



# The benefits of a lighting masterplan: a strategic instrument for the city

Tel Aviv- 2018 May 15

SUSANNA ANTICO  
lighting design studio

Evolution of Urban Areas



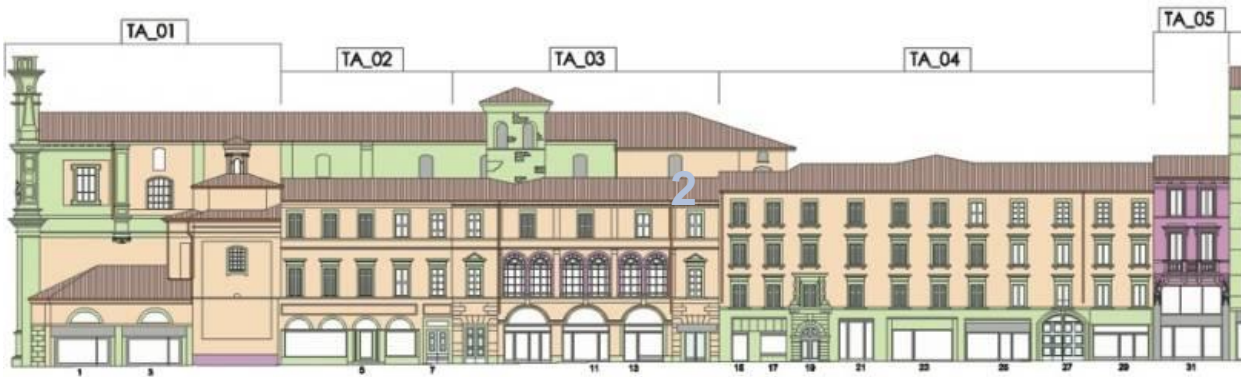
Need for tools allowing quality planning & coordination



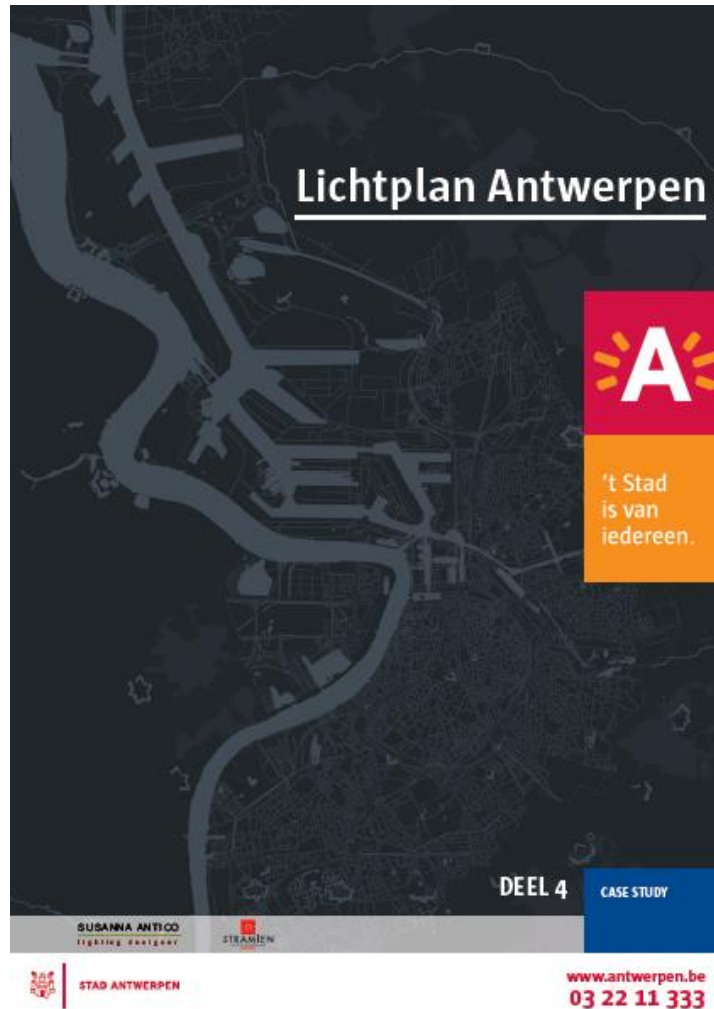
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## Most plans relate to the city during daytime

Mappatura dei materiali



## A new instrument was needed: the Lighting Masterplan





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## The appearance of electrical Exterior lighting



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Lighting as useful instrument for safe urban environments and motorized vehicles to drive in but also for commercial advertisements to be seen.



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Lit spaces are usually considered safe.



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**Notions of “more light is better”, “longer life at all costs” and “low energy consumption”, all at the cost of quality, quickly gained prominence.**



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## People spend more time outside at night



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## Impact: Night economy



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## Impact: Establishing corporate image and city identity



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## Impact: People congregate in public spaces



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## The transformation of pleasant and beautiful cities with bad lighting.



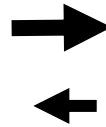
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## The transformation of pleasant and beautiful cities with bad lighting.



The LMP follows other major plans such as the structure plan





**The LMP defines: Guidelines for all the territory**

**The LMP enables: Coherent and coordinated development**

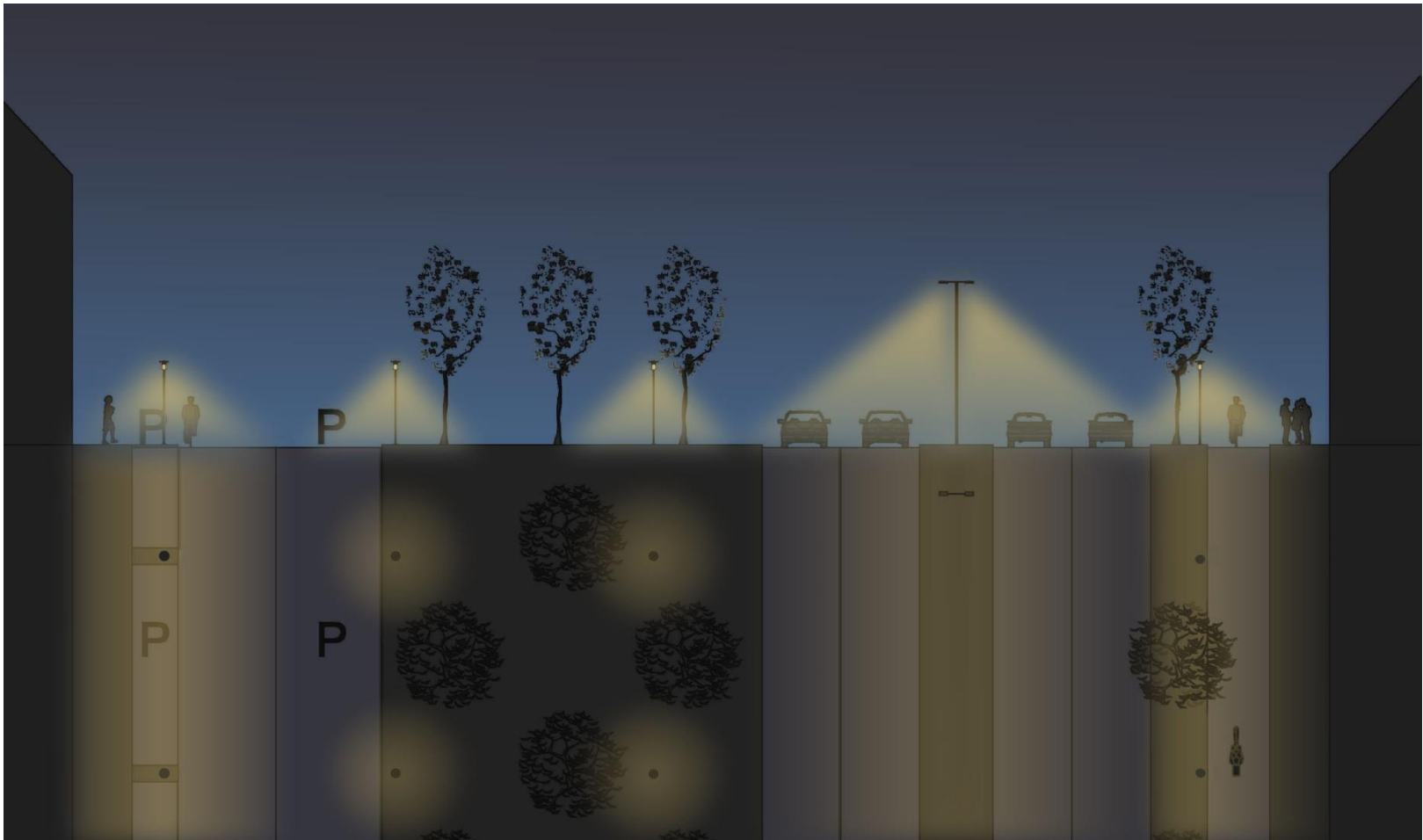
**The LMP requires: A development based on results, perception, independent of existing technology**

|   |  |
|---|--|
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| 1.2.2 Authorization.....  |  |
| 1.2.3 Conflicts between masterplan and building code .....      |  |
| 1.2.4 Updates.....  |  |
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| 2.3.2 Park and Ride .....                                       |  |
| 2.3.3 The Kaaien.....   |  |
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The LMP provides appropriate cultural and technical elements to reach a holistic integration of the functional and scenographic lighting to end up with a synergetic environmental lighting

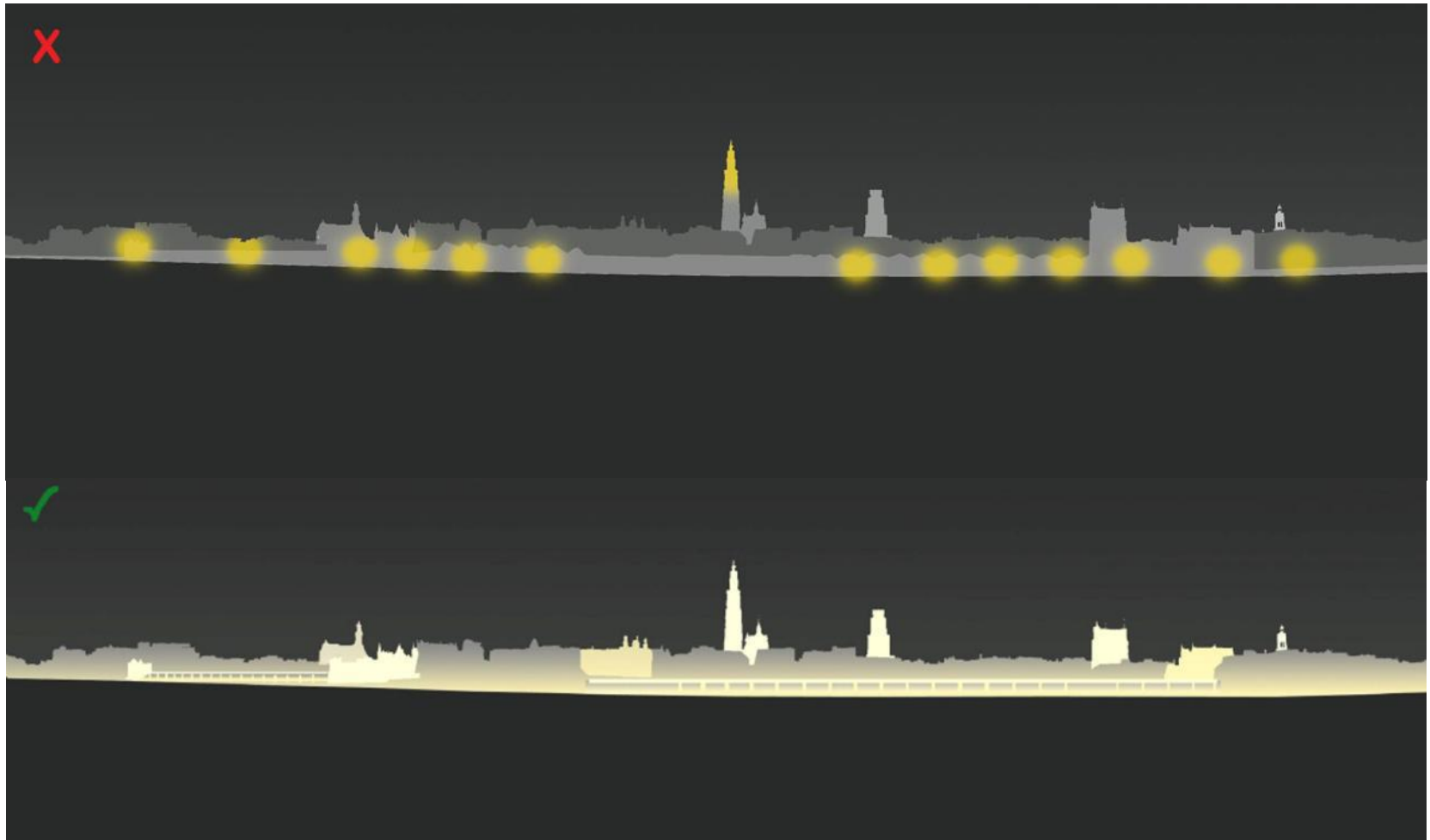


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The LMP provides appropriate cultural and technical elements to reach a holistic integration of the functional and scenographic lighting to end up with a synergetic environmental lighting (cont)

| Matrix 01 Base layer |                                       |  |
|----------------------|---------------------------------------|--|
| Only pedestrian      | $6\text{ m} > A$                      | V1 of V1 -- V1                                 |
|                      | $6\text{ m} \leq A \leq 9\text{ m}$   | V1 -- V1                                       |
|                      | $A > 9\text{ m}$                      | V1 -- V1 of V1 -- V2 -- V1 of V1V2 -- V1V2     |
| Mixed use            | $10\text{ m} > A$                     | M1 of M1 -- M1                                 |
|                      | $10\text{ m} \leq A \leq 14\text{ m}$ | M1 -- M1 of M1 -- V1 of M1V1 -- M1V1           |
|                      | $A > 14\text{ m}$                     | M1V1 -- V1 of M1V1 -- M1V1 of V1 -- M1M1 -- V1 |
| Commercial axes      | $9\text{ m} > A$                      | M1p  |
|                      | $9\text{ m} \leq A \leq 14\text{ m}$  | V1p -- M1p -- V1p                              |

The LMP gives a picture of the actions that are needed according to strategic wishes and how to prioritize them



The LMP allows long-term budgeting and thus assigning priorities to these actions



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## Two main factors:

*The people -quality of life*

*The place – the importance of  
culture and unicity*

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The appropriate uses of light has the power to provide a better human environment, thus a better quality of life for citizens and visitors.



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## The lighting masterplan is place and culture related



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Two values:  
*Technical*  
*Economical*

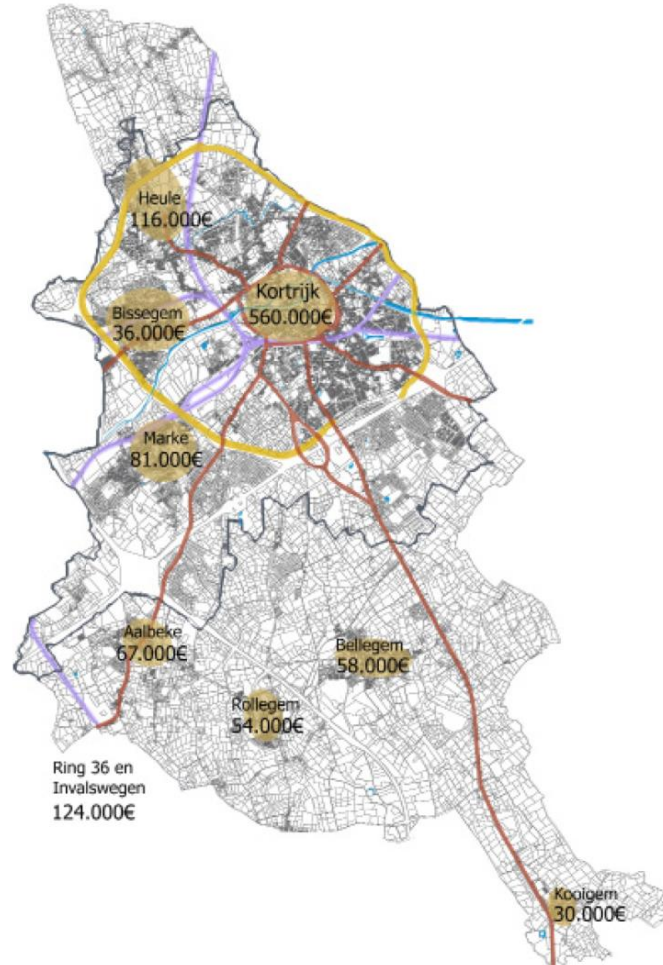
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**Technical: regardless of when the actions will be performed they will be coordinated and harmonious.**



**Economical: projects can be planned ahead of time combined with others. Consumption can be programmed on large scale.**

7.9 GLOBALE KOSTEN EN VERMOGENRAMING



Aankoop & installatie kosten van monumentale verlichting op plan

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**The end-result of the LMP will answer the following parameters:**

**Ensuring the safe functional circulation of pedestrians, cyclists and motor-vehicles.**



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The end-result of the LMP will answer the following parameters:

Ensuring conditions of safety, security and well-being for people spending time in the city after night-fall.



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The end-result of the LMP will answer the following parameters:

Enabling easy place recognition and orientation



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**The end-result of the LMP will answer the following parameters:**

**Allowing for an attractive and interesting night-time life and activity**



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The end-result of the LMP will answer the following parameters:

Creating the city's night-time identity.

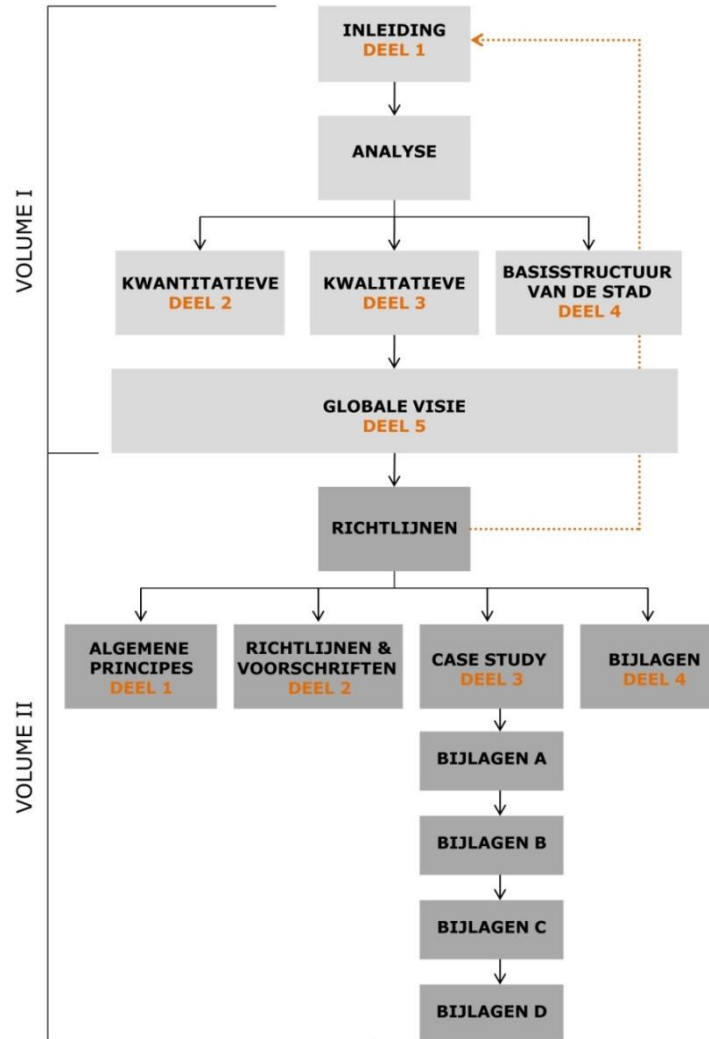




**All above while respecting the latest sustainability performance recommendations and requirements (energy savings, gas emission reductions, minimizing maintenance & related costs, eliminating ecological harm)**



## Establishing a LMP: two main phases: Analysis and Design



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## Phase 1:

### 1.1 In-depth analysis of the city and the implications of all parameters above on the night-time lighting including:

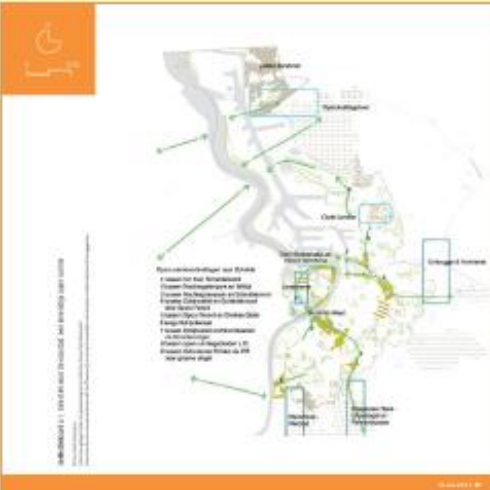
- City structure
- Urban fabric
- Circulation patterns
- Entrance & exit nodes
- Functional zoning
- Urban typologies
- Architectural typologies
- Public spaces
- Important architectural sites & structures
- Green spaces
- Water elements
- Internal and external vistas (perspectives)
- Historical, geographical and cultural influences
- Holidays and annual events

# City structure

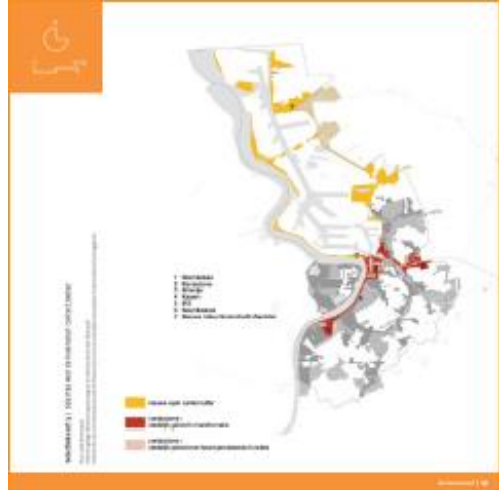
**Waterstad**



**Ecostad**



**Havenstad**



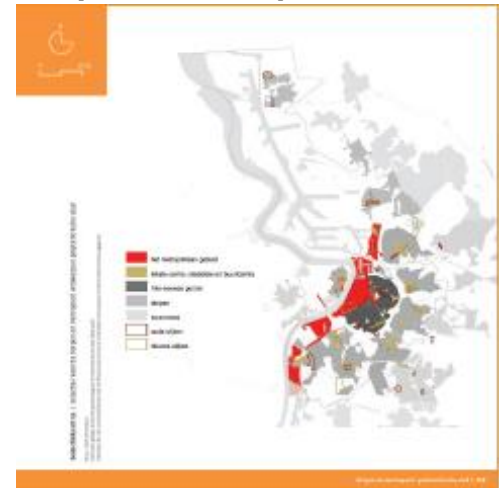
**Spoorstad**



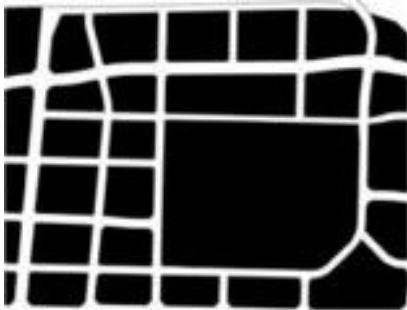
**Poreuze stad**



**Dorpen en metropool**



## Urban fabric



MISSISSAUGA



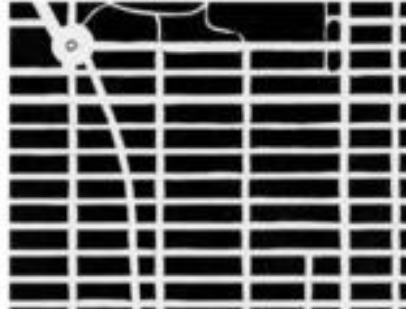
BARCELONA



COPENHAGEN



LONDON



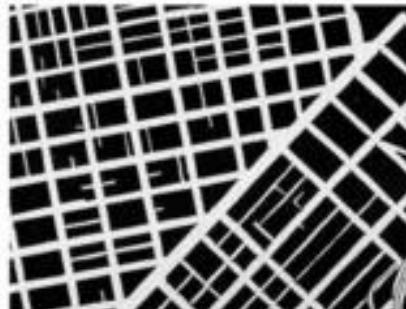
NEW YORK



PARIS



ROME



SAN FRANCISCO



TORONTO

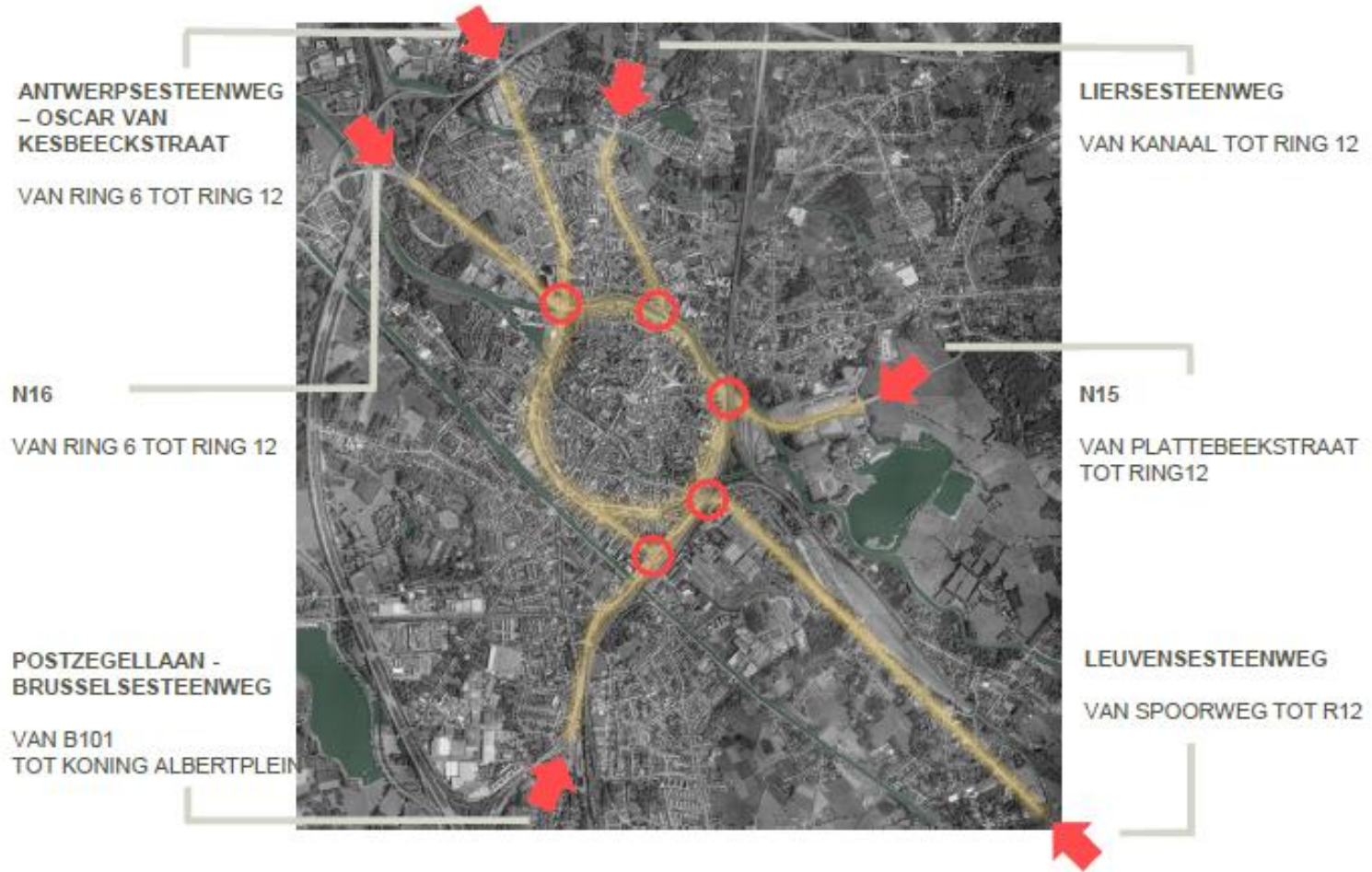
## Circulation patterns and infrastructure



'Middelleeuwse' stad



## Circulation nodes, entrances & exits



## Functional Zoning



-  *harde ruggengraat: strategische ruimte*
-  *strategische projecten in de harde ruggengraat*
-  *strategische ruimte: zachte ruggengraat*
-  *strategische projecten voor de zachte ruggengraat*
-  *strategische ruimte: groene singel*
-  *strategische projecten voor de groene singel*
-  *strategische ruimte: levendig kanaal*
-  *strategische projecten voor het levendig kanaal*
-  *stedelijke en buurtcentra*
-  *lager netwerk: boulevard*
-  *lager netwerk: alternatieve route voor auto's*
-  *lager netwerk: Oost-West boulevard*
-  *lager netwerk: parklaan*
-  *lager netwerk: parklaan - verlenging*
-  *lager netwerk: tramlijn*
-  *lager netwerk: alternatieve tramlijn*
-  *lager netwerk: winkelstraat*





## Architectural typologies



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## Public spaces



## Heritage and salient architectural sites and structures



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## Green spaces



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## Water elements



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## Vistas (inside the city, from outside of the city inwards and from the city outwards)



## Historical, geographic and cultural influences



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## Holidays and annual events



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Phase 1:

## 1.2 Analysis of the available energy resources and of the management of the existing or future lighting infrastructure :

- **Applicable standards and norms**
- **Quantitative & qualitative survey of existing/currently planned lighting infrastructure, energy consumption and resulting gas emissions**
- **Power distribution network & controls**

# Compilation of all applicable standards and norms.

ALP – Volume II. Guidelines

## 6 Norms and Standards

### 6.1 Relevant European norms and standards for urban lighting

- European norm EN\_13201\_1-4 – “Road Lighting”.
- Directive EC125\_2009 (formerly EC32\_2005) – Framework for Ecodesign Requirements for Energy-related Products
- Regulation EC245\_2009 – Regulation implementing EC125\_2009 (formerly EC32\_2005)
- Amendment EC347\_2010 – Amendment to EC245\_2009

### 6.2 Relevant Belgian norms and standards for urban lighting

- CEN\_TR\_13201:2004 – Road Lighting part 1: Selection of lighting classes
- NBN EN\_13201-2-0401 – Road Lighting part 2: Performance requirements
- NBN EN\_13201-3-0401 – Road Lighting part 3: Calculation of performance
- NBN EN\_13201-4-0401 – Road Lighting part 4: methods of measuring lighting performance
- NBN EN L 18-002: 1988 – Aanbevelingen voor bijzondere gevallen van openbare verlichting.
- NBN EN L 18-003: 2001 – Regels van goed vakmanschap voor verlichting van wegtunnels en ondergrondse doorgangen

- NBN 18-004 – Openbare verlichting – Selectie van verlichtingsklassen
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/9 Voorschriften voor Lampen
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/10 Voorschriften voor hulpapparatuur
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/11-1 Voorschriften voor verlichtingstoestellen constructie en onderhoudsvereisten
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/11-2 Voorschriften voor verlichtingstoestellen fotometrische vereisten
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/11-3 Methode voor vermogenmetingen van toestellen voor openbare verlichting uitgerust met LED's
- Synergrid Technische Specificatie 005 Uitrustingen voor openbare verlichting – C4/12 Voorschriften voor het leveren van lichtmasten
- RONA (Richtlijnen Ontwerp Niet-Autosnelwegen)

### 6.3 International recommendations

- CIE 115:200X, 2008 “Lighting of Roads for Motor and Pedestrian Traffic”.
- CIE 136:2000 “Guide to the lighting of urban areas”
- IESNA RP-33-99 Recommended practice – “Lighting for exterior environments”
- IESNA RP-8-00 Recommended practice – “Roadway lighting”
- IESNA RP-19-01 Recommended practice – “Roadway sign lighting”

## Survey of the Existing / Planned Lighting Infrastructure; Analysis of Quantity of Lighting Points and the Power Consumption

### Lichtbronnen

De 40.900 bestaande lichtbronnen zijn onder te verdelen in 9 families namelijk:

|                       | Aantal lichtbronnen |           | Vermogen        | Verbruik          |
|-----------------------|---------------------|-----------|-----------------|-------------------|
|                       | lampen              | types     | KW              | KWh               |
| Hogedruknatriumlampen | 34.052              | 15        | 5.827,22        | 22.452.417        |
| Metaalioididelampen   | 4.921               | 31        | 751,40          | 2.898.013         |
| Fluorescentielampen   | 865                 | 20        | 35,42           | 139.907           |
| Hogedrukkwikdamlampen | 707                 | 6         | 125,54          | 489.698           |
| Lagedruknatriumlampen | 245                 | 10        | 24,50           | 94.828            |
| Inductielampen        | 44                  | 2         | 2,84            | 10.962            |
| LED's                 | 24                  | 2         | 0,12            | 450               |
| Halogeenlampen        | 22                  | 3         | 26,70           | 103.062           |
| Gloeilampen           | 20                  | 4         | 2,38            | 9.187             |
|                       | <b>40.900</b>       | <b>93</b> | <b>6.796,12</b> | <b>26.198.524</b> |

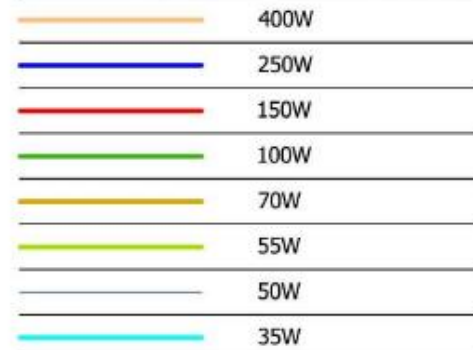
# Survey of the Existing / Planned Lighting Infrastructure; Analysis of Quantity of Lighting Points and the Power Consumption



## Analysis of the Distribution Network and Rationalisation



### VERKLARING - VERMOGEN - FUNCTIONELE



### VERKLARING - VERMOGEN - MONUMENTALE



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## Phase 2:

### 2.1 Elaboration of a city-lighting concept including:

- **Synopsis of principles;**
- **Lighting typologies;**
- **Lighting composition;**
- **Light quality characteristics (colour rendering, perceived light colours and hues);**
- **Treatment of green spaces, water elements, public spaces, heritage and architectural sites;**
- **Performance and quality specifications.**



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## Vistas (inside the city, from outside of the city inwards and from the city outwards)



Dijle Zone 1 bevat 2 bijzondere zichten vanaf de brug, zie ook inventaris dag en nachtbeelden  
Hoofdstuk 1.5  
De aanwezigheid van de twee koepels geven aan deze zicht een dynamische aspect



## Holidays and Annual Events



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## Synopsis of (Main) Principles

• The city for inhabitants & visitors (pedestrians and cyclists)' comfort, enjoyment, well-being & welfare.



High lighting quality;  
Low levels of illumination;  
Diffuse lighting distribution

• Motorized circulation network – a tool for serving inhabitants and visitors.



High lighting quality;  
Lighting levels & distribution answer minimum norms and standards

• Public lighting encompasses ALL lighting in public realm



Public spaces;  
Great structures;  
Monuments & salient architecture;  
Façades/signage;  
Green spaces & elements;  
Water elements;  
Streets of all types;  
Routes for public transportation;

## Synopsis of Principles (cont.)

- Quality lighting like painting – layers of light, sometimes independent, sometimes overlapping.



**Base layer – street lighting;**  
**Ambience layer – all other elements of urban fabric;**  
**Structural layer – lighting for major axes & public transportation routes**

- All public lighting - sustainable



**Light sources: long life; low consumption; no toxins & pollutants.**  
**Luminaires, accessories & supports – quality build & recyclable materials; no toxins & pollutants.**  
**Adapt to environment & architecture, day & night.**  
**No glare; No pollution; No trespass.**  
**Respect for architecture and heritage**

- All public lighting managed by “intelligent” control system



**Programmed dimming;**  
**Programmed scenes in main public areas;**  
**Allowing for energy & gas emissions saving;**

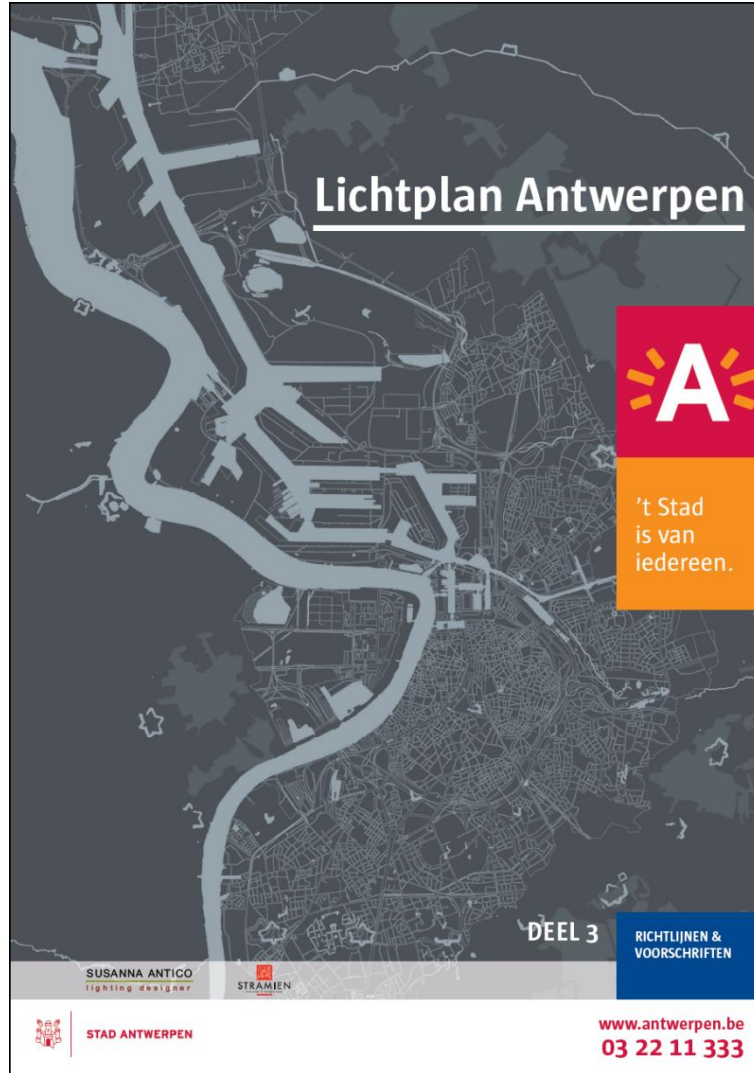
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Phase 2:.

## 2.2 Outcome:

**A set of illustrated guidelines ensuring at night-time:**

- **Visual Coherence**
- **Attraction and Comfort**
- **Safety and Security**
- **Ease of Recognition and Orientation**
- **Creating City-Identity / Corporate Image**
- **Boosting of City Economy**
- **Controlling the Light**
- **Streamlined maintenance**
- **Energy Savings & Gas Emissions' Reduction**



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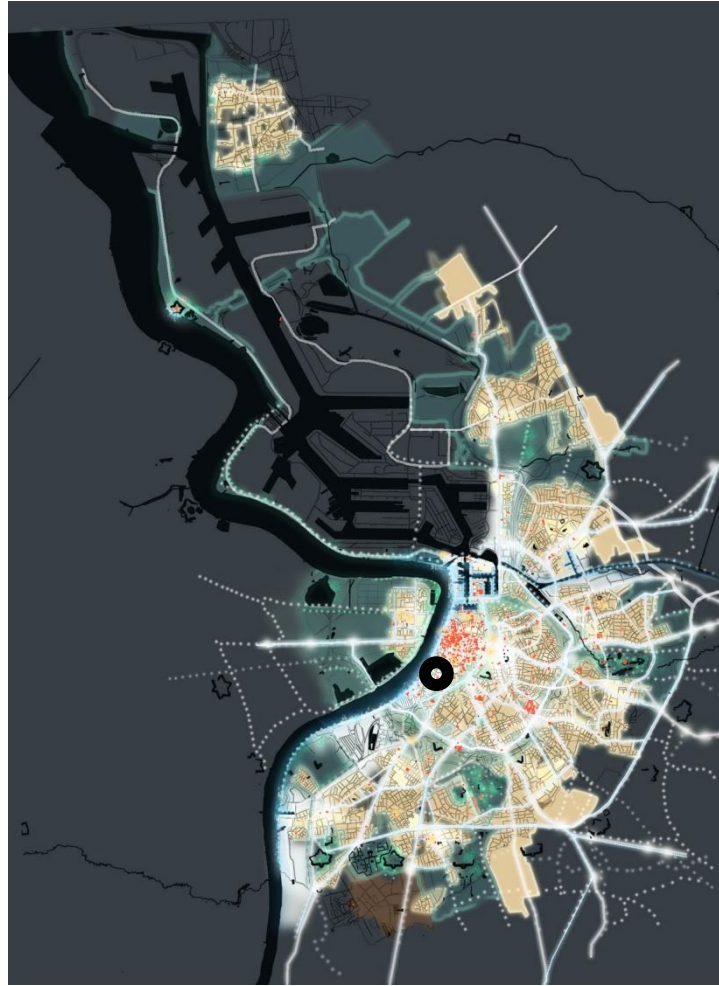
## **The LMP is not a specific project.**

**It is a set of detailed guidelines that give parameters regarding lighting to designers and planners**

**It does not lead to any specifications (except for performance and quality), bills of quantities, execution drawings or calculations relevant to any specific site or area in the city.**

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## A project implemented according to the LMP guidelines



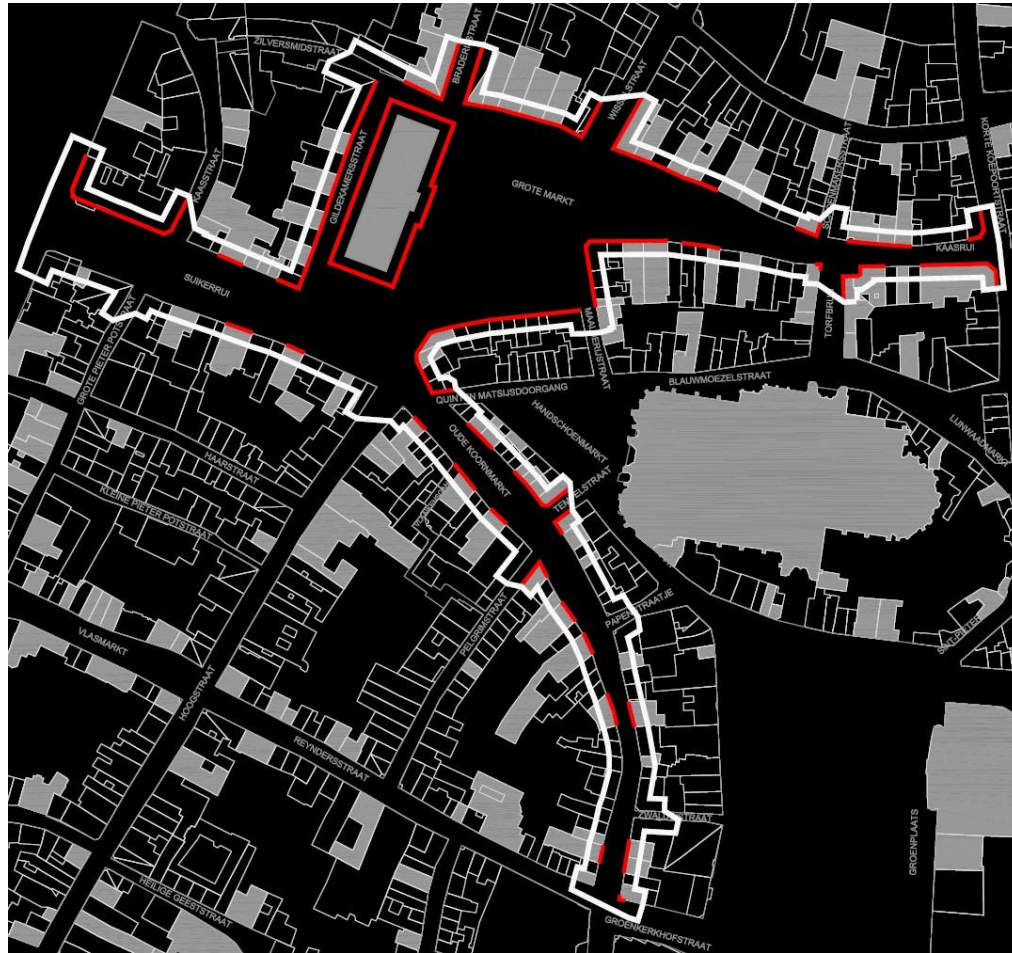
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## Downtown Antwerp



## Project area





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**The City of Antwerp has introduced a requirement from all planners and designers to refer the lighting part of their projects to the lighting masterplan guidelines.**



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