE
EXTENSION
ADDING NEW FEATURES TO THE INSTALLATION

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YOUR PARTNER BEYOND LIGHT