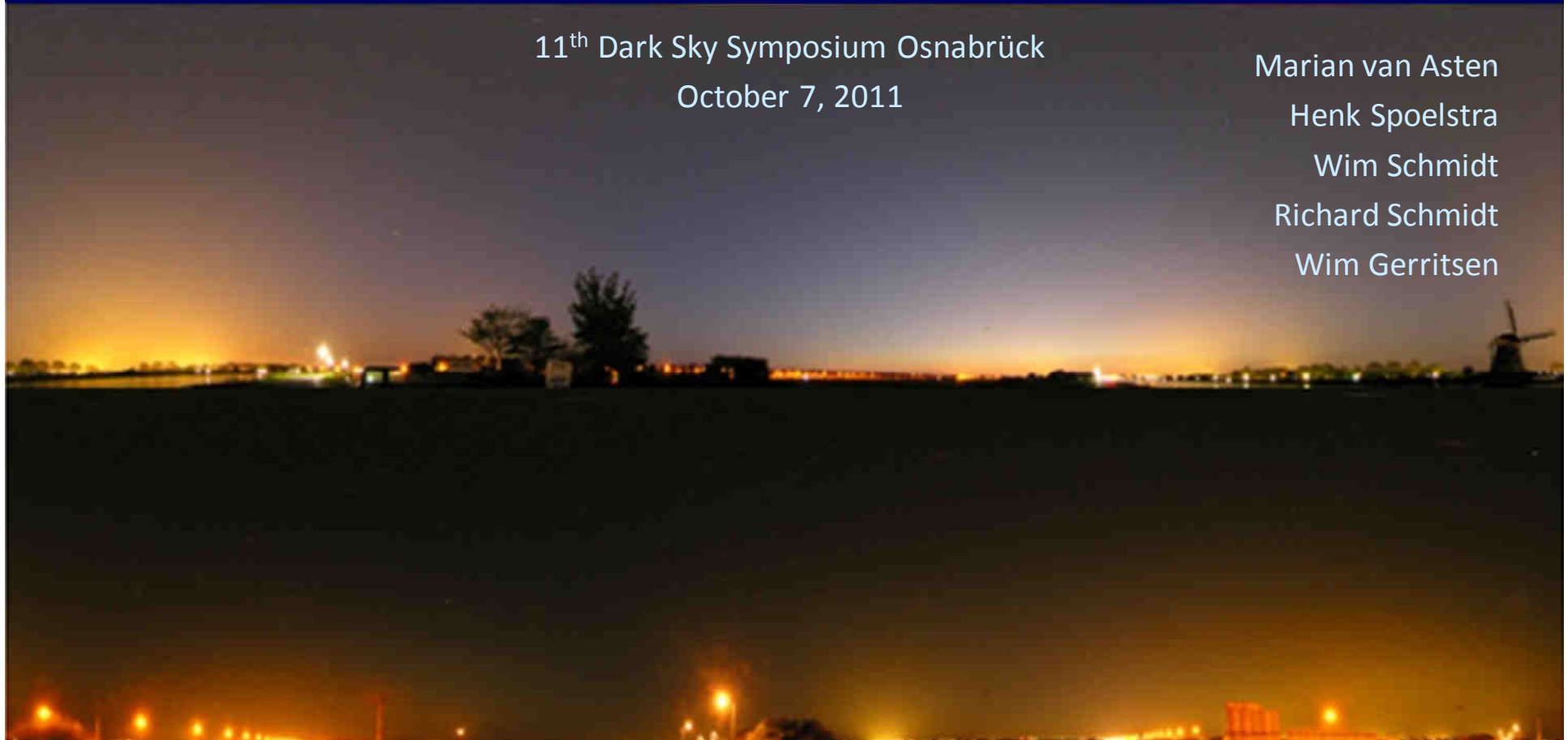


IPO-light

Development and applications of a light pollution calculation tool

11th Dark Sky Symposium Osnabrück
October 7, 2011

Marian van Asten
Henk Spoelstra
Wim Schmidt
Richard Schmidt
Wim Gerritsen



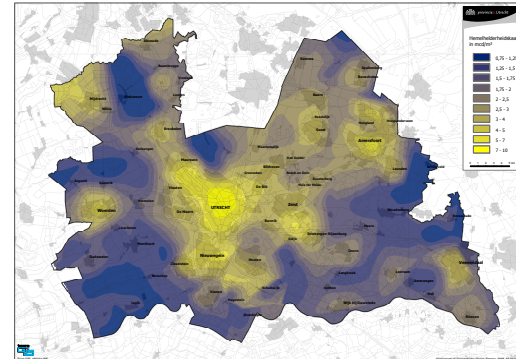
Dutch provinces and light pollution

- 12 regional authorities
- Growing concern about light pollution among civilians, social stakeholders and politicians
- Our role is diverse: raising awareness, licensing, spatial development authority, ...
- Focus Utrecht: land use, physical environment



Regional authority – regional scale

- Night sky brightness
- Horizon visibility



Sometimes:

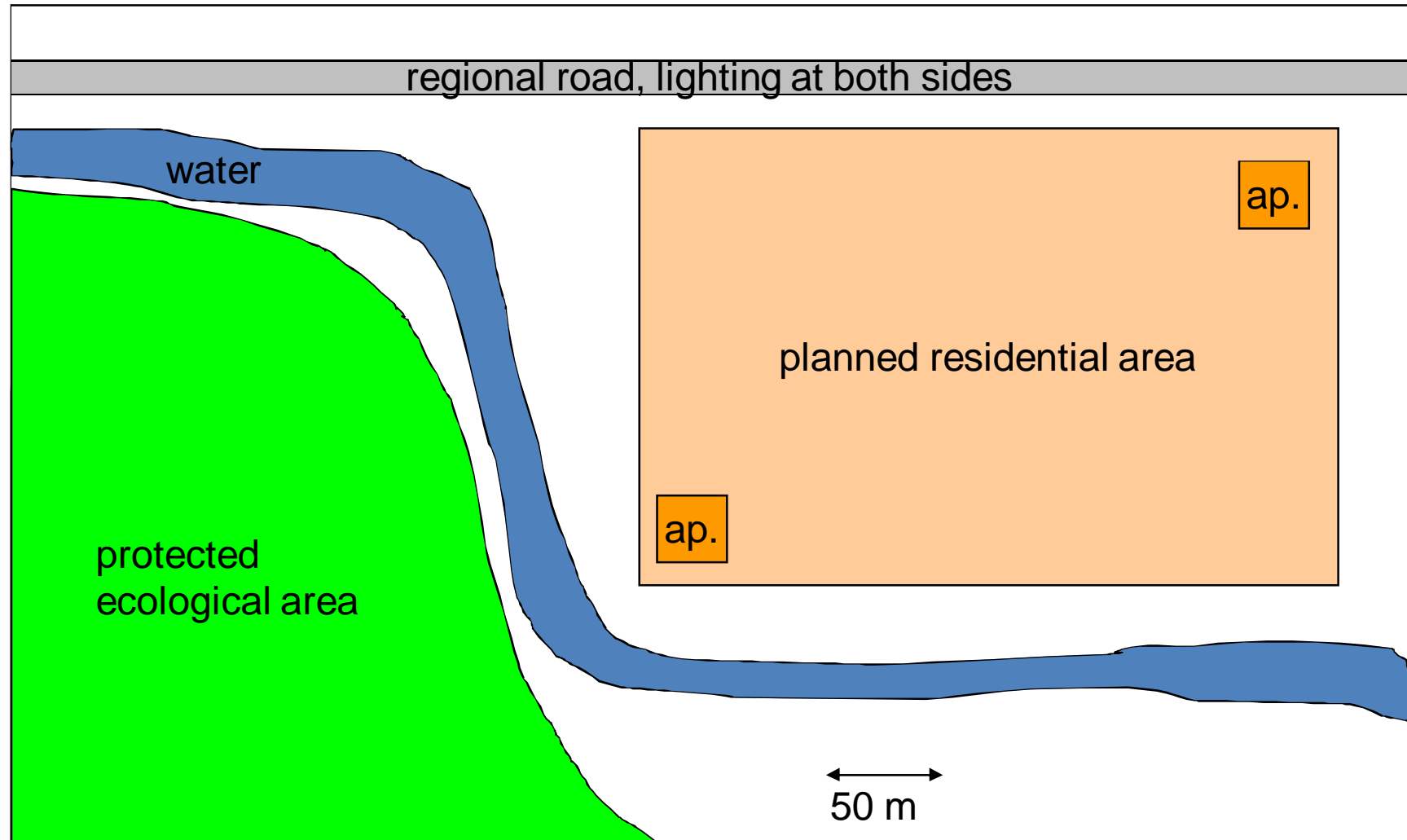
- Disturbance



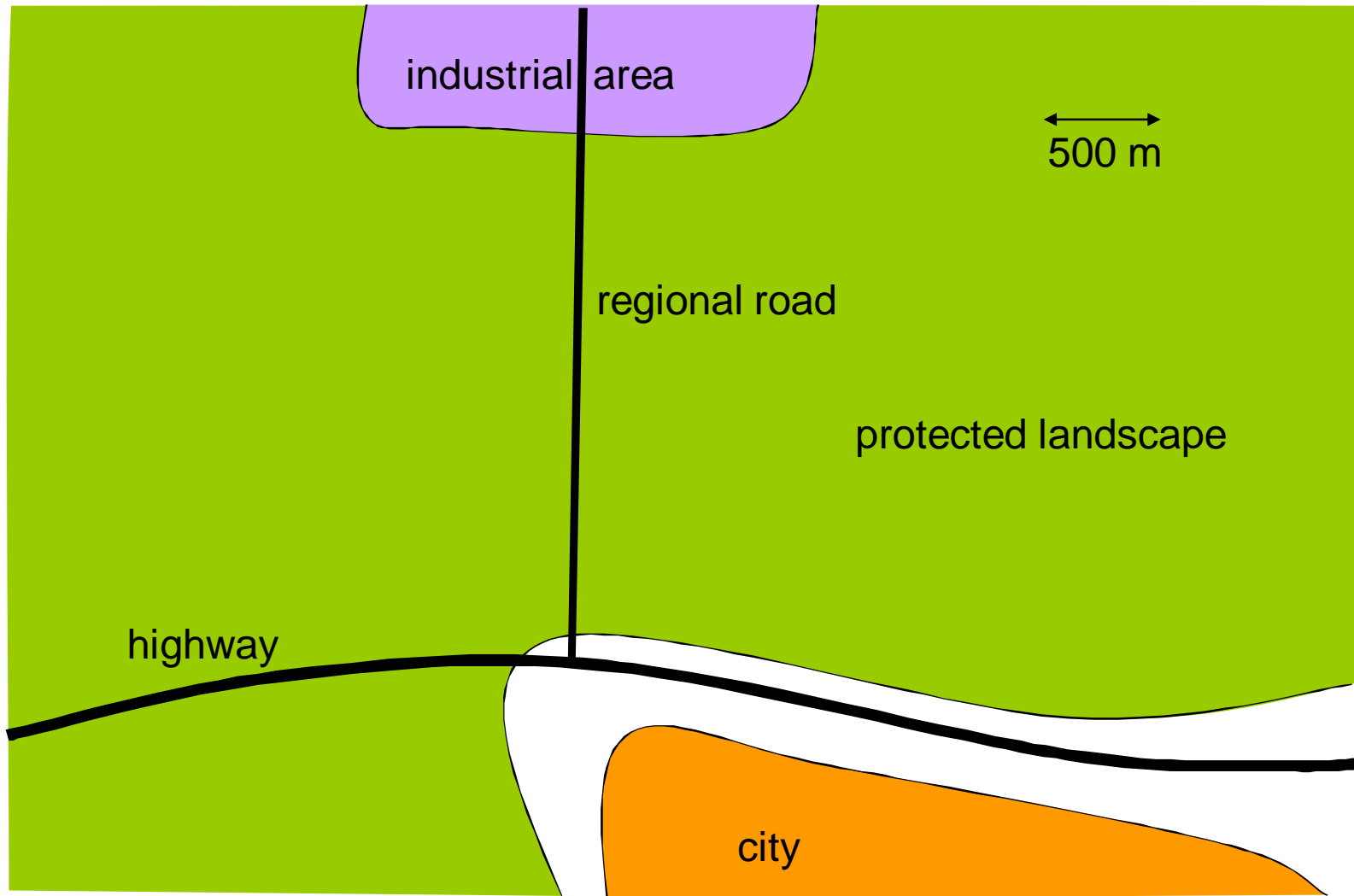
Prediction and interpretation?

- Effect of new development? (e.g. residential area, road, business or industrial area)
- Effect of mitigating measures? (e.g. installing better focussed or dimmed lighting)
- IPO (Association of the Dutch provinces)
How does this affect humans and animals?
commissioned for a calculation tool: IPO-Light

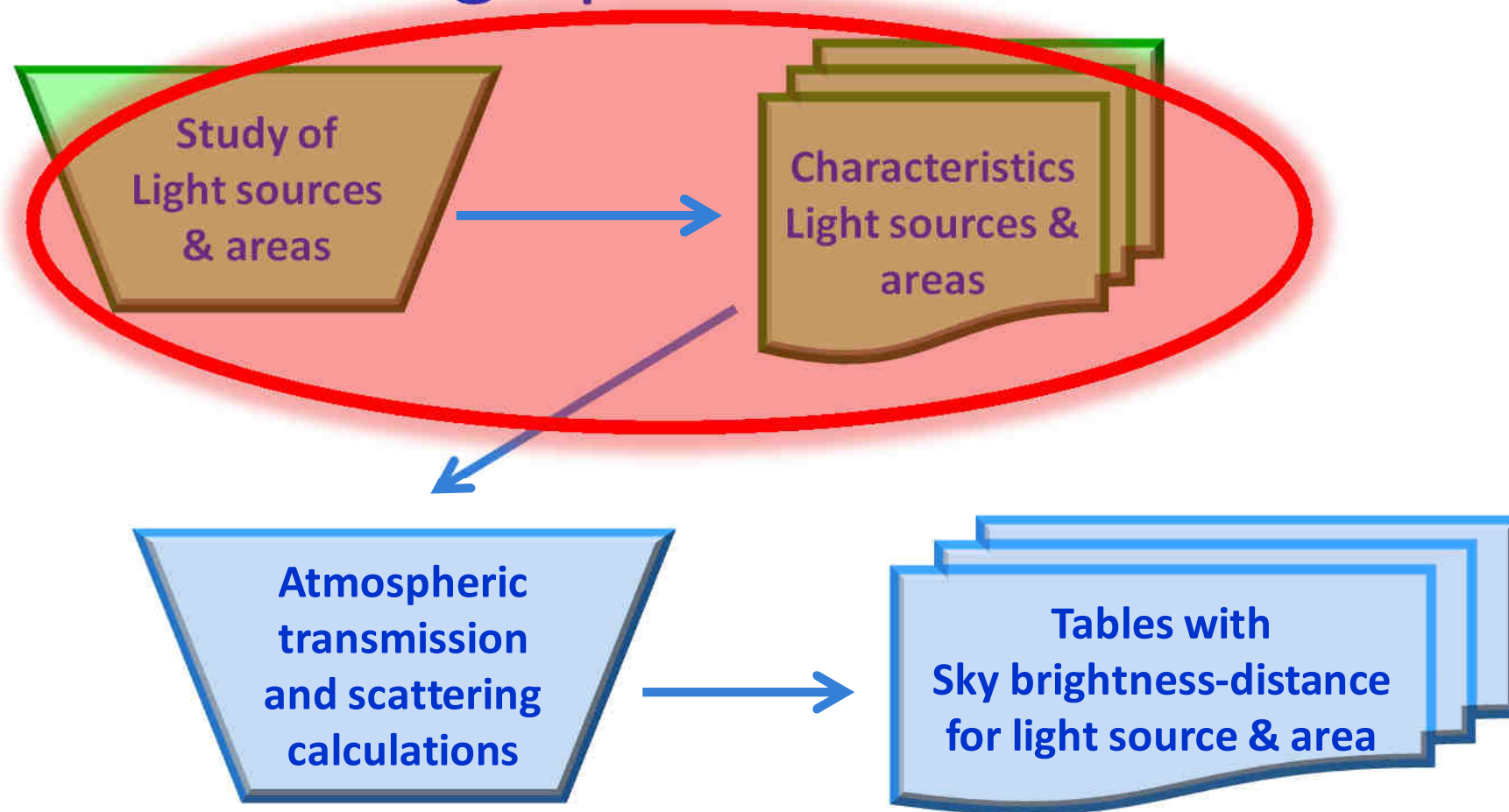
Applications of tool (1)



Applications of tool (2)



Design process of the tool



Light sources and areas

- Modular : areas of 100m x 100m
- Categories:
 - Residential/ City centers
 - Sporting fields
 - Business /retail / industrial areas
 - Roads
 - Greenhouses
- Characteristic light source areas in the Netherlands



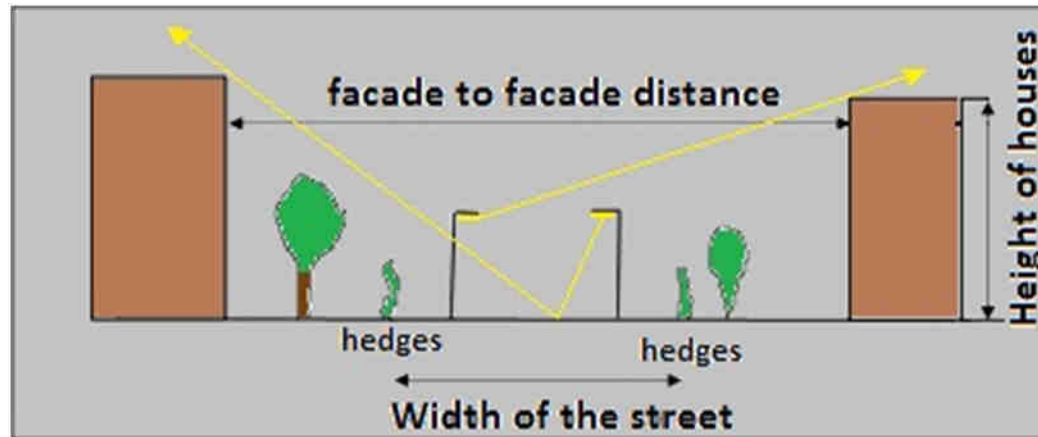
Characteristics - 1

- Determination of key figures
 - Amount of illuminated surface (%)
 - Roads (width), Residential areas (roads)
 - Sporting fields and greenhouses (% illuminated)
 - Business/industrial areas (roads and non-built areas)
 - Illumination (selected)
 - Number, type, illuminance, height
 - Other illumination (advertising)
 - Amount of reflection

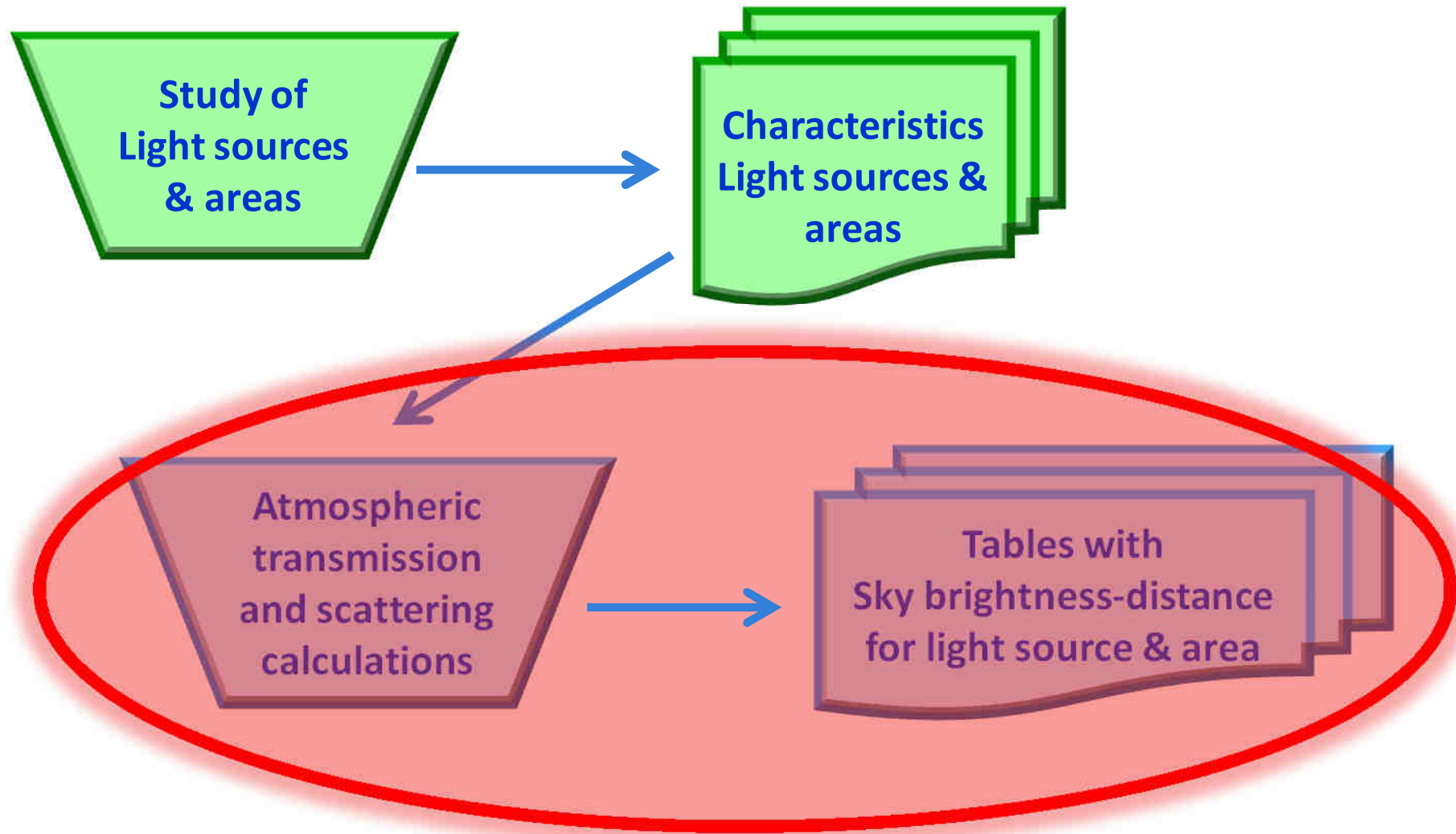


Characteristics - 2

- Shielding by buildings
 - Type of residential areas (houses, apartment blocks and city centers): ratio height houses and width streets
 - Sporting fields (tennis)



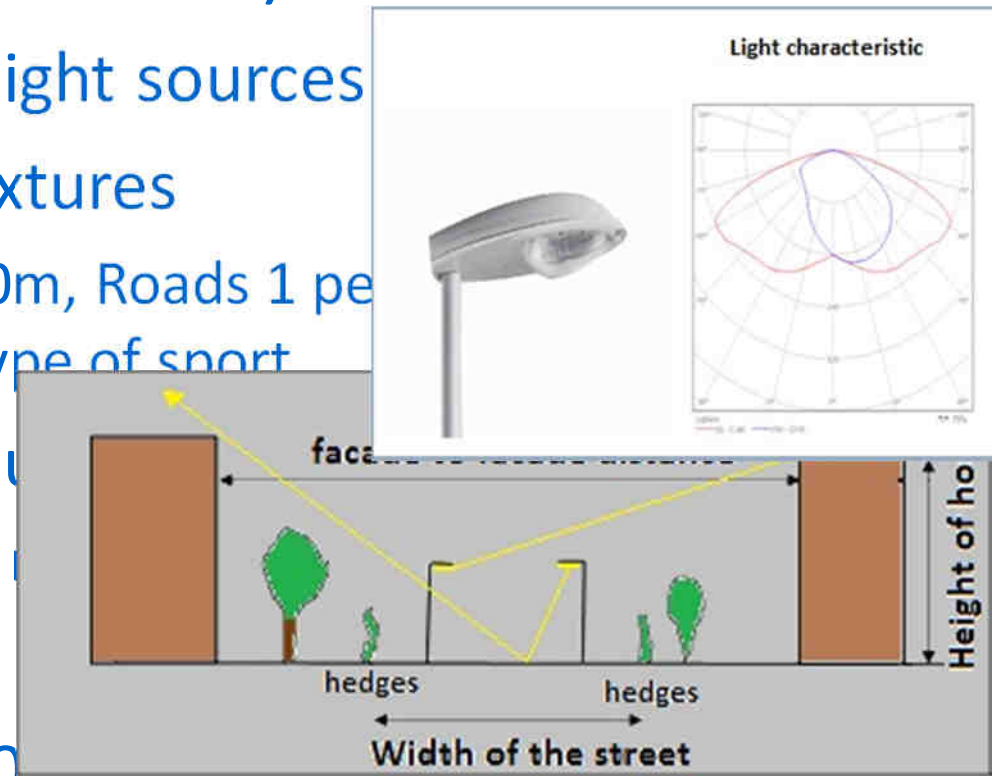
Design process of the tool



Input

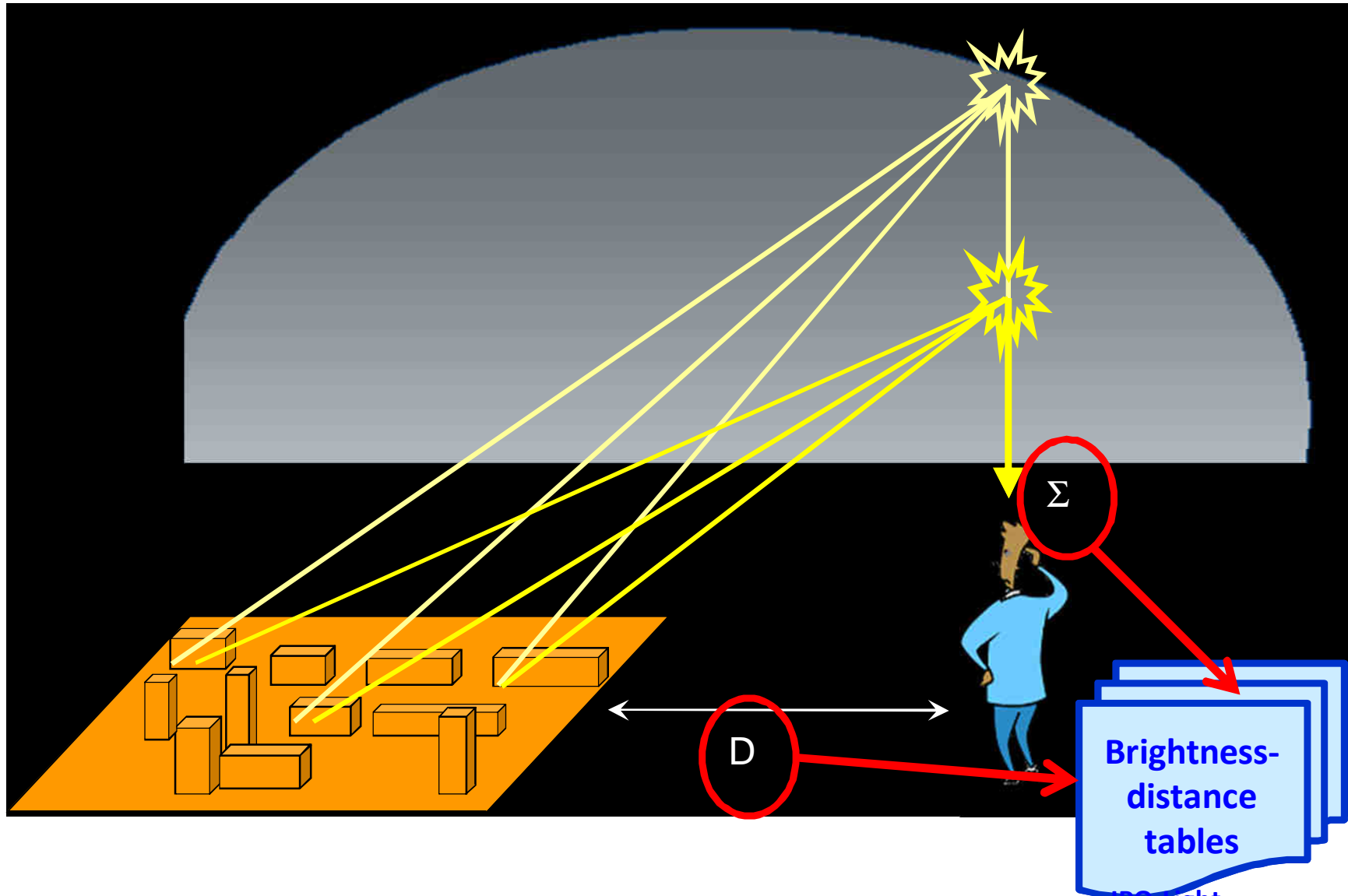
- Each source area (100x 100m) calculated with:

- Characteristics of the light sources
- Standard amount of fixtures
 - E.g. : Streets: 4 per 100m, Roads 1 per 100m, Sports fields: depending on type of sport
- Standard amount of illumination
 - E.g Roads, industrial & commercial areas: depending on type of area
- Shielding by buildings
- Standard reflection (100%)

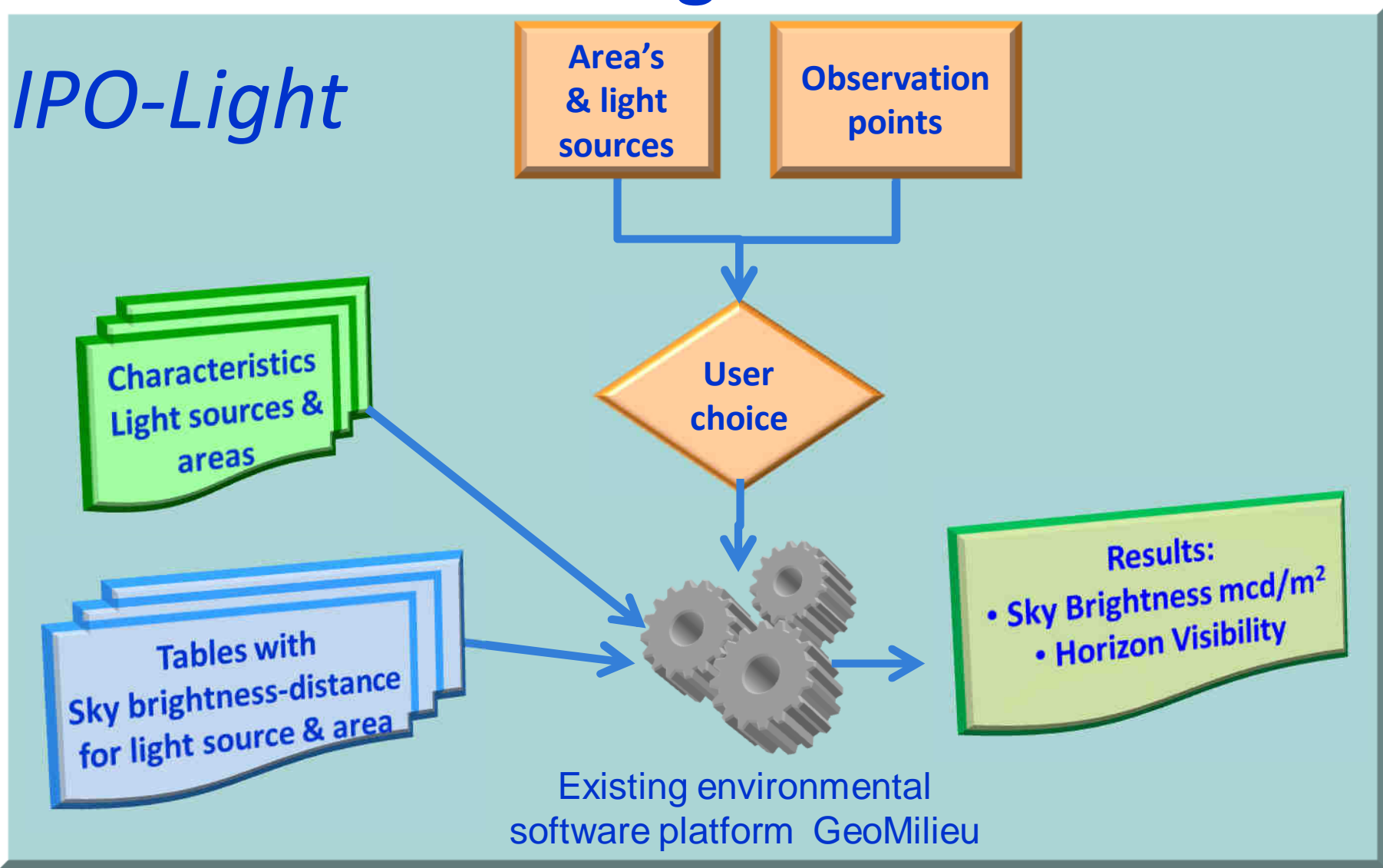


- Atmospheric transmission and scattering

Transmission and scattering



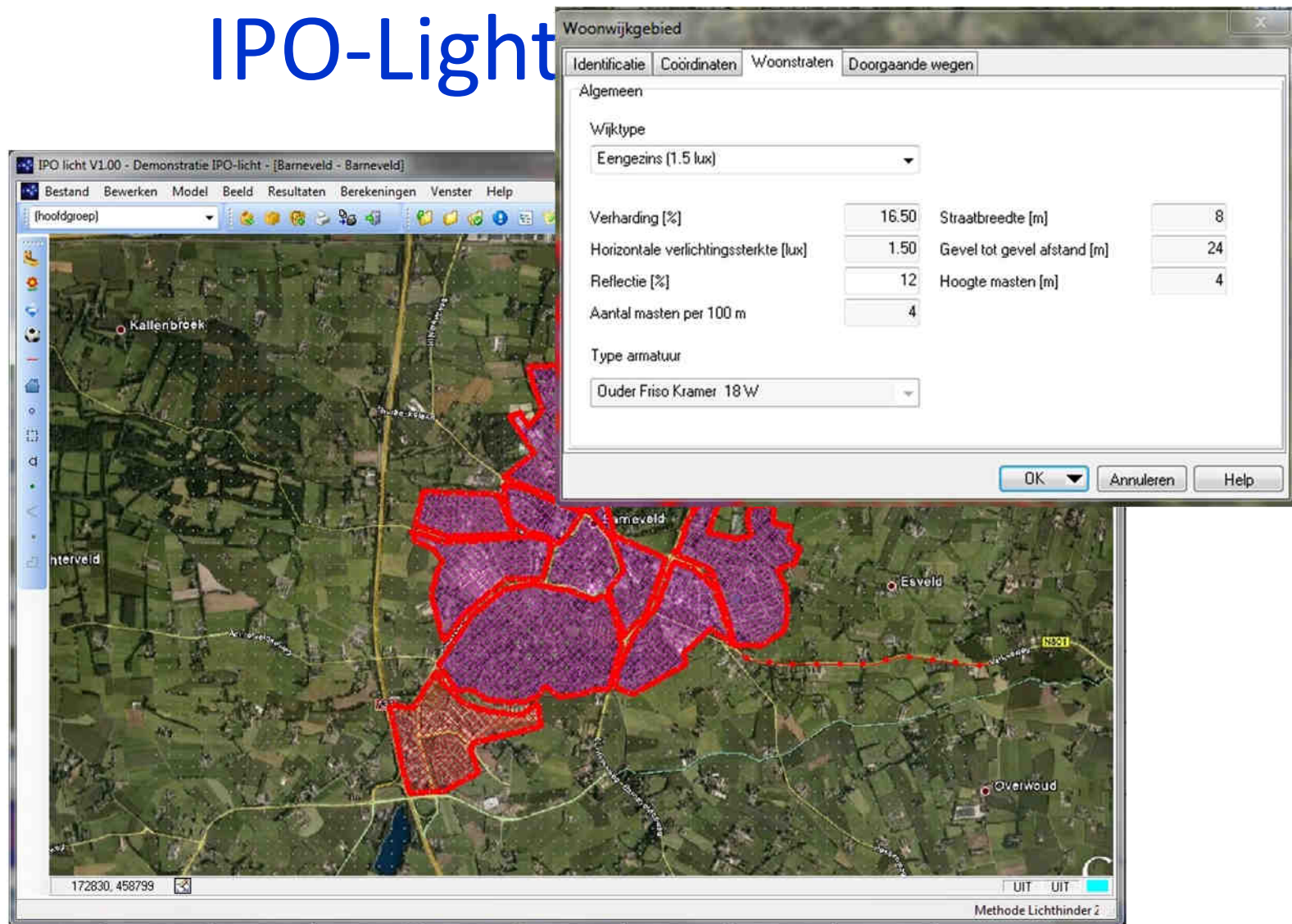
Functioning of the tool



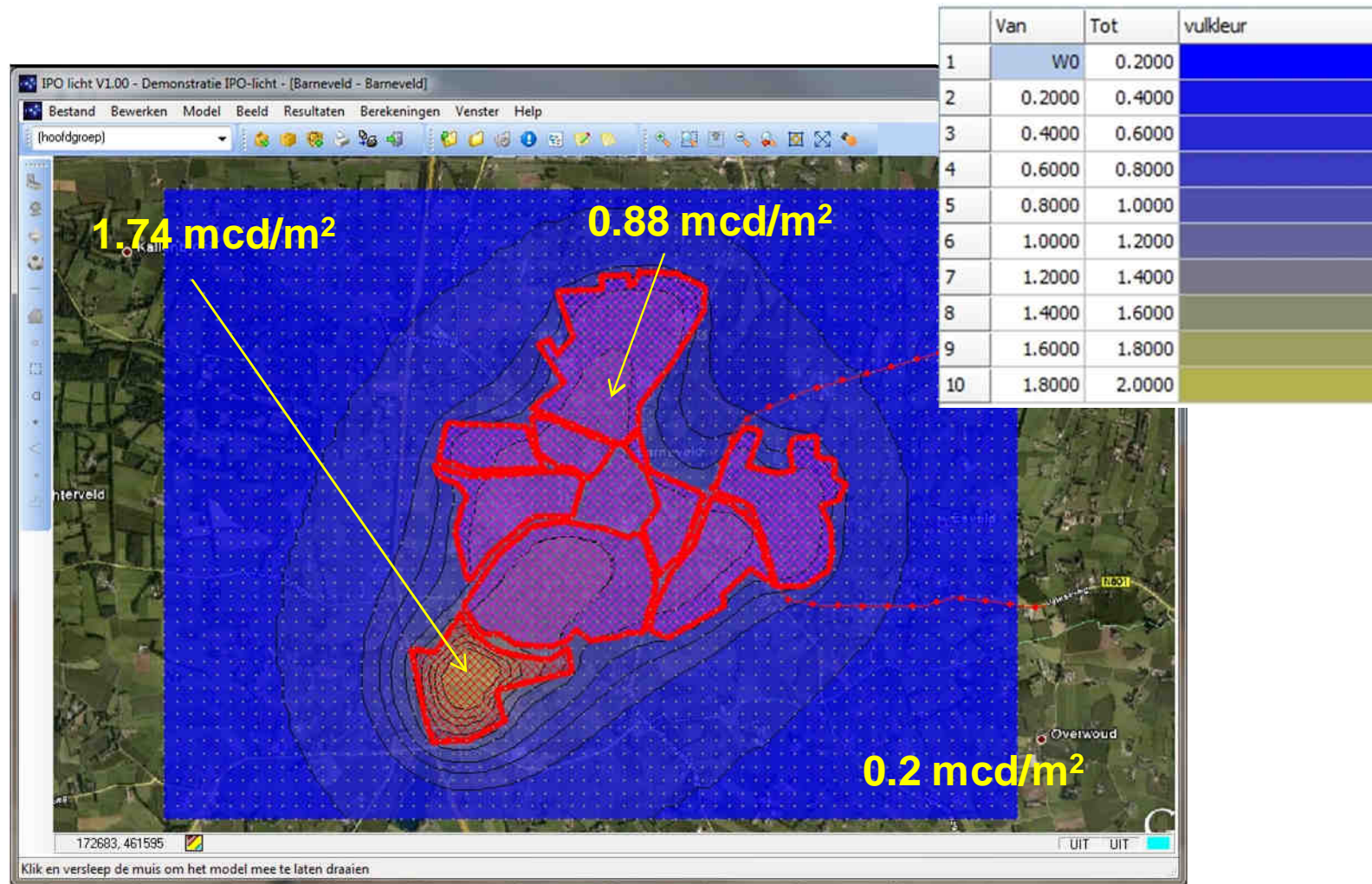
An imaginary case ...



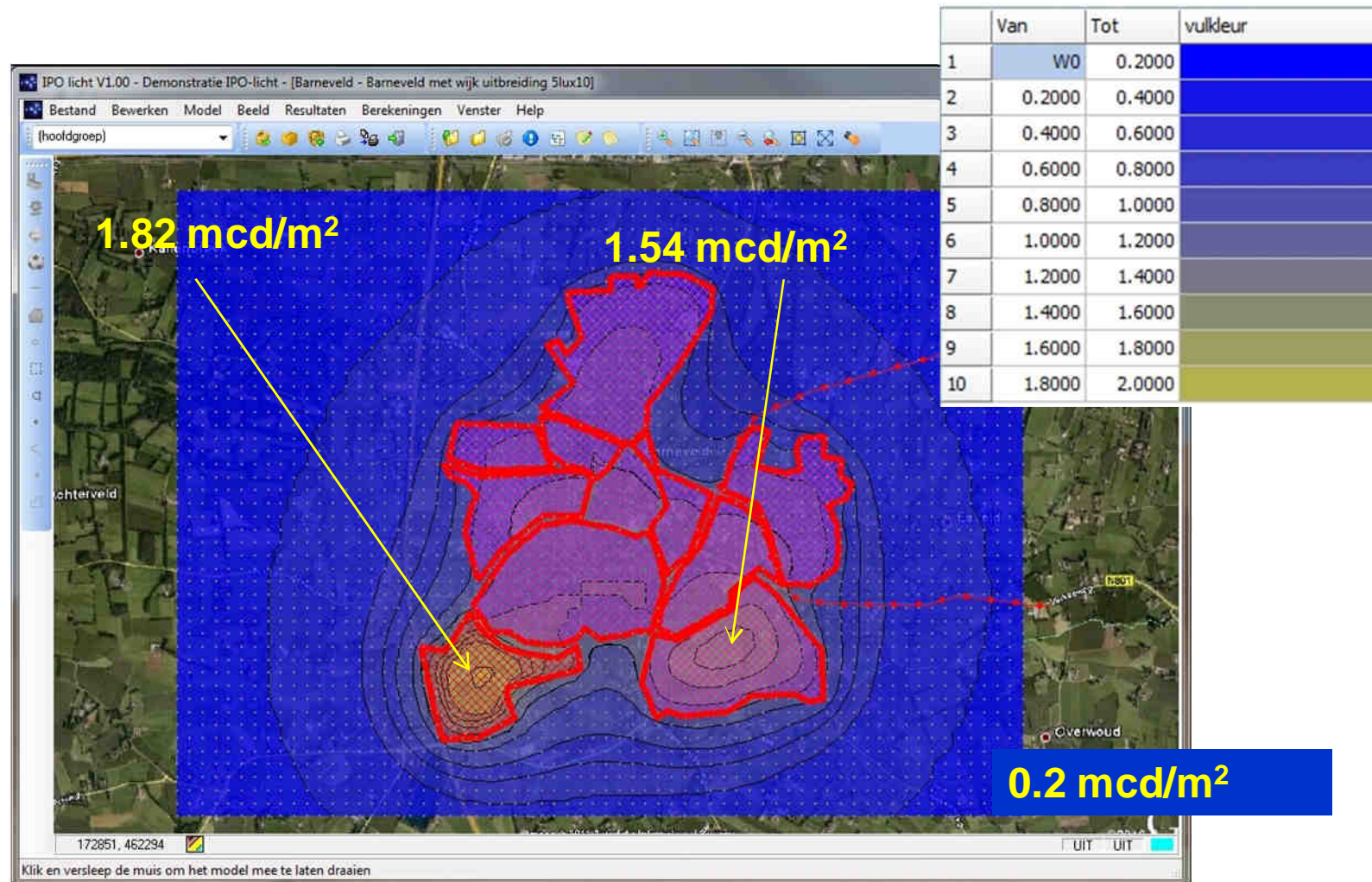
IPO-Light



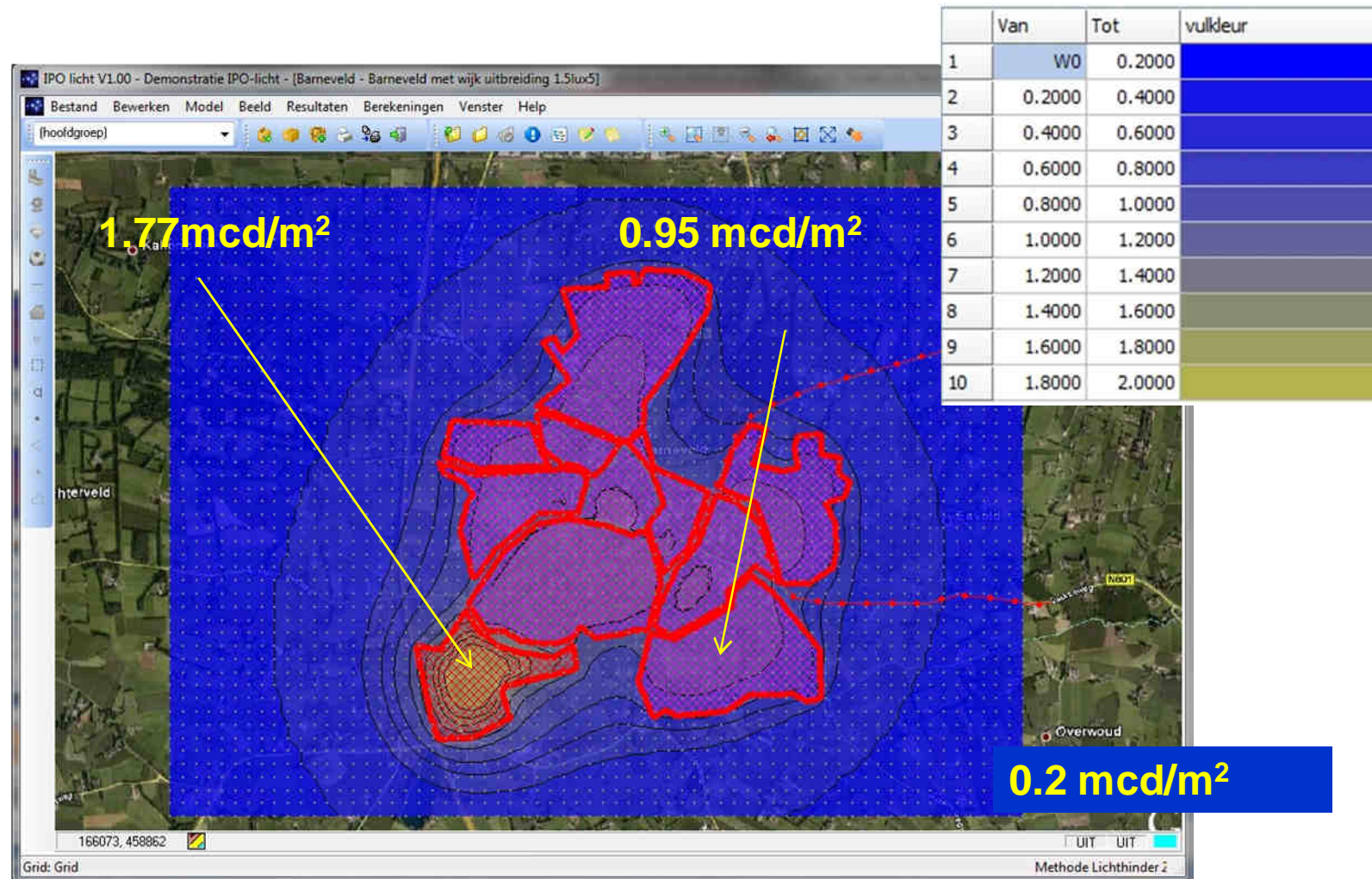
Sky brightness ... present situation



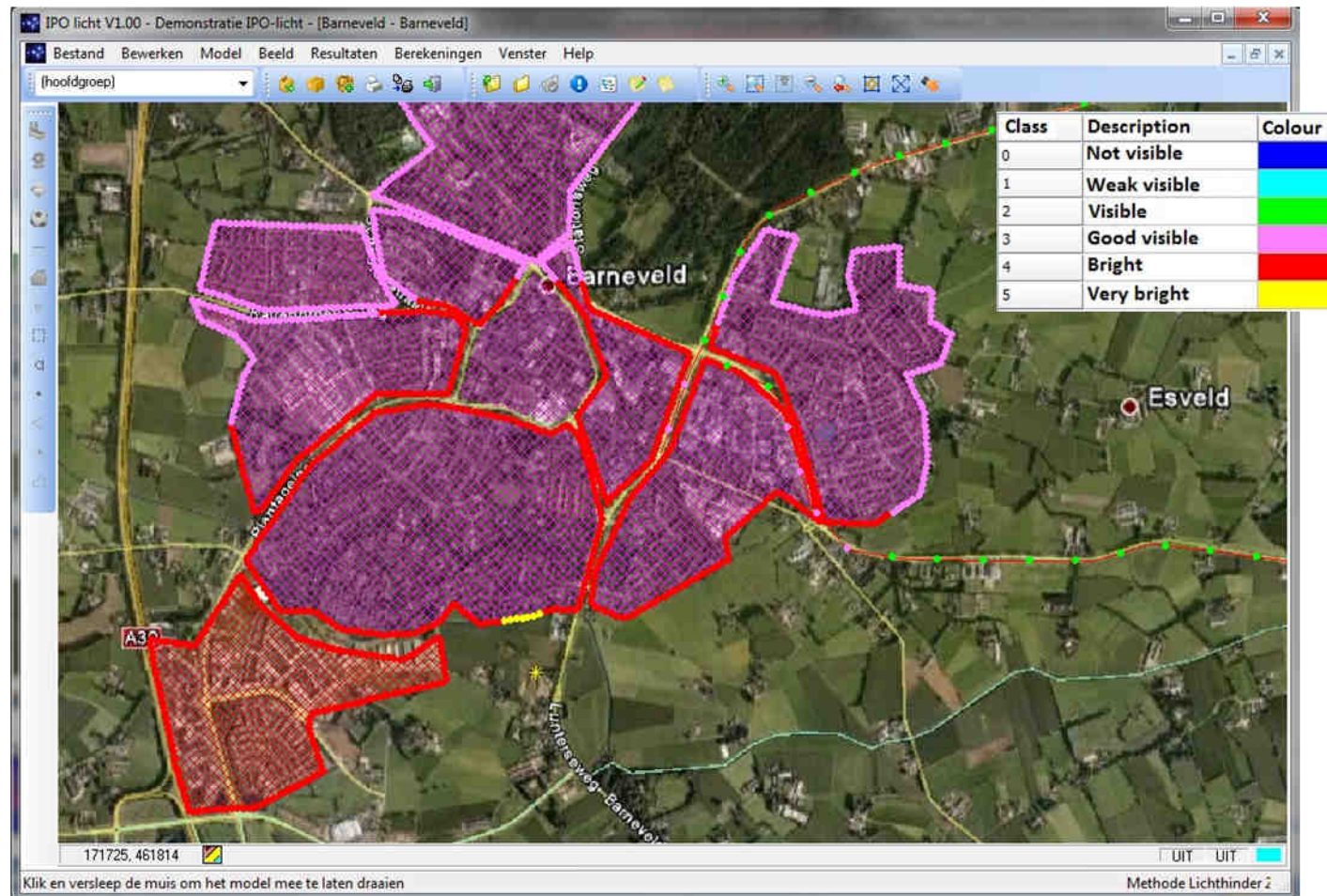
Sky brightness ... Future situation



Sky brightness ... After taking measures



Horizon visibility



What it can

- **Contribution** of lighting to sky brightness
 - in mcd/m²
 - Number of visible stars
- **Intensity** of light sources (horizon visibility)
 - in 5 classes (very bright -> not visible)

Possible future developments

- More meteorological conditions (> 1)
- More choices within sources areas:
 - More types of fixtures
 - Layout and type of source areas
- True measured sky brightness for the all of the Netherlands (now about 50% coverage)
- Sky glow in all directions (now only zenithal)

MonitoringPORTAAL

Maakt informatie over monitoring van milieu makkelijk vindbaar!

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Resultaat

Zoek informatie Type hier uw zoekterm...

Uitgebreid zoeken Toon alles

Geef informatie Ga direct naar het formulier en stuur uw informatie naar de webredactie...

terug | printen
Laatste wijziging: 03 okt 2011

Systemen en projecten > Monitoringsystemen en -projecten:
Rekenmodel IPOLicht (download)

PRISM rapport

Met het Rekenmodel IPOLicht kunnen de effecten op hemelhelderheid en horizonvervuiling van ontwikkelingen of maatregelen kwantitatief worden bepaald. Dit instrument kan worden gebruikt bij ruimtelijke processen als gebiedsontwikkeling en -inrichting, ter ondersteuning van beleidskeuzes en bij vergunningverlening.

Jaar van uitgave:
2011

[Download het Rekenmodel IPOLicht](#)

[Ga naar de snelstartgids van het Rekenmodel IPOLicht](#)

Nieuw in portaal

[Open data portaal](#)

[Rekenmodel IPOLicht \(download\)](#)

[Rekenmodel IPOLicht snelstartgids achtergrondinformatie \(PDF\)](#)

[Lucht in cijfers 2010: de luchtkwaliteit in Rijnmond](#)

[Mitec Advies B.V.](#)

[Open data portaal](#)

Gerelateerde informatie in het Monitoringportaal:

Organisaties

[Overheden en semi-overheden \(1\)](#)

■ [Interprovinciaal Overleg \(IPO\)](#)

Produkten

[Publicaties \(1\)](#)

■ [Rekenmodel IPOLicht snelstartgids achtergrondinformatie \(PDF\)](#)

95%

<http://www.monitoringportaal.nl/index/2438/Resultaat.html> IPO-Light

Thank you for your attention

Questions ?

More information

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IPO website for download of IPO-LIGHT:

<http://www.monitoringportaal.nl/index/2438/Resultaat.html>