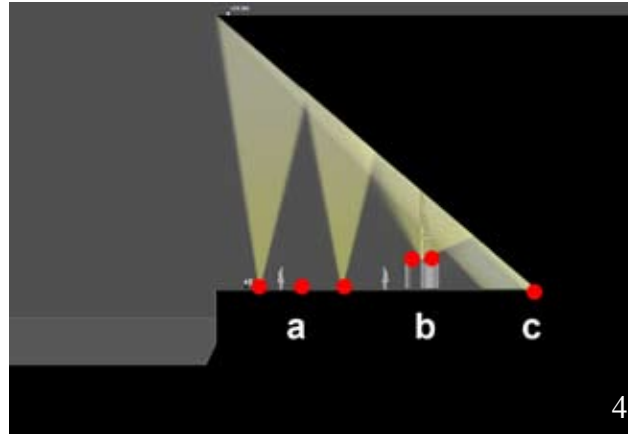
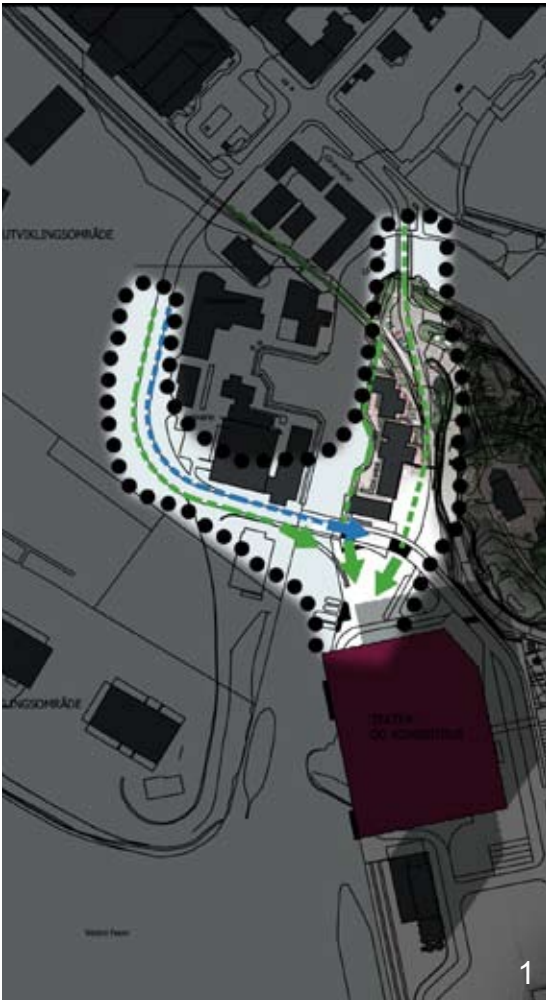




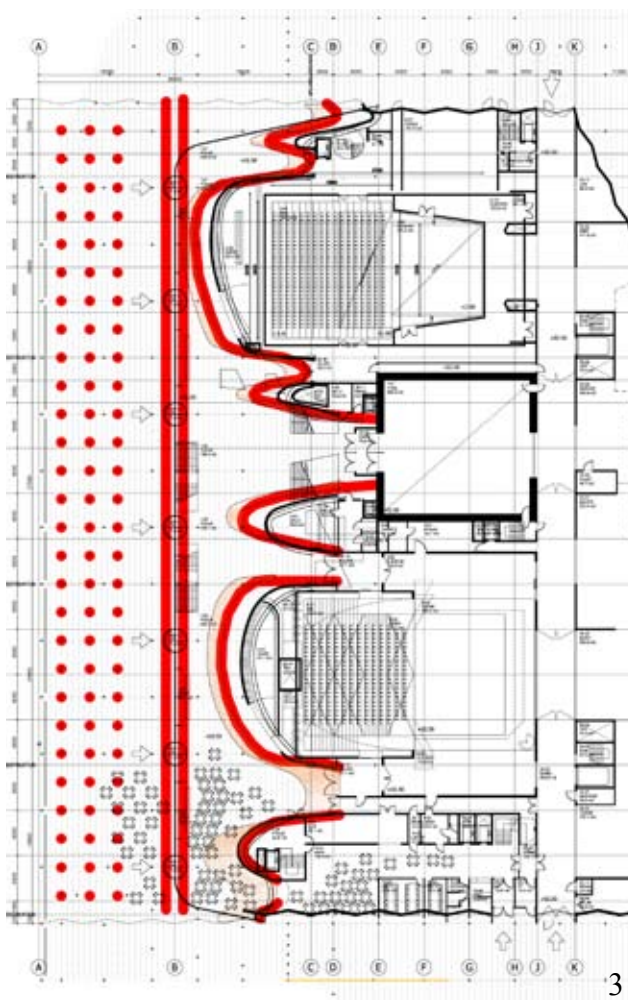
2



4



1

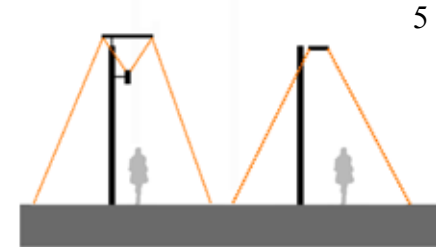


3

Approaching

Where visitors approach the building (1) an enjoyable lighting solution should respect the place, the building and its main facade (2), which lighting wise is in main role. Maximum luminance of light distribution surfaces of the used luminaires must be under Moon luminance = L_{max} . average = 3000 cd/m^2 . Then there will be no glare and contrasts can be seen clearly. This means that luminaires are either custom designed indirect outdoor luminaires with height of 5-6m, or carefully designed direct luminaires with peaceful light distribution surfaces (5). Average pole distance S will be 12m – 18m, depending on solution. Carefully made calculations must be available and also calculation on light distribution surface (Luminance of the light distribution surface) must be included in the design task.

5



Facade element

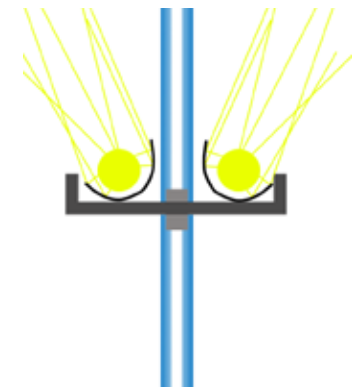
The main facade towards the water is a huge glowing element in the dark northern night. According to Hopkinsons diagramm the luminance of the wooden facade surface must be approx. 50 cd/m^2 . Then, during the dark performance periods (Ambient luminance 10 cd/m^2), the facade has approximately 60 visible units. Even early spring at 0700PM (Ambient luminance 50 cd/m^2), when normally perform-

ances start, we have still 30 visible units. Every 1 unit means just and just visible difference compared on earlier value. When visible units are 20, the contrast is humble. Visible units of 40 means clear difference. When visible units value is 60 or over, the contrast is strong (Like in images of this page). Lighting solutions are simple ones: Underground luminaires and lighting coves .

-The underground luminaires are located in heated pavement (4a)
Proposed luminaires: Underground luminaires Iguzzini (No glare, carefully designed optical systems, no water leaking and surface temperature is very low)

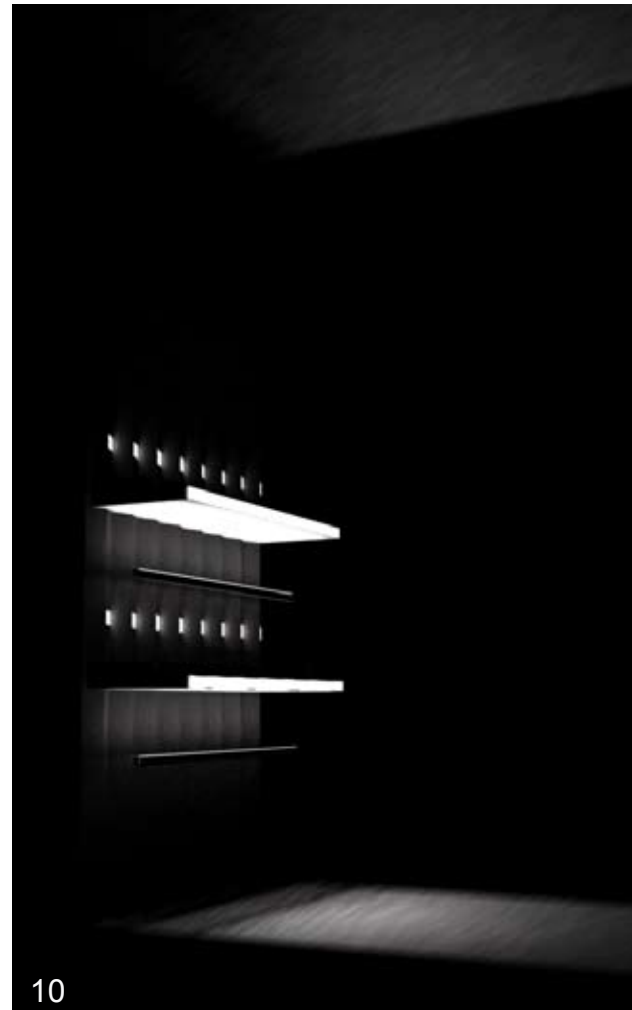
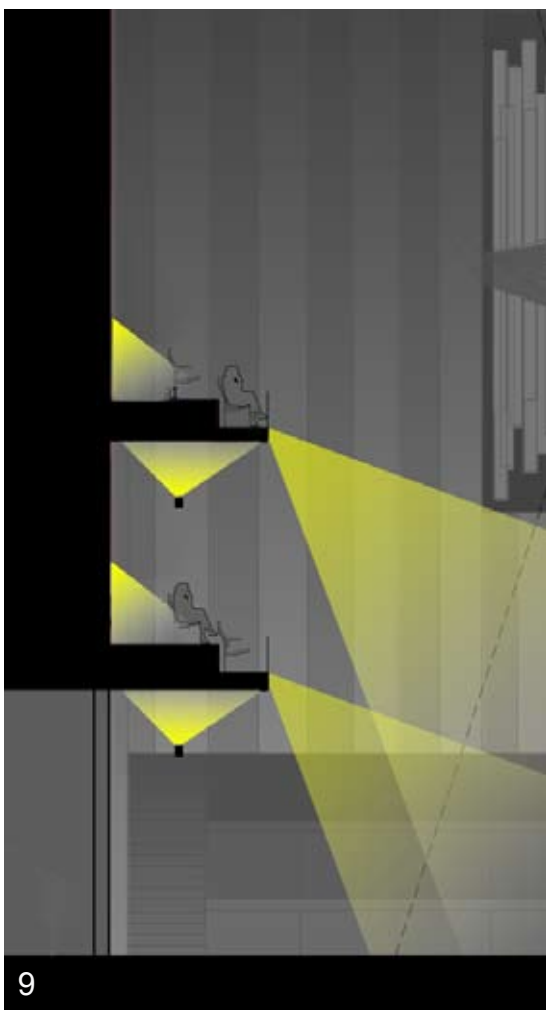
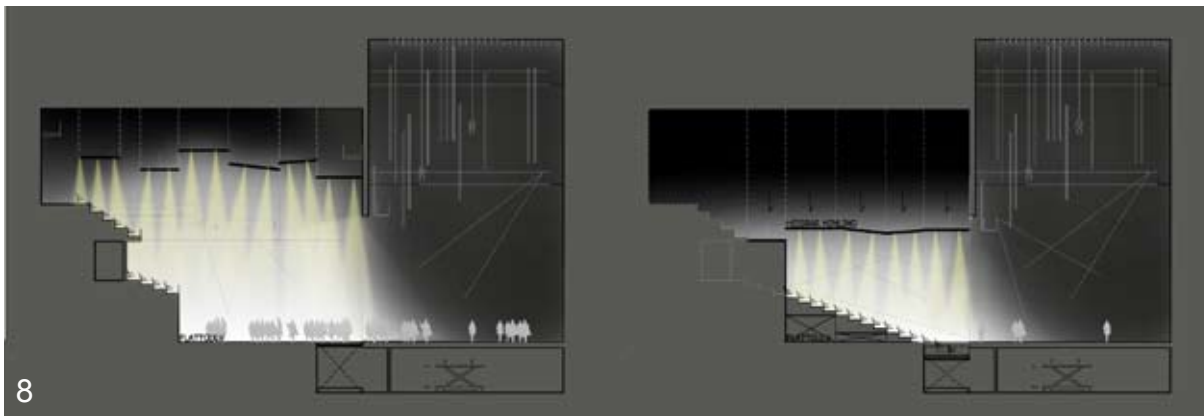
-lighting cove located both sides of the horizontal steel construction elements which are holding up the glass wall (4b)

Proposed lamp: Cold Cathode lamp, custom made reflectors bundle the light.(6)



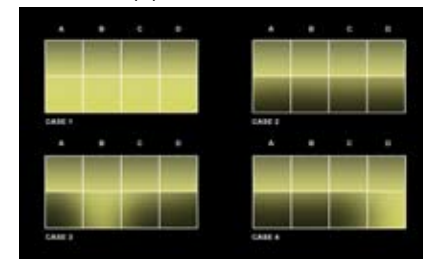
6





-lighting cove embedded in floor close to the lowest part of the curved wall (4c)

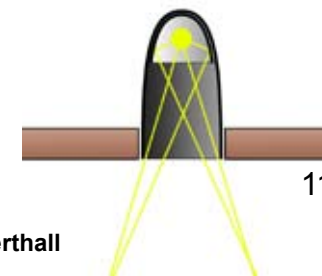
Proposed luminaires: Iguzzini Linealuce in 2 rows dimmable along the curved facade element. If there is for example only an operaperformance while the other stages are closed, the luminaires around the opera entrance can be used with full power while the other entrances are more humbly illuminated (7)



Theatre- and Opera Hall

For the architectural lighting concept in this space with the hight- adjustable ceiling structure (8) "Black Hole Luminaires" are used. The philosophy reflects the mystics of the building. Downlights are located in the bottom of black tubes which are located randomly in the ceiling elements. Light sources are dimmable PAR lamps. The luminaire itself is a cheap "Custom Made" black metal tube. Basicly lamps are always dimmed between -20% - - 100% in order to maximize lamp life to reasonable level and giving possibilities to different performances. Lamplife is approx. 5000 burning hours, depending on use. Lowest level of Ehorizontal = 10 lx and maximum level of Ehorizontal = 200lx. maximum level is defined according to cleaners union demands if any. This lighting solution is

invisible and has no glare. A prototype must be built (11) and light output Candlepowers in different Gamma – C angles must be measured with suitable measurement tool. Measurement results must be added in e.g. Dialux lighting design program in order to be able to solve how many luminaires are needed in each ceiling structure element. Stage lighting must be designed by stage lighting expert.

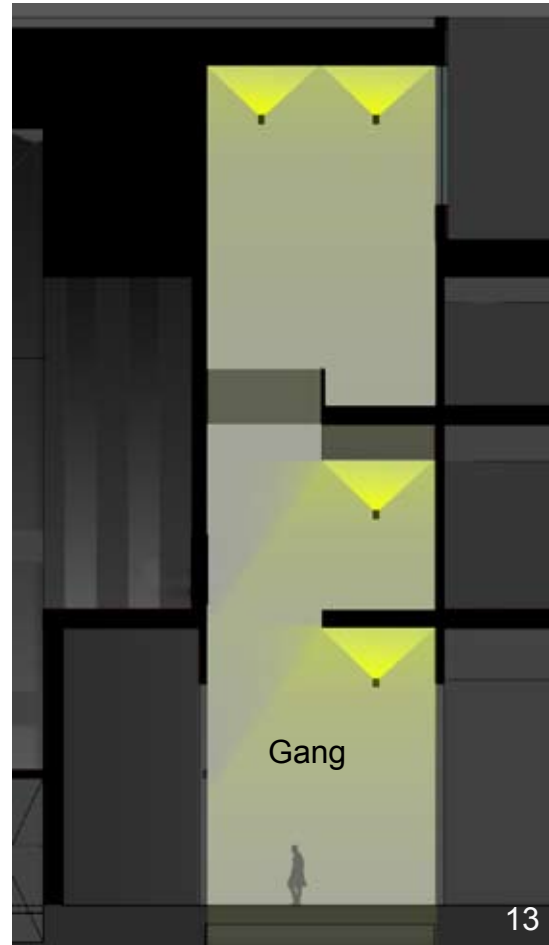


Concerthall

The mystical and strong architecture in the concerthall demands mystical lighting solution. The lighting is produced by using the balcony structure(9): undirect lighting of the lower balcony plane (f.e.with Notor- luminaires Fagerhult Belysning) and the edges of the balconies as glowing luminaires. The edges are covered with sandblasted glass elements which have basic fluorescent luminaires behind them. To get little accent "rhythm, blues and rock'n roll" on the lighting solution, light cones are located on the walls. In this mystic black room Ehormax = 60lx is enough. Level must be argumentated to cleaner's union if any. When large surfaces are used to produce light, the luminances (Seen as brightness) of the surfaces can be remarkable low, see picture Telenor headquarter (14). In this way the mystic of the architecture can be saved.(10)



12



13

Stage acoustic lighting balloon

Luminaires are located inside the balloon (12). The lower part of the balloon has a different surface structure than the upper part of the balloon. Evert. = 1000 lx on the note on the music stands is a must. Balloon designer must co-operate with lighting designer very closely in order to get a perfect solution. The balloon lighting together with the balcony lighting is a very important part of the general lighting. The heat inside the balloon which is produced by the lamps has to be considered. Proper airconditioning systems have to be provided.

Gang

The "Gang" is illuminated undirectly with Notor- luminaires (Fagerhult Belysning). Continuous row of light on the upper parts of the balcony elements shoot light softly everywhere in the space (13). originally Notor is specially designed for this kind of purpose. Ehor = appr. 50 lx without any glare. See picture Telenor headquarter (14).

Offices

Lighting values and lighting type as follows.



14

14

General lighting Eh = 50 lx – 100 lx produced with Direct / Indirect solution.
 Bookshelves Evert. = 200lx - 300 lx on the backs of books produced with small wallwashers..
 Plants and Pictures Evert. = 300 lx produced with simple spot luminaires.
 Task lighting Eh = 1000 lx produced with task luminaires.