



# Tunnel Lighting Control & Management Systems

Consulting – Engineering – Supply

Gulf Traffic  
Award Winner  
2011





# The Know How

- Tunnel Lighting Control
- Tunnel Ventilation and Control
- Guidance Lighting
- Emergency Exit Marking
- Structured Cabling Systems
- Design
- Servicing

**We have found the most efficient way how to manage tunnel lighting!**

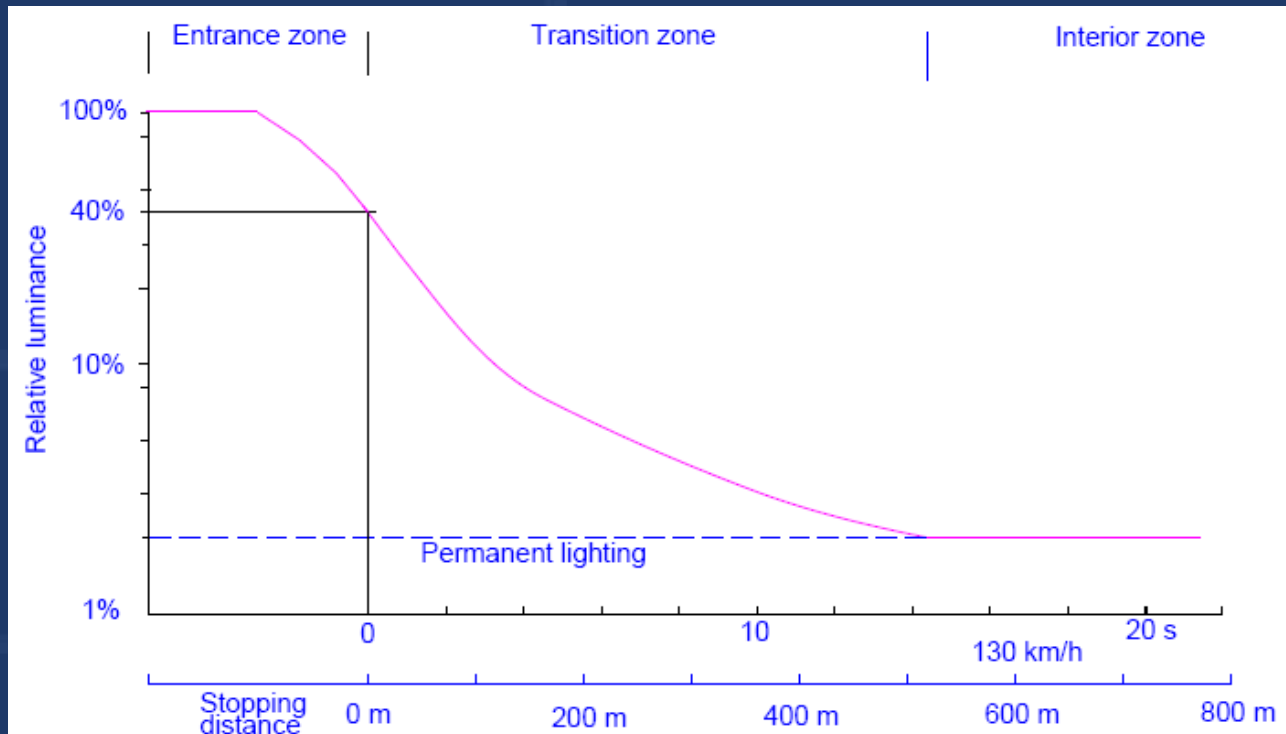




# The Concept

Tunnel lighting is controlled in a stepless manner (dimmed) to optimize operational cost (energy and lamp life) and continuously monitored to increase safety. Just like the outside light!

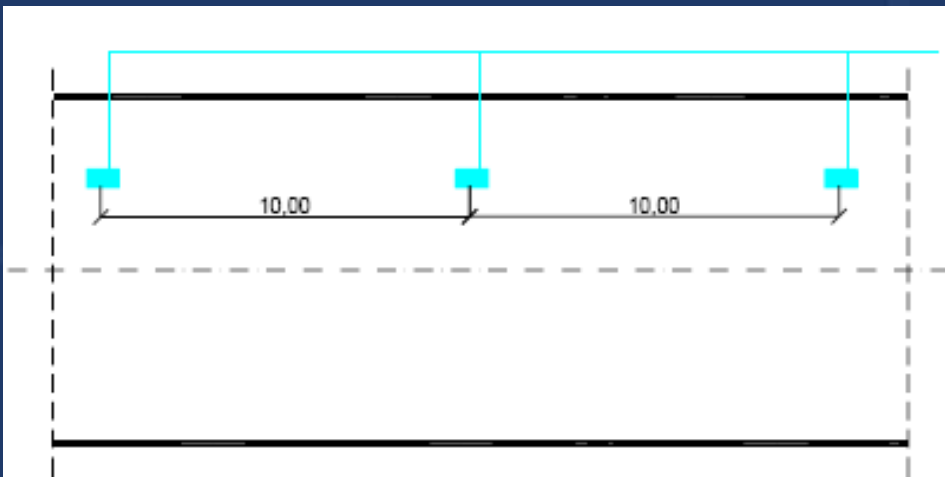
According to CIE 88 / 2004



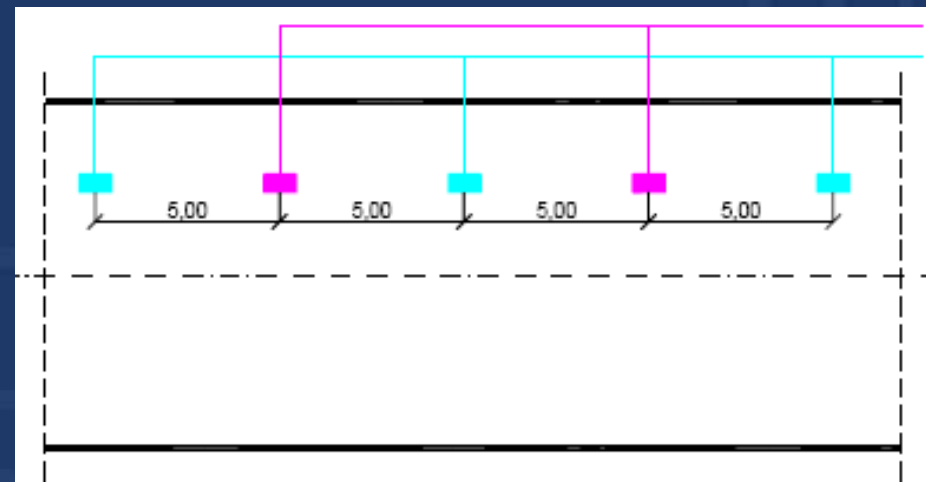


# The Energy Savings

- ✓ Up to 35% of energy can be saved!
- ✓ The number of luminaires can be reduced!
- ✓ Larger lamps with better efficiency can be used.



With Dimming



Without Dimming



# Dimming Control

## without dimming

P lamp	150 W	
P ballast	20 W	
P total	340 W	
Flux tot.	34000 lm	100 lm/W
Flux 50%	17000 lm	100 lm/W
Points	2 x SHP 150W	

## with dimming

P lamp	250 W	
P ballast	25 W	
P total	275 W	
Flux tot.	33000 lm	120 lm/W
Flux 50%	16500 lm	95 lm/W
Points	1 x HPS 250W	



# The Benefits

## 1. Lower Maintenance and Operational Cost

Due to the dimming, stabilisation and soft starting, the lamps last 2 – 3 times longer.

## 2. Energy Savings 25-50%

The tunnel lighting is adjusted to the outside light and the supply is stabilised. Excess light is turned into savings.

## 3. More Safety and Security

The proper functioning of the lighting is monitored and problems are reported instantly. Actions can be taken .

## 4. Short Return of Investment

Due to the savings systems have an ROI of <5 years.

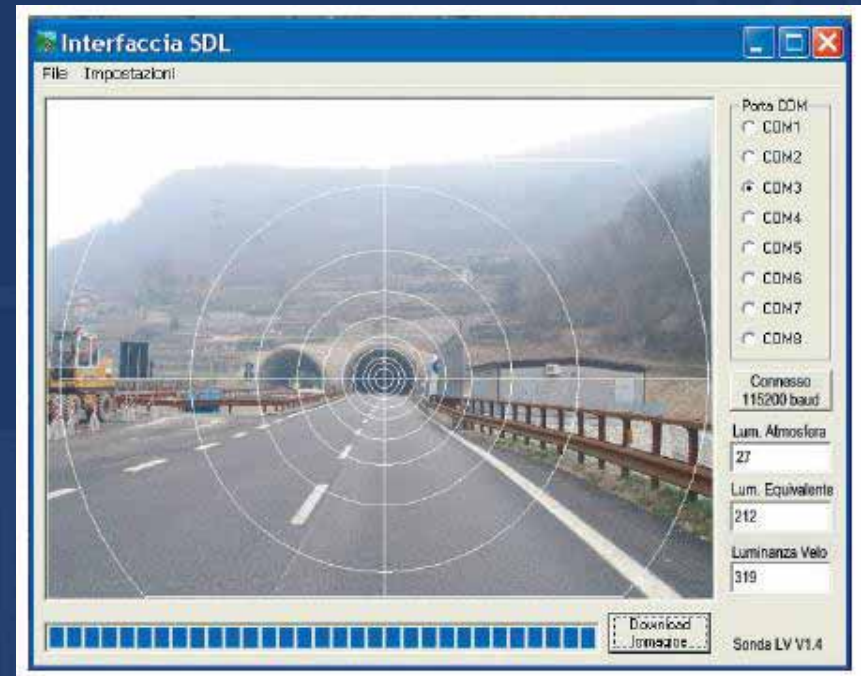




# How to Measure Light!

Years of research and decades of experience combined with some of the brightest lighting scientists yielded great results. Developed with a leading institute for lighting sciences: **The new Veil Luminance Meter of Reverberi.**

According to CIE 88 / 2004

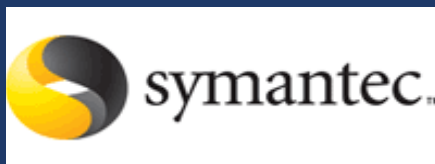
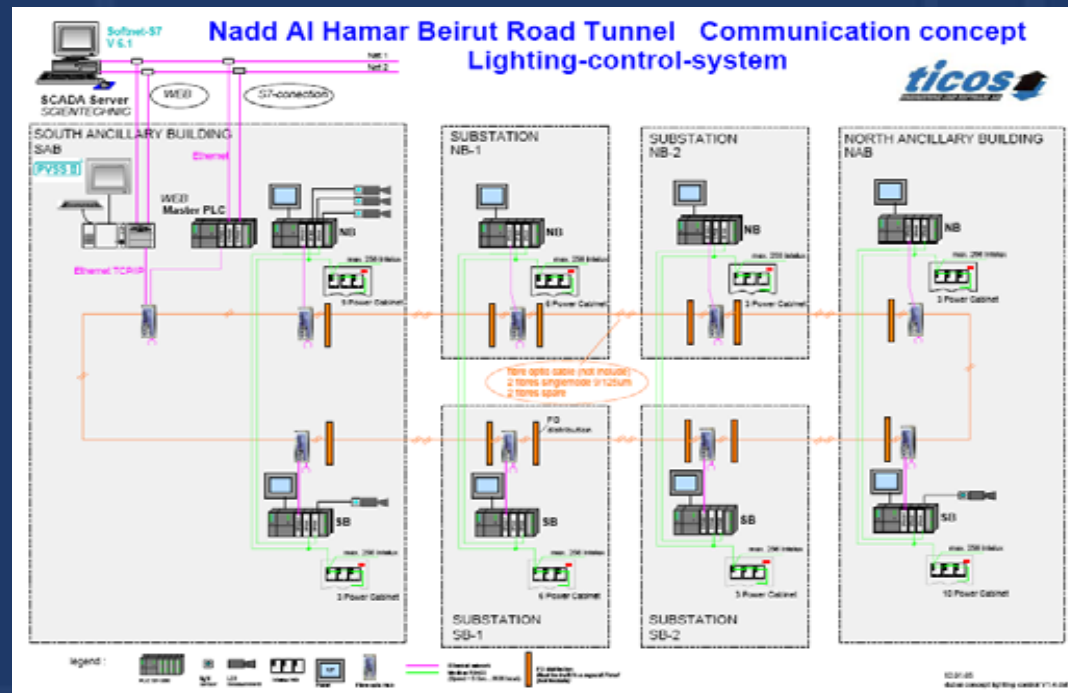




# Ticos, Switzerland



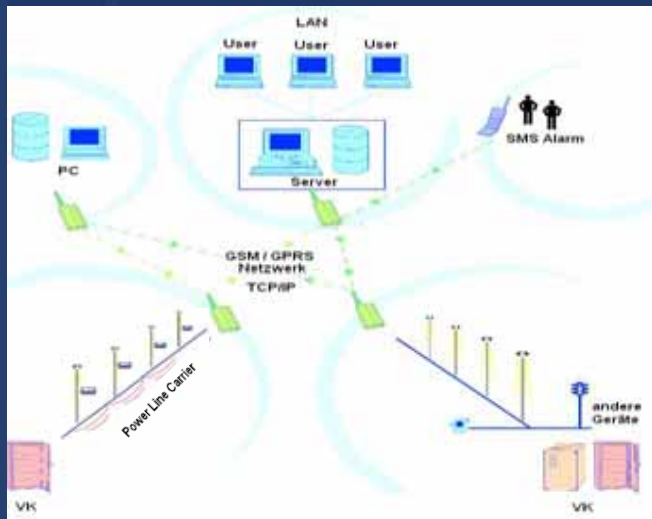
Tunnel Integration Specialists  
Hundreds of installations incl.  
longest road tunnel (Gottard)  
and two longest tunnels in ME







# Reverberi Italy



**Lighting Control and Management Specialists**

**No 1 in Italy**





## New challenges require new solutions!

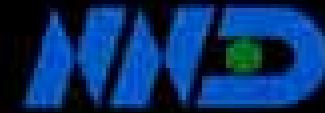
Gifas: over 1000 Installations!!!

### Guidance Systems





# NND, made in Malaysia



## Modular Cabling Systems

**Pre-fabricated**

**IP 68, fire resistant**

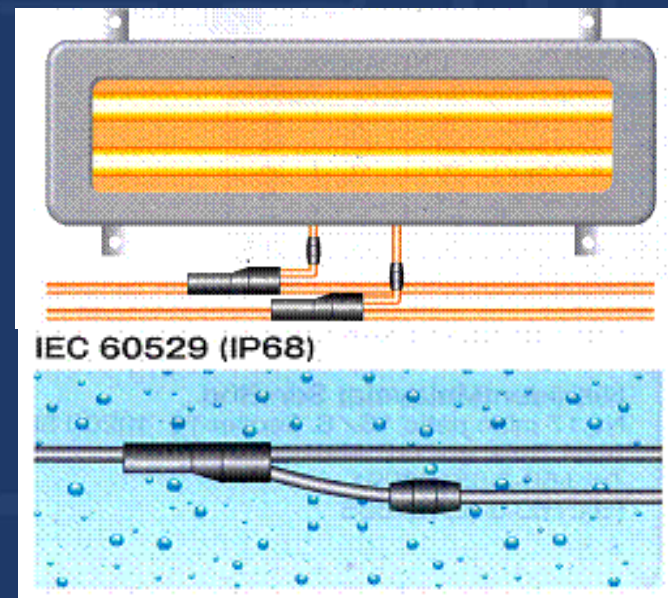
**100% tested**

**Huge time saving for installation**

**Hallogen free, low smoke**

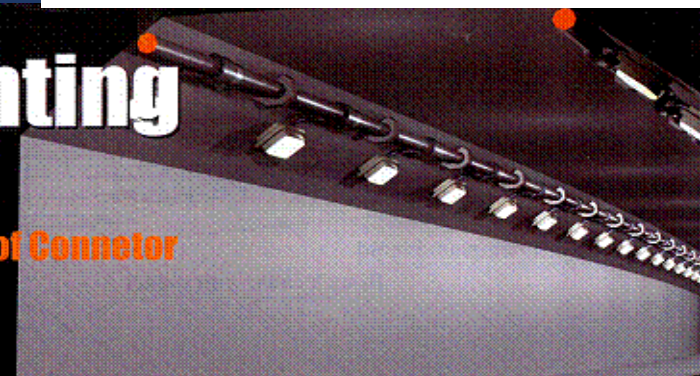


Left: Beirut Road Underpass Dubai



## Tunnel Lighting System

**Branch Cable With Fire Proof Connector**





# Recent success : Dubai Airport Tunnel



Gulf Traffic Award Winner 2011



# Dubai Airport Tunnel



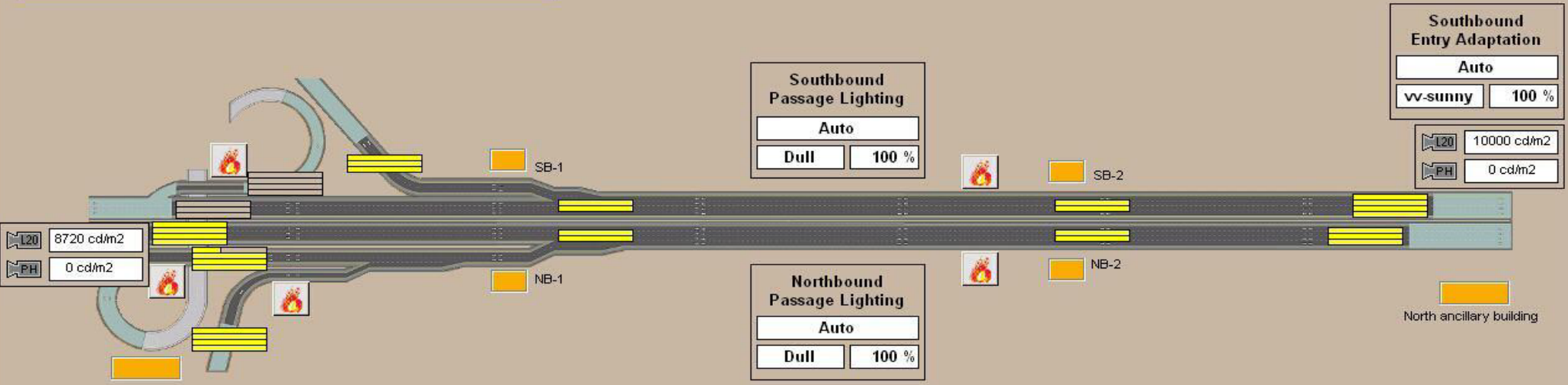
Operating Hours

Lighting Param.

Show/Hide Zones

User: para

14:18:51 2/7/2006



11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRS NB:SBT.DB117.DBW2100.rmJ	MT54-48 Southbound Wall 2-R NG Device 103 Status Communication timeout	ON
11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRS NB:SBT.DB117.DBW2120.rmJ	MT54-48 Southbound Wall 2-Y NG Device 104 Status Communication timeout	ON
11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRS NB:SBT.DB117.DBW2140.rmJ	MT54-48 Southbound Wall 2-B NG Device 105 Status Communication timeout	ON
11/13/05 13:00:38	40	+NAHBRT/NAB=LDB-TRS NB:SBT.DB117.DBW2160.rmJ	MT54-48 All the four lines-R NG Device 106 Status Communication timeout	ON



# Dubai Airport Tunnel

Operating Hours

Lighting Param.

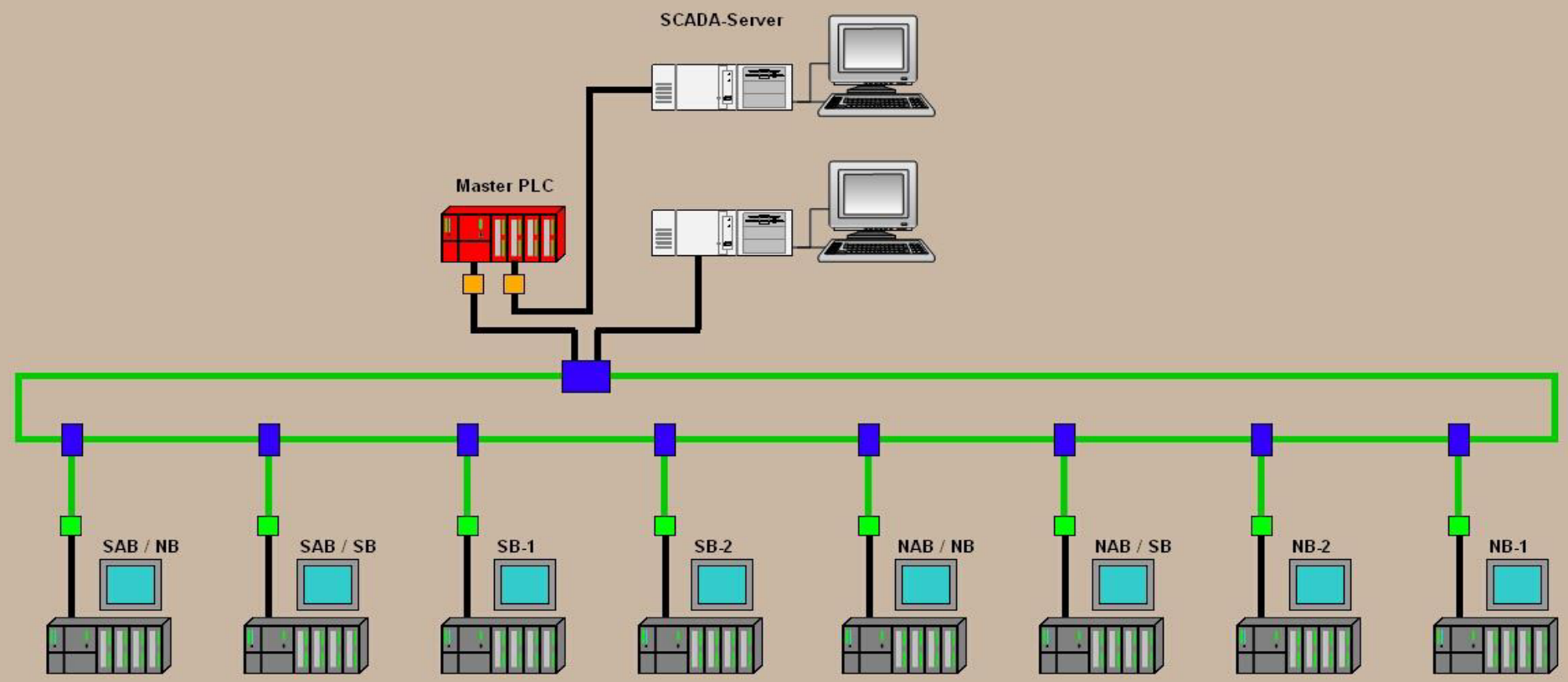
Show/Hide Zones

User: para

14:18:35 2/7/2006

System Overview

## Nadd Al Hamar Beirut Road Tunnel - System overview



11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRSNB:SBT.DB117.DBW2100.rmj	MT54-48 Southbound Wall 2-R NG Device 103 Status Communication timeout	ON	▲
11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRSNB:SBT.DB117.DBW2120.rmj	MT54-48 Southbound Wall 2-Y NG Device 104 Status Communication timeout	ON	
11/12/05 22:15:03	40	+NAHBRT/NAB=LDB-TRSNB:SBT.DB117.DBW2140.rmj	MT54-48 Southbound Wall 2-B NG Device 105 Status Communication timeout	ON	
11/13/05 13:00:38	40	+NAHBRT/NAB=LDB-TRSNB:SBT.DB117.DBW2160.rmj	MT54-48 All the four lines-R NG Device 106 Status Communication timeout	ON	▼



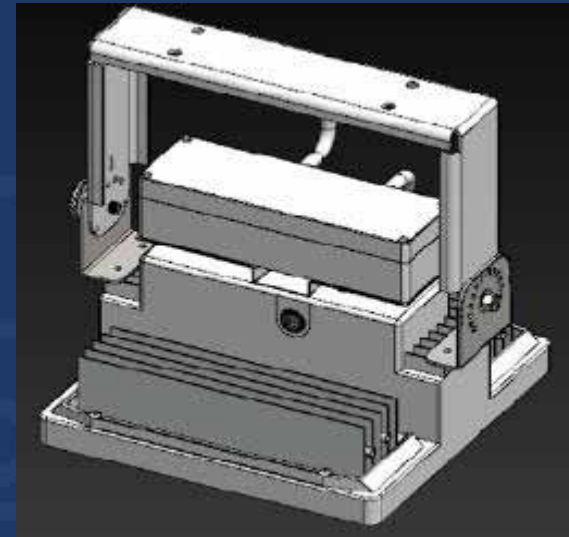
# Airport Tunnel Tunnel Dubai





# Salam Street Tunnel

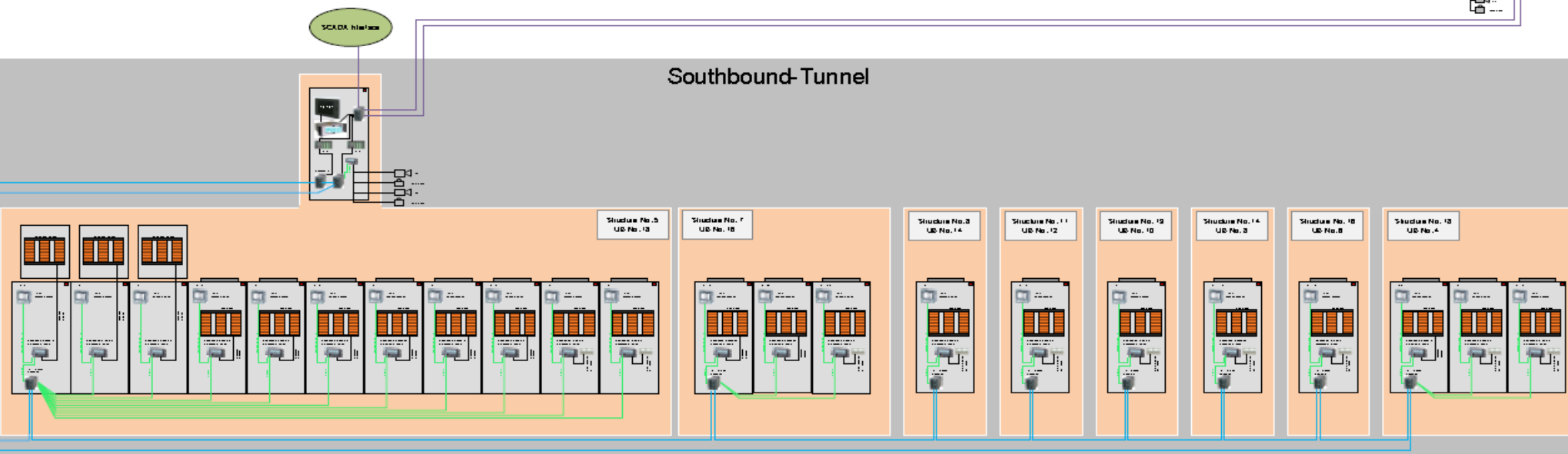
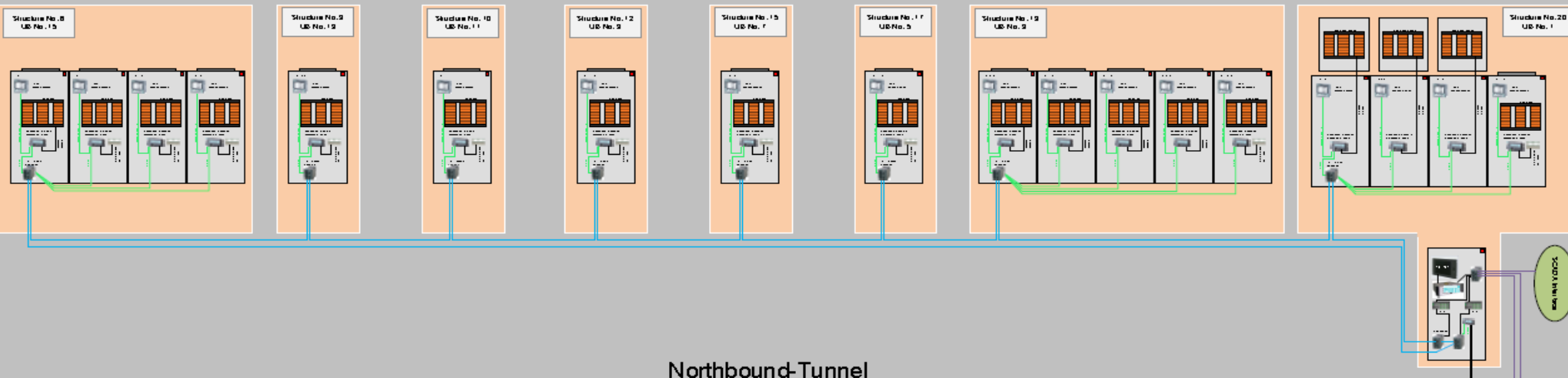
**Salam Street Tunnel is the longest tunnel in the Middle East. With over 5'000 LED luminaires it is one of the biggest LED tunnel applications in the world. All of the 5'000 LED lights and the 2'000 sodium lights are monitored and dimmed.**







# Salam Street Tunnel





# SST L<sub>20</sub> Threshold Settings

**Tunnel Lighting / Main Overview**

Northbound Lighting Parameters | Northbound Utility Buildings | Southbound Lighting Parameters | Southbound Utility Buildings

root 5:19:04 PM 12/21/2012

Meena Exit (UB-17, UB-15, UB-13, UB-11, UB-09, UB-07, UB-05, UB-03, UB-01)

Meena Entry (UB-16, UB-14, UB-12, UB-10)

Sheraton Entry (UB-18)

Sea Palace Entry

145m | 1685m

**objectsEntryLightingDialog.pnl**

**Entry Lighting**

Auto | Clock | Manual | Parameter

**Actual Setup**

Mode of Operation: Auto | Modus: Scene 1 | Setpoint: 52 %

**Manual Mode**

light | Scene 1 | Scene 2 | Scene 3

Setpoint: %

Apply

**objectsParameterEntryLightingDialog.pnl**

**Parameter Meena Entry Lighting**

min cd/m<sup>2</sup> | max cd/m<sup>2</sup>

Mode	min cd/m <sup>2</sup>	max cd/m <sup>2</sup>
Night	250	1000
Scene 1	1000	2000
Scene 2	2000	3000
Scene 3	3000	10000

Sheraton Entry: 73 | Meena Entry: 0 | Sea Palace Entry: 422 | Astronomical Clock: 633

Exit

File	Time	Tag No.	Description
P2	21.12.12 17:17:39		L20_1_SB Fail
P2	21.12.12 17:18:16		Photocell_1_SB Fail

```

Module: tscos
Panel: D:\pss\AlibahaTunnel\panels\system.pnl (1)
Object: 2 named: "RECTANGLE169" of type: RECTANGLE
  
```

OPC Client

Recycle Bin

start | tscos Main | PWS 3.8-92: Console | Para\_4: Deluxent.pl... | Log Viewer: Alibah...

Search Desktops | 1:19 PM

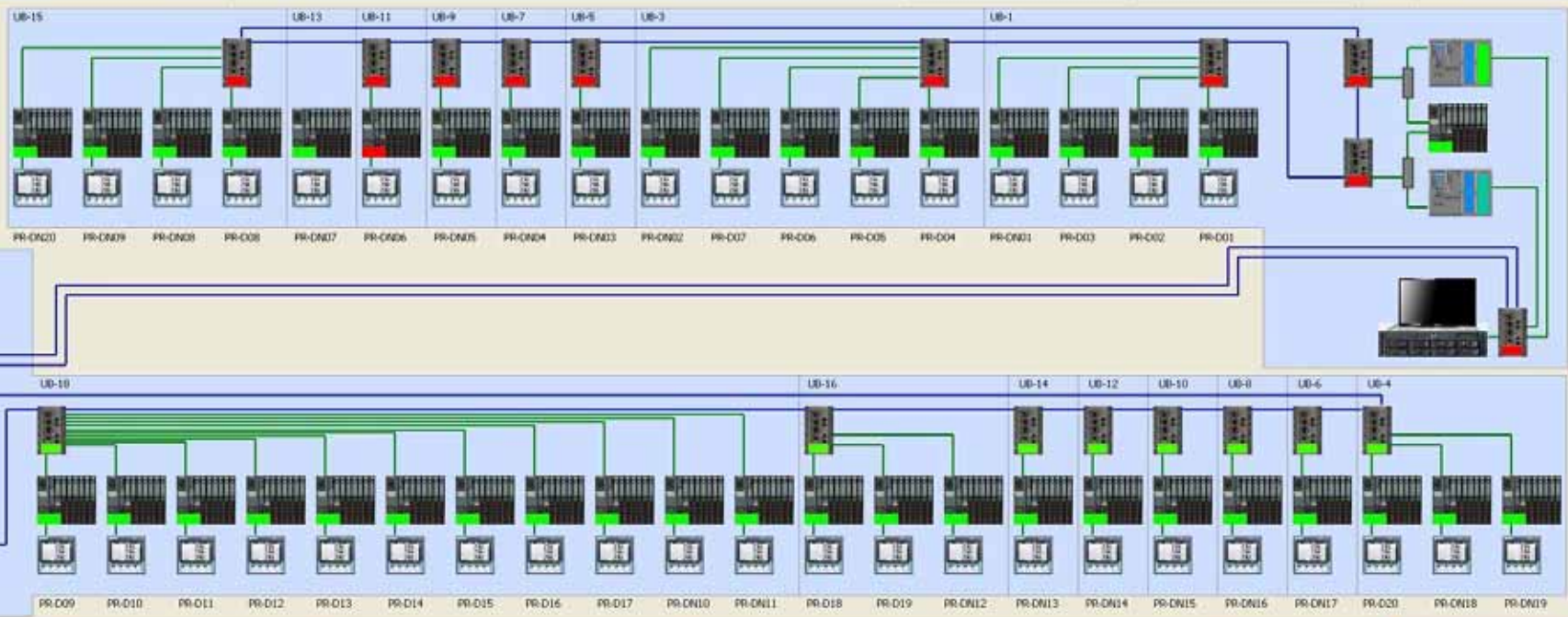


# SST TLCS Main Screen

Tunnel Lighting / System

Northbound Lighting Parameters | Northbound Utility Buildings  
 Southbound Lighting Parameters | Southbound Utility Buildings

root 4:10:56 PM 12/19/2012



PrNo	Time	Tag No.	Description	State
P2	18.12.12 14:40:34	UB12-LDBPRDN14-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB10-LDBPRDN15-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB8-LDBPRDN16-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB6-LDBPRDN17-MEDIA CONVERTER	Fibre Optic Converter	normal



# SST Electrical Data per LDB

Tunnel Lighting / SB Utility Building 18

Northbound Lighting Parameters | Northbound Utility Buildings | Southbound Lighting Parameters | Southbound Utility Buildings

root 4:16:59 PM 12/19/2012

LDB-PR-D9 / HPS				LDB-PR-D10 / HPS				LDB-PR-D11 / HPS				LDB-PR-D12 / HPS				LDB-PR-D13 / HPS				LDB-PR-D14 / HPS			
Actual Mode	Dimming	Switch Mode	Fault	Actual Mode	Dimming	Switch Mode	Fault	Actual Mode	Off	Switch Mode	Fault	Actual Mode	Dimming	Switch Mode	Fault	Actual Mode	Off	Switch Mode	Fault	Actual Mode	Off	Switch Mode	Fault
237.4 V [U] L1-N				237.4 V [U] L1-N				237.8 V [U] L1-N				237.7 V [U] L1-N				237.5 V [U] L1-N				237.7 V [U] L1-N			
410.8 V [U] L1-L2				411.1 V [U] L1-L2				411.5 V [U] L1-L2				411.2 V [U] L1-L2				411.2 V [U] L1-L2				411.2 V [U] L1-L2			
237.4 V [U] L2-N				237.5 V [U] L2-N				412.7 V [U] L2-L3				237.4 V [U] L2-N				237.6 V [U] L2-N				412.4 V [U] L2-L3			
412.0 V [U] L2-L3				412.4 V [U] L2-L3				237.7 V [U] L2-N				412.2 V [U] L2-L3				412.3 V [U] L2-L3				412.3 V [U] L2-L3			
230.3 V [U] L3-N				230.6 V [U] L3-N				412.2 V [U] L3-L1				230.4 V [U] L3-N				230.5 V [U] L3-N				412.0 V [U] L3-L1			
220.01 [U] Out				181.24 [U] Out				230.7 V [U] L3-N				220.01 [U] Out				183.10 [U] Out				230.4 V [U] L3-N			
70.0 A [I] L1				46.1 A [I] L1				181.24 [U] Out				9.7 A [I] L1				23.1 A [I] L1-max				23.1 A [I] L1-max			
151.6 A [I] L1-max				147.9 A [I] L1-max				181.24 [U] Out				10.1 A [I] L2				22.9 A [I] L2-max				22.9 A [I] L2-max			
65.3 A [I] L2				45.3 A [I] L2				0.0 A [I] L1				23.1 A [I] L2-max				0.2 A [I] L1				0.2 A [I] L1			
142.4 A [I] L2-max				143.9 A [I] L2-max				0.4 A [I] L2				0.2 A [I] L2				0.2 A [I] L2				0.2 A [I] L2			
64.5 A [I] L3				42.4 A [I] L3				0.2 A [I] L3				9.5 A [I] L3				0.1 A [I] L3				0.1 A [I] L3			
140.3 A [I] L3-max				33.0 A [I] L3-max				0.5 A [I] N				5.0 A [I] N				23.4 A [I] L3-max				23.4 A [I] L3-max			
44.5 A [I] N				27.6 A [I] N				0.0 A [I] L1				0.2 A [I] N				0.2 A [I] N				0.2 A [I] N			
-45.7 kW [P] Active Pwr.	0.960 Cos Phi			-30.5 kW [P] Active Pwr.	0.959 Cos Phi			-0.1 kW [P] Active Pwr.	0.411 Cos Phi			-6.8 kW [P] Active Pwr.	0.960 Cos Phi			-0.1 kW [P] Active Pwr.	0.597 Cos Phi			-0.1 kW [P] Active Pwr.	0.594 Cos Phi		
0.8 kvar [Q] Reactive Pwr.	ind. C/I			-1.5 kvar [Q] Reactive Pwr.	ind. C/I			-0.1 kvar [Q] Reactive Pwr.	ind. C/I			-0.5 kvar [Q] Reactive Pwr.	ind. C/I			0.0 kvar [Q] Reactive Pwr.	ind. C/I			0.0 kvar [Q] Reactive Pwr.	ind. C/I		
47.7 kVA [S] Apparent Pwr.	50.0 Hz Frequency			31.8 kVA [S] Apparent Pwr.	50.0 Hz Frequency			0.1 kVA [S] Apparent Pwr.	50.0 Hz Frequency			7.0 kVA [S] Apparent Pwr.	50.0 Hz Frequency			0.1 kVA [S] Apparent Pwr.	50.0 Hz Frequency			0.1 kVA [S] Apparent Pwr.	50.0 Hz Frequency		

Prn	Time	Tag No.	Description	State
P2	18.12.12 14:40:34	UB12-LDBPRDN14-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB10-LDBPRDN15-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB8-LDBPRDN16-MEDIA CONVERTER	Fibre Optic Converter	normal
P2	18.12.12 14:40:34	UB6-LDBPRDN17-MEDIA CONVERTER	Fibre Optic Converter	normal

Total Power

SIEMENS SENTRON PAC3200

Vph-n INSTANTANEOUS 1.0

L1 230 V

L2 230 V

L3 230 V

MAX MENU







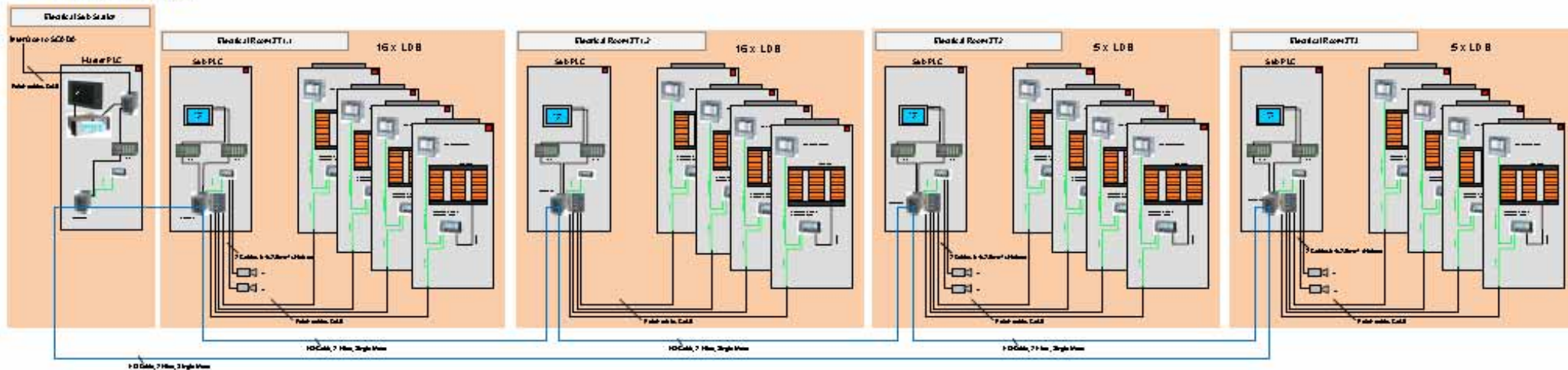


# Lusail Express Way Proposal

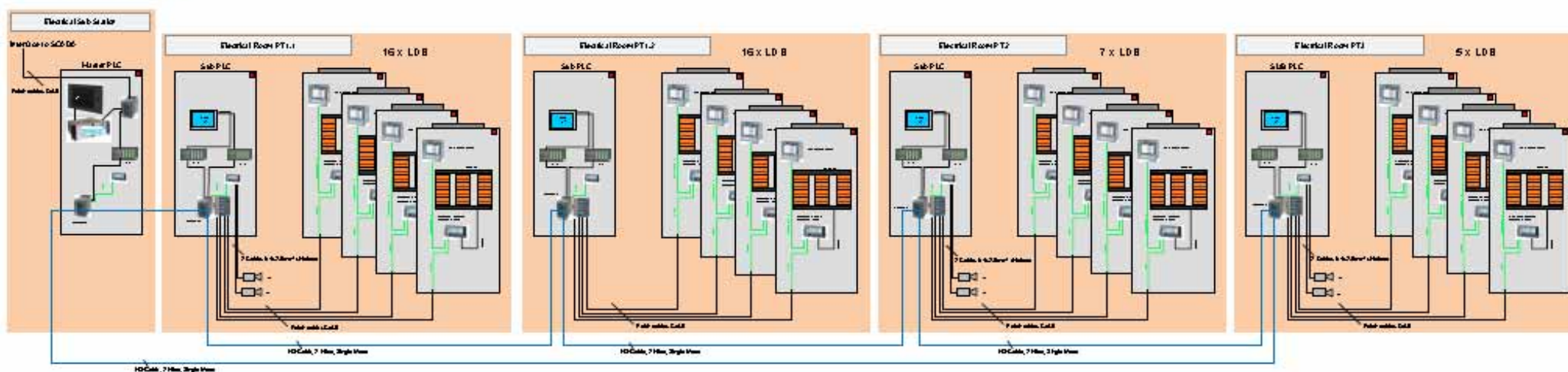
PROJECT : Lusail Express Way, Tunnel Lighting Control Systems  
Communications Layout



## Onaiza Tunnel



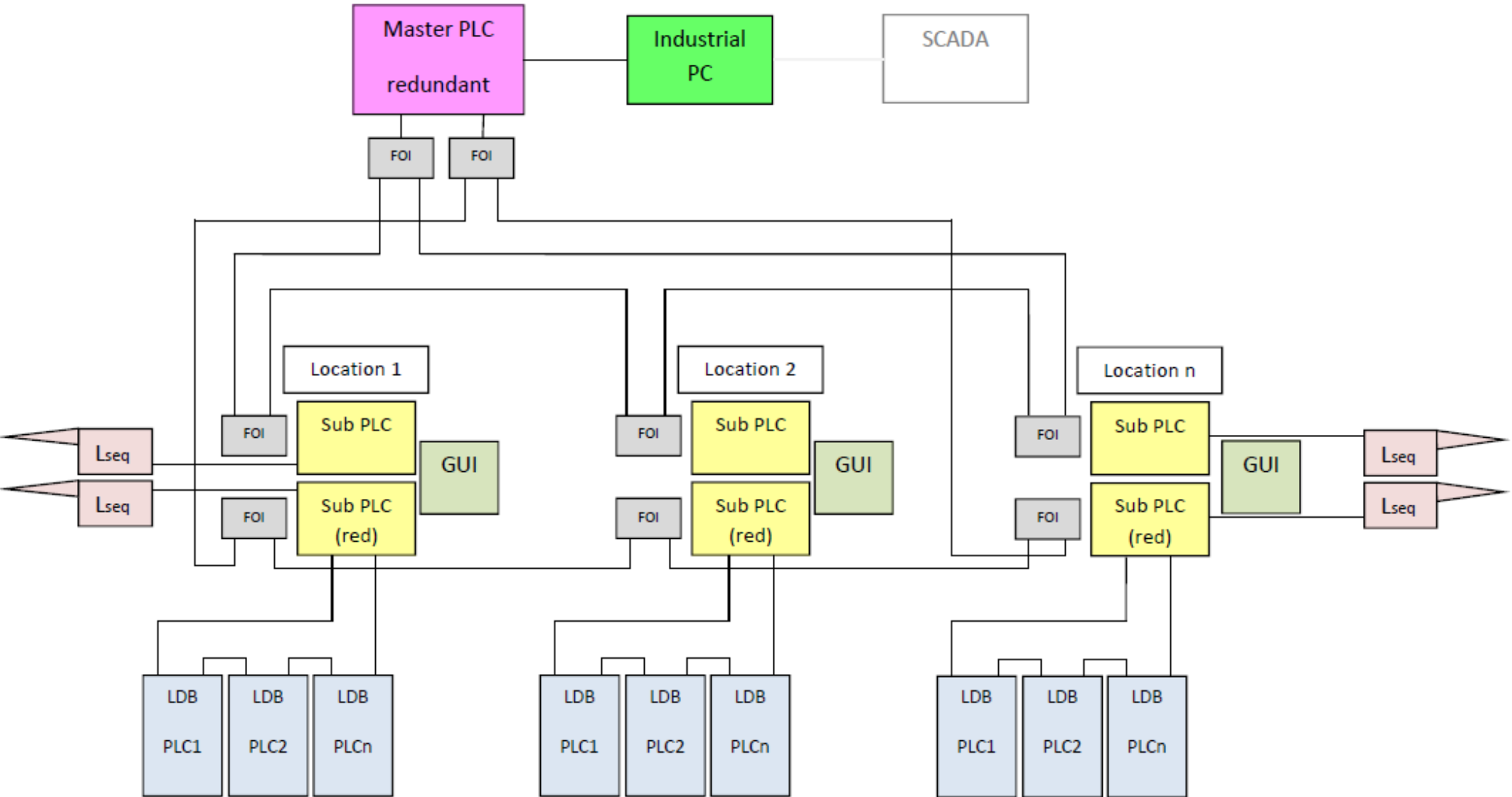
## Pearl Tunnel







# TLCS Block Diagram





# References Tunnels

- Abu Dhabi Salam Steeet Tunnel (5000 LED luminaires)**
- Abu Dhabi Ras Al Akhdar Tunnel (LED + HPS)**
- Aub Dhabi Baynunah Street Tunnel (LED + HPS)**
- Abu Dhabi Central Market UP (first LED only tunnel)**
- Dubai (RTA): Airport Tunnel + 16 Tunnels**
- Ajman UAE, Al Hamidiya Interchange Tunnels**
- Qatar, Lusail Express Way, 7 tunnels (design)**
- Bahrain (4 Tunnels)**
- Riyadh old Airport Tunnels, guidanc lighting system**



# References Public Lighting

**2013 Shouth Shamkah PLMS 18'000 LED**

**2013 Saadiyat Island PLMS LED**

**2013 Ajman Al Hamidiya Interchange PLMS LED**

**2012 Khalifa Port PLMS LED**

**2008 Dubai International City (Nakheel)**

**2007 Dubai Jumeirah Village (Nakheel)**

**2007 Maritime City (Nahkheel)**

**2004 Dubai PLMS**

**Riyadh, Dammam, Jubail**

**Muscat Public Lighting**



# THANK YOU