1. Introduction

The central idea of Open Building is the distinction of Levels of intervention: Infill, Support and Urban Tissue (see fig. 1.). Until today emphasis of methods and practice has mostly been on the levels Support and Infill. This paper focuses on the level ‘Urban Tissue’, a promising field of the Open Building.

![Levels of Intervention diagram](image)

**Fig. 1** Levels of Intervention according to Open Building. By author.

The development of an urban tissue is an important part of the Open Building principles and methods. We speak of an urban tissue when we experience in a built (urban) environment a repetition of typical, interwoven, public, **out-door spaces**. The spaces follow a **morphological theme**. Some examples:

![Urban tissues](image)

**Fig.2** Different characteristic urban tissues with their typical morphological themes.
The Foundation for Architecture Research directed by Prof. John HABRAKEN, published in 1973 a design method for new urban tissues, the SAR73 (see 9). This paper and our presentation aim to report in short the experiences in practice of this SAR73 design method and also some findings and conclusions after 35 years.

At the end of 1980 the city of LEUSDEN (NL) appointed us, KOKON Architects and Planners in Rotterdam, to design a new urban plan for the district “Claeverenblad-Wildenburg”, consisting of 1200 dwellings in an overall density of 40 units per ha.. The plan was to to be developed in cooperation with city officials and to be accepted by the city parliament within the short period of three months.

The SAR73 method has been proved very economic in time and costs, and effective in documents. The design process that was completed within 3 month, has also been advanced by the Pattern Language as developed by Prof. Chr. Alexander (see 9). The officially passed SAR73 documents, based on the morphological OB-zoning, turned out to be a powerful and successful planning tool over time in the realization of an urban tissue.

2 ‘SAR73’, a methodical formulation of agreements in designing urban tissues

2.1 Urban Tissue

SAR73 defines an urban tissue as an agreement about the way in which public spaces and buildings within a city district are interwoven. Repeated typical spaces defined by built volumes form a recognizable morphological system or theme based on agreements. Such a spatial theme could be rendered in a model and provided with dimensions. The level of Urban Tissue is the scale of community spaces and therefore of social life in a city district. Social life happens inside the collective outdoor spaces such as streets, canals, squares, courtyards and alleys. Urban fabric is knit from elements at the human scale. In the first place we recognize this by the form and mutual relationship of the outdoor spaces in which people move and stay, walk and play. Secondly we recognize an urban fabric in details of building facades, or in the placement of trees, but over time they become less consistent. That’s why form and relationship of typical outdoor spaces define the essence of an urban tissue and often survive the movements of social life in a district.

2.2 Zoning

The SAR73 design method distinguishes 2 elements of urban tissue: spaces – streets, squares, canals, alleys - and built volumes by which they are created – housing, offices, schools etc.. Spaces and buildings can be thematic, meaning their form and interrelation are typical and systematically spread in some way over the district. They follow specific rules, the essence of an urban tissue. Spaces and buildings can also be non-thematic, when they are local exceptions on the theme.

SAR73 offers a simple but effective way of notation of the position and dimensions of thematic spaces and buildings in the planning, called a O-B zoning (fig. 4). The zoning is the basic document. It presents O-zones: the un-built areas, the open spaces, B-zones: areas which should be built, and OB margins: areas that might be built. An O-B zoning regulates thematic spaces, thematic volumes and the margin in between, the ‘play’ area.

Fig. 4 O-B zoning document to form a tissue model. Example from SAR73. With permission.
3. The Leusden Experience, plan preparation

3.1 The site

In this Overall City Plan (Fig. 3) two major design elements were given. The first one consists of four possible car entrances into the district area from two main traffic roads - the four arrows. The second one is a ‘green’ zone of 40m width, 700 m long through the central axis, with a tree lined ditch named “Kupergracht”.

3.2 The Thematic Spaces

A team of 4 experts on traffic, civil works, plantations and costs and myself as urban designer, introduced the ‘SAR 73’ design method. In the LEUSDEN project the following six thematic spaces (Fig.5) have been discussed: 
A. Central canal with front sides of houses, B. Car-parking street, C. Pedestrian canal or street, D. Common back-yard, E. Square, F. Court.

Fig. 5. The 6 thematic spaces A - F of the Leusden project.
The ‘Patterns’,

The team accepted also the ‘Pattern Language’ (Alexander c.s.) as a tool for communication and agreements. A pattern is the description of supposed or expected human functioning - the question (Q), related to a form idea, - the answer (A). The discussion leader reported weekly about the meetings to the responsible alderman of the city for housing. During the first 4 meetings we discussed, the following 4 basic patterns (summarized).

3.3.1 Pattern 1. “KUPER CANAL”(A).

Q: The original beautiful green ditch zone with old trees is valuable and should therefore be public accessible. A: Design a Canal Space with green slopes, small traffic roads and fronts of houses on both sides, forming a beautiful central axis through the entire district.

3.3.2 Pattern 2. “SIDE STREETS”(B,C) and “BACK COURTS”(D).

Q: How to create a relationship between the Kuper Canal and the surrounding housing? A: Let side transverse streets slightly slope down to the Kuper Canal. Q: How to realize a high parking norm of 1.7 in a quiet neighborhood? A: Alternate pedestrian streets with car streets, keep main parking in the car streets, plan big quiet back courts and allow ad limited parking in back courts and near pedestrian streets.

3.3.3 Pattern 3. “OBSTACLE SQUARES”(E).

Q: How to prevent high speed in a long street? A: Create halfway the long car-parking streets small attractive parking as obstacles.

3.3.4 Pattern 4. “DEAD-END COURTS”(F).

Q: How to create quiet corners in this neighborhood? A: Design half open courts on the outer side of the district area. Here is no through-traffic possible.

3.4 From Theme to Model

These 4 patterns have been integrated, forming the theme of the urban tissue. By introduction of dimensions such as the minimum depth of private gardens, the width of the central canal, the width of the parking streets and the width of the pedestrian streets we designed the tissue model, drawn in a O-B zoning (Fig. 6).

The model presents the morphological essence of the urban tissue. The typical public spaces and building volumes have their minimum and maximum dimensions and their unique place in relation to one another: The spatial characteristic of the new district.

Fig. 6. O-B Zoning of the Tissue Model, The capitals A, B, C etc. present the thematic public spaces.
4 The Plan

4.1 From Model to Plan

During the work on the model, we tried to apply the model on the site resulting in an O-B Zoning Plan (fig. 7). Special objects or places have been integrated in this action, like:

1. The original straight ditch became a canal with a main traffic lane for bicycles. The western part of the canal had to be bend in order to connect the bike lane perfectly to a swimming pool west from the plan area.

2. In order to prevent fast driving through-traffic in the district, cars cross the canal only near pedestrian streets.

3. We decided to use all 4 car accesses to the district and after a short entrance street they split into two directions and so reduce traffic in the car parking streets.

4.2 Additional Agreements

The O-B zoning is the basic document of the urban tissue. Specific agreements are documented as: ‘Traffic Categories’(Fig.8), ‘Trees Plantations’(Fig.9) ‘Function allocations’(fig. 10), ‘Main Piping system’, ‘Wiring systems’, ‘Trial Allotment of different housing categories’(Fig. 11), etcetera.
Fig. 8. Traffic Categories Plan

Fig. 9. Tree plantations

Fig. 10. Function allocations
5. Realization of the Urban Tissue

5.1 O-B zoning formalized

The O-B zoning plan and the technical and functional agreement plans on the zoning plan have been established as official planning documents of the city of Leusden. Corporations and other developers, as well as hired architects used them as a solid base for realization of housing. Some decisions, like the height of the buildings and some architectural accents on street corners, were added on in a later stage.

5.2 Developers and Architects

The realization of the housing projects took 10 years, an average of 120 units per year. All developers and architects respected the zoning of the urban tissue, using the margins between built and un-built as their artistic 'play-ground'. They had no problem accepting the O-B zoning and agreements. They rather felt inspired in their work by the clarity of the Urban Tissue plan. To illustrate the urban tissue to the citizens of Leusden, a model of the whole district, based on sketches of the first 5 architects was shown. Without going in detail one can understand that it is evident that non-thematical, exceptional, spaces and buildings might also be adapted within the O-B zoning plan. It always serves as a base for agreements and calculations.
Fig. 12. The detailed plan with housing parcellation 24-11-1981

Parallel to the work of architects a special team detailed sections of streets, sewage systems, parking lots, pavements, plantations, lighting etc. All the work could be done step by step, based on the O-B zoning.

Fig. 13. The model 1:1000
6. Findings after 35 years, the Urban Tissue today

When I visited the project recently I was surprised by the vivacious energy and richness of the environment in this district. Today, all the six thematic spaces represent typical differences in form and urban life. They are still intact and can be well recognized. However the latest realization, the north-east part, only followed the O-B zoning along the district entrance and along the central canal, both very important to the whole of the district. Apart from this, the zoning has been abandoned in some remaining areas, probably for density reasons.
6.1 The central “Kuper” Canal

Striking today is the development of abundant greens and rural accents along the canal: beautiful trees and lawns (fig. 19, 27, 29), 3 wooden bridges for pedestrians (fig 21, 24), large ponds where cars and pedestrians intersect (fig. 21), a little island halfway serving as a pedestrian precinct (fig. 24) with nesting places for ducks (fig. 27, 28) and geese. The main bike traffic is matching well with the reduced car traffic (see 4.1 and fig. 23).

Fig. 15 Kuper Canal in summer

Fig. 16 In springtime

Fig. 17 Westend

Fig. 18 Detail

Fig. 19 Middle part and island

Fig. 20 From the canal to a carstreet
6.2 Streets

The car-parking streets (fig. 30, 31) are different from the pedestrian streets (fig. 32, 33) in size, street activities and character. In turn pedestrian streets are different from the pedestrian canal (fig. 34, 35). Amazingly different is one canal street for pedestrians, from which the water and slopes were removed before realization, resulting in wonderful children’s playgrounds (fig. 36, 37). In this street the private front gardens are more related to the carless street life (fig. 38, 39).
Fig. 32 Pedestrian street from a small parking lot
Fig. 33

Fig. 34 Small Canal
Fig. 35 with a bridge

Fig. 36 Large pedestrian street in stead of a small canal
Fig. 37 after removing water and slopes
6.3 Common Backyards

All common backyards (fig. 40) are provided with safe playgrounds for children and small car parking lots (fig. 41). Notice the increase of privacy inside the private back gardens around the common yards.
6.4 The Squares

The squares (fig. 42, 43) halfway the longer car parking streets turned out to be one of the smartest inventions of this urban tissue. In such places the street becomes wider and offers small parking units in its center surrounded by hedges and tree’s. This solution proves to be a friendly traffic barrier, without disturbing its linear street impression.

![Fig. 42](image1)
![Fig. 43](image2)

6.4 The courts

The courts in the dead-end corners of the plan accommodate more affluent groups of owners (fig. 44, 45) and invite a more retreated way of life. The characteristic form result almost automatically into larger back gardens of those more costly homes.

![Fig. 44](image3)
![Fig. 45](image4)
6.5 Central Park Area

Finally I like to show the central park area (fig. 46 - 51). In the first draft of the district plan the total length of the built strips appeared to contain plenty of space for all the desired housing volume. It was obviously the result of systematic planning by thematic design. As a consequence extra land could be reserved for parks, ponds and large playgrounds, without upsetting the financial balance of the district development.
7. Conclusion

7.1 Efficiency

The systematic way of working towards an O-B scheme of zones and margins - allowing more detailed agreements on traffic, plantations, piping and wiring, pavement, public green, private parcels and different developers - appeared to be time efficient. The method has also proved to be very team efficient: Instead of making the decisions as usual on different levels, with developers and architects, the decisions on the level of urban planning were made by the city authority’s. Design meetings have been very efficient, focused on the essence of the urban tissue, the thematic spaces, discussed by the 4 ‘patterns’, and accepted within four weeks. Over the years the city could control in a powerful way the realization of the urban tissue of this district with the help of the official SAR73 documents, without changing them.

7.2 Economy

With participation of officials and specialists, the ‘short planning time’ design decreased the planning costs of the city. Moreover, the city authorities were surprised by the economy of the land use, the minimum of unused areas and the abundance of green spaces.

7.3 Coherence and freedom on each level of intervention, the principle of Open Building

The imposed urban structure by the O-B zoning documents had two major results: The district today shows a strong coherence and character, and there is also a large amount of variation within the thematic design of the typical urban spaces: Open Building on the level of Urban Tissue has been a blessing for all.

8 Author biography:

1965 Graduation Delft University in Architecture and Townplanning
1965 - 70 Paris: New town center of Evry
1970-73 SAR research with Habraken on Urban Tissues
1975-89 Office KOKON architects, Rotterdam
1989 Guest teacher at MIT, Boston and at Rovaniemi Helsinki
1990-2010 Office Frans van der Werf, Amsterdam and Zandvoort
2010 - Consultancy, Workshops, Lecturing, Presentations

8.1 Congresses, workshops lectures

Europe, USA, Indonesia, Singapore, Japan, China, S. Africa, Sri Lanka.

8.2 Specific Expertise:

Affordable housing – low rise high density
Open Building, flexible, multifunctional
Bio-ecological Architecture, Sustainability
User participation
Pattern Language in decision making
Smart participatory urban planning
Elderly Care Centers and small City Centers

9 Book Sources: