UNIVERSITY COLLEGE LONDON
Bartlett School of Graduate Studies
MSc Built Environment: Advanced Architectural Studies
BUILT ENVIRONMENT REPORT

_ New Communities

Anne-Katrin Becker
September 2008

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

I would like to express my sincere gratitude to Ros Diamond for all the insights, valuable guidance and support throughout the course of this thesis. In addition I would like to thank Dr. Laura Vaughan for her advice and support throughout the years of the course.

Moreover I would like to thank cube_design for the support and patience during this adventure and finally I would like to acknowledge that none of this would be possible without the support of my parents.

_Abstract

Taking the ideas of the Bauhaus in the 20th century and their interpretation in the 21st century on housing developments this paper examines to what extent design and spatial configuration could influence and encourage the successful generation of communities as living entities regarding spatial and social properties. It explores how these ideas are reflected in their interrelation of the inside and outside and tries to define the connection between public and private spatial layout. The objective of the analysis is to pinpoint those variables which are associated with 'liveability' in the design and experience of external and internal spaces in the three estates and any spatial factors that may contribute to the generation of community.

This paper comprises of three sections: theoretical framework, analytical models and observation analysis that comment on how spatial configuration could affect the encounter and interfaces of inhabitants and how the intelligibility of the overall structure is seen and translated in the external and internal spatial layouts.

The intention behind this study is to explore any potential relationships between spatial configuration and societal make up of the communities, by carrying out a configurational analysis of three Bauhaus estates in Weimar and Dessau, Germany. The investigative methodology combines space syntax tools with geographical methods of urban morphology and is based on representations and quantitative measures of key properties of the estates and their urban environment such as land uses, figure/ground ratio, the amount and type of public spaces, the way building frontages and create boundaries and interfaces between interior and exterior spaces as well as exploring the axial representations of interconnectness and accessibility of each estate within its embedded urban environment. The aim of the report is to use spatial analysis to detect relationship between spatial design and social properties within the community as well as the connection between the community and the city itself.

Subsequent discussion reveals a correspondence between spatial layout and the generation of a community is determined by the enabling of human copresence in the space. The setting out should strongly relate the visual connections and morphological properties of the configuration and generate human copresence and social interaction between inhabitants and visitors. The paper concludes that there is a possible relation between the generation process of communities and their spatiality.

Keywords:

Community
Space syntax
Bauhaus
Interface
Co-presence

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_Introduction 00

The paper sets out to investigate the relation between community and its spatial characteristics and examines the relationship between those parameters taking on the one hand the social interpretation of the Bauhaus design ethos applied to urban development and on the other hand taking the concept of architectural determinism and its idea that architectural design influences human behaviour as starting points.

Gropius describes the home as the microcosm of social change, as the source from which 'spiritual and cultural revolution' would come, and as the module from which new society would be constructed. These ideas were intended to be implemented in the various estates built by the Bauhaus. The concept of architectural determinism as well is based on the idea that architectural design influences human behaviour. It demonstrates the concept of relation between human behaviour and the spatial patterning of the built environment - contradicting to this is the fact, that architecture is mostly a dependent variable which is used to reflect and create a pattern of behaviour; for example domestic space layout reflecting cultural "codes" in activity patterns, style and spatial interrelating which each other.(Hanson and Hillier, 1982). Under this light two type of design failure can be considered

a. whether the design of domestic space does not reflect the given culturally defined pattern of activity and
b. whether urban residential layouts designed to create life and encourage encounter and interaction fails to materialize these aims.

The possibility of misinterpreting the cultural usage of space could be seen as a reason for design failure. But the failure of new residential development in various countries makes the explanation of cultural variation unconvincing. (Hillier et al, 1987) There are however two questions arising from this discussion: "Does spatial design have any influence and consequences for the pattern of spatial life?" and "Does spatial life has consequences for social pathology?" The questions address two different areas of interest - one which is related to the architectural discipline and the other to the sociological one.

In this paper, an attempt is made to try to give an answer to the architectural question. The focus is made on the spatial configuration of the phenomena of Bauhaus estates and is trying to answer the question: "How design and the setting out of spatial configuration could influence and enhance the generation process of communities?" as well as exploring the relationship between the external layout of the settlement and the internal layout of each building. It aims to question whether there is any empirical relationship between public spatial layout of the settlement and private spatial layout of the buildings. The paper is based on three case-studies in the cities of Dessau and Weimar in Germany chosen for an investigation into their spatial and configurational properties and their conceptual aspirations. Two of the case studies fall into the period of the Bauhaus and were realised in the 1920; the third example uses the Bauhaus ideas as an inspiration and represents a current interpretation of the ideas. The latter scheme is realised on the original site of the first proposed Bauhaus estate.

The topic investigated in this paper is closely related to the space syntax theoretical and analytic framework, due to the intrinsic social matter that is embedded in space syntax theory as well as in its research methods. Space syntax theory studies the phenomenon of space as its final product reflecting the real world, and explores this product towards an understanding of the

spatiality of human activity. [Hillier 2005] Space is understood as an intrinsic aspect of everything human beings relate to, and the understanding of space is associated and experienced through movement, interaction and visual fields. Each of these ideas describes different aspects of how we use or experiences. Space syntax theory maintains that the experience of space can be represented and studied with a geometric language that reflects human behaviour. [Hillier 2005]

The aim of this paper is to shed light firstly on the different types and ideas of communities and how they are linked to spatial and configurational properties of space and secondly how the overall estate layout and Bauhaus ideas are reflected in the internal layout. Therefore the paper is divided into five chapters.

The first chapter reviews the literature of concepts of community and Space Syntax relevant for the construction of connections between spatial morphology and sociological phenomena. It examines relevant theories and ideas, linking them to the space syntax body of knowledge. The chapter is segmented into two parts reviewing firstly three approaches, which explain the concept of community differently, are introduced and explore which part spatial configuration inhabits in their concept. Secondly, Space Syntax as a configurational theory is introduced and how the research question is related to the Space Syntax framework.

The second chapter gives an account of the Space Syntax theories and methodology used for constructing the research.

The third chapter is a starting point for to the research, an introduction to the background of the subject. It gives an account of the study background and of the sample of estates. It describes the political developments and their influence on the approach towards the estates as well as introducing the two cities and their relation to the estates. It illustrates the distinction between each city and the settlement being studied.

The fourth chapter presents the research analysis. A discussion of the 'macro study' of the city portrays the significance of the interrelation between the city as a social realm and the settlement as well as the role of the city's growth pattern. The 'micro study' reviews the urban setting and the investigation of the main characteristics of the layout and spatial and syntactical data.

Taking account of the limitations on the research, the report concludes with a detailed discussion of the findings. In this final section both macro and micro scale analyses are combined to present interpretations of relations found between spatial morphology and sociological phenomena. The findings described in the chapter - are interpreted and discussed in the light of relevant bodies of literature and space syntax theory and are linked back to the initial questions and attempting to summarize the findings of the analysis and presenting the conclusion of this research.
The discussion section presents the interpretations and relations revealed in the study with reference to the theories. It also discusses the main ideas initially posed. The conclusion section draws the wide-ranging ideas with reference to the general theories.

_Literature Review 01

This chapter presents a review of the theories relevant to the present paper looking for theoretical relations between concept of communities and spatial configuration. The aim is to build a network of ideas that will provide a larger theoretical background for the propositions based on analysis set forth in the subsequent chapters. Firstly different concepts of communities and their relation to space are introduced and secondly space syntax is presented as a configurationally theory showing the relation between spatial organisation and social morphology.

CONCEPTS OF COMMUNITY

The idea of community is influenced and dominated by three main concepts – describing different views on the relationship between society and space. The section of the paper introduces the concepts and focuses on their main aspects. The following concepts are introduced by Hiller and Hanson.

Correspondence model

The correspondence model takes the concept of territory as a base and the inter-relation between space and human beings as a foundation for its concept. It is based on the assumption that space has an importance in ordering of social relations and by the virtue of correspondence between segments of space and segments of society it is influencing the arrangements between them. As Alexander describes the social and spatial order can be represented, analysed and assesses in terms of a fit between a social group and the tangible physical zones, which contains them; such that "each zone through its formal clarity and integrity induces, reflects and sustains the activity it has been designed to serve" [Alexander, 1970, 79] Hillier and Hanson are making some limited generalisations in their article "the architecture of community" regarding the concept of correspondence. They highlight that in a social system based on correspondence certain relations are primary to others, which is reflected in the arrangement of the group being based on the correspondence between spatial - local - and transpatial - space overcoming - group.

Example 1:

[group 1] [group 2]

The spatial encounters between these two groups shown in example one tend to be specific and the overlapping between the spatial and transpatial group increases the density of encounters within the group locally, but not the range of encounters globally across space. Hillier and Hanson define as the main aim the reproduction of itself as a strong and stable statistical pattern and therefore a need to reinforce and strengthen the local group, focussing on the element of exclusivity. It is in other word the formula for homogeneity. Hillier and Hanson stress that the requirement to purify the arrangement of people in space in this way, the system will also tend to grow strong and stable pursuing to emphasise physical separation of spatial groups, closed

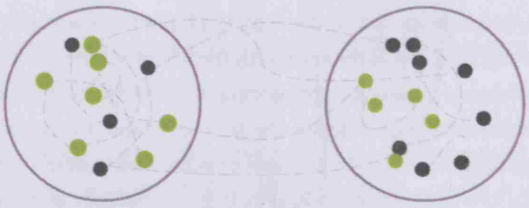
boundaries, local identification, the localisation of spaces which celebrate transpatial identities, formal hierarchies of integration to the global levels of society, etc. Any mixing of categories locally, or merging of physical zones, will shift the system in the opposite direction, towards non-correspondence. They identify the system as deterministic, in both ways socially and spatially. (Hanson and Hillier, 1987, 270)

Summarising can be said this model defines a correspondence between social grouping and spatial demarcation, reflecting a social structure in the spatial organisation and acknowledge a relation between these concepts.

Non-correspondence model

The model is defining independence between social grouping and spatial organisation, reflecting no relation between social structure and spatial arrangement and no requirement of spatial organisation to improve the social structure and acknowledges the existing heterogeneity. Taking the introduced example one and in comparison a different version of the system example two

Example 2:



(group 1) (group 2)

The two different examples show that each individual has spatial and transpatial identities which are distinct from each other, and engaging them in different modes of encounters.
In example two the spatial and social arrangements do not reinforce each other, rather act in a warp and weft relation. It makes local encounters non-specific in the way that the non-correspondence system is used to diffuse encounters across space to build a denser global network. Hillier and Hanson illustrate that a system working on non-correspondence the clarity of the system tends to be weakened, it will become in other words more locally heterogeneous, but at the same time transpatial identities will be used to encourage encounters across space and work towards global stability of the society. They demonstrate that such a system will tend to strength and stability to the extent that it locally emphasises openness, continuity of space, lack of local enclosure, and permeability of those boundaries. It works more probabilistically, using the likelihood and frequencies of events, which take place to reproduce a statistically stable global system. This gives the structure robustness and it can tolerate more local disorder and is still reproducible. (Hanson and Hillier, 1987, 270)

Structured non-correspondence model

Hillier and Hanson are taking the bipolar ends of the spectrum non- and correspondence model to sketch a theoretical model taking heterogeneity as a given condition and defining two relations between space and social groupings - spatial and transpatial. Spatial groupings, which are based by the virtue of proximity and everyday life, encounter zone and transpatial groupings - based

on overcoming spatial separation and conceptually uniting social groups. In principle they are demonstrating that even without an immediate correspondence between social and spatial layout space can be structured and play an important role through creating encounters among the different spatial and social groupings. Hillier is defining this type of communities as virtual community - it shows for him a form of group awareness in a collectivity and is realized through interaction between the members, id est the virtual community as a product of spatial design as well as a sociological important product. (Hillier et al, 1987)
Every individual is normally member of two radically different forms of social groupings, a. a member due by virtue of proximity and describing the same everyday encounter zone representing spatial groupings and b. a member of transpatial groupings which unites people independent of space and rather overcoming spatial separation; "space may not be structured to correspond to social groups, and by implication to separate them, but on the contrary to create encounters among those whom the structures of social categories divide from each other."(Hanson and Hillier, 1987, p.265) It shows the duality between spatial and transpatial groupings.

SPACE SYNTAX _ A CONFIGURATIONAL THEORY

In "Creating Life: Or, Does Architecture Determine Anything?" the hypothesis that architectural design affects human behaviour is described by Hillier et al (1987, p.233), as 'Architectural determinism'. It is argued that design acts as an independent variable in a describable process of cause and effect against socio-cultural variables which vary and are difficult to determine.

Space Syntax research adopts a configurational approach to spatial layout to explain its social implications, suggesting a systematic relation between social organisations of urban or building space and its spatial layout. The core objective of the research is the analysis of 'space' in relation to all spaces of the system, defined by this means as 'spatial configuration' (Hillier et al 1987). Space Syntax research puts forth a relationship between space and society, deduced from the analysis of topological properties of the urban grid. Mathematical representations of this topology, analysed and supported by empirical data, offer insights into the functional patterns of settlements and cities.

Hillier (Hillier et al 1993, Hillier 2001), argues that the structure of the urban grid has independent and systematic effects on movement patterns which he refers to as Natural movement. The research focuses on Natural Movement, as a deciding factor to the functional patterning is seen in cities. The axial map, a representation of the urban street network, portrays the natural movement fostered by the urban grid. Natural movement, in Space Syntax research, is imperative to rendering a space, in conjunction with other physical determinants.

In conjunction with other theorists, Hillier (Hillier 2001) establish that space plays a constructive role in shaping forms of social interaction. Hillier contends that spatial configuration arises out of social pattern and organisation (Hillier 1996b) and that different spatial configurations create varied patterns of co-presence and encounter amongst people through their effect on movement. In this light, residential layouts correspond to localised and restrictive spatial configurations, structuring and restraining co-presence while microeconomic activities tend to integrate space, both locally and globally, maximising co-presence. "It is the demands that different kinds of activity make on co-presence, which articulate the spatial laws to make one kind of space rather than another, in the spatial construction of settlements" (Hillier 2001, p.132). The interpretation of the physical environment, in being both reflecting and conveying of social structure and interactions

is of particular interest to phenomenologist's (Seamon 2003). Seamon (1994, p.37) interprets spatial pattern as an integral part of 'the particular human worlds and places' that unravels in space.

In 'Creating Life: Or, Does Architecture Determine Anything?' Hillier et al (1987, p.248) propose that in cities the spatial morphology creates a pattern of space use or "spatial life" within its configuration. With its effect on movement, the spatial layout is a mechanism that creates fields of probabilistic encounter and co-presence. "This field of encounter has structural properties that vary with the syntactical properties of the layout from being sparse or dense, localised or globalised, predictable from the intelligible structure of space or unpredictable, and mix inhabitants and strangers in different degrees"(Hillier et al 1987, p.248). The authors elucidate the pattern of co-presence with its describable pattern as the virtual community. "Community, because it collectively forms group awareness; and virtual because it has not yet been realised through interaction among its members. The virtual community is the product of spatial design" (Hillier et al 1987, p.248).

In order to capture the quality of a 'structured' environment as being comprehendible and easily navigable, a measure of how easily and fast a building or a built environment can be understood has been introduced by space syntax, recognised as 'intelligibility'. The definition of an intelligible environment is given in the paper "Creating Life" (Hillier et al 1987) where it states that "The property of 'intelligibility' indexes the degree to which the number of immediate connections a line has - which can therefore be seen from that line - are a reliable guide to the importance of that line in the system as a whole" (Hillier et al 1987,p. 237). It is argued that the whole can be read from the parts. Therefore, the definition of intelligibility concerns the relationship between local visual signs and the global properties of a space within the system. It is implied by space syntax theory that it is intelligibility that mediates between, and directly affects the relationship between cognition and configuration.

Space Syntax investigates the relation between the forms societies take and their spatial forms, but looking at the spatial relation first. In this view space is not a backdrop to human activity but it is an intrinsic aspect of human life. This notion is of a two-way relation: space affects society and society affects space in return. Space and society mould each other, which mean that space has an inherent sociality and society an inherent spatiality. The works that consider space as an output of society only achieves the level of spatiality and cannot establish a coherent link from social forms to spatial ones, treating society as an abstract entity. In this sense Space Syntax is based on a different paradigm of the space-society relation based on a relational account of space that sees space as an entity with its own effects.

Hillier and Hanson distinguish the inhabitants from the visitors by stating that the former 'control the knowledge embodied in a building and its purposes' and the latter 'do not control the knowledge embodied in a building and its purposes' (1984, p. 184) Hillier and Hanson highlight the significance of domestic space by suggesting that 'what is happening in it is the transpatial expression of our membership of society and our participation in culture. In moving from outside to inside, we move from the area of encounter probabilities to a domain of social knowledge, in the sense that what is realised in every interior is already a certain mode of organising experience, and a certain way of representing in space the idiosyncrasies of a cultural identity' (1984,p. 144-145). This statement demonstrates how crucial the structure of the domestic space is and it also shows how this could contribute to the development and determination of the relationships amongst the occupants. It therefore seems that the architectural plan is of vital

importance regarding the various social relationships, the realisation of potential activities, the visual experience and the division of space into functional zones

In this context, Space Syntax has been focusing its research in the influence of the Spatial Configuration in human's spatial behaviour through an objective analysis of the complexity of the environment. [Hillier 1996a] Space Syntax Theory shows that space and social activity relate in two ways: reflecting and embodying a social pattern and also shaping a social pattern and creating natural co-presence in space. These patterns of co-presence are basic concepts in Space Syntax and are the way by which space influences social relations and is affected by them.

RESEARCH METHODOLOGY 02

In connection with Space Syntax theories put forth in the Literature Review, this chapter demonstrates the methodology adopted by Space Syntax research for systematic analysis of urban space in relation to movement and co-presence. Space Syntax Research adopts a configurational approach to convey the social organisation of urban space. It explains the methodology and techniques used as part of the spatial analysis for the research as well as the limitations and constraints that were encountered during their applications. Introducing space syntax as the main methodology enables to describe and represent the morphology of the built environment in an objective way and uses the foundations of space syntax to detect the dual connection between the community and the spatial configuration. The analysis explores on the one hand the reflection and embodiment of social patterns in spatial layouts and on the other hand the shaping of social patterns through space by using space syntax.

The methods applied during the analysis and research constitutes of four different syntactical types and is complimented by investigating the spatial properties of the urban environment as well as introducing a questionnaire to detect the sociological phenomena. The different types are based on the idea of describing and analysing spatial configurations as well as showing the relation between the sociological and spatial influences. Coupled with the spatial analysis is the statistical information showing the influence between the pattern of space and the usage

A. SPATIAL ANALYSIS

Landuse and topographical maps

To determine and represent the existing conditions in the chosen case studies a survey of the physical composition of the area in question has been undertaken. This research tool is used to represent make up of the spatial fabric. The most common form of this type of representation is the land-use map. The characteristics by surveying land use in the area are used to generate a graphical map of the area which objectifies the structure. However, it highlights the characteristics of the urban area objectively and makes it immediately verifiable, but it does not provide an explanation of that characteristic.

B. SYNTACTICAL ANALYSIS

Axial analysis

To analyse the network and the basic spatial configuration in the urban grid of the communities the axial analysis provides a tool to detect the main routes of interaction and shows the likelihood of encounter. The technique was used especially to discover the difference between the separated route systems of pedestrianized and vehicular arrangements. The axial map is applied in order to highlight the underlying properties of spaces, with relevance to their position in the system under consideration. In all three case studies the axial lines are drawn as lines of sight and movement and where roundabouts are found, the visibility and accessibility through the roundabout is the criterion in order to decide the way the line is drawn. One key property of the axial map is integration (see appendix), picking up the most important lines of movement in the settlements and also highlighting the powerful lines that connect the settlement with its urban surroundings.

VGA - analysis

In order to explore a second set of syntactical properties of space VGA and Isovist analysis are selected and processed through Depthmap. These methods were chosen due to the ability of capturing the effect of the spatial layout regarding the function and use of the space, as well as the intelligibility of the system. The VGA analysis offers the possibility to show the relation of the visual pattern of integration regarding the open spaces as the grid covers the entire extension of those spaces, in contrast to the axial lines representing a specific pattern of movement and sight through the minimum set of lines in the system. This tool appears to be most meaningful for this kind of research, since it allows the analysis of large open spaces with a much higher degree of resolution than an axial map would, covering every space of the park, and not only the predefined paths where movement is occurring. Moreover, the study of public squares in the city of London by Campos (1997, 1999) has illustrated that the location of static people is closely related to the visual properties of the open space. However, VGA analysis shows certain restrictions applied to wide and open areas such as parks or plazas. The definition of the borders influences the result and increases the difficulty to obtain of clear results due to the fact that the wider are as attract the connections values in the graph and minimizing the effect of the surrounding areas. Due to this constraints several measures were run with different layouts for the simulations and the most representative were selected for the paper. The Isovist, defined by Benedikt in 1979 (see appendix) correspond in some way to movement patterns of people and it is for that reason that it is considered as a meaningful tool for the purposes of this study, however an approximation to it is used, which illustrates the visual steps from a selected point to every other point in the system.

Convex analysis

This part of the syntactical analysis focuses on the local level of the system and tries to establish the properties and relation to the global system as well as the relation between buildings and landscape. It tries to detect the connection between public and private space - internally and externally. The two dimensional representation concentrates on the co-presence of the existing setting out and shows the articulation of the local differentiation. The subset of spaces is less associated with movement and enables to demonstrate the visible influence and orientation of the local system.

Graph analysis

A very simple yet informative representation used by space syntax is the justified graph (see appendix A). Justified graphs of three estates are drawn from their main entrances in this report, in order to reveal differences in their structure and to identify deeper spatial relations that determine the character of the configuration.

In the justified graph representation, spaces are represented as small circles, or nodes, and the relation with other spaces as lines, or links, joining the circles. By drawing a justified graph from a space in the system, or usually the space outside, the relations of permeability are being illustrated and the structure of the configuration is visually clarified. It reveals the differences in their structure and to identify deeper spatial relations that determine the character of the configuration.

In addition to this a space can also be classified according to its topological properties. Space syntax has developed a theory related to the graph representation, which supports that each space can be assigned with a typological identity, according to how it fits into a local complex and so acquires potentials for occupation and movement (Hillier 1996: chapter eight). Spaces, therefore, according to Hillier, can be divided into four topological types. First, there are spaces with only one link, which can be characterized as dead-end spaces and have no

through movement, thus, they are mostly occupation spaces and these spaces as such only accommodate movement to and from themselves and are characterized by static occupation (Hanson 1998, p. 173). They are linked to the graph via a unique entrance. These are marked as 'a-spaces' in the graphs. Then, 'b-spaces' are the ones that have more than one link and are connected with one or more dead-end spaces, so all movement through a 'b-space' must eventually go back the same way. The movement is highly directed. 'C-spaces' have more than one link and lie on at least one circulation ring, meaning that there is an alternative way to return to this space. Finally, 'd-spaces' have more than two links and lie on more than one rings, encouraging in that way movement (Hillier 1996: 318-320). It is suggested that in general, b- and c-spaces increase segregation, since they enhance sequencing, while a- and d-spaces tend to increase integration and generate choice, by producing shallow systems, where there is no need to pass through a lot of spaces to reach a destination (Hillier 1996: 321-327).

The syntactic analysis has been performed using Depthmap, Mapinfo and Confeego. The figures presented in the following chapter have been selected as the most essential, while a full list of illustrations can be found in the appendices.

C. QUESTIONNAIRE

The purpose of this exercise was to assess the extent to which sociological phenomena are inscribed in spatial relationships. The intention was to find out which aspects of spatial configuration are referred to explicitly and which values and relations are recognised as having spatial implications. This section was effectively designed to put the research question, "How design and the setting out of spatial configuration could influence and enhance the generation process of communities?" directly to the members of the relevant settlement.

A questionnaire was prepared using an electronic questionnaire and e-mailed to the respondents in the form of an attachment (responses were anonymous). The initial contact was made at the beginning of August 2007. The decision to use an electronic questionnaire was based on the need to collect data regarding a relatively large number of responses within the limited time available. The questionnaire was designed with three set of questions. The first one is intended to collect personal general information of the respondent, the second one about the physical community and the third one about the social community.

Due to little response the results could not be incorporated into the research. The original sample is enclosed as appendix one.

_Background 03

The chapter introduces concept and ideas of the Bauhaus and reviews them regarding its inspirations for urban planning and architectural approach.

BAUHAUS - IDEAS AND CONCEPTS

The political developments in the 1920ies in Germany created a political climate furthering the development of new concepts regarding town planning and architecture. The Weimar coalition gave relevance to social legislation and especially to housing and urban requirements. The ideas were based on the principle that every citizen had the right to a sound dwelling within his means. These rights were incorporated into the Weimar Constitution. Rent controls, state housing loans, the provision of public lands for new housing, state subventions for building societies, the creation of federally-supported housing research organisation such as the Reichsforschungsgesellschaft fuer Wirtschaftlichkeit in Bau- und Wohnungswesen, and the establishment of minimum standards of housing, combined to involve the government in the provision of housing to a level never before experienced in Germany.(Miller - Lane 2007, p260) The role of modernism in the arts was endorsed by state and federal cultural officials.

The CIAM - Congres Internationaux d'Architecture Moderne -founded in Switzerland in 1928 was an avant-garde association of architects intended to advance both modernism and internationalism in architecture. CIAM saw itself as a group revolutionizing architecture and city planning to serve the interest of society. Its member included amongst others Le Corbusier, Walter Gropius, Hannes Meyer and Mies van der Rohe. CIAM was intended both to define the basis of new architecture and to vigorously promote the official client and public at large. (Mumford 2002, p.10) The first congress set out to formulate ideas of modern architecture and to include a link between the phenomenon of architecture and that of the general economic system. It described town planning as the organization of functions of collective life, which extends over both urban agglomeration and the countryside. (Mumford 2002)

The declaration of the first congress related to the structural change in society and their impact on architecture and city planning. It emphasised the necessity for new materials, construction types and production methods.

The Urbanism section stated the following points:

1. *Urbanism is the organisation of all functions of collective life; it extends over both urban agglomerations an over the countryside. Urbanization cannot be conditioned by the pretensions of pre-existent aestheticism: its essence is if a functional order.*

2. *This order consists of three functions: dwelling, producing and relaxation. Its essential objects are land subdivision, regulation of traffic, building legislation.*

3. *The relation between residential, sports and green areas and circulation areas is determined by the density of population set on the basis of social and economic principles. The chaotic division of land, resulting sales, speculations, in heritance, must be abolished by a collective and methodical land economy and that this land distribution, the indispensable preliminary basis for any town planning, must include the just division between owners and community of the unearned increment resulting from works of joint interest.*

4. *The traffic management has to encompass the chronological and local result of all function of community life*

5. *The constant development of technical methods have to encourage a change in legislation and to include a constant adaption to reflect the ongoing technical developments*

[Translation of "Declaration and aims of the C I A M" 1979]

Architecture and the architecture curriculum at the Bauhaus focussed on the one hand on fundamental matters such as property ownership, solutions to the housing problems, changing ways of life in the industrial society, with new traffic systems and a new technical infrastructure, new approaches to the distribution of labour, and the role of the family and of the women and on the other hand on environmental aspects. These aspects had also begun to play a role by this time, as architects turned their attention to such issues as urban fragmentation, urban hygiene, green areas in cities and communities, energy conservation in building construction. Aside from school buildings and theatre projects, residential architecture (especially low-cost social housing) was a central concern in architectural activities at the Bauhaus. (Siebenbrodt 2000, p.18)
Publicised the idea that a new society created by war and revolution required an entirely new architecture, devoid of all association with the past. They called for a new community, spiritual and social, in which architecture would act as a powerful educational force among the citizen of the new state. (Miller Lane 1985, p41) The new architecture with a dual function: the expression of new community relations in city planning and in the design of public buildings, and the bringing of the other arts into the service of the spiritual needs of society. (Miller Lane 1985, p49)

Gropius continued to declare that the educational programme of the Bauhaus, which brought arts and architecture back into the service of society, would produce "a complete spiritual revolution of the individual" and "a new style of life" (Miller Lane 1985, p67)

These estates – Siedlungen - represented a combination of the utopian and often medievalizing ideas of expressionism and the egalitarian and technological enthusiasm of "Neue Sachlichkeit". (Miller Lane 2007, p261) Housing had always been an integral part of the architectural interests of Gropius. In the housing designs that he and others executed during the middle years of the Weimar Republic the communitarian ideas of the first post war years continued to be important. While none of these architects ever succeeded in reshaping a whole society – rather they designed and executed Siedlungen of limited size – they saw these Siedlungen as the microcosms from which the larger society would take its shape. The centrality of the communal facility were emphasised in these Siedlungen. Another important aspect of the communal life was the gardens and parks, back gardens attached to the terraced houses and allotment gardens accompanying the apartment buildings and row houses. The landscaping together with some of the street layout created a village like feeling.
The Siedlungen demonstrate a complex vision of society and politics. They were full of inherent contradictions: intended for the working classes, but not inhabited by them, they were close to the soil, but mechanized in construction and offered a streamline minimal design. They were arranged along broad boulevards but folded into a village like street pattern and were studded with parks and gardens designed to promote self sufficiency. They were united by colour and severe abstract pattern, yet they referred to a variety of medieval and early modern historical precedents. (Miller Lane 2007, p263-264)
In all these buildings the home was seen as the microcosm of social change, as the source

form which 'spiritual and cultural revolution' would come, and as the module from which the new society would be constructed.

In his statement on the principles of Bauhaus production of 1926 Gropius affirmed his belief that "the creation of standard types of all practical commodities of everyday use is a social necessity." Standardization was essential, he maintained, in order to exploit the effectiveness of the machine as a device for mass production of products. The drive toward standardization in the Bauhaus is expressed best by the attempt to crystallize a few, ideal, solutions to everyday problems. To this end the workshops of the Bauhaus were to be regarded in Gropius's phrase, as 'the laboratories in which prototypes of products suitable for mass production.'
In the Bauhaus this principle of integration and order was not extended in any systematic study to the overall system of dwelling and contents. Even Gropius and Meyer's proposal of the same year for the 'Baukasten im Grossen', an adaption of the concept of children's blocks in terms of large-scale prefabricated elements, was an experiment that examined one particular problem, that of variability within the standardized system rather than the total problem of an overall system of prefabrication. (Miller Lane 2007, p242)

Research Analysis 04

The Research Analysis illustrated further in this chapter is sub-divided into a Macro-study of the city and a Micro-study of the estate and the buildings for all three estates.

- The Macro study discusses the physical form of the city and the relationship of the centre to the estates and vice versa. The analysis of the physical arrangement also highlights its significance in the interfaces and co-presence between the city inhabitants into and the estate inhabitants.
- The Micro study illustrates the framework of the estate as the area under observation. The discussion of the street pattern, land-use, physical permeability and visual permeability at the estate are presented in relation to the internal layout of the buildings. The micro study focuses on the interrelationship between the inhabitants of the estate. The chapter further progresses with a review of the internal layout of the buildings and their relation and arrangement to the external layout of the estate.

WEIMAR _ 1922-1923

4.1 GENERAL INFORMATION

The first ideas and concepts for the estate were collated in 1920 and went to various stages. The design from Fred Forbat was progressed further. The estate was planned as settlement for the teacher and students of the Bauhaus and should have acted as living and working place. The chosen area for the estate was situated to the east of Weimar's centre, overlooking the Ilmpark.[Fig.1] The site is enclosed by the roads Besselstrasse to the East, Am Horn to the West and the Wilhelms Allee to the North. The planned estate contained of 20 detached houses, approximately 50 one family terraced houses, as well as an additional 40 houses for students. [Fig.12] Three main types of land-use surround the estate - existing residential area, military used part and landscaped areas either used as a buffer zone or recreational area [Fig.7].

The urban planning strategy was based on the one hand on geometric principle and on the other on free open arrangement of buildings. The 20 detached houses on the slope are situated between the roads 'Am Horn' and 'Besselstrasse', whereas the area south of the pinewood is not used for any construction. The north plateau accommodates 50 single family terraced houses on the main orthogonal orientated routes of the estate. The houses are laid in single or double rows and orientated towards the street realm. All of the houses have got access to a rear garden. The north plateau includes as well an area for university and workshop buildings, which is situated to the front of the estate. The junction point between the three main roads forms the centre of the development and is lined with student housing. [Fig.12]

The concepts of the buildings are based on one Gropius ideas for standardisation and mass housing. He describes this concept as honeycomb principle. The principle was official introduced at the Bauhaus exhibition in 1923 as the 'Baukasten im Grossen'. [Fig.a] The principle consisted of six elements which can be arranged to achieve variation in the built form. The principle enabled on the one hand to achieve a high flexibility in layout arrangements and was able to be adapted to the needs of the inhabitants and on the other hand it enables to obtain control over materials and production times.

The estate was not realised due to the recession and a change in the political system. The only

element to be constructed was the 'Haus am Horn'. The single storey building was presented at the first Bauhaus exhibition in 1923.

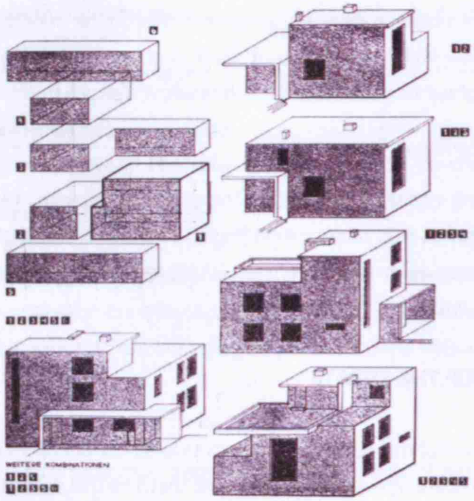


FIG.A BAUJASTEN IM GROSSEN

4.2 THE PHYSICAL AND SPATIAL ANALYSIS OF WEIMAR

The physical image of Weimar is determined by strong topographical features. The centre itself is located in a dip and the city has grown mainly to the south, west and north. The growth to the east has been limited by the Ilmpark - a landscaped park, which stretches over 48 hectares from the city centre along the river Ilm to the south and provides a natural border between the loosely populated area to the east and the city.[Fig.3] The regional connection is provided by the train. The main train station is located in the north; a second station is located in the west. In addition the city provides a net of tram links to connect the train station to the city centre.[Fig.2] The proposed site is located in the east.

4.3 SYNTACTICAL ANALYSIS OF WEIMAR

The physical city of Weimar, analysed through its axial representation [Fig.4-6]] renders the structure and order in the system. It is used in order to highlight the underlying properties of spaces, with relevance to their position in the system under consideration.

The syntactic analysis of the axial map showing global integration values (ranged chromatically from higher integration in red to lower integration in blue) depicts a centre to edge pattern of integration, with a highly integrated core. The integrated orthogonal spokes link the heart of the city to the external quasi ring road and is highlighted in the local integration map [Fig.4]. This pattern is defined by Hillier as the deformed wheel (Hillier 2005), indicating a morphological structure of the settlement acting as a whole. The streets linking the centre to the edge are frequently used by inhabitants as well as by visitors who use these streets as the main routes to the city. The effect here being that the structure of the city creates probabilistic interfaces between the inhabitants moving in and out of the buildings and those on the street, and between those moving in the global scale of the system and those moving in the local scale areas. (Hillier and Hanson 1984)

In Space Syntax Theory and analysis, the global measure of integration provides valuable insights into the working of a system as a whole. 'Integration' measures the mean depth of every line in the system from each of the other lines in turn relativised in accordance to their possible depth

with that number of lines (Hillier and Hanson 1984, p.108). The axial representation showing global integration R6 [Fig.] indicates a structure where the residential areas weave around the orthogonal grid layered around the city centre. The city through the centuries has evolved and is configured today as a functional whole, where the public area are orientated towards the centre, the more private functions are forming the middle layer and the outer layer is characterised by an industrial structure. The axial break down highlights that Weimar is a shallow system due to the radius radius being a value of six.
On a global level the site is characterised by relatively segregated lines, whereas on a local level the site is located on one of the main integrators into the city centre. The step depth measure for the estate in relation to the city centre supports this observation.[Fig.6] The site is located five steps away from the centre but only two steps away from the main integrator into the city. It is well connected via pedestrian and vehicular routes.

4.4 THE PHYSICAL AND SPATIAL ANALYSIS OF THE ESTATE

There are six access points to the site.[Fig.10] Two of the access points provide direct access to the site. The other four points requires insider knowledge of the area to link them to the estate.
The overall site area of the estate averages 22 hectares and the average building area per plot is 25%, which demonstrates a loose arrangement of buildings. [table 2]
The figure ground ratio of the estate, i.e. the proportion of space dedicated to different outdoor functions to building footprint, is 6.9 times as much unbuilt space as there is building footprint.
The external space is subdivided in three main functions, 40% of the space is dedicated to the path and access system, 27% to green landscaped area and 33% to private garden. [Fig.11]
The residential and non residential functions are evenly allocated throughout the estate.

The estate itself is split into three different elements, which allocates the more public functions to the outer level of the estate and the private areas into the centre of the estate. There is a grading from open and public area to private areas.
The configuration is determinant by an outer layer of occupancy spaces. The arrangement of the buildings is either as terraced houses or detached family houses. The internal structure of the estate is characterised by a linear arrangement - movement spaces. The overall built area is loosely set into the site and provides a high percentage of open area.[fig.8-9]

The main way in which open spaces of the estate are laid out on the ground and architecturally shaped, is by the assignment of primary and secondary boundaries. The primary boundaries are formed from the perimeter of the building and the position of the facade, see table 4. Secondary boundaries are the walls, fences etc. that divide up the unbuilt spaces on which buildings are situated, see table 5. Primary and secondary boundaries have been subdivides into different categories. The ratio between primary and secondary is 14% primary and 86% secondary. For the primary boundaries the main figure for the estate reveals that the primary boundary with the greatest proportion of metric length is constituted by doors and windows (60%), followed by only windows (39%). The majority of the boundaries are permeable, only two percent are impermeable.[Fig116]
To establish a base for a comparison of the case-studies a quantitative analysis method is introduced, describing the three estate showing simple syntactic measures.

Definition of measure:

Maze index the mean depth of the axial system from the surrounding streets

No-neighbours score	the mean depth of the convex system from the dwelling entrances
Separation index	the mean depth of surrounding streets from the nearest dwelling entrances
Constitudeness rate	the percentage of convex spaces that are constituted convex spaces
Neighbourliness score	the average number of dwelling entrances per constituted convex space
Interface decomposition score	the mean steps between dwellings in the shortest path that links all dwellings in the layout together

(Hanson, 2000, p.104)

The proposed estate presents a shallow system and has a tendency towards a street system for example the constitutedness rate of 85.4%. [Table 1] The results suggest that the configuration was aimed at encouraging co-presence and encounters in the public areas.

The interface map represents the relation of both adjacency and direct permeability from the building to the convex space. It shows that the majority of convex spaces are constituted and the system is continuous.[Fig.16] The decomposition map of the estate explores this property more visually and shows that the structure survives the decomposition and retains the majority of its rings.[fig.17]

4.5 THE SYNTACTICAL ANALYSIS OF THE ESTATE

The estate constitutes out of 13 axial lines. The system is with a value of 0.11 for axial articulation shows high degree of axiality, which is coherent with the results of axial integration of convex spaces [Table 1]. The grid axiality of 0.66 indicates a slight deformation of the grid. The 34 convex spaces build up the system. The break down shows a medium deformation of the grid. Axial and convex articulation presents a high value for ringiness. The configurational analysis of the estates shows that the setting out is based on a sequence of movement spaces - linear space - to occupancy spaces- convex spaces. The convex space attracting the highest values of integrations as well as control is forming the central space of the estate and is the transition point between all three different residential types.[Fig.13]

The vga analysis for the street system[Fig.14] shows the highest visual integration values for the main integrator into the city. The internal main access routes into the estate are highlighted with higher levels visual integration. These levels are contained within the more public part. The detached houses are situated in a more segregated area. The analysis of the overall system shifts from the main city integrator towards the main entrance area of the estate. It provides a more balanced image.[Fig.15] The points of control are in both cases allocated at the site access point and in the main convex spaces

The graph analysis aims to identify the generic characteristics of the spaces that constitute the estate. This representation is capturing in an apparent way the relations of depth between the spaces. On the whole, the justified graph is a deep graph, consisting of strategic gathering points and deep interconnected rings.[Fig.18] The majority of spaces seem to be c- (48%) and d-spaces (41%) and more or less equally distributed in the system. [Table 6 + Fig.19] These numbers illustrate the effects of the topological properties to the experience of the users of a space, as Hillier and Tzortzi describe, in that the more d-spaces, then the more there is choice

and potential for exploration, while the more the c-spaces, then the more constraint the visitor will be to particular sequences.

4.6 ANALYSIS OF BUILDING TYPES

For all four different building types proposed for the estate there seem to be consistent features. The living room and in general living accommodation are gaining more influence and have a central location in the arrangement of the buildings. It is used as origin for the daily activities and is closely allocated to the external spaces. This is reflected in the justified graph analysis [Fig 25, 31, 37 and 43]. The graphs are deep and contain interconnecting rings.

The convex and vga analysis reveals that a similar representation the living room on the one hand the best integrated area, on the other hand the area with the highest control.[Fig 20-42]

DESSAU TOERTEN ESTATE _ 1926-1928

4.1 GENERAL INFORMATION

Dessau Toerten estate was built from 1926 to 1928 according to designs laid out by Walter Gropius. The estate was commissioned by the Dessau authorities. With a building volume of 316 single-family houses, the estate is the largest building project realised in conjunction with the Bauhaus in Dessau.

The site is bordered by a stream called Lorkbach to the east, a high tension power line to the south and to the west the main road leading into Leipzig.[Fig 50]

The houses built in three construction phases in 1926 to 1928 and have a living space of between 57 and 76 square meters. Each house has a garden measuring 400 square meters so that growing fruit and vegetables and keeping small domestic animals in the sense of a 'semi-rural' estate, the residents' living costs are decisively reduced. The most important requirement was to keep costs low through the consistent rationalisation of planning and construction processes, so that a single -family house would become affordable for a large portion of the population.

As such, the Dessau-Toerten estate, alongside other estates such as Stuttgart Weissenhof, became one of the largest trial estates for the testing of new building methods and materials.

The overall structure of the estate is characterised by a centre located at the inflexion point of Damaschkestrasse and the web- like radials of the estate's streets. The backbone of the estate is formed by a green on Damaschkestrasse. In contrast to the 'Doppelreihe', the houses in Damaschkestrasse have no facing row; the comb-like continuation of the development to the south indicated rather the further expansion of the estate.[Fig.51+52]

The urban planning layout of the estate shows numerous references to the concept of the garden city. The grouping of housing units and formation of pairs through merging house entrances are design principles that had already been adopted in garden cities to combine small building volumes in a creative manner. The mirrored configuration of the houses along the street in defiance of orientation along the points of the compass and the orientation of the street along the Lorkbach eludicate the priority given to the street area in Gropius' design.

The accent in urban development terms, and the functional centre of the estate, is the multi-storey building of the Konsumverein built in 1928, which has, in addition to two shops and a cafe, three appartments. Set apart from the main thoroughfares this centre again represents as the social hub of the estate. The streets on the plan, which extended far into the uncultivated rural landscape, opened the estate outward and suggested the principle of extensibility. This tension between cohesion and openess can also be observed in the right-angled arrangement of the buildings around the triangular area located between the enclosing streets.

The majority of the estates is made of three different building types, which were adpated to the requirements of the users. In addition to the two storyey single family houses Hannes Meyer put a proposal forward for the expansion of the estate in 1930. The proposal contains on the one hand of appartment blocks called 'balcony houses' and on the other hand. The balcony access houses are integral parts for the expansion of the Dessau-Toerten estate. The intention was to create a mixed development of flat roof single-family houses and multi-storey tenements which, according to Hannes Meyer, should be a 'mixed development in a social sense'. However of the ten Balcony Access houses planned for this urban development project only five were built. The Balcony Access houses are constructed using traditional building technologies. In contrast to the section of the estate designed by Walter Gropius, the roads in the extension plan are arranged accoding to a grid pattern. The buildings were to be aligned in such a way that they would receive maximum sunlight.

Each block has a playground, a covered laundry and drying area and a garden. On a living space of 47 square meters, a carefully thought out and well-organised ground plan for a four person house hold was designed, which encountered its exceptionally meagre surface area with relatively high levels of comfort as well as a number of additional facilities.
Everythings centers around the living room. It is from the living room that the bedrooms and kitchen can be reached. The large south facing windows helps to give the appartments maximum sunlight and excellent view.

4.2 THE PHYSICAL AND SPATIAL ANALYSIS OF DESSAU

Dessau is situated on a floodplain where the river Mulde flows into the river Elbe. The physical image is determined by the two rivers as well as the surrounding parks and palaces giving the city a green image. The city ability to grow is limited by the river Elbe to the north and the river Mulde to the east.[Fig.46] Therefore the city has grown mainly to the, west and south. The regional connection is provided by the train. The main train station is located in the north; several stations are located in the city linking the regional network to the local. In addition the city provides a net of tram links.[Fig.45] The proposed site is located in the south.[Fig.44]

4.3 SYNTACTICAL ANALYSIS OF DESSAU

The syntactic analysis of the axial map showing global integration values portrays a centre to edge pattern of integration, with a highly integrated core. The integrated orthogonal spokes link the heart of the city to the external areas. The shape is influenced by the topographical features and is elongated and stretched [Fig.47]. This pattern is defined by Hillier as the deformed wheel [Hillier 2005], indicating a morphological structure of the settlement acting as a whole. The streets linking the centre to the edge are frequently used by inhabitants as well as by visitors who use these streets as the main routes to the city. The effect here being that the structure of the city creates probabilistic interfaces between the inhabitants moving in and out of the buildings

and those on the street, and between those moving in the global scale of the system and those moving in the local scale areas. (Hillier and Hanson 1984)
The axial representation showing global integration R6 [Fig.47-48] indicates a structure where the residential areas are layered around the city centre. The city through the centuries has evolved and is configured today as a functional whole, where the public areas are orientated towards the centre, the more private functions are forming the outer layer. In addition to this new entities are created in the outskirts, linked with the integrated spokes to the city centre.
The site is one of these new additions. On a global level the site is located on one of the main integrators into the city centre. The step depth measure for the estate in relation to the city centre supports this observation. The site is located two steps away from the centre and directly located at the main integrator into the city. It is well connected via pedestrian and vehicular routes. [Fig.49] The axial break down highlights that Dessau is a shallow system due to the radius radius being a value of six.

4.4 THE PHYSICAL AND SPATIAL ANALYSIS OF THE ESTATE

There are two main vehicular and pedestrian access points to the site. Four additional access points are provided, but require insider knowledge of the area to link them to the estate and are only accessible by foot.[Fig.53] The overall site area of the estate averages 55 hectares and the average building area per plot is 20 %, which demonstrates a concentrated arrangement of buildings. [Table 2]
The figure ground ratio of the estate, i.e. the proportion of space dedicated to different outdoor functions to building footprint, is 10 times as much unbuilt space as building footprint. The external space is subdivided in three main functions, 13.5% of the space is dedicated to the path and access system, 18.5% to green landscaped area and 68 % to private garden. (Fig.54) On the one hand the estate presents a focus on the self sufficiency, which is reflected of the high percentage of private garden, but on the other the majority of offered facilities are off residential nature and only limited facility like the Konsumverein are providing public facilities.

The estate itself is split into three different elements - main public spine, private residential areas and the communal area of the balcony houses. The main public area is distributed along the main spine of the estate running from the west to the east and forming the public face of the estate. This allocates the more public functions right into the centre of the estate and the private areas as extension to the outside. Hence there is a grading from open and public area to private areas. [Fig.55-56]
The internal structure of the estate is characterised by a linear arrangement - movement spaces. These movement spaces are only intermitted by green spaces at the starting points of routes.

The main way in which open spaces of the estate are laid out on the ground and architecturally shaped, is by the assignment of primary and secondary boundaries. The primary boundaries are formed from the perimeter of the building and the position of the facade, see table 4. Secondary boundaries are the walls, fences etc. that divide up the unbuilt spaces on which buildings are situated, see table 5. Primary and secondary boundaries have been subdivides into different categories. The ratio between primary and secondary is 31%primary and 59% secondary. For the primary boundaries the main figure for the estate reveals that the primary boundary with the greatest proportion of metric length is constituted by doors and windows (49%), followed by blank walls (23.5%) and only windows (21%) and doors only (6%). The majority of the boundaries are permeable, but a relative high percentage of 23.5% is impermeable.[Fig.117]

The proposed estate presents a deep system and has a labyrinth structure. The proposal is segmented and over 50% of the space are unconstituted [Table 1]. The results suggest that the configuration creates a clear segmentation between the main spine and the residential area, which as well generates a division between inhabitants and visitors.

The interface map represents the relation of both adjacency and direct permeability from the building to the convex space. It shows that there is a front- and back-face. The main routes are constituted whereas the internal access routes are allocated to the rear and unconstituted. [Fig.60] This causes a defragmentation of the system. The decomposition map of the estate explores this property more visually and shows that the main structure has a high degree of defragmentation and various separate islands are created.[Fig.61]

4.5 THE SYNTACTICAL ANALYSIS OF THE ESTATE

The estate constitutes out of 58 axial lines. The system is with a value of 0.52 for axial articulation shows medium degree of axiality. The axial integration of convex spaces of 0.72 is high and demonstrates a low integration of the convex spaces [Table 1]. The grid axiality of 0.22 indicates a high deformation from the grid. 80 convex spaces build up the system. The break down shows a medium deformation of the grid. Axial and convex articulation presents a high value for ringiness. The configurational analysis of the estates shows that the setting out is based on a sequence of movement spaces – linear space - to occupancy spaces- convex spaces. The convex space attracting the highest values of integrations as well as control is forming the central space of the estate and is the starting point to the residential areas.

The vga analysis for the street system and for the complete system does not pick up any specific areas of high visual integration. The points of control are in both cases allocated at the site access point and at the crossing points to the different residential parts.[Fig.58-59]

The graph analysis aims to identify the generic characteristics of the spaces that constitute the estate. This representation is capturing in an apparent way the relations of depth between the spaces. The majority [59%] of spaces in Toerten can be characterised as c-spaces. [Table 6] The movement is more restricted and random encounters with other visitors are less probable. On the whole, the justified graph is a deep graph, consisting of strategic gathering points and deep interconnected rings.[Fig.62-63]

4.6 ANALYSIS OF BUILDING TYPES

For all three different building types proposed for the estate there seem to be consistent features. The living room and in general living accommodation are gaining more influence and have a central location in the arrangement of the buildings.[Fig.64, 70, 76] It is used as origin for the daily activities and is closely allocated to the external spaces. This is reflected in the justified graph analysis [Fig.62, 69, 75 and 81]. The graphs are deep and contain few interconnecting rings.

The convex and vga analysis reveals that a similar representation the living room on the one hand the best integrated area, on the other hand the area with the highest control.[Fig.64-81]

WEIMAR _ 2000 - NEUES BAUEN AM HORN

4.1 GENERAL INFORMATION

Initiated by the Bauhaus University Weimar, in cooperation with the Thuringia State Development Company "LEG Thuringen" and Weimar council, the former barracks site was dedicated to the planning and development of a new urban quarter. The project was named 'Neues Bauen is Horn'. The "Haus am Horn", a model building for a planned 1920s Bauhaus residential estate has served to inspire the estate's architecture. Eleven European architectural offices were invited to a competition. The results of three contenders were combined and created the basis for the master plan.

The aim of the project is the planning, development and realisation of new community which encompasses the following points

- a variation in built form
- economical use of materials
- the ability to adapt to social change
- the integration of the existing

The proposed functions for the site incorporate a variety of usages such as residential development, buildings for the university and student organisations as well as additional public and private functions.

The site is situated on the so-called „Horn", a green slope facing the south west. The location is to the East of the city centre overlooking the Ilmpark.[Fig.82] The borders of site are defined to the east by the Albrecht Duerer Strasse and to the south by the Theodor-Storm Strasse, towards the West and North the site is separated by network of footpath to the existing developments. The site is surrounded with different types of residential areas, the northern area between Leibnizallee and Jenaer Strasse is characterised by a heterogeneous, multi storey ensembles of open and closed blocks, the eastern area is characterised by three or four-storey linear apartment blocks, whereas the south and west are dominated by mansion-like houses set into a landscaped area.[Fig.88]

The B7 is the main integrator on a regional level. The site is well connected on a pedestrian level to the city centre. The main access is provided via three vehicular access roads and two pedestrian access points. The local vehicular access is planned from Albrecht-Duerer Strasse and Theodor-Storm Strasse.[Fig.83] The proposal for the south and east side of the development is a loose arrangement for one of two storey housing whereas the north and west is reserved for development of the university and commercial developments. The concepts and their surroundings should be adaptable to changes in the family structure, working environment and new forms of communication.

The development is based on a so-called „urban design grammar". The site was subdivided into variously sized working fields containing parcels. Uniform regulations were defined for the development via location, dimension and layout specifications. The results are compact buildings containing up to five apartments and rooms for flexible uses. The combination of workplaces and residences was recommended, as was the use of ecological materials. The urban design and aesthetic aims of the project were safeguarded via the legally-binding land-

use plan. An advisory body for the development composed of representatives of all project stakeholders monitored compliance with all specifications and supported the realization in an advisory function.[Fig.89-90]

By June 2004, 45 of the 73 parcels had been developed. For the further development of the area and as a contribution to the promotion of architectural culture, the LEG has commissioned nine European architects with so-called pilot plans for the as yet undeveloped parcels. The planning suggestions comply with the specifications for the location and are an offer for families interested in building.

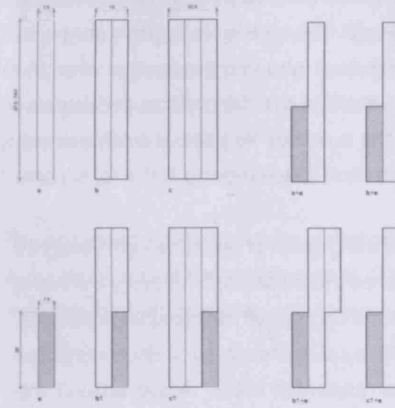


fig.b types of cell

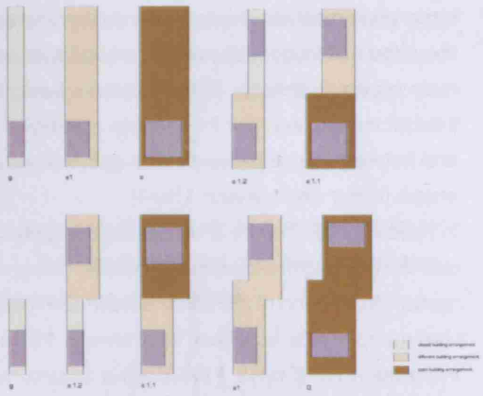


fig.c possible building arrangements

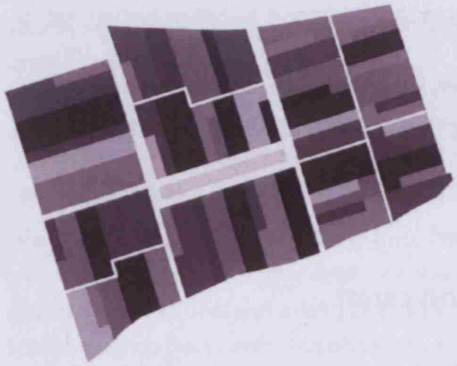


fig.d site pattern

fig.e 3d visualisation

4.2 THE PHYSICAL AND SPATIAL ANALYSIS OF WEIMAR

The physical image of Weimar is determined by strong topographical features. The centre itself is located in a dip and the city has grown mainly to the south, west and north. The growth to the east has been limited by the Ilmpark - a landscaped park, which stretches over 48 hectares from the city centre along the river Ilm to the south and provides a natural border between the populated area to the east and the city. [Fig.84] The regional connection is provided by the train. The main train station is located in the north; a second station is located in the west. In addition the city provides an extensive net of bus links to connect the train station to the city centre. [Fig.83] The proposed site is located in the east.

4.3 SYNTACTICAL ANALYSIS OF WEIMAR

The physical city of Weimar, analysed through its axial representation [Fig.85-87] renders the structure and order in the system. It is used in order to highlight the underlying properties of spaces, with relevance to their position in the system under consideration.
The syntactic analysis of the axial map showing global integration values depicts a centre to edge pattern of integration, with a highly integrated core. The integrated orthogonal spokes link the heart of the city to the external quasi ring road and is highlighted in the local integration map [Fig.85]. This pattern is defined by Hillier as the deformed wheel (Hillier 2005), indicating a morphological structure of the settlement acting as a whole. The streets linking the centre to the edge are frequently used by inhabitants as well as by visitors who use these streets as the main routes to the city. The effect here being that the structure of the city creates probabilistic interfaces between the inhabitants moving in and out of the buildings and those on the street and between those moving in the global scale of the system and those moving in the local scale areas. (Hillier and Hanson 1984)
In Space Syntax Theory and analysis, the global measure of integration provides valuable insights into the working of a system as a whole. 'Integration' measures the mean depth of every line in the system from each of the other lines in turn relativised in accordance to their possible depth with that number of lines (Hillier and Hanson 1984, p.108). The axial representation showing global integration R7 [Fig.85] indicates a structure where the residential areas weave around the orthogonal grid layered around the city centre. The city through the centuries has evolved and is configured today as a functional whole, where the public area are orientated towards the centre, the more private functions are forming the middle layer and the outer layer is characterised by an industrial structure. The axial break down highlights that Weimar is a shallow system due to the radius radius being a value of seven.
On a global level the site is characterised by relatively integrated lines, whereas on a local level the site main routes are highlighted located. The step depth measure for the estate in relation to the city centre supports this observation. The site is located four steps away from the centre, but only two steps away from the main integrator into the city. [Fig.87] It is well connected via pedestrian and vehicular routes.

4.4 THE PHYSICAL AND SPATIAL ANALYSIS OF THE ESTATE

There are seven access points to the site. Three of the access points provide direct access to the site - two of these main points are vehicular, the third one is a pedestrian access point. The other four points require insider knowledge of the area to link them to the estate. [Fig.91] The overall site area of the estate averages 11.4 hectares and the average building area per plot is 40%.[Table 2]
The figure ground ratio of the estate, i.e. the proportion of space dedicated to different outdoor functions to building footprint, is 7.5 times as much unbuilt space as there is building footprint. The external space is subdivided in three main functions. 33% of the space is dedicated to the path and access system, 17% to green landscaped area and 50% to private garden. [Fig.92] The residential and non residential functions are balanced, however there is a separation between the functions.

The estate itself is split into two different elements, which allocates the more public functions to the front of the estate and the private areas to the rear of the estate. This enables a grading from open and public area to private areas.

The internal structure of the estate is characterised by a linear arrangement - movement spaces leading onto a central space in the centre of the estate. The overall built area is loosely set into the site and provides a high percentage of open area. [Fig.93]

The main way in which open spaces of the estate are laid out on the ground and architecturally shaped, is by the assignment of primary and secondary boundaries. The primary boundaries are formed from the perimeter of the building and the position of the facade, see table 4. Secondary boundaries are the walls, fences etc. that divide up the unbuilt spaces on which buildings are situated, see table 5. Primary and secondary boundaries have been subdivides into different categories. The ratio between primary and secondary is 47%primary and 53% secondary. For the primary boundaries the main figure for the estate reveals that the primary boundary with the greatest proportion of metric length is constituted by doors and windows (53.5%), followed by only windows (44.5%). The majority of the boundaries are permeable, only two percent are impermeable.[Fig.118]

The proposed estate presents a shallow system and has a tendency towards a street system for example the constitutedness rate of 75.6%. [Table 1] The results suggest that the configuration was aimed at encouraging co-presence and encounters in the public areas.

The interface map represents the relation of both adjacency and direct permeability from the building to the convex space. It shows that the majority of convex spaces are constituted and the system is continuous.[Fig.97] The decomposition map of the estate explores this property more visually and shows that the structure survives the decomposition and retains the majority of its rings.[Fig.98]

4.5 THE SYNTACTICAL ANALYSIS OF THE ESTATE

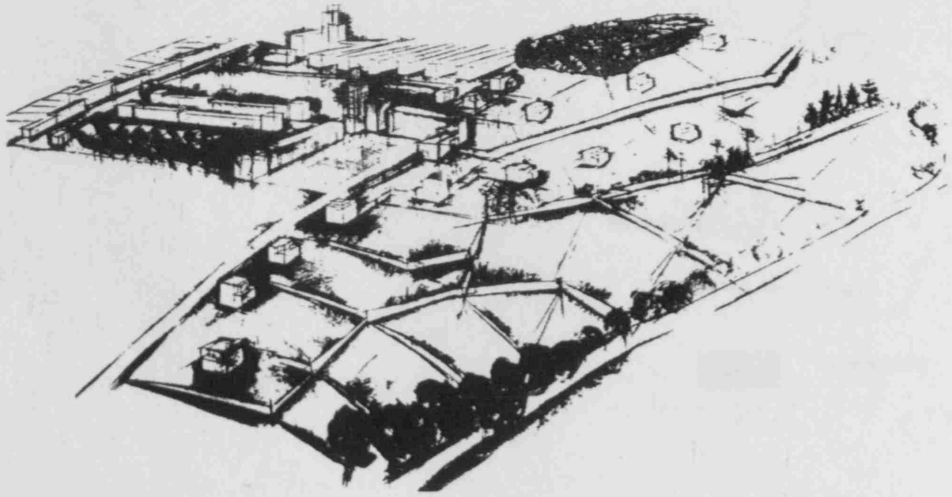
The estate constitutes out of 26 axial lines. The system is with a value of 0.27 for axial articulation shows high degree of axiality, which is coherent with the results of axial integration of convex spaces [Table 1]. The grid axiality of 0.38 indicates a deformation of the grid. The 51 convex spaces build up the system. The break down shows a medium deformation of the grid. Axial and convex articulation presents a high value for ringiness. The configurational analysis of the estates shows that the setting out is based on a sequence of movement spaces - linear space - leading to one main occupancy spaces- convex spaces. The convex space attracting the highest values of integrations as well as control is located towards the entrance of the site reflecting the public functions allocated in this area. The central space of the estate is showing as well a higher integration value. [Fig.94]

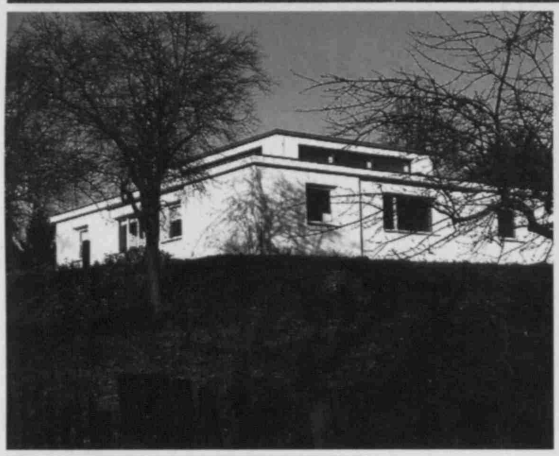
The vga analysis for the street system shows the highest visual integration values for the main integrator into the city. The internal main access routes into the estate are highlighted with higher levels visual integration. These levels are contained within the more public part. The detached houses are situated in a more segregated area. The analysis of the overall system shifts from the main city integrator towards the main entrance area of the estate and the internal layout of the estate. It provides a more balanced image. The points of control are in both cases allocated at the site access point and in the main convex spaces.[Fig.95-96]

The graph analysis aims to identify the generic characteristics of the spaces that constitute the estate. This representation is capturing in an apparent way the relations of depth between the spaces. On the whole, the justified graph is a deep graph, consisting of strategic gathering points and deep interconnected rings [Fig 99] The majority of spaces seem to be d-spaces [47] and more or less evenly distributed in the system.[Fig 100] These numbers illustrate the effects of the topological properties to the experience of the users of a space, as Hillier and Tzortzi describe, in that the more d-spaces, then the more there is choice and potential for exploration.

4.6 ANALYSIS OF BUILDING TYPES

For this section due to the variety of different building types two different arrangements have been selected and investigated. The choice is based on buildings which illustrate a modular approach. The six different buildings seem to have consistent features. All of the building are based on an open plan layout and minimise any circulation area. The relation to the outside is a key property and the relation is attempted to be created as frequently as possible. The general living accommodation is tailored to their users needs and arranged in various ways. The justified graphs reflect the different arrangement. The graphs have in common deep structure and contain interconnecting rings. [Fig.106, 115].





macro-scale_weimar 1922-23

fig.1 location plan

tram

train

road system

fig.2 ground figure and vehicular route

river ilm

landscaped park

fig.3 topographical plan

high

low

max. - 1.96

min. - 0.62

fig.4

integration r6

high

low

max. - 3.12

min. - 0.33

fig.5

integration r3

fig.6 step depth

micro-scale_weimar 1935

green bufferzone

landscaped park

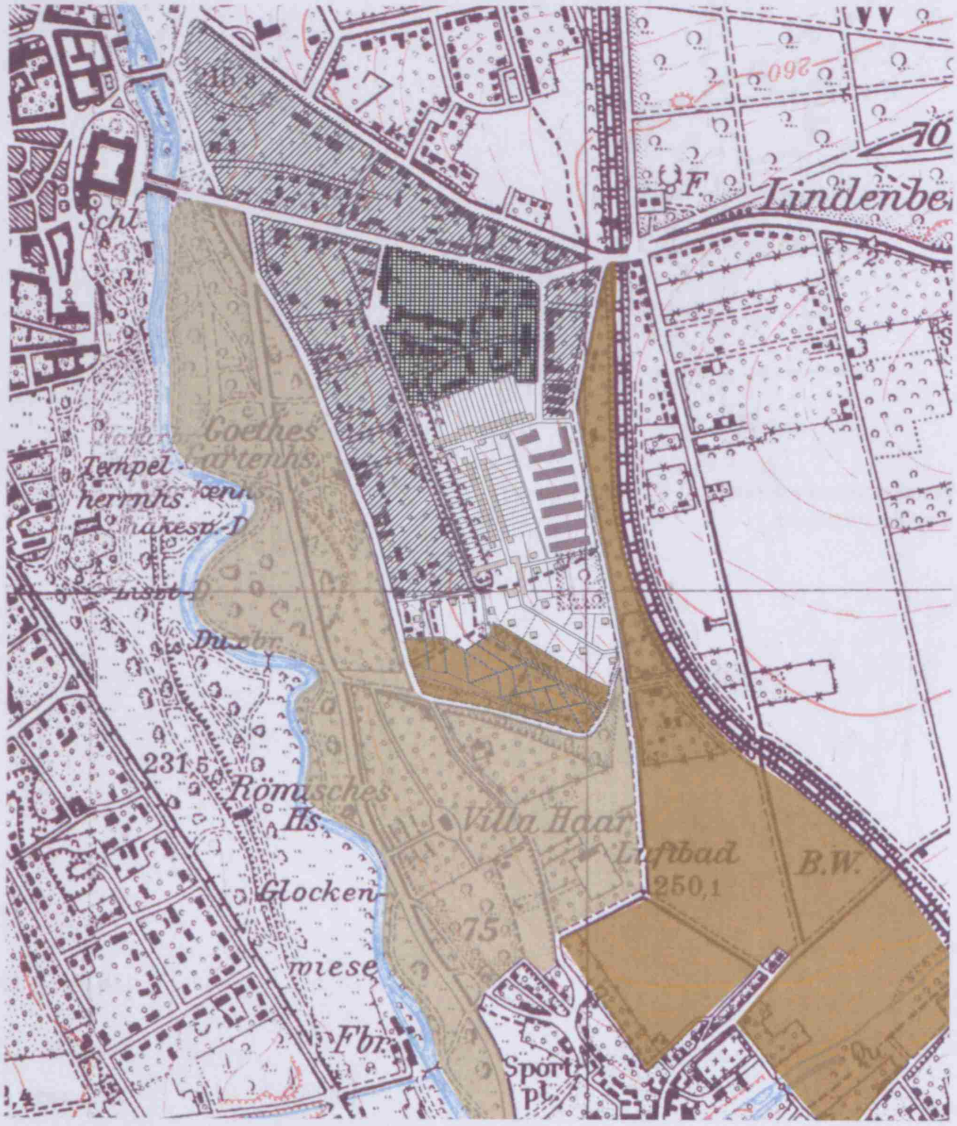
new residential

new workshop

existing industrial

existing residential

fig.7 land use map



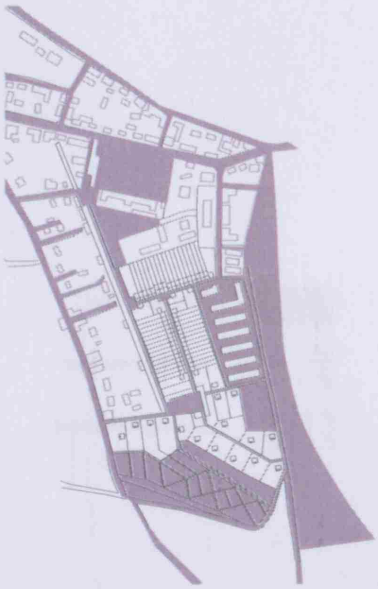


fig.8 ground figure map

fig.9 nolli map

fig.10 site access

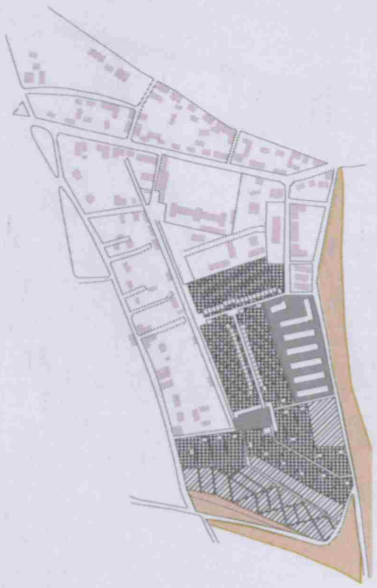


fig.11 open space analysis

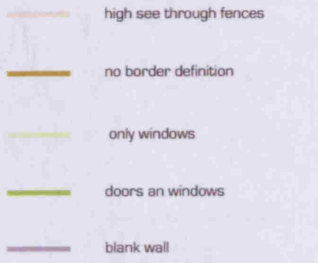
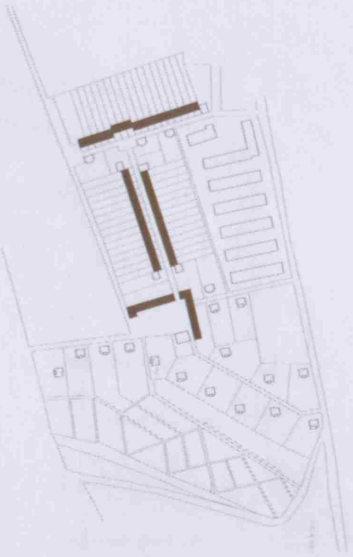


fig.116 primary and secondary boundary analysis



Type 01 - terraced house

No of households	59
No of household with garden	59
Average area per household	150 sqm
Average area per plot	625 sqm
No of household per plot	1
No of plots	49
No of floors per plot	2

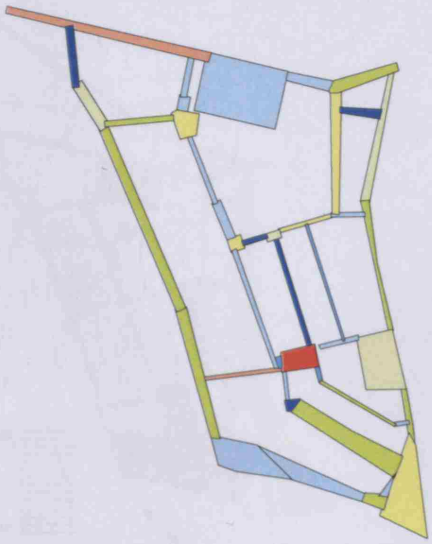
Type 02 - detached house

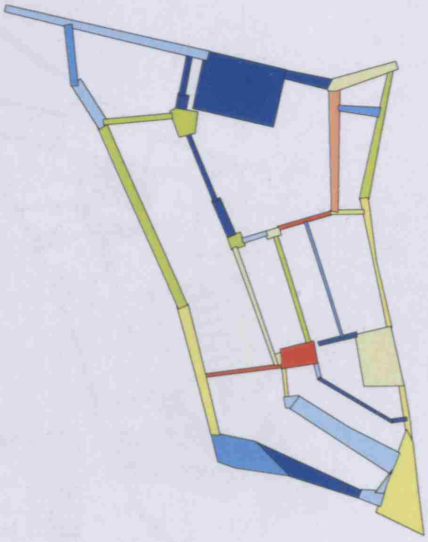
No of households	25
No of household with garden	25
Average area per household	115 sqm
Average area per plot	1,350 sqm
No of household per plot	1
No of plots	25
No of floors per plot	1.5

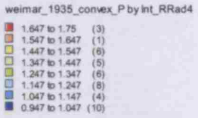
Type 03 - workshop

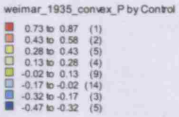
No of households	7
No of household with garden	-
Average area per household	1900 sqm
Average area per plot	20000 sqm
No of household per plot	7
No of plots	1
No of floors per plot	2

fig.12 building type









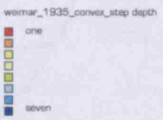
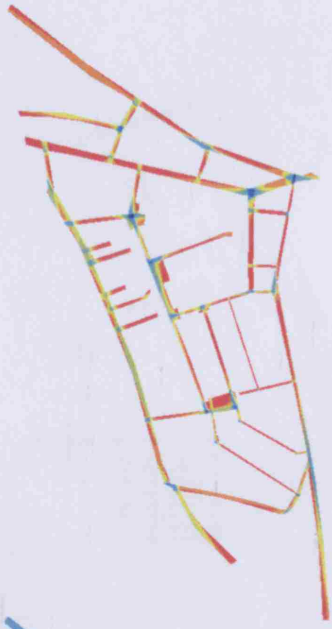
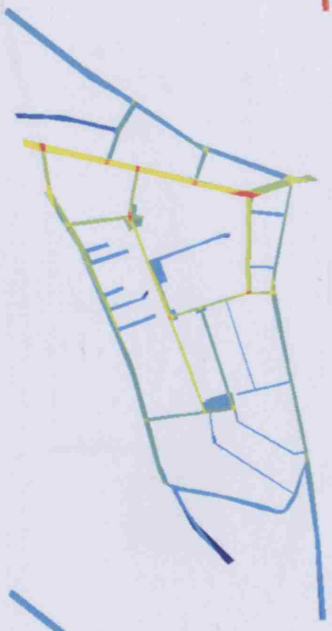
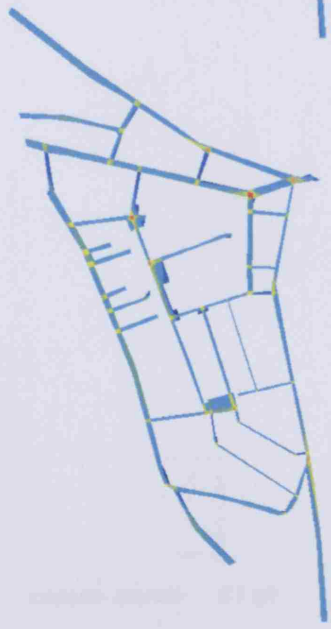


fig.13 convex analysis







high
low

visual clustering coeffient max. 1 min. 0.36

high
low

visual integration[HH] max. 6.0 min. 2.42

high
low

visual control max. 2.58 min. 0.18

fig.14 vga analysis_street system

high
low

visual clustering coeffient max. 1 min. 0.34

high
low

visual integration(HH) max. 6.60 min. 1.81

high
low

visual control max. 2.32 min. 0.08

fig.15 vga analysis_all spaces

fig.16 interface map

fig.17 decomposition map

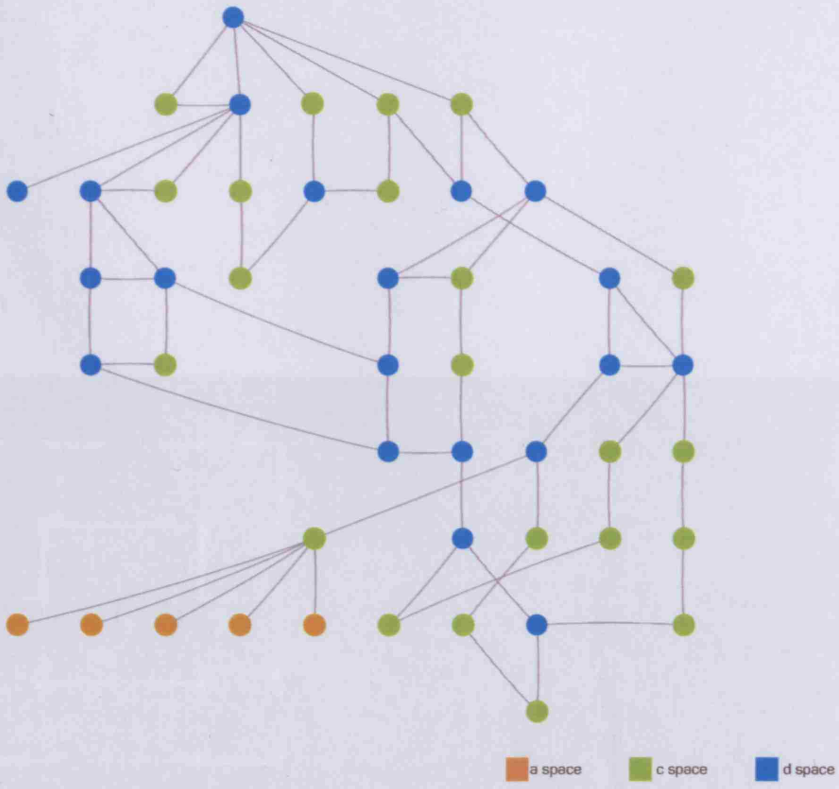


fig.18 justified graph

fig.19 space type analysis

micro-scale_haus am horn

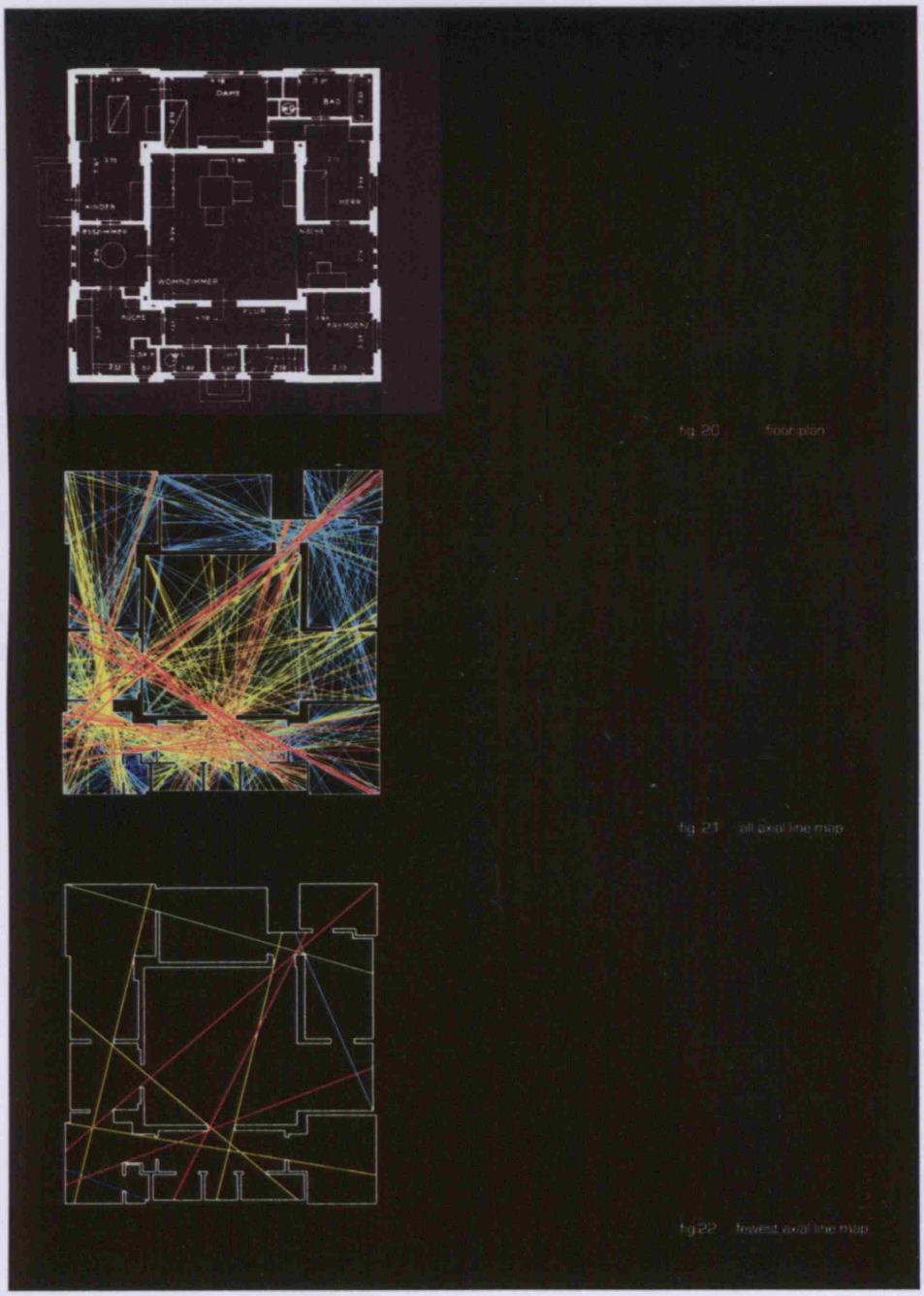


fig 20 floor plan

fig 21 all axial line map

fig 22 fewest axial line map

fig.23 VGA analysis

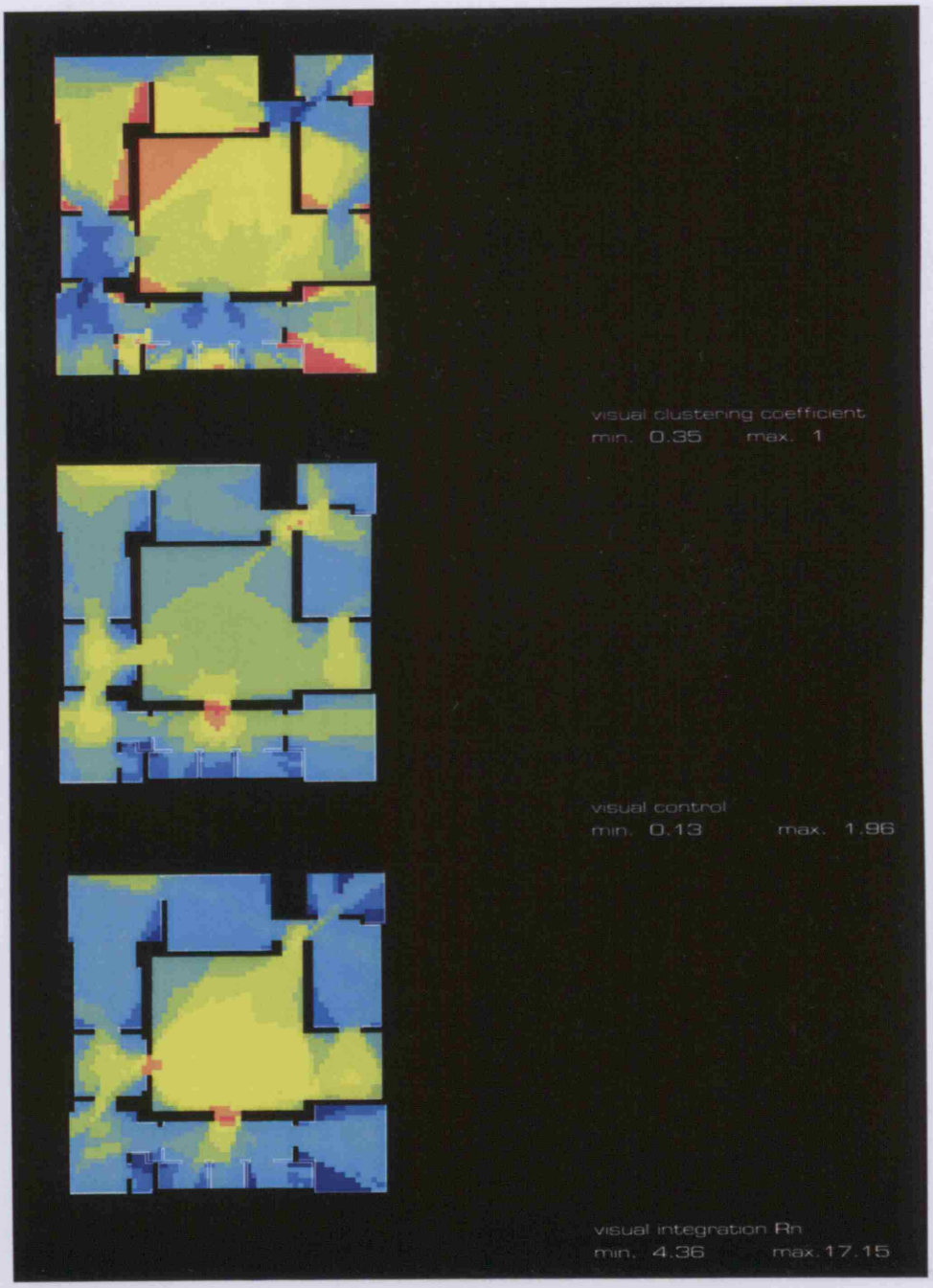
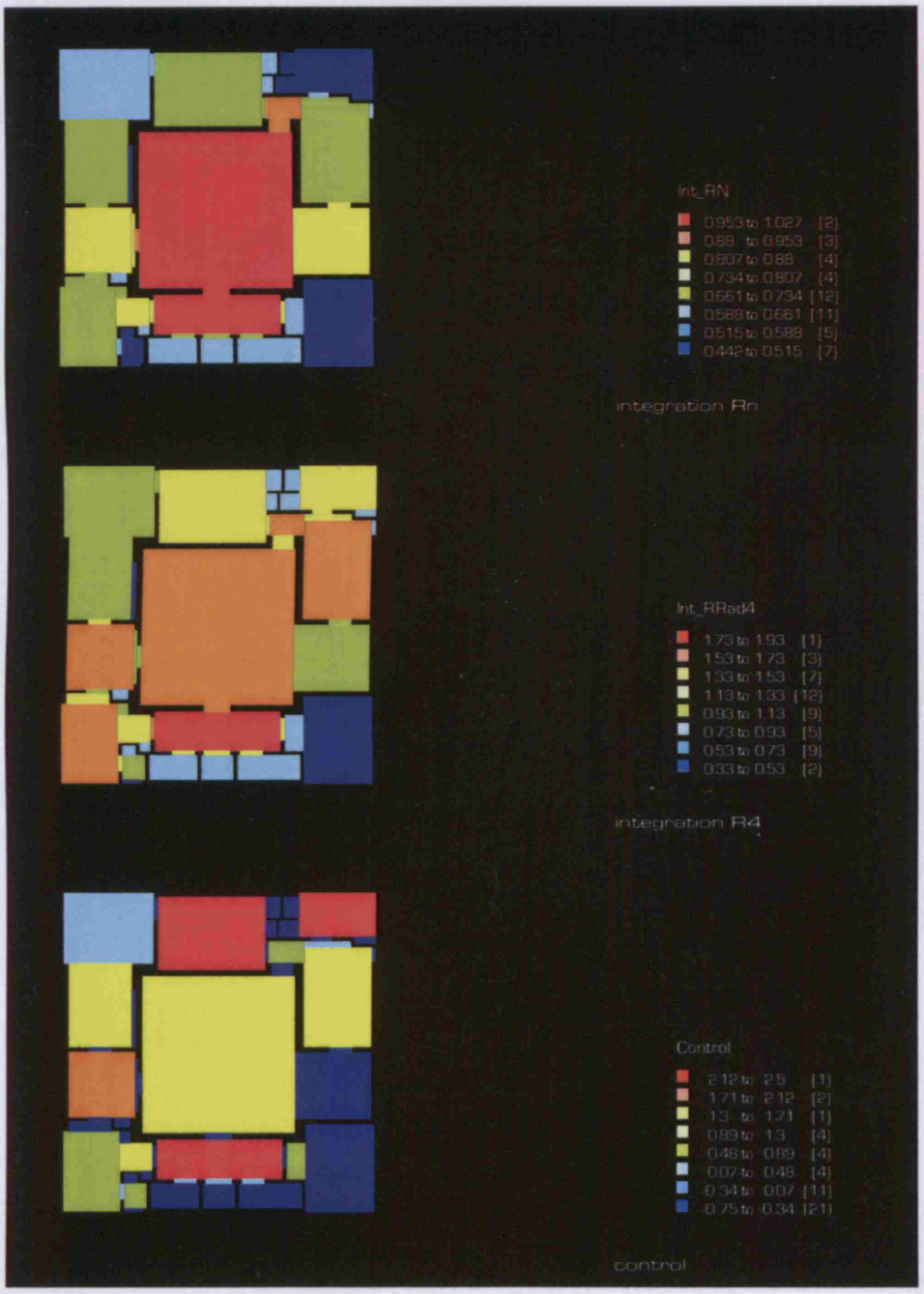
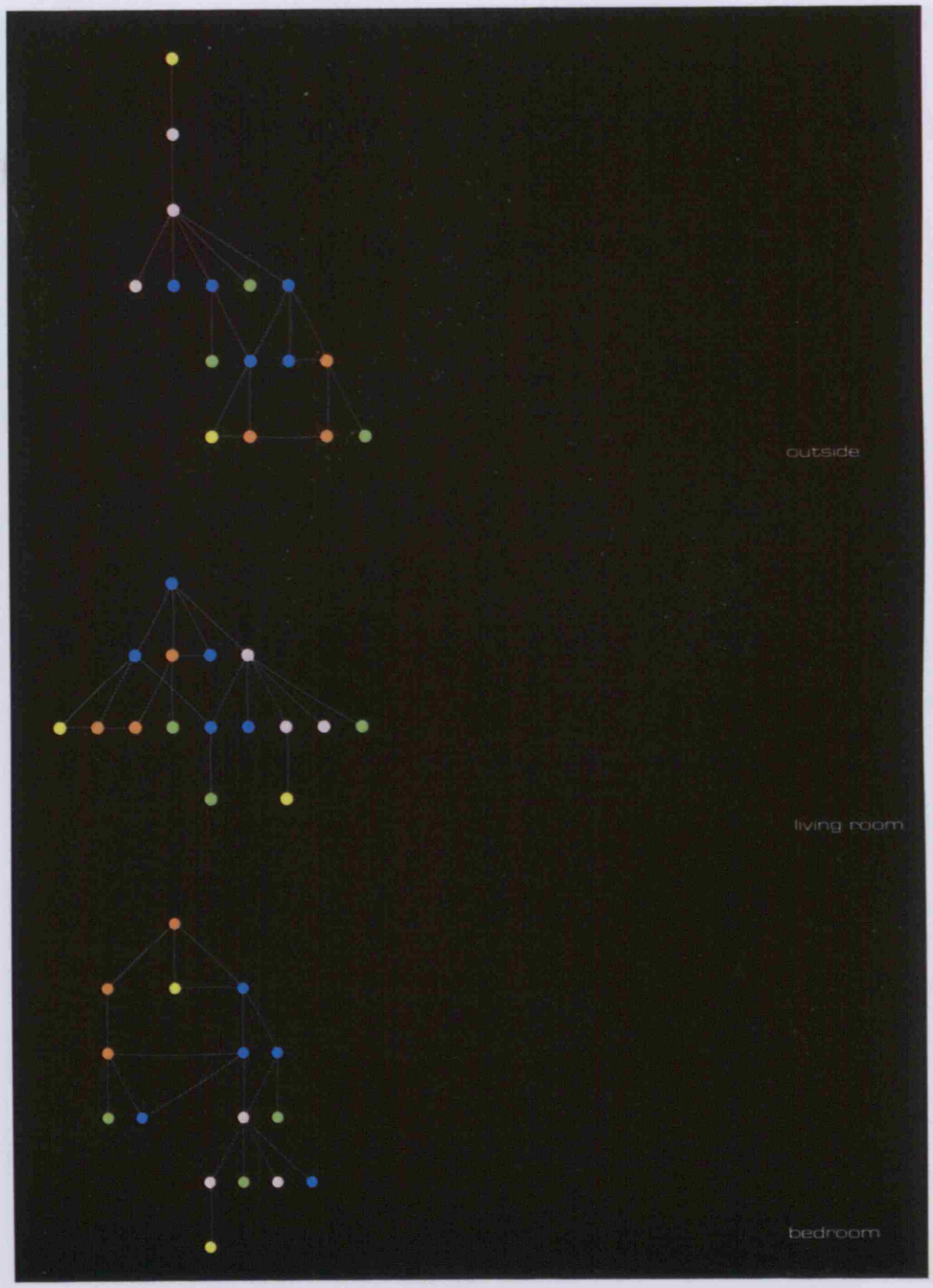


fig.24 convex analysis



outside
living
bedroom
circulation
service

fig.25 justified graph analysis



micro-scale_haus am horn_version 01

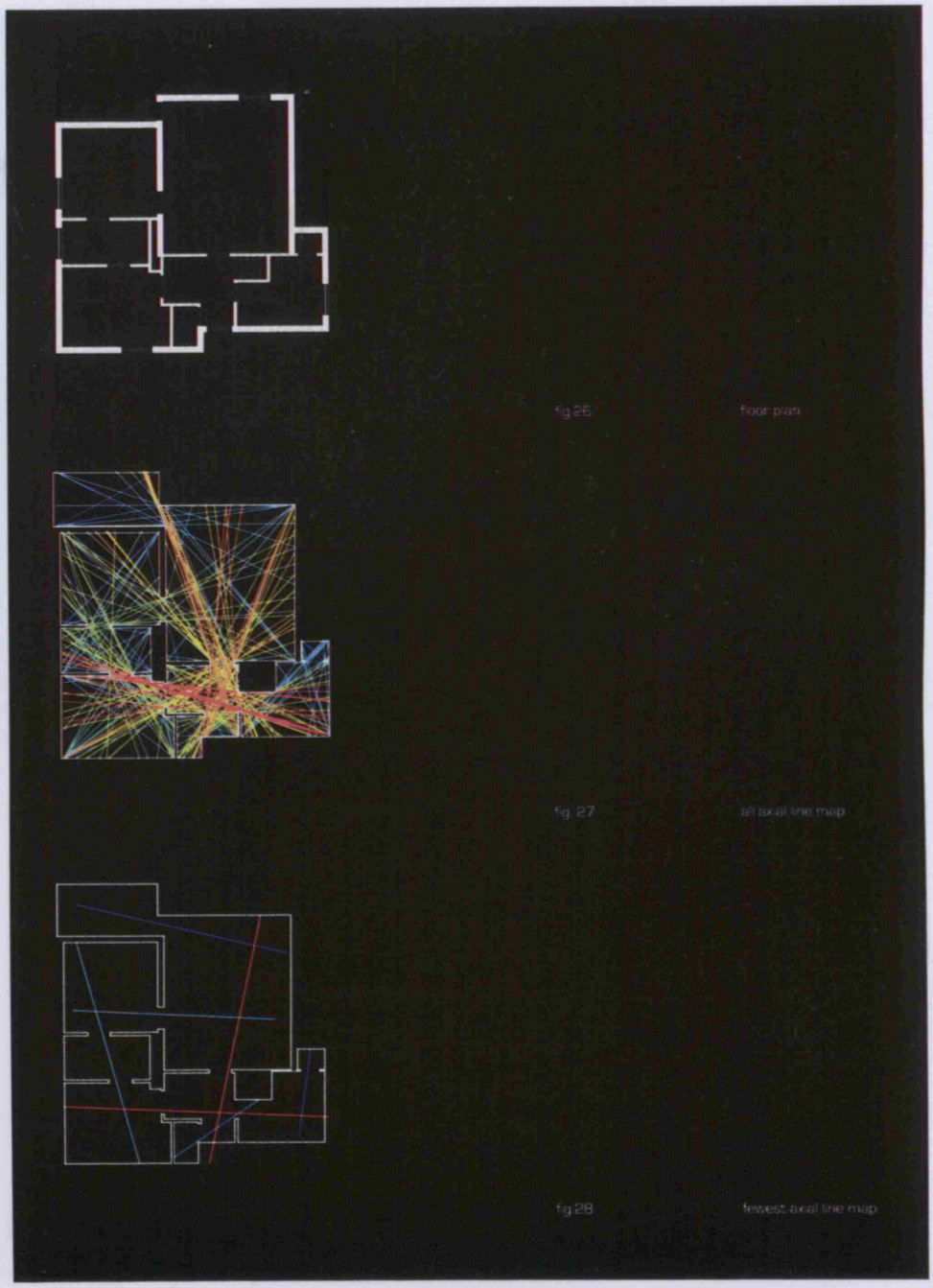


fig 25 floor plan

fig 27 all axial line map

fig 28 fewest axial line map

fig.29 VGA analysis

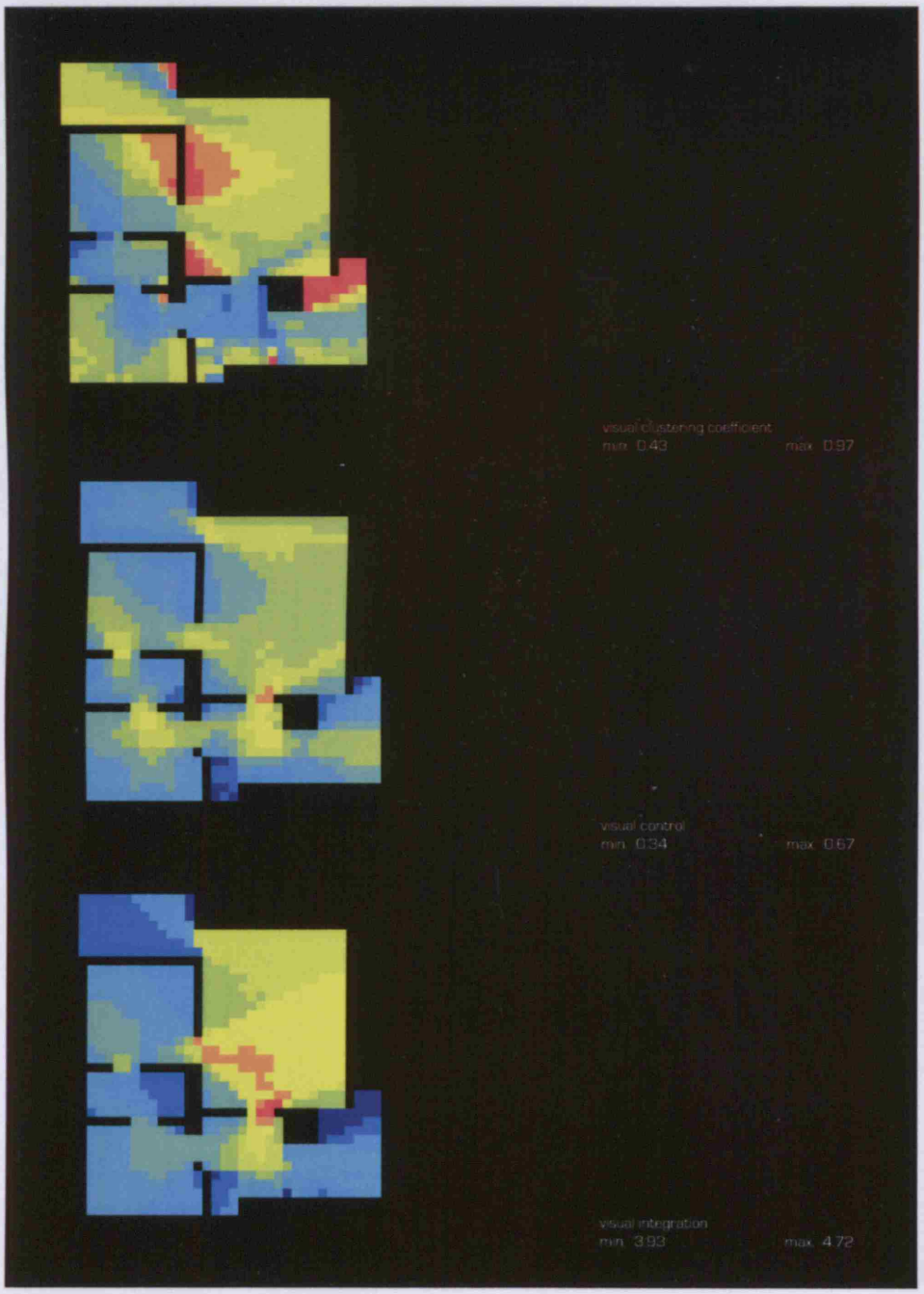
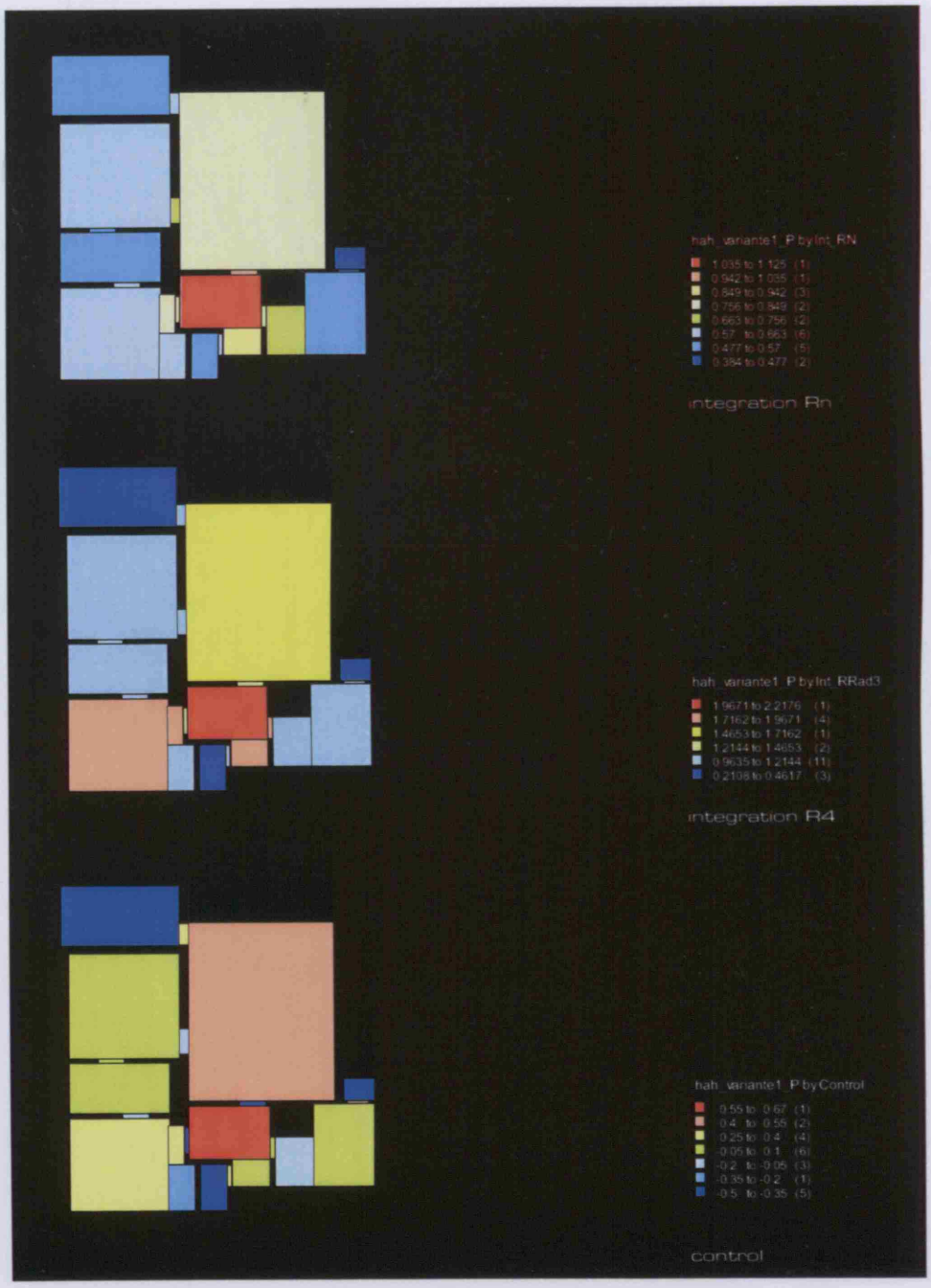
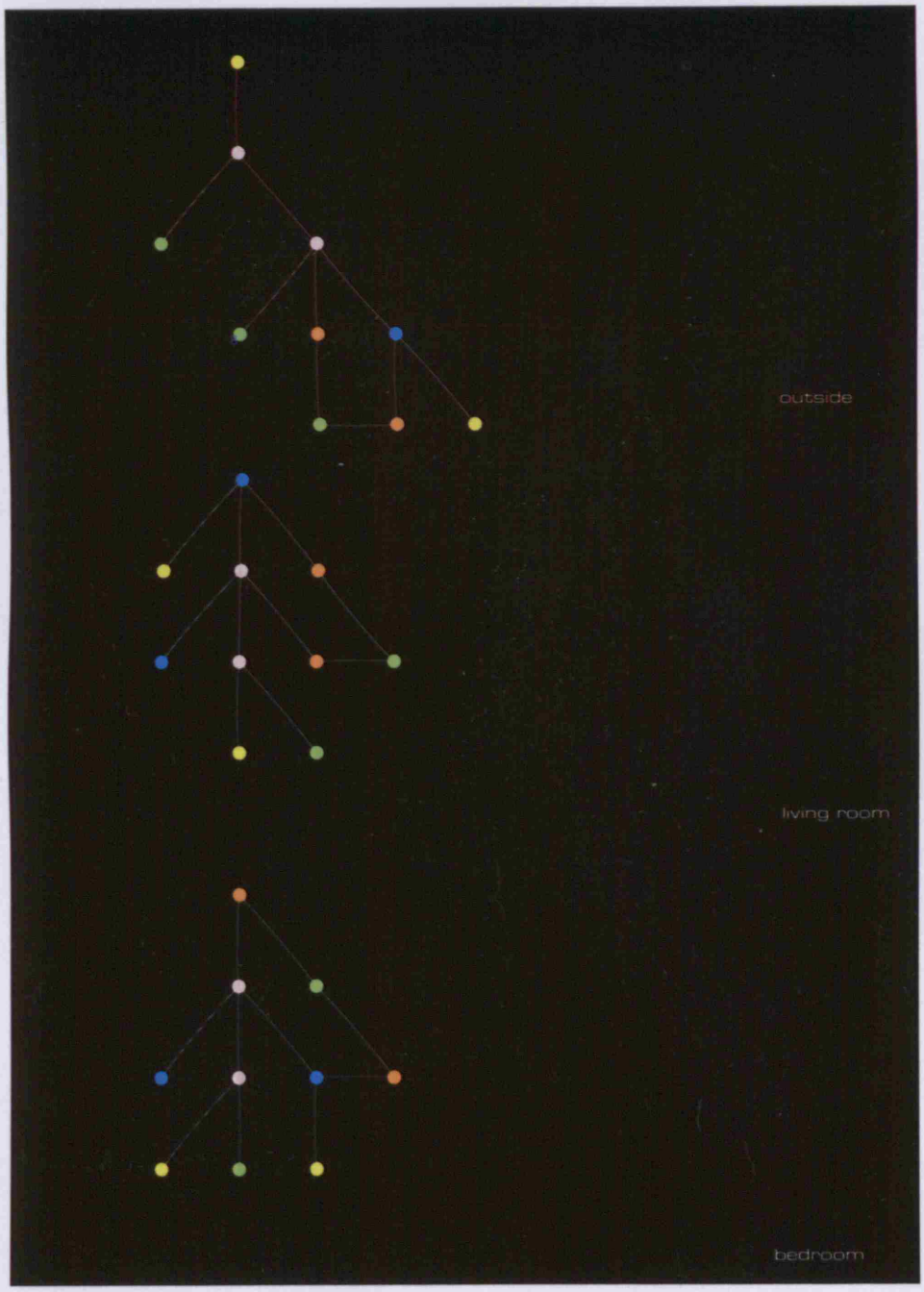


fig.30 convex analysis



outside
living
bedroom
circulation
service

fig.31 justified graph analysis



micro-scale_haus am horn_version 02

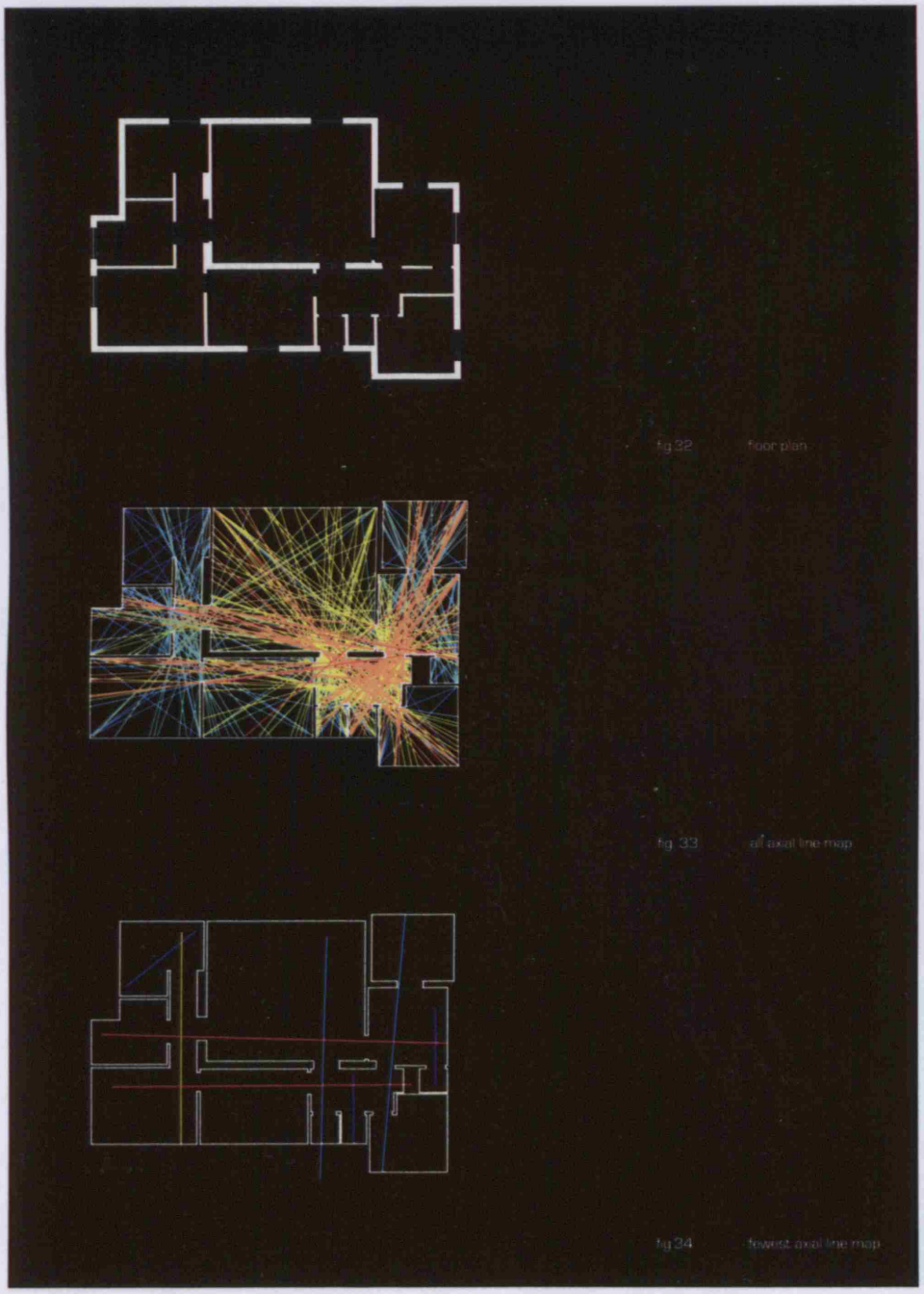


fig 32 floor plan

fig 33 all axial line map

fig 34 fewest axial line map

fig.35 VGA analysis

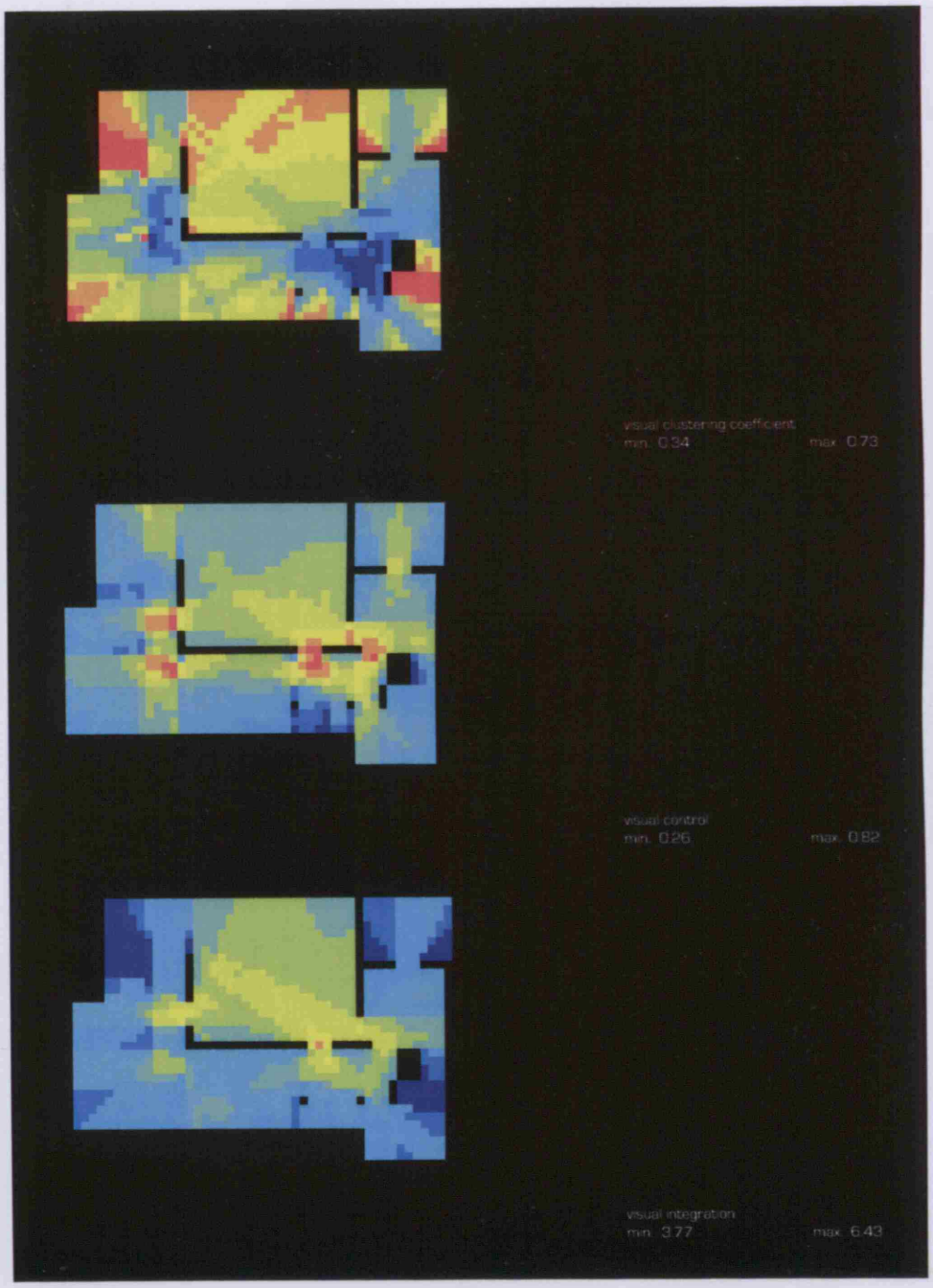
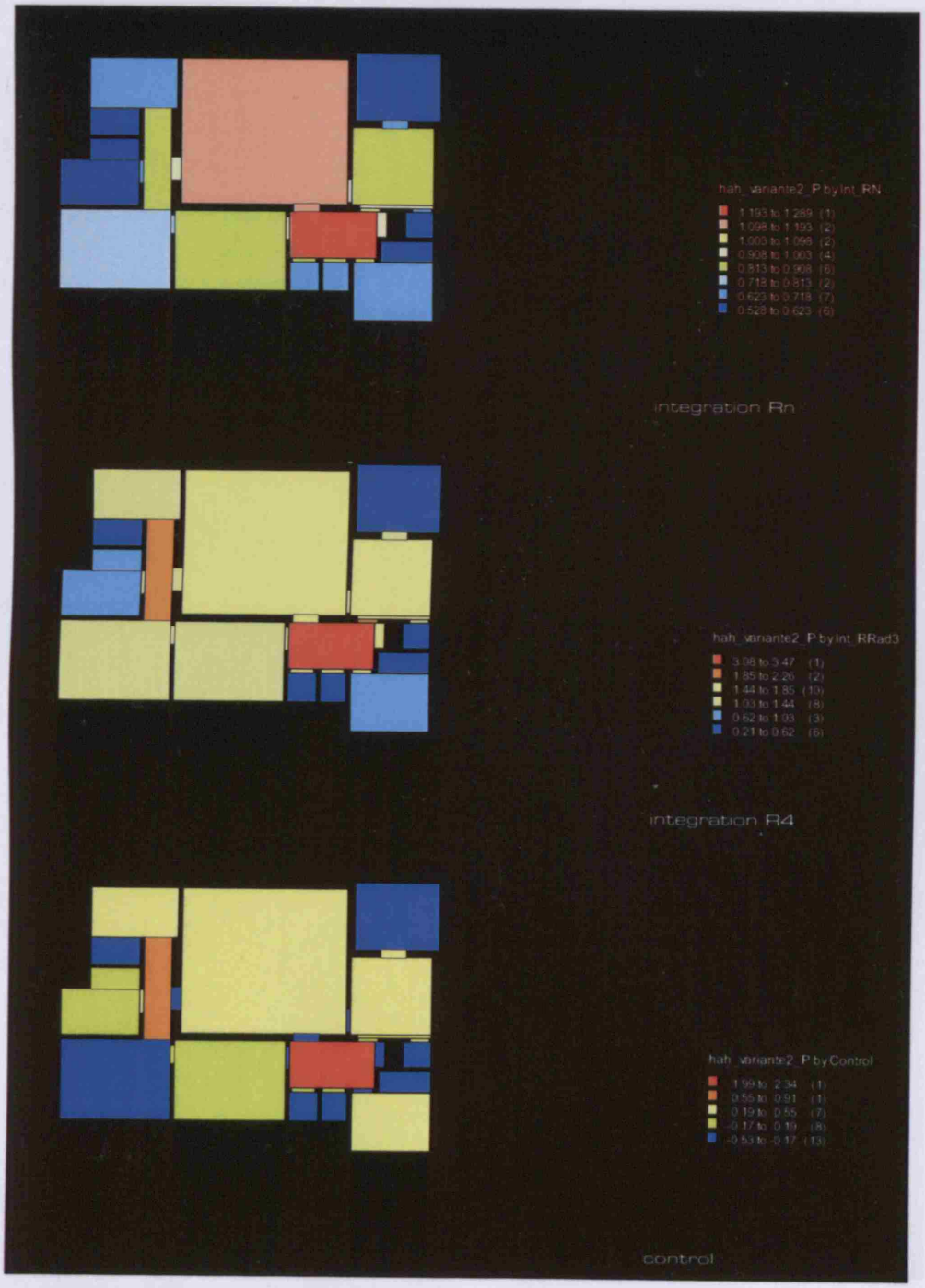
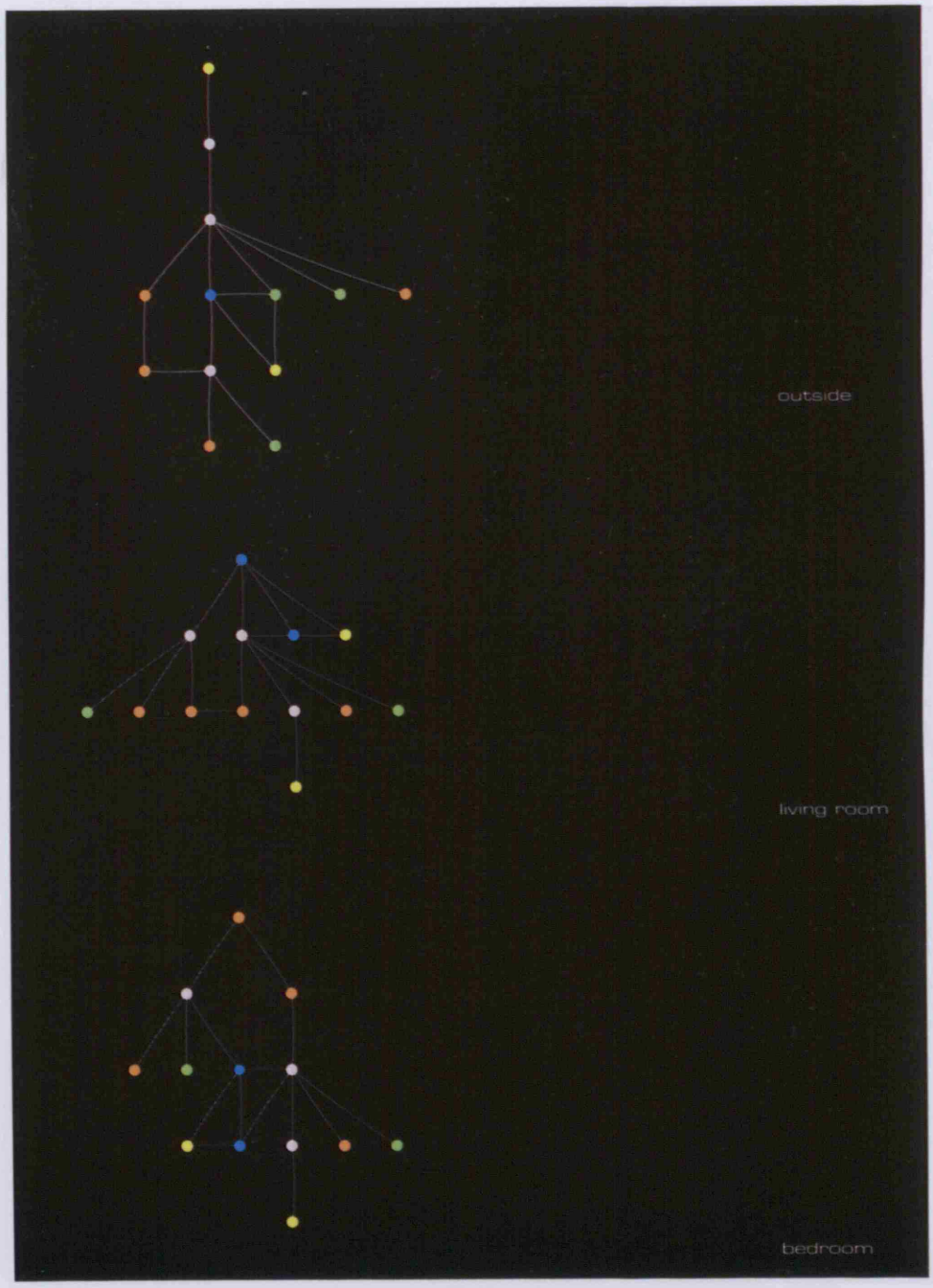


fig.36 convex analysis



outside
living
bedroom
circulation
service

fig.37 justified graph analysis



micro-scale_haus am horn_version 03

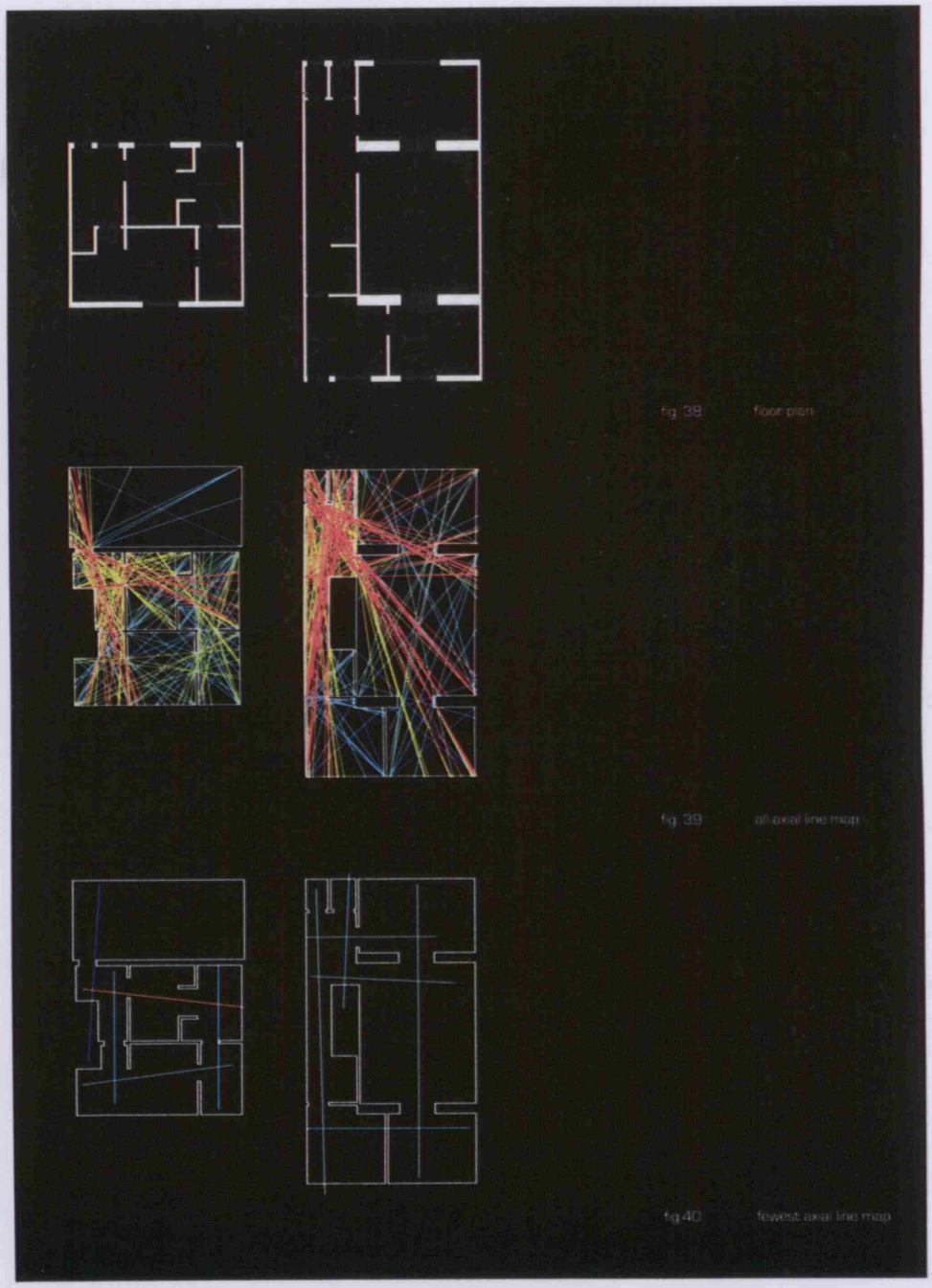


fig.38 floor plan

fig.39 all axial line map

fig.40 fewest axial line map

fig.41 VGA analysis

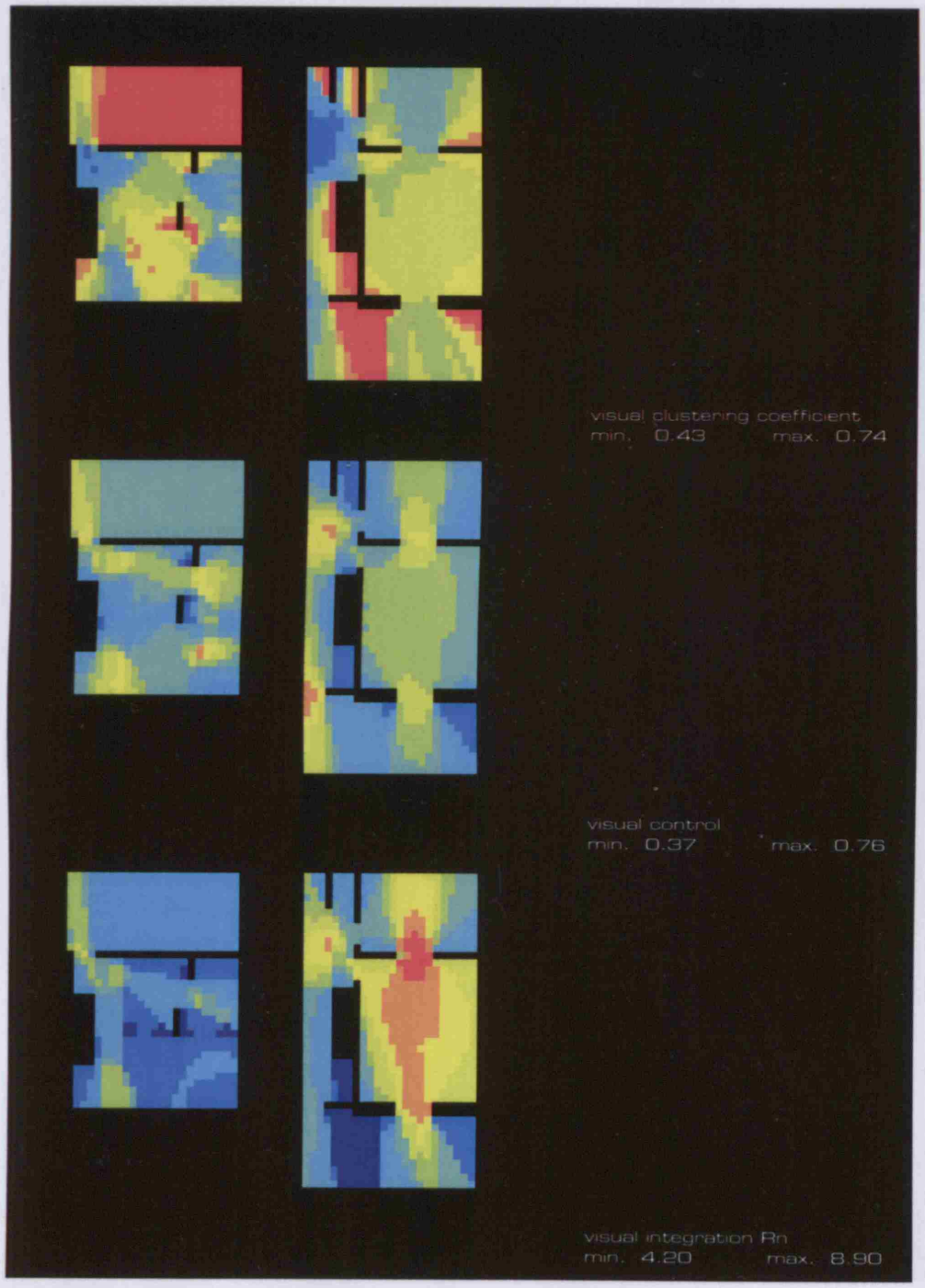


fig.42 convex analysis

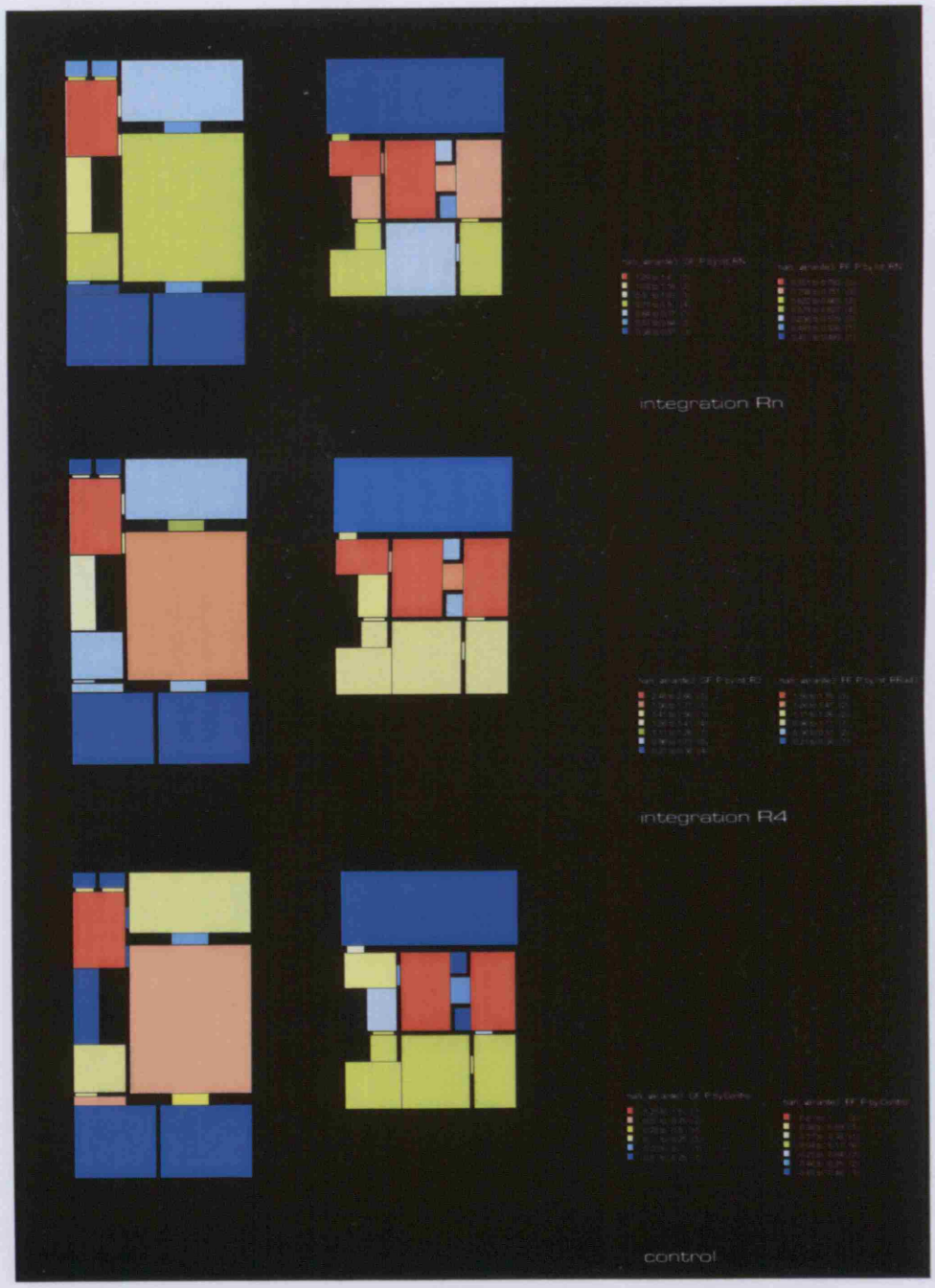
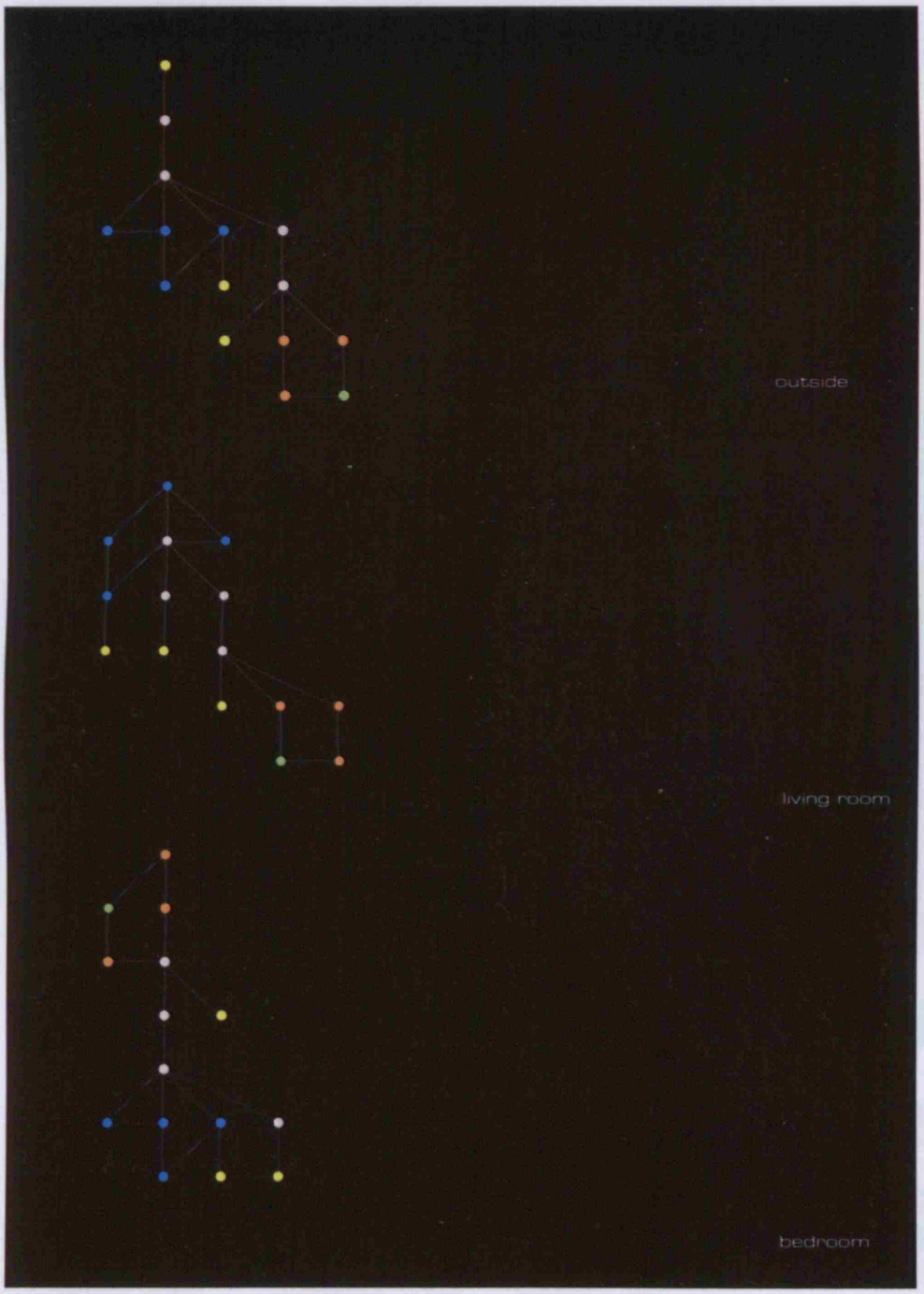
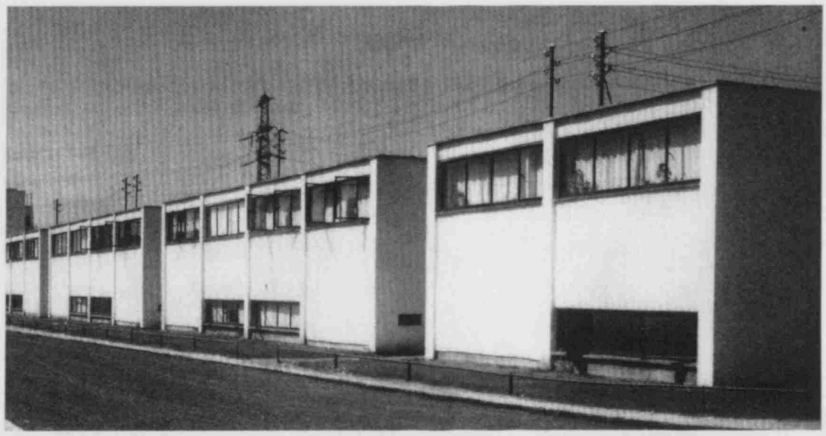
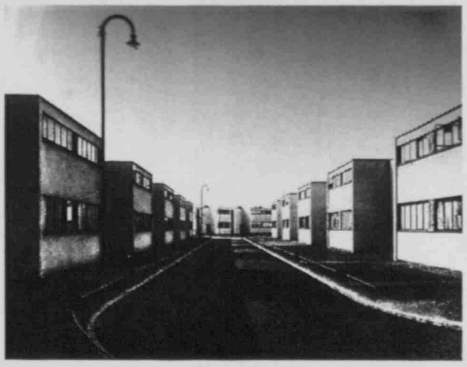


fig.43 justified graph analysis

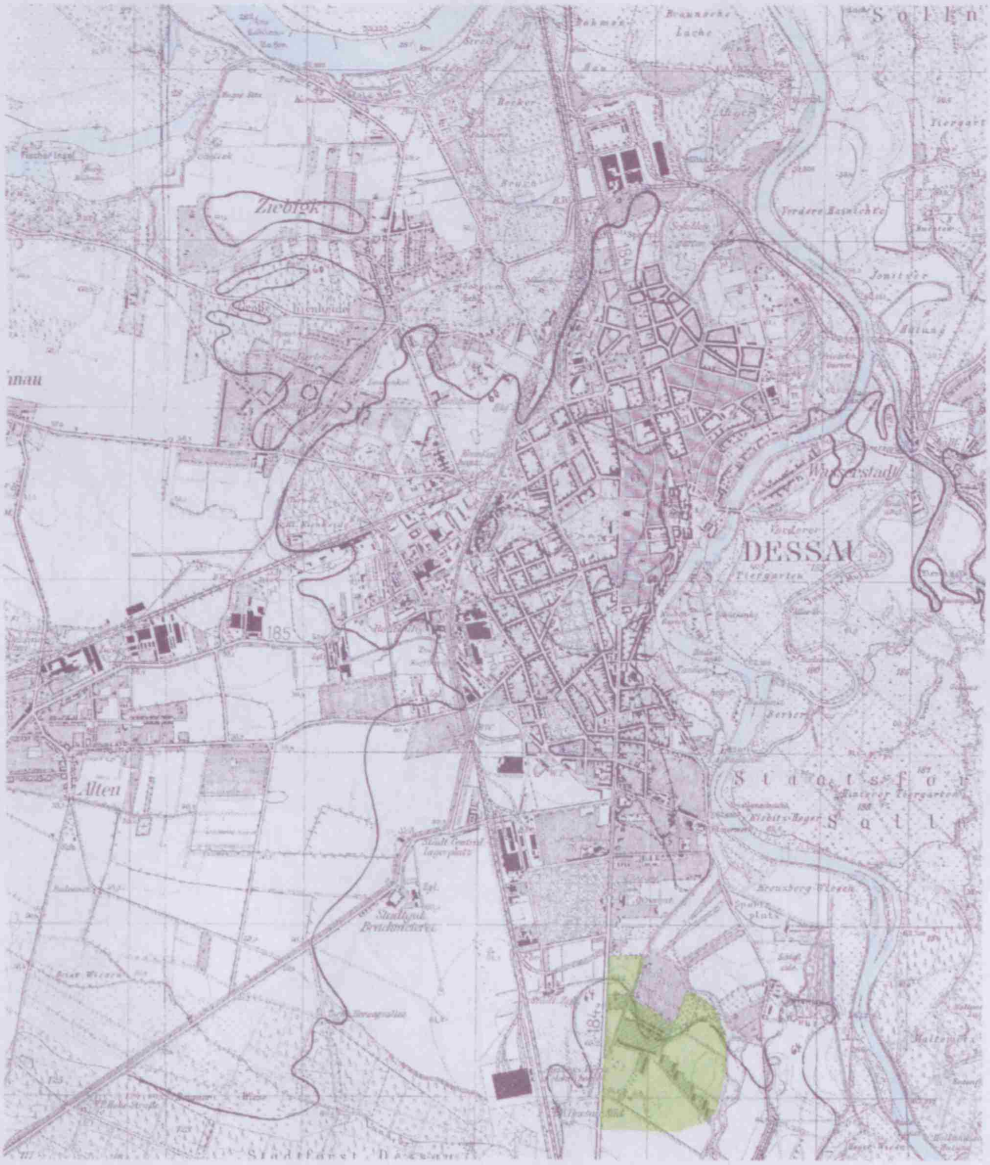






macro-scale_dessau 1935

fig.44 location plan

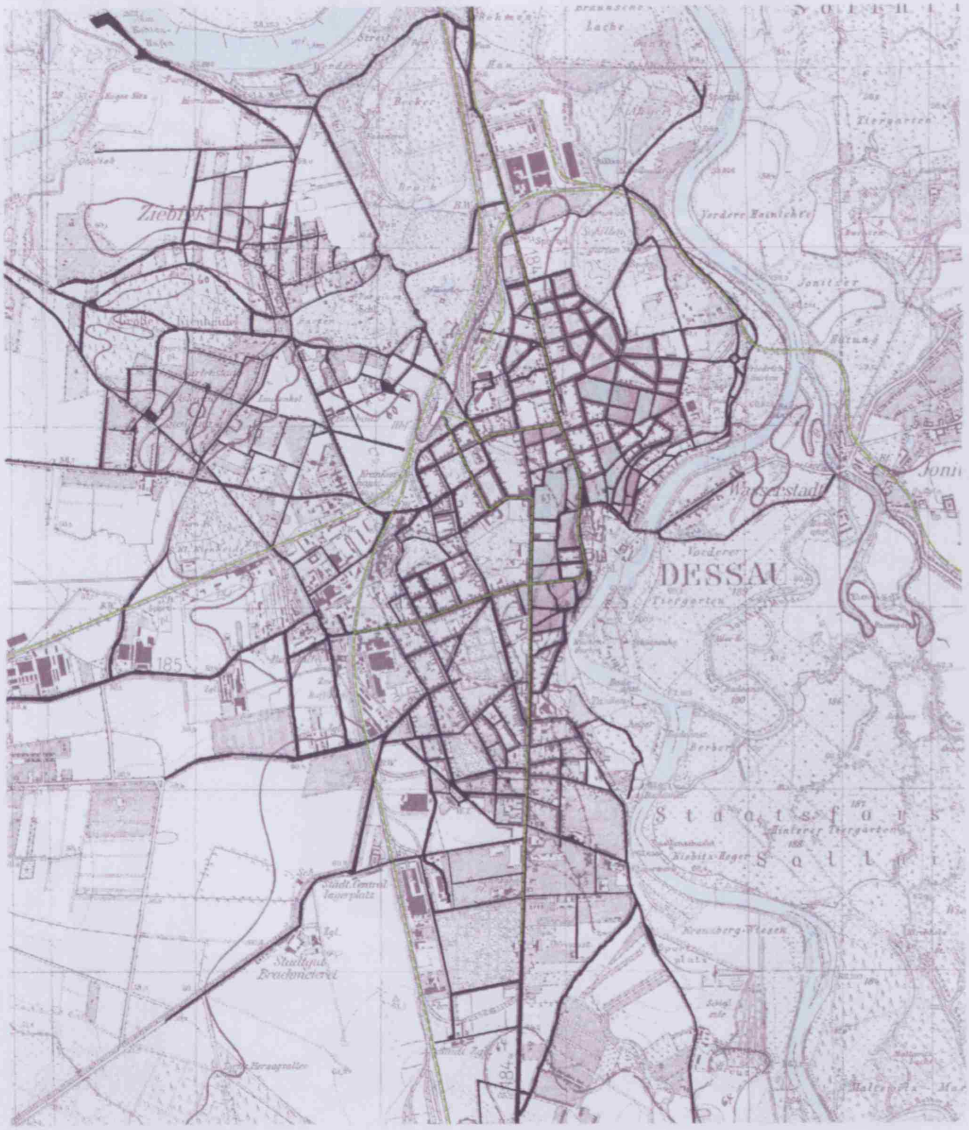


tram

train

road system

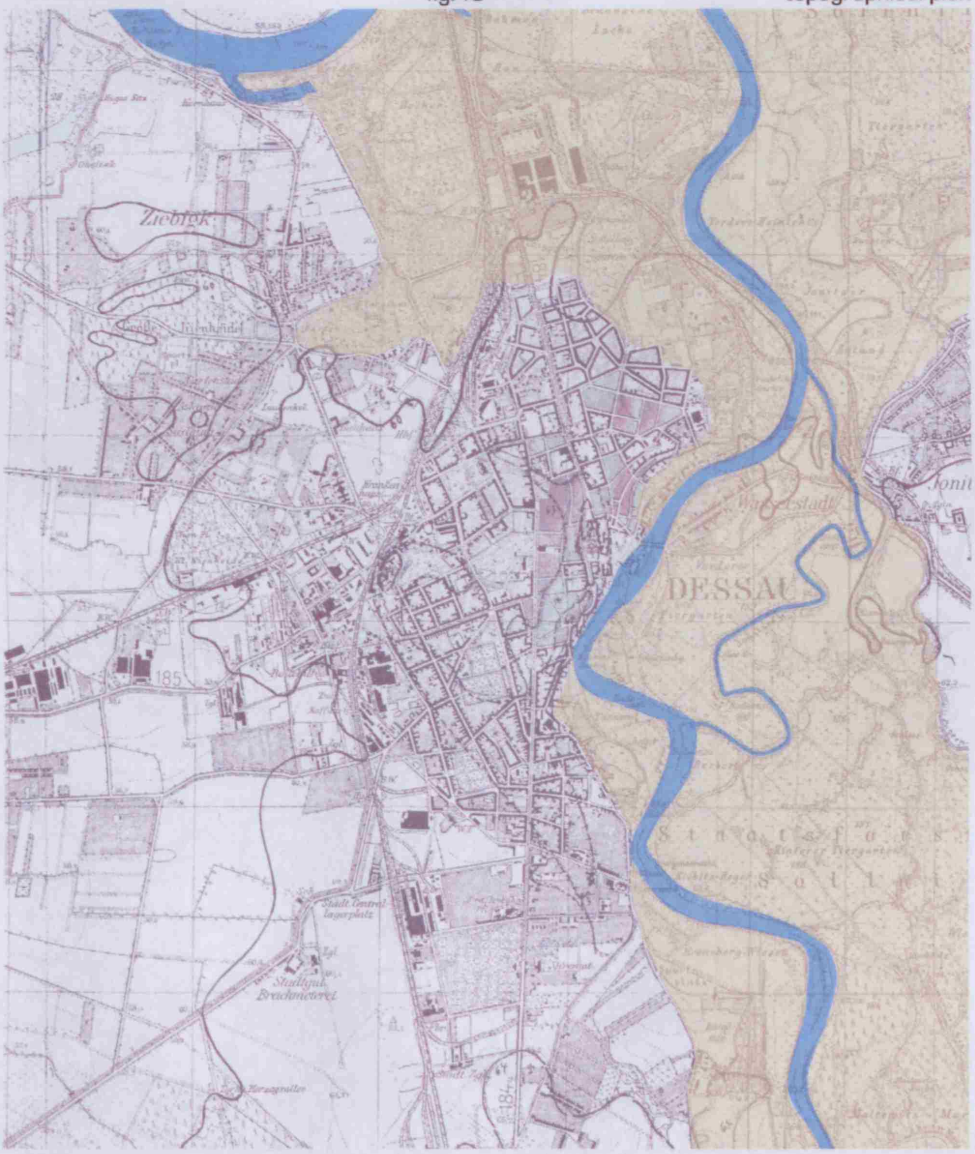
fig.45 ground figure and vehicular route



river ilm

landscaped park

fig.46 topographical plan



high

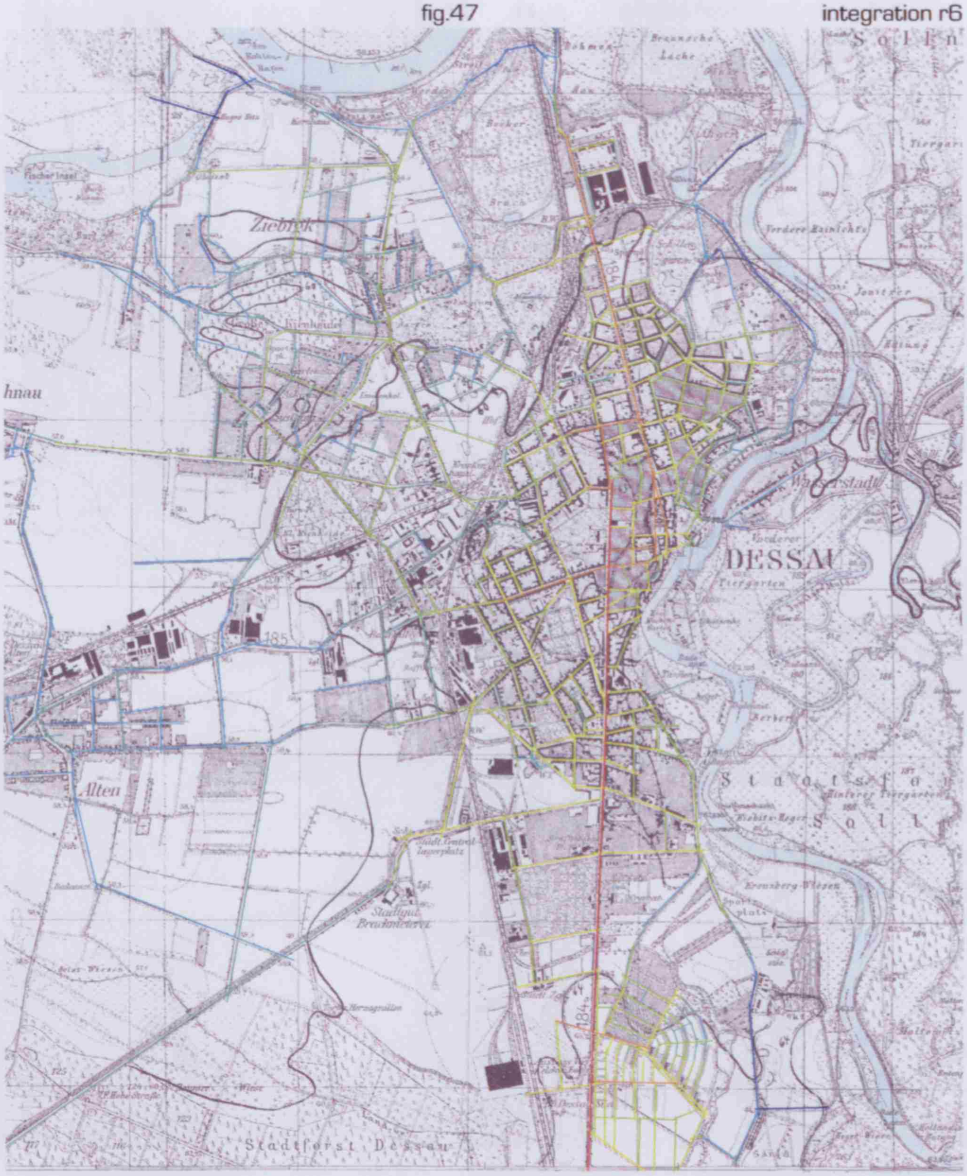
low

max. - 2.25

min. - 0.46

fig.47

integration r6



high

low

max. - 3.95

min. - 0.33

fig.48

integration r3

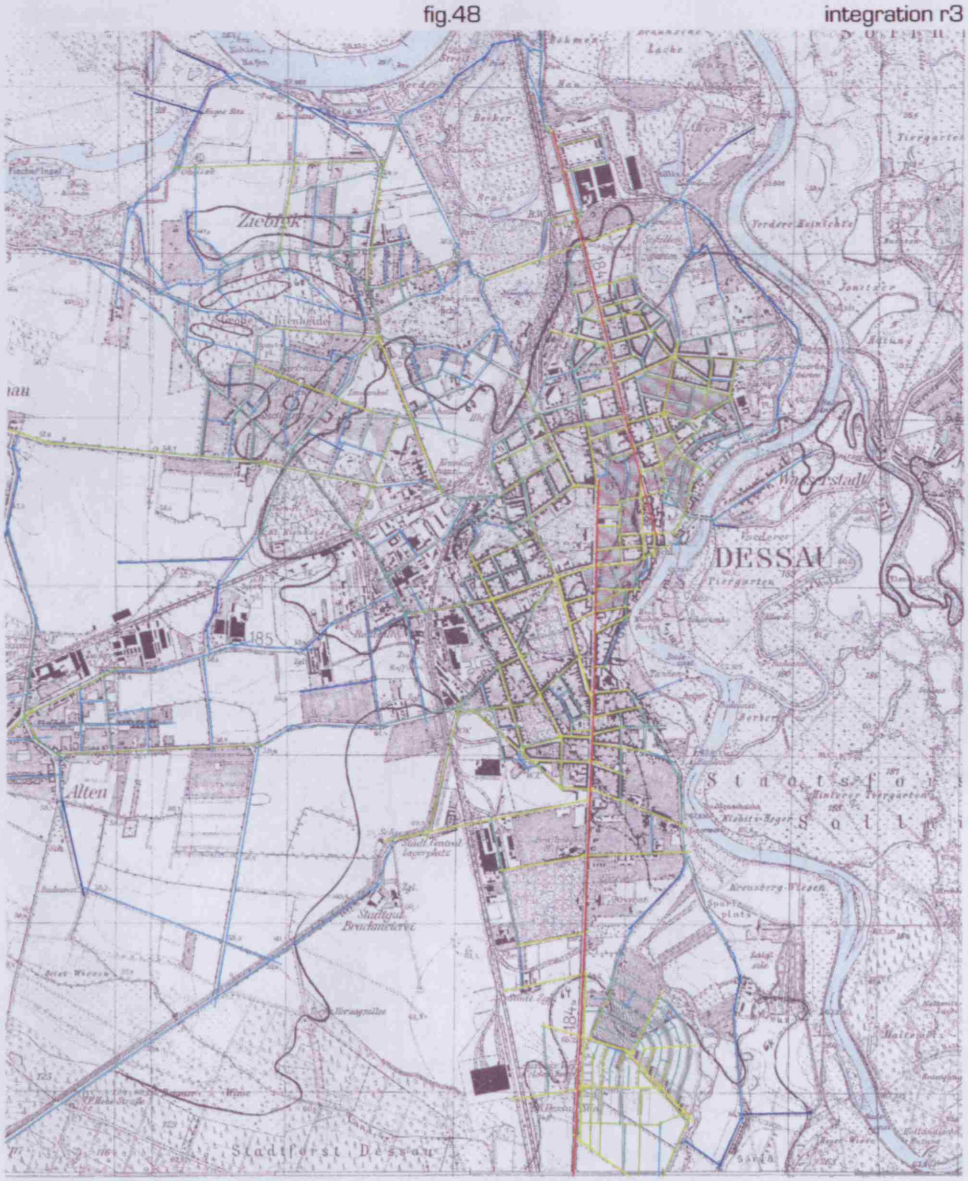
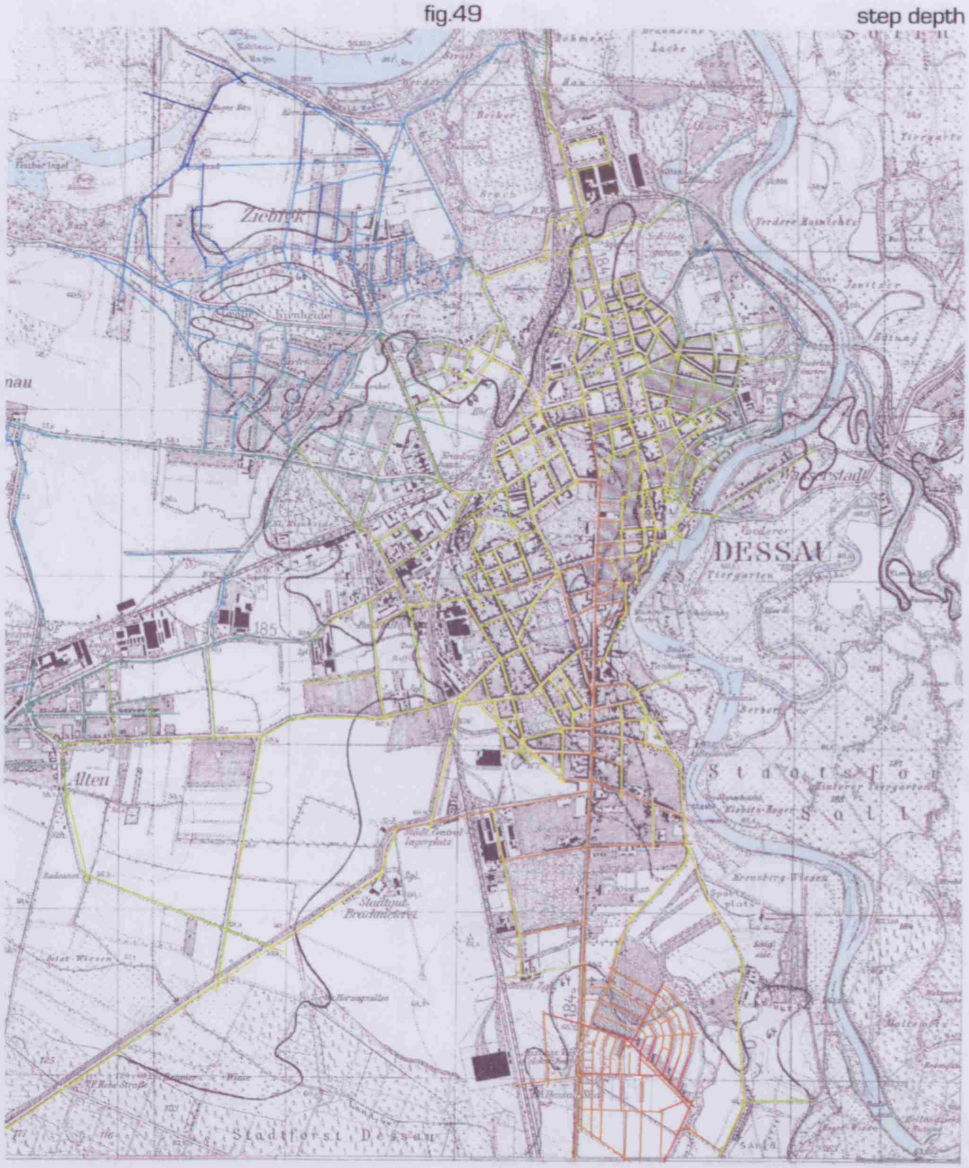


fig.49 step depth



micro-scale_dessau 1935

new retail

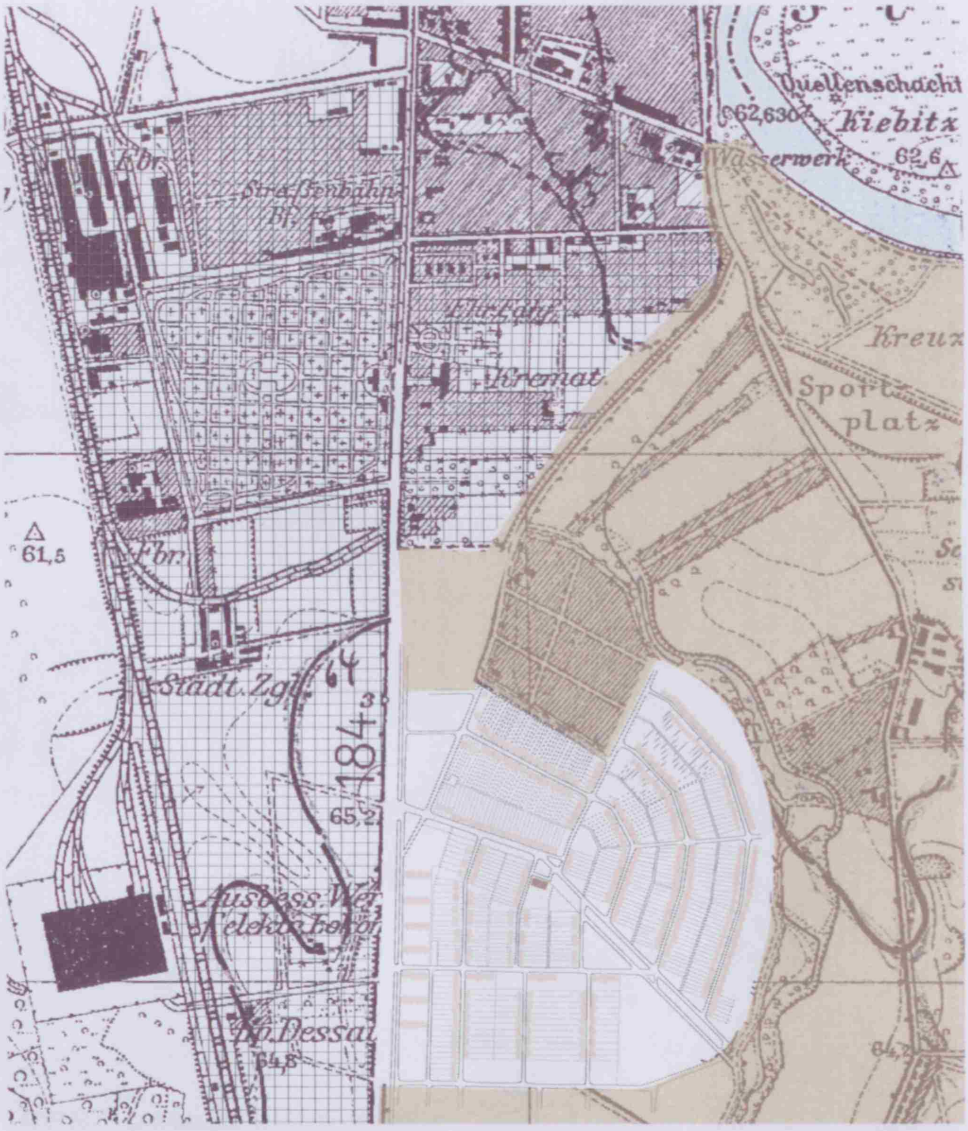
landscaped park

existing industrial

new residential

existing residential

fig.50 land use map



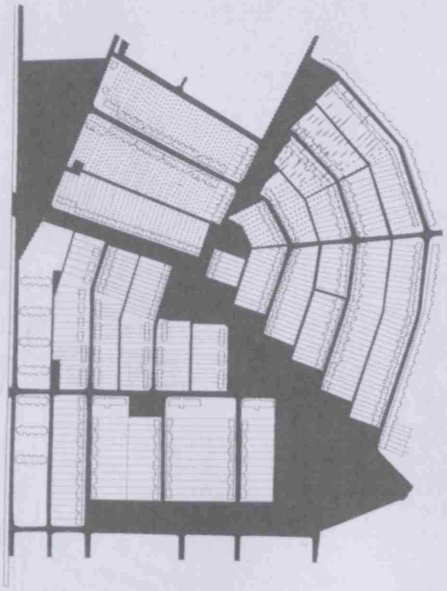
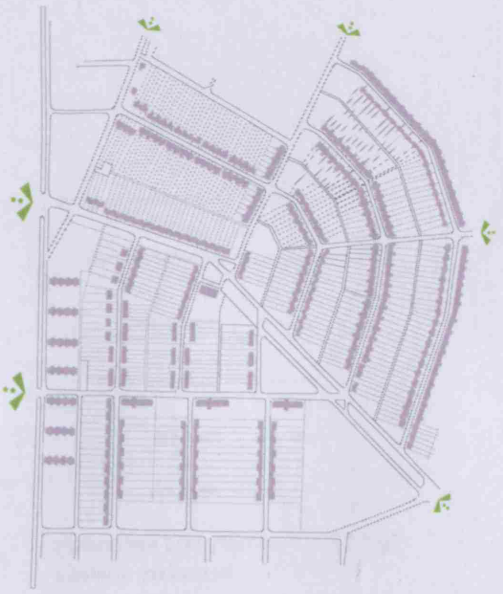


fig.51 ground figure map

fig.52 nolli map



site access

fig.53 site access

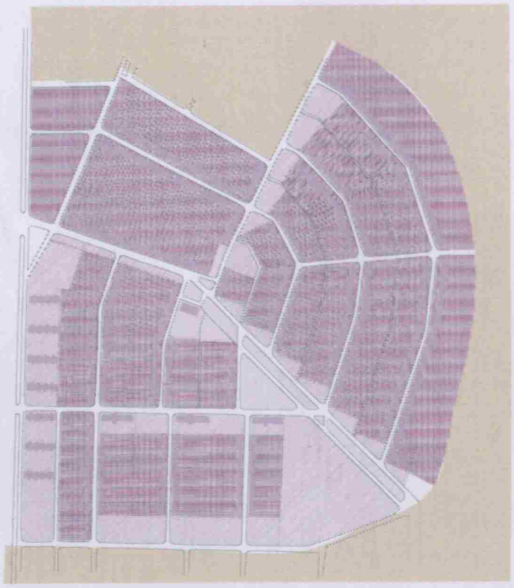


fig.54 open space analysis

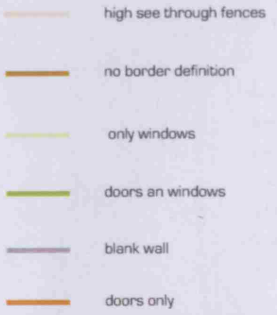


fig.117 primary and secondary boundary analysis

Type 01 - terraced house	
No of households	74
No of household with garden	74
Average area per household	100 sqm
Average area per plot	525 sqm
No of household per plot	1
No of plots	74

Type 02 - terraced house	
No of households	235
No of household with garden	235
Average area per household	95 sqm
Average area per plot	420 sqm
No of household per plot	1
No of plots	235
No of floors per plot	2

fig.55 building type

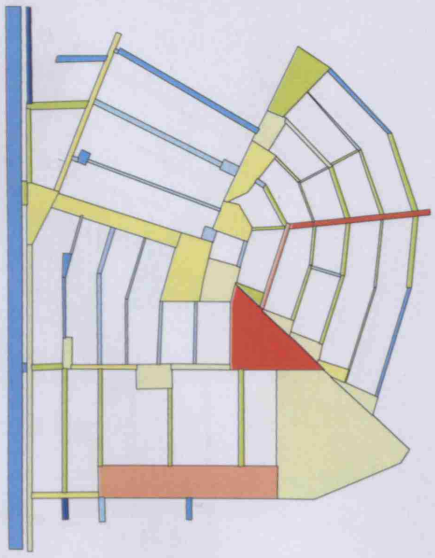
Type 04 - terraced house

No of households	100
No of household with garden	100
Average area per household	80 sqm
Average area per plot	420 sqm
No of household per plot	1
No of plots	100
No of floors per plot	2

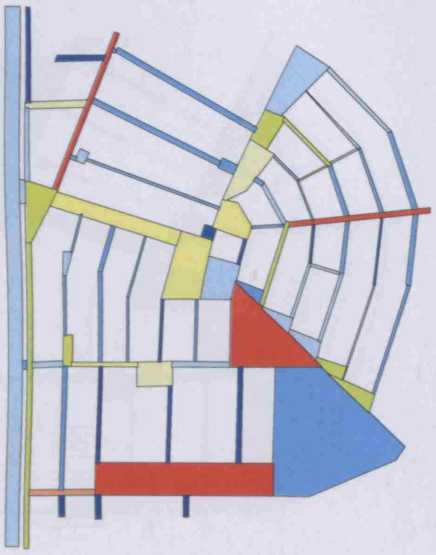
Balcony houses - appartements blocks

No of households	180
No of household with garden	180
Average area per household	60 sqm
Average area per plot	2200 sqm
No of household per plot	18
No of plots	10
No of floors per plot	3

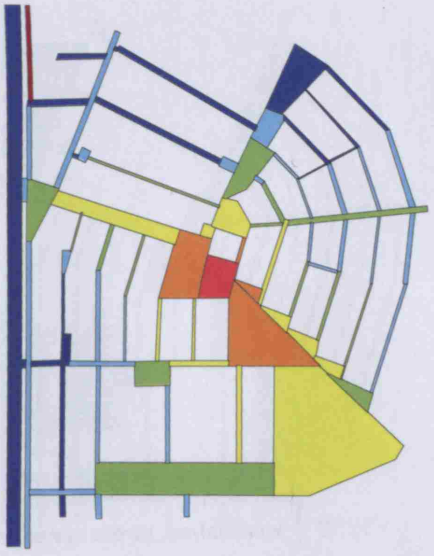
fig.56 building type



toerten_convex_P by Int_RRad3
3.37 to 3.75 (2)
2.96 to 3.37 (2)
2.55 to 2.96 (9)
2.14 to 2.55 (12)
1.73 to 2.14 (25)
1.32 to 1.73 (18)
0.91 to 1.32 (10)
0.5 to 0.91 (2)

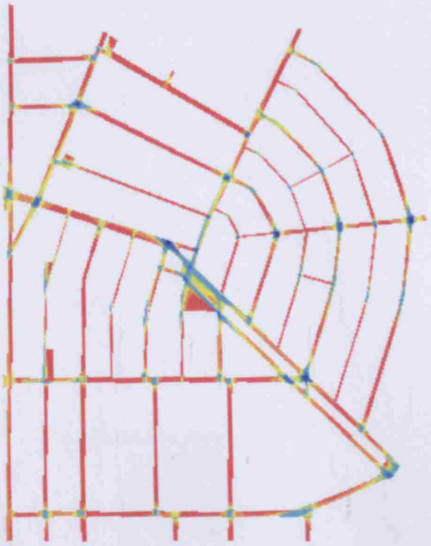


toerten_convex_P by Control
2.2 to 2.5 (2)
1.86 to 2.2 (1)
1.52 to 1.86 (1)
1.18 to 1.52 (1)
0.84 to 1.18 (4)
0.5 to 0.84 (3)
0.16 to 0.5 (9)
-0.18 to 0.16 (19)
-0.52 to -0.18 (27)
-0.86 to -0.52 (13)

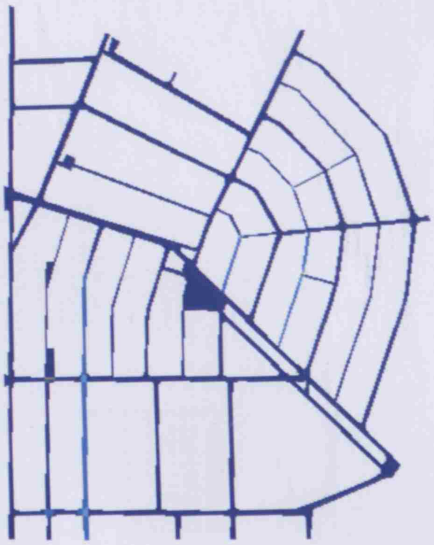


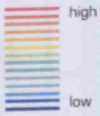
dessau_1935_convex_step depth
one
seven

fig.57 convex analysis

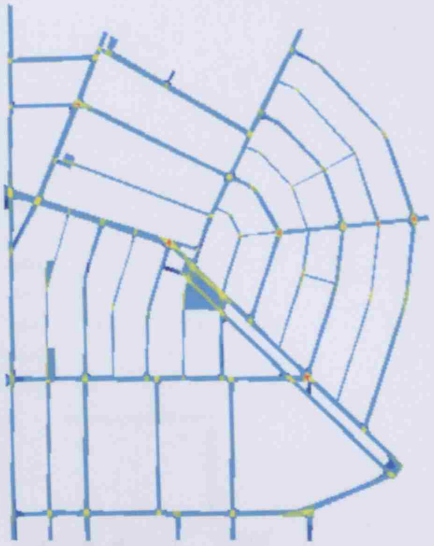


visual clustering coeffient max. 1 min. 0.37



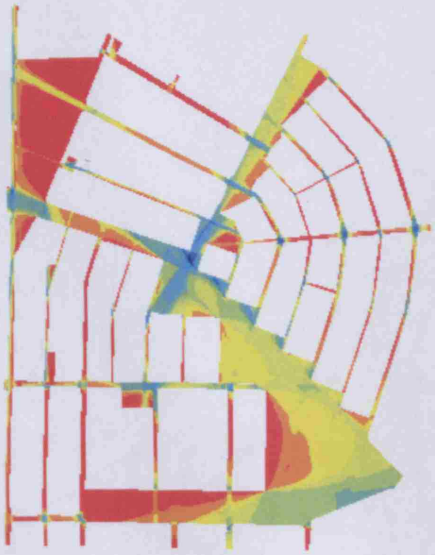


visual integration[HH] max. 61.94 min. 2.07

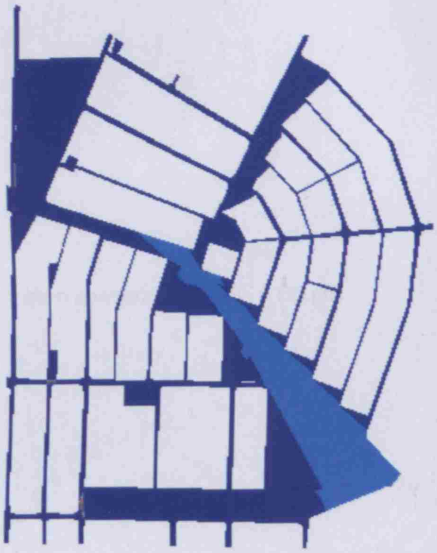


visual control max. 2.79 min. 0.05

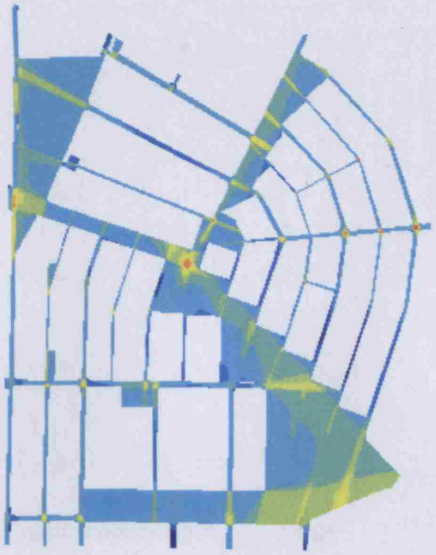
fig.58 vga analysis_street system

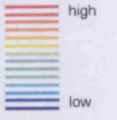


visual clustering coeffient max. 1 min. 0.32



visual integration(HH) max. 81.08 min. 2.78





visual control max. 2.59 min. 0.04

fig.59 vga analysis_complete system

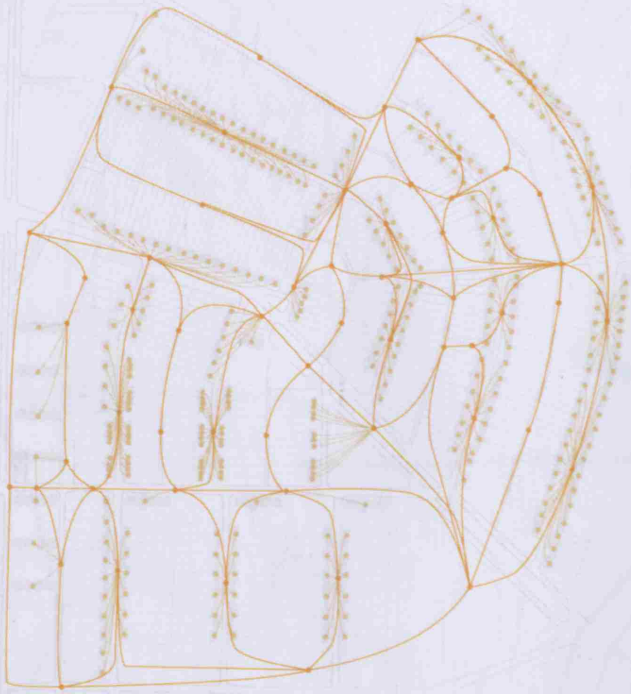


fig.60 interface map

fig.61 decomposition map

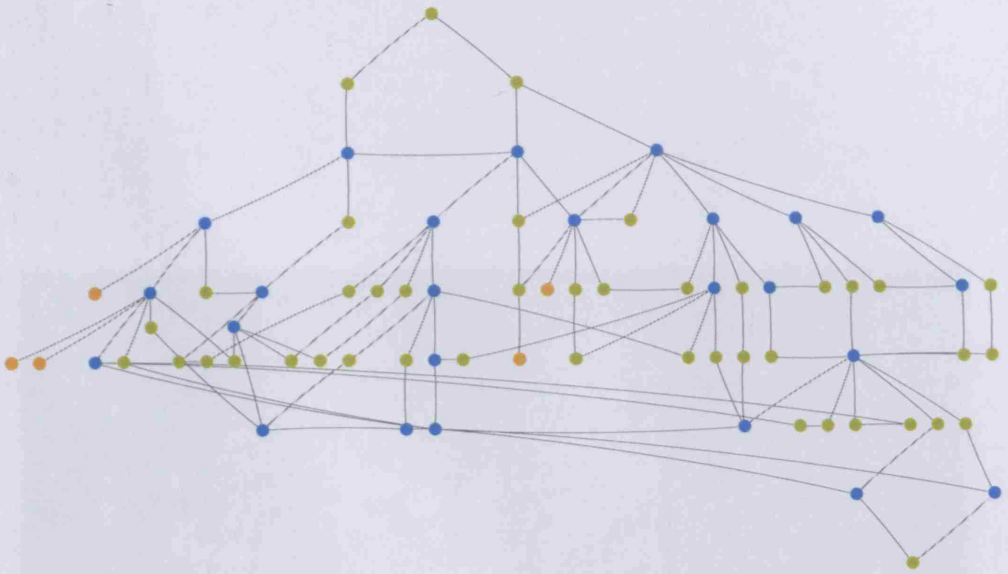


fig.62 justified graph

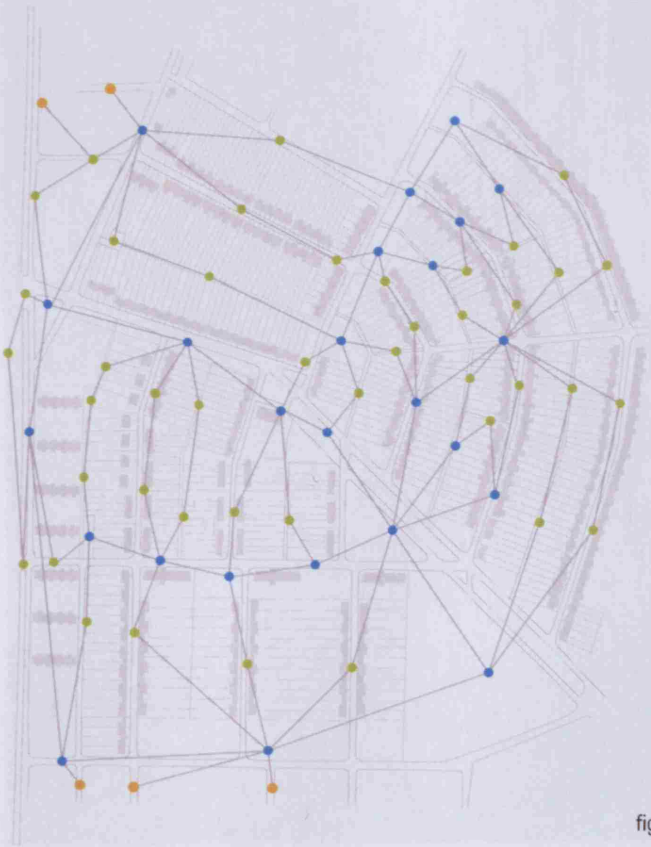


fig.63 space type analysis

micro-scale_type 01

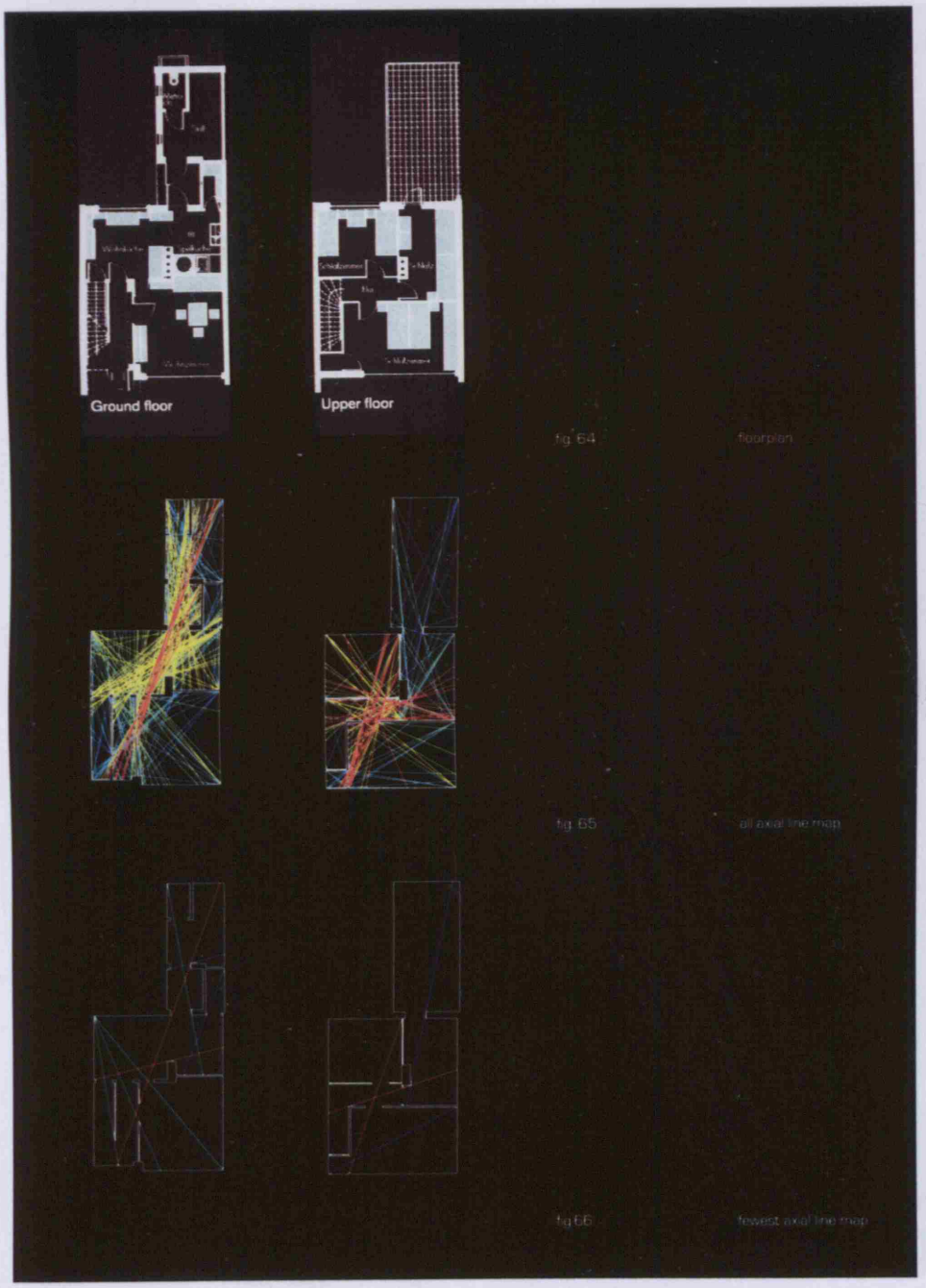


fig 64 floorplan

fig 65 all axial line map

fig 66 fewest axial line map

fig.67 Vga analysis

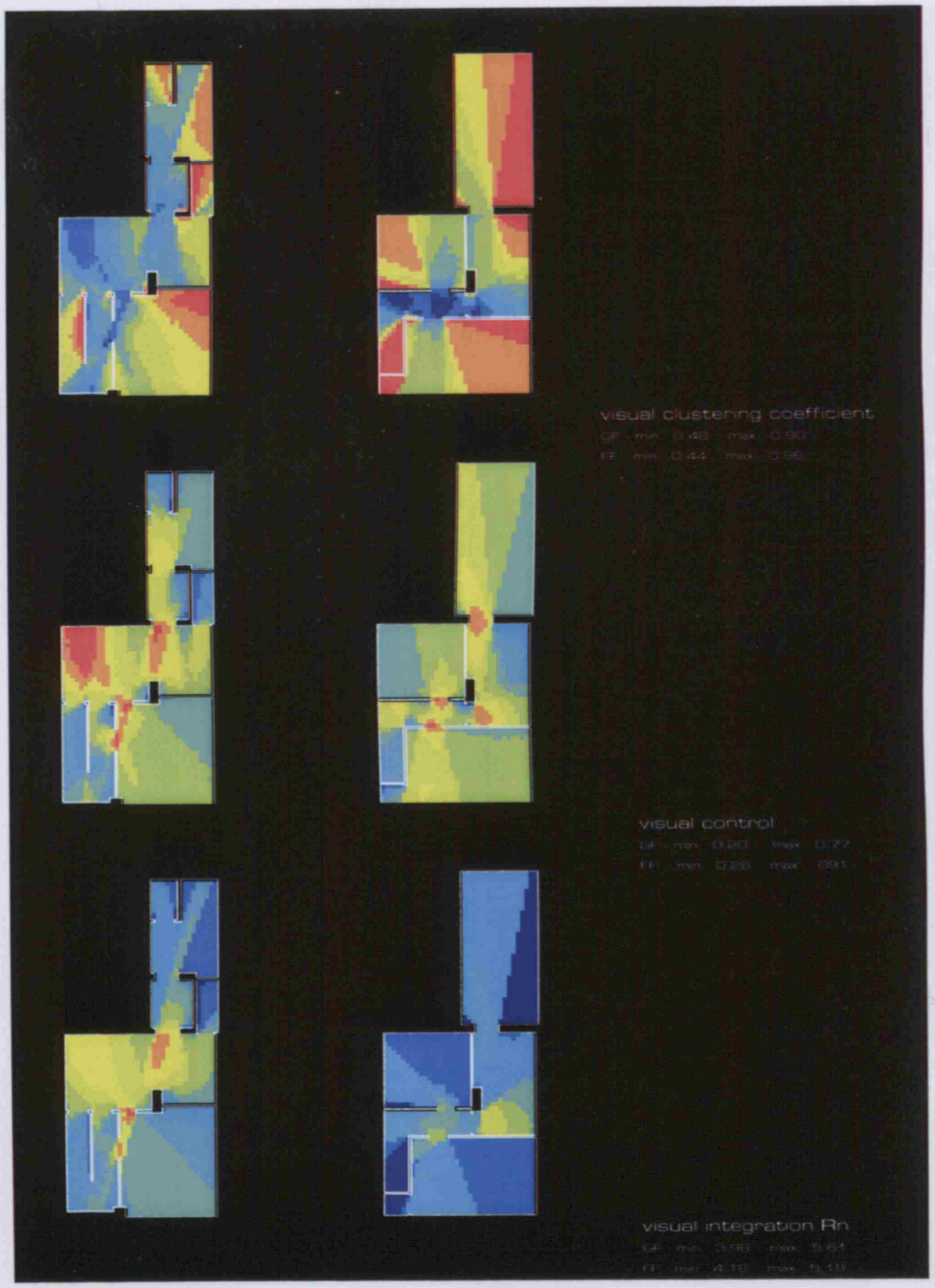
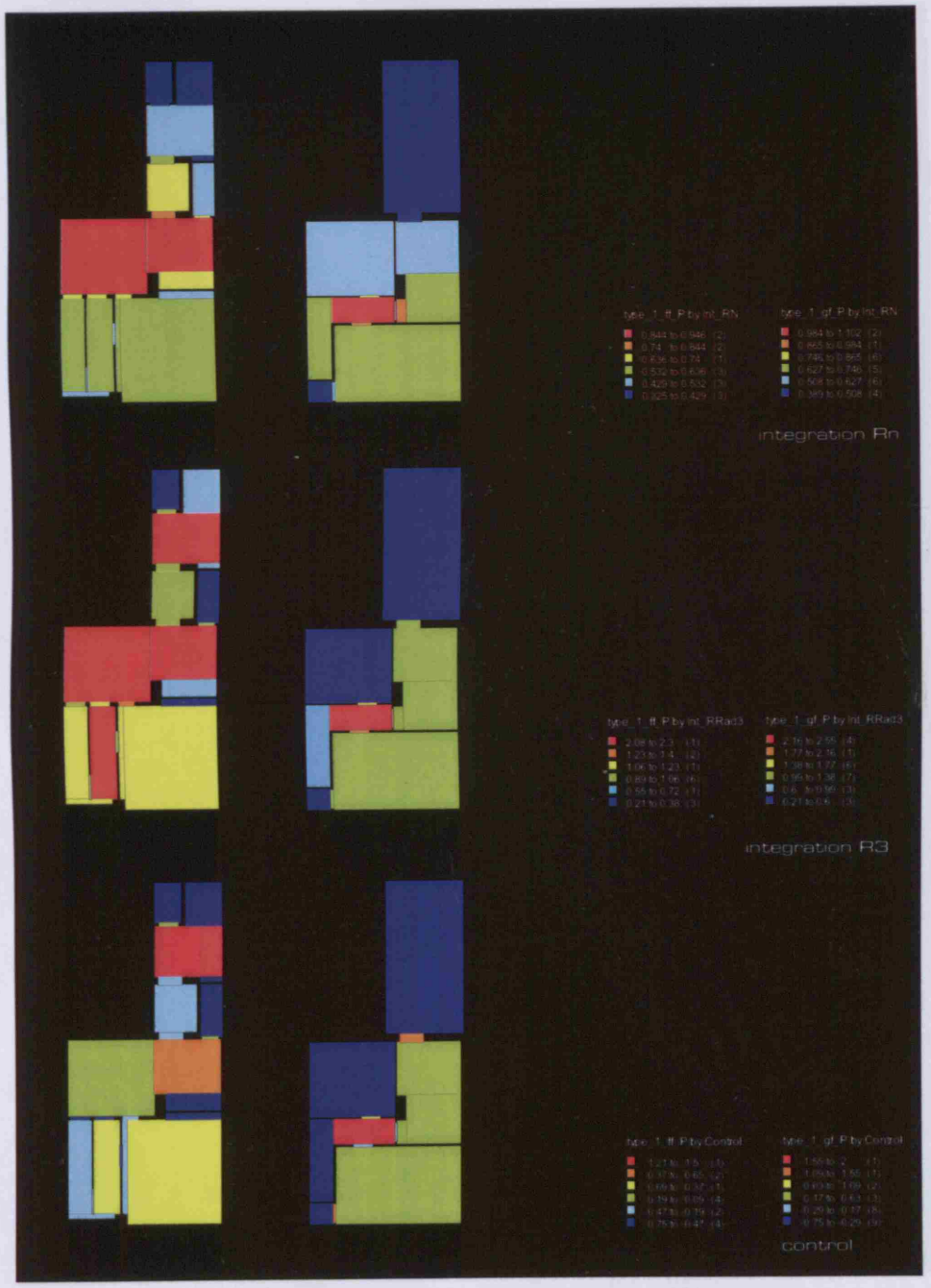
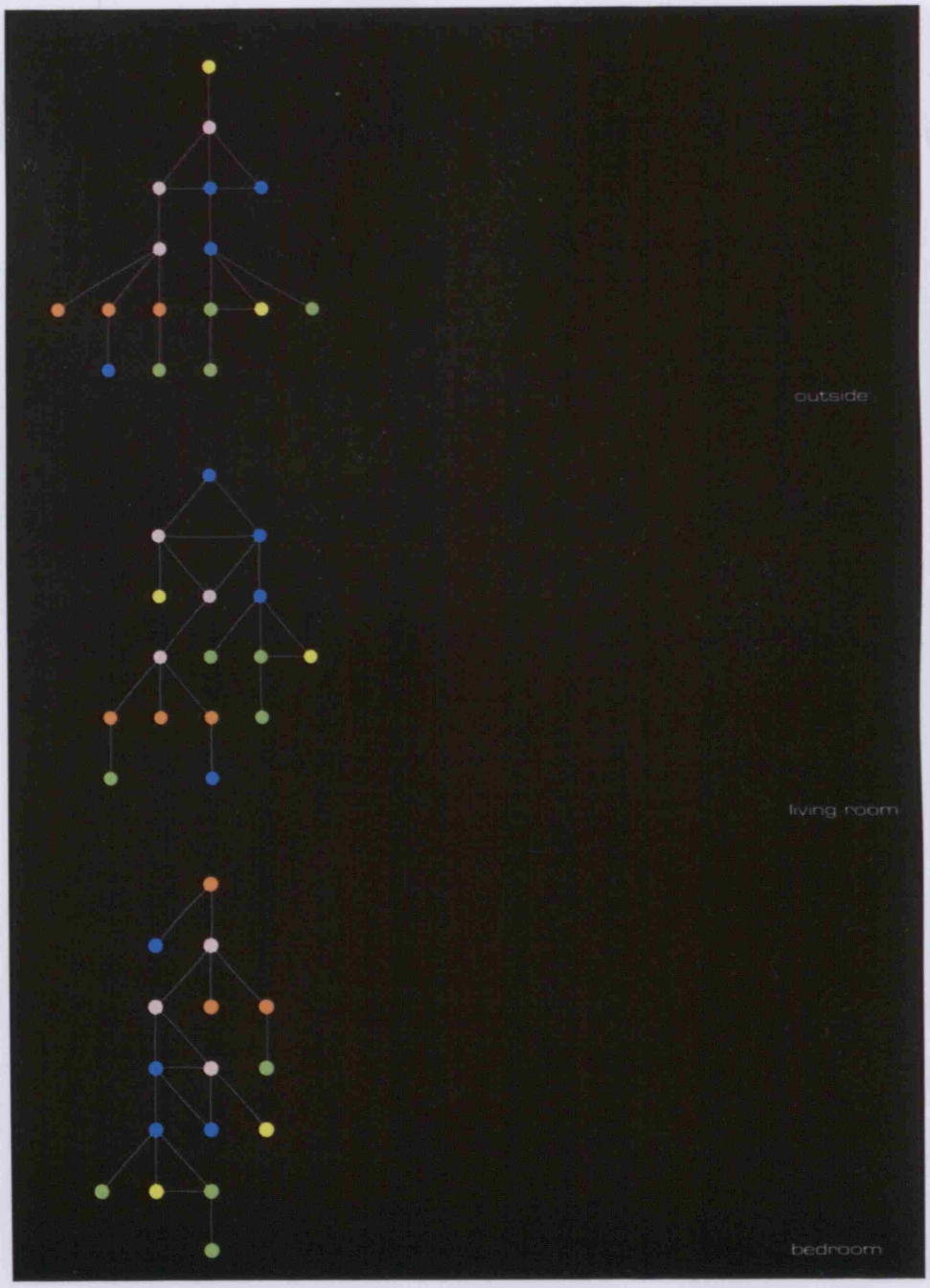


fig.68 convex analysis



outside
living
bedroom
circulation
service

fig.69 graph analysis



micro-scale_type 02

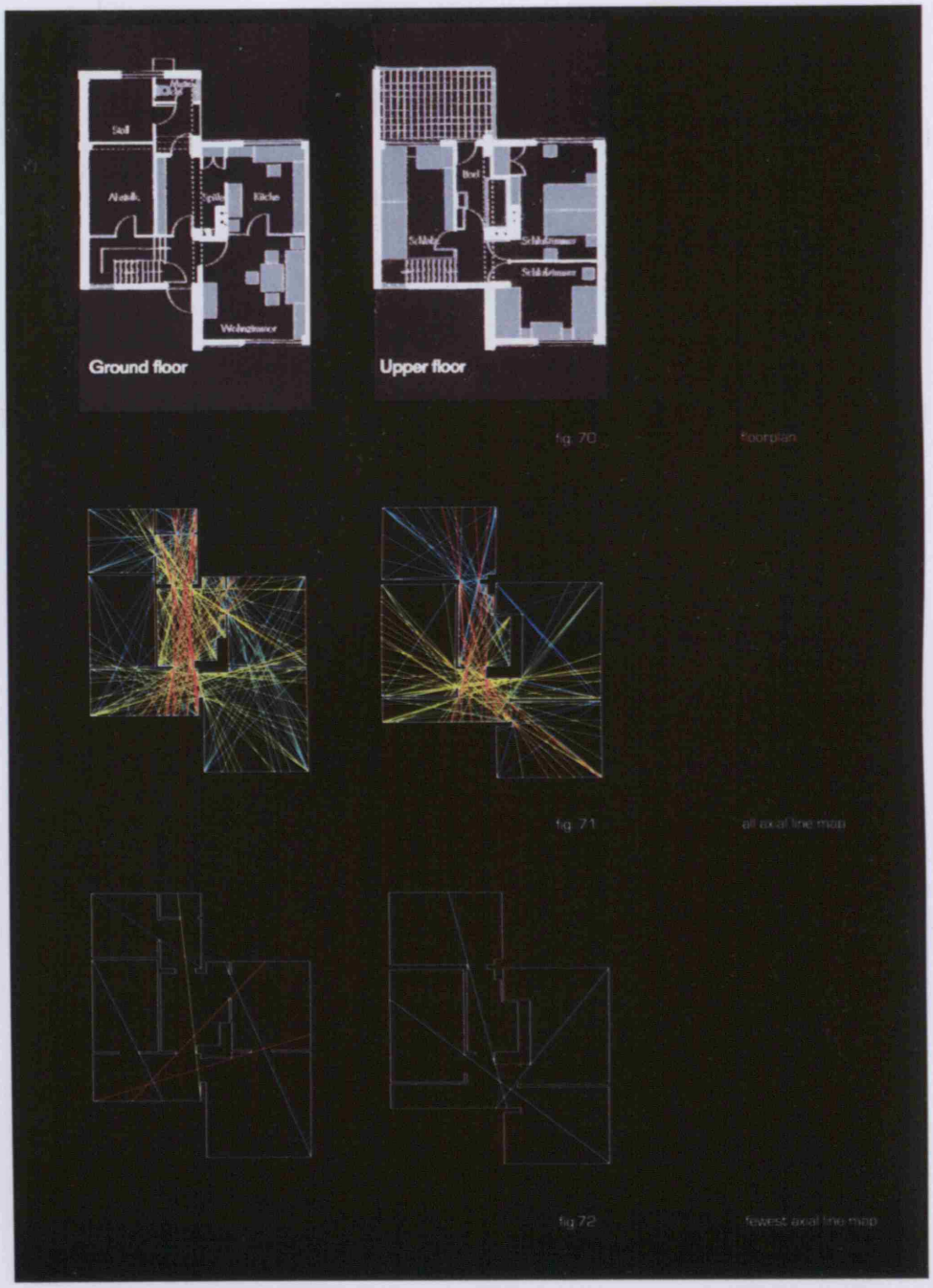


fig. 70 floorplan

fig. 71 all axial line map

fig. 72 fewest axial line map

fig.73 Vga analysis

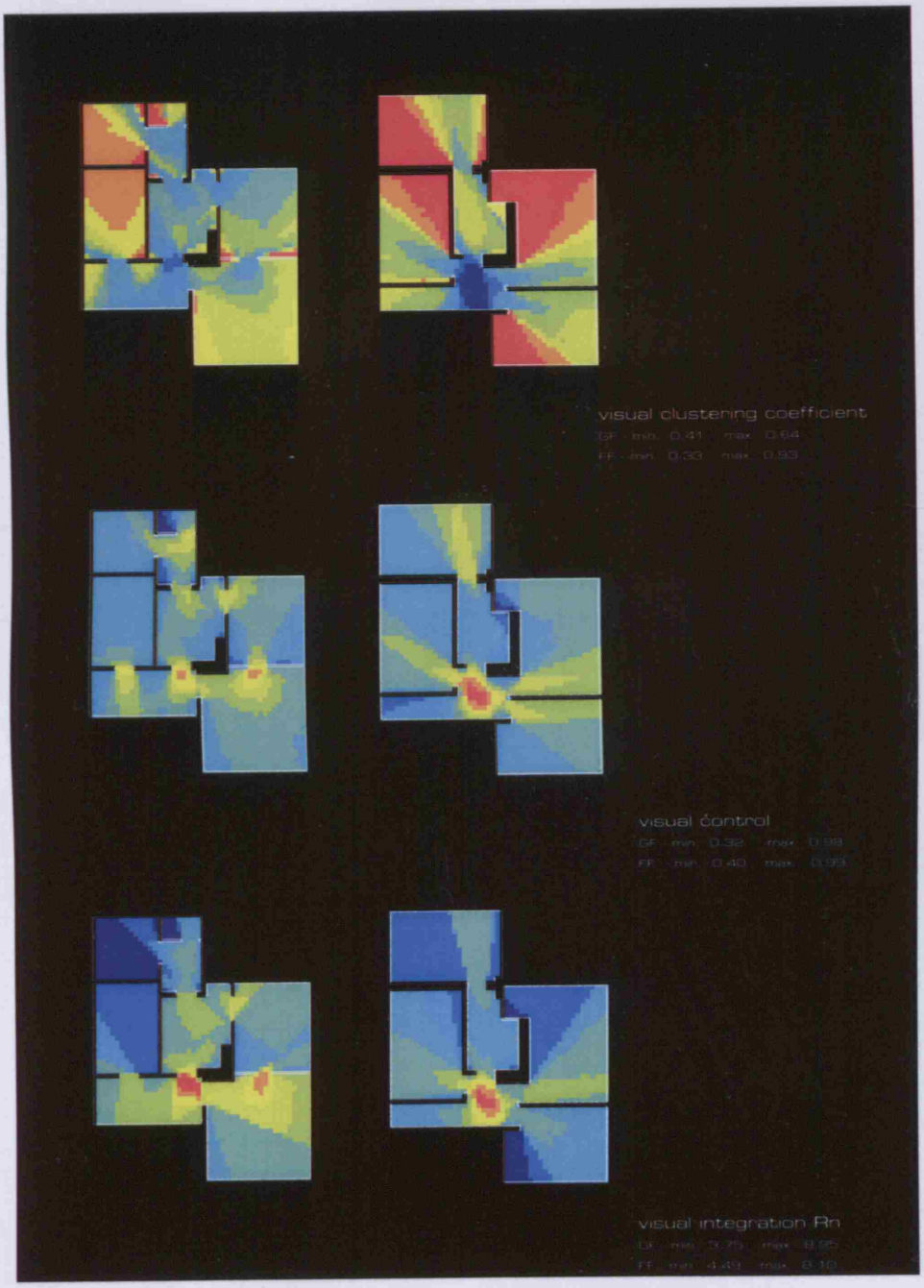


fig.74 convex analysis

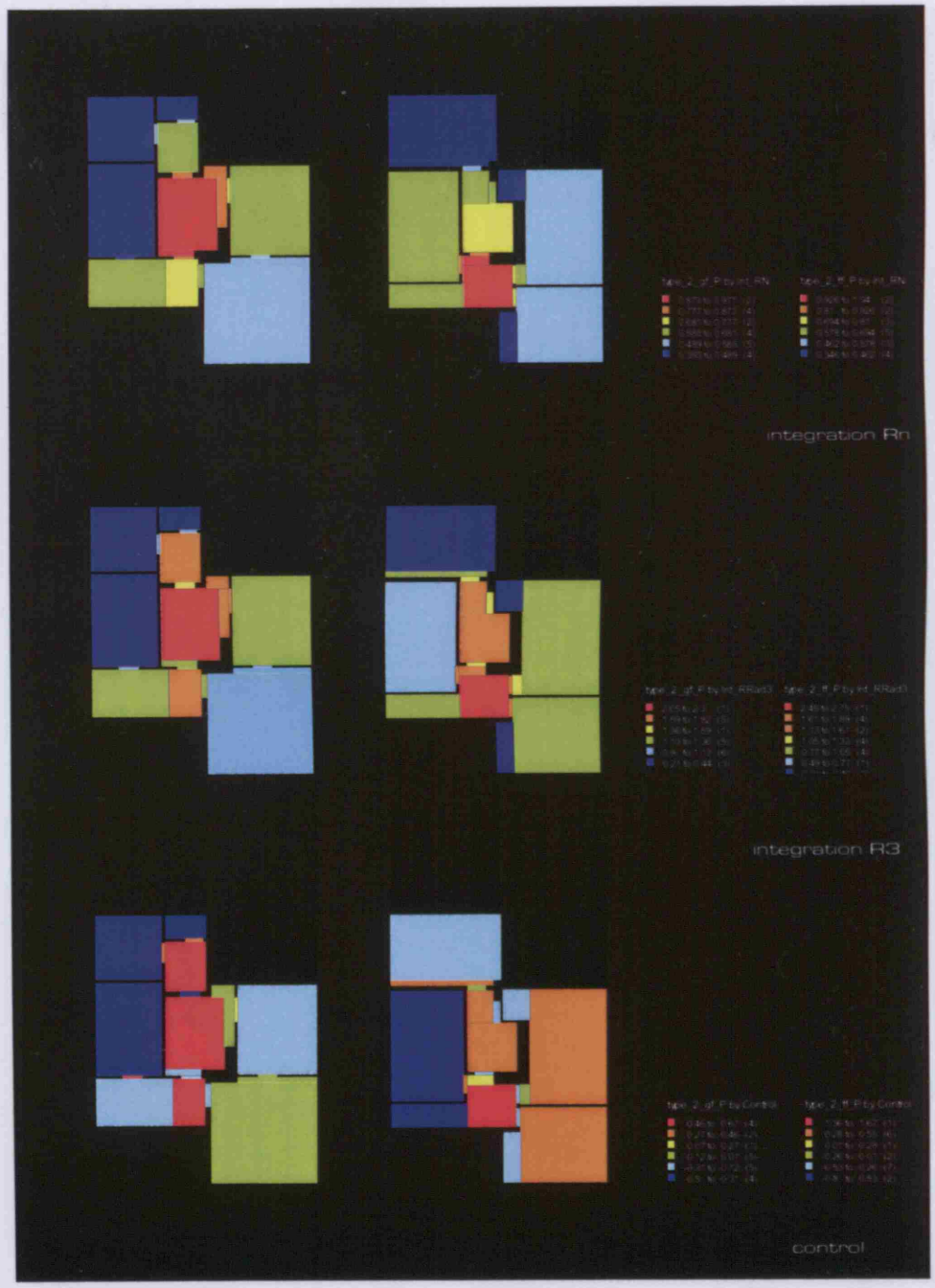
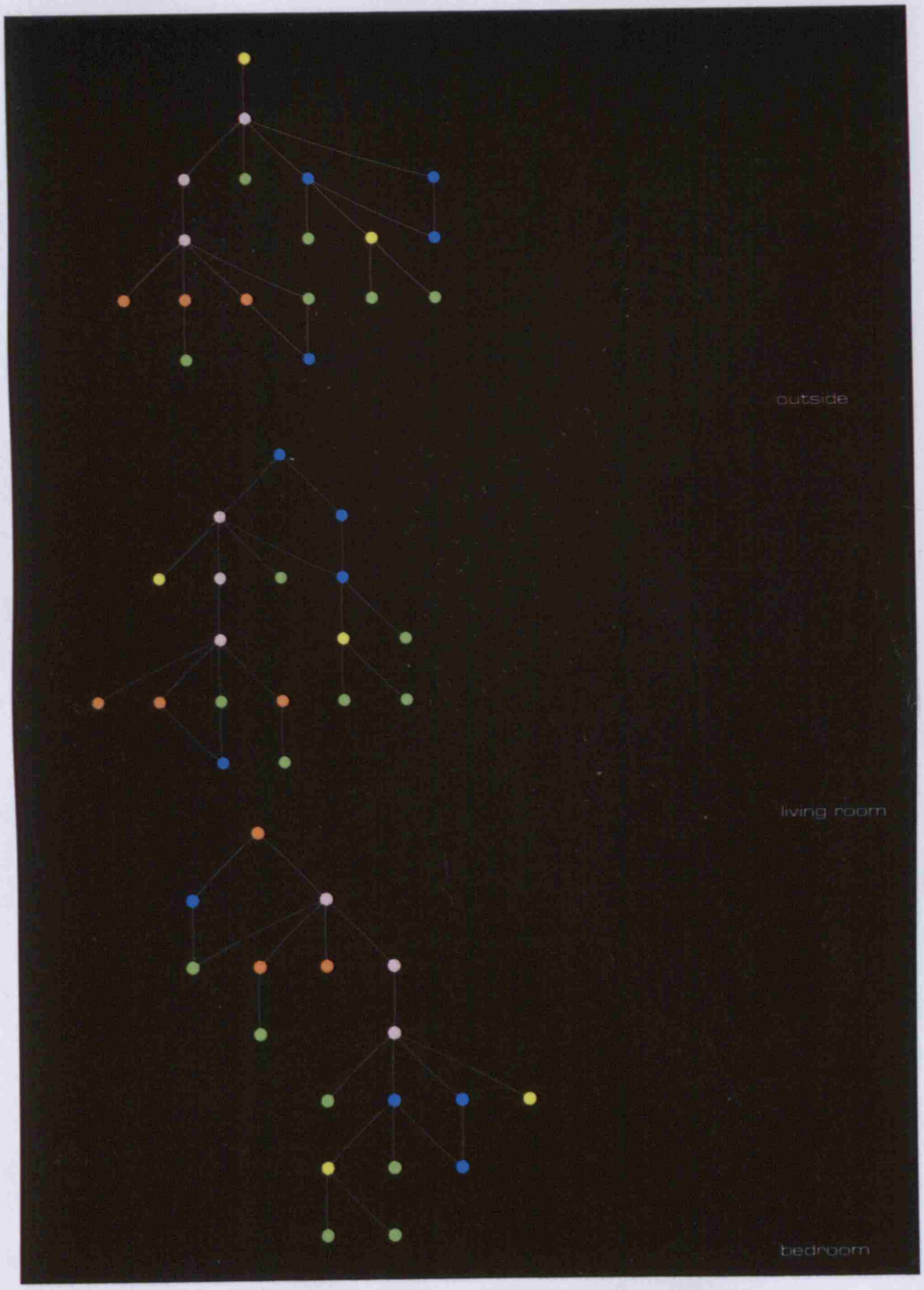


fig.75 graph analysis



micro-scale_type 04

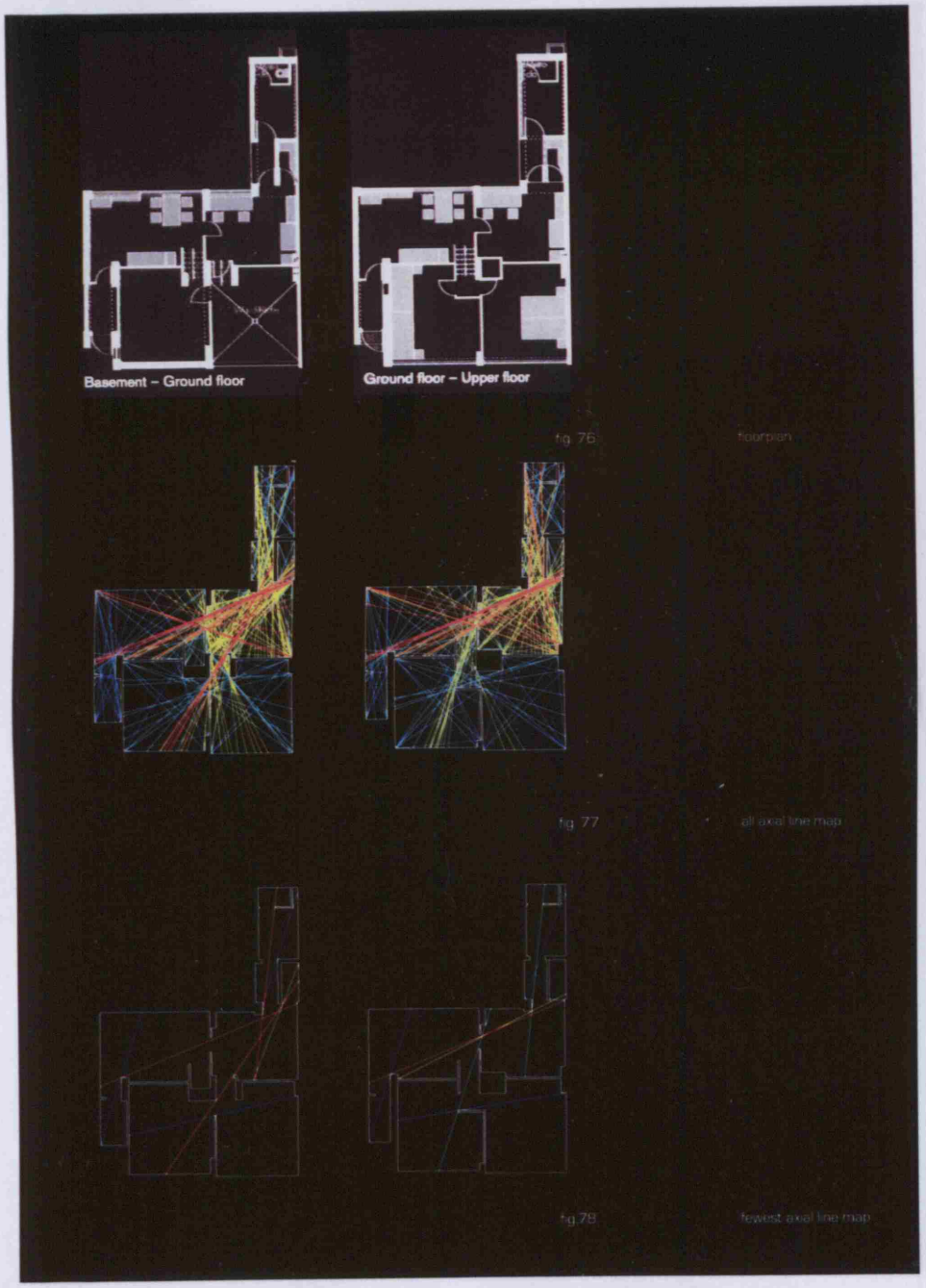


fig.76 floorplan

fig.77 all axial line map

fig.78 fewest axial line map

fig.79 Vga analysis

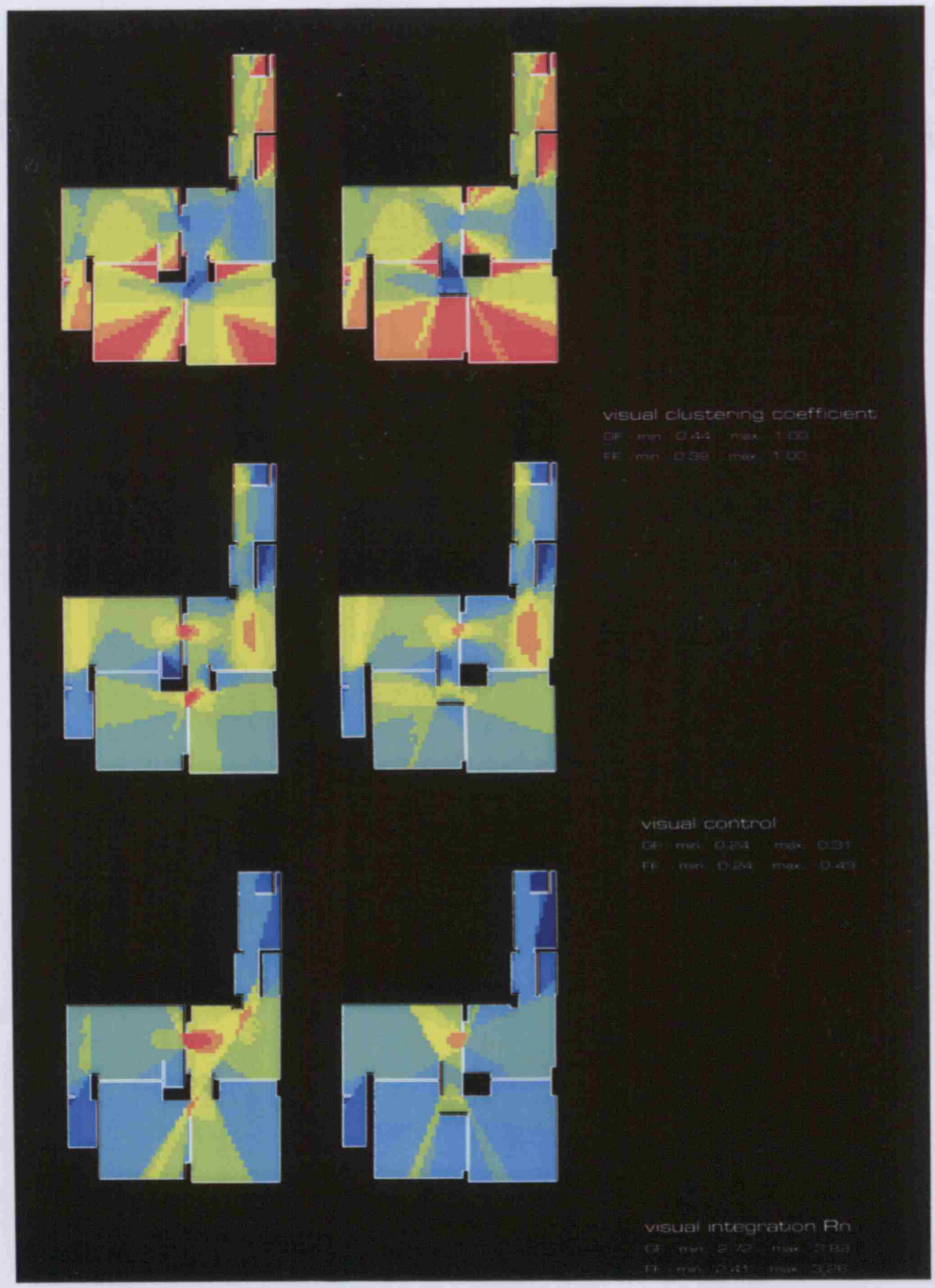
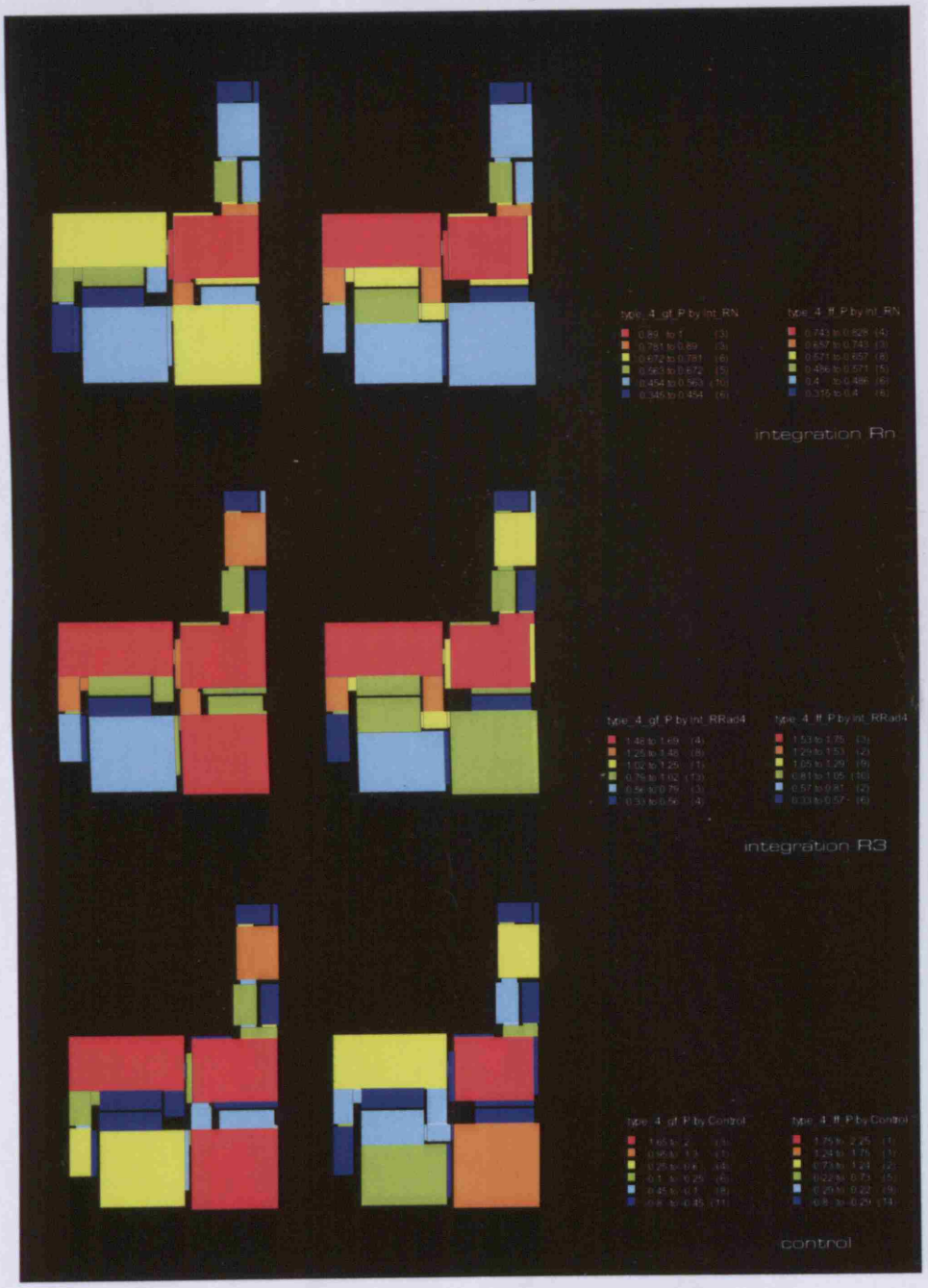
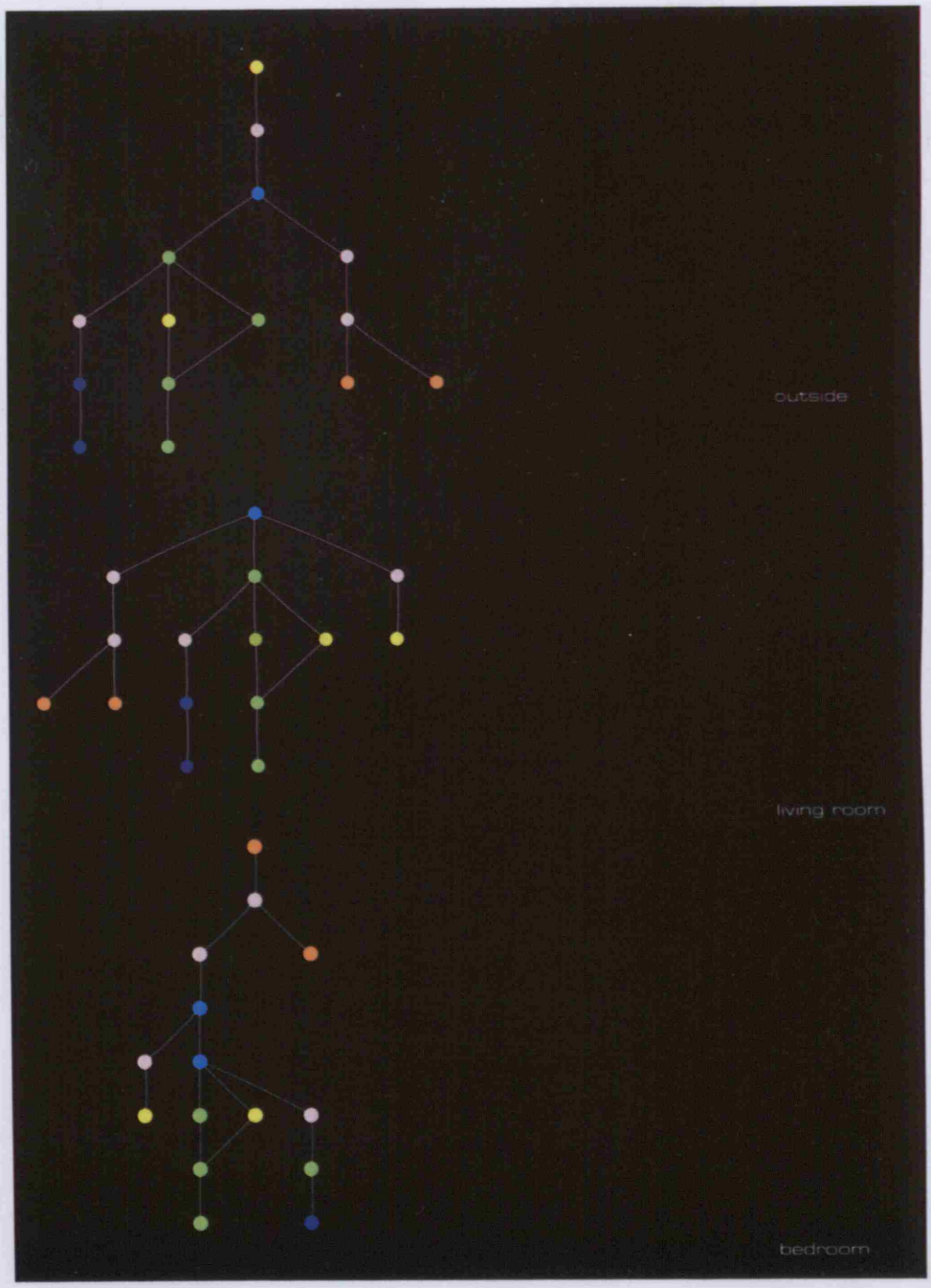


fig.80 convex analysis



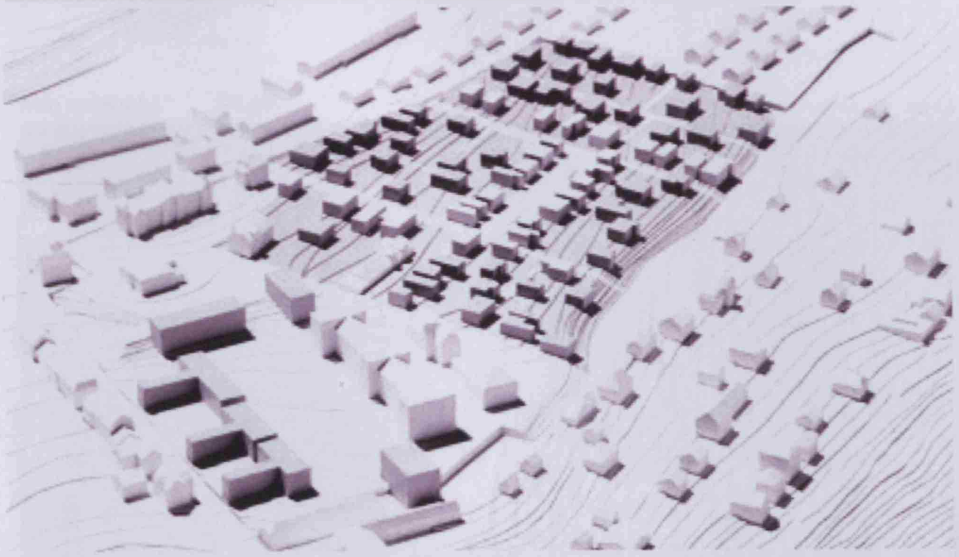
outside
living
bedroom
circulation
service

fig.81 graph analysis



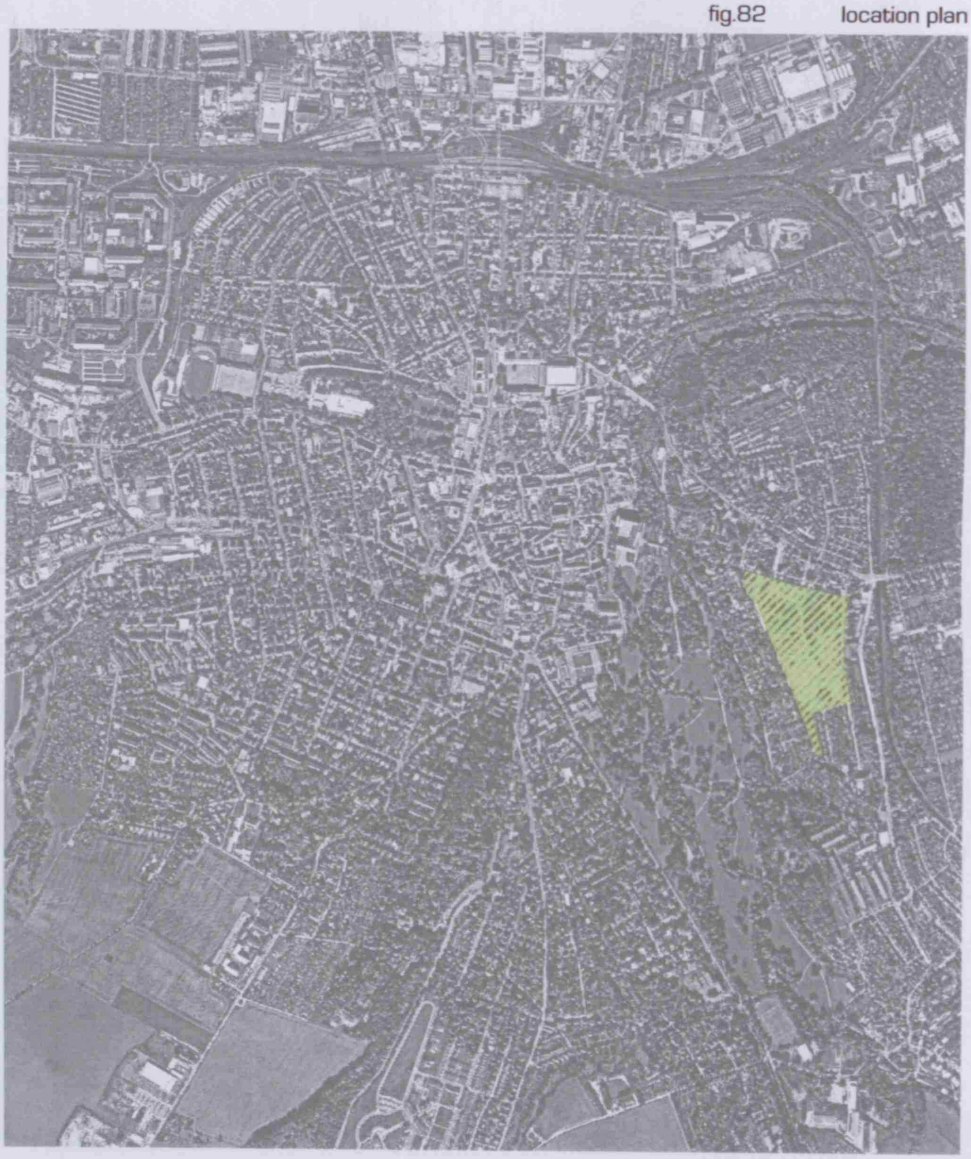







macro-scale_weimar 2007

fig.82 location plan



train

regional routes

road system

fig.83 ground figure and vehicular route

river ilm

landscaped park

fig.84 topographical plan

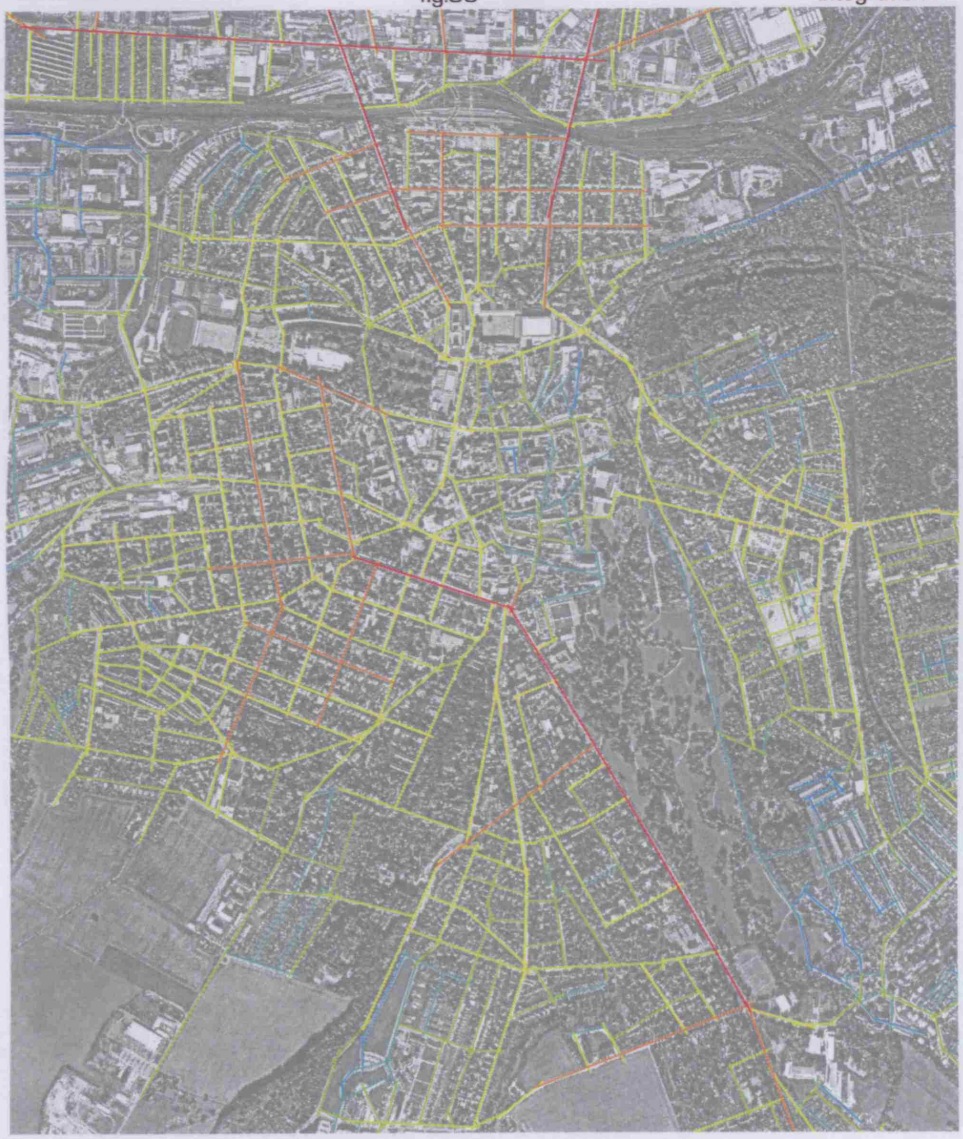
high

low

max. - 1.77

min. - 0.44

fig.85 integration r7



high

low

max. - 3.40

min. - 0.33

fig.86 integration r3

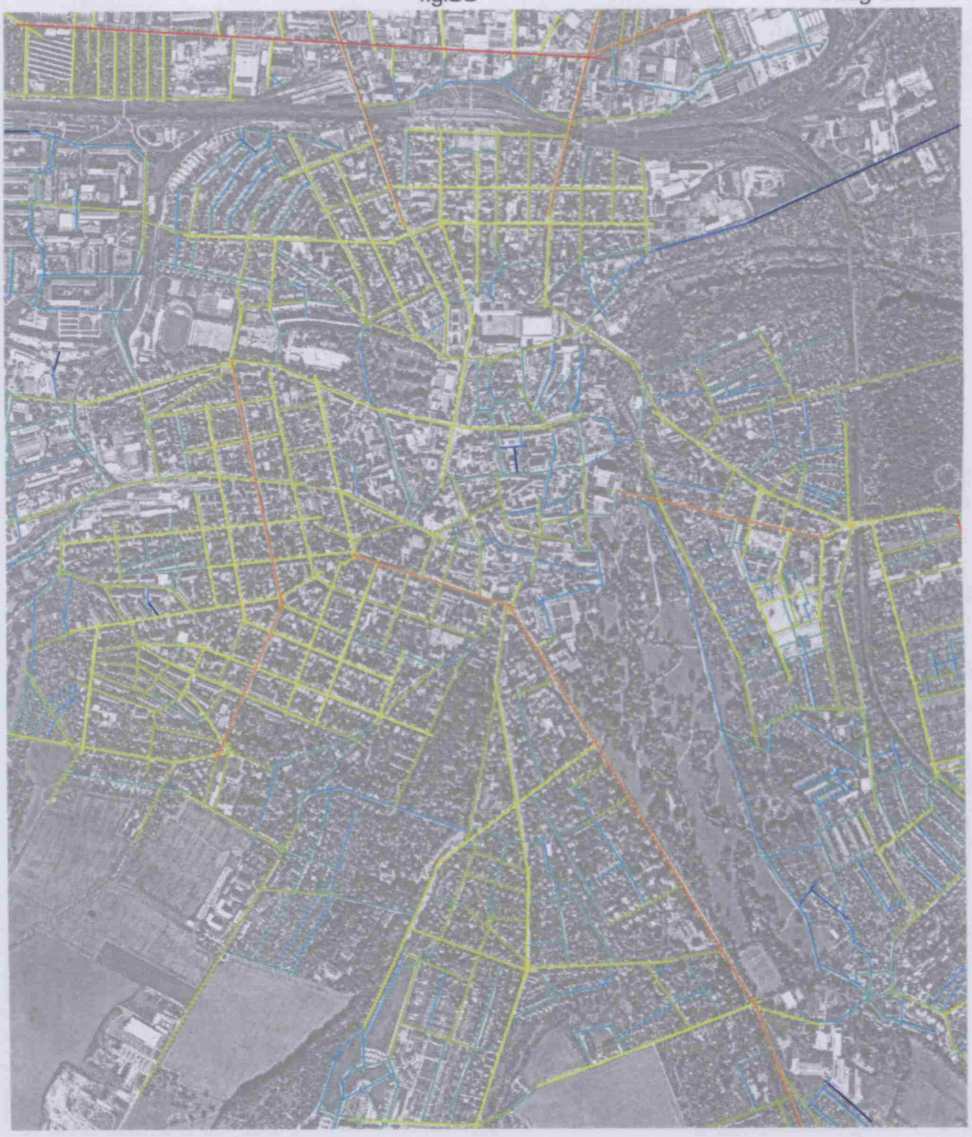


fig.87 step depth

fig.88 land use map

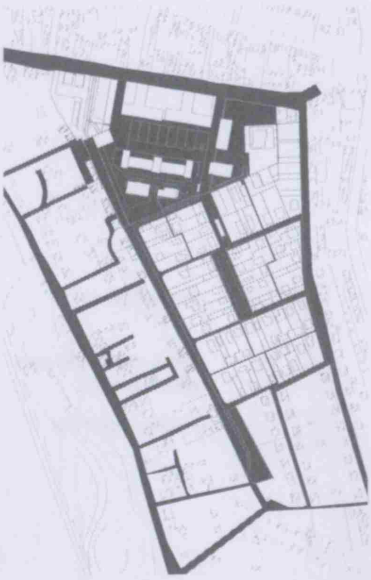


fig.89 ground figure map

fig.90 nolli map

site access

fig.91 site access

public hard landscaped area

recreational green-zone

semi-public hard landscaped area

private front-/backyard

fig.92 open space analysis

no border definition

wall

only windows

doors an windows

blank wall

planting

fig.118 primary and secondary boundary analysis

Type 01 - residential

No of households	85
No of household with garden	85
Average area per household	varies
Average area per plot	260 - 850 sqm
No of household per plot	varies
No of plots	74
No of floors per plot	2 - 3

Type 02 - special use

No of households	-
No of household with garden	-
Average area per household	-
Average area per plot	-
No of household per plot	-
No of plots	-
No of floors per plot	-

fig.93 building type

NBAH_CONVEX_P by Int_RRad3

3.36 to 3.72	(3)
2.98 to 3.36	(6)
2.6 to 2.98	(6)
2.22 to 2.6	(7)
1.84 to 2.22	(14)
1.46 to 1.84	(19)
1.08 to 1.46	(7)
0.7 to 1.08	(2)

NBAH_CONVEX_P by Control

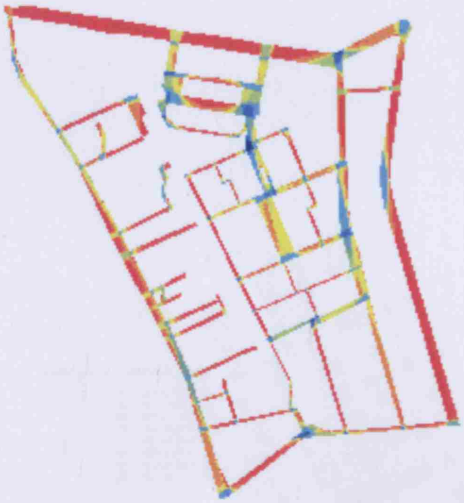
1.75 to 2.04	(1)
1.5 to 1.75	(1)
1 to 1.25	(3)
0.75 to 1	(1)
0.5 to 0.75	(4)
0.25 to 0.5	(4)
0 to 0.25	(8)
-0.25 to 0	(22)
-0.5 to -0.25	(13)
-0.75 to -0.5	(7)

NBAH_convex_step depth

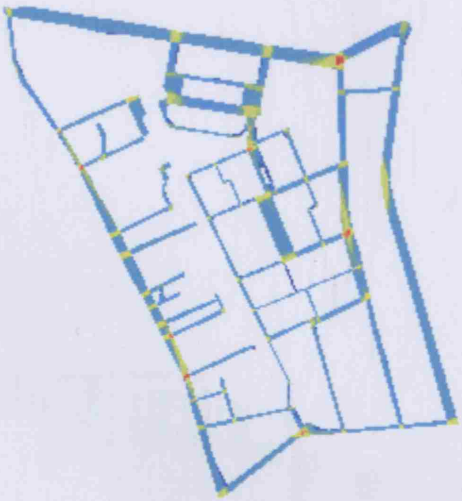
one

five

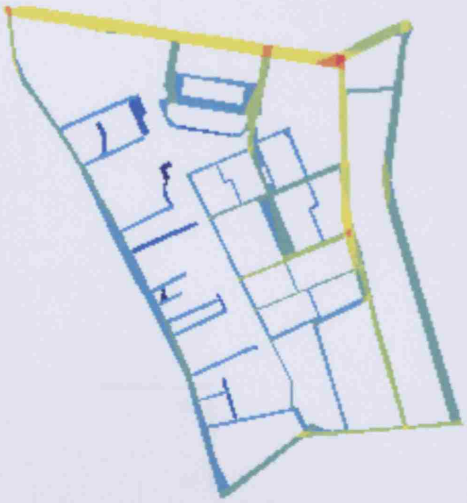
fig.94 convex analysis



visual clustering coeffient max. 1 min. 0.40



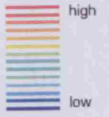
visual control max. 2.46 min. 0.133



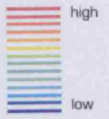
visual integration[HH] max. 5.88 min. 1.51

fig.95 vga analysis_street system

visual clustering coeffient max. 1 min. 0.28



visual control max. 2.46 min. 0.08



visual integration[HH] max. 6.47 min. 1.60

fig.96 vga analysis_all spaces

fig.97 interface map

fig.98 decomposition map

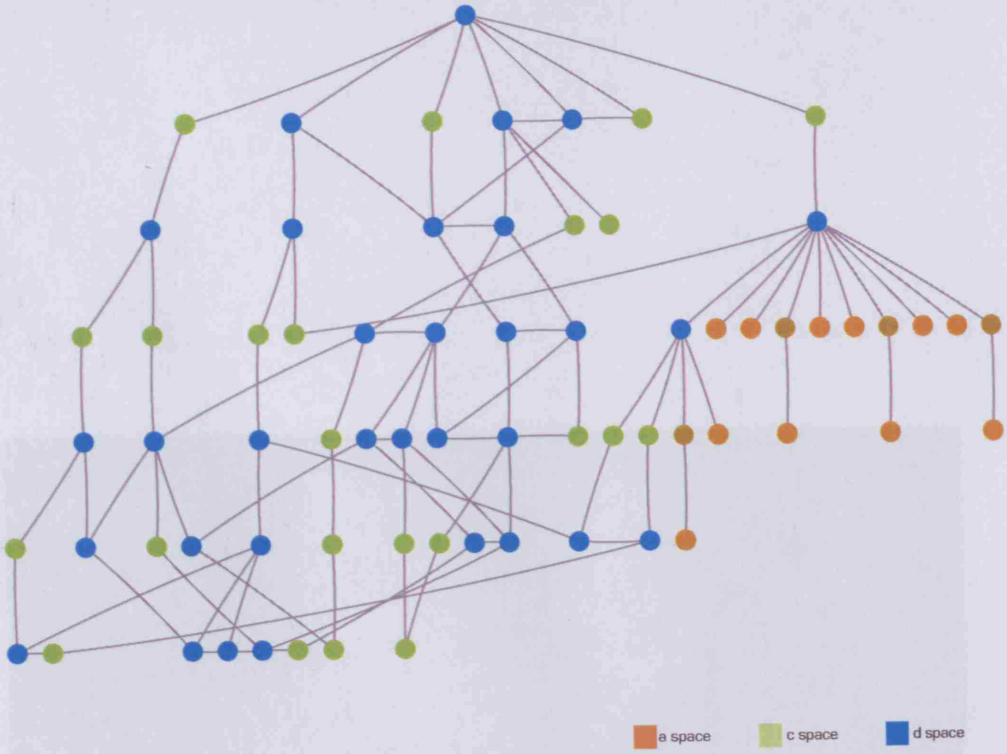


fig.99 justified graph

fig.100 space type analysis

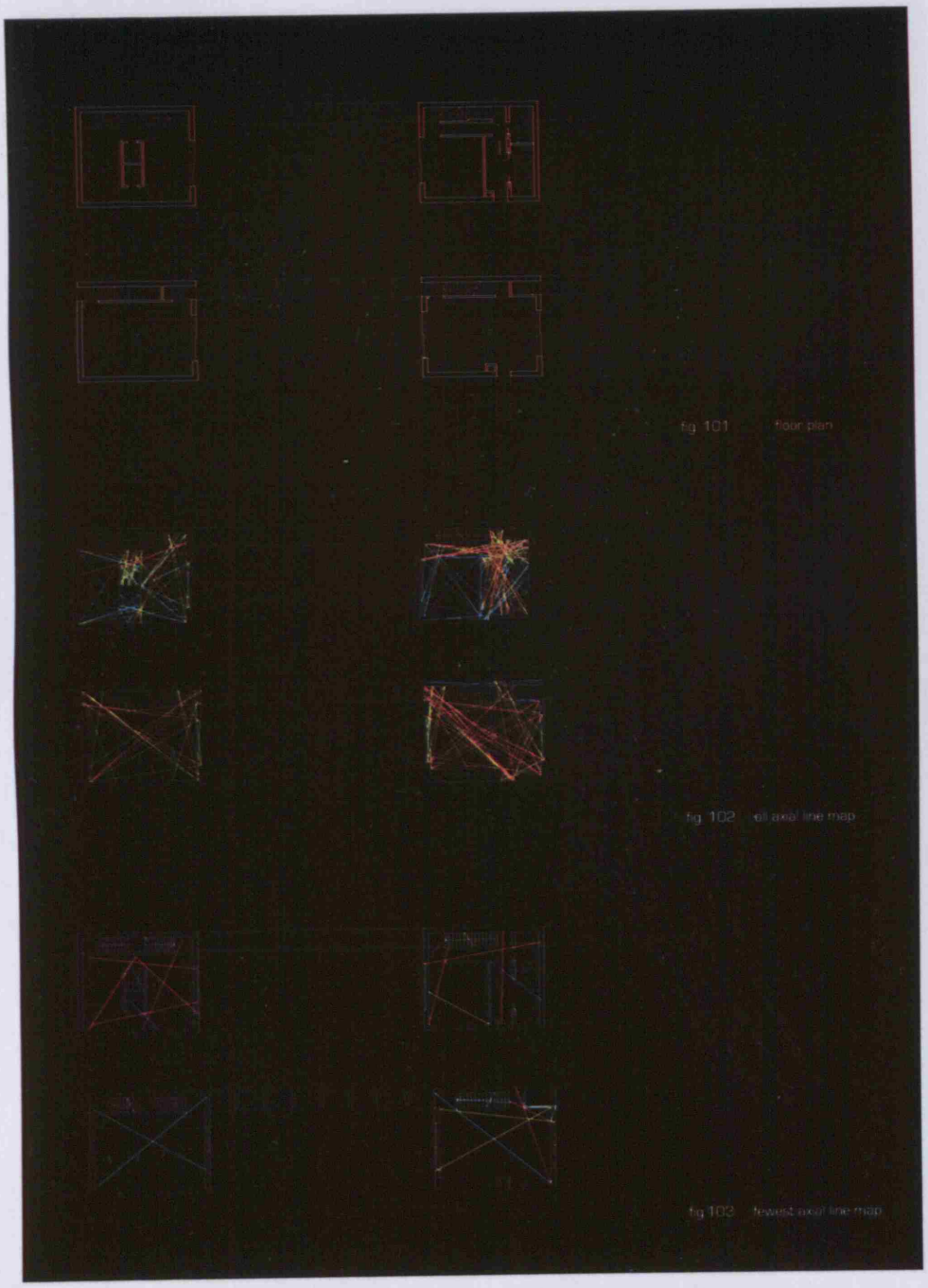


fig 101 floor plan

fig 102 all axial line map

fig 103 fewest axial line map

fig.104 VGA analysis

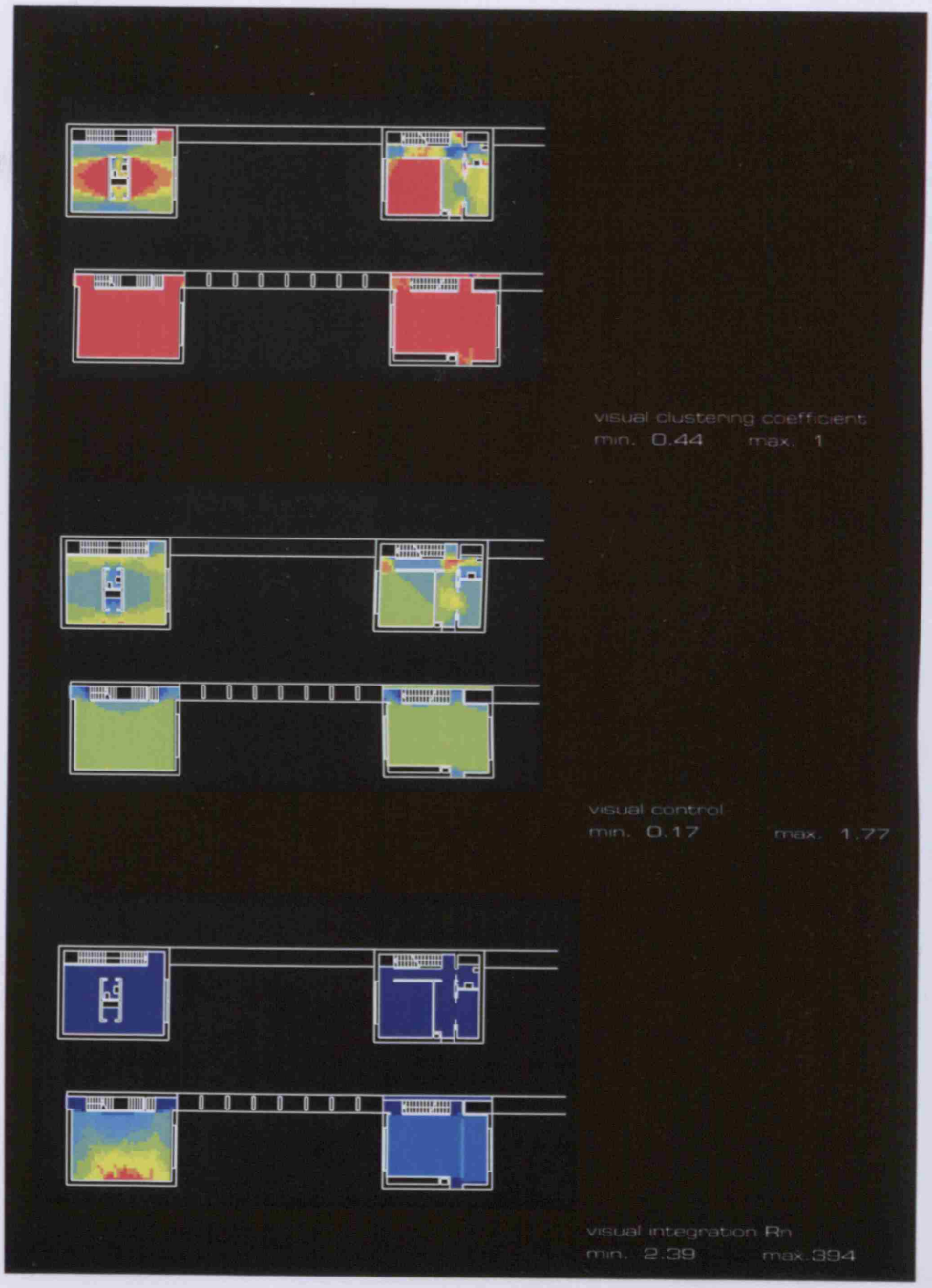
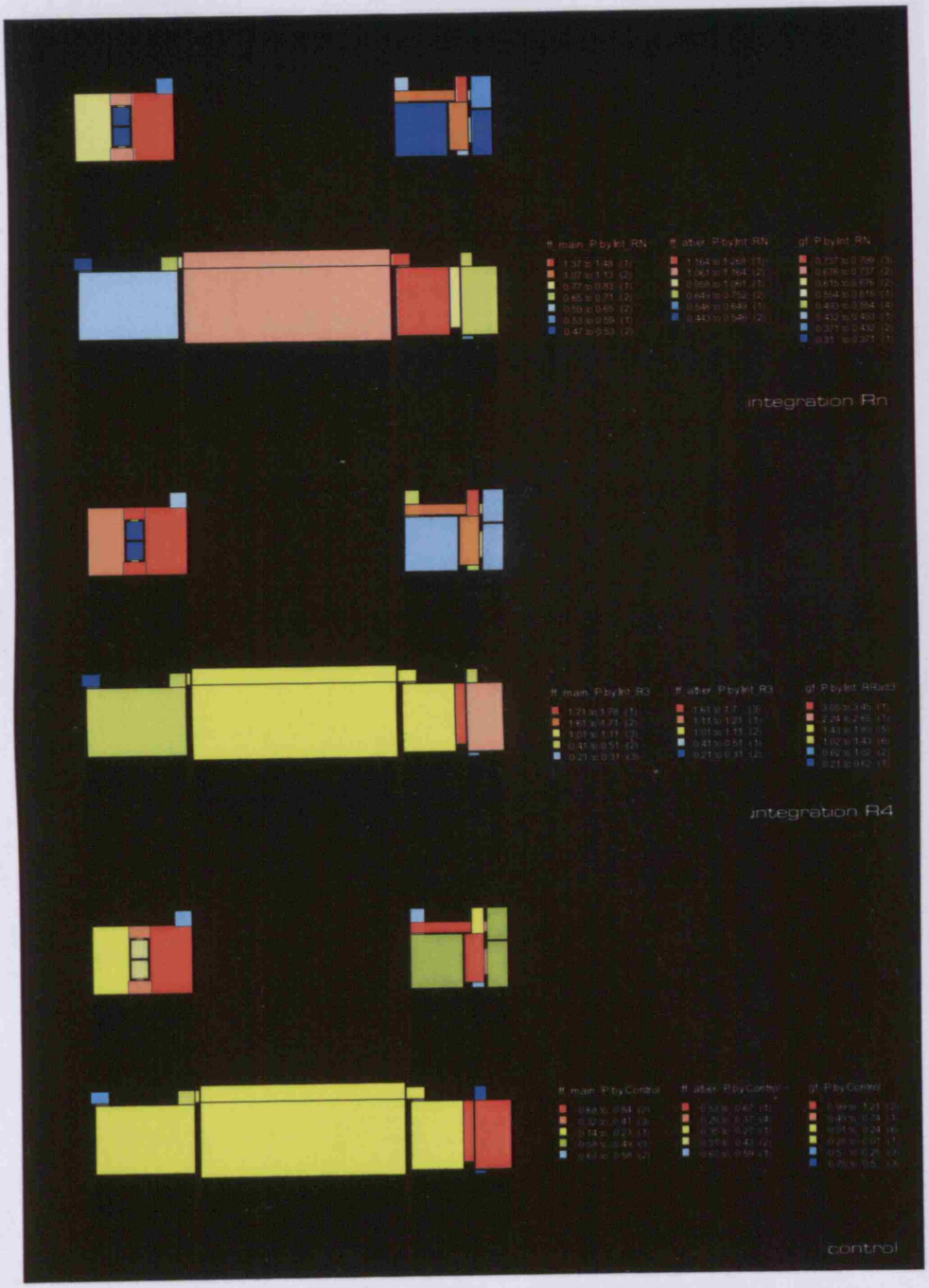
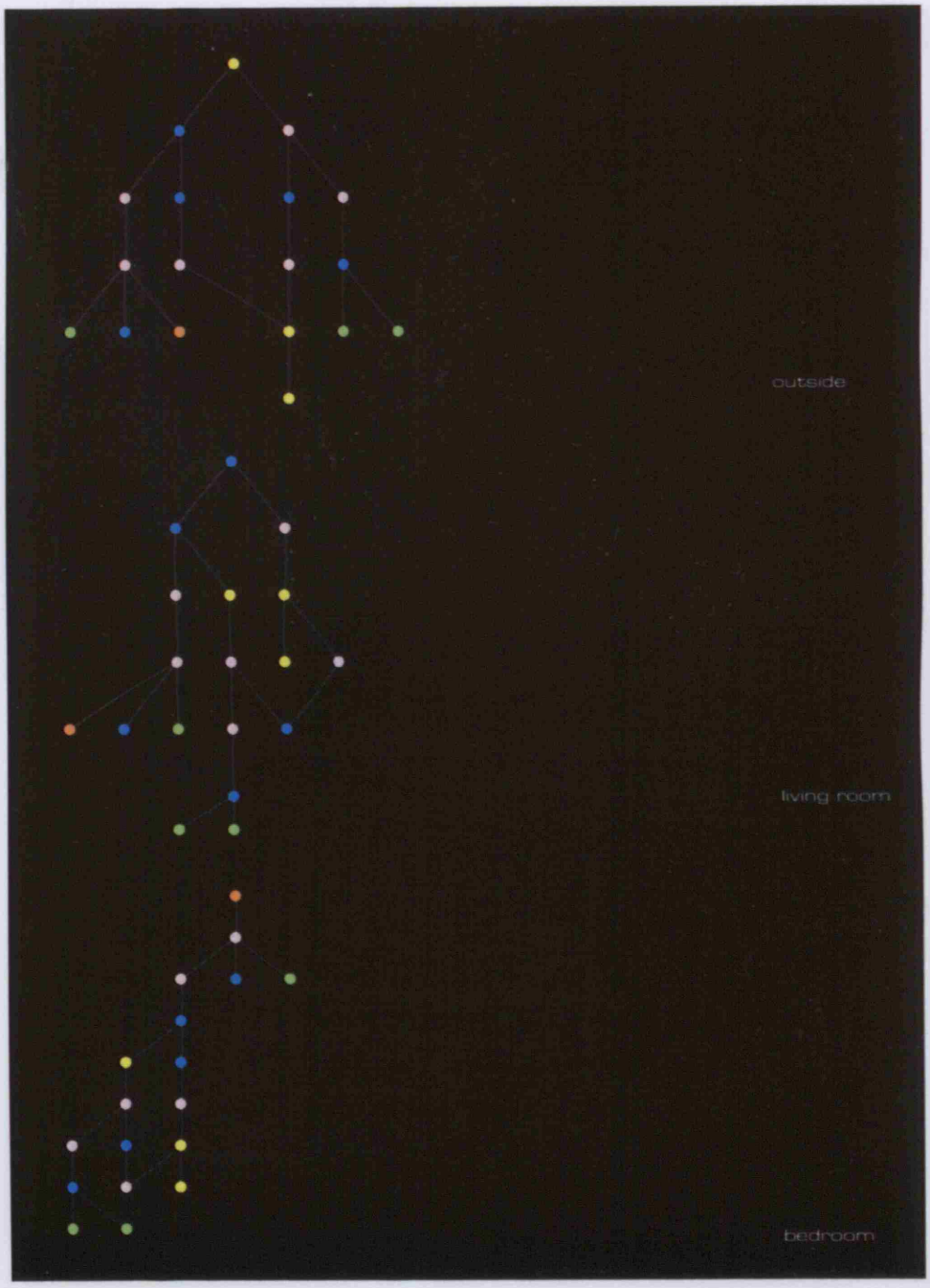


fig.105 convex analysis



outside
living
bedroom
circulation
service

fig.106 graph analysis



micro-scale_walter stamm-teske

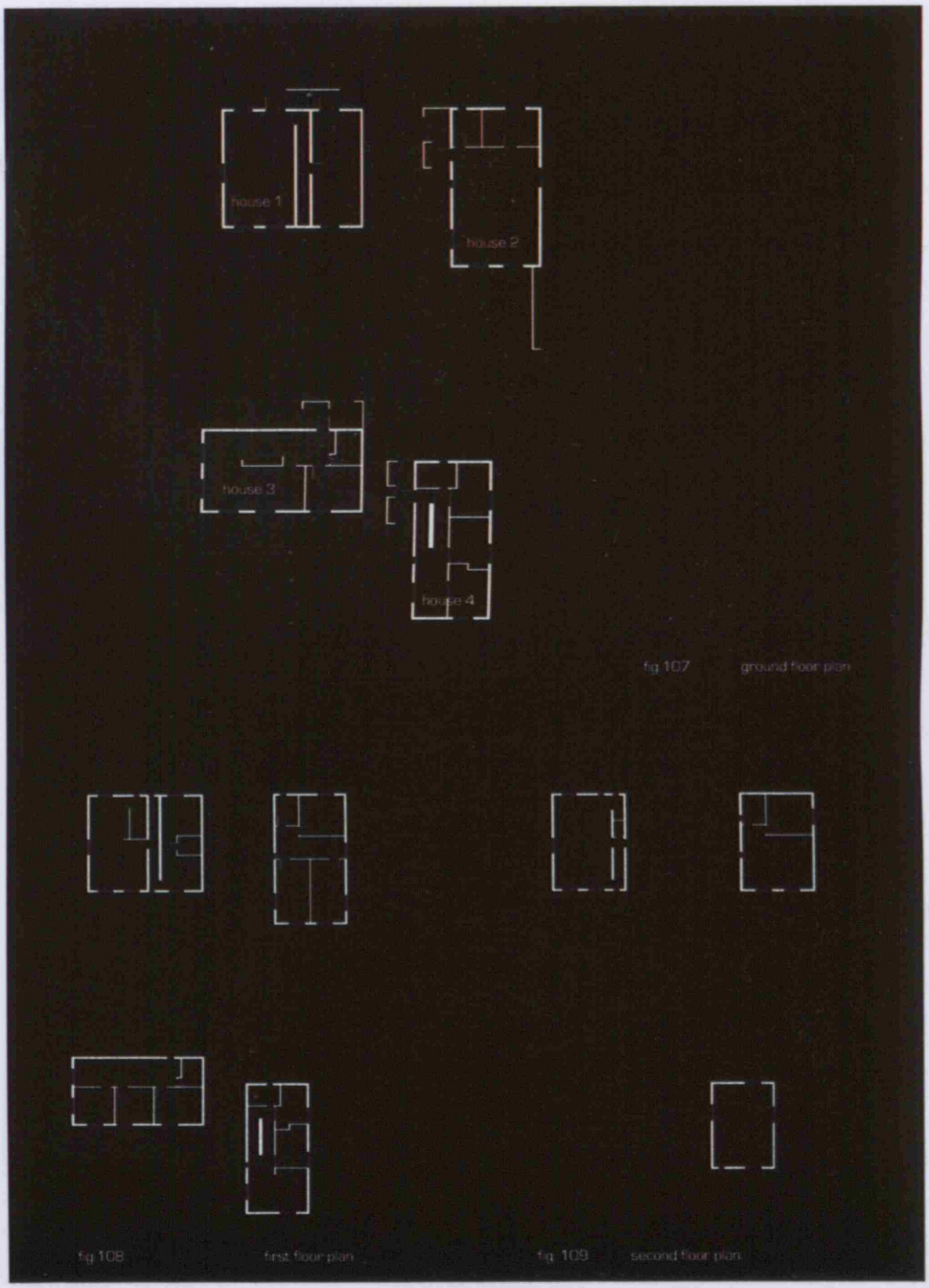


fig 107 ground floor plan

fig 108 first floor plan

fig 109 second floor plan

fig.110 all axial line map

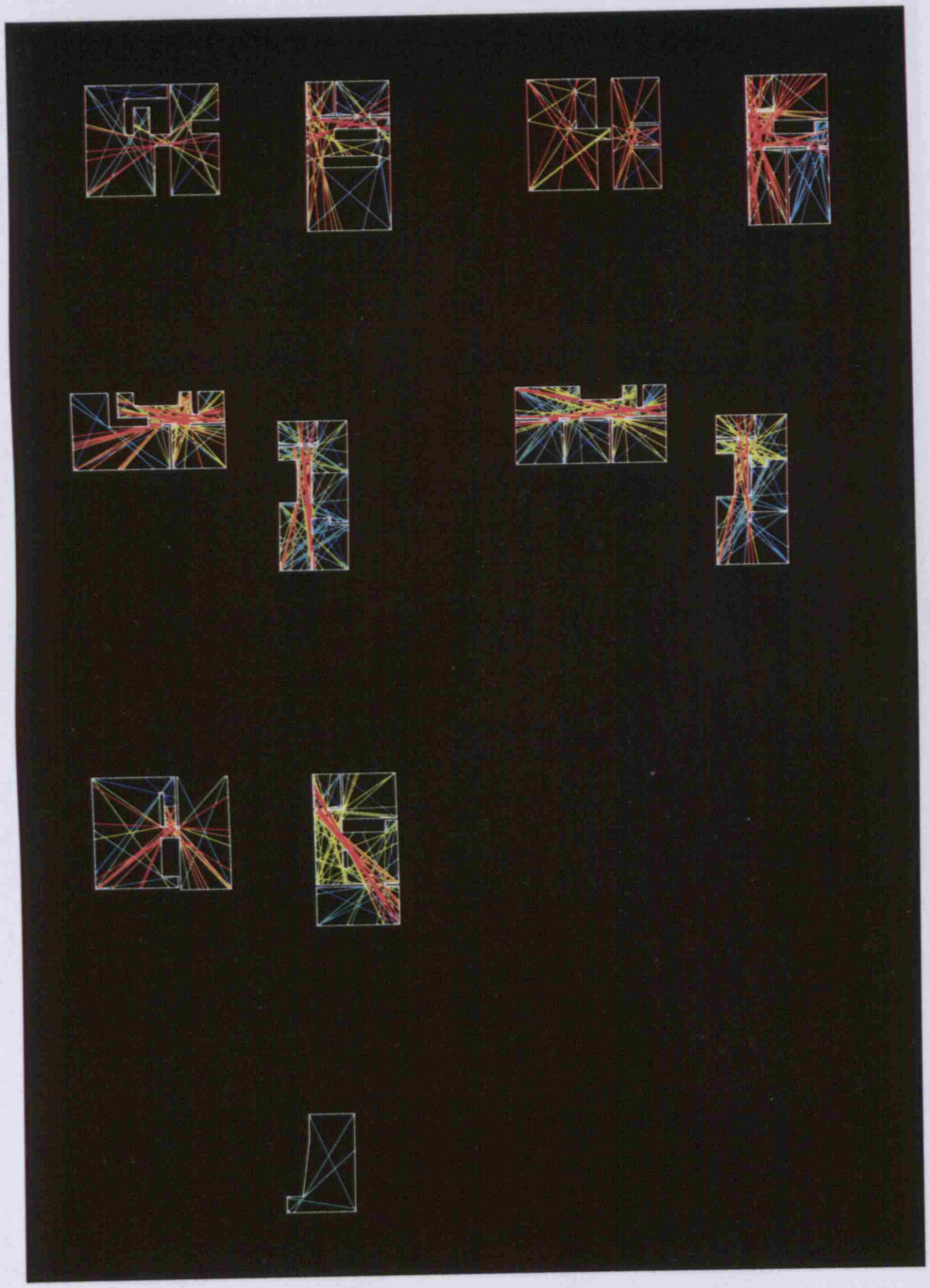


fig.111 fewest axial line map

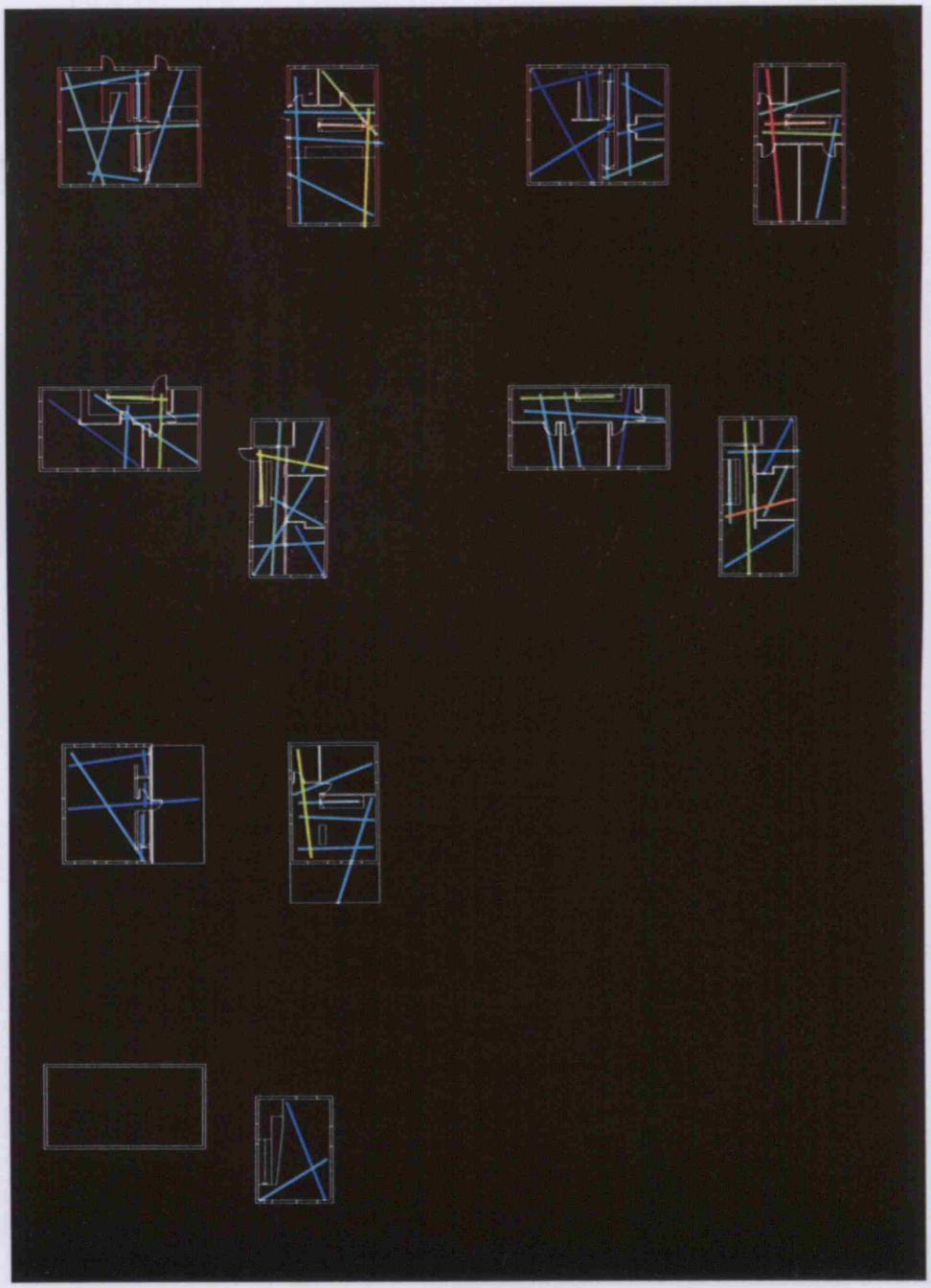


fig.112 VGA analysis

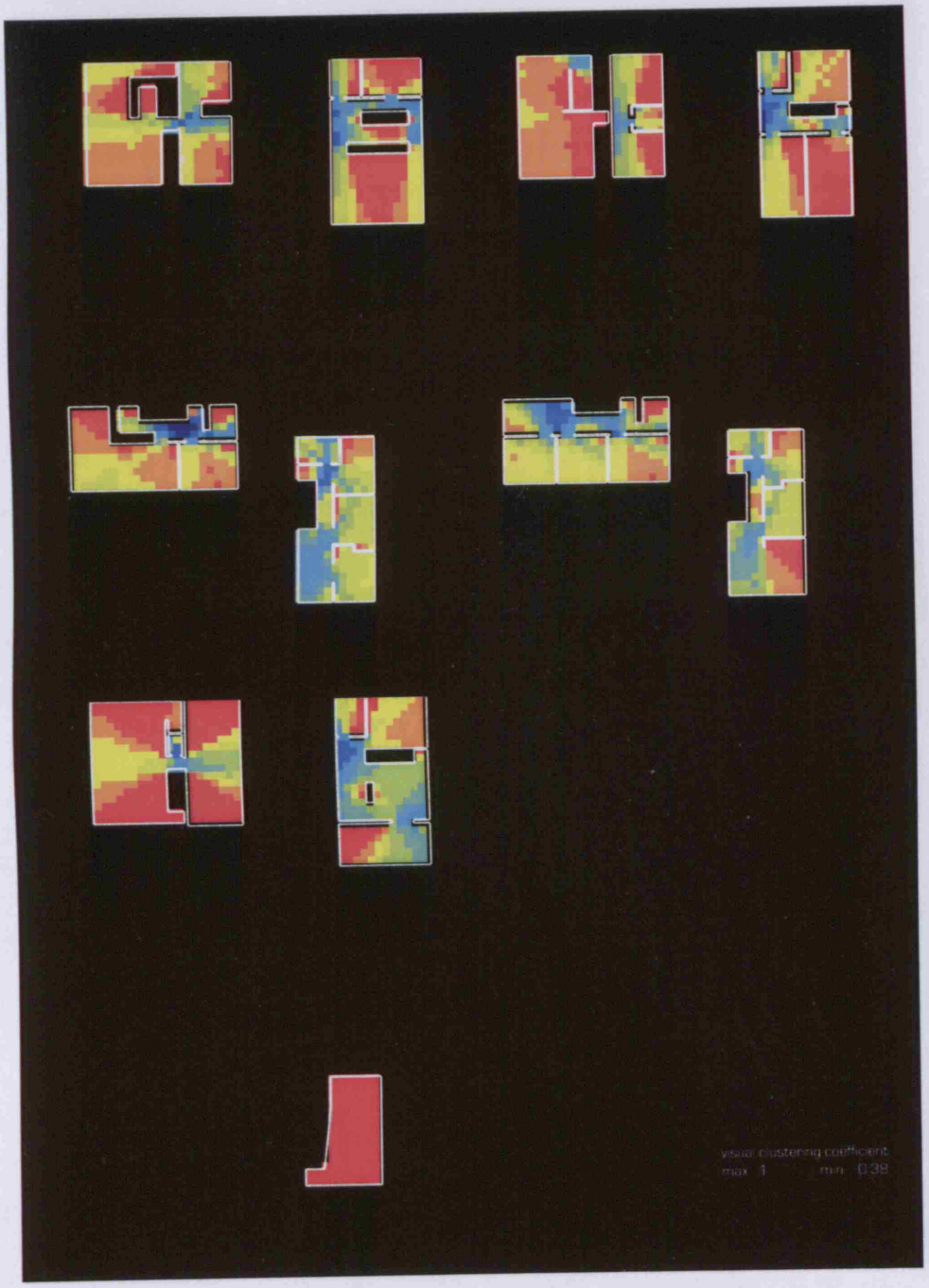


fig.113 VGA analysis

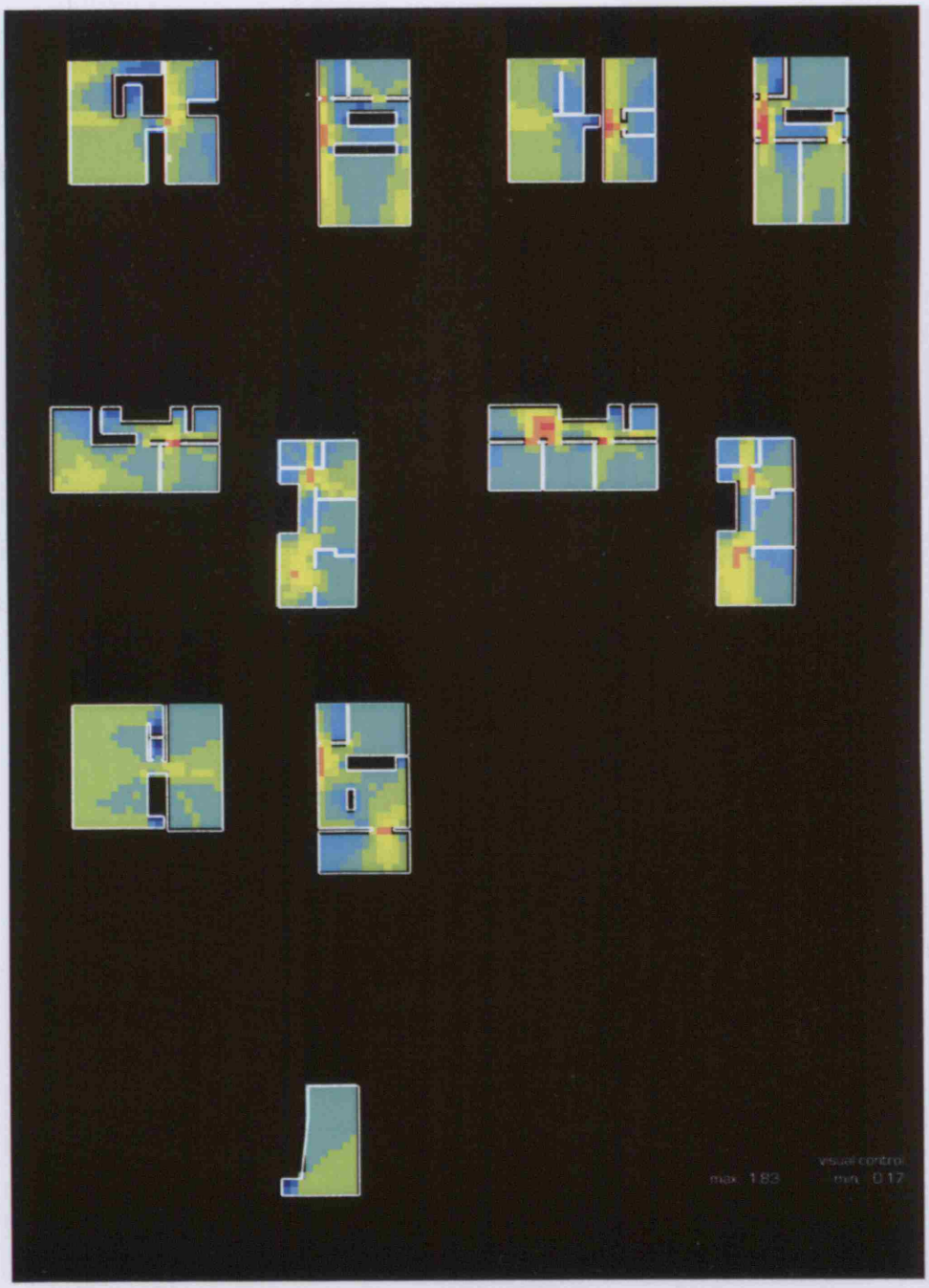
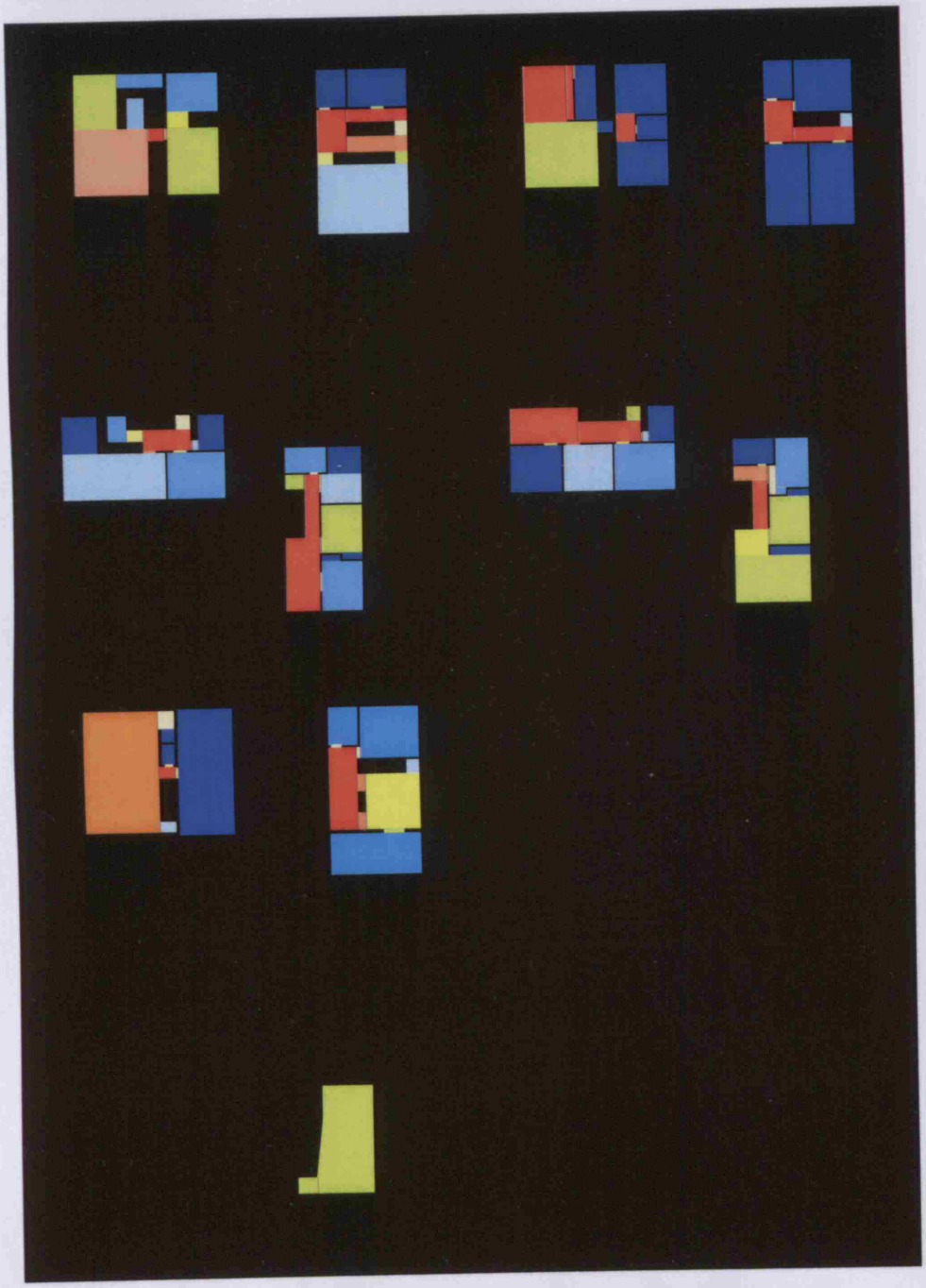


fig.114 convex analysis



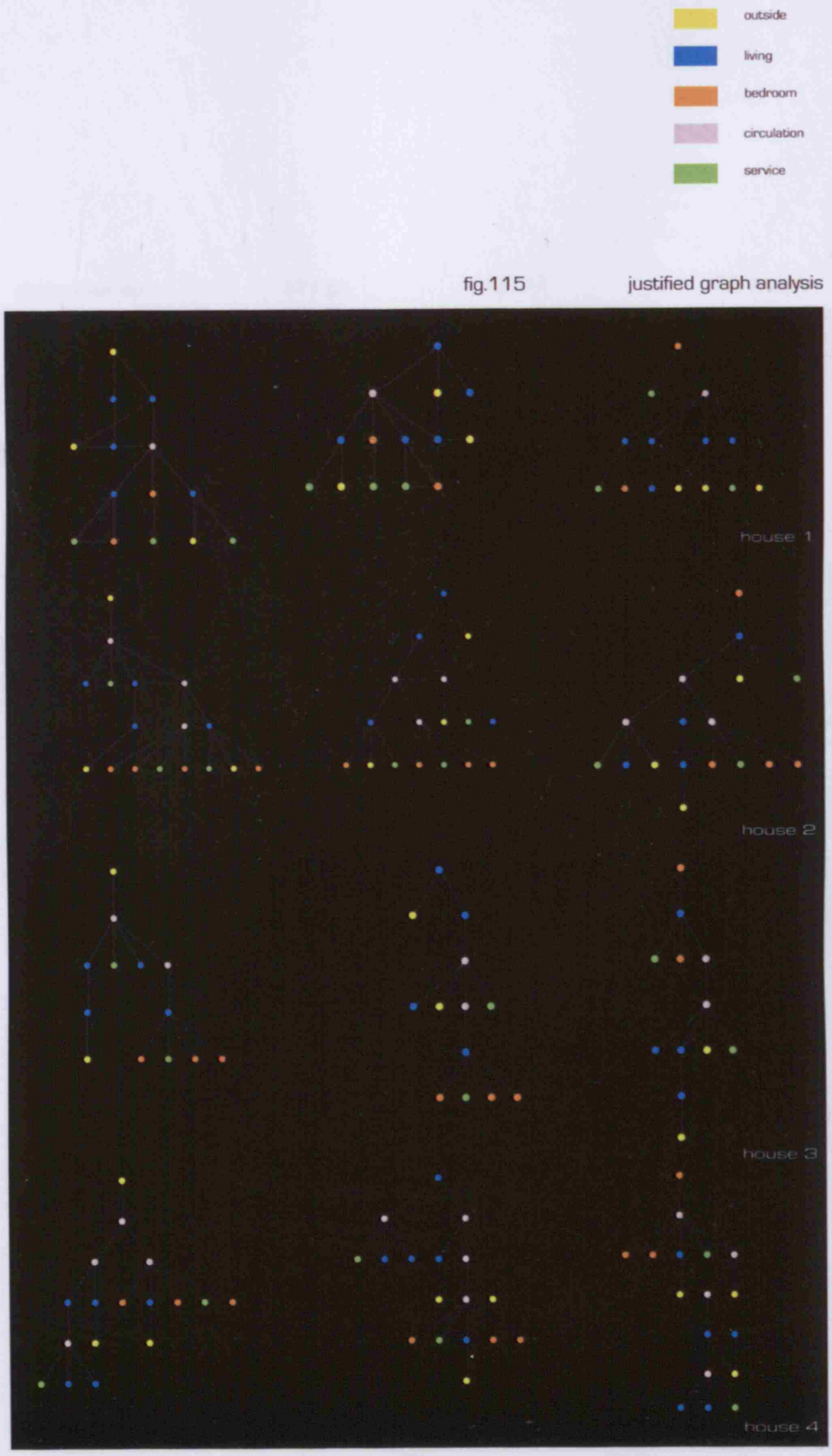


fig.115 justified graph analysis

_Discussion and Conclusion 05

This thesis sets out to provide insights into the relation between the spatial form of the Bauhaus estates, its conceptual aspiration and the generation of communities. It investigates the co-presence between the resident and visitors and the resident and resident. After analysing the three examples in the previous chapter it could be argued that the spatial setting can enhance or obstruct the generation of communities. Through a review of the urban surrounding of the estates, the paper provides a context for understanding the spatial aspects of the socio-economic processes prevalent at the time illustrating the emergent spatial pattern as a contributor to the estate's socio-spatial organisation. Hillier (2001a) contends that the socio-cultural and the micro-economic processes give form to the urban spatial system. While micro-economic activity mainly affects the emerging global structure of settlements, variable cultures imprint the local texturing of space. The examples set out to create a community providing a configuration for people of all ages and incomes and focussing on the aspect that the design should enable a socially integrative function.

• The analysis of the urban framework of both cities showed the relation of the city and the estate in response to the microeconomic activity, with their deformed wheel pattern linking the local grid of the centre to the estate in the expansion. The deformed wheel pattern and the part-whole relationship of the core with the rest of the city demonstrate the city's growth in preserving 'life' at the centre and integration of the new entities. In all three examples the choice of location is an important factor to encourage integration of the estate within the city.

• Through the syntactical and quantitative analysis of the estates it is highlighted that spatial design concepts are implemented to evade 'small scale', separate, inward facing unconstituted and hierarchical development. The schemes are trying to join and stitch the estate together with the city. The layout of the estates endeavours to encourage 'natural surveillance' as a natural occuring process that involves both space occupancy and space observation. As people are moving through the estate, they will be able to to observe what is happening through the public open space. The diversity of uses within the public space, the good integration of public spaces and the maximization of visibilty is believed to be a effective natural surveillance strategy. These effects are tried to be realised, but in the example of Dessau with little success, partially due to the change in the political system and the inabilty to finalise the development, and the use as a testing ground for ideas. The VGA analysis and the syntactical and spatial analysis reflect patterns of social interaction embedded in the space. As Hillier argues [Hillier, 2005], space creates a pattern of natural co-presence in space, and in these cases the configuration provides the foundation for two main aspects. Firstly it creates the base for possible co-presences and secondly it enables to balance the need for communal and private use according to their function. These notions are embedded in the space and in the everyday life. It relates the visual patterns in the estate's layouts and the functional organisation.

• The building analysis investigated if there is a relationship between the external public space and the internal layout of the buildings. The syntactical and graph analysis indicates that the living function of the accommodation acquires further significance and the visual and physical relations to the external are off importance. In the end, further research into this part of analysis regarding the visual properties of the space in terms of relations to the external and vice versa of would strengthen this studies assertions, as well as, extending the analytical techniques to a wider range of layout possibilities.

Summarizing can be said that the relation between spatial layout and the design process of a community is determined by the enabling of human co presence in the space. The community is a made up of a complex layering of intimacy and anonymity, in which social encounter and urban safety are maintained but co-presence and the interface between local inhabitants and visitors. The setting should strongly relate the visual connections and morphological properties of the configuration and generate human co-presence and social interaction between inhabitants and visitors. In addition the overall correlation between city and new entity is of great importance.

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Stadtentwicklungsgesellschaft Weimar

google earth

GLOSSARY OF TERMS

axial map is defined as the fewest and longest straight lines of sight and access which cover the system and pass through every convex space (Hillier and Hanson 1984: Chapter 3). After processing the axial map lines are coloured according to their integration value. The colour scale slides from red (highest) through to blue (lowest) line.

convex map is defined as the least set of fattest spaces that covers the system (Hillier and Hanson 1984: Chapter 3).

interface map is representation of convex spaces, showing the convex spaces as circle and houses as dots, describing the relation of adjacency and direct permeability from building and convex spaces (Hillier and Hanson 1984: Chapter 3).

decomposition map is representation of convex spaces, showing convex spaces as circle and lines linking each one circle to another only when both are directly adjacent and permeable to at least one building entrance (Hillier and Hanson 1984: Chapter 3).

justified graph spaces are represented as small circles, or nodes, and the relation with other spaces as lines, or links, joining the circles. By drawing a justified graph from a space in the system, or usually the space outside, the relations of permeability are being illustrated and the structure of the configuration is visually clarified.

visibility graph analysis (VGA) provides a means of examining how integration is distributed within a system according to how visible spaces are from different points in the configuration. The application of visibility graph analysis divides space into a uniform grid of equal sized tiles and creates a graph similar to the accessibility graph, which is analyzed collectively for its properties of co-visibility. Local and global syntactic measures can be calculated for each of the generated points and then represented with different colourings of the points. The visual integration of a point, which is used in this study, is based on the number of visual steps it takes to get from that point to any other point within the system (Turner 2004: 1); the most visually integrated points are coloured red, while the most segregated are blue.

integration measures is a normalized (inverse) measure of the mean shortest path from one point to all other points in a building/urban configurational system. It is the degree to which each line in the map is present on the simplest routes to and from all other lines measuring in a way the importance of a space within a system, its potential for 'to' movement (Hillier et al 1987).

APPENDIX A _ QUESTIONNAIRE

New communities

This Questionnaire is part of a study investigating the relation between community and its spatiality and examines this relationship using several case-studies to detect their spatial and syntactic properties as well as their conceptual aspirations.

Part One: General

Q001

Which age group are you in?

- ☐ 16-18
- ☐ 19-24
- ☐ 25 - 39
- ☐ 40 - 59
- ☐ 60 +

Q002

Are you:

- ☐ Male
- ☐ Female

Q003

To help understand what the structure of the community is, please tick any of the following who live in your home:

Children aged under 5 years	☐	Yes	Children aged 5 to 11 years	☐	Yes
	☐	No		☐	No
Children/young people aged 12 to 18 years	☐	Yes	Adults aged 19 to 24 years	☐	Yes
	☐	No		☐	No
Adults aged 25 to 39 years	☐	Yes	Adults aged 40 - 59 years	☐	Yes
	☐	No		☐	No
Adults aged 60 + years	☐	Yes			
	☐	No			

Q004

Please tick the box that most closely describes where you are from:

- ☐ Weimar
- ☐ Thuringia
- ☐ Germany
- ☐ Europe

Q005

How long have you been resident in this area?

- ☐ Less than a year
- ☐ One to five years
- ☐ Five to ten years
- ☐ Ten years or more

Part Two: The Physical Community

Q006

How would you describe the location of your community?

- ☐ Urban
- ☐ Sub-urban
- ☐ Rural
- ☐ Other

Q007

How is your area connected to the overall network/city:

- ☐ Car
- ☐ Walk
- ☐ Cycle
- ☐ Bus
- ☐ Train
- ☐ Any Other

Q008

Are there key places where people meet/gather?

Q009

How do you describe the facilities/open space in your community?

- ☐ Good condition
- ☐ Poor condition
- ☐ Not fit for use
- ☐ None

Q010

Do you fill safe using this area?

- ☐ Yes
- ☐ No
- ☐ Other:

Q011

If you use this space, roughly how often do you use it?

- ☐ A lot
- ☐ Regularly
- ☐ Occasionally
- ☐ Never

Part Three: The Social Community

Q012

Overall, how satisfied or dissatisfied are you with this areas place to live in??

- ☐ Very satisfied
- ☐ Fairly satisfied
- ☐ Nether satisfied nor dissatisfied
- ☐ Fairly dissatisfied
- ☐ Very dissatisfied

Q013

Which, if any, of the things listed on this card would you say area problem in this area?

- ☐ Noisy neighbours or loud parties
- ☐ Graffiti on walls or buildings
- ☐ Teenagers hanging around on the streets
- ☐ Homes and gardens in bad condition
- ☐ Vandalism & deliberate damage to property
- ☐ None of these

Q014

Do you socialise with the people in your community? If so , how frequently

Q015

Your own comments (we are keen to hear all your thoughts and suggestions)

Thank you for your participation. Should you wish to make any further comments you can contact Anne-Katrin Becker on

Please return to:

APPENDIX B _ TABLE

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
maze index		1.6	9	1.85
no neighbour score		1.34	4.4	1.65
separation index		0.57	15.8	1.75
constitutedness rate	%	85.4	41.7	75.6
neighbourliness score		3.9	19.2	6.2
interface decomposition score		1.2	1.26	1.09

TABLE 1 PRE-SYNTACTIC MEASURES

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
figure/ground ratio		6.9 : 1	10 : 1	7.5 : 1
total building footprint in sqm		28600	47395	13544
storey height		2	2	2 - 3
average building area / plot area %		25	20	40
total site area in hectares		22	55	11.4
residential/ non-residential		1.03 : 1	115 : 1	1.2 : 1
path as % of ground		40	13.5	33
green as % of ground		27	18.5	17
private garden as % of ground		33	68	50

TABLE 2 QUANTITATIVE DATA RELATING TO FIGURE/GROUND AND OPEN SPACE CHARACTERISTICS

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
number of axial lines		13	58	26
axial articulation		0.11	0.52	0.27
axial ringiness		1.90	3.70	2.90
number of convex spaces		34	80	51
convex articulation		0.30	0.72	0.53
convex ringiness		0.17	0.19	0.16
axial integration of convex spaces		0.38	0.73	0.51
grid convexity		0.54	0.52	0.49
grid axiality		0.66	0.22	0.38

TABLE 3 AXIAL AND CONVEX DATA

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
doors and windows	%	60	49	53 5
blank wall	%	2	23 5	2
windows only	%	38	21	44 5
upper level visibilty	%	-	-	-
active frontage	%	-	-	-
doors only	%	-	6 5	-

TABLE 4 PROPORTION OF PRIMARY BOUNDARIES CONSTITUTED BY DIFFERENT INTERFACE CONDITIONS

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
very low fences	%	-	-	-
low fences	%	-	-	-
high see through fences	%	49	28	12 5
high wall	%	-	-	14 5
planting	%	-	-	46
no border definition	%	51	72	27

TABLE 5 PROPORTION OF SECONDARY BOUNDARIES CONSTITUTED BY DIFFERENT INTERFACE CONDITIONS

		Bauhaussiedlung _ Weimar 1922 - 1923	Siedlung Toerten _ Dessau 1926 - 1928	Neues Bauen am Horn _ Weimar 2000 -
total no of space types		46	73	70
a - space	no	5	5	11
	%	11	7	16
b - space	no	0	0	4
	%	0	0	6
c - space	no	22	43	22
	%	48	59	31
d - space	no	19	25	33
	%	41	34	47

TABLE 6 QUANTITATIVE DATA RELATING TO SPACE TYPES