Lighting For Transitions

A Master thesis by
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Abstract:

How do we design urban lighting which feels unique and site specific but also gives the impression of a whole and cohesive nightscape?

This thesis proposes working with the transitional space – the space where two different spaces meet – to overcome the abovementioned problematic. Creating a lighting design specifically for the transitional space will smooth the transition from area to area, connecting unique lighting in an overall cohesive way.

In this thesis, such a design approach is arrived at by first examining transitions through a state of the art within the areas of architecture, and lighting design. The state of the art identifies Aldo van Eyck's theory of the in-between and Till Boettger's methodology of the threshold space as relevant architectural theoretical and methodological framework for working with transitional spaces.

In order to use these architectural approaches for lighting design, the thesis unites them with lighting design principles compiled from different professionals, practitioners, and scientists, creating a complete framework for examining lighting transitions and cohesiveness in an urban space.

The thesis examines the efficacy of the framework by applying it to three cases of transitional spaces, analyzing their lighting through the framework and the method of collage.

Finally, the paper utilizes the framework to create a redesign of one of the analyzed cases, showcasing the strengths and weaknesses of the framework for designing light in transitional spaces.

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PREFACE

This thesis is a continuation of a previous project made in the third semester of this master's education named 'In-between light and spatial coherence' (Strunge, 2023). In that paper, I examined the spatial theory of the 'in-between' by architect Aldo van Eyck, and lights role as a facilitator of transitions. Different lighting designs, anchored in a single case, were created and then showed to a number of informants, who through a Likert scale questionnaire evaluated the redesigns compared to the existing lighting. In addition, short interviews were conducted as a supporting factor. The results generally favored the redesigns, but not conclusively. This indicates that designing specific lighting for the transitional space has the potential to create a cohesive nightscape, but that something in the approach was unsuccessful. This is the basis for this master thesis: To further examine how the transitional space and lighting can be united to create beautiful, unique and cohesive nightscapes.

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Til min kærlighed og lykke

Johs & Tora

CONTENTS

1. PROJECT OVERVIEW

Writing a project is never a linear process, but it often presents itself to be, qua its format of presentation – the written paper. In order to show how the different components of the thesis interact with each other, and how the process has been far more circular than linear, I have tried to visualize the thesis in a more back-and-forth manner. Each line should not be understood as 'led to' in a motion from 'up to down', but rather as elements that mutually informed each other, as the problem informed the state of the art, which then re-informed and shaped the understanding of the problem, etc.

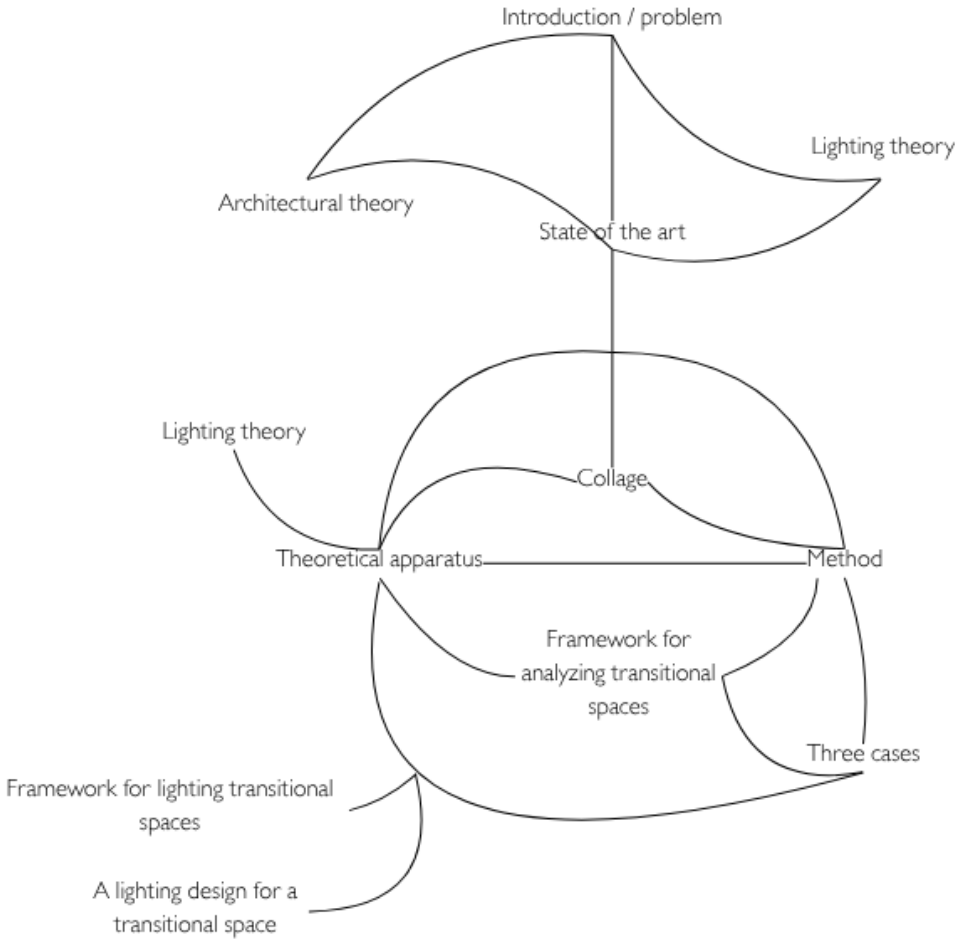


Figure 1: Project overview (Strunge, 2025)

As for reading the thesis, I first present the reader with the overall concepts which are the basis for this thesis, how the problematics are viewed and how I approach them, in section 2. This leads to a more defined field of inquiry – transitions – and then to a structured review of the concepts as viewed in both architecture and lighting design in section 3.
With the overall concepts defined and their application in this thesis clarified, the methodological approach is presented in section 4, leading us to the research question in section 5. In section 6 architectural theory is combined with different principles of lighting design, culminating in the creation of a framework for analysis and design of lighting for transitional spaces. In section 7, I apply the framework in an analysis of three different cases, as a means to test and evaluate it. This leads to section 8, where I use the framework to make a redesign for one of the cases. Section 9 discusses the strengths and weaknesses of the framework, with section 10 summarizing and concluding the work.

A GUIDING HAND

In my view, lighting, design, spaces and atmosphere are difficult to disentangle from the eyes that see, the self that experiences. In an attempt at giving the reader a chance to see the examined spaces through my eyes, I have chosen to only present material which I have produced as part of the process of writing this thesis. This means that every image presented is one I have made.
I recognize, however, that some readers may find this approach distracting, disorienting, or simply lacking context. As such, a pamphlet containing images used as inspiration and photos of the examined cases has been attached.

(as Pamphlet)

It is up to each reader to choose to what extent they wish to consult the pamphlet. And I urge you not to refrain from using it.
Embodied contact with the subject, working with analog techniques, has been a central part of my process, and immensely helpful to it. My hope is that the physical act of going back and forth between text and pamphlet will break up the linear lull of scrolling through this thesis, allowing attention to be paid to the act of doing.

2. LET ME SHOW YOU THE WAY

- An Introduction to lighting the city at night

The birth of the concept of a masterplan for a city's light happened in the 1980ies in France. Here, a lighting design studio looked at the whole city and tried to make a strategy for how to light it, as opposed to individual neighborhoods as before. The idea was to not just generate visibility, but create a holistic approach, which further involved thinking about the characteristics of different neighborhoods, architectural heritage buildings and a cohesive and whole image of the city at night. This approach was met with pushback as it was a chaotic process, and as a new field does, lacked vocabulary and well-defined concepts to defend its merits (Narboni, 2016). Now, 40-some years later, it is no longer unusual for cities to have masterplans for their urban lighting, though not all places have followed suit. One city which decided to implement such a plan was Copenhagen, which needed to update the existing lighting and make it more sustainable. So, in 2014, following an extensive analysis of the existing lighting and the urban landscape, the municipality published a lighting masterplan. They write

> The purpose of the Lighting Master Plan for Copenhagen is to describe a holistic and strategic approach to the development of Copenhagen's street and urban lighting. The ambition is to ensure extensive energy savings and create a cohesive, locally anchored and unique lighting image for Copenhagen.
>
> ([authors translation] Citelum et al., 2014, p. 6)

In the masterplan, it is possible to see examples of how they approach lighting a city and how they try to achieve their stated purpose. They separate the city's light into what they call 'basic lighting' and 'accent lighting'. For the basic lighting, roads were classified into different types and paired with lighting and fixtures. This was done to create an overall cohesive experience and ensure consistent visibility on the city's road network. For accent lighting the planners created 6 principles to light for, each with its own focus: Lighting for a *Secure city, Safe city, Alive city, Sustainable city, Active city and Communicating city.* Included in the plan were examples of successful application (Citelum et al., 2014). This was done to create local and unique lighting.
But how can unique lighting coexist with a cohesive lighting image? Are those not by nature opposites, as being unique requires standing out, while cohesiveness is about a continuation of the existing. If the focus is on uniqueness, how does the part play into the whole?

Since cohesiveness is an unexplored concept, I will take my starting point in the concept 'wholeness', which is closely related and more widely discussed. In architecture and in most thought traditions, wholeness is often understood through scale. The wholeness of a piece of furniture is its parts, as the furniture in a room creates the wholeness of it, with the rooms

creating the wholeness of the house, houses the neighborhood, neighborhoods the wholeness of the city and so on. This mode of thinking is built upon the idea of well-defined boundaries. Architect Thomas Ryborg Jørgensen challenges this point of view and poses the question:

> Is it simply about creating a physical gestalt, the outer boundaries of which can frame and hold a plurality of materials, parts, and aspects together, or can the wholeness's unifying ability also consist in something else? Something, that perhaps cannot be maintained in a form, but perhaps to a greater extent act as a force, examined as a problem, unfolds as a story, a discussion, a system, an ecology etc. which is more difficult to "fence in" as a clearly identifiable physical figure?
>
> ([authors translation] Jørgensen, 2023, p. 242)

As Jørgensen alludes to: Perhaps the whole is not comprised of the parts alone, but also of their interplay, both whole and parts changed by each other. Different theoreticians and philosophers have dabbled with the idea of wholeness beside Jørgensen, often utilizing allegories as a tool to grasp the concept, as seen for instance in Peter Sloterdijk's 'Foam theory'. Clusters of bubbles, or parts, in varied sizes, constitute and create the foam, but are also units in and of themselves in a porous relationship, always affecting each other. Another picturable metaphor of the concept of wholeness is the 'Rhizome theory' by Gilles Deleuze and Félix Guattari, borrowing their imagery from nature, with the rhizome – a flat root network. Instead of focusing on the individual spaces as in the foam theory, the focus here is on the connecting routes between. The rhizome has no beginning and no end, it is always in between (Jørgensen, 2023). These two concepts of wholeness are simultaneously opposite and complimentary. Looking at wholeness this way opens up the possibility to unite the concept for cohesiveness and uniqueness, exemplified in Jørgensens continuing explanation of his understanding of the concept:

> Wholes are also parts of larger wholes, which means that a whole can simultaneously be both a whole and a part. Each level of wholeness therefore has consequences for other levels, and for this reason the concept of wholeness should not be understood merely as a concept of singular entities (one piece of furniture, one room, one building, etc.), but must also be understood as a transversal network concept, which is not only concerned with consolidating individual wholes, but also with establishing relationships between different levels of wholeness.
>
> ([authors translation] Jørgensen, 2023, p. 242)

In this conceptualization, wholeness is understood as parts and wholes weaving in and out of each other, making and being made by each other, through the relationships that are created between them. Cohesiveness comes into play through the relations between the parts and wholes, each viewed as equals. As Strauven puts it:

> All viewpoints are equivalent; every place is entitled to be regarded as a center. But far from being a chaos of unrelated fragments this polycentric reality has a complex coherence in which things, though autonomous, are linked through purely reciprocal relations; a coherence in which these relations are as important as the things themselves.
>
> (Strauven, 2007, p. 4)

Architect Robert Venturi's work in his practice with what he also titled one of his books; 'Complexity and contradiction'. Through these concepts he attempted to reconcile parts and wholeness, in an effort to create a cohesive city, architecture, and show how a wholeness approach can be put into practice. He says on the matter:

> (…) the degree of wholeness can vary. Parts can be more or less whole in themselves, or, to put it in another way, in greater or lesser degree they can be fragments of a greater whole. Properties of the part can be more or less articulated; properties of the whole can be more or less accented. In the complex compositions, a special obligation toward the whole encourages the fragmented part or, as Trystan Edwards calls it, the term, "inflection."
> Inflection in architecture is the way in which the whole is implied by exploiting the nature of the individual parts, rather than their position or number. By inflecting towards something outside themselves, the parts contain their own linkage: inflected parts are more integral with the whole then are *un*inflected parts. Inflection is a means of distinguishing diverse parts while implying continuity.
>
> (Venturi, 1977, pp. 88–90)

Such a goal is accomplished is done through a both-and approach, done through contradictions and ambiguity when relating parts and the whole, and the architecture being double-functioning (Venturi, 1977), in opposition to the modernist tendencies.

The architecture in and of itself has a significant impact on how we understand the city in relation to experiencing it as a whole and cohesive place but without it becoming sterile and deprived of character. Lighting designer and artist Christa van Santen points to the importance of daylight in this regard and explains how "*We also want to benefit from these daytime qualities and characteristics in the evening: the identification of buildings, the view into side streets, the cohesion of the whole."* (Santen, 2006, p. 10). She expands on that thought:

> In spite of the architectural differences, during the daytime we experience the city as a whole, because the daylight that is present throughout the city unites it in a natural way. The light in the city at night is determined by all kinds of factors. Many of these are incidental: light emission from shop displays, lighting on terraces, light from cafes, restaurants, houses and other buildings, light from the traffic. It's quite a tall order to achieve a sense of unity at night, so that the layout and structure of the city is still clear and

> recognizable in spite of all the incidental factors. To do this, it is necessary to bring all the light into harmony, as far as possible.
>
> (Santen, 2006, p. 26)

Here she points to the underlying problematic of the separate parts, which on one hand create uniqueness, but which can easily become an overwhelming tangle of impressions. Her solution is an overall cohesive lighting landscape.

This approach also poses a set of problems: *"Recently, geographers have warned of the potentially homogenizing and sensorially sterilizing effects of contemporary lighting practices (...)"* (Ebbensgaard & Edensor, 2021, p. 2). As experienced by cultural geographers C. L. Ebbensgaard and Tim Edensor *"(...) move[*ing*] through the nocturnal city, our perceptive registers constantly adjust to shifting, contrasting, and overlapping lighting regimes and the insurgent contingencies of temporary and transient illuminations."* (Ebbensgaard & Edensor, 2021, p. 4).

To reconcile all of these challenges – creating unique lighting while maintaining cohesiveness, avoiding overwhelming the senses, working within the existing lighting regimes – I propose taking a deeper look into the world of transitions. As lighting designer Lou Michel puts it: *"Good transitions (...) become important to avoid monotony along a sequences of spaces, and they are generic to the creation of spatial aesthetics."* (Michel, 1995, p. 227). And within the world of transitions, lighting has a strong complimentary role to play as a facilitator since:

> (…) the illuminated area is never a closed system isolated from its surroundings, but on the contrary – it exists in a direct physical or visual relationship with it. Furthermore, depending on its location, it relates to the surrounding space in an individual manner.
>
> (Lis et al., 2024, p. 3)

Focusing on the transitional aspect of lighting between different lighting regimes can calm the chaotic experience of walking through many different lighting designs, preserve unique lighting, and giving an overall cohesive feeling of the city at night, by relating parts and wholeness to each other.

However, this aspect of lighting design - utilizing lighting to facilitate transition from one space to another - is underexplored in the literature. Rather, transitional lighting often mentioned but rarely examined more deeply. As lighting designer Daria Casciani points out *"(...) few lighting designer have described their lighting design practice into a formal knowledge, contributing to the creation of basic principles different from the ones of lighting engineering (...)"* (Casciani, 2020, p. 120). Santen point out that: *"The transition from the well-lit street to the park must not be abrupt as far as light is concerned, but naturally tuned to the adaptation of the human eye."* (Santen, 2006, p. 62) with Michel recognizing the important of connecting space with light as *"Space need to be connected in such a way as to facilitate a pleasant transition between them, which*

depends on the brightness levels of what precedes and what follows." (Michel, 1995, p. 168). Casciani further notes the importance of the relation of the brightness between two area in facilitating a pleasant transition with *"High contrasts between two contiguous areas confound the understanding of the space because the eyes start to "bounce" among the twos with an unpleasant effect. A lower lighting level that fills the spots is considered more comfortable."* (Casciani, 2020, p. 30). These important observations indicate a want and need for a formal approach to lighting transitional spaces.

But what is a transitional space, where does it start, how does it end and what is it made of, and how does light fit into the picture?

THE TRANSITIONAL SPACE AND LIGHT

Architectural space is defined by its boundaries, which delimits spaces. The transitional space is interrupting those boundaries and facilitates movement from one space to another (Boettger, 2014; Michel, 1995). Architect Till Boettger who examines a subset of the transitional space – the threshold – defines it as:

> (…) openings in boundaries that constitute an invitation to cross. They are a preface to a space and create not only the transition but also the space itself. In terms of defining space, thresholds are both boundary and transition. That means they thrive on the ambiguity of both (…)
>
> (Boettger, 2014, p. 47)

According to Boettger a *""Threshold space" is a compound term. The "threshold" part refers to the transition from one space to another."* (Boettger, 2014, p. 49), from that it can be extrapolate to also applicable to the general term of transition. From his vast investigation of the threshold space in literature fiction, the arts, and historical architectural examples, he has defined three main criteria to describe and define it:

> • A threshold space defines the opening of spatial delimiters during the act of crossing them.
>
> • A threshold space is a transition that separates spaces from and connects them to one another.
>
> • Threshold spaces are transitional spaces that provide a spatial preface to the functional spaces that follow.
>
> (Boettger, 2014, p. 49)

All at the same time, a transitional space separates and connects, is its own unique space, a continuation of the previous and an expectation of the next. Boundaries creating space can take many different forms. They can be the clear delimitation of space, a creation of an inside and outside of that

particular boundary; They can exist as a transparent boundary, with glass which alludes to the other side, without providing access; Then there is the invisible boundary, which has a lot of cultural determinations (Boettger, 2014). Jørgensen gives a more philosophical take on the boundaries related to defining a wholeness:

> If it makes sense at all to try to develop a boundary definition for such an extended overall understanding, this is in any case more principled than concretely registerable. The boundary cannot be concretely identified, and we probably cannot get much closer to a definition, other than that the outer boundary of the extended whole – no matter how complex, frayed, porous and changeable this may be – lies where the work's "effects" cease and something else takes over.
>
> ([authors translation] Jørgensen, 2023, p. 251)

As *"Materials and lighting play a decisive role in forming pathways in a threshold space."* (Boettger, 2014, p. 50), it seems that these two components can also help define (materials) and facilitate (light) transitions in the urban nightscape. And as:

> Light is a threshold in itself, and it makes its own thresholds. You can step into the light coming through a doorway before you actually step across the threshold of the doorway itself. And with light comes other things: color, warmth, perfume, even a sense of euphoria.
>
> (Unwin, 2007, p. 130)

As light creates atmospheres and moods, it can show the way or hide it through its absence. As such, light must be understood as a facilitator for connecting parts and wholeness, in addition to contributing to the creation of both.

(Pamphlet page 1)

3. STATE OF THE ART

- A Walkthrough

To get closer to an understanding and definition of the transitional space, the concept of transitions will be examined in this state of the art. The section is structured around a categorization of the approaches different authors take in examining the transitional space. This includes architectural approaches and lighting design approaches.

IN ARCHITECTURE transitions have been examined in different scales. From between regions, to cities, between houses and the component within it.

Carsten Juel-Christiansen explores in his book 'Overgang: rum i den spredte by' (Transitions: space in the dispersed city) (1999), spatial transitions in three different orders of magnitude. He points out that the architectural field's increasing interest in transitions stems from changes in the relationship to wholeness in the modern era.

> In these changes, relationships are at stake, that previously had an established connection. This applies to the relationship between body and place, the relationship between individual and community, and the relationship between repetition and difference.
>
> (Juel-Christiansen, 1999, p. 30)

The changes are due to the *globalizing* tendencies which influence the *collective space*. *Individualizing* which the *middle ground of the space* reacts to and *simulation* which the *edge of the space* reacts to. He understands the spaces through polarities in a vector formation.

The collective space's defining characteristics are:

accessible
private public
inaccessible

It is expressed through scale and an integration of these, of local and global interests. In practice, this could take shape as a double use of surfaces.

The middle ground of the space's defining characteristics are:

collective
local global
individually

It is expressed by making the individual world part of the world of others. In practice, this could take shape as a fusion between the layers of space.

The edge of the space's defining characteristics are:

no place
the blind spot the development perspective
place

It is expressed through making room for those things which have no room. In practice, this could take shape as a shifting of the horizon.

He then has three different architects explore his theoretical apparatus through the conceptualization of an architectural design. They are able to blend the different polarities in their conceptual designs, anchoring them in the space (Juel-Christiansen, 1999).

Aldo van Eyck (1918-1999) was a Dutch architect and member of the Team Ten, a postwar generation group who put themselves in opposition to the prewar functionalistic tendencies. Instead, their focus was on what they called a humanist architecture which among other things focused on being site specific in their practice and build for community. In order to develop his practice van Eyck took inspiration from many sides, with both artists and writers influencing his work. In particular, the Marxist sociologist and philosopher Henri Lefebvre and theologian and philosopher Martin Buber had an impact. He describes his design philosophy of the in-between, a term he borrowed from Buber, as:

> A house like city and a city like house should, I think, be thought of as a configuration of intermediary places clearly defined. This does not imply continual transition or endless postponement with respect to place and occasion. On the contrary, it implies a break away from the contemporary concept (call it sickness) of spatial continuity and the tendency to erase every articulation between space, i.e. between outside and inside, between one space and another. Instead I suggest articulation of transition by means of defined in-between places which induce simultaneous awareness of what is significant on either side. An in-between place in this sense provides the common ground where conflicting polarities can again become twin phenomena.
>
> (Eyck, 2008, p. 63)

In practice this means that when meeting polarities in spaces i.e. inside/outside or private/public, an in-between space should be designed, where the spaces meet where both the polarities can exist and smooth the transition between them (Eyck, 2008; Lefaivre & Tzonis, 1999; Strauven, 2007).

Till Boettger examines in his book 'Threshold' (2014), what he calls the threshold space. His spatial understanding comes from Jürgen Joedicke and his concept of between-ness.

> Joedicke's understanding of architectural space as one in which humans can move in exact between-ness. Humans move between space defining elements. They open their spheres of perception, which are created, together with the spatial bodies, by the architectural space.
>
> (Boettger, 2014, p. 19)

Boettger maps out the historic use of the threshold as a transitional space, including ancient Greece, the gothic period and traditional Japanese homes. Furthermore, he is looking at how transition has been examined by the arts, through paintings, literature, and installation art. From this, he establishes an analytical and design framework to analyze and design threshold spaces. In all, according to Boettger, the transitional zone crates spatial ambivalence and prepares the user for what is to come, and these experiences can very much be designed (Boettger, 2014).

IN LIGHTING DESIGN no theorist has specifically zoomed in on transitional spaces and the impact of light on them. Instead, the movement through spaces and how the lighting affects the experience has been studied, as well as how high contrast between adjacent spaces impacts the visual perception.

Tim Edensor explores, among other things, darkness and movement in his book 'From Light to Dark' (2017). He conducts a light walk (The straightforward approach of walking through the city scape, reporting through thick description of the feelings and thoughts evoked in the researcher) through a dark sky park, noting how the other senses become more prevalent in experiencing the landscape. Moreover, he points out how often his eyes have to adapt to the shifting levels of light nature allows and provides. In contrast, during a different exploration, titled 'Speed of Light', personal light (headlamps) were introduced leading to a shifted focus from the feeling of the space unfolding while walking through it, to the feet of the participants, illuminated by the light cones (Edensor, 2017).

Sara Pink and Shanti Sumartojo have participants perform a light walk through their normal route from work to home. They ask the participants to document the automated lights on their way and later interview them about it. Here, emotions and feelings get connected to the different light in the examination of how light shapes the experience of the urban landscape. Different light meant different thing to the participants – safety, beauty, ugliness, chaos, order, home – but most of all the exercise made the participants aware of the light, which usually they did not notice in their day to day life (Sumartojo & Pink, 2018).

Casper Ebbensgaard and Tim Edensor examine through their own light walk in London, how light facilitates the experience of urban change and power. They focus on the edges of different lighting schemes and how they blend or disrupt the existing lighting. They experience how even the most carefully designed lighting schemes inevitably get affected by the constant

chancing of the city and the dominant powers insertion of their ideology through aesthetics (Ebbensgaard & Edensor, 2021).

Mette Hvass and Ellen Hansen's focus is on visibility and connectedness to the surroundings – spatial and social – through balanced brightness levels. They conduct an array of different studies, including a walk-along with participants in a preselected area at nighttime. Their findings suggest that low contrast between two areas gives the perception of a more harmonious space (Hvass et al., 2021; Hvass & Hansen, 2022).

G. T. McKennan's study concerns the sequel experience of different lighting. Furthermore, whether a mathematical model could predict the users' experience of how dim or bright a new room seems, after being in a previous room with different lighting. Which it could (McKennan, 1981).

Lou Michel in his book 'Light: the shape of space – designing with light and space' (1995) relays all the different aspects of designing space with light. He understands the space as a spatial envelope, which is the volume defined by the delimitation of the space. Regarding transition, he focuses on the biological characteristics of the retina and its reaction to sudden changes in brightness-contrast, highlighting the biological need for time to adjust to a new level of lighting. To accommodate this, he suggests a transitional zone between the inside and outside to mitigate the sudden change in brightness which often accompanies moving between the spaces. This can be done by focusing on the interspatial brightness-contrast. This refers to the appearance of an adjacent space, its objects and how bright it seems, when the two spaces are lit differently. He has come up with two rules of thumbs, to address the problematic:

> Any increase of illumination in the room of the observer will darken the appearance of an adjacent space as seen through an opening in a common wall.
>
> Conversely, any decrease of illumination in the room of the observer will brighten the appearance of surfaces in an adjoining room.
>
> (Michel, 1995, p. 208)

Mohamed Araji, Mohamed Boubekri and Nader Chalfoun investigates light adaptation, specifically when moving from the inside to the bright outside without a transitional area. Via models, different design solutions of transitional zones are tested in terms of their ability to reduce the contrast levels experienced by moving through the space. Here, factors such as time and distance have a great impact on the experience and a solution containing transmittance characteristics were the most successful in creating visual comfort (Araji et al., 2007).

Summary

The state of the art shows that the architectural field has had a rich, rigorous and detailed discourse about designing transitional spaces, connecting adjacent spaces in a smooth transition.
The concept of transition has been examined with its own distinct theorizing, at different scales, with the common thread of designing transitional spaces as both-and spaces full of ambiguity.
Contrary to that, in the field of lighting design, only movement between different lighting has been examined in an urban setting, without such examination being anchored to specific spatial contexts. Whenever a specific space and its light are the object of interest, it is in an indoor context or moving between the outside and inside.
For this reason, the field lacks a dedicated approach to lighting that facilitates nighttime spatial transitions, to act as a counterpart to the architectural discourse that emphasizes the importance of such transitions.
The lack of specific lighting for transitions will create a disjointed nightscape when moving between different lighting regimes, removing the experience of the city even further from its daytime counterpoint. Without a formalized approach to lighting transitional spaces, we will continue to see challenges of such spaces feeling disjointed, forcing the eyes and minds of people moving through them to constantly adapt to new lighting.
Therefore, this thesis will act as a first step in the direction of a formalized approach to lighting transitional spaces, moving the field to be more holistic, rigorous, and evidence based, while still allowing the designer room for creative expression and context specificity.

A LOVED CHILD HAS MANY NAMES

While reading this thesis, the reader may notice how different words will be, and have been, used to describe nearly (and often exactly) the same concept i.e. – transition, threshold, in-between.

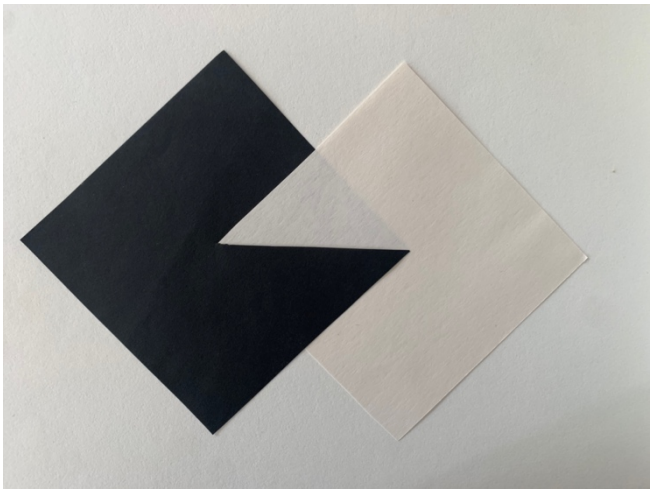


Figure 2: Conceptual collage of all the concepts of transition (Strunge, 2025)

These are all used to understand the specific space where two different spaces meet, overlap, intertwine. There are, however, differences, which I would like to clarify here.

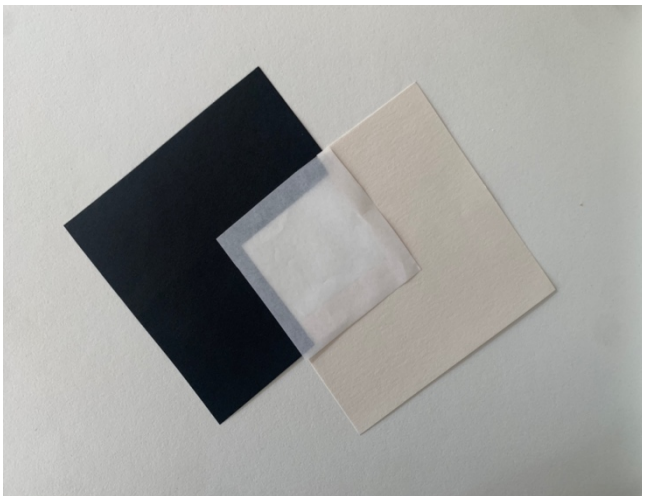


Figure 3: Collage of the concept of threshold (Strunge, 2025)

Threshold is borrowed from Boettger, used when I am drawing on his method, and denotes a focus on the quality of the space itself.

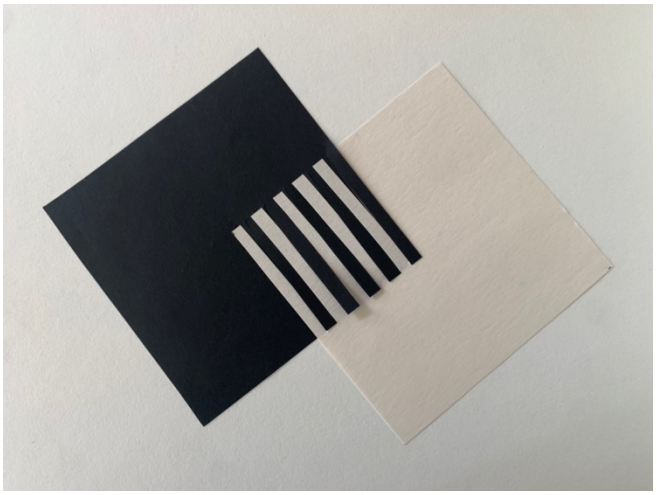


Figure 4: Collage of the concept of in-between (Strunge, 2025)

In-between is borrowed from van Eyck, used when I am drawing on his theories, and denotes a focus on the two spaces meeting and how they are represented in the in-between.

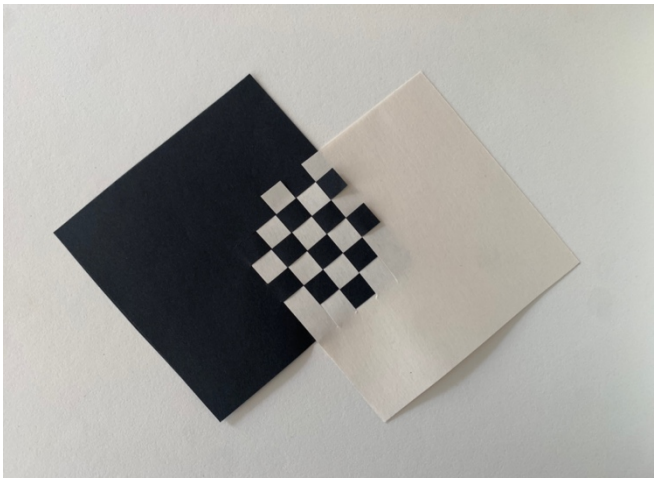


Figure 5: Collage of the concept of transition (Strunge, 2025)

Transitional space is my own preferred term, used most generally throughout, and brings into focus the importance of the transitional space facilitating a transition between the adjacent spaces, both through its situating in their context and through its own unique qualities.

4. CREATING THE WAY

- The Methodological framework

The methodological framework of this thesis rests upon two main pillars. One is an already established method for analyzing and designing architectural transitional spaces – Boettger's threshold space analysis. The other is the use of collages as an analytical and theory/method making tool.

THRESHOLD SPACES – A METHOD FOR ANALYSIS

Boettger presents six parameters for analyzing existing thresholds and designing new ones. These parameters should only be applied to the threshold space and not the entire connected spaces or structures.

In the phase of analysis Boettger only presents the headline of the parameters and only elaborates on the polarities they contain as a tool for the design phase. However, I will in this text present the parameters with their polarities, as I also see these as a useful tool for the analysis itself. The six parameters with their polarities are:

Delimitation: open — closed
Sequence: freely selectable — guided
Geometry: free — ordered
Topography: independent — embedded
Materiality: neutral — distinctive
Furnishings: unobtrusive — self-contained

Delimitation refers to the structure which constitutes the space. The walls or the lack thereof, which define the space and frame it as one. A space can be delimited to be more open or closed in the structure.
Sequence is connected to how the space facilitates movement through it. Is the path freely selectable for the user or are they being guided through it on a predetermined path?
Geometry examines the geometrical forms of the space and the proportions of these. Furthermore, this parameter also touches upon the relation to its locality. Is it considered its own space or part of another and how is it related to its surroundings? The geometry and forms of a space can be more ordered or the space can contain a freer geometry.
Topography is how the threshold is positioned in relation to the architecture to which it is connected. It can be an independent structure with its own delimitation or embedded in the bigger architectural picture.
Materiality of the space refers to the usage of materials. Are they different and more unique compared to the rest of the structure or the same kind of materials in both spaces? It can be either neutral or distinctive in relation to the architecture it is part of.

Furnishings refer to the objects or things occupying the space. These can be unobtrusive embedded in the existing space-defining components or self-contained and be space-defining in that capacity.

Using Boettger's parameters for analyzing and subsequently designing, the polarities of each parameter should not necessarily be understood as either-or. For instance, a space can both have a freely selectable sequence and a guided one, just as well as it can have only one or the other. Furthermore, the different parameters are not sharply isolated, as one can affect the other, e.g., the geometry affecting the sequence of a path. The parameters and their polarities are points of interest to be noted and investigated for a structured analysis, but never overruling the totality and experience of the space.

Movement through a threshold

As the threshold is defined by the connection and/or overlap of two adjacent spaces, the movement through it is furthermore a characterizing feature of the threshold.

> Both entering a space and leaving a space are key moments in experiencing spaces. Threshold spaces are perceived in terms of accelerated or decelerated movement.
>
> (Boettger, 2014, p. 49)

Boettger points out how the experience of the threshold space is dependent on the sequence or the order the space is being experienced in. To explore this, he devises seven points of departure of moving to, in and out, of the space, which are:

Recognition of the threshold as an entrance.
Approach is determined, and the direction and path are chosen, often guided by the visibility of the threshold.
Reaching often happens without the user noticing the change in the space, or that they have arrived. Instead it is an intuitive experience of arrival.
Arrival is often accompanied with a shift in the materials or slowing down the user in their path.
Orientation and Information is something the user experiences in getting a thorough overview of the spatial situation.
Monitoring refers to access control like video cameras which often are located in the threshold space and can act as another threshold as you move past the surveillance – however, this aspect will not be included, as no surveillance is present in the chosen cases.
Exit of the threshold space are often experienced as an entrance into a new spatial experience. Although there are many similarities, arriving and departing is not the same.

COLLAGE

> The word-bound concept is always inadequate to the torrent of life. Hence it is only the image-making or figurative word that can invest things with expression and at the same time bathe them in the luminosity of ideas: idea and thing are united in the image.
>
> ([Huizinga] Fabrizi, 2019, p. 8)

The second pillar of my methodological framework is the collage. As an art, the collage draws back to 1912 with cubism as its primary source. As an artifact, the collage is comprised of fragments, cut from its original meaning, and placed in a new composition to then bring a new meaning collectively. Within the architectural tradition, the method explores spatial and sensory perceptions and can additionally be used to investigate social issues, and the architect's role in society. The method values process over product, where exploration, and trying new ideas and techniques, are viewed as having value in and of itself, regardless of whether the end result is successful.
The expression of a collage can take many forms, from analog found materials cut from magazines, paper, paint, and other materials to digitally manipulated works.

> Collage, as it has evolved, brings with it a number of dualities including representational/abstract, gestural/precise, field/figure, surface/depth, and literal/metaphorical, all of which are considered within the methodologies of art and architecture. The variety of methods can be hybridized and tailored to suit the conceptual framework within which a work of architecture (existing or proposed) resides.
>
> (Shields, 2024, pp. 13-14)

As the collage itself is made from fragments and parts, so is the methodology of collages, and its space of opportunities. Both abstraction and the literal can be explored and used in this process. Many architects, including Le Corbusier, Superstudio, Aldo van Eyck, and Eduardo Chillida have used collage in their approach to exploring and designing spaces (Shields, 2024).

In Lighting

In contemporary lighting design, digital media has become a favorite tool.

> Digital media dominate the design process, while new technologies and regulations in the field of lighting design indicate a second approach when facing a design problem. This has led to a focus on the quantitative control of light as opposed to the perception of space.
>
> (Skipetari & Nijhuis, 2012, p. 42)

At the same time, however, there have been numerous calls to approach lighting not exclusively from a regulatory and measurable place, but more from perception, human sensibilities and creativity (Casciani, 2020; Hvass & Hansen, 2021; Martinez & Bordonaro, 2022; Narboni, 2016).

> It is very easy to put forward the argument that lighting design software allows designers to generate realistic models showing the design of the overall space, or to calculate light in a space using specific data. However, we need to consider that lighting design is not only about accurate data or deceptive renderings, but also about original ideas that incorporate space and light in a unique way.
>
> (Skipetari & Nijhuis, 2012, p. 43)

Just as it is important to remember lighting's qualitative sides in the design phase, I find it vitally important to include perceptual exploration and understanding in the analysis of the space and existing lighting. Using the method of collage in the field of lighting design, to investigate the light and space, opens a room of opportunities to explore the unmeasurable through a poetic approach. It is a method for capturing those aspects of perception and spatiality which have such an influence on our experience of light, and which go unaccounted for in a purely quantitative approach.

Application

In this thesis, I use collage in multiple ways: As a way to visually communicate some key theoretical concepts, as a tool for analyzing light and space, and finally as a design tool. Using collage for multiple purposes throughout binds different sections together and creates links and communication between different parts of my work.

As theory making

The collage as an expression method for theory making and thinking is seen in the work of van Eyck:

> [van Eyck] frequently employed collages of texts and images to synthetically formulate his complex thoughts and visions of architecture. This method of representation enabled him to construct sentences which were not definitive statements, but open-ended questions, which welcomed doubt and opened possibilities.
>
> (Fabrizi, 2019, p. 1)

A famous example of this is the collage he did called the ´Otterlo Circles´, in which he was trying to synthetize his complete design methodology of the architect and architecture's role and relation to people. He worked with

found materials, where he collected images in the style of the musée imaginaire (Fabrizi, 2019).

(Pamphlet page 2)

Van Eyck *"(...) aimed at producing a theoretical stance through the technique of the collage."* (Fabrizi, 2019, p. 3). This thesis seeks to add to the theoretical understanding of lighting the transitional space. As such, utilizing the same tools as an architect working with transitions seemed valuable.
As *"(...) images become agents capable of guiding the architect toward the development of a new practice capable of harmoniously synthesizing different traditions."* (Fabrizi, 2019, p. 5), this thesis seeks to unite architectural theory with lighting design theory, putting them together through image, materializing theory through the collages.

As analytical tool

A strong example of analyzing space and spatiality through collages can be seen in the works of architect and artist Eduardo Chillida. Chillida makes spatial investigations through analog paper cuttings and drawings. He is particularly interested in the juxtaposition of the solid and void as entities for space-creating, as well as the question of what delimits space, and the concept of spatial overlap (Shields, 2024).

(Pamphlet page 2)

Inspired by Eduardo Chillida's approach, I chose to work primarily with analog techniques, specifically cut paper, as a means of analyzing the space. This approach to visualizing spatial forms and lighting aligns closely with my sensibilities, skills, and aesthetic preferences.

The images/visualizations do not aim to be a faithful rendering of the transitional space, but rather an exploration of the space, similar to notation drawings. Here it is important to note that *"A good notation drawing is not necessarily one which aims at representing the object in photographic detail or 'faithful likeness'"* (Steinø, 2018, p. 131). Rather, the most essential aspect of this technique is communicating a sense of the place and the author's interpretation and focus within it. By stripping down the space and its light to a stylized version, it is possible to focus on the essential elements that make up the space: *"In reality, a drawing becomes architectural the moment it is treated as such: the moment it is engaged with as a map of an architectural construction to be*." (Bertram, 2014, p. 13). If you treat it as a road map for understanding, it will become one. The collages *"(...) forces you to engage with the subject, rather than simply press the camera shutter"* (Steinø, 2018, p. 131). This furthermore allows a focus on the tactile and 'knowledge of the hand' experience in the examination.

While collage can serve to give a sense of place and stylize the essentials, it falls short when attempting to convey an important aspect of light and

space: Movement. The experience of moving through a space and seeing it change and shift is simply not captured in the sparse and static collage images. To remedy this, both as a communicative tool and as a tool for structuring my own experience of the movement through the spaces, I have chosen to create a digital photomontage.
In many ways, photomontage is a sister art of collages. This technic also involves the cutting and merging of materials to create a new image, however its source is only photographs. The technic was claimed by both Dada artist and Russian avant-garde artist in the early 1900's.

An instructive example of utilizing photomontage to explore space is architect and artist Gordon Matta-Clark: *"*[Matta-Clark] *addresses the human experience of space that lies outside what can be measured or quantified."*(Shields, 2024, p. 152). By merging photos of the same place but from different viewpoints, he creates a new whole of the fragmented, while focusing on the human scale as it becomes scaleless. He was interested in the ambiguity of the structure and often took abandoned buildings as his subject.

(Pamphlet page 2)

This led to a further point in his work, which was the act of documentation itself, as the buildings he photographed often got demolished soon after he had been there (Shields, 2024). In this way, the act of documenting itself becomes pivotal to the work, similar to how my choices of photos construct the viewer's experience of moving through the space, separate from walking through it themselves.

My approach to conveying the movement through the transitional spaces analyzed will be in line with Matta-Clark's work. However, instead of an analog cut and merge technique, I have chosen to do so digitally, since the photos already needed digital altering from color to black and white.

In this thesis, the photomontage replaces the use of luminance maps, presenting the contrast of lighting in the space through a more holistic, sensory-driven approach. It seeks to integrate aesthetics, atmosphere, and spatial experience, while still conveying the qualities of light and contrast that a luminance map would traditionally depict.
I will combine the photomontage technique with Boettger's six points of departure (excluding monitoring), attempting to share an experience of the movement through the transitional space, which is more concrete than an analog collage, but still sharing the space as seen through my eyes. Using a photomontage in this way can also be seen as a counterpoint and/or addition to the practice of the light walk. Instead of the subjective thick descriptions, pictures emphasizing the subjective are used to report my experience.

As design tool

To illustrate the design proposal for a redesign of a transitional space in section 8, I explore a different aspect of the method of collage, this time in a 3-D format, mixing the collage with modelmaking:

> Models can be extraordinarily versatile objects within this process, enabling designers to express thoughts creatively. Architects makes models as a means of exploring and presenting the conception and development of ideas (…)
>
> (Dunn, 2010, p. 6)

The model as a communication and design process tool is a familiar one in the world of architecture. However, in lighting design, the method of representation is more often the sketch drawing, as seen in Skipetari & Nijhuis (2012), or a more artistic/painterly drawing as seen in Lindh (2012). When using a physical 3-D model, it is typical to use an actual light source, as seen in Lindh (2012) or in Hvass, Van Den Wymelenberg, Boring & Hansen (2021). However, these two examples were both done as experiments in a lab, rather than using the model as a design communication tool.

Adding to this, using any analog methods at all is much less typical than the main way light is represented in contemporary lighting design: Digitally, in CAD programmes or new adventures into virtual reality.

However, even in its goal of rendering realistic lighting scenarios, digital renderings often disappoint when the light is actually realized. With the call to move from an overly engineering-focused aproach to a more human and sensing aproach, which is happening in the field of lighting design, I believe collages as a facilitator for this will be beneficial. Moreover, as I use collage as a method for understanding and communicating the transitional spaces in my analysis, it follows naturally to also utilize collage directly in the design process.

Finally, the physical aspects of creating a collage – different densities and shapes of paper – allowed me to materialize the light and quickly explore different ideas while focusing on the poetic nature of light, design, space, and the mediation of thoughts. There is much here for lighting designers to rejoice in.

5. REASEARCH QUESTION

From above sections, exploring the theoretical framework and the methodological structure, I have arrived at the following research question:

> How can lighting be designed for transitional spaces which supports the architecture and creates cohesiveness with existing lighting regimes?

6. TRANSFORMING AND UNITING THEORIES

While a number of lighting designers have pointed out the importance of transitional spaces, the state of the art also shows a distinct lack of a coherent and structured framework for analyzing and designing light in transitional spaces. This section will attempt to construct such a framework, with the remainder of the thesis functioning as a test of the frameworks capacity to first analyze and then design lighting for transitional spaces.

To construct such a framework, I take van Eyck and Boettger's work as a jumping off point, bringing together their focus on broad spatiality and context (van Eyck) and specificity of the structure (Boettger) to complement each other and cover their respective blind spots. Then, I will transpose these ideas into the field of lighting design in dialogue with Descotte's six principles of lighting, as well as contemporary lighting design studies.

IN–BETWEEN SPACE

The in-between space is the overlapping space between two different spaces in opposite polarities. These can be small/big, whole/part, inside/outside and so on. When the polarities meet in the in-between space, they become a twin phenomenon – their true expression – by reconciling the opposite. As such, polarities should not be understood to be detached from each other, but two sides of the same coin. It is thereby important to create a space where the polarities can meet and become a twin phenomenon. Not all spaces that meet, meet in an in-between space, which is why according to van Eyck, that the whole sequence of spaces can feel disjointed.
But how does a space become an in-between space in which polarities can become a twin phenomenon?

From analyzing van Eyck's architecture, writings, and looking to Francis Strauvens categorization of van Eyck's work, Farhady and Nam (2009) have distilled van Eyck's design philosophy into a more comprehensibly methodical approach, which I will use as a guide for my work.

Spaces meeting

Farhady and Nam identify three different ways spaces meet. It is in these meetings that an in-between space will be warranted to facilitate transition. These are:

Contradictory
– Two spaces with strong differences meet, often accompanied by polarities of public/private, natural/man made, and interior/exterior.

Hierarchical
– Two spaces have dissimilar configurative levels, i.e. part/whole, small/big, dark/light.

Similar
– Two spaces of the same type meet, i.e. two interior spaces or two roads.

After the type of meeting between the spaces has been identified, different elements are used to create an in-between space.
For the purposes of creating a framework for analyzing and lighting transitional spaces, I have chosen to exclude *hierarchical* and *similar* spaces and focus solely on *contradictory* spaces. I have made this choice both because contradictory spaces are the most common, and because *hierarchical* and *similar* spaces vary widely and are especially context-specific, undermining the usefulness of a generalized framework in such situations.

However, it is still important for the designer to consider which type of space they are examining, as this is a key indicator for which types of lighting will support the space as a successful in-between. When *similar* spaces meet, their similarity should be factored into the lighting in the in-between. Likewise, the hierarchical relationship should be recognized and incorporated when lighting between *hierarchical* spaces.

Elements in an in-between space

Farhady and Nam identify four different categories of elements used by van Eyck to design an in-between space. These are:

Space
Space relates to the shape, placement, and materials of the physical structures in the in-between space. As the in-between thrives in ambivalence, the spatial features must support this. For instance, through the overlapping of different materials, creating repetition, or fusing elements from the spaces meeting in the in-between.

Environment
Environment encompasses the elements which help create delicacy and ambiguity in the in-between space. This is nature and greenery, light and shadows, colors, and transparency and translucent qualities.

Time
Time refers to the in-between space not being set in a specific time and thereby function, giving the space the opportunity to evolve and have other functionalities than what was originally thought.

Human

This category indicates the human use of the in-between space, which differs from person to person, but also between different kinds of people. Having the space allow different usage imbues the space with ambiguity in keeping with the human elements (Farhady & Nam, 2009).

Most often, the designer focuses their design on the element *space*, as this is the only element fully in their control. However, keeping the other elements in mind when constructing an in-between space can often strengthen the design, allowing it to change and evolve.

How to create a twin phenomenon un the in-between space

Once the type of space has been established and the elements within and surrounding it have been explored, the designer can choose how to utilize these elements in the creation of an in-between space. The goal is to turn polarities between the spaces meeting into a twin phenomenon, creating a seamless flow between them. This can be done through:

A link – Of the two different spaces. Often this entails bringing a part from both of the adjacent spaces into the in-between space, where they then both are present. Expressed in the element space, the porch offers a *link* as the intermediate ground between inside and outside, containing both.

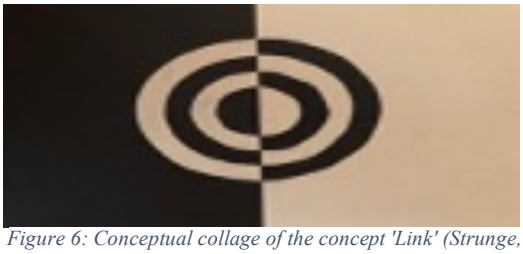


Figure 6: Conceptual collage of the concept 'Link' (Strunge, 2023)

Fusion of patterns – Different patterns fuse, to then give a new form or structure. Expressed in the element space, it could be through a slow transition between wood and stone, where one slowly *fuses with* the other.

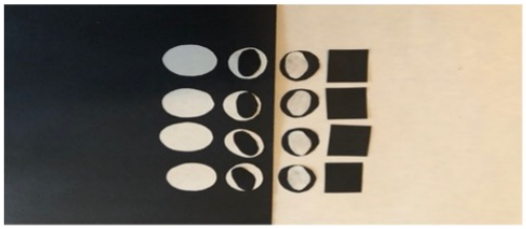


Figure 7: Conceptual collage of the concept 'Fusion of patterns' (Strunge, 2023)

Relating part and whole – In relating part and whole a better understanding of them both is achieved by making them equal. Expressed in the element environment, light is made understandable through darkness and darkness having the same value in the space as the light, *relating the two* (Farhady & Nam, 2009).

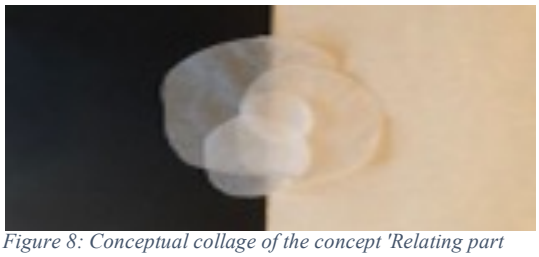


Figure 8: Conceptual collage of the concept 'Relating part and whole' (Strunge, 2023)

Lighting for the in-between

For a transitional space to be successful, it is vital that it is situated well in its context, requiring a structured analysis of the two individual spaces meeting. Van Eyck (and Farhady and Nam) set out a path in architecture, which must be transformed for use in the lighting design field.
I will do so for contradictory spaces meeting and elaborate on the polarities of private/public, nature/man-made and interior/exterior. Each space is different, and many more polarities can exist, each of which should be considered when analyzing and designing a specific transitional space. I have chosen to focus on polarities which are often present in the urban nightscape and create issues in the lighting of many transitional spaces.

Private - Public

(Pamphlet page 3)

Three main elements impact our perception of lighting as either private or public.Firstly, how the light source is placed in relation to the horizon and body, mirroring our experience of the sun and its movements. The lower the light source is to the horizon, i.e., ground, table or other masses creating a horizon or line in the space, the more intimate or private a feeling. On the other hand, the higher up the light source is placed, the more public the space feels. Furthermore, in architectural lighting, the private/public polarity is closely related to a feeling of intimacy on one hand and exposure on the other (Descottes & Ramos, 2011).
Secondly, uniformity and intensity of the lighting impacts our perception. Here non-uniform and dim lighting creates a private feeling, while uniform and bright lighting indicates a public space.
Finally, the CCT influences the feeling of the space, with a warm CCT giving a private feeling of the space and a cold CCT a public feeling (Hvass et al., 2021; Nasar & Bokharaei, 2017).

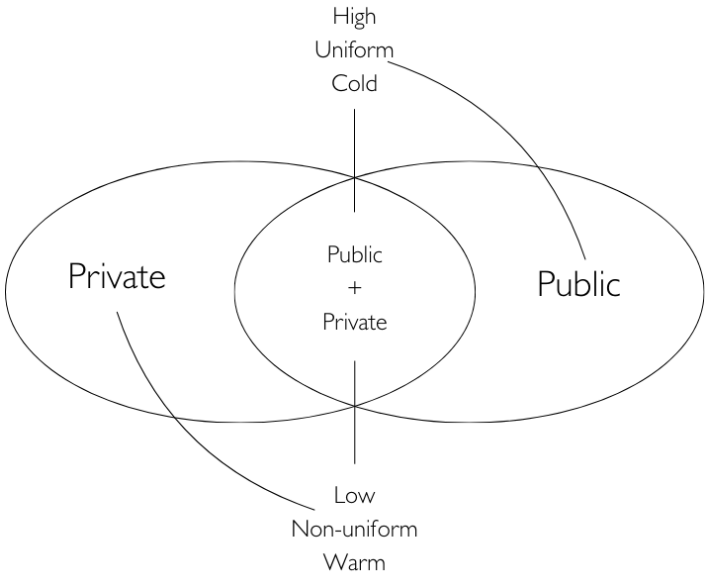


Figure 9: Drawing of the relationship between light and the polarities 'Private – Public' (Strunge, 2025)

Lighting the transitional space and making it a successful in-between space can thus be accomplished by bringing lighting elements of each polarity into the transitional space, creating a twin phenomenon. As an example, placing high fixtures (public space lighting) with a warmer CCT (private space lighting) can function as a *link* between the two spaces.

Nature - Man-made

(Pamphlet page 4)

When walking through the city at night, natural elements are often in the periphery and have a beautifying purpose, while man-made structures often require active focus and contribute to wayfinding. The two – nature and man-made – are cooperating in creating urban legibility as, *"Lighting could influence the urban nocturnal legibility, by visually extending or limiting the space, guiding the eyes across the space due to the luminous contrasts between objects, emphasizing some urban elements and blanking others."* (Casciani, 2020, pp. 29–30).
In lighting nature, ambient lighting should be used, expanding the periphery and giving attention to the beautification aspect of nature. This approach can be achieved with low level of lighting and high distribution and uniformity of light.
To create wayfinding and sharpen focus on specific architectural elements, effect lighting and path lighting are robust approaches. When lighting architectural elements, it is important to create a high luminous contrast between the elements and the background. Without contrast, the lighting risks distorting the understanding of the element in regard to dimensions, size, and placement, creating a disorienting effect rather than guiding.

Human attention is drawn to light, which is the guiding principles of wayfinding. However, if the contrast is too high between two areas, it confuses the mind and eye and makes it harder to orient in the space. Balancing lighting nature as the peripheral component and man-made structures as wayfinding gives visual hierarchy to the space (Casciani, 2020; Kelly, 1952).

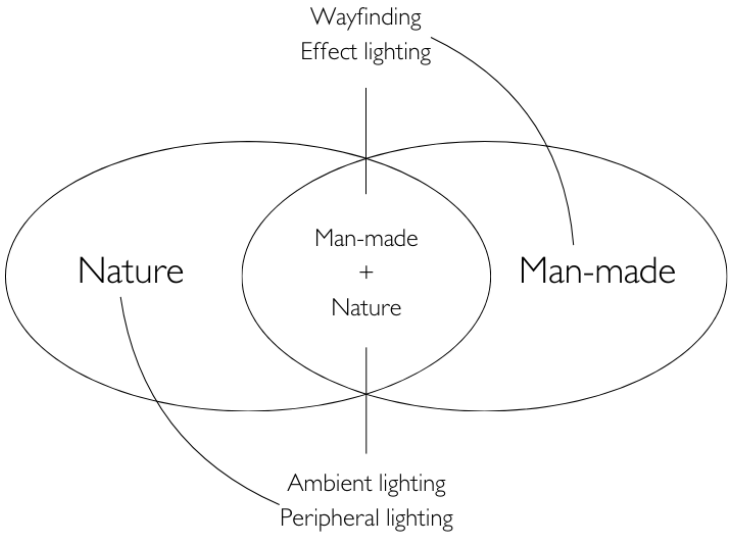


Figure 10:Drawing of the relationship between light and the polarities 'Nature – Man-made' (Strunge, 2025)

An example of creating a twin phenomenon between nature and man-made is *relating part and whole.* Finding architectural objects to light for wayfinding while also illuminating the greenery, connecting the area to itself, its parts, and its whole.

Interior - Exterior

(Pamphlet page 5)

Light is neither static nor disconnected from the people whose lives it illuminates. In certain ways, light is something you do. When inside a home, light often follows the person's movement through the house or the apartment. We turn on the light when entering and off when exiting. It signals presence and creates atmosphere. As such, "*A person is hence not **in** an atmosphere but **part** of an atmosphere, and this partaking connects individuals that may otherwise not feel or seem connected.*" (Bille, 2015, p. 58). The atmosphere is something that cannot be grasped or measured: It is felt and produced, quasi-objective, existing only in the interplay of things, place, and people. Light from the home seeps out, reacting beyond its primary bounds as "(…) *the cultural premises and affective responses of the atmospheres luminosity takes part in shaping, by tying together the 'outside' urban spaces with the 'inside' domesticity in Denmark.*" (Bille, 2015, p. 58). The personal light from windows create a cozy atmosphere, where *"(...) coziness in Denmark implies dimmed, 'warm' lighting dispersed across the room to carve out smaller spaces within spaces around*

which to gather, often (but not always) assisted by candlelight."(Bille, 2015, p. 59). Having and giving access to the light of the home, sensing neighbors through the light, creates community, security, and togetherness (Bille, 2015). When lighting the urban space, and working within the polarities of interior and exterior, it is important to keep in mind the uncontrollable but essential aspect of the home's lighting and its influence on the outside space. This is done by leaving room for it, and not overshadowing it with high intensity uniform streetlighting, balancing the visual hierarchy (Casciani, 2020).
This point can be taken further in regard to the uncontrollable aspects of the urban nightscape. There must be room in the nightscape for traffic lights, car and bike lights, lit up signs and so on, without it overpowering when it is present or completely darkens an area when it is gone, qua its automation and mobile nature (Brandi & Geissmar-Brandi, 2007; Ebbensgaard & Edensor, 2021; Sumartojo & Pink, 2018).

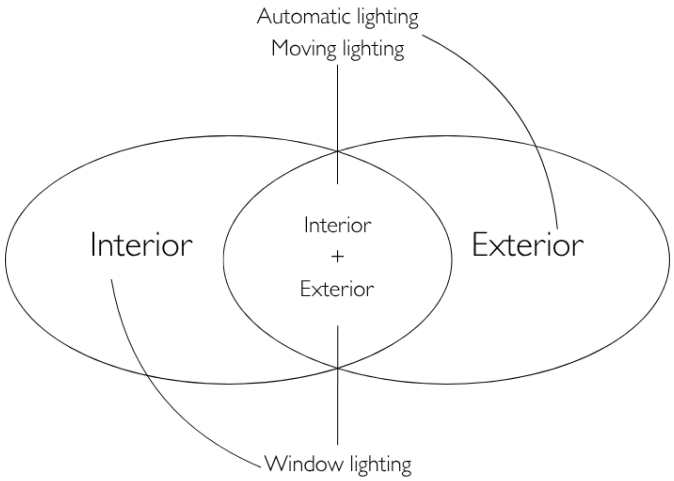


Figure 11: Drawing of the relationship between light and the polarities 'Interior – Exterior' (Strunge, 2025)

This polarity differs from the two other pairings, since it contains the uncontrollable parts of urban lighting, parts where the lighting designer has no control. Given that these light sources are part of the nightscape, they shouldstill factor into the analysis and design process. Creating active focus on the personal and uncontrollable can further ensure that heavily trafficked and alive places do not become overwhelming. Moreover, ensuring lighting designs do not bother residents in the area with excessive lighting, resulting in closed curtains and the loss of connection and community, is central.
Finally, The interior/exterior polarity is closely related to private/public, and the principles for designing light for the interior/exterior and public/private often mirror each other.
An example of creating a twin phenomenon between interior and exterior would be adding an artistic light installation which mimics the manifold patterns coming from windows onto the ground in a *fusion of patterns.* Or, simply, placing lights along the ground with heterogenous distances and levels of illumination, mirroring the interspersed and non-uniform light from different shops.

While van Eyck's in-between space approach supports us in characterizing the two spaces meeting, it lacks the specificity for a rigorous examination of the transitional space itself. Here, Boettger's six principles contribute structure and focus points for analysis as well as design.

As mentioned earlier, Boettger formulates six principles for analyzing and designing threshold spaces, these are:

> Delimitation: open — closed
> Sequence: freely selectable — guided
> Geometry: free — ordered
> Topography: independent — embedded
> Materiality: neutral — distinctive
> Furnishings: unobtrusive — self-contained
>
> (Boettger, 2014, p. 110)

Lighting for the threshold

1) Delimitation: Open – Closed

The delimitation of the space can be supported by focusing on the periphery, which is done by creating *contrast and hierarchy* in the lighting scheme. In a closed or semi closed space the focus should be on the vertical surfaces to create delimitation of the space. By lighting the vertical surfaces, it will enhance the feeling of enclosure, though only by a dim light; a bright light will instead further expand the space. In open spaces without vertical surfaces, inner noticeable lighting zones of the space have the same effect of delimiting the space (Descottes & Ramos, 2011; Lindh, 2012).

2) Sequence: Freely selectable – Guided

The sequence can be supported by the *density of fixtures* which creates *rhythm and movement, space navigation* and *depth perception*, letting you know where to go. Having fixtures close together in a line 'showing the way' gives rhythm to the path and a forward-going movement. The space between them decides the pace; the further apart, the slower it feels. Illuminating a path also signals where the movement should take place, and from where, to where. The sequence of a space can also be enhanced with different temperature of the light, with a warm light being 2700-3000 CCT, are slows down movement and is more cozy, while a white and natural light being 3000-4000, and cold light being 4000-6500, often give energy and movement (Casciani, 2020; Descottes & Ramos, 2011). Equally illuminating the space in a uniform light, will further cement the sequence as being freely selectable.

3) Geometry: Free – Ordered

The geometry can be supported by creating *visibility and reassurance* in the space and helping the user understand the space they are in. Increasing or creating a feeling of spaciousness also creates visibility where a *" (...) brighter surface (...) contribute to a more spacious impression in the direction of the illuminated surface"* (Lindh, 2012, p. 92). This helps define and orient the body in the geometry. The height of fixtures also influences the experience of the space, as the perceived height and size of the space follows the height of the fixtures. In addition, a vertical pattern of fixtures and their light gives the space height, while a horizontal pattern gives width to the space (Descottes & Ramos, 2011; Lindh, 2012). Following the geometry of the space with the lighting enhances it as ordered, while lighting spilling out or changing the feeling of the geometry will reinforce the space as being free.

4) Topography: Independent – Embedded

The topography can be supported by *the direction and distribution* which can further delimit or frame the space, compared to its surroundings.

> Through the direction of light, one can alter the visual structure of a composition in space, guiding the eye to places of heightened contrast and revealing unexpected tensions between flatness and depth, foreground and background, object and architecture.
>
> (Descottes & Ramos, 2011, p. 73)

By creating foreground and background, through the contrast made by different distribution and directions of light, the space can be experienced as part of something else or as its own structure (Descottes & Ramos, 2011).

5) Materiality: Neutral – Distinctive

The materiality can be supported by focusing on the color of the objects in the space through the *color rendering index* (CRI), which represents how well the light represents the material. Fixtures with a CRI between 80-100 are the best to reproduce color to look natural. Another way to support the materiality is through a focus on *luminance*, the reflection of light. Different materials reflect different amounts of light back when lit. Paying attention to the reflectance of materials can influence the level and character of light to support a neutral or distinctive expression (Descottes & Ramos, 2011).

6) Furnishings: Unobtrusive – Self-contained

The furnishing can be supported by the *height of the fixtures* and the *distribution* of the light. This can be done by focusing on the object in the space, framing it with light, making it a point of interest, creating a higher contrast between object and background. The *CCT* and/or color of the light can also help guide the understanding of the objects in the space.
Colored lights mark object as special and noteworthy, while warmer CCT invites people to stop and observe the objects, slowing down the flow of the

space and differentiating it from surrounding spaces (Casciani, 2020; Descottes & Ramos, 2011). If the furnishing or objects are unobtrusive, it can be inferred that the architect or designer likely does not wish for the object to be seen, and thus, lit.

FRAMEWORK – ANALYSIS

The combination of van Eyck's In-between approach and Boettger's Threshold approach, coupled with classic technical lighting design knowledge, thus gives us a complete framework for analyzing the transitional space and subsequently designing light for it.

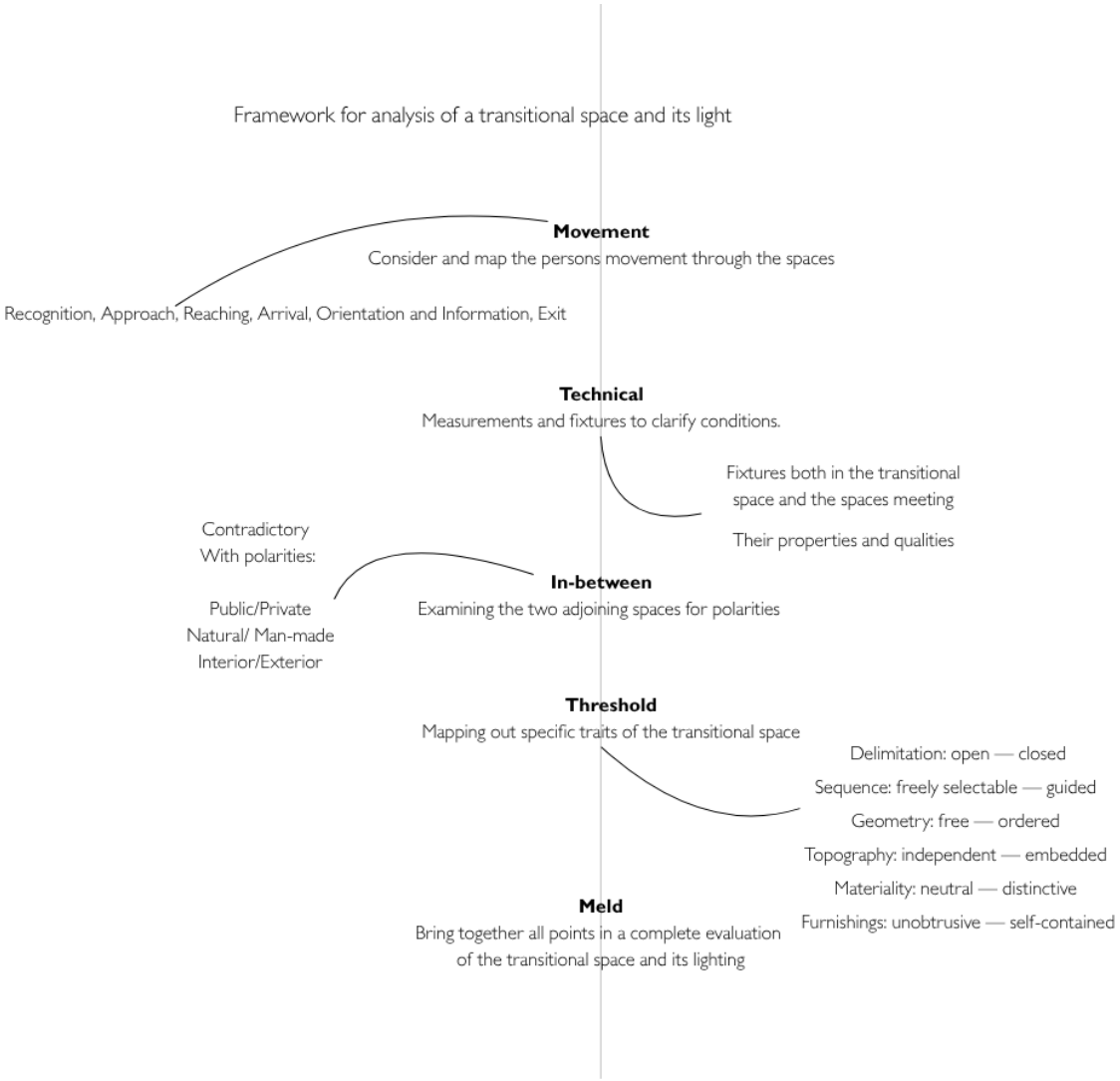


Figure 12: Framework for analysis of a transitional space and its light (Strunge, 2025)

7. EXPLORING CONCEPTS THROUGH REALITY

- A Case study

With a framework created, I now seek to assess its efficacy. I will do so by applying my framework in an analysis of three separate cases of transitional spaces – Bispebjerg Kirkegård, Fisketorvet and Karens Minde Aksen.

(Pamphlet page 6)

I take an instrumental case study approach. The cases in and of themselves are secondary, and are used primarily to say something broader about the subject and theory I am investigating (Bjørner, 2015).

For each case, I first present a short introduction of the space, followed by a photomontage of the movement through the transitional space, serving as the initial visual introduction.

The analysis consists first of a technical analysis of fixtures and lux measurements, then a spatial analysis of the case as an in-between space, and lastly as a threshold space, using collage to underline and specify the different parameters. Each case concludes with a short summary and an evaluation of the strengths and weaknesses of the framework in analyzing the given space.

BISPEBJERG KIRKEGÅRD

(Pamphlet page 7)

Bispebjerg Kirkegård is an old cemetery in the northern part of Copenhagen. It is surrounded by a brick wall, which has a prominent entrance/exit gate and some small side entrances with revolving turnstile gates. In order to create a more engaging urban space, one of the side entrance points was renovated by dividing the wall and moving it back so a piece of the wall is further inside the cemetery. The new urban space is described by its architects VEGA Landskab as a *" (...) hinge between the city and the cemetery.*" ([authors translation] Vega Landskab, n.d.). The space and its lighting were finished in 2022. Lightscapes, the design firm behind the lighting, describes the lighting as being *"(b)ased on darkness"* and say that *"(...) the lighting design guides people between darkness and light with a soft and hidden illumination of the red brick wall.*" ([authors translation] Lightscapes, n.d.).

Both the architecture and the lighting are designed with a specific focus on transition and connection, as the space explicitly seeks to connect the street/neighborhood to the cemetery. However, when in the space at night, it does not seem to be connected to its adjacent spaces. I have chosen it as a case for this reason. Here, designers are purposefully seeking to facilitate transition, with an explicit focus on light, creating a good opportunity to see whether the framework captures their decisions and where it might differ.

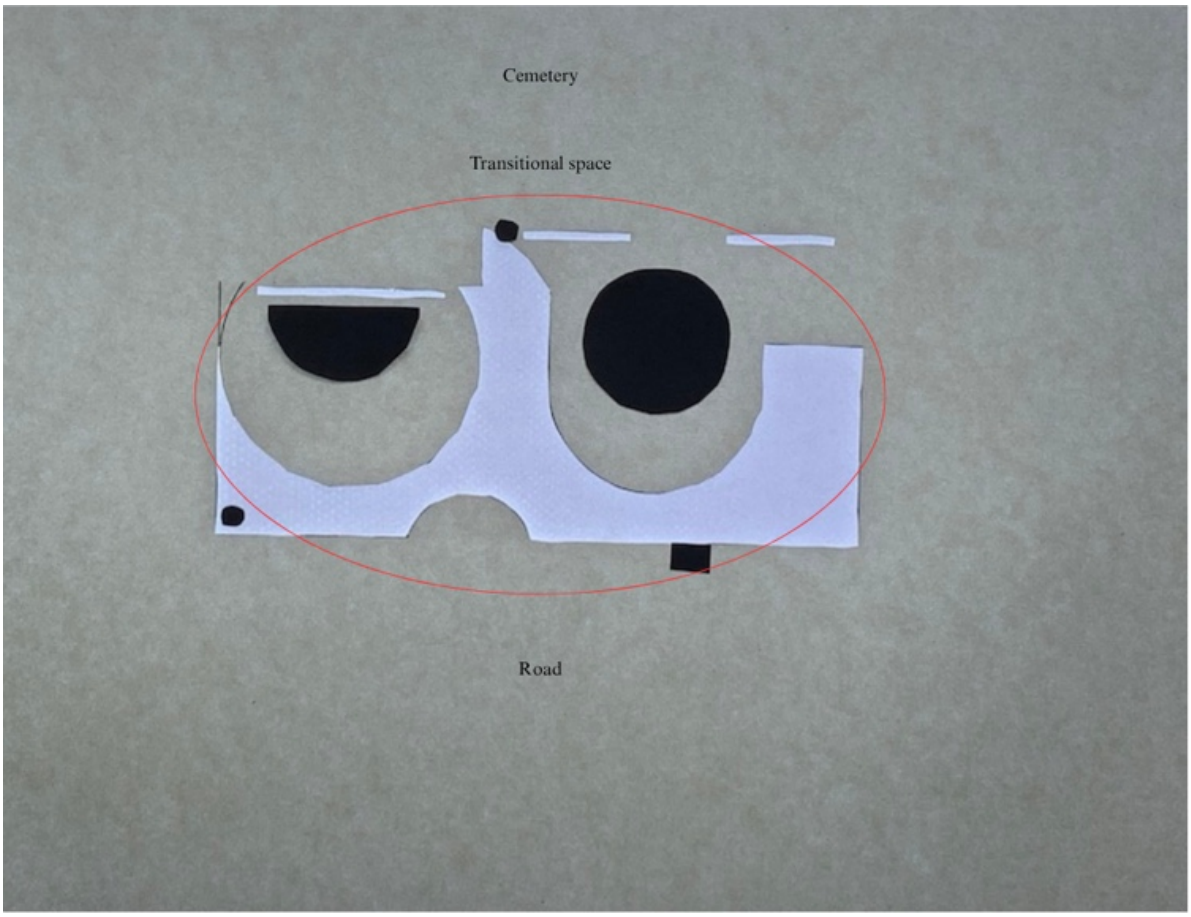
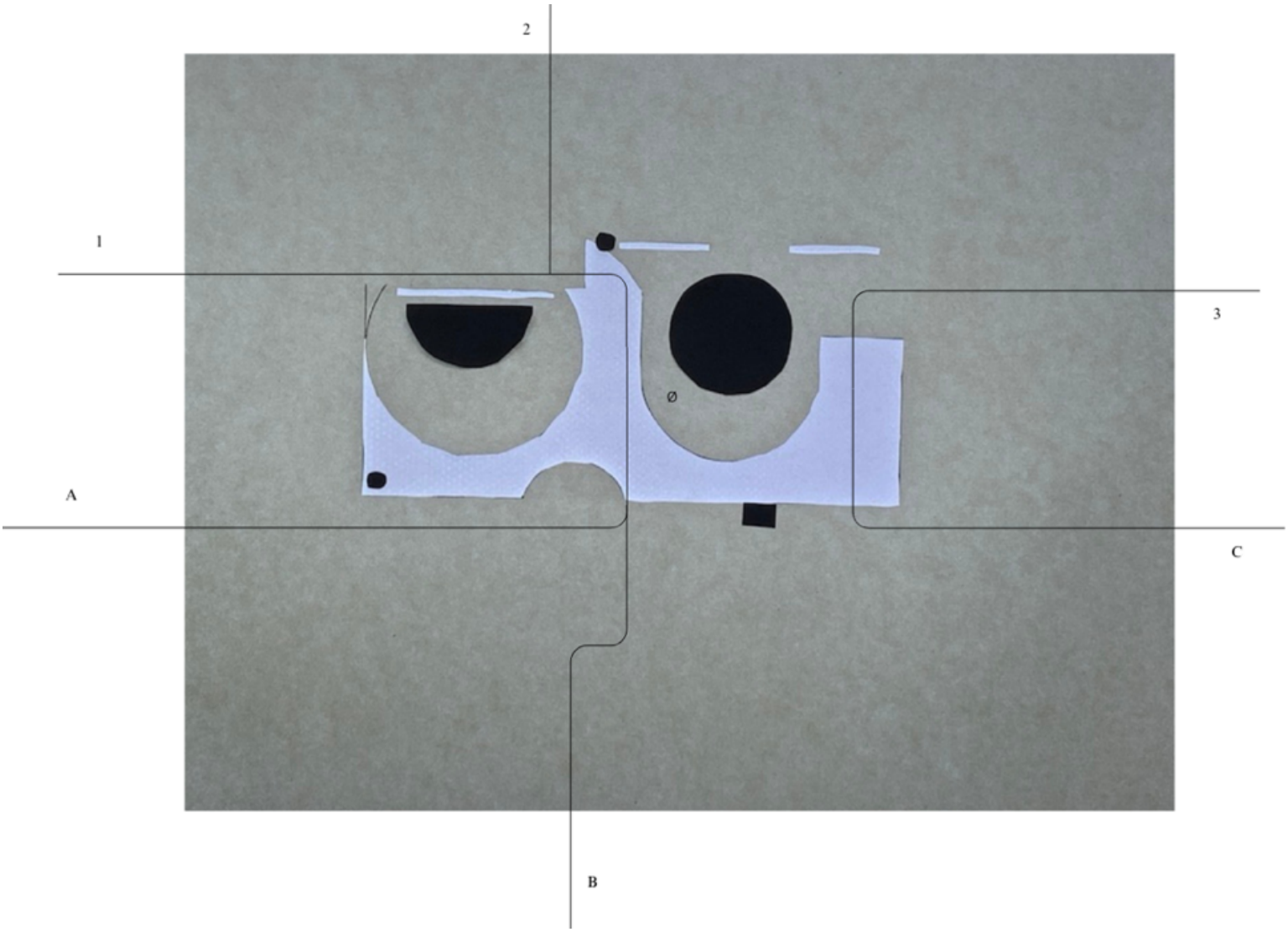


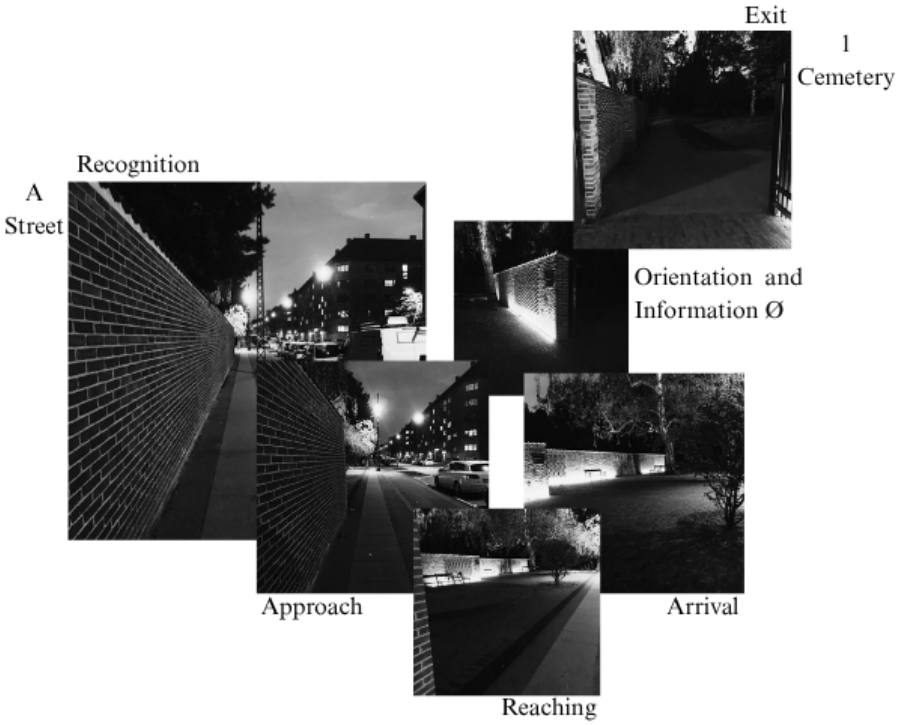
Figure 13: Collage of overview of Bispebjergs transitional space (Strunge, 2025)

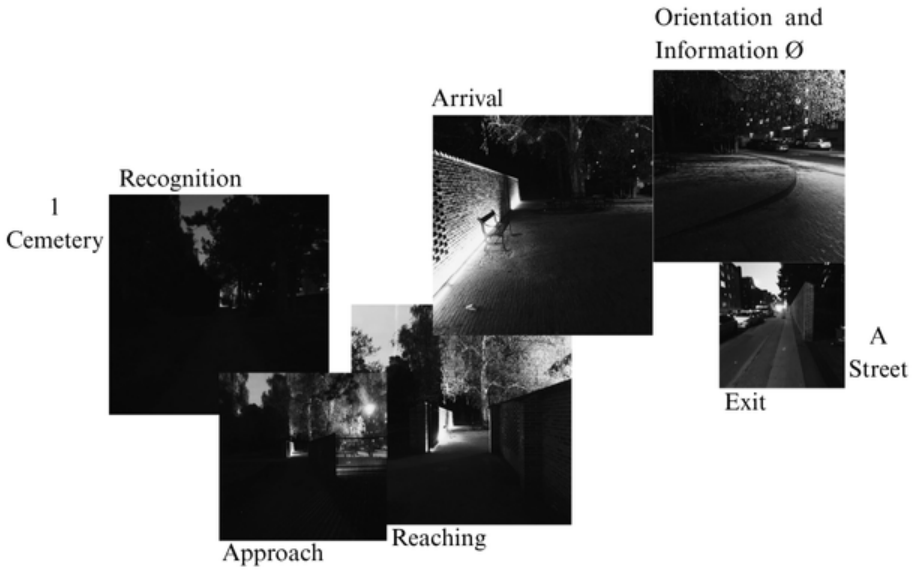
Movement

Since the transitional space has multiple entrance and exit point it offers different experiences entering and exiting the space. Three possible paths have been identified as, from A to 1, B to 2 and C to 3, see map below.There are many other possible paths than the three depicted here.



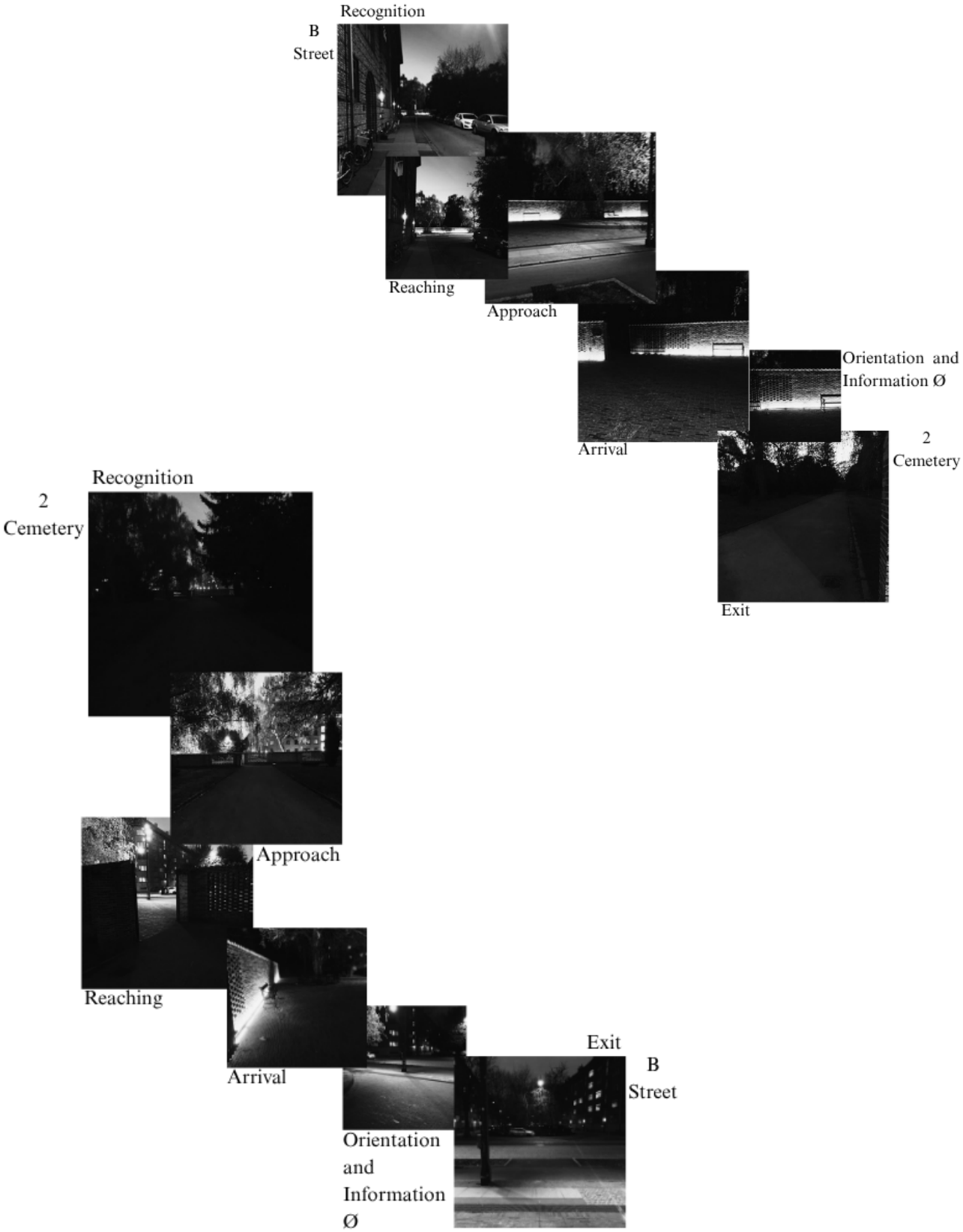
Map 1: Routes taken through the transitional space (Strunge, 2025)





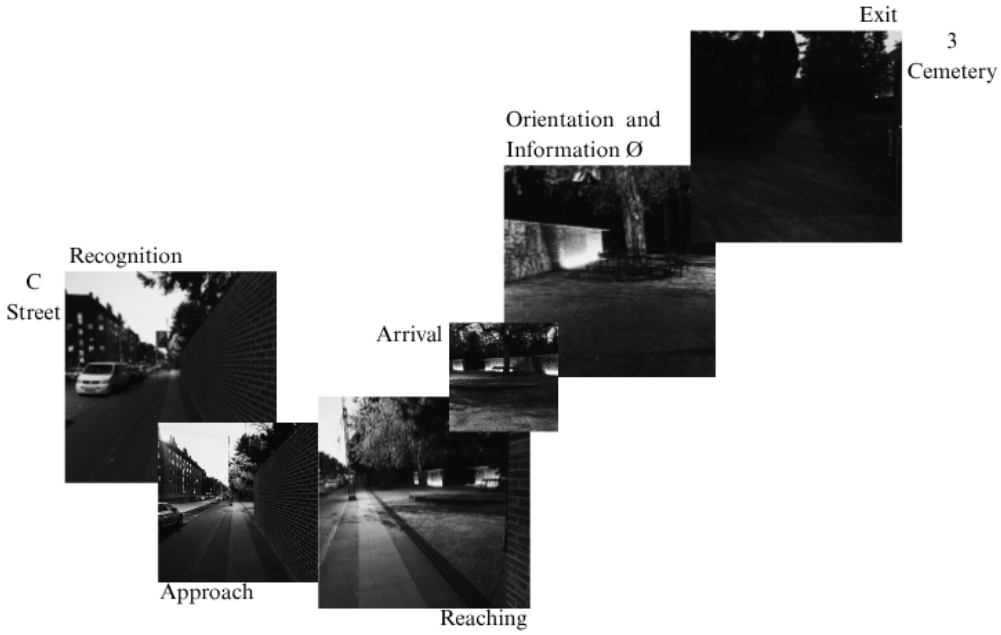
Photomontage 2: Top – Bispebjerg route A – 1 (Strunge, 2025)

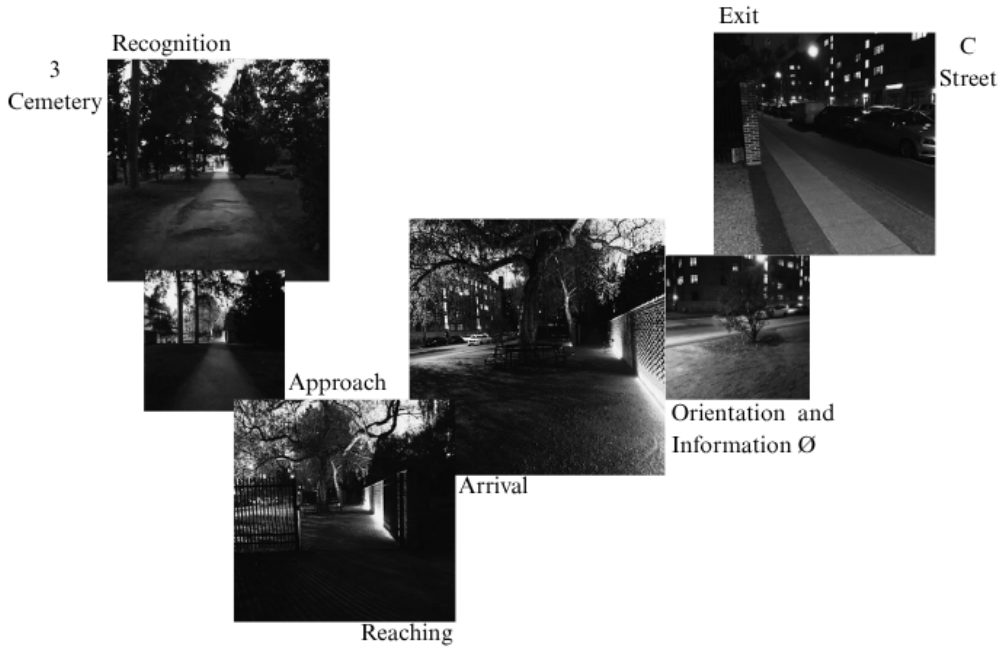
Photomontage 2: Below – Bispebjerg route 1 – A (Strunge, 2025)



Photomontage 4: Top – Bispebjerg route B – 2 (Strunge, 2025)

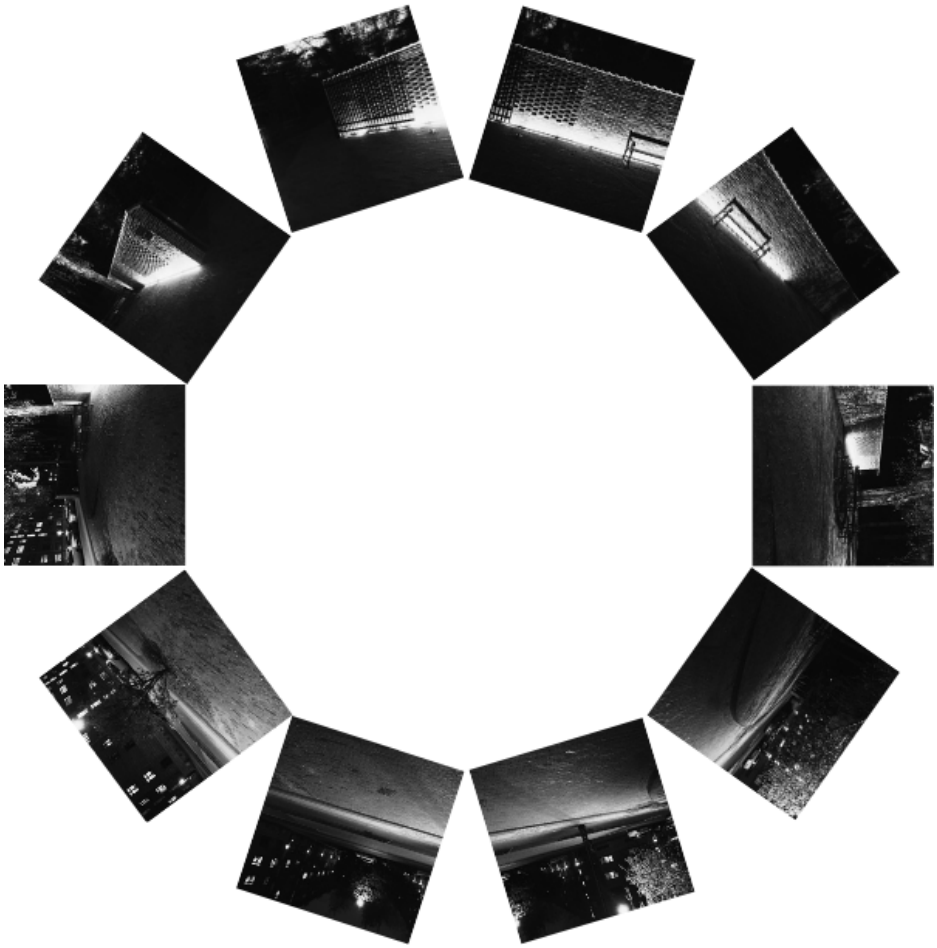
Photomontage 4: Below – Bispebjerg route 2 – B (Strunge, 2025)





Photomontage 6: Top – Bispebjerg route C – 3 (Strunge, 2025)

Photomontage 6: Below – Bispebjerg route 3 – C (Strunge, 2025)



Photomontage 7: Bispebjerg route orientation and information (Strunge, 2025)

Technical

Three different fixtures are placed in and around the transitional space, with Københavner armaturet located in the road and the Woody and Cluster fixture in the threshold space. There are no fixtures in the cemetery.

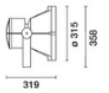
Name	Manufacture	CCT	CRI	Image
Københavner armaturet	Philips	3000	80-89	
Maxi Woody / Multi Woody	Iguzzini	RGB	–	
SOLID Cluster	Lightconstructor	2400-4000	>90	

Table 1: Fixtures and their technicalities (Produced by the author from: Copenhagen Gen2 stor og mega, n.d.; MultiWoody Minimal and Connected Pole, n.d.; Produkter, n.d.)

Lux measurements were conducted in the transitional space and the two adjacent spaces. The road ranged from 5-25 lux. The transitional space ranged from 0-72 lux. The cemetery ranged from 0-1 lux. Note that the measurements were performed holding the luxmeter facing up, which skews the measurements taken in the transitional space, given that half of the lights are wall grazer up lights. The lower bound measurement of zero lux in the transitional space is still accurate, as there are areas in complete darkness.

In-between

Examining the two spaces meeting – the road and the cemetery – the spaces are understood as contradictory spaces with the central polarities being public/private. The road is emphasized as a public space, with a lot of movement of cars, pedestrians, and bicyclists taking place in a somewhat exposed landscape. On the other hand, the cemetery offers a calmer, enclosed experience when being there – a private space. To succeed as an in-between space, the two must become a twin phenomenon in the transitional space.
The transitional space's architecture blends the two polarities of public and private in a twin phenomenon through a *link* of the spaces where both the polarities exist. This is done by offering different seating, some more public and some more private. As it being open to one side and closed to another.

The lighting in the road supports the interpretation of the space as public, with high mounted light with a neutral CCT, while the cemetery, with no light at all, supports an interpretation of the space being private, as darkness

offers the most amount of privacy. On the other hand, however, the intense darkness can lead to a feeling of being unsafe, which is not meant to be the case for a private space.
The lighting of the in-between space suggests a bridge of the public/private polarity, with low fixtures lining the cemetery walls and high spots from the road. However, the warm and yellow light from the spots has such an ever-presence in the space that it becomes overpowering, giving the place an exclusively private feeling, rather than it being an in-between space of private and public.

A second polarity exists between the natural and the man-made, with the trees and other nature in the cemetery contrasting the asphalt road and apartment buildings of the road. To remedy this, the architects put down a bricked path, referencing the apartments and the wall surrounding the cemetery, together with a subtle shift in the terrain's height. Then, a *fusion* occurs between the two different patterns: The dirt path from the cemetery moves in and becomes a platform holding a full circle of benches, the benches encircle a tree in the transitional space.

The uniform lighting, designed for movement, adds to the man-made polarity of the road. However, the lack of lighting for beautification and peripheral vision (as well as lack of lighting in general) in the cemetery does not support the polarity of nature.
The light in the transitional space creates a focal point by the wall grazers on the wall, enhancing it for wayfinding, though the paths are not well lit.
The light in the transitional space takes on a general feeling of uniformity of light, despite its wide range in lux measurement, qua it being yellow light, which makes it possible to orient through the periphery. As such, the light supports the man-made/nature polarity of the adjacent spaces.

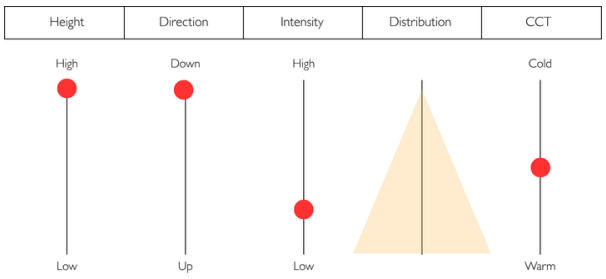


Figure 14: The Lights qualities anchored in the Road (Strunge, 2025)

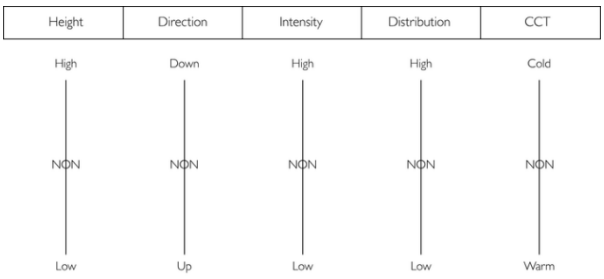


Figure 17: The Lights qualities anchored in the Cemetery (Strunge, 2025)

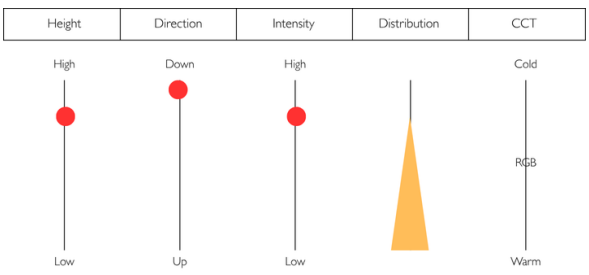


Figure 16: The Lights qualities anchored in the in-between space, closest to the road (Strunge, 2025)

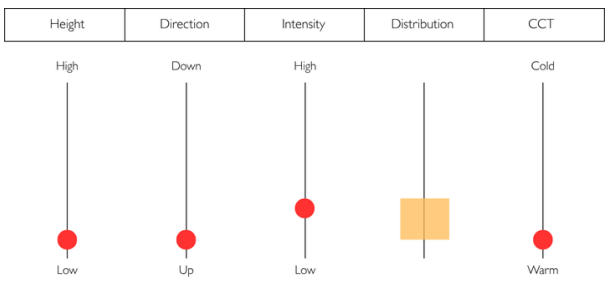


Figure 15: The Lights qualities anchored in the in-between space, closest to the cemetery (Strunge, 2025)

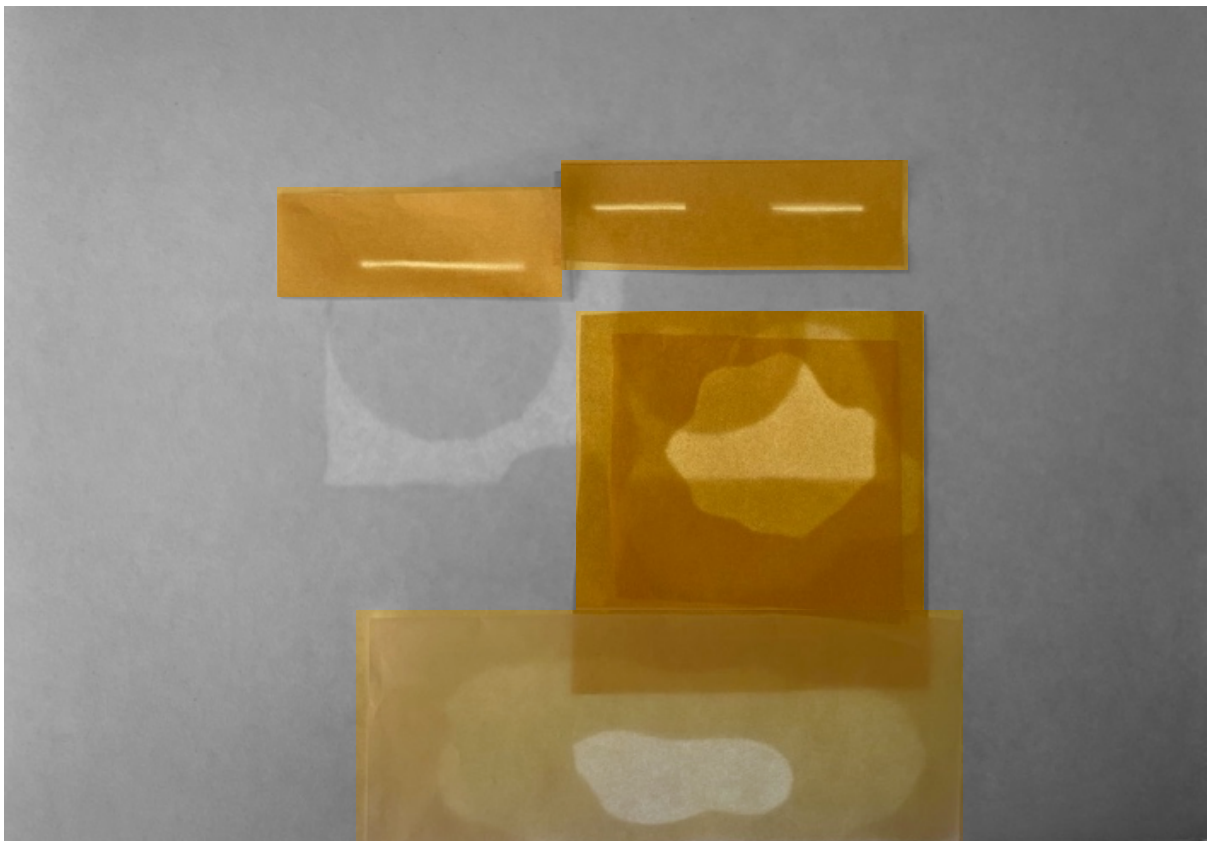
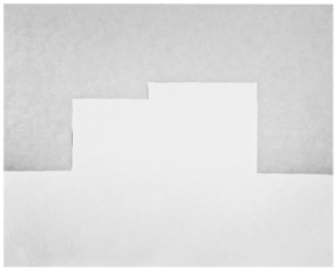


Figure 18: Collage of the light of the in-between and adjacent spaces (Strunge, 2025)

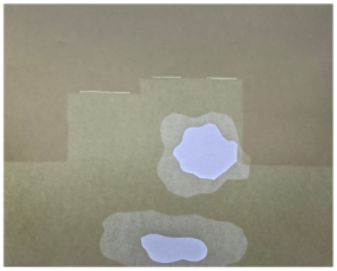
The Space

The Light

Delimitation
open
&
closed



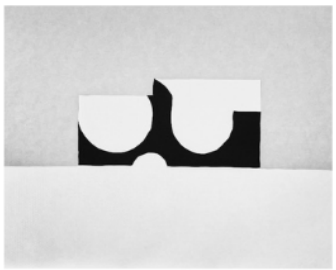
The threshold space is framed by a wall made from bricks encircling the cemetery and the sidewalk opposite the wall. The wall is punctuated by metal gates, and the bricks are laid so small holes appear, allowing the cemetery to be viewed from the outside. Despite half the space not having a physical delimitation, the wall is such a prominent feature that I consider the delimitation of the space to be more closed.



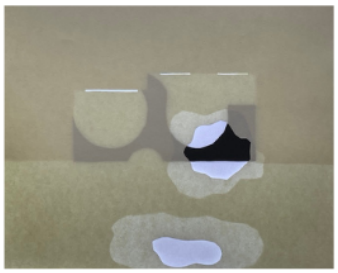
Support
open
&
closed

The lighting emphasizes the walls by illuminating their vertical surfaces with up lighting. This supports an experience of the spatial delimitation as closed. However, there are spot lights centered in the middle illuminating it, creating an inner light zone in the threshold, simultaneously supporting an open delimitation.

Sequence
guided



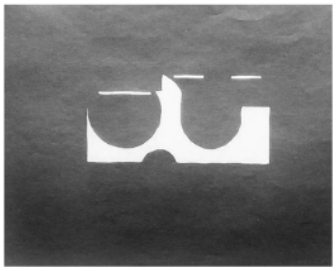
When approaching the cemetery, the space guides the user towards one of the two entrances. The path is formed by raising the ground in some areas, which separates the area for movement from the area for rest.



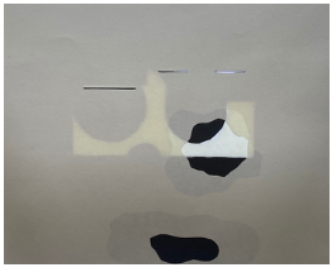
Support
freely selectable

The path is luminated with 6 down spotlights. These are all focused on the 'middle' of the space, separating it from the rest of the space. As such, the light does not support the feeling of being guided towards the entrance of the cemetery, as the density of the fixtures and light is gathered at a single point. However, the light also does not indicate a freely selectable sequence, as the rest of the space is unlit.

Geometry
ordered



The space consists of circles and half circles and the area they create between them. The half circles and circles constitute the area for rest, while the area between them forms the path for movement. This clear distinction makes the geometry recognizable, creating an ordered geometry.



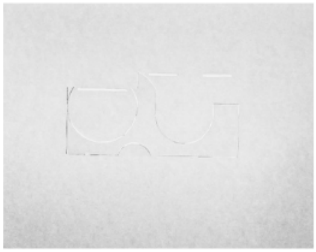
Support
free

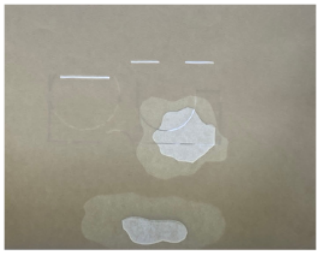
The up light on the walls, in addition to the height of the spots, increases the thresholds spaciousness, even as trees create a ceiling. Since the spot lights are centered in the middle of the threshold and have a yellow color, the corners of the space get hidden in darkness. It take some effort to orientate yourself in the space. This does not support the geometry as being ordered.

The Space

The Light

Topography
embedded



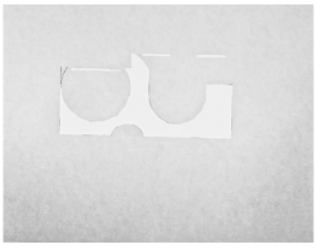


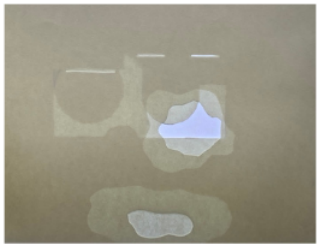
Support
embedded
&
independent

The threshold space is embedded into both the street and the cemetery. However, the embedding into the street is clearer, since the cemetery is walled off and a gate is closed during the night, separating the threshold space from the cemetery.

The light supports the embedded topography through down spotlights landing on both the sidewalk and the threshold space, erasing the separation of the two, lighting them as one space. On the other hand, the up lights pointed at the wall makes them a focal point, marking that part of the threshold as independent.

Materiality
neutral



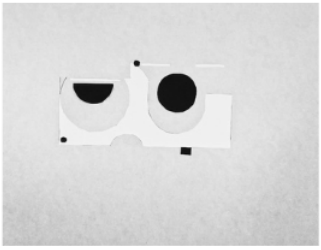


Support
freely selectable

The path inside the cemetery is paved, as is the road, the sidewalk consisting of cement tiles. The path connecting the cemetery and road through the threshold is made from the same bricks as the wall surrounding the cemetery. This gives the impression of the wall being laid down horizontally – as the path – and instead of separating spaces, as a wall usually does, it invites you into the space. The materiality of the path feels like a natural continuation of the wall, creating a neutral materiality of the space.

Red bricks, the kind of bricks the wall and path are made of, have a reflections of 0.25. Therefore, more light is needed to reflect back an appropriate amount of light for visual orientation. The fixtures at the wall have a CRI above 80, which insures a truthfully rendering of the color and supports a neutral materiality. However, the choice to have colored light in the form of yellow, gives the materiality a more distinctive quality.

Furnishings
self-contained



Support
unobtrusive

The furnishings consist of classic Copenhagen benches: One standing alone, several in a half circle and more in a full circle. Each (half)-circle is encircling a tree, seeming as its own structure and shaping the space around it, hugging and highlighting the circle motif. In addition, there are two trashcans, one light pole with 6 fixtures, and some greenery in the side of the theshold.

None of the furnishing are in direct illumination, except some of the tree branches which are illuminated by one of the spotlights turned to an up light. The benches are placed so you have the back against the illuminated walls. This positioning makes the sitting person visible to others without any glare. As none of the lights are directly illuminating the furniture of the threshold they are not supported as being self-contained.

Summary

The transitional space at Bispebjerg Cemetery succeeds in bringing together the two spaces in a twin phenomenon of public and private by creating a link and fusion of the patterns and materialities of the adjacent spaces. My analysis of the light shows that the lighting supports this gesture but not fully. The lighting does not support the sequence or the geometry of the transitional space, and the transitional space is disproportionally lit as a private space, not facilitating the transition from road to cemetery sufficiently.

Evaluation

Using the framework to analyze the Bispebjerg Cemetery opening has pin-pointed several polarities and aspects included in the architecture but not sufficiently represented in the lighting design, showcasing the potential strength of the framework. At the same time, however, the framework was lacking in that it addressed neither the absence of lighting within the cemetery nor offered guidance on how to approach this absence, a key issue for the transitional space. When one of the two adjoining spaces is entirely unlit, it remains unclear how lighting strategies for the transitional space can meaningfully respond to this condition. Here, considering the space as a different spatial condition than *contradictory*, for instance *hierarchical*, which is better positioned to address the polarity light/dark, could be beneficial.

FISKETORVET

(Pamphlet page 8)

A staircase is located in Copenhagen's area of Dybbølsbro, by the harbor, and is part of the project called 'Cykelslangen' (Bicycle Snake) by the architect firm DISSING+WEITLING, billing it as an *"(...) example of architecture that binds us together (...)"* ([authors translation] Dissing+Weitling, n.d.). The Bicycle Snake is meant to connect bicyclers to 'Bryggebroen', a bridge running over the canal. It was completed in 2014 and praised for *"(...) managing to give identity to an otherwise architecturally disjointed place and transforming the experience into something far more interesting (...)"* ([authors translation] Dansk Center for Arkitektur - DAC, n.d.).
As part of the project, a staircase was built, offering a pathway for pedestrians to change terrain to the bridge one floor (Dansk Center for Arkitektur - DAC, n.d.; Dissing+Weitling, n.d.). The lighting for the staircase and the Bicycle Snake was done by Lightconstructor, a firm designing fixtures, and was finished in 2016 (Lightconstructor, n.d.).

The staircase at Fisketorvet acts as a distinctive transitional space in that it connects two vertical levels, literally giving pedestrians the ability to change terrain. Unlike the other two cases, the staircase's use is mainly practical, offering an opportunity to examine the framework in a more functional context.

Furthermore, the two spaces meeting are not *contradictory* in nature, but *similar*, making the staircase a useful test of the framework's applicability to transitional spaces that fall outside its original parameters.

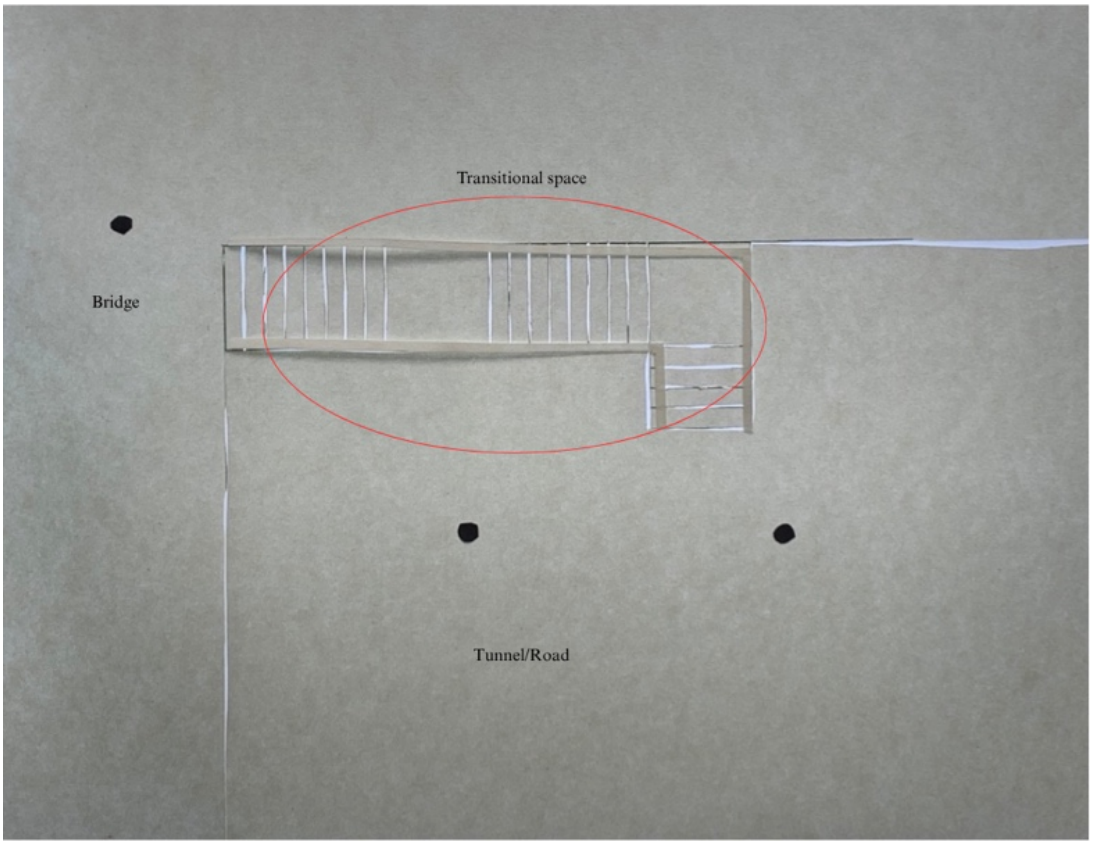
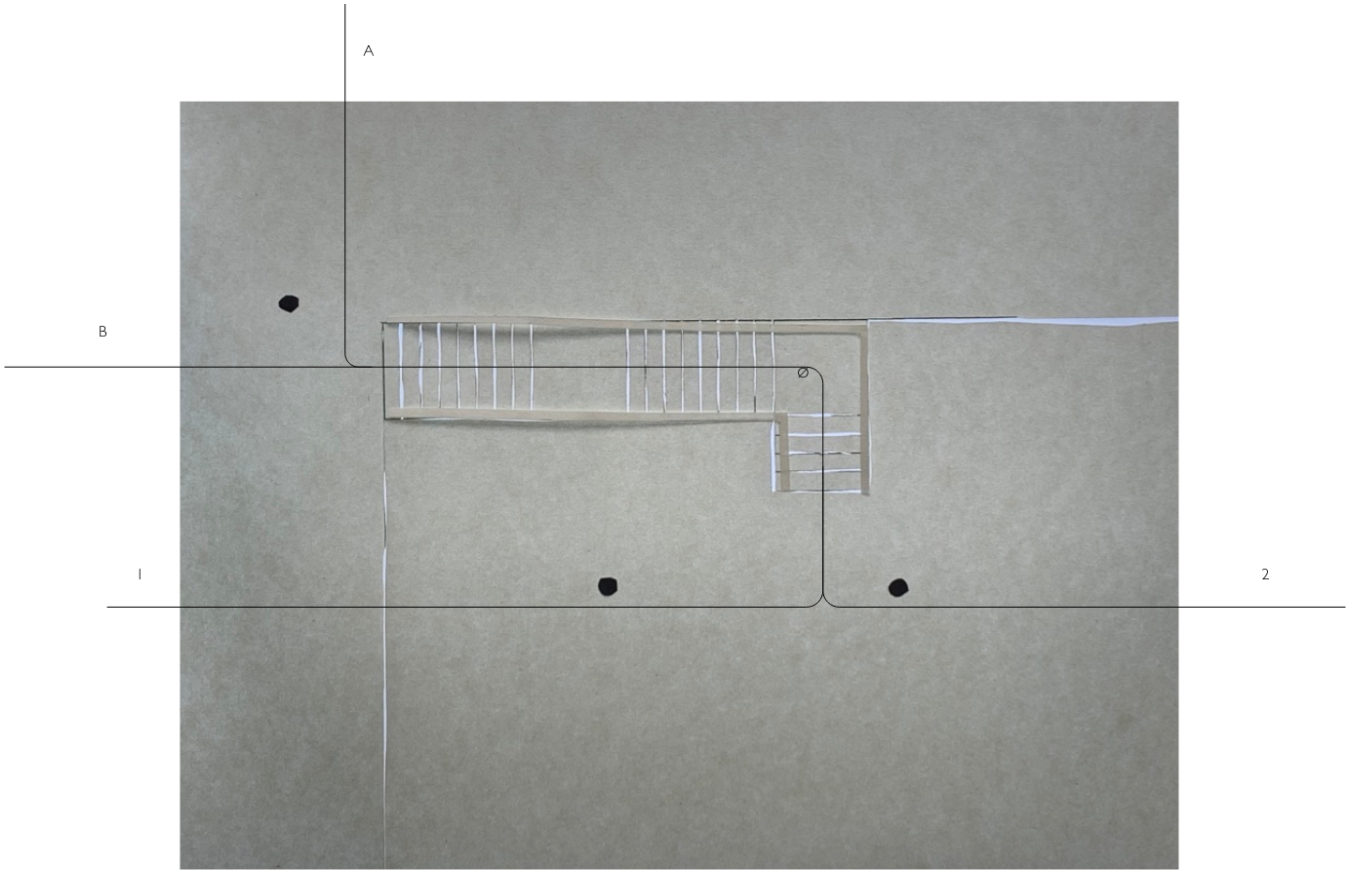


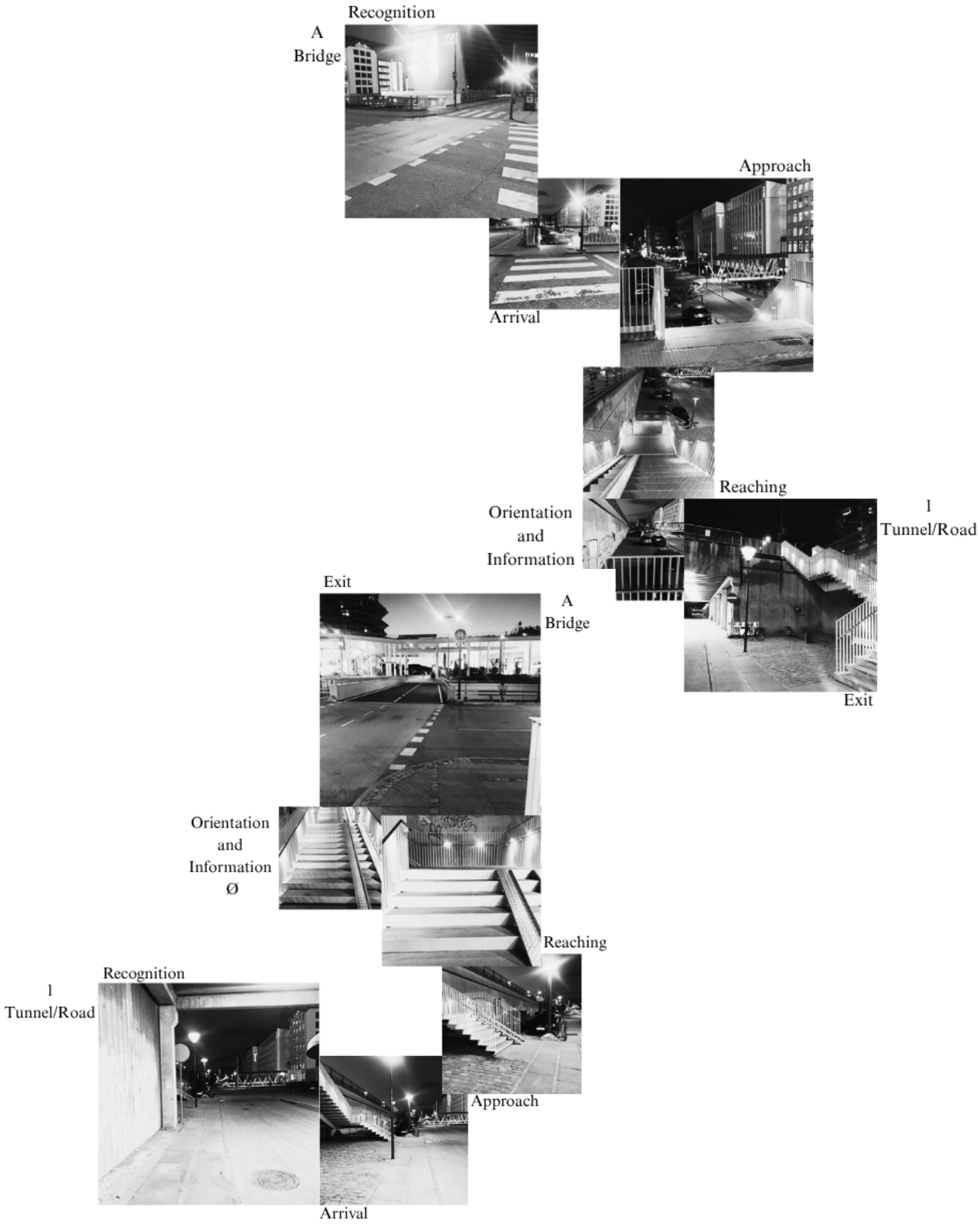
Figure 19: Collage of overview of Fisketorvets transitional space (Strunge, 2025)

Movement

Two different paths, from A to 1, B to 2, will be examined in the photomontage as seen in the map.

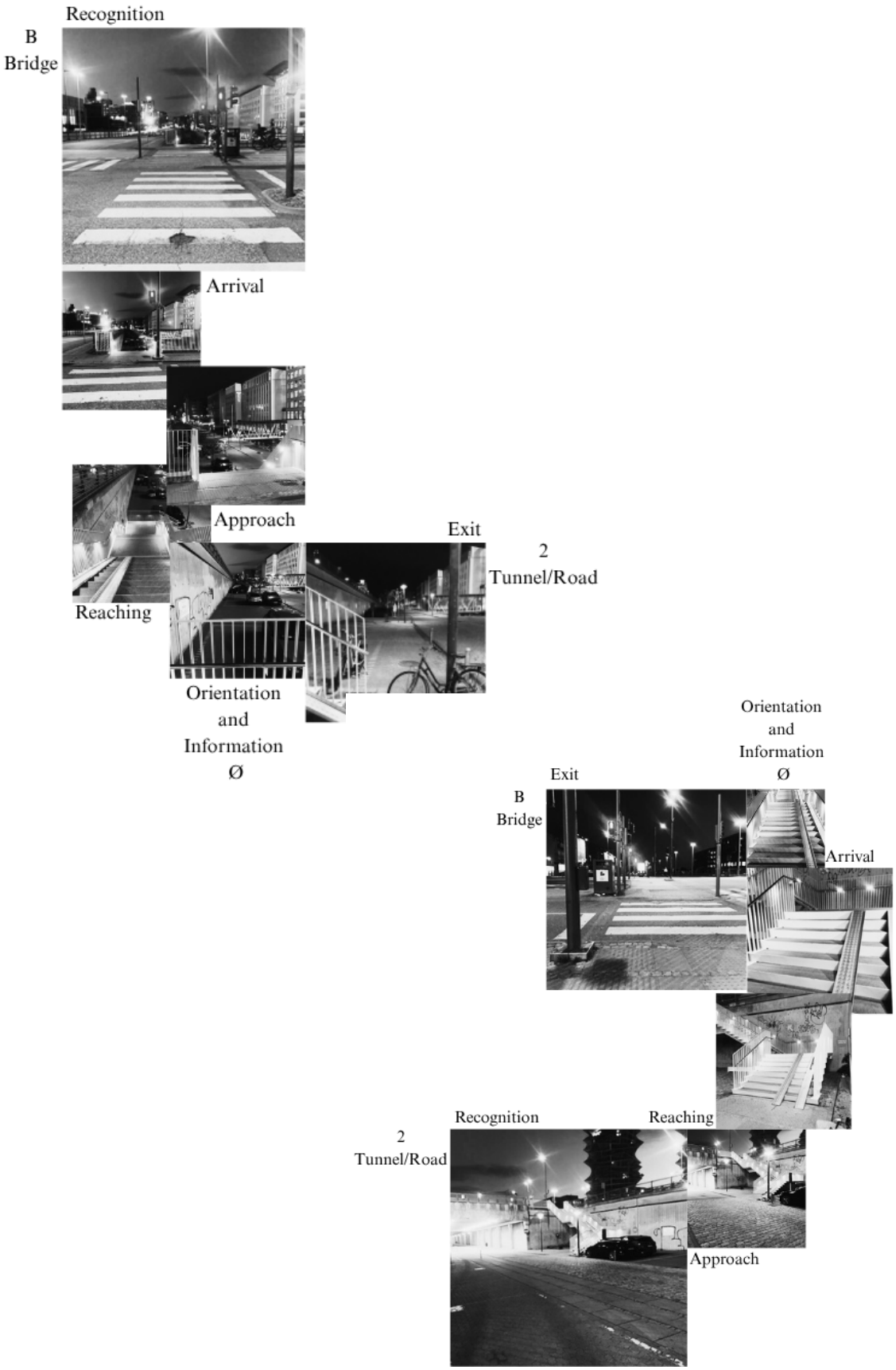


Map 2: Routes taken through the transitional space (Strunge, 2025)



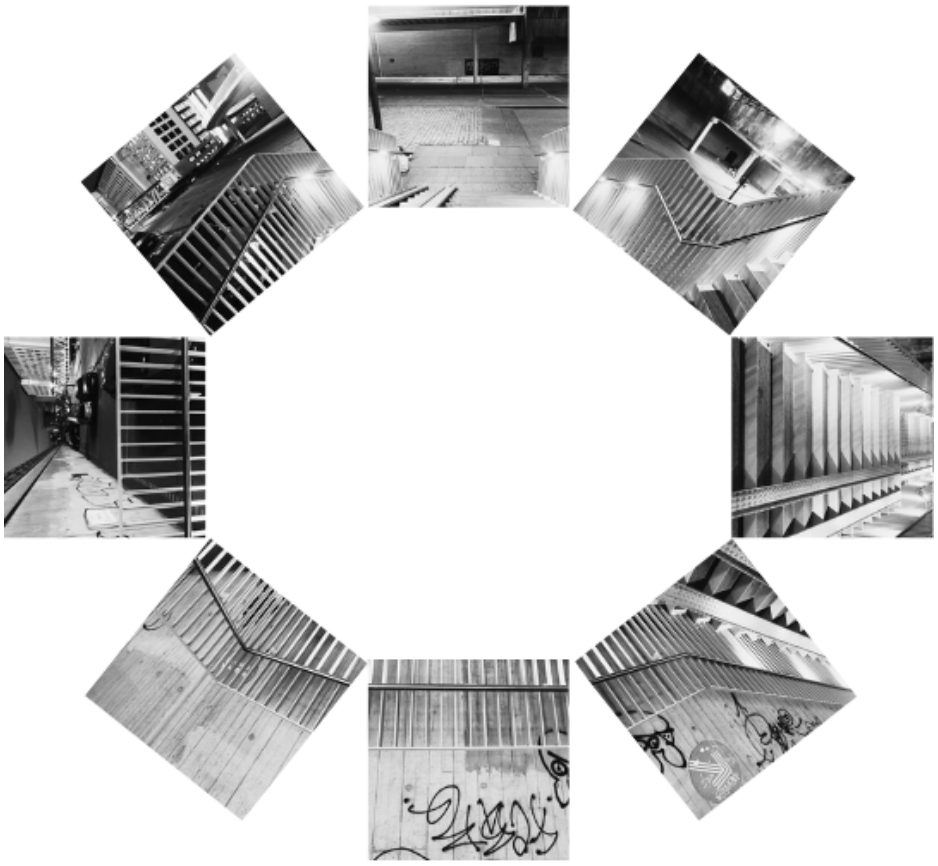
Photomontage 9: Top – Fisketorvet route A – 1 (Strunge, 2025)

Photomontage 8: Below – Fisketorvet route 1 – A (Strunge, 2025)



Photomontage 11: Top – Fisketorvet route B – 2 (Strunge, 2025)

Photomontage 11: Below – Fisketorvet route 2 – B (Strunge, 2025)



Photomontage 12: Fisketorvet route orientation and information (Strunge, 2025)

Technical

In and around the transitional space five different fixtures can be found. On top of the bridge one Thor L resides, with twenty BRIDGE EVOs lining the railings of the staircase. At the foot of the staircase, two different light poles, one the SPACE SYMMETRISK, and the other SKY PARK. As the bridge continues it creates a tunnel which is fitted with Tuscan fixtures.

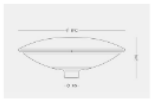
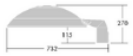
Name	Manufacture	CCT	CRI	Image
SKY PARK	Focus Lighting	2700- 3000-4000	80-85	
SPACE SYMMETRISK	Focus Lighting	2700- 3000-4000	80-85	
BRIDGE EVO	Lightconstructor	2700-4000	>90	
Thor L	Thorn Lighting	3000-4000	70	
Tuscan	Fagerhult	3000-4000	>80	

Table 2: Fixtures and their technicalities (Produced by the author from: Focus-Lighting - SKY PARK, n.d.; Focus-Lighting - SPACE SYMMETRISK, n.d.; Produkter, n.d.; Thor — Danmark (Dansk), n.d.; "Tuscan 88," n.d.)

Lux measurements were conducted in the transitional space and the two adjacent spaces. The bridge ranged from 11-22 lux. The transitional space ranged from 5-13 lux. The road the tunnel ranged from 18-51 lux.

In-between

The bridge functions as a space for movement, and so does the road below it with the tunnel. This makes the two spaces *similar*.
The similar places are connected in an in-between space – the staircase – which, by virtue of continuing their primary function of movement, works through a *fusion of patterns*. However, since only foot traffic is allowed/possible on the staircase, it also stands out from the two adjacent spaces.

Furthermore, with its red tread surface, the aesthetic of the staircase differs significantly from the adjacent spaces, seemingly separating them rather than connecting them. Of course, the red tread surface is used to relate the staircase with the bicycle snake, which also has that surface.

The light is vastly different in the three spaces, with the number of fixtures, height, and resulting uniformity. The choice to add distinctly different lighting in the transitional space diminishes the similarity between the adjoining spaces and challenges cohesion, resulting in a less successful in-between space.

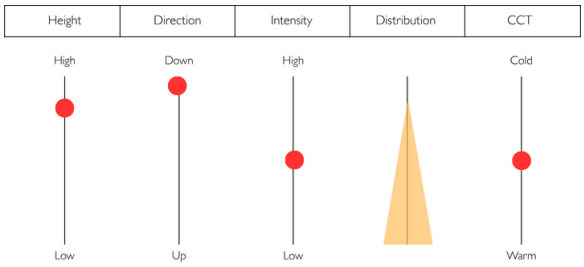


Figure 20: The Lights qualities anchored in the Bridge (Strunge, 2025)

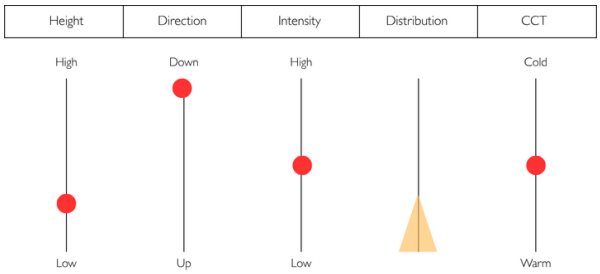


Figure 21: The Lights qualities anchored in the in-between space (Strunge, 2025)

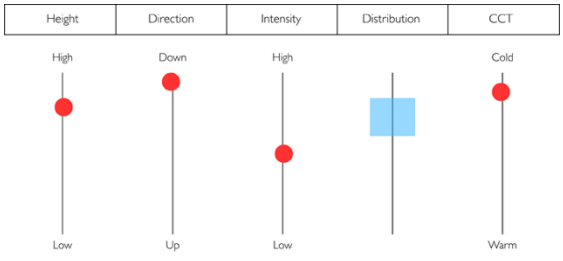


Figure 22: The Lights qualities anchored in the Tunnel (Strunge, 2025)

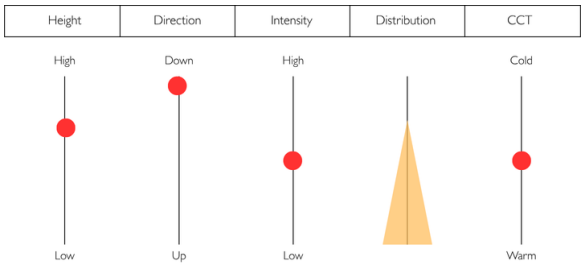


Figure 23: The Lights qualities anchored in the Road (Strunge, 2025)

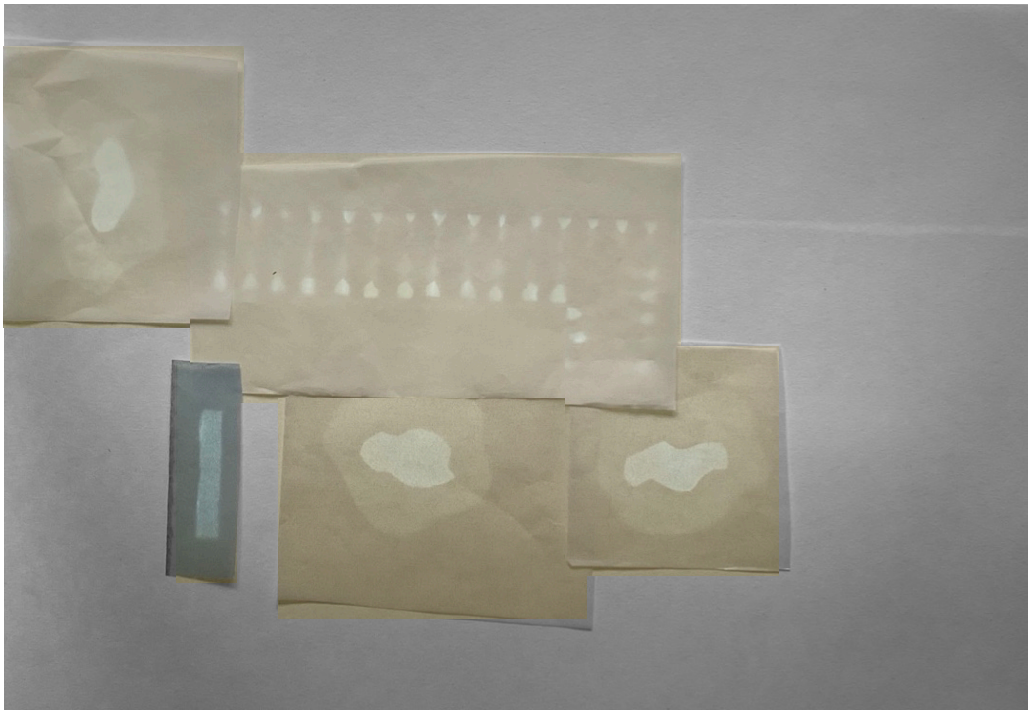
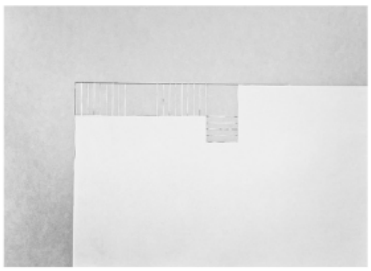
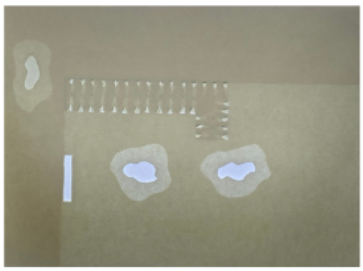
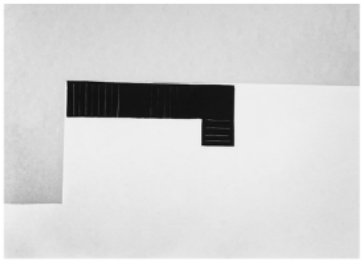
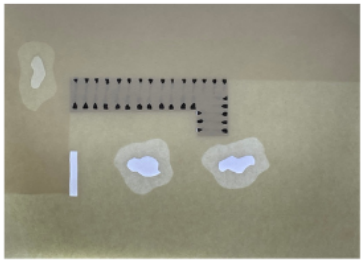
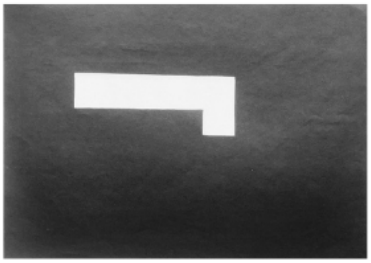
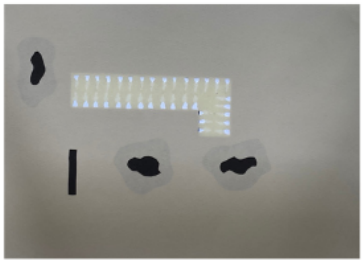
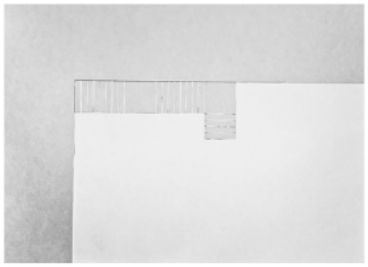
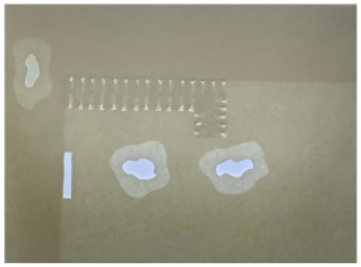
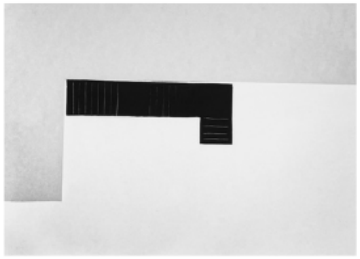
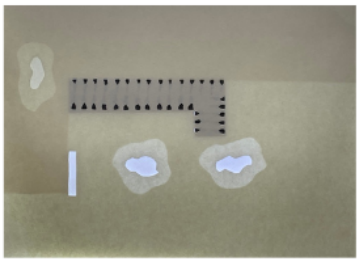
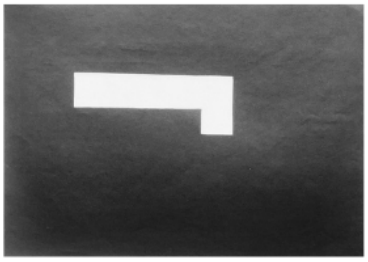
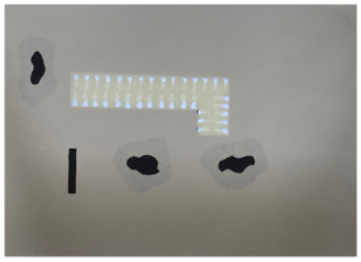


Figure 24: Collage of the light of the in-between and adjacent spaces

	The Space	The Light	
Delimitation closed			**Support** closed
	The railings of the staircase create a closed delimitation of the space even though there is no celling. It strictly defines and encapsulates the space.	The railing is fitted with fixtures which creates a downlight and marks the delimitation of the space as closed, emphasizing the vertical surface of the railing.	
Sequence guided			**Support** guided
	The sequence in the threshold is guided since it only offers one path of movement in it – up or down – which the structure forces the user to take.	Rather than one continual fixture, the railings are inlaid with 20 small fixtures. The fixtures are placed close to each other, giving the space a forward rhythm of movement and enhancing the guided sequence.	
Geometry ordered			**Support** ordered
	The geometry is ordered and makes use of squares and rectangles in its creation of the space.	The rectangular form of the threshold is being highlighted by the distribution of the light, acting like wall grazers on the railing and illuminating the stair steps and platform, creating visibility and highlighting the threshold's geometry as ordered.	

	The Space	The Light	
Delimitation closed			**Support** closed
	The railings of the staircase create a closed delimitation of the space even though there is no celling. It strictly defines and encapsulates the space.	The railing is fitted with fixtures which creates a downlight and marks the delimitation of the space as closed, emphasizing the vertical surface of the railing.	
Sequence guided			**Support** guided
	The sequence in the threshold is guided since it only offers one path of movement in it – up or down – which the structure forces the user to take.	Rather than one continual fixture, the railings are inlaid with 20 small fixtures. The fixtures are placed close to each other, giving the space a forward rhythm of movement and enhancing the guided sequence.	
Geometry ordered			**Support** ordered
	The geometry is ordered and makes use of squares and rectangles in its creation of the space.	The rectangular form of the threshold is being highlighted by the distribution of the light, acting like wall grazers on the railing and illuminating the stair steps and platform, creating visibility and highlighting the threshold's geometry as ordered.	

Summary

The analysis of Fisketorvet's staircase shows the transitional space's shortcomings of being an in-between space of the variety *similar*, with its lighting falling even shorter. On the other hand, as a threshold space, the lighting supported its intentions in nearly every aspect. Taken together, the analysis shows a space which is well and intentionally lit, however adding a new lighting regime to the nightscape rather than tying together the adjacent spaces.

Evaluation

The framework does not contain a formalized approach to examine the meeting of *similar* spaces. As a result, the in-between analysis using the framework becomes somewhat surface-level, lacking the depth added by considering the polarities. While the threshold analysis still provides valuable insight into the specifics of the transitional space, these insights are partially untethered from the context, resulting in a shallow evaluation of the space as a whole.

One other important observation stemming from the analysis of the Fisketorvet staircase is the shortcomings of the framework when analyzing spaces which are not (solely) aiming for cohesion. As a prestige project, the Bicycle Snake and the staircase are also attempts at creating architecture which stands out in the city scape. My framework assumes that the primary goal of a transitional space is to facilitate cohesion, which is not always the case. For the staircase, connecting two functional and monotonous spaces, the goal may have been exactly to stand out – to imbue the area with much needed vibrancy. In such a case, the framework points the designer to the issue of lacking cohesion, even when that was the intended goal. As with all frameworks, the designer must approach it as a tool at their disposal and use their judgement to determine when its application is relevant and fruitful.

KARENS MINDE AKSEN

(Pamphlet page 9)

Karens Minde Aksen is a compounding space made up of an established public park, a culture house, and an animal park for children, which was renovated in conjunction with a cloudburst protection installation. When arriving from the nearby train station and big roads, people pass through a small 'island', connecting the installation and path with the busy city. While Karens Minde Aksen itself can be viewed as a transitional space, I choose to focus on the island transitioning from the street and into the axis. It is located in the southern part of Copenhagen.

> The project proposal sets out to create a better connection between the Karens Minde Culture House, the Children's Animal Park, the playground, and the protected dance pavilion. In addition, more Copenhagen benches and better lighting will be added to the area.
>
> ([authors translation] Hal, 2020)

It was inaugurated in 2023 and the general counsel, landscape architecture firm Schønherr's vision was *"(...) that the water flow literally binds together an area that was previously experienced as very divided."* ([authors translation] Schønherr, n.d.).

Karens Minde Aksen serves as a case of a project focused on creating a transitional (and connecting) space, but without an explicit focus on lighting and the nightscape. Utilizing the framework, I seek to examine whether the vision of the designers is upheld when connection and transition requires lighting to support it.

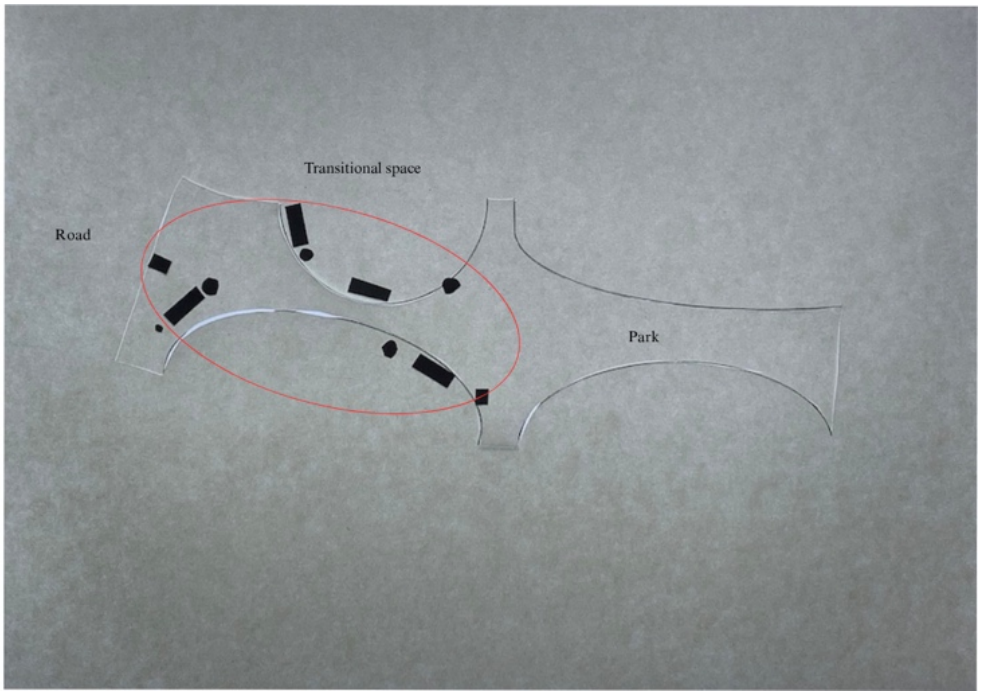
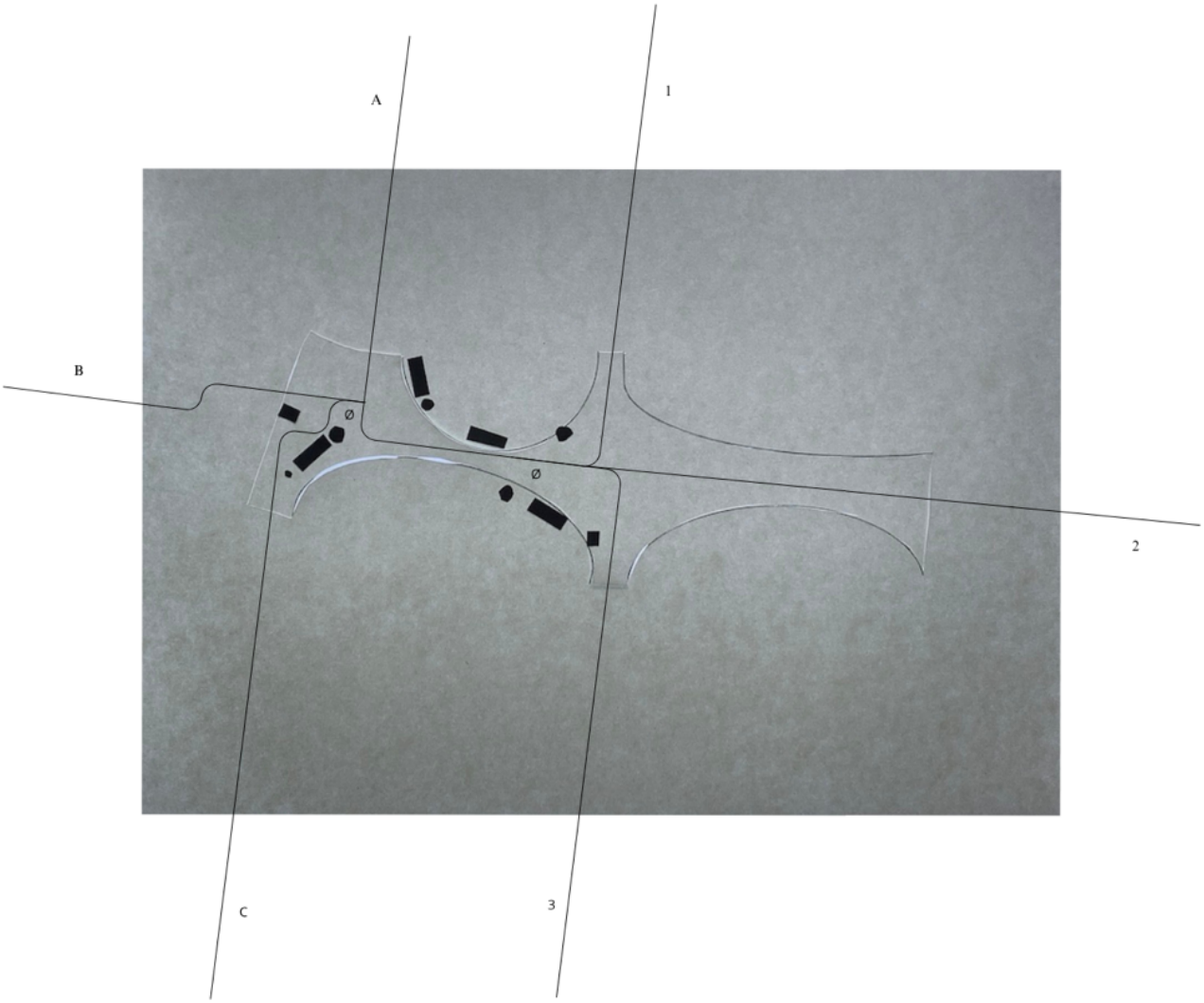


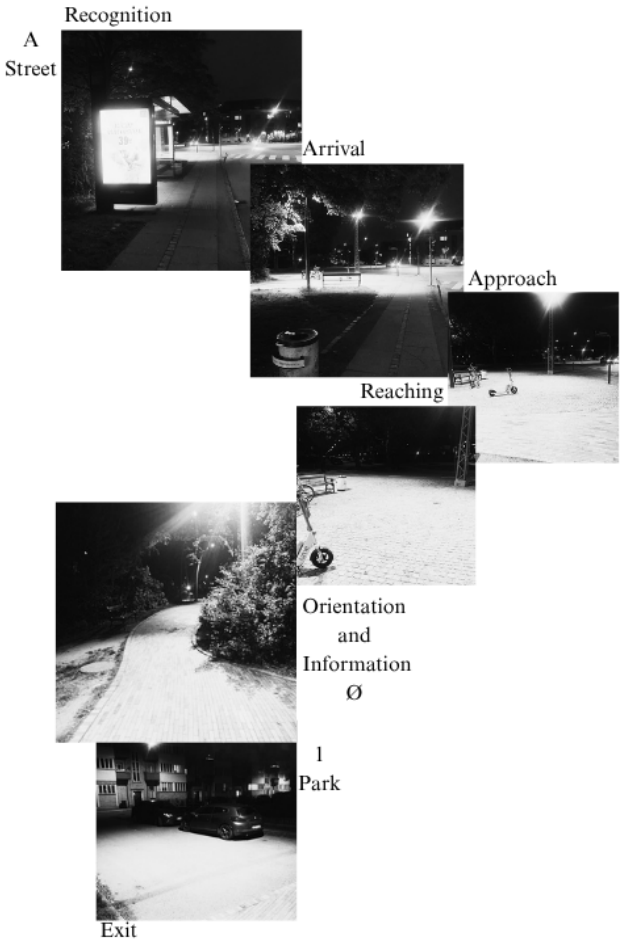
Figure 25: Collage of overview of Karens Mindes transitional space (Strunge, 2025)

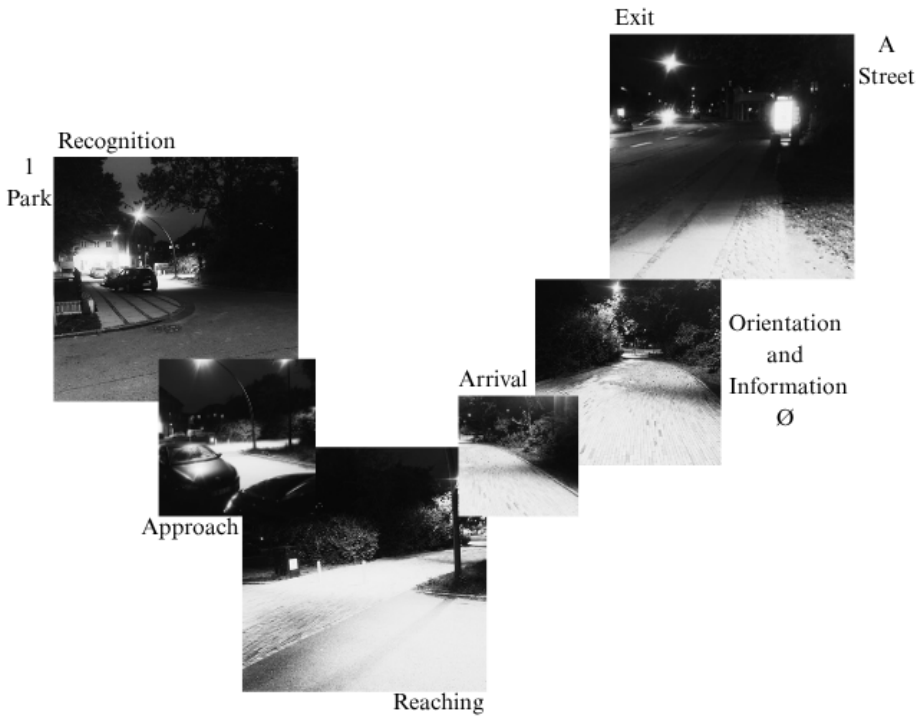
Movement

The space offers different ways of approaching it from both ends as illustrated on the map.



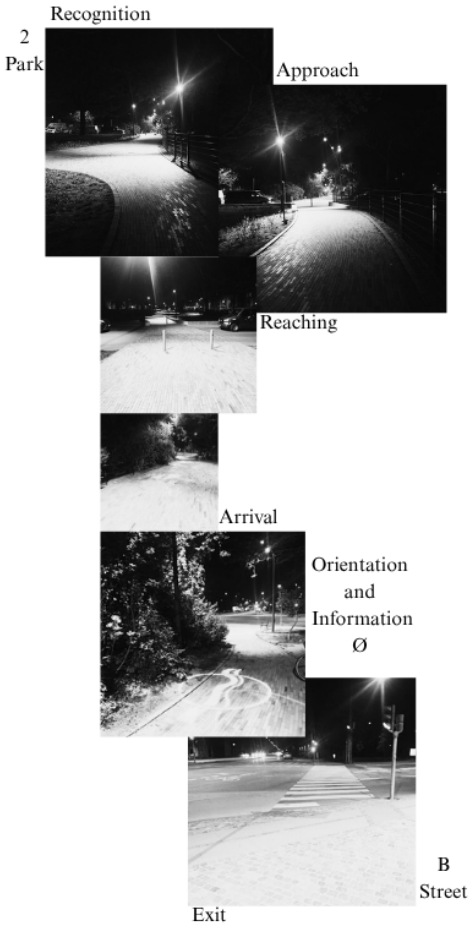
Map 3: Routes taken through the transitional space (Strunge, 2025)

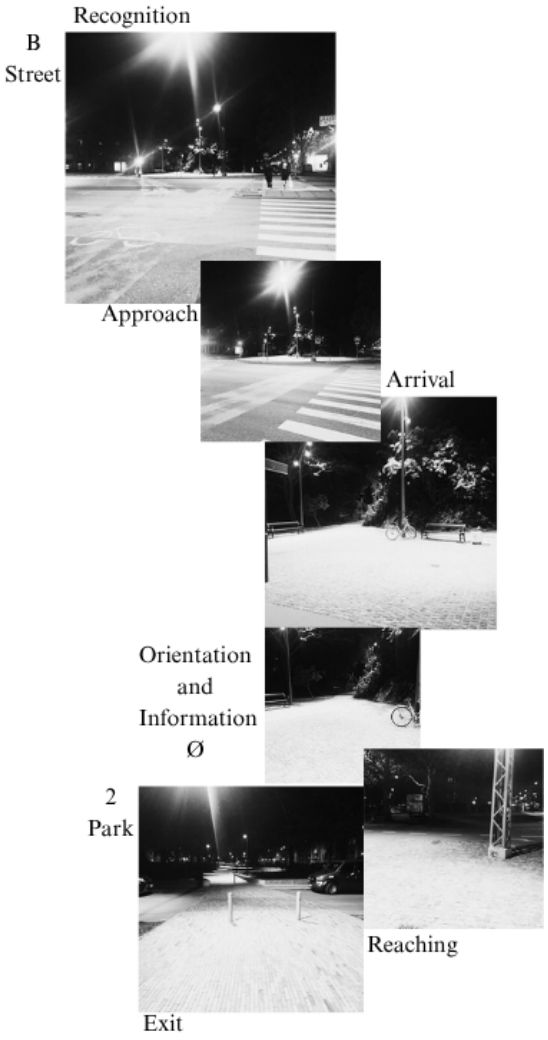




Photomontage 13: Top – Karens Minde route A – 1 (Strunge, 2025)

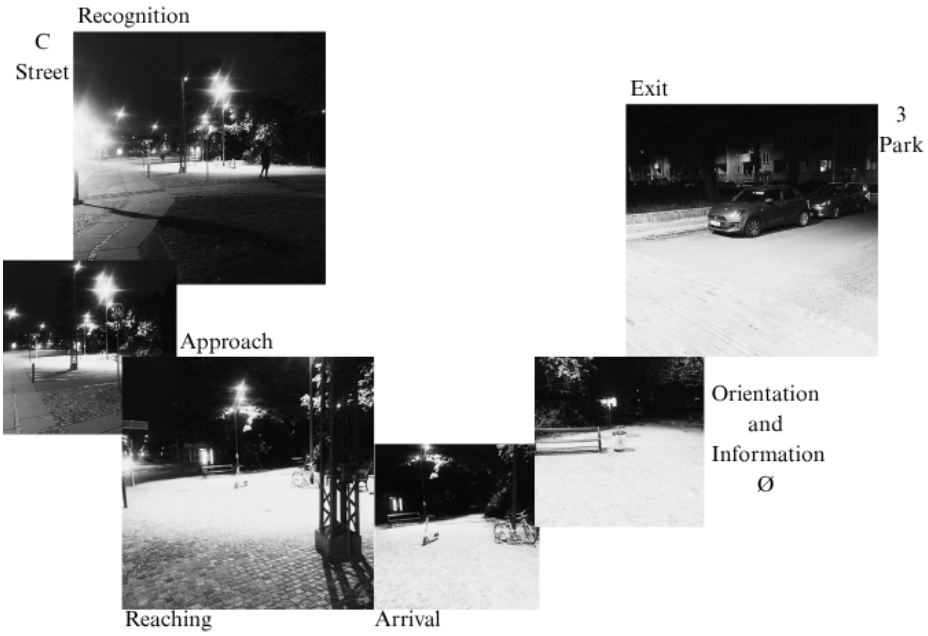
Photomontage 14: Below – Karens Minde route 1 – A (Strunge, 2025)

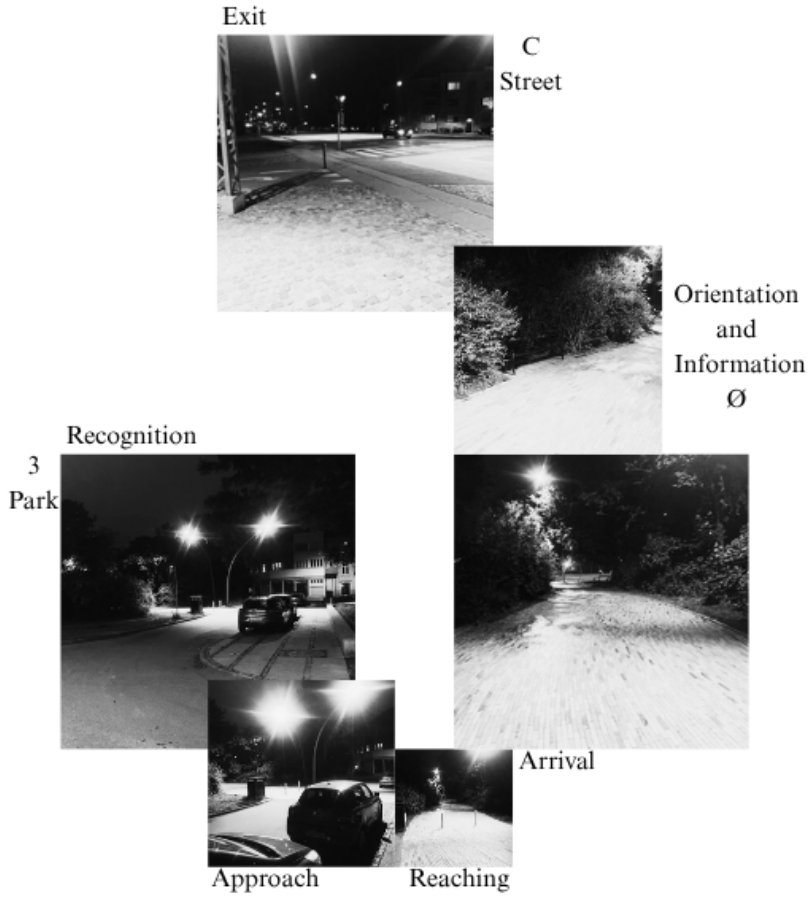




Photomontage 15: Top – Karens Minde route B – 2 (Strunge, 2025)

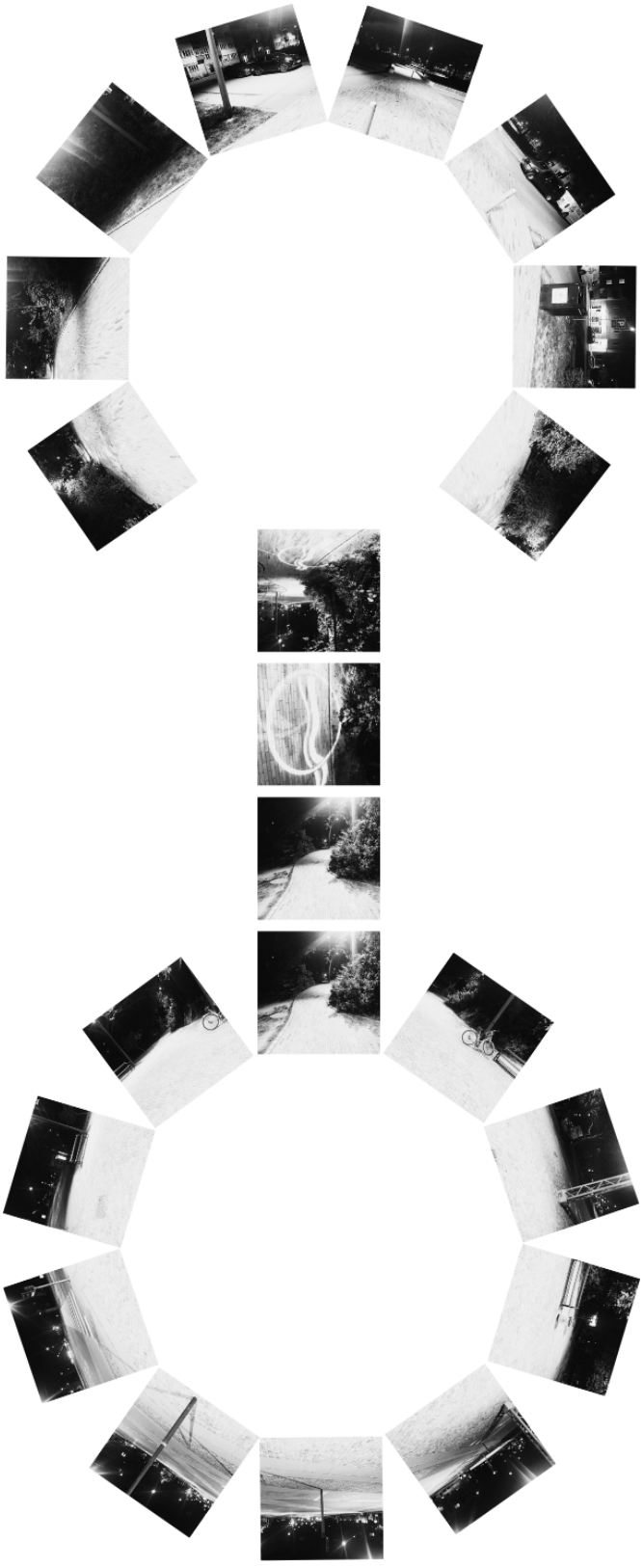
Photomontage 16: Below –Karens Minde route 2 – B (Strunge, 2025)





Photomontage 17: Top – Karens Minde route C – 3 (Strunge, 2025)

Photomontage 18: Below – Karens Minde route 3 – C (Strunge, 2025)



Photomontage 19: Karens Minde route orientation and information (Strunge, 2025)

Technical

Two different fixtures are present in and around the transitional space, with Københavner armaturet in the road and the Woody in the transitional space and park. Additionally, the road is fitted with traffic lights.

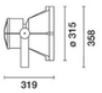
Name	Manufacture	CCT	CRI	Image
Københavner armaturet	Philips	3000	80-89	
Maxi Woody / Multi Woody	Iguzzini	3000-4000	80	

Table 3: Fixtures and their technicalities (Produced by the author from: Copenhagen Gen2 stor og mega, n.d.; iGuzzini, 2018)

Lux measurements were conducted in the transitional space and the two adjacent spaces. The road measures between 13-27 lux. The transitional space measures between 8-464 lux. The park measures between 0-914 lux.

In-between

The clearest polarity between the road and the park is that of *nature* and *man-made*. The architecture of the transitional space includes elements of both, with bushes and trees surrounding a paved path cutting through. This co-existence in the transitional space creates a *link* between the polarities, connecting the two adjacent spaces, with the nature of the park and a pathway together with the high movement of the road.

The lighting supports the polarity of man-made in the road, which is illuminated for movement. This is done with the height of the fixtures, the distribution and CCT of the light. The parks lighting does not support the polarity of nature, as none of the greenery is lit, only the path between it, with spotlights.

The lighting in the transitional space fails to support both polarities. Where the path is bathed in light, the greenery is completely ignored, creating an emphasis on the man-made while neglecting the nature. The neglected transitional space instead becomes a simple extension of the road, while the natural elements take on an almost unsettling character in the darkness, qua the intensity of the light in the path.

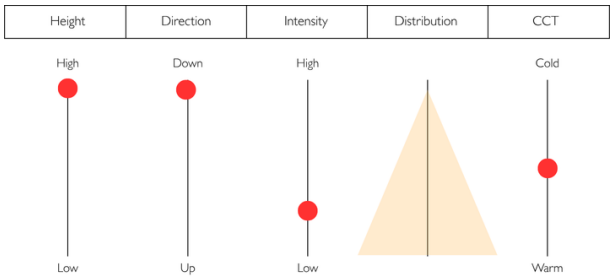


Figure 26: The Lights qualities anchored in the Road (Strunge, 2025)

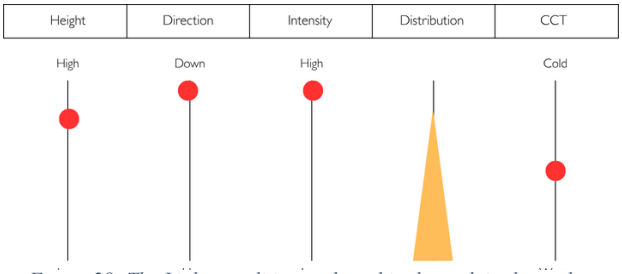


Figure 28: The Lights qualities anchored in the path in the park (Strunge, 2025)

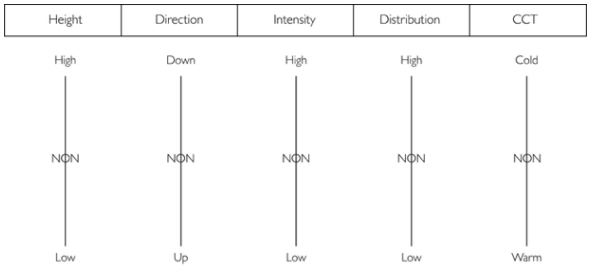


Figure 27: The Lights qualities anchored in the greenery in the park (Strunge, 2025)

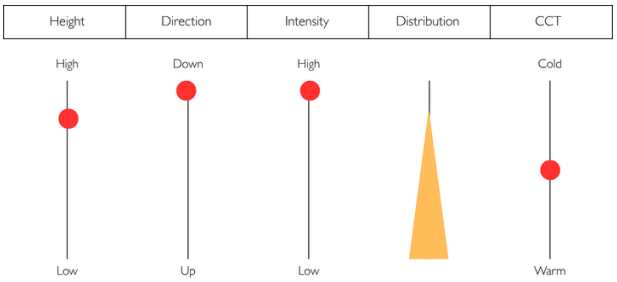


Figure 30: The Lights qualities anchored in the in-between space, on the path (Strunge, 2025)

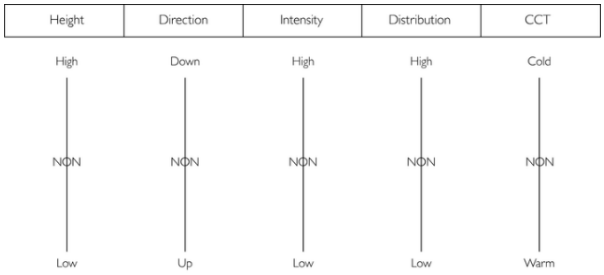


Figure 31: The Lights qualities anchored in the in-between space, in the greenery (Strunge, 2025)

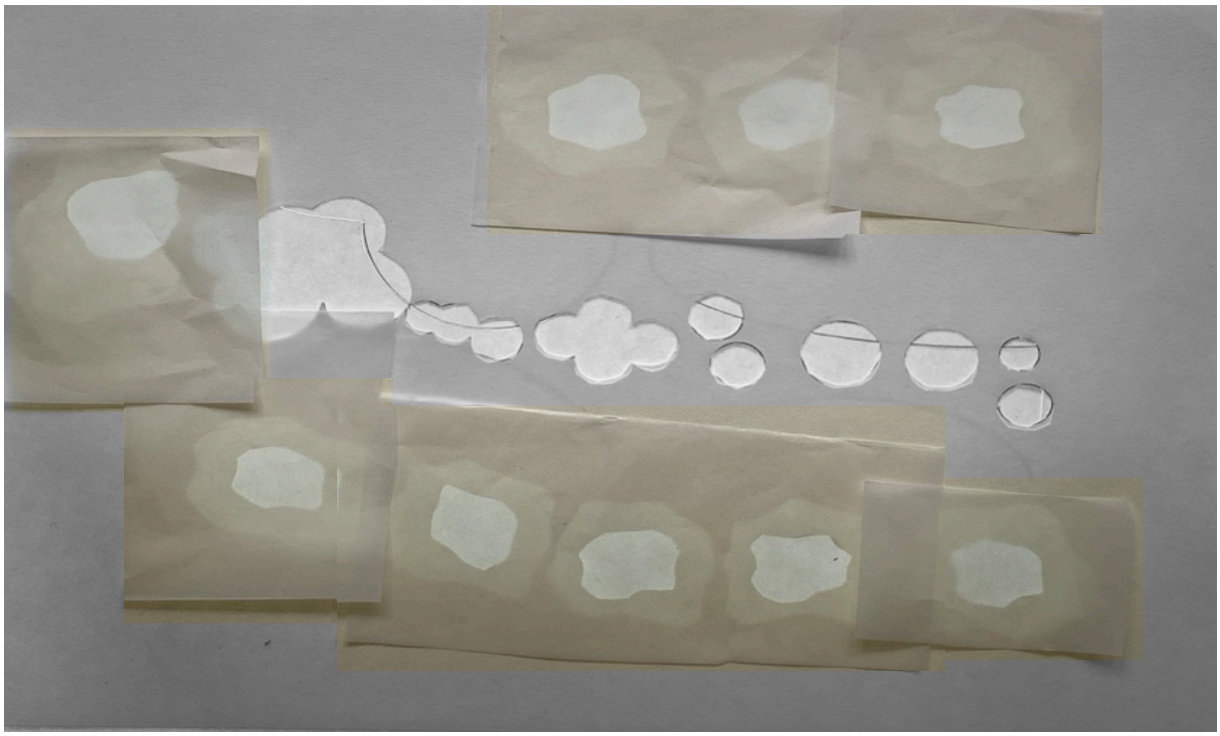
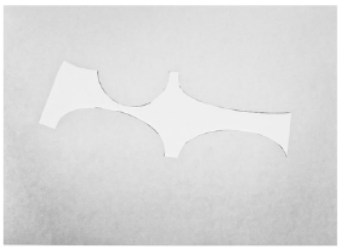
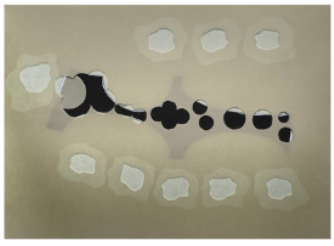
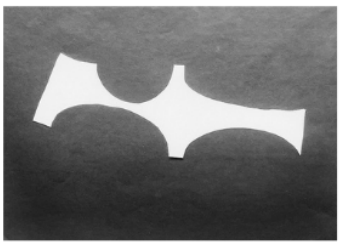
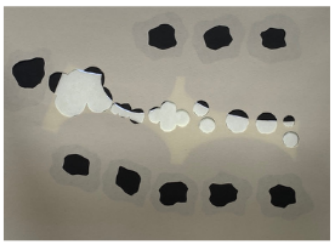
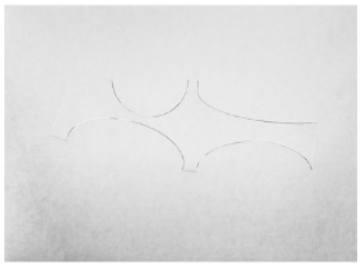
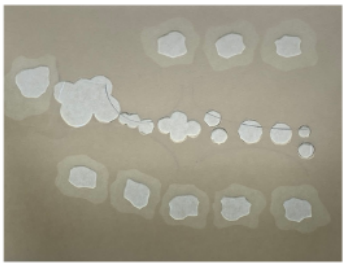
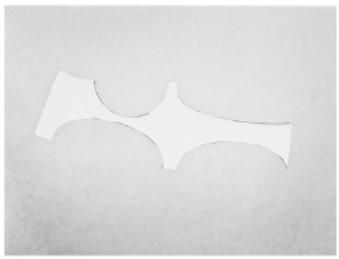
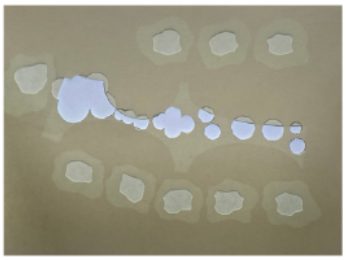
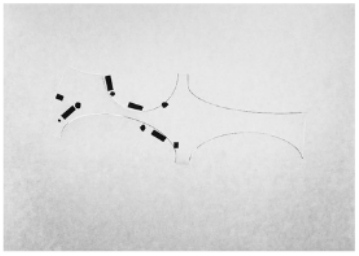
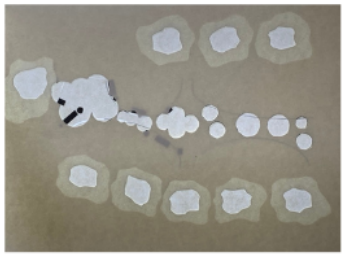


Figure 32: Collage of the light of the in-between and adjacent spaces

Threshold

	The Space	The Light	
Delimitation open			**Support** closed
	There are no built objects surrounding the space, giving it an open delimitation. Only bushes and trees surround it, even the bunker is hidden as a hill.	The spotlight bathes the space in light and creates a cone of light which frames the space facing the train station. It seems to create a uniformity of distribution at a high intensity, but when moving towards the rest of the Axis, dark spots are created, where the spotlights do not overlap. No other part of the threshold is lit, creating a tunnel of light with a very dark periphery. This delimits the space to the path, instead of creating a cohesive open experience of the space. Even as the light creates inner light zones of the space, the intensity of the light completely eliminates the the rest of the threshold.	
Sequence freely selectable & guided			**Support** freely selectable
	Moving into the threshold coming from Karens Minde Aksen, only one path is available. Moving out towards the train station, the path splits in two, but because there are cobblestones between the two paths, it is also possible to freely choose your own way.	The space facing the train station is fully lit, and there is no distinction between the suggested path or the other space. The space contains 16 fixtures, which would often make it possible to create a rhythm, but since they are concentrated around 5 poles, they do not. As such, the light denotes a freely selectable sequence, contradicting the spatial sequence.	
Geometry ordered			**Support** free
	The geometry of the threshold is made up by half circles and the space in between them, as seen in Bispebjerg. Here, the path is marked by the space between the circles, so even though the path's geometry is not strictly ordered, it gives that impression, as the negative space of orderly circles.	As indicated in the high lux measurement, it is possible to have a high level of visibility when in the threshold space. However, this also makes it harder to orientate yourself visually in the nearby space, which can create insecurity. The light does not highlight the geometry of the space as ordered, but spills out over the pathway and creates dark pockets on the path.	

	The Space	The Light	
Topography embedded			**Support** independent
	The threshold is fully embedded in its adjacent spaces, with no delimitating structures. Only the materiality changing is indicating a new or other space.	The high distribution and down light clearly delimits the thresholds from its adjacent spaces, making it into its own space, and is not supporting the space as being embedded.	
Materiality neutral & distinctive			**Support** neutral
	The path of the threshold is denoted by yellow bricks and the space between paths is cobblestones. The paths of the surrounding spaces are pavement made from cement tiles, and the road from asphalt. This gives the materiality of the threshold a distinctive expression, though the bricks are the same as those of the surrounding buildings, thereby giving an overall neutral feeling of the space as a whole.	With yellow bricks having a reflectance of 0.25-0.35, a high level of illumination is necessary in order to have the area properly lit, which this lighting certainly succeeds at. With the fixtures having a CRI of 80, the rendering of the color of the materials is good. This support the materials as being neutral but not distinctive.	
Furnishings self-contained			**Support** self-contained
	As also seen in Bispebjerg, the furnishings are all self-contained, made up of bushes, four benches, two trashcans and five light poles. They are placed on the border of the path, helping to define the space.	Two benches are bathed in a uniform, high lux white light with a CCT at 3000-4000 from high fixtures at approximately 7m facing the road. This creates a strong feeling of being exposed when sitting on the benches. The remaining two are placed in the middle and have no lighting at all, which can sow insecurity for the people walking by. The light here both supports some but not all the furnishings as being self-contained.	

Summary

Karens Minde Aksen's transitional space succeeds in creating a twin phenomenon of the nature/man-made polarity in the in-between space, by bringing both nature and movement into the space. However, the analysis has shown that this is not supported by the lighting, which neglects the natural elements of the transitional space, tying it exclusively to the road. The threshold analysis reinforces the conclusion that the lighting is unsuccessful, as the sequence, materiality, and furnishings of the space are supported by the lighting, but often at the expense of other elements.

Evaluation

Using the framework to analyze Karens Minde Aksen highlights its strengths. The Axis has been widely regarded as a success and received praise and prizes. Yet the nighttime lighting leaves much to be desired. With the significant differences in lux (almost complete darkness next to scorching spotlights), a generally discomforting atmosphere, and the simple fact that people avoid walking there at night, the light in both the park and the transitional space have deep problems – problems which most lighting designers would plainly see. However, rather than simply pointing out obvious issues with the lighting, the framework allows a more complex and nuanced examination of where the problems stem from, and what can be done to change them. The focus on polarities and integrating the light with the existing lighting regimes allows us to consider small interventions that improve the lighting and atmosphere without introducing a new lighting regime and overloading the nightscape.

When examining a transition between *contradictory* spaces with a need for balanced and cohesive nighttime lighting, and neighboring spaces with unsatisfactory lighting, the framework provides a strong tool for analysis. For this reason, I have chosen Karens Minde Aksen as my case to redesign, to see what results the analysis can yield.

8. CREATING TRANSITION

- A Design framework

A central point of this thesis is the importance of a structured, deep, and rich analysis of the space when examining and designing light. It is my hope that my framework can contribute to such work. However, for the framework to be valuable, it should also be possible to use the analysis of the spaces meeting and the transitional space, directly in a design process. This section tests the design capabilities of the framework in a design proposal for the case of the transitional space at Karens Minde Aksen.

FRAMEWORK – DESIGN

Compiled in the below figure are the lessons from section 6: transforming and uniting theories, which serve as a guide for designing light for a transitional space.

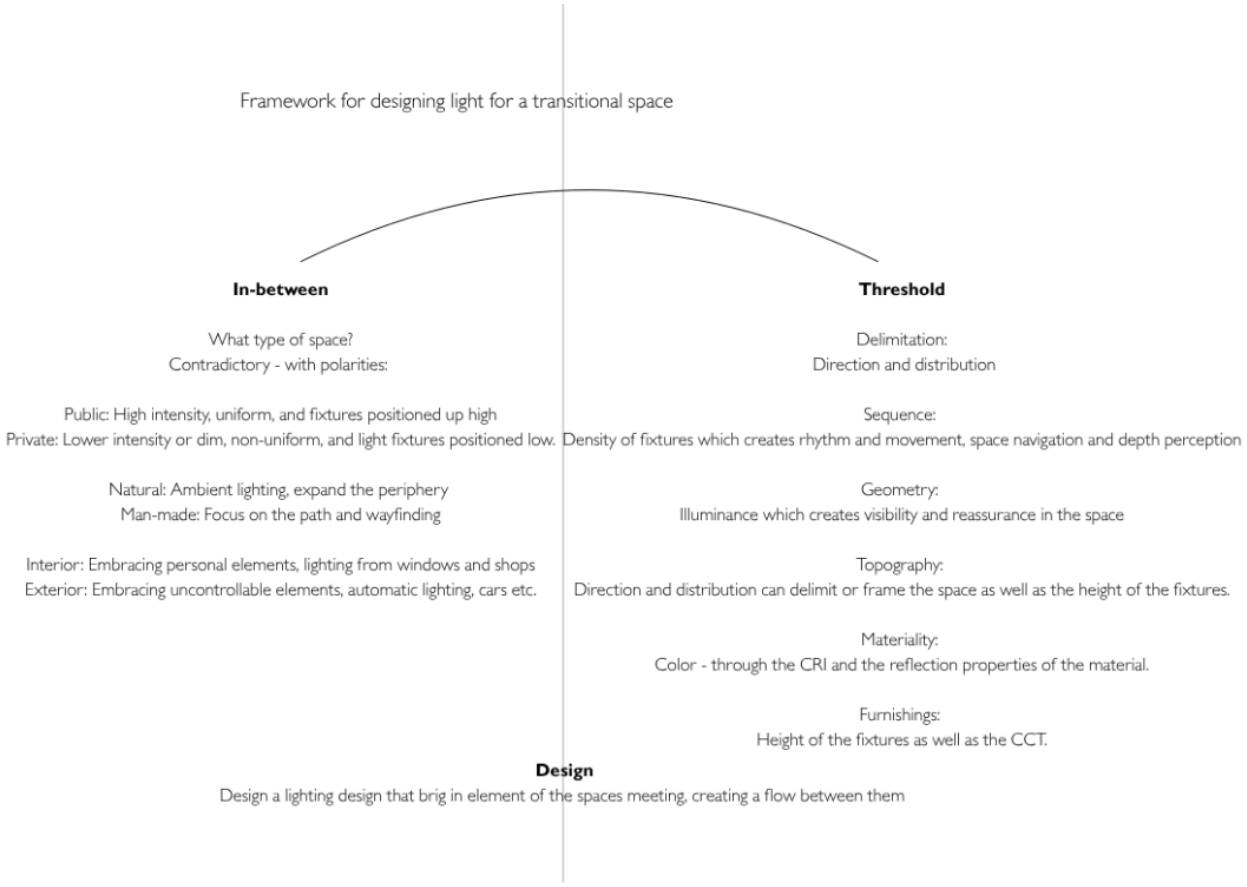


Figure 33: Framework for designing light for a transitional space (Strunge, 2025)

APPROACH

When designing light for a transitional space, a lot of moving pieces have to come together. We need to combine the results from the spatial analysis with the existing light regimes which border and create the transitional space, all while injecting our own creative vision into the design.

In the case of Karens Minde Aksen, the light in the adjacent park is not designed with regard to beautification and periphery, focusing exclusively on the path. In such a case, adding beautifying periphery lighting to the transitional space and disregarding the park's lighting would undermine cohesiveness and the whole, simply adding another light regime to the nightscape. Even if this would perhaps result in the best self-standing lighting design, it would not result in a successful transitional space. My goal, therefore, is to create a space that fuses the existing lighting regimes, while still improving upon the shortcomings of the adjacent spaces.

The biggest difference in the lighting of the park and the road is in its distribution, with the more diffused streetlight of the road and the intense spotlights in the park. In addition, the park contains fixtures both high and at medium height, whereas the road contains only high fixtures. To accommodate this, light in the transitional space should therefore be a narrow defused light distribution, with medium height and a neutral CCT.

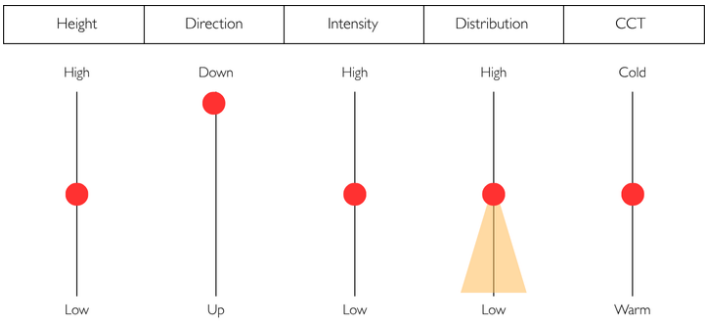


Figure 34: The Lights qualities anchored in the path in the transitional space (Strunge, 2025)

The overall elements which should characterize this lighting design stem from the in-between analysis. Here, the above identified characteristics of the light can be applied to highlight the man-made aspect of the space. By changing the beam of the light to be more defuse rather than the sharp beam which exists currently, the space's organic geometry will be enhanced with a softness, underscoring its ordered geometry.

As for placement, the current lighting creates a sharp delimitation of the space illuminating all of the path, creating a tunnel of light with a few dark spots. To loosen up the space and avoid this harsh delimitation, less of the surface should be illuminated to instead accentuate the openness of the

space. This will also mitigate the light tunnel effect and create an understanding of the space as embedded rather than independent.

Rather, fixtures should be placed in a pattern leading the user through the space. Placing a fixture at each bench accomplishes this task, in addition to accentuating the benches as self-contained furnishings. This will also alert passers-by to the presence of people using the benches, contrary to the situation now, where they are in darkness. To ensure that the material of the space gets reflected clearly, the fixtures' CRI should be of 80 or above.

On each side on the path is an entrance to an old bunker, located between bushes and trees. In my design, these bunker entrances are illuminated with a low up light with warm CCT and a narrow beam, acting as architectural effect lighting and creating opposition to the down light of the path and neutral CCT. By virtue of the bunkers being located in the greenery, combined with the intensity of the light being low, the periphery of the space is opened up when walking along the path, delicately supporting the nature polarity of the space.

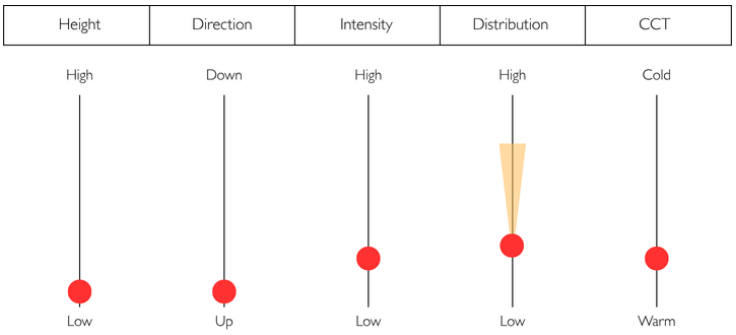
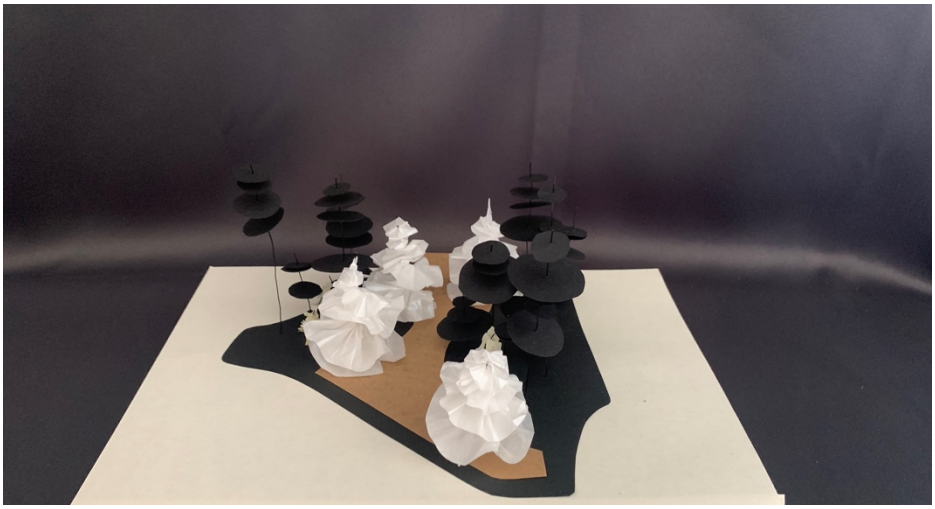


Figure 35: The Lights qualities anchored in the greenery in the transitional space (Strunge, 2025)

The transitional space

Semi opaque white paper twisted in a downward spiral, placed at the benches, create four light columns, lighting the way through the transitional space, while inviting the passer-by to stay for a while. Gathered semi opaque yellow paper shines like pillars on the bunkers adding interest to the greenery – fashioned of black circles, reminding us of a time past.



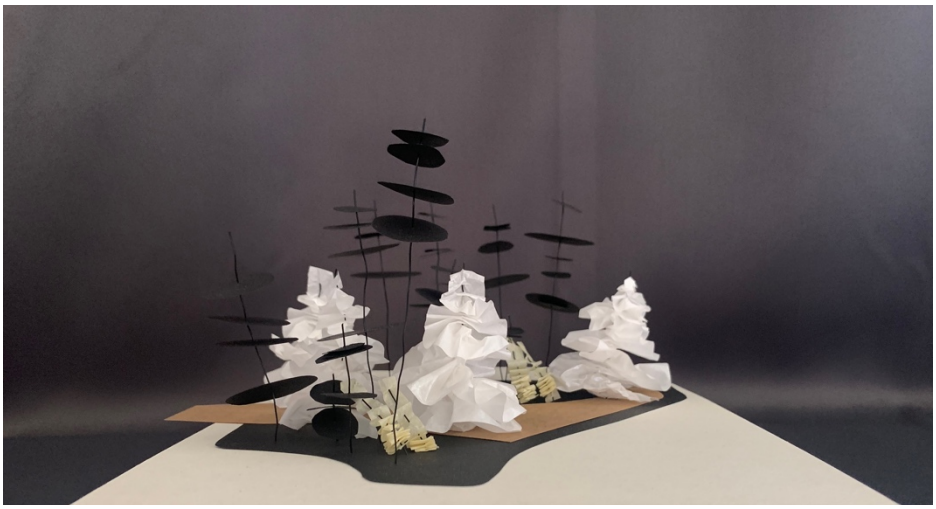


Photo 2: Top – Overview of model (Strunge, 2025)

Photo 2: Below – Sideview of model (Strunge, 2025)

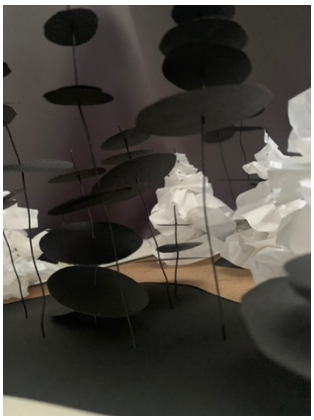


Photo 4: Top – Complete overview of model

Photo 4, 5, 6: Below – Close-up view of model

The transitional space + its adjacent light regimes

Semi opaque paper in circles spatially layered – representing streetlights – tower over the other light sources, but by virtue of the airiness do not take up too much room. Gathered white paper in a cone – the harsh spotlights in the park – makes looking through them impossible, illustrating their massive presence in the space. In this context, the twisted cones serve as a medium between the two poles, connecting, creating transition.

Photo 5, 8, 9: Over- and sideview of the model with the adjacent spaces lighting (Strunge, 2025)

9. MOVING FORWARD

- Discussion of application and future works

My hope for this thesis is that I have created a framework for analyzing and designing light for transitional spaces which can serve as a useful tool for other lighting designers going forward. To increase the likelihood of this, this section discusses the strengths and weaknesses that have become clear while applying and evaluating the framework to the three examined cases.

An overview of the spaces and the lighting designs' ability to support them as in-betweens based on the analysis has been compiled in figure X.

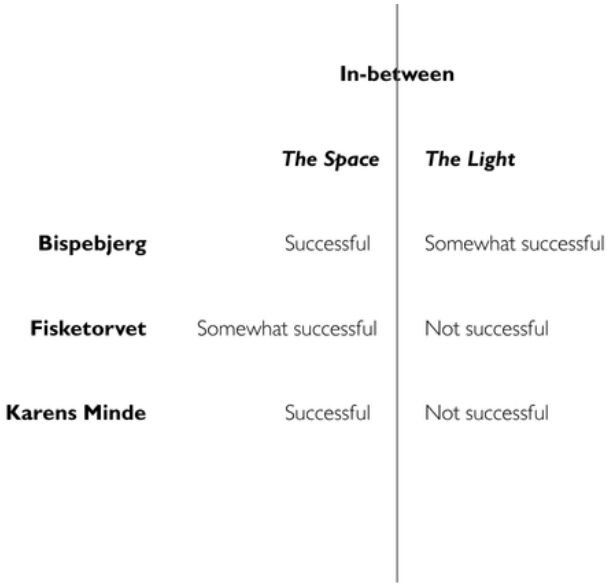


Figure 36: Overview of the cases as successful or not in-between spaces and the lights ability to support them (Strunge, 2025)

Overall, I found the framework to be helpful to my process, and add structure, rigor, and depth to my analyses of the transitional spaces. The combination of the in-between approach for analyzing context and the threshold approach for analyzing specific aspects of the space complement each other well, without becoming so rigid as to undermine my own intuition and eye. Analyzing the cases with the framework showed that the architecture was generally more successful in facilitating transition and cohesion than the light was, indicating the need for this framework.

However, the framework had some shortcomings, which limit the usefulness of it in analyzing specific types of cases. Most importantly, my choice of limiting my scope to *contradictory* spaces only, requires the designer to be acutely aware of pitfalls in the case of a *hierarchical* or *similar* space.

In the Bispebjerg case, the spaces meeting could be viewed as *contradictory*, which yielded a useful critique of the lighting, but which was unable to sufficiently address the fact that one of the adjacent spaces was completely darkened. Had the framework allowed me to consider the space also as *hierarchical*, with darkness and light as the polarities of different configurative levels, it would have been possible to understand this aspect of the space, its consequences, and whether different lighting choices could support the transitional space better.

In the Fisketorvet case, the connected spaces were straightforwardly *similar*, which resulted in a lack of polarities and thus an unproductive in-between analysis. In the case of *similar* spaces meeting, the transitional space needs not combine their characteristics but articulate them, which van Eyck would do by enhance the different aspects of the *similar* spaces within themselves.

As I argued in section 6: Transforming and Unifying Theories, both *hierarchical* and *similar* spaces are especially context-specific, which makes the usefulness of a generalized framework more questionable (and establishing one more complicated) than for *contradictory* spaces. Even so, incorporating some considerations surrounding *similar* and *hierarchical* spaces into the framework would enhance its utility and prevent designers from feeling unsupported when facing these types of spaces.

A second issue of the framework is the risk of sticking to it too closely. Evaluating my own use of the framework, it is clear that there are important aspects of the transitional spaces which I miss or undervalue, because they are not included in the framework. At Fisketorvet, I focus so heavily on cohesiveness that I nearly label the design as unsuccessful, despite the staircase clearly adding value to the nightscape and the experience of its users, exactly by overruling its context.

At Bispebjerg, I neglect going deeply into the polarity of light/dark because it is not one of the polarities I have elaborated on. In section 4: Creating the Way, I clarify that private/public, nature/man-made, and interior/exterior are merely a sample of the many possible polarities. And yet, in the analysis, I forget to heed my own advice.

So, let me here expand on my earlier clarification: The framework is useful only if the designer is able to still keep an open mind. Sticking to the framework too closely will yield analyses that are as biased and unnuanced as going off of intuition alone. It is the combination of a rigorous approach and the intuition/eye of the designer, that will result in a deep understanding of the transitional space, and hopefully in a strong and successful lighting design.

One other important point for me to mention: My choice of cases has turned out to yield a few blind spots, since all three cases aligned with regard to several of Boettger's threshold aspects. All three cases contained ordered geometry (as opposed to free), and all three cases contained guided sequences (although Karens Minde is also freely selectable). As a result, it is not clear how the framework will function when applied to a space with free geometry, or a space with only freely selectable sequence. The aspects identified in each space, and the ability of the light to support those aspects, have been compiled in figure 37 below.

Threshold

	Delimitation		Sequence		Geometry	
Bispebjerg	open & closed	successful	guided	not successful	ordered	not successful
Fisketorvet	closed	successful	guided	successful	ordered	successful
Karens Minde	open	not successful	freely selectable & guided	somewhat successful	ordered	not successful

	Topography		Materiality		Furnishings	
Bispebjerg	embedded	somewhat successful	neutral	not successful	self-contained	not successful
Fisketorvet	independent	successful	neutral & distinctive	somewhat successful	unobtrusive & self-contained	somewhat successful
Karens Minde	embedded	not successful	neutral & distinctive	somewhat successful	self-contained	somewhat successful

Figure 37: Overview of the different elements in each of the case as thresholds and the success or not of the lighting to support the space (Strunge, 2025)

The overall result of the analysis using the framework shows how and where the lighting differs from its spatial anchor point, which can contribute to explaining why the transitional spaces can feel disjointed from their surroundings at night, despite them being designed to connect.

FUTURE WORKS

It is my general view of the relatively new field of lighting design, that the field would benefit from generating more structured approaches to analysis and design. Structured approaches allow designers to challenge their own preconceived notions of 'the right way' to design lighting, and they can serve as the basis for generalized debates within the field, increasing knowledge and quality overall. While I intended to create a framework that others may take advantage of when designing light for transitional spaces, my deeper hope is that this thesis can also encourage professionals in the field to create and share more structured approaches to lighting design and analysis.

Possible places to start: Within transitional spaces, transitions between inside and outside would likely be strengthened by the addition of lighting theory specifically focusing on this; Interior to interior transitions function very differently from what I have explored and would benefit tremendously from a counterpart to this thesis' framework; Smart lighting, which is sometimes so focused on the technological capabilities that it becomes disconnected from atmosphere and experience, could instead be an anchoring force if used in conjunction with a framework for lighting in the context of shifting ambient light sources.

10. CONCLUSION

Through a state of the art in the fields of architecture and lighting design, the concept of transition has been examined. Two architectural approaches – van Eyck's theory of the in-between and Boettger's method of designing threshold spaces – were connected with different lighting design principles, creating a framework for analyzing lighting in transitional spaces.

Three cases of transitional spaces were analyzed, using the framework and the method of collage, in order to evaluate the efficacy of the framework. Finally, a redesign of one of the cases – Karens Minde Aksen – was proposed, to evaluate the framework as a design tool, and to answer the question:

> How can lighting be designed for transitional spaces which supports the architecture and creates cohesiveness with existing lighting regimes?

This thesis shows that light which supports the architecture in transitional spaces can be designed by anchoring the lighting design in architectural transitional theory. By analyzing the transitional space's distinctive elements in depth, it is possible to identify which elements need what type and amount of lighting to support the articulation of the space. By analyzing the spaces meeting in the transitional space and incorporating elements of them into the lighting of the transitional space, it is possible to ensure a cohesiveness with the existing lighting regimes, thus preserving unique site-specific lighting.

The framework developed in this thesis offers a structured approach to including both elements into an analysis of lighting for transitional spaces. While certain shortcomings of the framework presented themselves during the analysis, especially when the spaces meeting were similar or hierarchical in nature, it nevertheless provides a strong foundation for a more systematic approach to analysis and design of transitional spaces and can serve as a reference for developing other frameworks in lighting design.

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