

Hannover Kronsberg:

model of a

sustainable

new urban community

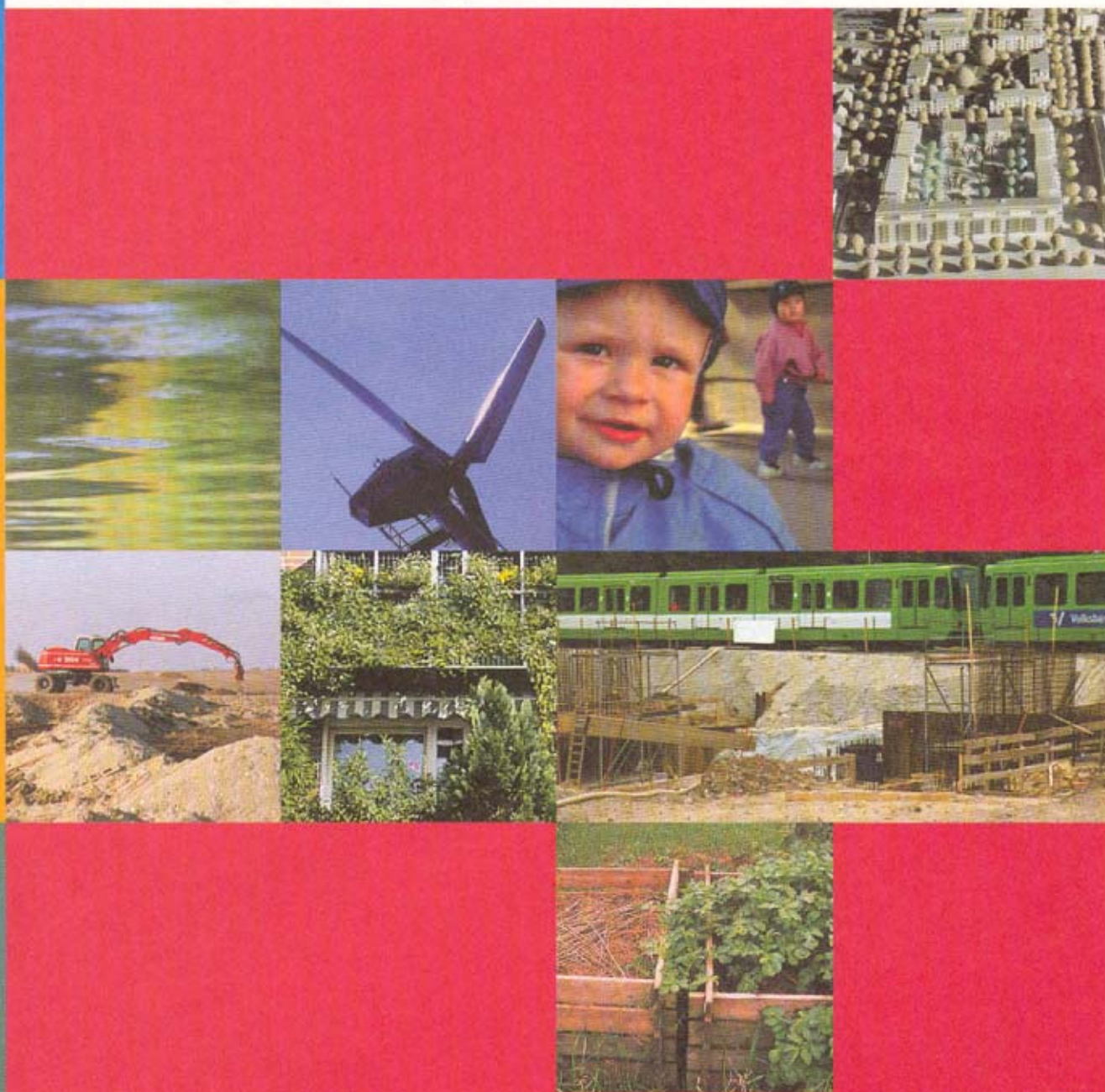


STÄDTEN
KONZERN
HANNOVER



Hannover Kronsberg

model for a
sustainable new urban community





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The City of Hannover's Kronsberg suburb will showcase exemplary initiatives on urban development and ecological and social planning: a new city district created for the future to make manifest the world exposition themes, 'Humankind, Nature, Technology' in everyday community life.

Kronsberg is the location for most of the city's registered EXPO projects within the 'Ecological Optimisation at Kronsberg' and 'City as Social Habitat' programmes along with the 'Kronsberg Landscape' project within the EXPO programme 'City as Garden'.

This is where comprehensive practical solutions for a living socially and ecologically sound city district are to be demonstrated. In the creation of this community, then, all our current knowledge on ecological optimisation of building and habitation will be applied, consistently and holistically across the entire district.

Of course, the City of Hannover can only meet the challenge of creating a large new residential district on sustainability principles by working closely with those who are building there, and so the hard work of developing a socially and ecologically stable district is shared between the municipality and around thirty investors. Residents of the new district, too, should be involved in the creation of their community from the earliest stages, living the ideals of communication, culture and neighbourliness.

The EXPO 2000 host city extends an invitation to the world to follow the sustainable development of this district in the period leading up to and during the world exposition.

Herbert Schmalstieg

Lord Mayor of Hannover, State Capital of Lower Saxony

At Kronsberg in Hannover one of the most ambitious urban development programmes of the late 20th century is being realised. To give a form to the numerous ecological and social precepts of the development we need communications structures that will enable the many protagonists and stakeholders to measure up to the exceptional challenges of the Kronsberg ideal. The ambitious aims set at Kronsberg can only be achieved when all involved carry them through willingly, and for this to happen there must be a shift in people's awareness and attitudes that, in the medium and long term, will lead to a different, sustainable, way of life.

The task of establishing the communications structures necessary to coordinate and liaise between all parties has been taken on by the team at 'Kronsberg Environmental Liaison Agency' (KUKA). Our activities focus on ecological skilling and qualification of everyone involved in creating Kronsberg – craftspeople, architects, developers and, not least, the residents themselves – and on presenting the district during and after EXPO 2000. Additionally, KUKA will gather together all the separate projects on energy, water, waste, soil management and agriculture within the overall ecological concept.

With such a network of well-coordinated activities, and when all those involved in the process – City administration, developers, and especially residents – are pulling together, we can make the lofty aims of the Kronsberg development come true in practice.

Werner Jesse

Managing Director, KUKA GmbH

In the year 2000 Hannover, state capital of Lower Saxony, will take centre stage in the eyes of the world. On each day of the World Exposition the city will play host to an estimated 300,000 visitors, their perceptions shaped by the EXPO motto 'Humankind- Nature - Technology': in its major themes of Health and Nutrition, Home and Work, Ecology and Development and Communications and Information along with Education and Culture, EXPO will pick up on the central issues addressed by Agenda 21.



The World Exposition thus places the City of Hannover under a particular obligation to present exemplary forward-looking approaches to sustainable residential development in the spirit of Agenda 21 .

For the very first time, a world's fair will feature model projects located outside the exposition grounds. The City of Hannover has seized this opportunity to stage projects as decentral exhibits in the EXPO programme 'City and Region as Exhibit':

- Ecological Optimisation at Kronsberg
- City as Garden
- City as Social Habitat

The projects present local action in a global context, working towards environmentally responsible, durable and sustainable development – a strong commitment to a Local Agenda 21 as ratified by the City Council.

In implementing these projects the City of Hannover is striving for lasting ecologically responsible development in all walks of life: central issues are the quality of the environment and ecological awareness, and the importance of communications and information systems as a means of sharpening awareness of sustainable development and effecting behavioural change. The practical applications at Kronsberg include devising and implementation of an environmental liaison concept, skills qualification measures in the areas of building ecology, energy use and waste management and, not least, widespread citizens' participation. Seen in this light, the exemplary Kronsberg projects assume international significance.

Hannover Kronsberg

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On the Kronsberg hill, south-east of Hannover and adjacent to the EXPO site, a long-term construction project will build homes for 15,000 people. Of the final housing stock of 6,000 units, about 2,800 will be completed by the opening of the World Exposition; 1,000 will initially be put at the disposal of personnel and exhibitors at EXPO 2000. The district will be an exemplary project in its approaches to urban and social planning and environmental measures, and thus itself a world exposition exhibit – although the aim is not to present spectacular highlights but to offer generally practicable solutions applicable to the entire district and transferable to other communities. Salient features are urban and landscape planning, ecology and technology, infrastructures and the social habitat under an umbrella of cooperative project development.

Two design competitions created the basis for the Kronsberg development as a concept which covers the EXPO site, the Kronsberg district and the local countryside. The new residential district is laid out as a grid, a long rectangle running north-south, linking the existing community of Bemerode with the EXPO grounds.



KRONSBERG - LOCATION

The planned new district stands as the realisation of a great ideal: that of sustainable residential development. An opportunity has arisen to construct an entire city district on a greenfield site as a model for future-orientated residential development in the spirit of Agenda 21 and, as part of EXPO 2000, to present it to an international public. In this, particular attention should be paid to the necessity of using natural resources more carefully, but also of setting high social and cultural expectations. To ensure that this process with its many protagonists runs smoothly the City of Hannover's Directorate of Building Services set up the Urban Planning Group for the World Exposition (J/2000) and the EXPO Environmental Planning Group at the Directorate of Environmental Services (K/2000 AG Umweltplanung Weltausstellung) with responsibility for coordinating the Kronsberg development.

Now, most of the planned projects are in full swing and the remainder will commence soon: building activity has reached such a pitch that the area under construction and over 30 cranes make Kronsberg one of the biggest building sites in Germany.

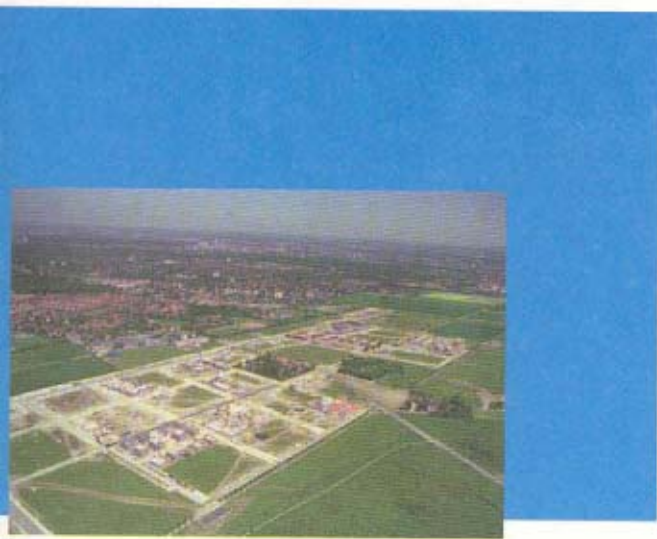
1.1 COOPERATIVE PROJECT DEVELOPMENT AND INTEGRATED PLANNING

Kronsberg was an agricultural area which had been earmarked for more than twenty years for urban development, and for this reason the City of Hannover bought up most of the land on the western slope and has disposed of it to various property developers on the basis of the overall concept. As landowner, then, the City is in a position to act as principal contractor: it formulates quality standards for investors and architects.

Because of the very tight schedule (completion deadline is 2000!) the planning process runs concurrently at every level. This parallel procedure demands a high degree of cooperation, flexibility and adaptability from all stakeholders.

The main features of this integrated planning procedure are:

- decentralised organisation of separate measures in various City Administration departments, under the overall supervision of a bureau outside the City's traditional line organisation,
- the coordinated enforcement of planning statutes, constitutional and civil law instruments – building regulations, insulation standards, contracts of sale, and services contracts – to meet the ecological aims,
- cooperation with developers supervised by a district coordinator,
- residents and new members of the community involved in the process through a planning ombudsman system,
- Kronsberg Environmental Liaison Agency (KUKA), established to coordinate and support the process, implement qualification and skilling initiatives, and manage the new district's public relations strategy.



THE NEW DISTRICT UNDER CONSTRUCTION - VIEW FROM THE SOUTH

1.2 AGENDA 21

The Kronsberg district will be planned according to the postulates of Agenda 21. Of its 40 chapters, those particularly important at Kronsberg are 'Support for Sustainable Settlements' and 'Promotion of Public Awareness'. Agenda 21 foresees that residential development should be designed to give overriding priority to sustainable land planning and economic use and to the promotion of ecologically-responsible energy provision and transport systems in metropolitan and rural communities. Equally important are ecologically responsible building methods to avoid environmental damage in the forms of excessive resource consumption, injury to sensitive ecosystems, chemical contamination and the use of building materials injurious to health. All the above objectives are being addressed at the Kronsberg development.

The overall ecological concept for the Kronsberg project was developed in the spirit of the Charter of Aalborg, ratified by more than 80 European cities, and in harmony with ICLEI (International Council for Local Environmental Initiatives) recommendations on the establishment of a Local Agenda 21.

Agenda 21 is the key document from the 1992 United Nations Conference on Environment and Development in Rio de Janeiro (the Earth Summit), where government representatives from all over the world met to devise a strategy to combat increasing national and global environmental destruction and to address the world's most pressing pollution problems. 179 countries approved Agenda 21 as an 'Action Programme for the 21st century': it sets out detailed procedures for halting the deterioration of the global environment, introducing improvements and ensuring the sustainable use of natural resources. A crucially important approach is the integration of environmental aspects in all areas of public and political life, while social aspects also play a significant role: features of consumer behaviour such as unsustainable production and consumption habits are to be altered, and human health protected and improved. Included in the process is the more efficient use of energy and resources, waste avoidance, and support for consumers in making ecologically sound purchasing decisions.

1.3 URBAN DEVELOPMENT AND LANDSCAPE PLANNING

The planning of the new district includes enhancement of the adjacent countryside. Kronsberg is conceived as a green settlement: tenants' and allotment gardens, neighbourhood parks and green public spaces for sports and games are planned in from the earliest stages. The landscape plan foresees the planting of woodland on the Kronsberg ridge, extensive and varied green spaces, and recreational facilities. Diverse habitats for wild plants and animals will be created in the vicinity. There are many landscape and nature conservation

areas nearby as well as agricultural land – an organic farm will be established very close to the residential district.

The distinctive feature of the Kronsberg development is its grid layout incorporating avenues, parks, squares and planned courtyards to frame the local architecture, which was designed by some 40 architectural consultancies. Each section of the district will contain about 1,000 dwellings grouped around a neighbourhood park.

CONSTRUCTION PRAXIS	SOCIO-CULTURAL CONSIDERATIONS	ENVIRONMENT
COMPACT LAYOUT	SOCIAL MIX OF FUTURE RESIDENTS	ECOLOGICAL STANDARDS
RESOURCE-EFFICIENT CONSTRUCTION	CENTRAL FACILITIES	ENERGY
MIXED USE: RESIDENTIAL AND COMMERCIAL	arts, community and advice centre	energy use optimisation
CONSULTATIVE PLANNING PROCEDURES	church and neighbourhood centre	district heating systems
TRAFFIC MINIMALISATION CONCEPT	health centre	low energy buildings
tram route D	SOCIAL INFRASTRUCTURE	electricity saving measures
all amenities within easy walking distance	'Kinderhouse' with community bakery	'Solar City'
cycle priority route	kindergartens	solar district heating system
parking space restrictions	primary school & middle/secondary school	passive solar houses
OPEN SPACE QUALITY	'FOKUS' housing project	fuel cell co-generation plant
courtyards	'Habitat' international housing project	wind turbines
avenues	decentralised support for senior citizens	photovoltaic cell technology
neighbourhood parks	space allocation for community use	WATER
green corridors	NUTRITION	rainwater management concept
district park	market	drinking water economy measures
	Kronsberg Farm – 'Herrmannsdorfer Landwerkstätten am Kronsberg'	WASTE
		ecologically compatible building materials
		building waste concept
		domestic and commercial waste concept
		SOIL
		soil management
		inherited pollution – removal or containment
		LANDSCAPE
		ecological landscaping
		ecological farming
		ENVIRONMENTAL COMMUNICATIONS
		KUKA – Kronsberg Environmental Liaison Agency

Kronsberg will be a high-density development respecting the principles of efficient resource and land use. The construction pattern follows the 4-6% gradient of the west-facing hillside, the buildings becoming less dense and lower as one approaches the crest of the hill and the neighbouring countryside. This results in three zones from west to east of different levels, density and housing type: in the west of the district, next to the main service road and tram route, the 4¹/₂-storey apartment houses in blocks and rows will be the highest buildings in the district with the greatest land use density. In the middle band of the district there will be mainly 3¹/₂-storey housing in rows and pavillion formations, and the upper margins of the district will consist of 2¹/₂-storey terraced houses.

Concurrently with the construction process, many jobs are being created especially in service enterprises. Some of the commercial premises serving the district are integrated in the residential development and a mixed use strip has been planned for the main service road where the minimum ground floor ceiling height has been set at 3.2 metres. This is where most of the 'reserved areas' are located; they will be released for various user groups contributing to the social infrastructure such as kindergartens and elderly people's day centres.



1.4 DEVELOPMENT SUBSIDIES TO CREATE A SOCIALLY-BALANCED POPULATION

Kronsberg will be a mixed residential district of terraced houses and large and small apartments, financed on different models. A mixture of apartment sizes and standards will meet a variety housing needs and stimulate demand for different types of accommodation, thus meeting the development's long-term responsibilities.

A central concern of the development subsidy programme as financed by the State of Lower Saxony, federal government and the City of Hannover was to create a robust model of a socially balanced population. There is a wide range of subsidies for builders of rented and owner-occupied accommodation. The desired variety is achieved within localities because investors take advantage of various subsidy models on their sites. In addition, it has been made markedly easier for them to rent the properties: for all apartments not earmarked for EXPO use as the first tenancy there is an exceptionally high income ceiling (e.g. around 120,000 DM p.a. for a three-person household) making over 90% of the city's population eligible for social housing at Kronsberg.



HOUSING BLOCKS AT KRONSBURG

The City will only exercise its right (where it has one) to nominate tenants starting with the second tenancy. This contractual condition – which in any case only applies to a small number of dwellings – will thus have a gradual effect on the composition of the local population. Some investors will also take advantage of the transferability option: the condition will be applied to existing housing stock elsewhere in Hannover, so that the Kronsberg apartments can be offered on the open market.

The realisation of this new residential area at Kronsberg will pursue two functional aims beyond the general one of providing new housing: it should relieve the pressure on the housing market caused by the world exposition, and some of the apartments will be allocated to EXPO before and during the event, primarily for occupation by stand personnel from the exhibiting countries. It meets the fundamental aim of sustainability when decisions on EXPO accommodation are taken not as an end in themselves but with regard to subsequent residential use. For this reason there will be no separate EXPO village; these dwellings are – apart from a certain concentration in one area – incorporated in the general residential layout.

1.5 QUALITY OF THE BUILT ENVIRONMENT AND RESIDENTS' PARTICIPATION

The district should make a friendly and airy impression, and for this, particularly unobtrusive gently-sloping single pitch or V-shaped roofs will predominate. Most exterior walls will be rendered in light material and red clinker bricks.

All dwellings at Kronsberg have direct access to green space. The courtyards, with their more private atmosphere, offer grassed communal areas with facilities for games and relaxation. Each eight-block neighbourhood is grouped around a park within easy reach of every home; these neighbourhood parks should be a central feature to help create local identity, offering space and facilities for sports, games and relaxation.

There is a wide range of accommodation types. Nearly all dwellings have either a private garden, a balcony or a roof garden, be light, airy and designed to save space. In their planning, particular attention was paid to the shape of the entrance areas and their direct link to the courtyards. Although the front gardens need retaining walls, access to them is easy, even for the Disabled.

Building a community for the future means creating a social and socially-sustainable high-quality human habitat. Kronsberg is not intended to become a privileged enclave – social mix is crucial, and so most dwellings will be publicly-subsidised accommodation for various income groups. Ninety percent of constructions will be multi-storey rented apartments and just 10% of the Kronsberg settlement will be owner-occupied terraced housing. Residential quality should also be developed by needs-oriented planning: residents and users will be involved from the first in the creation of their district because citizens' participation is a priority – as the community grows so its infrastructure should expand and develop to meet residents' needs. The City of Hannover has appointed a planning law ombudsman and a coordinator to advise and support residents and committees in the planning and implementation process.

The first decentralised services and amenities for the new district will be a primary school, a schools centre and three kindergartens, two neighbourhood parks, reserved areas for social services facilities and space for commercial uses. The district's arts and community centre will also house city council advice bureaux, KUKA, a church and neighbourhood centre, a health centre, shops, cafés and restaurants.



1.6 KRONSBURG TRANSPORTATION CONCEPT

Local Public Transport

The development of the new city district of Kronsberg is based around an environmentally responsible transportation concept serving a compact community. The new tramline D connecting Kronsberg and the EXPO site to the city centre generates ribbon development along the track. Journey time to the city centre will be just 15 minutes.

To make the most of this advantage several tramstops will be built to ensure that no dwelling will be more than 600 metres from a stop and even nearer for most people: despite its peripheral location, Kronsberg's housing density is relatively high and increases the closer one lives to the tram line.

Street Layout

The streets of Kronsberg are laid out to channel the heaviest traffic flow along the main service road parallel to the tramline on the edge of the residential area to minimise disruption by vehicles. A new link road will be built to the existing trade fair link road outside the residential area.

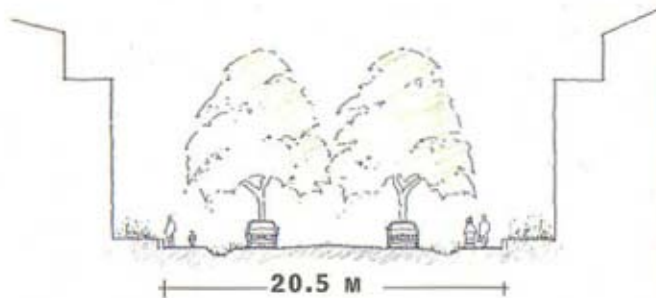
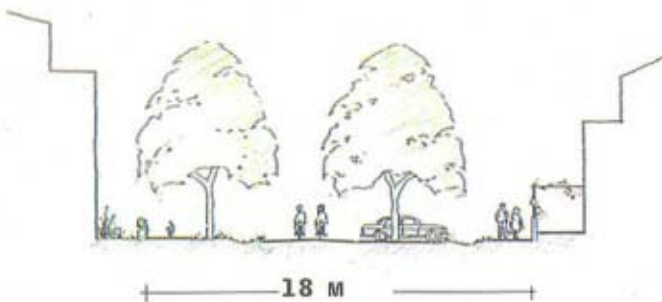
From the main service road the district is covered by a network of minor streets. The overall internal street plan is a wide mesh; streets are so laid out that there will be no through traffic and that all vehicles will have to drive slowly; traffic calming measures include 30 kph zones, precedence to traffic coming from the right, and many designed bottlenecks.

A specially-constructed 1.5 km cycle priority route crosses the district from north to south.

The Street Scene

All the streets of Kronsberg are designed as avenues with a large proportion of greenery – across the district there will be trees on both sides of the road and in the front gardens. Grass verges beside on-street parking spaces will help rain-water infiltration as part of the retention basin system at Kronsberg.

All house doors face the street and most of them have generously-proportioned entrance areas which make addresses easy to find and impart a feeling of security among residents. The street environment is welcoming and laid out for the benefit of pedestrians and cyclists. A special planning feature is the two avenues with open watercourses alongside them that run downhill to the main road.



STREET LAYOUTS AT KRONSBURG

Footpaths and Cycleways

To complement the street layout a finely-branched network of paths is laid through the quiet inner courtyards of the district which, with their more private character, offer safe play spaces for children. All streets and paths in the district give access to the attractive footpath and cycleway network in the surrounding countryside.

Parking

Car parking spaces are provided partly in underground garages or in smaller facilities. Exploiting the local topography, they are often dug into the hillside and thus visually well-integrated.

To reduce the number of parking spaces in the inner courtyards for the general enhancement of public spaces, the City of Hannover passed a bylaw permitting just 0.8 of a parking space per dwelling (instead of the standard one space per dwelling).

The deficit is made up by on-street parking spaces for general multiple use. By the same token the proportion of space needed for traffic within the district is reduced.

Joint Car Use

Following the motto 'Use without Ownership' an attractive joint car use scheme is planned for Kronsberg as an extension of the proven system already operating in Hannover. A suitable base with servicing facilities for the 'Teilautos' is planned for the district centre.



BOUNDARY AVENUE, SOUTHERN SECTION



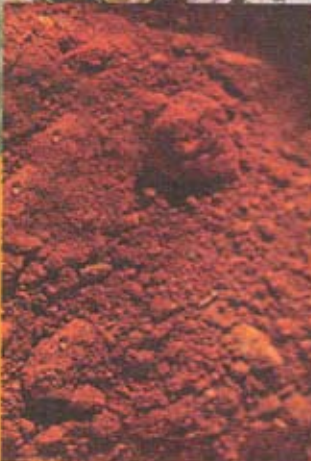
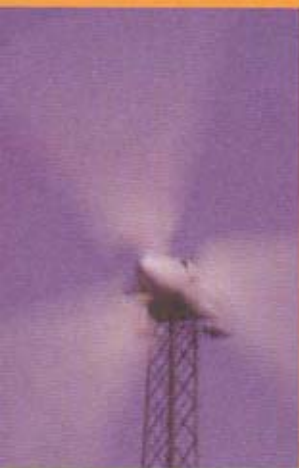
ecological optimisation at Kronsberg



Hannover

The creation of the new residential district at Kronsberg with its 6,000 dwellings will consistently apply all currently-available knowledge on ecologically-optimised construction, living arrangements and social aspects across the entire area, from ecologically-responsible soil management throughout the construction period, energy-saving construction methods for all buildings and an exemplary waste management concept through to the water concept with its semi-natural rainwater system and drinking water saving measures – and the Kronsberg Environmental Liason Agency (KUKA), located at the Kronsberg site, has been set up to coordinate and facilitate information flow between the many different stakeholders in the Kronsberg enterprise and to provide demand-oriented information and qualification in the areas of energy, construction, waste treatment and water.

The 'Ecological Optimisation at Kronsberg' project and its subsidiary components is registered through the 'EXPO 2000 Hannover GmbH' company as a world exhibit of the World Exposition.



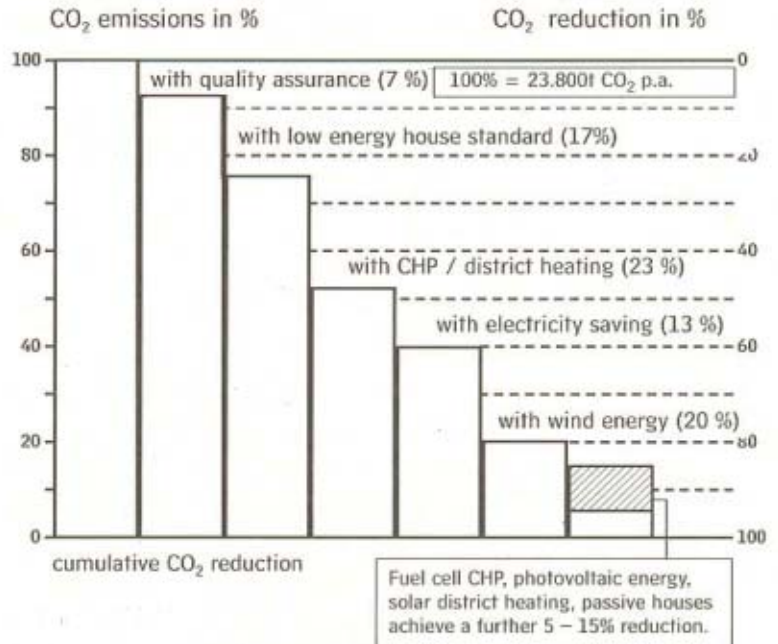
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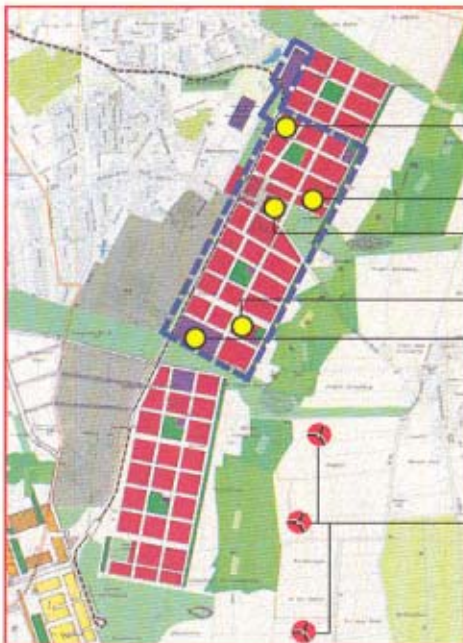
2.1 KRONSBURG ENERGY CONCEPT

Worldwide, CO₂ emissions from the burning of fossil fuels are steadily increasing: each year some 22 billion tonnes of this greenhouse gas is released into the atmosphere. Germany alone produces almost a billion tonnes of carbon dioxide annually, contributing to global warming caused by human activity.

The City of Hannover has set the target for the Kronsberg development of reducing CO₂ emissions by at least 60% through savings on heating, hot water and electricity use with no reduction in living comfort or homeliness. On the contrary: healthy, ecologically-sound building materials and good air quality in the dwellings will actually increase comfort standards. The Kronsberg energy concept pursues dual aims: energy use optimisation based on low-energy housing, electricity saving and district heating, and the use of renewable energy sources and innovative technology.



CO₂ REDUCTION AT KRONSBURG



- LEH construction methods with quality assurance, skilling and qualification programme
- CHP
- passive solar houses
- Photovoltaic technology
- solar district heating
- CHP + fuel cell technology
- wind turbines

KRONSBURG ENERGY CONCEPT

Energy Use Optimisation

'Energy Efficiency Optimisation at Kronsberg' is a model urban development project and currently the leading ecological construction programme in Germany, setting an example for new residential development. The concept is thus a subsidiary enterprise of the registered decentral EXPO projects and an EU-funded 'Thermie Project' (Expo Cities).



DIRECTORATE-GENERAL
FOR ENERGY (DG XVII)
EUROPEAN COMMISSION

Quality Assurance and Qualification Programme

Energy use optimisation at Kronsberg adopts the 'Low Energy House' as the construction norm. Standard heating energy requirements for normal low energy housing are currently set at a maximum 70 kWh per square metre living space per annum; at Kronsberg, builders are contractually committed not to exceed 55 kWh/m². This value, according to Kronsberg calculation methods, is equivalent to about 45 kWh/m² p.a. when calculated according to the usual method for German insulation standards.

In any case, purely calculation-based energy savings are inadequate to effect a shift to energy-efficient residential building. Architects and craftspeople must learn that energy-efficient building methods start with the details, such as windproof and airtight fabrications and the avoidance or minimisation of heat bridges. For this reason the City of Hannover has set quality assurance of the low-energy standard as compulsory across the whole development and established a support programme for its implementation. If quality inspectors see that contractors lack the knowledge of Low Energy House construction methods this is compensated for by fast response skills upgrading courses within the KUKA qualification programme.

Through a cooperation model led by KUKA various institutions offer planners, architects, craftspeople, and the future residents, needs-oriented qualification and skilling programmes in low-energy building methods and living. Crash courses on location or specialist excursions tackle current problems and compensate for deficits in knowledge or methodology. Another feature of the qualification programme is the use of environmentally sound building materials, and KUKA informs residents through brochures, personal advice sessions and the district magazine on how to get the best from their low energy houses.



'Low Energy House' (LEH) is a term applied to dwellings mainly characterised by their heating energy efficiency.

- LEHs use less than 55 kWh/m² p.a. according to Kronsberg calculation methods (or 40-45 kWh/m² p.a. according to 1995 federal insulation calculation methods).
- LEHs save around a third of their heating energy requirements over the year compared to conventional dwellings.
- LEHs can be erected using conventional building methods and offer all the standard facilities for comfortable living.
- An LEH with a living area of 100m² will use no more than 500 m³ of natural gas per year.



District heating by decentral cogeneration plants (combined heat and power stations) is highly efficient. The boilers are powered with a more environmentally friendly fuel, usually natural gas, which is converted into both mechanical and thermal energy: the mechanical energy drives a generator to produce electricity where efficiencies of 20-40% are possible. The thermal energy released in the generating process is passed through a heat converter to produce hot water at an efficiency of 40-60%. Decentral cogeneration plants are thus a very rational use of energy sources – their total efficiency reaches 80-95%.

Electricity Saving

At Kronsberg a comprehensive electricity saving programme for all domestic technology and appliances will be introduced – for instance, aiming to supply all dishwashers and washing machines with hot water from the district heating systems.

The City of Hannover promotes electricity saving measures at Kronsberg and KUKA advises residents on the practicalities.

District Heating Cogeneration

Another component of energy use optimisation is an economically-viable district heating system: the principle at Kronsberg is that all buildings will be linked to heating networks served by decentral gas-fired cogeneration plants or that their needs will be met from renewable energy sources, the exception being the passive solar houses which will meet their extremely low supplementary heating needs through a heat exchanger, reclaiming warmth from air as it leaves the building.

The City of Hannover passed a bylaw for Kronsberg which stipulated supply networks for space heating, hot water provision and refrigeration. The supply contract was put out to open European tender and won by the local utility, 'Stadtwerke Hannover AG', and 'GETEC Hannover mbH', a medium-sized company, who will provide district heating from low-emission, energy-efficient plants.

In the southern section of the development 'Stadtwerke AG' has built a 1-megawatt power station to supply heat and power to 2,700 dwellings, while in the north of Kronsberg 'Getec' runs a decentral heat and power system for 600 dwellings and a junior school. The special feature of this power station is that it is accommodated in the cellar of a multiple-occupancy building. Vibrations from it are damped by its special mountings and it is very quiet in operation; the cellar is in any case so well insulated that residents will be unaware of its presence.



The District Cogeneration Plant



Use of Renewable Energy Sources and Innovative Technologies

Energy provision worldwide is still heavily dependent on finite resources. The Kronsberg development, by contrast, will make use of solar and wind energy and innovative energy-saving technologies in the form of passive solar houses and a fuel cell decentral heat and power station.

Solar Powered District Heating

One innovative building project in its use of renewable energy is the 'Solar-City-Projekt' by the 'Gesellschaft für Bauen und Wohnen Hannover' (GBH) housing association, which will build 100 exemplary dwellings and a children's day centre drawing around half of their heating requirements from solar energy and the other half from the district heating network. The concept for the use of solar energy is being developed by the Lower Saxony 'Energie-Agentur'.



Passive Houses

In another innovative enterprise property developers 'Rasch und Partner Bauen und Wohnen GmbH' are running their own EXPO project with support from 'Stadtwerke Hannover AG', constructing up to 90 dwellings as passive houses. The aim of this project is to demonstrate a new building standard that will enable the space heating cost efficiency ratio to be reduced to 15-20 kWh/m² p.a. (the '1 Litre House') while significantly reducing energy needs for hot water and household appliances.

A passive house dispenses entirely with conventional heating systems, using passive systems to maintain a pleasant indoor climate in winter and summer by:

- minimising heat loss through very high quality insulation, draughtproofing, airtightness and highly efficient heat recovery systems,
- optimising passive solar energy use,
- exploiting internal heat sources, and
- installing very efficient electrical appliances.

In active solar energy use through solar collectors the warmth of the sun is used for heating and hot water. Seasonal variations are partially compensated for by a large water tank acting as a thermal storage radiator.

Fuel Cell Decentral Cogeneration Plant

'Stadtwerke Hannover AG', the city's energy utility, will also run a fuel cell plant at the district's main cogeneration plant. Such technology can be characterised as currently the most innovative cogeneration possibility and is therefore intended as an EXPO project.

Wind Turbines

At Kronsberg the City of Hannover plans to commission three large state-of-the-art wind turbines. Two 1.5 megawatt turbines should be erected by the year 2000; the power produced will cover the electricity needs of the almost 3,000 dwellings to be completed by then.

Photovoltaic Technology

On the roofs of the district arts and community centre and the primary school, photovoltaic cells will be installed to produce electricity for the building.

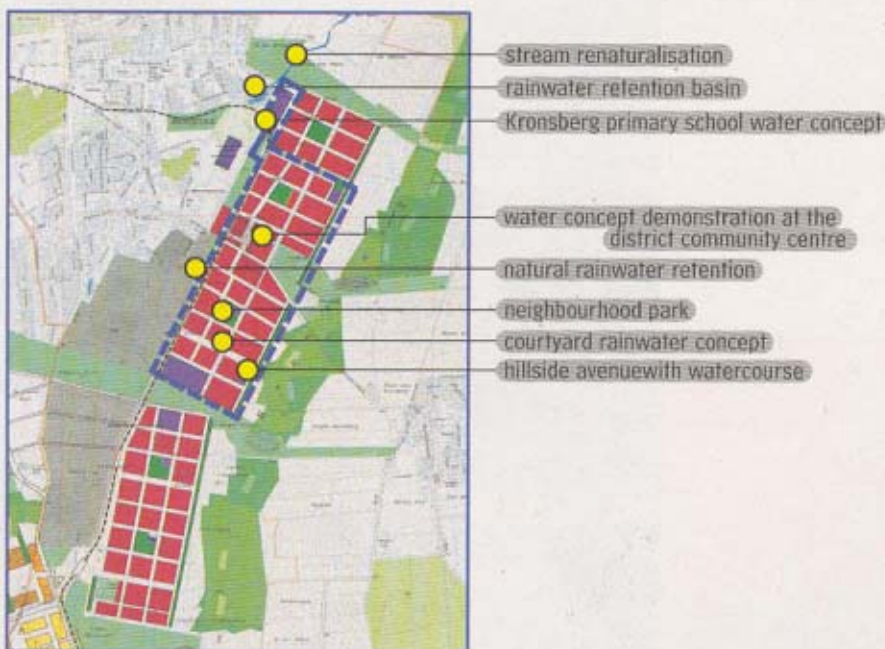
A fuel cell functions like a battery: hydrogen and oxygen combine in a chemical reaction to release electricity and heat. The fuel cell offers some advantages compared to power and heat provision with natural gas-fuelled decentral CHPs: electrical efficiency is higher and harmful emissions lower, there are no moving parts and so the process is very quiet, installation is simple and the system requires little maintenance.



2.2 KRONSBURG WATER CONCEPT

Water is essential to life; people, animals, plants – without it nothing would live on earth. Sustainable urban development thus has an inescapable obligation to expose our blithe wastage of water and to demonstrate alternative attitudes. The Kronsberg water concept, based on this ideal, takes three courses:

1. a rainwater management system following natural principles as part of the registered EXPO project 'Ecological Optimisation at Kronsberg', that also includes a 'Visualisation' component,
2. drinking water economies across the entire district, and
3. the qualification and awareness-raising programmes.



KRONSBURG WATER CONCEPT

Semi-natural Rainwater Management System

The rainwater management system at Kronsberg imitates the characteristics of a natural water cycle: rainwater falling on all built-up areas will be retained on site and gradually released into the water features at Kronsberg.

A large-scale site development such as Kronsberg serviced by conventional drainage systems would bring about changes in the local water ecology: long term, the water table in the nearby woodlands of Mastbrucher Holz and Seelhorst could sink. A better alternative is the 'Mulden-Rigolen' system for decentralised retention and infiltration of rainwater through soakaways.

At the foot of Kronsberg Hill beside the main service road, 16-25-metre-broad retention areas will be laid out as parkland. The existing rainwater retention basin will be extended in natural fashion.

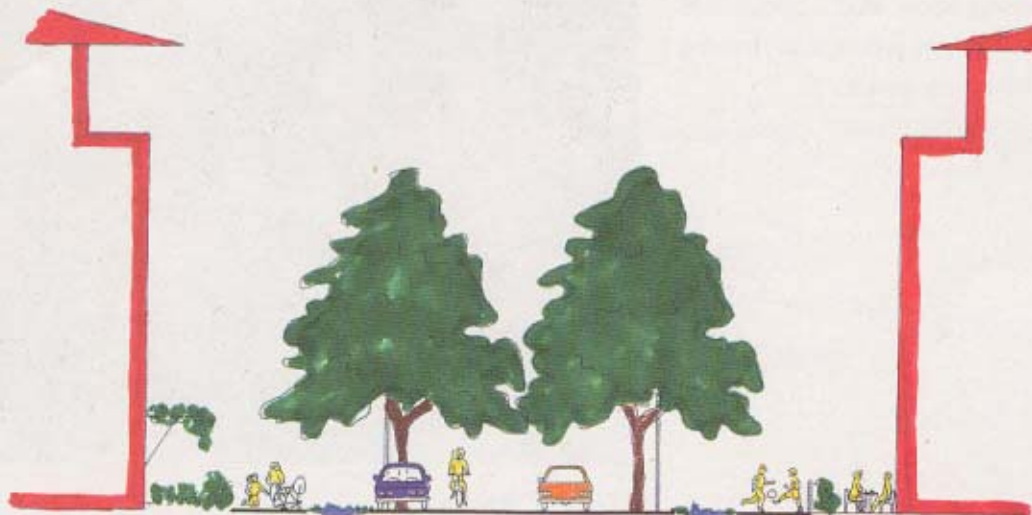
There is also a stream running north from the new district which had been channeled into a regulated gradient. After its renaturalisation the stream will flow at a slower rate, more typical for this landscape, and residents will then be able to enjoy a watercourse on their doorstep as a natural recreational feature.

Drinking Water Economy Measures

At Kronsberg, measures to reduce drinking water consumption will be introduced across the entire district, beginning with calculations for the supply network, where small-bore pipes will be laid. In the dwellings, too, the construction phase will exploit many opportunities to reduce water wastage in the household such as spray savers on taps for the washbasins: by mixing water and air the water quantity is halved without the water shrinking to a thin stream. Also effective are flow limiters and pressure regulators. To save drinking water, rainwater can be used as grey water to flush toilets and to water green spaces.

Mulden-Rigolen-System

- A 'Mulden-Rigolen' system is a special rainwater retention and infiltration system.
- A 'Mulden-Rigolen' element consists (in reverse order) of a restricted-flow outlet and a gravel-filled underground basin (the 'rigole') beneath the 'mulde' (a hollow).
- Through open gulleys the rain water is channelled into the grassed-over hollow.
- The vegetation planted in the hollow cleans the rainwater.
- The water seeps into the pebble-filled underground storage basin beneath (the 'rigole').
- The rigole is connected via a drainage pipe with a restricted-flow outlet shaft.
- Through small holes in the outlet the rainwater is gradually released into the surrounding retention areas.



ROADSIDE DRAINAGE SOAKAWAYS



Water Use

The average German uses 128 litres of water per day:-

- 35% for baths and showers
- 25% for toilet flushing
- 25% for washing
- 10% for washing up
- and just 5% for cooking and as drinking water

By comparison, 'Stadtwerke Hannover' (the city utilities company) as the water supply company at Kronsberg is calculating on the basis of 100 litres per person per day.

Globally, drinking water shortage is a serious and growing problem, and so the world exposition should demonstrate alternatives to today's high consumption.

Around 150,000 m³ of rainwater fall on the additional paved and built-up areas of the EXPO pavillion site, the EXPO Plaza and parts of the trade fair site each year. Unlike at Kronsberg, soil and groundwater conditions there mean that it makes little ecological sense to infiltrate these quantities on site; instead, the rainfall is stored temporarily in a retention basin. Through the construction of a rainwater network south of the planned residential and commercial area next to the trade fair commercial estate the collected water will be used for toilet flushing, commercial uses and watering the parkland.

The installation of dual water networks in southern Kronsberg is an important step, to take a stand against the squandering of valuable drinking water. Model calculations have shown that, after EXPO, one can reckon with drinking water savings of over 100,000 m³ per annum.

Qualification and Awareness-raising Programme

To make 'Water' a high-profile issue and convey a striking and ever-present idea of its crucial importance, training and consultancy measures are intended for water engineers but, even more importantly, for consumers. In cooperation with Hannover's water treatment services, KUKA will develop an environmental communications concept at the Hannover Kronsberg district around the theme of water. At the centre of this concept is targeted development and communication of the water theme to emphasise personal 'hands-in' experience with the element.

At Kronsberg, the importance of water will be in everyday life as an ever-present creative experiential element: on the hillside avenues there will be broad green spaces with open water, ponds and terraced seating with small water areas and water games. Together they will improve the local climate and the well-being of local people because water stabilises temperatures and damps down dust.



LIVING WATER



HILLSIDE AVENUE WITH WATERCOURSE

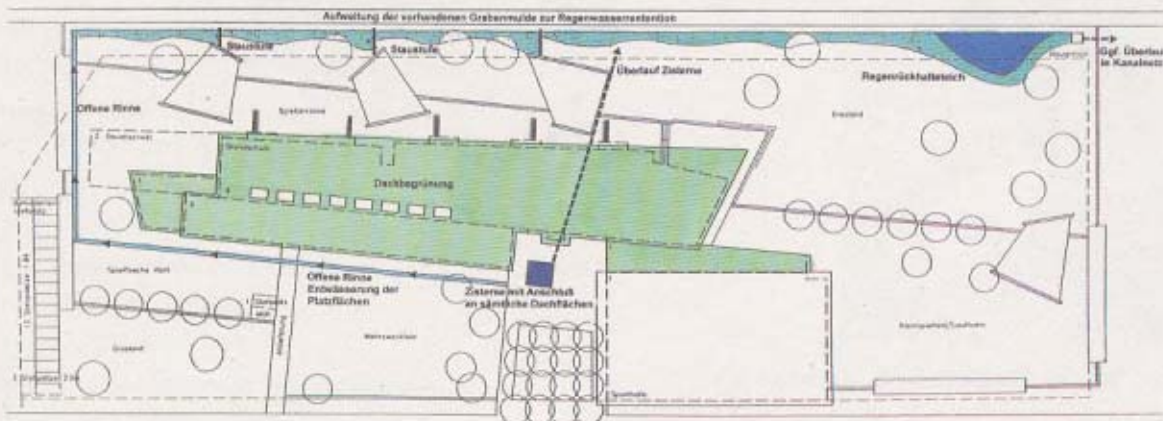
Infrastructure drinking water economy measures must be matched by changes in residents' consumer habits and behaviour patterns and so advice, information and tips on the consciously thrifty use of water are part of the Kronsberg water concept. KUKA is developing, as part of the communications concept, a thematic approach to promote consistent water-saving mainly implemented through consumer campaigns – events, exhibitions, leaflets, brochures and information in the Kronsberg district magazine.

A crucial aspect of the rainwater concept is the visualisation of water as 'the water of life'. In practical terms this will happen through the information brochures, but there is also an imaginative dimension such as the installation of art objects at selected locations addressing the water theme.

Following up an arts workshop that produced the project 'The Blue Ribbon of Water Art', KUKA will initiate further encounters where, for example, water engineers, educationalists and artists can devise joint concepts and innovative approaches as to how public awareness of the water issue can be sensitised.

With this 'Wasserkunst' project the City of Hannover intends to create a special presence for the aquatic element in public spaces: in the layout of streets and squares, green spaces and parks, central locations will be graced by water in the form of sculptures, fountains or installations.

At the new Kronsberg primary school, too, water will be given a central significance. All the rainwater falling within the school grounds will be retained and infiltrated on site or collected in a cistern, the gently sloping roof of the school will be grassed so that precipitation runs off more slowly, and the rainwater collected will be used for flushing toilets and watering the school garden. KUKA and the school will jointly devise an educational project to emphasise the value of water, including the development of in-service training for teachers and intermeshing with the intended exemplary water engineering plans for the district. The children will use the natural water cycle every day, learning about the careful use of this precious element.



THE WATER CONCEPT AT KRONSBURG PRIMARY SCHOOL



2.3 KRONSBURG WASTE MANAGEMENT CONCEPT

The central policy aim of waste management in Hannover is the deliberate avoidance of waste, and at Kronsberg volumes of waste are to be significantly reduced through an integrated cycle. Right from the planning and construction phases a strict waste avoidance strategy is in place, and this will lead to a situation whereby residents and commercial users will accept avoidance and reduction of waste as everyday praxis.

The Kronsberg waste concept is in two parts: the building waste concept and the domestic and commercial waste concept.

Both parts together are registered as sections of the EXPO project and by the year 2000 they will already be spreading their influence beyond the Kronsberg district.

Whilst individual projects are initiated and supported by Hannover waste management services, KUKA is strongly involved in their presentation, in public relations work, and in promoting acceptance of the measures: as a compact, flexible unit on site at Kronsberg it can respond directly to the needs, wishes and enquiries of agencies and residents. In association with Hannover waste management services it will offer a specialised range of consultancy services and information events.

Building Waste

Building waste makes up a sizable proportion of the city of Hannover's rubbish – about 40% by weight. The city administration has laid down a series of practicable regulations for property investors: whoever builds at Kronsberg builds ecologically, committing themselves to using building materials whose origins, processing, function and disposal meet high health and environmental standards. This includes general avoidance of materials containing hazardous substances which will later create specialist disposal problems and high costs. The City of Hannover supports property investors with exemplary recommendations, and KUKA helps them with specialist advisory services.



KRONSBURG WASTE MANAGEMENT CONCEPT

It is the responsibility of the developers to give the highest priority to low-waste building methods right from the construction scheduling stage, and if waste is unavoidable then sensible recycling is the next-best solution rather than sending it for incineration or to landfill. Developers will be supported by Hannover waste management service's model project 'Abfallarme Baustelle' in sorting building waste: wood, paper and cardboard, glass, plastics and rubble can thus be recycled for reuse.



'LOW WASTE BUILDING SITES' PROJECT

Domestic and Commercial Waste

The model waste management concept at Kronsberg is a comprehensive catalogue of measures for the avoidance of waste generation. Retail markets with a range of minimum-packaging products and the promotion of home composting through the establishment of composting sites among other measures will lead to a reduction in waste volume.

By setting up innovative indoor and outdoor collection systems domestic waste can be separated into organics, paper and cardboard, glass and packaging and thus reduced by some 75%. This is also good for the housekeeping – waste collection charges are then significantly lower.

The domestic and commercial waste concept has five components:

- systems for pre-sorted waste collection,
- encouraging home composting,
- low-packaging retail goods,
- service industries, and
- the waste management communications concept.

Collection Systems for Pre-sorted Waste

In the kitchens, different types of waste will be collected in separate built-in containers. Outside the house, residents will use nearby waste and recyclables banks situated in light, attractively-designed and easily recognised sites. The system will be extended with a recycling station, to be built on a reserved site after the district is completed.

Encouragement of Home Composting

Both the Exemplary Waste Concept at Kronsberg and the City of Hannover's waste management programme place particular emphasis on composting by each household, and so all Kronsberg residents will be encouraged to compost their own organic waste, with practical help and advice from Hannover waste management services and KUKA on the step-by-step building of a compost heap. Town planning at Kronsberg foresees terraced houses for single families and multiple occupation buildings in rows or blocks, and so a variety of composting and advisory models must be developed to suit different building and residential forms.

Low-Packaging Retail Goods

Primary and secondary packaging normally makes up about 30% of domestic waste. In the ecologically exemplary community at Kronsberg, consumers influenced by educational and public relations work will increasingly demand loose fresh produce and minimum-packaging products, and the range of retail goods must reflect and respond to this. It is also intended that the nearby Kronsberg Farm will sell its produce through direct marketing in the district.

Composition of Domestic Waste

- 40% compostable organic waste
- 25% unrecoverables
- 16% paper and cardboard
- 9% plastics, metals, packaging
- 8% glass
- 2% textiles

Range of Services

At Kronsberg, services will be set up to circumvent the one-way 'consumption-throwaway' system under the motto 'Mend it, don't dump it'. A dense network of repair and alteration services, demand-oriented facilities such as delivery and pickup services for the ill and elderly, shopping services and a nappy service will be available.

'Use without ownership' is the core philosophy of the 'Eigentumsloser Konsum' project run by Hannover University's chair of Marketing and Consumer Studies. Services in the fields of energy (e.g. refrigerators), water (e.g. washing machines) and mobility services (e.g. shared car use) plus a tool- and appliance hire service should promote ecological low-waste consumer patterns at Kronsberg.

The Waste Management Communications Concept

That Kronsberg will have an exemplary infrastructure does not automatically imply attitude and behaviour change among its residents on such issues as low-waste shopping, consumer habits and waste separation; for this to happen they must be actively involved in the process, and this means initiating dialogue through citizens' fora, educational work and targeted personal advice to involve and motivate them. A range of services will be on hand to respond to enquiries and problems and there will be awareness-raising campaigns and support through positive feedback to effect behavioural change towards a low-waste, future-oriented ecological lifestyle. Competitions and workshops (e.g. on the layout of composting facilities) and the integration of possible artistic approaches are planned to make the whole issue of waste more enjoyable.



ECOLOGICAL OPTIMISATION AT KRONSBERG

2.4 ECOLOGICAL SOIL MANAGEMENT

Waste soil has considerable potential; instead of disposing of this valuable raw material at far-flung landfill sites to the detriment of the environment and letting it literally 'go to waste', the excavated soil at Kronsberg will be efficiently reused on site.

Since 1996, federal law on economic cycles and waste treatment has provided for material reutilisation of soil waste with the highest priority placed on waste avoidance – but until now there have been very few models of praxis illustrating the framework conditions and organisational forms necessary for residential development and large-scale projects. Within Germany the City of Hannover leads the field with its practical applications of such ecological soil management, pursued in exemplary fashion through every phase of the construction period.

Construction of almost 3,000 dwellings and the necessary infrastructure by the turn of the century will produce around 600,000 m³ of excavated soil on the Kronsberg site. Normally, transporting such quantities to the landfill site would create serious dust, noise and traffic pollution for residents of surrounding districts: in purely numerical terms around 100,000 lorry journeys of up to 20 km would be needed to get the excavated soil to landfill sites!



SOIL MANAGEMENT AT KRONSBERG



The central aim of ecological soil management is to reuse all excavated materials directly on site for landscaping and environmental enhancement. This requires a detailed, adaptable management system – from the planning stage onwards the volume of excavated soil can be minimised. Soil management responsibilities at Kronsberg fall into the following key areas:

Construction Traffic to and from Kronsberg

During the construction period, transportation of soil out of the Kronsberg area will be largely avoided; equally unnecessary is delivery of soil to the area, because excavated soil will be redistributed for landscaping on site.

Biotopes

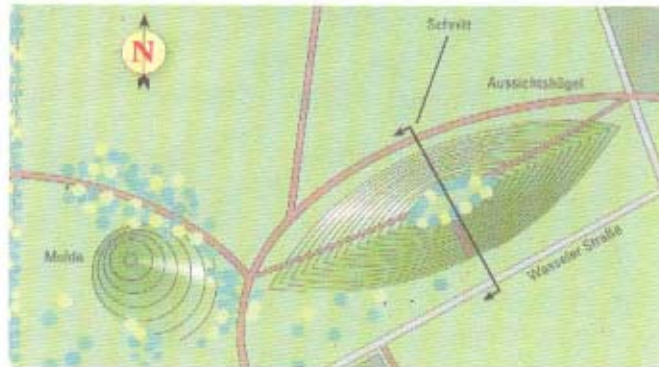
Excavated soil will be specifically used to create and develop biotopes typical of the Kronsberg area.

Costs

Normal transportation to landfill sites would create very high disposal and transport costs for the developers; reuse of excavated soil reduces these costs significantly.

Plans for Kronsberg include landscaping and the establishment of biotopes directly adjacent to the residential area. The four major landscaping measures are:

- two artificial viewpoints, landscape constructions raising the summit of Kronsberg hill from 106 m to 118.5 m above sea level,
- excavated soil used to build noise buffers along the nearby A7 motorway,
- some of the excavated soil used to seal the old landfill site in nearby Bemerode, and
- landscaping around the world exposition site with soil from Kronsberg.



THE NORTHERN VIEWPOINT



Soil and Topography Enhancement at Kronsberg

- The Kronsberg soil consists mainly of loam, clay and marl.
- Typical biotopes such as the dry calciferous semi-barren areas will be reinstated.
- At 106 m above mean sea level Kronsberg is Hannover's highest natural elevation. By the year 2000 it will be 12 - 14 metres higher at two points. The northern viewpoint is already completed; from a height of 118.5 m it is possible to see the Brocken, the highest point of the Harz Mountains to the south of Hannover.

2.5 'KRONSBURG-UMWELT-KOMMUNIKATIONS-AGENTUR GMBH' (KUKA) – THE KRONSBURG ENVIRONMENTAL LIAISON AGENCY

The comprehensive and innovative development plans at Kronsberg represent a major challenge to all involved. Effective ecologically sound realisation of the multifarious ideas, building and town planning measures, and simultaneous behaviour change among all stakeholders, demands a comprehensive coordination structure. For the new city district to be successfully created in the spirit of sustainable development, a communications framework must be created to meet all the new challenges, and the sheer number of people involved makes an effective liaison system indispensable.



KUKA was established as part of the registered EXPO project 'Ecological Optimisation at Kronsberg' to ensure ongoing consultation and information flow between the individual participants to build a consensual overall conception. Supported by Germany's national environmental foundation, the 'Deutsche Bundesstiftung Umwelt', 'Kronsberg-Umwelt-Kommunikations-GmbH' is jointly owned by the City of Hannover and a trust, 'Förderverein der Kronsberg-Umwelt-Kommunikations-Agentur e.V.'. It brings together the participating institutions such as property developers, energy providers and engineering consultancies, and makes its services available to other members.

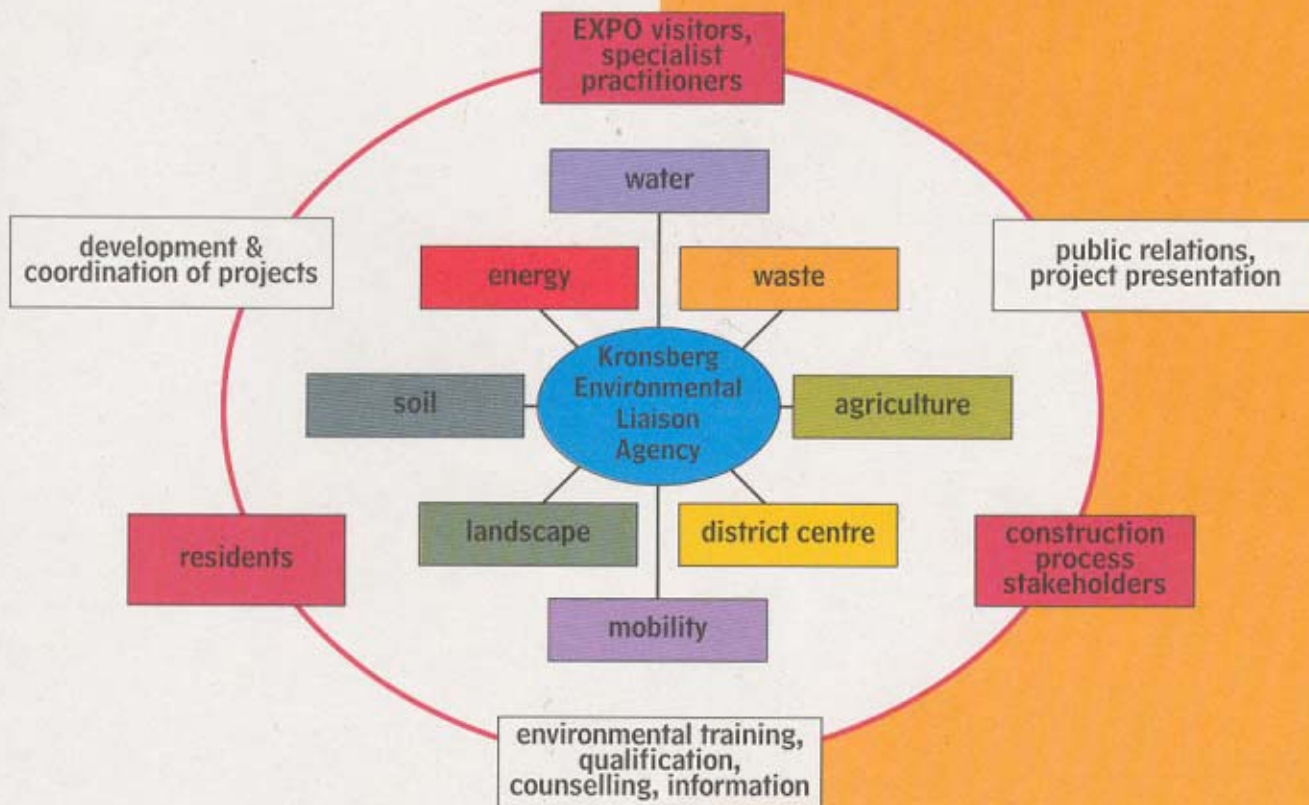


THE INSTITUTIONAL STRUCTURE OF KRONSBURG ENVIRONMENTAL LIAISON AGENCY (KUKA)

KUKA's raison d'être is to generate high standards of knowledge and expertise among all stakeholders and users with regard to the ecological profile and standards at Kronsberg, and the cutting edge of this is to bring about shifts in awareness, perceptions, attitudes and behaviour. The contextual areas are energy, water, waste, soil, landscape and agriculture, while also providing constructive support for other agencies' social and cultural integration projects and the building of a district arts and community centre.

In this KUKA's range of target groups is very wide, including town planners, architects, property developers and builders, craftspeople, manufacturers, users and residents of the new district. Residents of adjacent districts, visitors and the general public, and multipliers in education and consultancy, are also important clients and contacts.

Within a cooperation agreement supervised by KUKA five different institutions offer demand-oriented skilling and qualification programmes for planners, architects, craftspeople and the future residents in the construction and use of low energy housing. Use of environmentally sound building materials is another focus. The skilling and qualification programmes impart knowhow and information, deal with current problems as they arise and make good deficits in the participants' capabilities. This takes place in specialist seminars, crash courses or 'infobreakfasts' on site, and through targeted publications.



KUKA'S AREAS OF RESPONSIBILITY, TARGET GROUPS AND CONCEPTUAL AREAS

Kronsberg – town as garden



While one would hardly call it a mountain ('Berg'), Kronsberg is the highest natural elevation within the city boundaries, until a few years ago used almost exclusively for growing cereal and sugar beet. Directly adjacent to the trade fair site, it was the sole remaining area within Hannover suitable for a major development project, and for these reasons has been the subject of intensive urban and landscape planning activities for several years.

Kronsberg is eminently suited to implementing the ideal of 'City as Garden', the motto adopted by the City of Hannover in undertaking numerous enterprises to enhance the quality of open spaces within the city. Consisting of over 20 sub-projects, and registered as a world project by 'EXPO GmbH', the programme is presented in detail in its own brochure. At Kronsberg the following subsections are being implemented:

- Open Spaces in the New District
- Kronsberg Landscape (part of the registered EXPO project 'City as Garden')



- Kronsberg Farm – 'Herrmannsdorfer Landwerkstätten am Kronsberg' (part of the Agri-Expo project 'Environmentally Friendly Agriculture and Regional Marketing at Kronsberg').

3.1 OPEN SPACES CONCEPT IN THE NEW DISTRICT

Planning of the new district is shaped by comprehensive and consistent application of the principles of sustainable urban development; concepts of urban and of open space development must be seen as a unity. The open space concept starts with the private and public spaces between the houses – they should become green oases, private gardens, meeting places for neighbours and play areas for children, while also serving to absorb rainwater – and extends into the wide stretches of common land above the built-up areas for the use and enjoyment of all the Kronsberg residents.

Neighbourhood parks will be integrated in the street grid to provide public gardens and meeting places for young and old in each area of the district, offering numerous locations for games and sports outside the sports clubs' playing fields.

A new park will be created on the edge of the existing neighbouring district of Bemerode and the parks will be complemented by playgrounds near the houses.

The framework concept, developed from a workshop by the Zurich landscape planning consultancy 'Kienast', is shaped by five traversal park corridors and a park ribbon alongside the district. The park corridors both link and separate; each of them has a distinct content, formal and spatial character, distinguishing it from the surrounding agricultural landscapes. 'Kienast' characterise the intended measures as: the landscape is enclosed, compressed, elevated, rendered unfamiliar, and given scale.



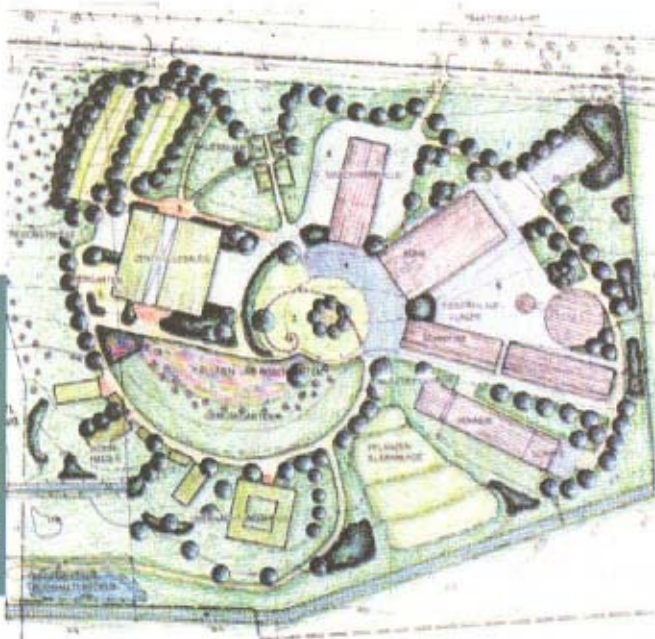
3.2 KRONSBURG LANDSCAPE

The vision for the Kronsberg landscape as part of the registered EXPO project 'City as Garden' was: that a dreary 'beef prairie' should be transformed into a unique landscape that emphasises its natural and historical character, that the views over the city and countryside should be retained, recreational facilities improved, habitats of flora and fauna enriched, existing nuisances and contamination reduced, new ones avoided, and long-term agricultural use guaranteed, while later maintenance costs should be kept within reasonable bounds.

Following the first landscape plan, from 1987, some 60 hectares of the crest of the hill have already been planted as woodland. The approved changes in the land use plan were guided by a painstaking environmental case study, a comprehensive town and landscape development competition and a subsequent town planning competition. Alterations to the land use plan also brought about changes to the landscape plan.

Many measures implemented on Kronsberg over the last few years have already enhanced its landscape. A 2.5-kilometer-long avenue marks the border between the residential district and the neighbouring countryside. Two viewpoints are taking shape, more woodland is being planted and a multi-use network of paths with broad biotope verges has been laid out.

Major co-funders of the project with the City of Hannover are the Hannover region local government association, federal government and the 'EXPO 2000 Hannover GmbH' company. In this connection the federal department of environmental protection has recognised significant parts of the Kronsberg landscape concepts as developmental and experimental programmes in nature conservation and landscape care.



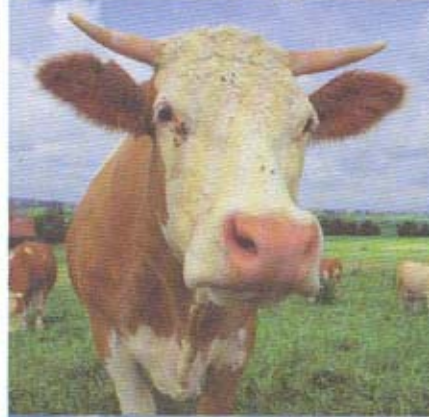
**KRONSBURG FARM - 'HERRMANNSDORFER
LANDWERKSTÄTTEN AM KRONSBURG'**

3.3 KRONSBURG FARM – ‘HERRMANNSDORFER LANDWERKSTÄTTEN AM KRONSBURG’

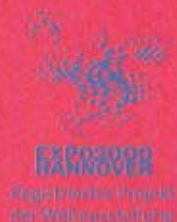
Intensive farming usually creates serious pollution. The world exposition in Hannover offers an opportunity to present a wider public with models of future-oriented, environmentally benevolent variants of agriculture on the margins of a city. In this connection the south-eastern edge of the Kronsberg district will be the site of an ecological model farm – ‘Herrmannsdorfer Landwerkstätten am Kronsberg’, part of the Agri-Expo project ‘Environmentally Friendly Agriculture and Regional Marketing at Kronsberg’ and also of the abovementioned close-to-nature development and experimental nature conservation / landscape care programme.

About 100 hectares of city land will be farmed as a registered EXPO project according to guidelines from the ‘Arbeitsgemeinschaft ökologischer Landbau’ (AGÖL – Association for Ecological Agriculture) to counteract the high degree of specialisation and spatial disruption caused by agribusiness and the increasing remoteness of the agriculture base from regional economic cycles. The farm’s produce will be processed in its own slaughterhouse, cheese dairy and bakery, and sold through the farm shop and on the city markets direct to the consumer. At an inn (with its own brewery) visitors will be served with fresh produce. The farm will also carry out landscape maintenance on public green spaces in the surrounding countryside.

The ‘Herrmannsdorfer Landwerkstätten am Kronsberg’ will also house an educational facility whose courses will be devised mainly for specialists, particularly farmers and horticulturalists, but there will also be some to appeal to the general public, especially children and young people. The close proximity of a large urban population to a farm and the Kronsberg countryside facilitates environmental education that makes the connections between city and country particularly clear and easy to appreciate.



city as Social habitat



Hannover

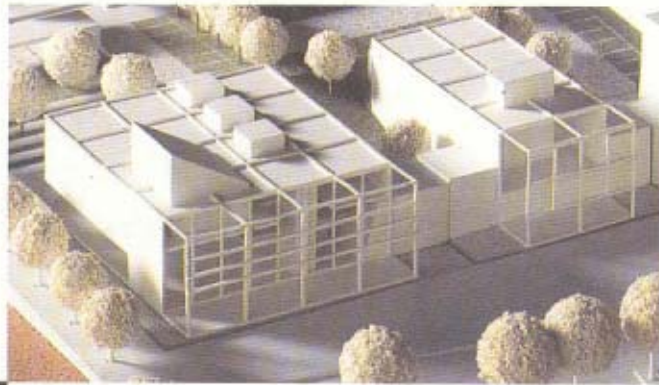
On the threshold of the third millenium, how do human beings live together, how do they behave towards each other, their children, their neighbours, their elderly and disabled? The registered EXPO project 'City as Social Habitat' reflects the plurality of urban life: the project intends to tackle typical conflict and problem constellations within social issues and demonstrate how solutions could look both in their specific context and when extended into the realms of universal criteria.



At Kronsberg a district should develop which is exemplary in both its ecological and social aspects. Right from the planning phase, attention was paid to the way small-scale, legible dwellings could be grouped around green centres. Residents should be able to identify with their neighbourhood and a sense of community developed, and social and cultural amenities should contribute to this as they are established along with the new homes. There will be new kindergartens and children's after-school centres, and across the district reserved space integrated in the residential buildings will be made available to local clubs and residents' associations. The central meeting place will be the local arts and community centre where community work with residents will be based, making close links between social, cultural and ecological issues. There will be support for housing projects designed to integrate and respond to the needs of the Disabled, senior citizens and people from other cultures.

4.1 DISTRICT ARTS AND COMMUNITY CENTRE

The new Kronsberg arts and community centre, run by the City of Hannover, is conceived as a meeting place for people of all nationalities, ages and interests. Here, one can celebrate, talk, study or access information and advice. With a public library incorporating a special ecology section, senior citizens' bureau, youth workers and KUKA the centre will be the base for community agencies within the district, where exemplary models of social and cultural approaches will be linked with ecological themes and from whence impulses will radiate to the decentral facilities at Kronsberg and thence into the surrounding neighbourhoods. For children from 6-14 there will also be a 'kinderhouse' with community bakehouse run on free school educational principles.





4.2 'FOKUS' HOUSING PROJECT

The way disabled people live and are accommodated is still today largely determined by traditional attitudes based on full care and abnegation of their independence. To be able to shape one's own life and home and still get help when needed is the philosophy of the 'FOKUS' housing project run by the 'Fokus' charitable association, for which 30 disabled people's homes will be built in the new district. The special feature is that the homes are not concentrated in one building but grouped around the 'FOKUS Base', manned round the clock by care workers who can respond quickly to any resident's call for help: an innovative communications system will make it possible to contact the homes at any time.

4.3 DECENTRALISED CARE FOR THE ELDERLY

At Kronsberg the 'Henriettenstiftung' charitable foundation will develop a stock of up to 100 old people's flats, not concentrated in one building or area but spread around the district, integrated in the housing blocks. To be oneself and independent, but not cut off from help when needed, are some of the aspects of life that become increasingly difficult to reconcile as one grows old; the new Kronsberg district takes these needs into account. This decentralised care for the elderly project will demonstrate how accommodation for older people could look in the future.



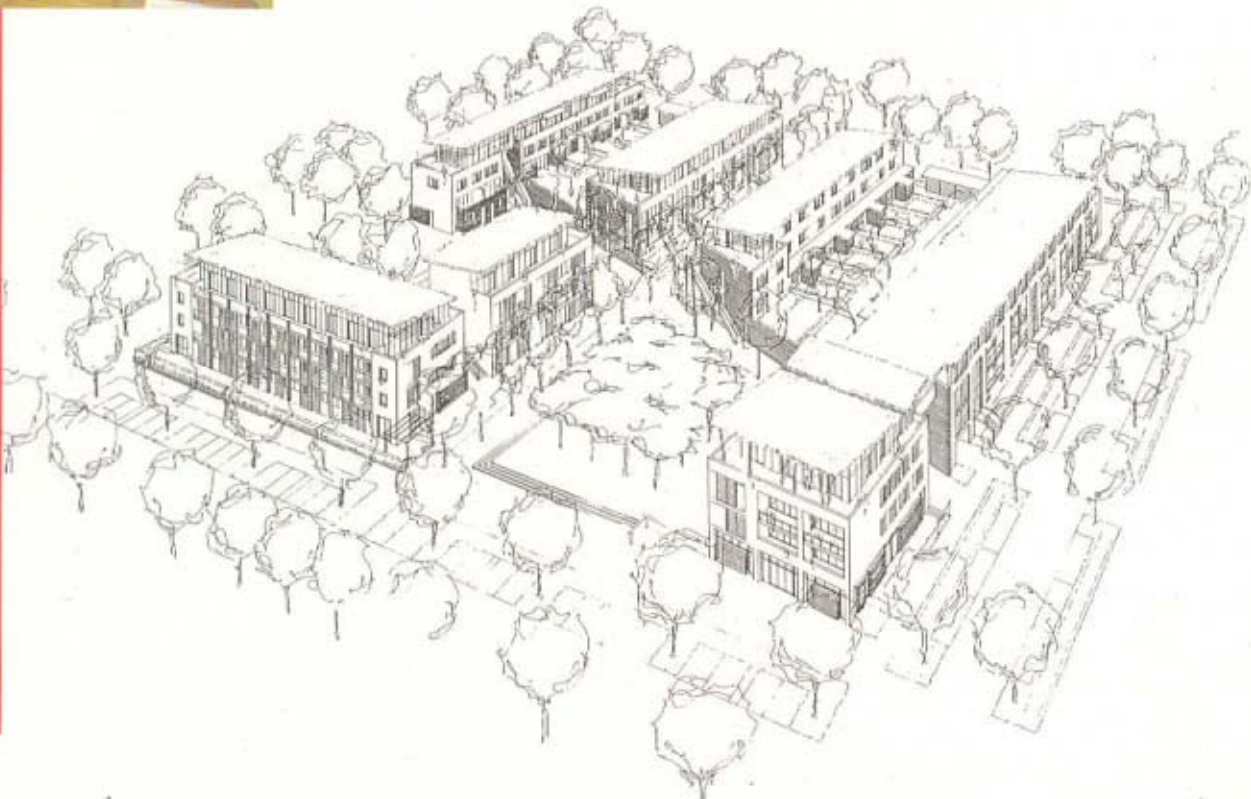
4.4 EXPO 2000 HEALTH CENTRE

In recent years alternative healing methods have become increasingly significant: 'natural healing', especially, is being used by more people every year. Bringing the most various healing and preventative methods together under one roof is the aim of the 'SPORT-Systems' organisation at the EXPO 2000 Health Centre, offering information, preventative care and treatment. A pool of doctors from various disciplines will be established and the centre will house a comprehensive range of rehabilitation treatment including remedial gymnastics, physiotherapy and sporting injuries rehabilitation.



4.5 'HABITAT' INTERNATIONAL HOUSING PROJECT

Hannover is home to immigrants from more than a hundred nations, some of them already into the third generation. Each nation and each culture has its own identity and traditions that are reflected in the way they make their homes. At Kronsberg it is intended to show how immigration and its cultural potential can be positively integrated in the development of neighbourhoods. The 'Habitat' project run by 'Gundlach' housing enterprises has set itself the aim of responding to the growing internationalism of German culture and society. Gundlach's plans are based on the findings of the May 1996 'Habitat II' conference in Istanbul: 93 dwellings will be home and centre of the lives of German and immigrant families. Around a green centre with a boulevards courtyard an international neighbourhood will evolve, setting standards for multicultural life and carrying the international themes of EXPO 2000 into the 21st century.



THE 'HABITAT' QUARTER

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WOODLAND PLANTING

FALLOW LAND
(SHEEP GRAZING)

NORTHERN VIEWPOINT

BORDER AVENUE

SEALING BEMERODE LANDFILL
SITE

PARKLAND CORRIDOR

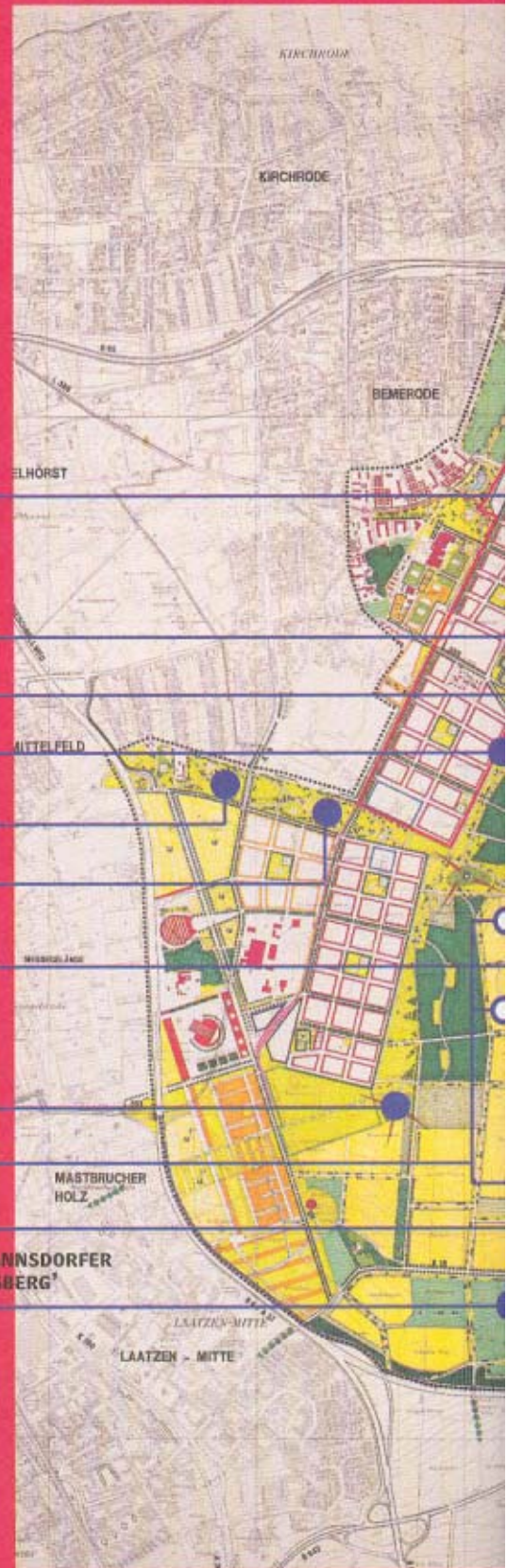
NOISE BUFFER ALONG THE A7
MOTORWAY

SOUTHERN VIEWPOINT

WIND TURBINE LOCATIONS

BOCKMERHOLZ GREEN LINK

KRONSBERG FARM - 'HERRMANNSDORFER
LANDWERKSTÄTTEN AM KRONSBERG'



KRONSBERG LANDSCAPE PLAN



ECOLOGICAL OPTIMISATION AT KRONSBURG

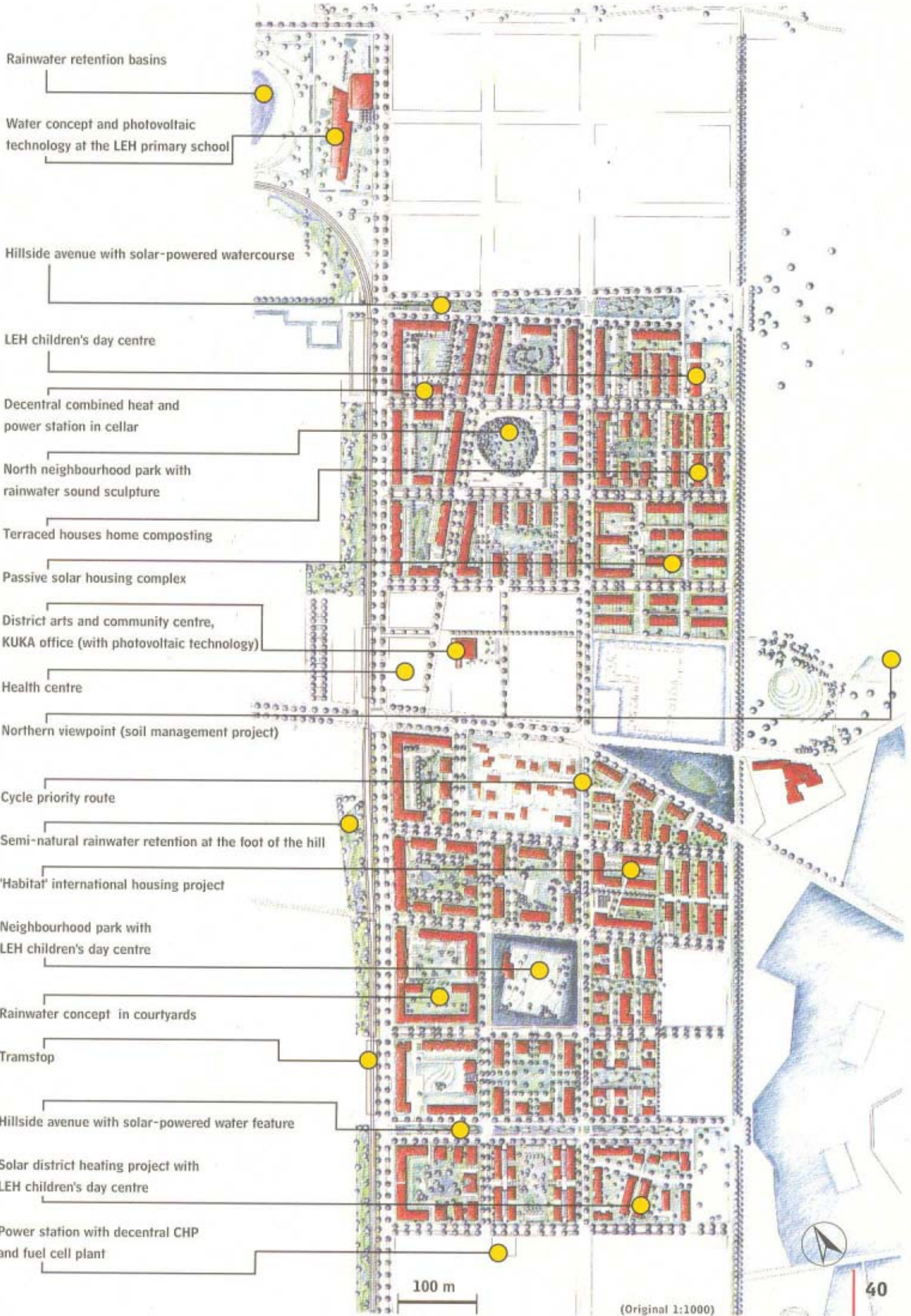
- Energy use optimisation
- Water concept
- Exemplary waste management concept
- Ecological soil management
- Kronsberg Environmental Liaison Agency (KUKA)

KRONSBURG - TOWN AS GARDEN

- Open space concept
- The Kronsberg landscape
- Kronsberg Farm - 'Herrmannsdorfer Landwerkstätten am Kronsberg'

KRONSBURG - TOWN AS SOCIAL HABITAT

- District arts and community centre
- 'FOKUS' housing project
- Decentralised care for the elderly
- Health centre
- 'Habitat' international housing project



Rainwater retention basins

Water concept and photovoltaic technology at the LEH primary school

Hillside avenue with solar-powered watercourse

LEH children's day centre

Decentral combined heat and power station in cellar

North neighbourhood park with rainwater sound sculpture

Terraced houses home composting

Passive solar housing complex

District arts and community centre, KUKA office (with photovoltaic technology)

Health centre

Northern viewpoint (soil management project)

Cycle priority route

Semi-natural rainwater retention at the foot of the hill

'Habitat' international housing project

Neighbourhood park with LEH children's day centre

Rainwater concept in courtyards

Tramstop

Hillside avenue with solar-powered water feature

Solar district heating project with LEH children's day centre

Power station with decentral CHP and fuel cell plant

100 m

(Original 1:1000)

	<p>Sources</p> <p>'Ecological Optimisation at Kronsberg' adapted from the City of Hannover's 1997 brochure 'Zukunft ökologisch gestalten':</p> <p>'Hannover Kronsberg' by the City of Hannover Urban Planning Group for the World Exposition (J/2000)</p> <p>'City as Social Habitat' adapted from the City of Hannover's 1997 brochure 'Stadt als sozialer Lebensraum', pp. 1-8</p> <p>'Kronsberg – Town as Garden' adapted from the City of Hannover's 1996 brochure 'Stadt als Garten', pp. 7 & 11-15</p>	<p><i>Water</i></p> <p>'Regenwasserkonzept' June 1997</p> <p><i>Soil Management</i></p> <p>'Ökologisches Bodenmanagement' August 1996</p> <p>'Ökologisches Bodenmanagement Kronsberg' GTU, January 1997</p> <p>'Bodenqualität und Umgang mit Bodenaushub' May 1997</p> <p><i>Environmental Communications</i></p> <p>'Konzeptstudie-Umweltkommunikationskonzept Kronsberg' September 1996</p>
<p>Other publications (in German) by the City of Hannover</p>	<p><u>The Kronsberg District</u> Planungsgruppe Weltausstellung (J/2000):</p> <p>'Stadtteil Kronsberg – Wohnen im 21. Jahrhundert' May 1998</p> <p><u>Ökologische Optimierung Kronsberg</u> AG Umweltplanung Weltausstellung (K/2000):</p> <p><i>Energy</i></p> <p>'Hinweise zur Realisierung der Anforderungs- profils NEH-Standard – Wärmedämm- und Dichtheitskonzept' May 1995</p> <p>'Hinweise zur Realisierung des NEH-Standards – Lüftungskonzept' September 1996</p> <p>'Richtlinie zur Förderung der Qualitätssicherung von Niedrigenergiegebäuden' May 1997</p> <p>'Hinweise zur Realisierung des Anforderungsprofils Niedrigenergiehaus- Standard – Heiztechnisches Konzept' February 1998</p> <p>'Erläuterungen zum Kronsberg- Berechnungsverfahren' revised version</p> <p><i>Waste</i></p> <p>'Berichtsband Umweltverträgliche Baumaterialien und vorbildliches Bauabfallkonzept' January 1996</p> <p>'Berichtsband Vorbildliches Haus- und Gewerbeabfallkonzept Kronsberg' February 1996</p> <p>'Hinweise zur Abfallvermeidung / Abfalltrennung / Eigenkompostierung' January 1997</p> <p>'Umweltverträgliche Baumaterialien' revised version, March 1998</p>	<p><u>City as Garden</u> Parks and Green Spaces Department:</p> <p>Discussion Papers 'Weltausstellung EXPO 2000, Beiträge zur Diskussion' No.12: 'Landschaftsgestaltung Kronsberg/EXPO-Park' November 1994</p> <p>'Gutachten zum Landschaftsplan Kronsberg' summary</p> <p>'Grünes Hannover. Führungen und Veranstaltungen des Grünflächenamtes 1998'</p> <p>'Stadt als Garten' in 'Hannoverprogramm 2001' December 1996</p> <p><u>City as Social Habitat</u></p> <p>Gesundheits-, Jugend- und Sozialdezernat der LHH:</p> <p>'Stadt als sozialer Lebensraum' October 1997</p> <p><u>General Interest Publications</u></p> <p>'Vorwärts nach weit – Das Hannoverprogramm 2001' April 1996</p> <p>'Sustainable Environmental Development' 1995</p>
	<p>KUKA GmbH</p>	<p>'Kronsberg-Umwelt-Kommunikations-Agentur. Die KUKA – ein Projekt stellt sich vor' March 1998</p> <p>'Kronsberg Life – das Umweltmagazin der KUKA', first issue October 1998</p>

All publications on the ecological optimisation programmes at Kronsberg are available from KUKA.



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