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Le Vie dei Mercanti

World Heritage and Dwelling on Earth

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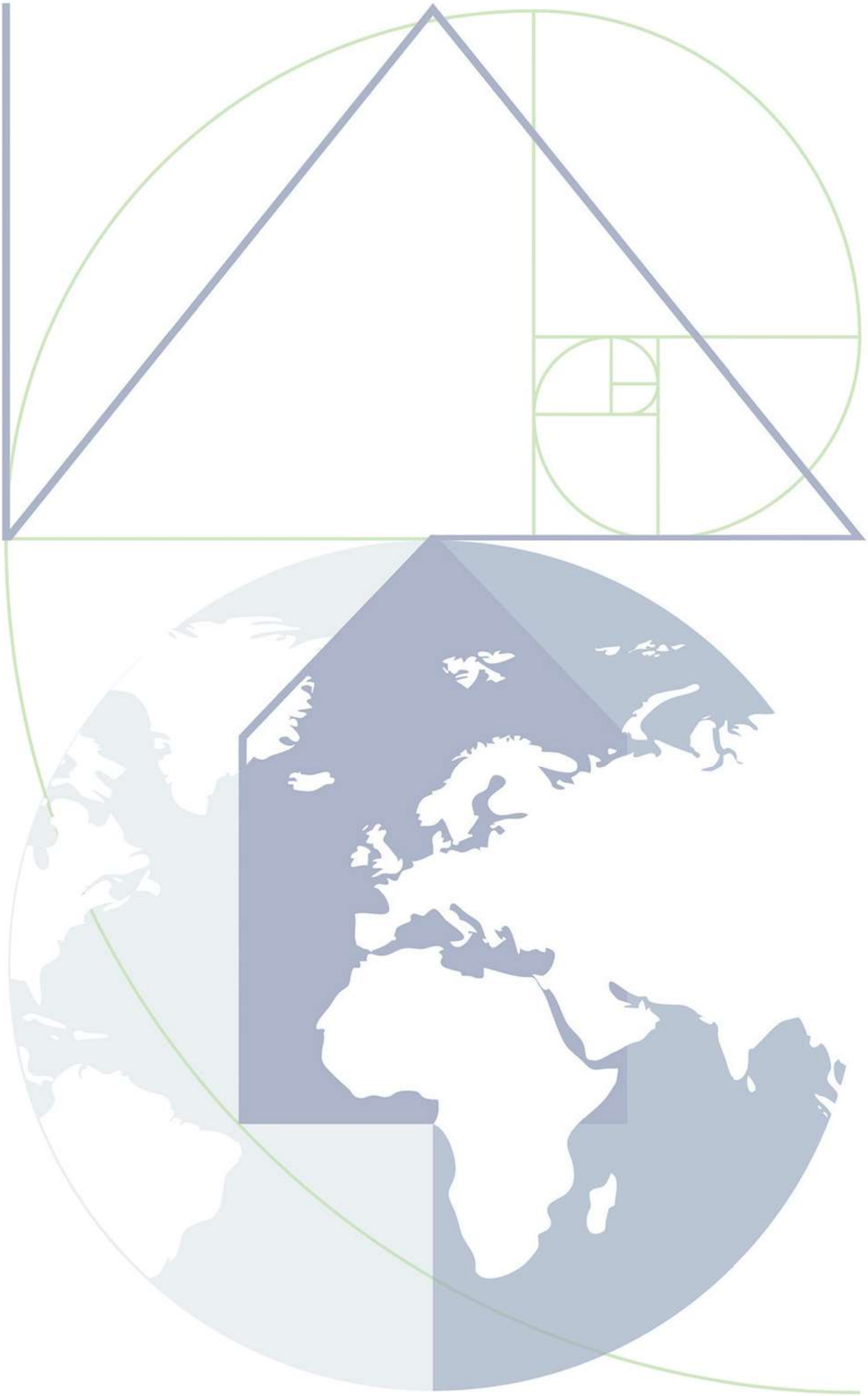

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The Rewilding Approach in Urban Design. The Case Study of Budolfi Plads in the Historic Centre of Aalborg (DK).

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Abstract
Dwelling on Earth responsibly means guaranteeing global environmental well-being, within which the habitable environment for human beings must find a new homeostasis. At the turn of the second and third millennium, tackling environmental degradation and halting the continued loss of biodiversity became a global policy goal.
In this context, new approaches to biodiversity conservation and ecosystem restoration are emerging, such as rewilding, an approach that aims to strengthen the adaptive capacity of ecosystems by restoring natural processes and minimizing human management.
The article analyses urban rewilding as a design approach aimed at restoring natural processes and reintroducing nature on an urban scale, evaluating its advantages and positive effects in terms of improving health, supporting biodiversity and contributing to the fight against climate change. The aim of the research is to explore how urban design can use urban rewilding methods and techniques for the regeneration of cities.
The article describes the transformation project of Budolfi Plads, the central square of the historic centre of Aalborg (DK), as an example of urban design adopting the rewilding approach. The project involved the transformation of a dreary parking area into a central place with mixed urban functions. By attributing a predominant role to greenery, the project represents an innovative turning point for urban design in a historic urban context.

Keywords: Rewilding; Urban Regeneration; Green Transition; Aalborg; Budolfi Plads

1. Rewilding as a strategy to face the environmental crisis
Tackling environmental degradation and halting the growing loss of biodiversity are among the most urgent imperatives at the turn of the third millennium, recently indicated as political objectives by the United Nations Decade on Ecosystem Restoration 2021-2030 [1], by the EU Biodiversity Strategy for 2030 [2] and by the Global Biodiversity Framework Post-2020 issued by COP 15 [3] as implementation of the CBD (Convention on Biological Diversity).
In response to the global environmental crisis, different approaches to nature conservation, biodiversity protection and ecosystem restoration are emerging. Among these, rewilding is conquering large fields of experimentation, an approach that aims to strengthen the adaptive capacity of ecosystems by restoring natural processes and minimizing human intervention or management [4–6].
The concept of rewilding emerged in North America in the 1980s [4], when it was originally called "wildness recovery" [7], and has become increasingly popular around the world [8]. Originally, rewilding was concerned with the conservation and restoration of native biodiversity [9], while reducing human pressures and control [4, 10], through interconnected networks of large-scale reserves established primarily to protect major interacting species and their trophic relationships [11].
The goal was to make regenerated ecosystems, where possible, self-sustaining by providing for the conservation of large core reserves, wildlife connectivity corridors and the protection of keystone species [12].

2. Urban Rewilding

While rewilding was originally associated with rural projects, it is also experiencing growing interest in the field of urban regeneration as a design approach that can deliver quality built environments through the use of natural resources and the incorporation of native plants and animals into urban infrastructure [13]. Urban rewilding seeks to restore natural processes and reintroduce nature on an urban scale by balancing the needs of humans and wild environments to create better urban landscapes for all [14].

Goal 11 "Sustainable cities and communities" of the United Nations 2030 Agenda for Sustainable Development states that cities and human settlements must be "open, safe, resilient and ecologically sustainable". A sustainable city must offer long-term well-being to its citizens without compromising the functions of the urban ecosystem. Consequently, a sustainable city concept integrates green practices, green spaces and assistive technologies into the urban environment to reduce air pollution and carbon emissions, improve air quality and protect natural resources. These practices result in a healthier environment for the inhabitants and a lower carbon footprint for the city.

Sustainable cities are becoming increasingly important in reversing global climate change. Urban rewilding can help mitigate the effects of climate change by making cities more resilient and delivering a number of benefits, including:

- Promote biodiversity by providing food and habitat for wildlife and forming green corridors to connect fragments of nature together;
- Reconnecting city dwellers with nature, enabling people to receive physical and psychological benefits, develop stronger connections with nature, and appreciate ecosystem dynamics and the aesthetic values of wilderness;
- Help create or inspire ecological and cultural change in society;
- Reduce the management costs of urban green using native species able to survive and reproduce in an almost autonomous way and without expensive maintenance interventions (planting, pruning, cleaning, irrigation);
- Contribute to local rainwater management, enabling the collection, storage and purification of rainwater and its subsequent reuse;
- Contribute to the reduction of urban pollution through the sequestration of carbon in the atmosphere;
- Help reduce the heat island effect in cities.

In urban rewilding, nature cannot be left completely free to conquer its spaces; it requires careful planning and is configured as a transdisciplinary practice involving the disciplines of urban design, landscape architecture, botany, environmental engineering and hydraulic engineering.

Urban regeneration projects have been initiated around the world as a response to biodiversity loss and the climate crisis [4] with reference to the science-based restoration of self-regulating ecosystems and the transformation of human-nature relationships [15].

Among the best known examples: the Promenade Plantée (1988-1993, project by landscape architect Jacques Vergely and architect Philippe Mathieux); the pedestrian sections of the Petite Ceinture railway in Paris; the High Line in New York (2006-2009, architects Diller Scofidio+Renfro and landscape architect James Corner Field); the Garden by the Bay in Singapore with its 18 Supertrees; Nottingham's Broadmarsh Shopping Centre transformed into an urban wetland oasis; the Qunli National Urban Wetland in Haerdin (China), an urban park that provides ecosystem services and restores natural wetland habitats; the All-Ireland Pollination Scheme, which bans lawn mowers and pesticides in parks, roadsides and green areas to encourage the growth of plants and wild flowers essential to bees; the Stadte Wagen Wildnis Project in Hanover, Frankfurt and Dessau which reserves abandoned industrial areas for wild nature for the creation of new habitats for animal and plant species; Queens Plaza in New York (project by landscape architect Margie Ruddick) conceived as an island of wild herbs.

The wild urban garden as a device for safeguarding and increasing biodiversity is at the centre of the research of landscape architects such as, among the most innovative, Gilles Clément [16–18], designer of the Parc André Citroën, the gardens of La Défence, the garden of the Musée du quai Branly in Paris, etc., and Nigel Dunnet [19, 20], designer of the Olympic Park in London, the Barbican Centre in London, the suspended forest of Porta Romana Park in Milan, etc.

Numerous scholars have dedicated themselves to the theme of rewilding [21, 22] who outline a new positive environmentalism by restoring and regenerating damaged ecosystems. Among them, Massenberg notes that, particularly in Europe, characterized by densely populated areas and a long history of landscape cultivation, rewilding also affects socio-economic and socio-cultural dimensions. He suggests a holistic approach to rewilding, addressing the complex interplay between ecology, society, economy and culture [5]. He also notes that positive perceptions of rewilding by local residents are crucial to the successful implementation of the practice. Humans tend to appreciate the kind of nature and landscapes they have known since their youth [23]. Therefore, the loss of diverse and traditional cultural landscapes associated with historical and cultural heritage, a sense of place and a certain landscape aesthetics can represent a serious social brake on rewilding [24–26]. To overcome

the dualistic misunderstanding of man-nature relations in which humanity is outside nature, a social construction of the landscape through participatory approaches is needed.

3. Case study: the rewilding of Budolfi Plads

The contribution presents the redevelopment project of the Aalborg cathedral square, which began in March 2017 and was completed in November 2019. The project is inspired by the practice of rewilding and addresses the delicate issue of introducing wild nature into the historic centre of the city.
In this case, the theme of the transformation of historical contexts had to deal with both the dichotomy between conservation and innovation, and with a radical change in the historicised image of places. All this required a long and intense public debate, supported by the Municipality of Aalborg, which was attended by citizens and experts in landscape architecture and environmental engineering.

3.1. Context history

Budolfi Plads (Budolfi Square) is located in the heart of Aalborg, a city located in the northern part of Denmark. The city of Aalborg is the third largest city in Denmark, with a population of 221,082 (2021 data).
The city of Aalborg developed in the Middle Ages around a main east-west road, Algade. Around the year 1000, a church dedicated to Saint Budolfi was built in the centre of the main axis [27]. The Church, which became a cathedral in 1554, has always represented an important point of reference in the city of Aalborg [28]. Over time it has undergone numerous expansions and renovations that have combined the Gothic and Baroque styles.
The neighbourhood where the church stands, called Skolegadekvarteret due to the presence of a school, is one of the oldest. In the mid-fifteenth century, numerous manufacturing activities settled in this district which gave it an industrial character, as well as pubs, brothels and gambling halls which connoted it as the entertainment district of Aalborg [27]. As the city grew, the neighbourhood became very busy and featured many narrow, winding streets.
In the 1930s, when new, wider and more regular streets were built in Aalborg to accommodate vehicular traffic, Skolegadekvarteret became a slum district and was considered an unsanitary, infectious and morally depraved place. Between 1936 and 1939, the Municipality of Aalborg decided to rehabilitate the neighbourhood by demolishing 43 buildings and acquiring ownership of the freed land [27]. The streets were widened to accommodate cars and Skolegade changed its name to Vingårdsgade, hoping to remove the bad reputation as well. A square used for markets and events was built around the church.
After the Second World War, urban culture placed great value on modernizing historic urban areas with the introduction of parking lots and supermarkets. Thus, in the early 1960s, the Municipality rented the area of the square to private entrepreneurs for the construction of a car park, offices, shops, a petrol station and a public shelter. The contract covered an area of approximately 4,800 m2 and had a duration of 52 years (expiring on 1 January 2012). Upon expiry of the contract, both the land and the structures built will return to the property of the Municipality.
Following the design lines of the time, it was decided to create a dense settlement around the Budolfi church, in order to enclose the churchyard in a more measured space as was characteristic of medieval settlements. Even the functions of the new buildings had to respond to the new needs of modern life: thus, a supermarket was born, the first Kvickly in Denmark; the Budolfihus office building in a functionalist/modernist style; two office buildings, Algade 53 by Danske Bank and Vingårdshus. The car park was built on two levels, taking advantage of the irregularities in the terrain, and was equipped with a petrol station (Fig. 1).

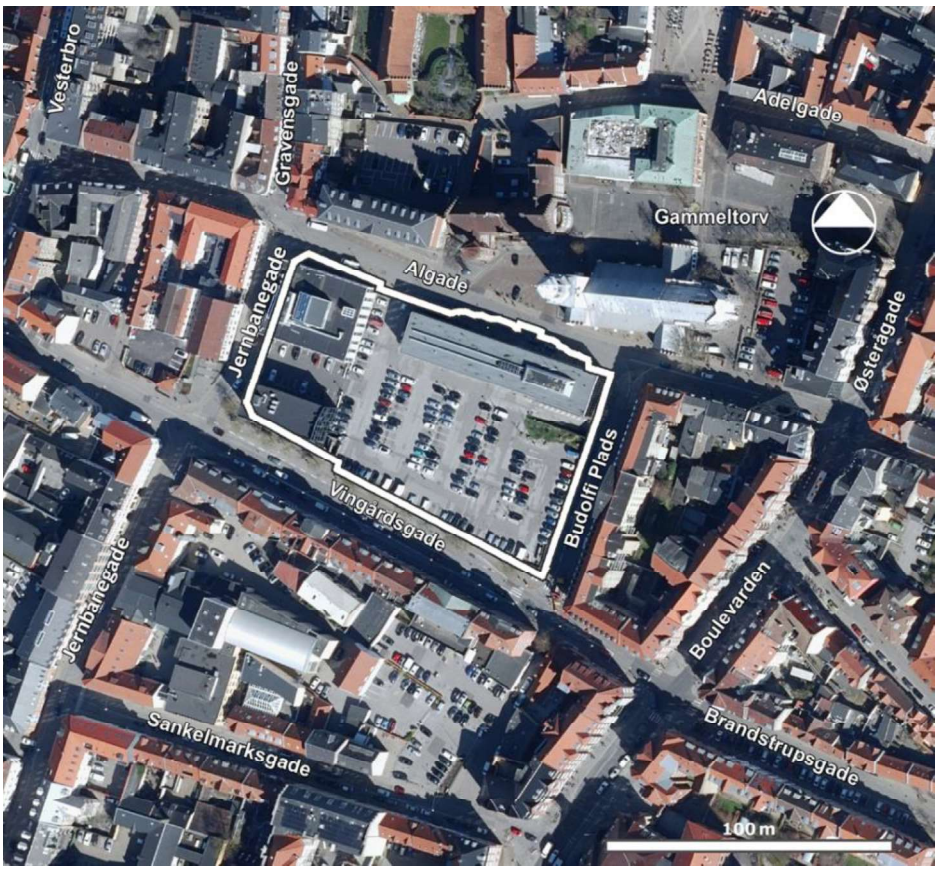

Fig. 1: Budolfi Plads before the transformation. The white outline indicates the area under transformation. Source: Aalborg Kommune, 2017.

3.2. Urban regeneration and public debate

By the end of the 20th century the square had taken on a dilapidated appearance. In this period Aalborg had started a process of urban regeneration to guide the transition from an industrial city to a city of culture and knowledge [29]. The 2004 Comprehensive Plan for Aalborg Midtby envisaged the redevelopment of the areas surrounding the Budolfi Church: the indications of the plan envisaged the creation of a garden at the eastern end of the church and the arrangement of the existing parking lot, to give the character a worthy forecourt [27].

In view of the expiry of the lease (2012), in 2010 the Municipality started a public debate to discuss the potential of the site. In 2013, the area was the subject of a public tender. The sale, however, was not completed as the offers received were too low or did not comply with the tender requirements [30].

In 2015 there was a second debate; this time the debate was based on a draft proposal that the Municipality of Aalborg had developed in collaboration with the landscape architecture studio SLA and the real estate entrepreneurs Sadolin & Albæk [31].

To create a co-base for comparison between the various sub-surveys, all the proposals and comments have been grouped into four general themes: Urban space and urban life, Construction and use, Traffic and parking, Temporary use and furniture.

Some widely shared proposals emerged from the debate, including: the area should take on a green and inviting appearance; the history of the place had to be valued; the market function had to be re-proposed in more modern and functional terms; commercial activities and meeting places such as shops, cafés and restaurants were to be envisaged. The general vision was to create an oasis of peace and tranquillity in the centre of Aalborg, a green recreation area equipped for playing, meeting and socializing (Fig. 2) [31].

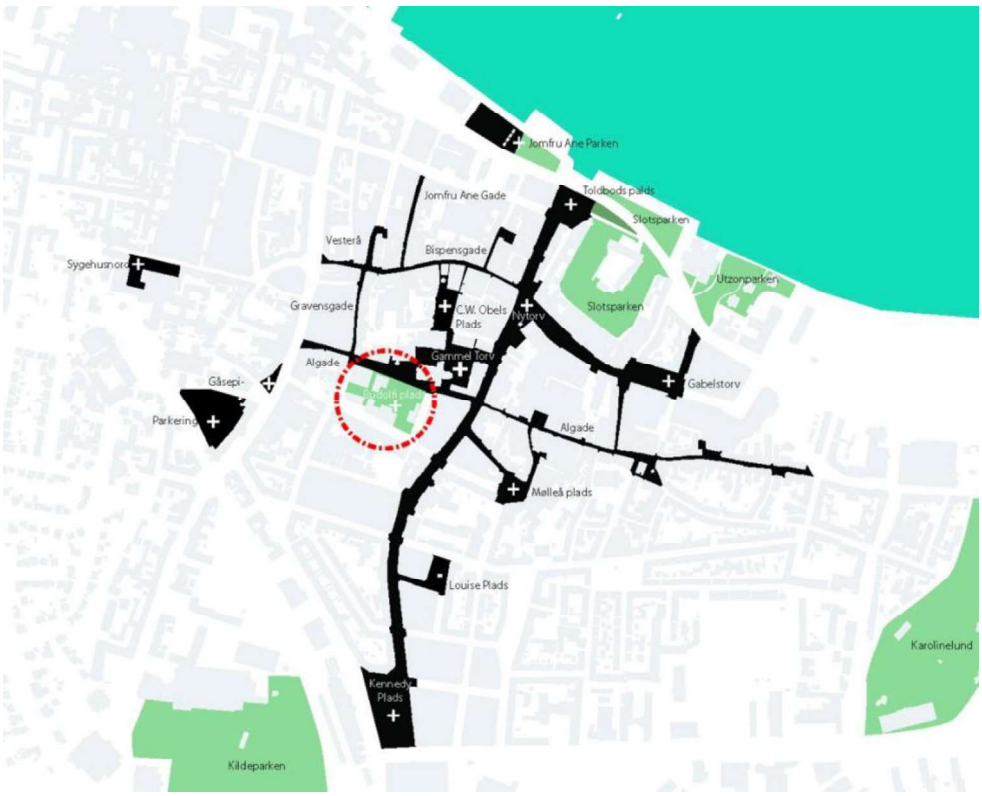

Fig. 2: Location of Budolfi Square in the historic centre of Aalborg. In black: connections with the central points of the historical centre. In green: urban spaces with green areas. Source: Aalborg Kommune, 2017.

3.3. The regeneration project

The proposal for the square project obtained largely positive approval, for which a new tender for the executive design was published. The tender was won by the consortium composed of NCC Construction Danmark A/S, Udviklingsselskabet Viben A/S and Rema Butiksudvikling A/S (consultants: Kjaer & Richter A/S, byMUNCH, urban and landscape design and Balslev Consulting Engineers A/S) [32].

The most important problem was to reconnect the square to the cathedral. The Budolfihus building clearly separated the church from the square and the latter was essentially perceived as a desolate parking lot built in a back space rather than a central place in the city (Fig. 3).

Budolfihus was built in 1962 in a functionalist/modernist style (designed by architects Torben Stokholm and Christian Pedersen); the building had a cantilevered curtain wall above the base, curved walls with thin profiles in aluminium and polarized glass, a double-height central hall.

The National Association for Building and Landscape Culture believed that Budolfihus represented an era in the city's development of significant architectural and cultural-historical value. Although the National Association had recommended Aalborg City Council to protect the Budolfihus in order to preserve the entire post-war architectural heritage, the opinion prevailed to demolish the building in order to obtain a direct correlation between the Church of St. Budolfi and the square [30].

Fig. 3: Budolfi Plads before the transformation. The Budolfihus building separated the church from the square. The square was entirely occupied by a parking lot. Source: Aalborg Kommune, 2016.

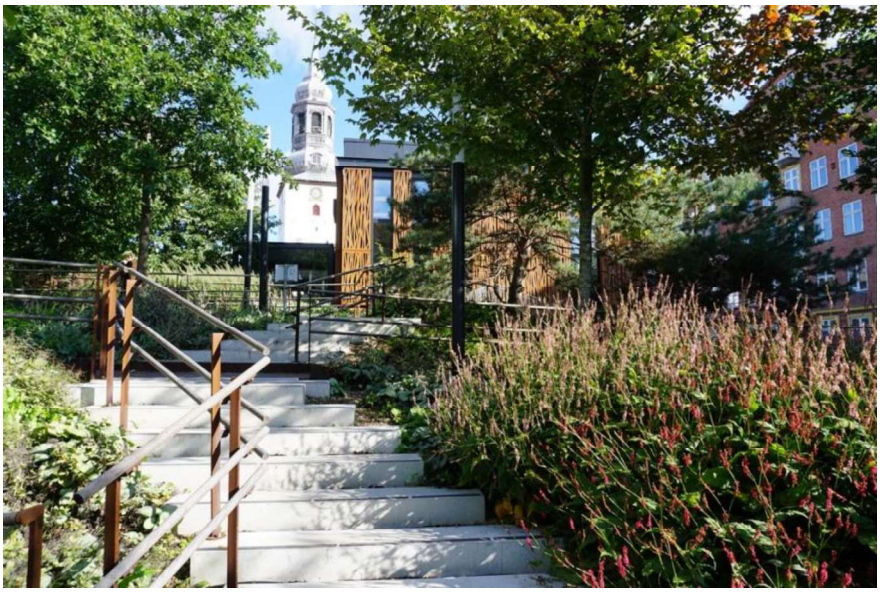

Fig. 4: Budolfi Plads after the transformation. An artificial hill covers the underground car park. The pedestrian area is richly planted with native plant species. Ph. A. Badami, 2022.

The project envisaged the following transformations (Figs. 5-6): the walking surface was raised so as to leave the surface entirely pedestrian and cover the car parks; the buildings surrounding the square have a common architectural language and are built in red bricks to recall the traditional building materials used for the construction of the houses in the historic centre; all the rooms that open onto the square level host public functions (restaurants, cafes, art galleries, shops) and, through open (transparent) and active (openable) facades, interact with the public space by supporting a good synergy between the urban space and the function of buildings; the upper floors are intended for residential functions with homes equipped with balconies or terraces to host private outdoor living spaces; green roofs and green facades support local stormwater management solutions; most of the square is intended for greenery.

Fig. 5: Transformation project of Budolfi Plads. Planimetry. Source: Aalborg Kommune, 2017.

Fig. 6: Transformation project of Budolfi Plads. North-South section and East-West section. Source: Aalborg Kommune, 2017.

4. Rethink greenery in the city

The Budofli Plads regeneration project provides an innovative contribution to urban planning in historical contexts for the original conception of urban green.

The innovative value of the project consists in enhancing the ecosystem balances of nature, regardless of the principles of aesthetic-formal evaluation of urban green intended as mere decoration. For the selection of plant species, the principle of collaboration was adopted, i.e., all species were selected by virtue of their ability to adapt, live, reproduce and support each other in local climatic conditions and within an urbanized environment.

The local transformation plan of Budolfi Plads [32] contains the list (Table 1) of tree plants, shrub species, tall and perennial grasses, flower bulbs and ground cover plants. The plants must be planted according to precise associations (Fig. 7): to obtain a luxuriant and varied planting of the urban space – both in terms of species, character, size and function – the trees must be made up of different species of hardwoods, conifers and flower that can vary over the seasons in terms of flowering, leaf colour, bark and growth forms. Grasses, perennial herbs and flower bulbs must be combined with a great diversity of species, taking into account different growing conditions and in such a way that a dense planting is created. Low plant density varieties are combined with high plant density varieties to obtain a high plant density degree.

PLANT SPECIES	
Trees	Robina Pseudoacacia, Gleditsia Triacanthos, Metasequoia Glyptostroboides, Prunus Maackii, Prunus Avium “Plena”, Prunus Padus, Pinus Sylvestris, Cedrus Deodara, Prunus subhirtella ”Autumnalis”, Quercus Palustris, Quercus Robur, Alnus Cordata, Acer Rubrum, Acer Campestre
Grasses	Stipa Pennata, Stipa Calamagrotis, Deschampsia Cespitosa Tardiflora, Carex pendula, Miscanthus sinensis "Ferner Osten"
Perennials	Echinacea 'Baby white swan', Salvia nemorosa 'Ostfriedland’, Persicaria amplexicaule 'Album', Sedum 'Matrona', Hosta Sieboldiana, Echinops exaltatus, Persicaria amplexicaulis, Hosta Halycon, Salvia nemorosa
Flower bulbs	Narcissus 'Mount Hood', Allium Christophil, Allium 'White Glant', Nectascodum silicium, Allium Sphaerocephalon
Ground cover plants	Brunnera macrophylla 'Jack Frost', Hosta Sieboldiana, Stachys Byzantina, Dryopteris filix-mas, Parchysandra terminalis
Pteridophytes	Foot fren Cotula Dioica Reptans

Table 1. Plant species foreseen for the street furniture of Budolfi Pads. Source: Aalborg Kommune, 2017.

Fig. 7: Tree species selected for Budolfi Plads. Examples of intercropping between species. Source: Aalborg Kommune, 2017.

The design of the square is conceived starting from the greenery. The general image appears as a slight hill full of vegetation inside which the paths leading to the top are inserted. The mix of conifers, deciduous trees, grasses, ground cover and flowers restores the experience of a forest, importing a piece of Danish natural landscape into the historic city centre.
On the south and north sides of the square there are two large stairways intersected by ramps that blend into the vegetation, like paths in the woods. The large square above is paved with large white cement tiles interspersed with flowerbeds, like natural ground on which paving stones are laid for circulation. The tiles are marked by sinuous grooves that recall the traces that microorganisms leave in the plaster deposits, also acting as an anti-slip (Fig. 8). The excess rainwater that runs off the pavement is collected and diverted to an underground tank so that it can be used to irrigate the area during dry periods.
The flooring recalls both the colour of the church of San Budolfi and the white Portland cement which is one of the most important industrial productions of Aalborg, a symbol of the city known and exported all over the world.

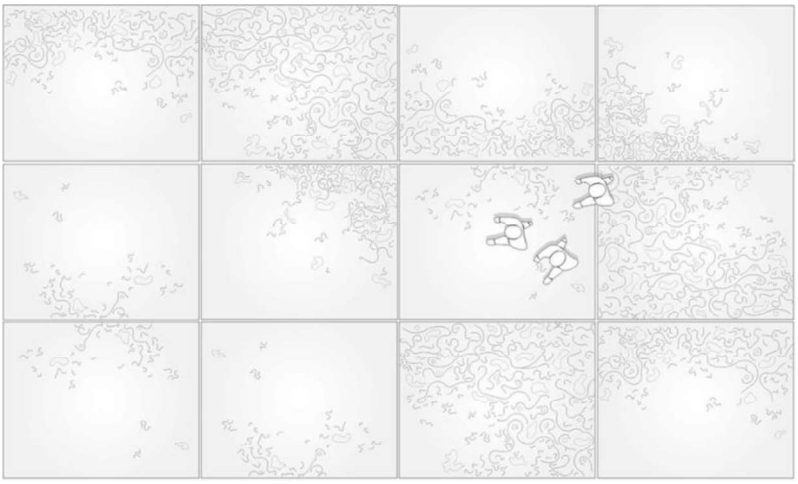

Fig. 8: Principle for engraving grooves in cement tiles. Source: Aalborg Kommune, 2017.

The furnishings of the square are designed to offer various and changing opportunities for rest and relaxation: chaise longues (Fig. 9), benches, terraces of bars and restaurants are distributed in such a way as to enjoy the most evocative views of the cathedral and the historic buildings that open around the square.

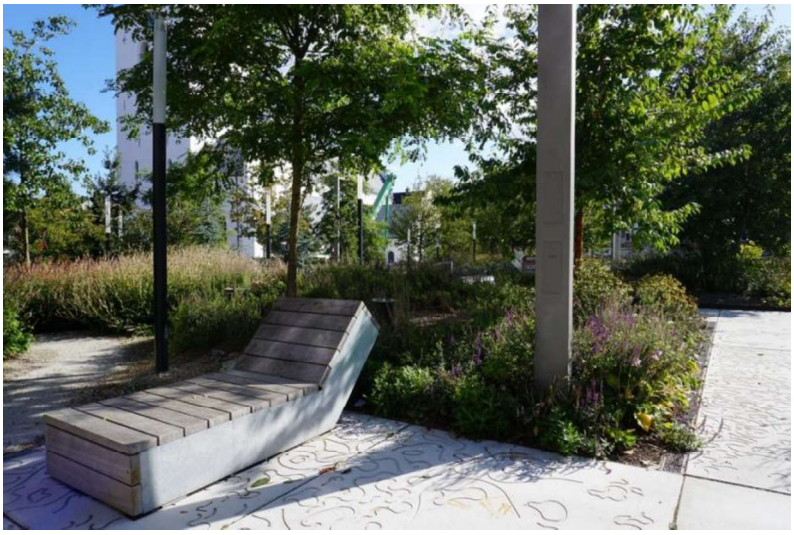

Fig. 9: Urban furniture in Budolfi Plads. Chaise longue in concrete and wood. Ph A. Badami, 2022.

Fig. 10: Render of the transformation project of Budolfi Plads. Source: Aalborg Kommune, 2017.

5. Considerations about the innovative value of the project

The project was awarded the Aalborg Municipality Architecture Award in 2020 for the harmonious combination of wilderness and architecture in the historic city centre. The Building Awards Committee wrote in its assessment that the heart of the city has been revitalized by removing traffic, inserting underground parking, increasing planting and biodiversity, and beautifully integrating the architecture, use and materials of the buildings into the historic area.

The project represents a breakthrough in traditional urban design. The open space was designed following the principles of natural ecosystems, reconstructing a piece of the Danish forest landscape. Covered surfaces and buildings adapt and integrate into this space, and not vice versa, reaffirming the priority role of greenery.

The urban policies implemented for the realization of the project involved citizens, specialists, investors and stakeholders in a process of cooperation. Dialogue and collective participation preceded the design phase and were the basis of the design choices. This ensured the appreciation of a project that transformed the appearance of the central square of the historic centre of the city to the maximum; moreover, the multifunctionality of the square has made it possible to respond to the various questions and expectations expressed by the different users.

The project has made a significant contribution to the environment and biodiversity. The vegetation is varied, lush and verdant, appealing to the senses and ensuring different experiences as the seasons change. The species planted have been chosen to increase biodiversity, to create variety in terms of spatiality and to insert a new green volume in a dense part of the city. Large trees have been planted to create lush greenery in a short amount of time, while a mix of hardwoods and softwoods allows for an evergreen expression to be maintained during the winter months.

The large biomass that the project has introduced into the area through the green roofs, flower beds and trees has multiple effects on the microclimate of the area: the vegetation absorbs CO2, absorbs polluting particles from the air and reduces the acoustic resonance between buildings; provides shade in the summer months reducing the urban heat island effect; helps reduce rainwater runoff and increases evaporation.

With the transformation of Budolfi Plads, a new green identity has been created in the heart of Aalborg offering accessible meeting places for people of all ages, thus strengthening social cohesion. Today the square is buzzing with life and has become one of the busiest and most loved central points in the city.

Fig. 11: Budolfi Plads. View of the elevated square from the east side. Ph. A. Badami, 2022.

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