

**‘Ecological Standards for Building Construction within the Municipality’s
Sphere of Influence’**

1 Energy

A) Existing Standards

1. Urban land-use planning

Utility and access systems are optimised for energy efficiency (e.g. building orientation to sunlight); in certain cases building orientation is governed by aesthetic and other design considerations. Further energy efficiency criteria are not set.

2. Contractual conditions for residential construction

2.1 Land sale contracts

Purchasers of municipally owned land for detached and multiple-occupancy houses are already committed to the following measures as clauses in the contract of sale:

2.1.1 Requirements for energy-efficient construction standards

a) Low Energy House construction methods (LEH)

Following the positive experience with the LEH standard at the Kronsberg development, new buildings are erected to at least LEH standard¹. Heat loss through the building envelope is on average 25% less than the statutory requirement.

b) Passive House (PH) construction methods

As PH² is the building standard of the future, tendering procedures for the sale of all

¹ Prerequisite for a **Low Energy House** (LEH) is that heat loss through the building envelope does not exceed $H_T = 0.3 + 0.07 / (A/V_e)$ according to the current federal energy saving regulations.

² Prerequisites for a **Passive House** (PH) are (1) that the annual thermal energy demand does not exceed 15 kWh per m² and year living space and (2) that the annual primary energy demand Q_p does not exceed 40 kWh per m² and year used area.

municipal land and existing properties will, financial considerations being equal, favour bids that achieve Passive House Standard in new buildings (cf. Drs. 0574/2006).

2.1.2 Requirements for heat provision

a) Compulsory connection to remote and local network heating

If, in a new-build development, a remote or local piped heating supply is offered which is just as economical as in other parts of the city for comparable properties, the purchaser will be obliged to connect the new buildings to, and to draw heating from, this system.

This obligation does not apply when Passive Houses are constructed or when, at the time of the planning application or the development announcement, it is plain that heating provision from the network for the building cannot be guaranteed by the beginning of the heating period (autumn). The building may then be equipped with its own heating system, which must meet the requirements above.

If the current statutory regulations impose more stringent requirements, then these must be adhered to.

b) Minimum standard: gas condensing boiler

Only those heating systems will be permitted whose emission values are no higher than those from gas condensing boiler systems. The only exceptions to this are automatic-feed biomass boilers (e.g. wood pellet-fuelled boilers) whose emission values adhere to the limit values of the federal economics agency and are eligible for subsidy.

2.1.3 Compulsory advice service

Purchasers are obliged, before the land sale contract is registered, to be advised by the City of Hannover Environmental Protection Department's Energy and Climate Protection Unit.

The consultation comprises:

- Explanation of the compulsory clauses in the contract that address climate protection
 - An overview of current subsidies
 - The particular importance of energy-efficiency quality assurance monitoring
 - Information about opportunities for saving energy that exceed statutory requirements.
- Potential purchasers are informed, for example, that comfortable and energy-saving Passive Houses can also be the cheapest to build in Hannover when they attract subsidies (currently from the *proKlima* and *kfw 40* programmes) when construction and running costs are taken together.

The practical consequences for the actual building project are agreed between the client and the Environmental Protection Department before the land sale contract is concluded. Amendments are permitted if implementation proves impossible or unreasonable in individual cases: the experience of recent years has shown that agreement has been reached in every case.

The calculation procedure of the national energy saving regulations (EnEV 04) is to be applied when calculating for subsidised LEH construction methods included in the land sale contract.

If the statutory framework conditions and calculation procedure change then the contractual conditions will be reconsidered.

2.1.4 Verification obligation

The purchaser is required, at the latest when submitting the planning application or planning announcement, to provide proof of adherence to the contractual obligations and, of their own accord, to send the 'Ausweis über Energie- und Wärmebedarf' (certificate of energy and heating demand) with the energy consumption indices according to § 13 of the national energy saving regulations (EnEV) to the Energy and Climate Protection Unit. At present there are no sanctions in the land sale contracts for non-compliance.

2.2 Urban planning permission contracts

For residential developments, the energy efficiency requirements are negotiated and agreed as appropriate. Current contractual negotiations include obligatory energy efficiency advice. Here, too, there are no fixed sanctions for non-compliance.

3. Contracts for commercial developments

For commercial construction there are currently no regulated agreements on energy efficiency standards, neither in land sale contracts nor in planning permission contracts. In current contractual negotiations, obligatory energy efficiency advice is included where appropriate.

B) Future higher standards

Introduction

As a member of the Climate Alliance, Hannover has committed itself to a 50% reduction in CO₂ emissions by the year 2030 compared to the reference year 1990. Reduction of energy demand is an important component of meeting this target. The following measures are currently being pursued:

- Aiming to apply the most energy-efficient construction methods, to Passive House Standard where possible.
- Expansion of the use of Combined Heat and Power (CHP) for district heating or as decentral CHP stations
- Preference for more efficient heating systems whose emission levels are not higher than those of gas condensing boiler plants
- Expansion of the use of renewable energy sources, especially solar thermal, photovoltaic and biomass
- Maximising energy efficiency during building modernisation within the financial constraints
- Quality assurance monitoring becomes standard practice during energy-efficiency retrofitting and new-build projects.
- Appropriate and effective advice services from the City Administration

1. Urban land-use planning

According to the statute book on construction (*Baugesetzbuch, BauGB*), urban land-use plans are also to be developed with regard to general climate protection considerations (§ 1 Para.5 BauGB). In drawing up plans, the factors to be considered include: avoidance of emissions (§ 1 Para.6 No.7.e) and the use of renewable energy sources together with the sparing and efficient use of energy (§ 1 Para.6 No.7.f).

Thus, in the land-use plan, areas can be designated where new construction must include

specific structural measures for the use of renewable energy sources, especially solar energy (§ 9 Para. 1 Nr. 23.b).

For the use of renewable energy sources and for the sparing and efficient use of energy in future urban planning areas, it is important that the builder or their client has clear guarantees of e.g. energy efficiency and the use of solar energy.

For extremely energy-efficient houses such as Passive or kfw-40 Houses, the contribution of solar gain is of great significance. Especially maximised exploitation of this resource makes it possible to do without most of the heating from fossil fuels.

Derived from the CO₂ reduction target set out in the introduction, sparing and efficient energy consumption is a priority. The following aspects must be taken into consideration:

- Compact building forms – that the ratio between the area of the building envelope and its internal volume should be as low as possible; this is calculated by dividing the sum of all envelope surfaces by the sum of all room volumes.
- South-facing orientation of at least 50% of the building and roof, windows and main living rooms (max. divergence of $-^{\pm}35^{\circ}$) to maximise solar gain.
- Where appropriate, energy-efficiency and/or solar optimisation should be carried out.
- Building regulations prohibit overshadowing (building height and spacing) to maximise solar gain.
- Inclusion of a plant catalogue according to ecological and shade aspects in the written statement to the land-use plan.
- For detached single-unit houses, double-unit houses and groups of houses, the land-use plan mainly foresees two-storey built forms .

The general obligation, to weigh up all relevant factors and the possible need to give one factor precedence and to set aside another, remains in force.

Environmental report on land-use planning

The environmental report comprises a special part of the written statement appended to the land-use plan (§ 2a). The findings of an environmental study, in which the main predictable environmental impacts are identified, described and assessed (§ 2 Para. 4). Environmental protection concerns include the avoidance of emissions (§ 1 Para.6 No.7.e) and the use of renewable energy sources, along with the economical and efficient use of energy (§ 1 Para.6

No.7.f).

With regard to energy efficiency, the chosen construction standard for the building is of crucial importance, while the viability of heating provision from gas or district heating networks also depends on this. Therefore the environmental report for the land-use plan should where possible include a prediction of heating energy demand for construction methods:

a) meeting the basic statutory standard

b) to LEH standard and

c) to Passive House standard.

In simplified procedures according to § 13 BauGB (e.g. for a minor amendment to existing development and land-use plans) and in the fast-track procedure for land-use plans of inner-city redevelopment according to § 13 a BauGB, an environmental assessment and report are not conducted.

2. Contractual formulations for residential development

2.1 Land sale contracts

Purchasers of land owned by the municipality for building single- and multiple-family houses are legally obliged through clauses in the land sale contract to carry out the following measures:

2.1.1 Requirements for energy-efficient construction standards

a) Passive House construction methods

It is not seen as necessary to raise standards, as the City Council resolution of 4 May 2006 on the recommendation in council paper 0574/2006, 'Preferential sale of building plots for Passive House standard' has already led to an improvement in Passive House standard constructions (see **A 2.1.1 b**). With the sale of existing buildings in regeneration areas or areas in the 'Social City' programme exceptions may be permitted if the sale is intended to be to people or groups of people with special social or cultural aims or needs, or when the regeneration aims conflict with this. The obligatory energy efficiency consultation is not affected by this.

b) Low Energy House Plus (LEH-plus³)

Minimum standard for planned new-build constructions LEH-plus: heat loss through the building envelope is, instead of 25%, **30%** below the statutory maximum. This corresponds with the current standard of building envelope necessary to receive preferential credit terms (e.g. from the Kreditanstalt für Wiederaufbau, kfw).

2.1.2 Requirements for heating provision

a) When building to Passive House standard, the system to meet the remaining heating demand is to be selected to ensure that the primary energy demand does not exceed 40 kWh/m² and year.

The builder or client may choose between various heating systems. It is not necessary to define the type, as the environmental assessment is implicit in setting the primary energy limits.

For dense building forms (terraced houses, apartment blocks) heating provision should be from a central CHP or biomass plant.

b) When building to LEH-Plus the existing standards continue to apply, see **A 2.1.2**: (a) compulsory connection to remote and local district heating networks and (b) gas condensing boiler as minimum standard.

For heating from open fireplaces and stoves, according to § 9 Para. 1 No. 23 a) of the BauGB, only specified low-emission fuels (e.g. wood pellets) are to be used.

2.1.3 Duty to provide documentary proof

Before the sale contract is registered and certified, the purchaser is obliged to supply the City of Hannover Energy and Climate Protection Unit with a calculation of the expected heating energy demand with the Passive House prognosis (Passivhaus Vorprojektierung, PHVP)⁴.

After the building is completed, the insulation certificate based on the PHPP calculation

³ Prerequisite for a **Low Energy-Plus House** (LEH-plus) is that heat loss through the building envelope does not exceed $H_T = 0.21 + 0.105 / (A/V_e)$ according to the current federal energy saving regulations.

⁴ The PHVP calculation model devised by the Passivhaus-Institut Darmstadt is a very simple version of the Passivhaus-Projektierungs-Paket (PHPP) and gives a rough indication of the expected heating energy demand at a very early stage of planning.

procedure⁵ 2004 and certified by a quality assurance bureau recognised by the City must also be submitted to the Energy and Climate Protection Unit.

Purchasers who do not meet this requirement must pay a 10% surcharge on the purchase price.

2.2 Planning permission contracts

The urban development planning permission contract is a legal instrument through which the requirements in **2.1 Land sale contracts** can be enforced. The agreed energy efficiency requirements must take the overall situation into consideration.

3. Contracts for commercial developments

3.1 Land sale contracts / Planning permission contracts

3.1.1 Requirements for heating and cooling provision

Both heating and air conditioning/cooling needs (base load) must be met by Combined Heat and Power plants. Air conditioning cooling will be drawn from an absorption refrigerator using the CHP heat.

If district heating provision is available the property must be connected to it. If heating from remote or local district heating is impossible a decentral CHP plant should be foreseen. Exceptions may be granted on application e.g. if the CHP solution is not economically viable.

Further requirements are not imposed, as in the estimation of the City Administration, applying too stringent energy efficiency standards may lead to companies choosing locations outside the City limits. As part of the advice service, however, the City Administration will point out the following aspects.

- a) Possible ways of reducing energy needs:
 - explanation of Passive House construction methods and the LEH-Plus standard
 - use of heating, cooling and ventilation technologies that save on primary energy
 - optimising the technology applied

- b) Structural measures to use photovoltaic and/or thermal solar energy:

⁵ PHPP is a specialised calculation model that takes into account the exceptional features of a Passive House.

- optimising the orientation of the roof, consideration in the structural analysis and installation of empty pipes to facilitate later installation of solar thermal or photovoltaic plant.
 - It should be pointed out during the initial planning phase that south-facing roofs of at least 900m² will be interesting investment sites for photovoltaic plant operators.
- c) *proKlima* funding possibilities

4. Costs

Worldwide, there is no prospect of energy prices falling and it can thus be assumed that building a Passive House will be increasingly economically viable despite the extra building costs e.g. for insulation, ventilation plant, high-quality energy-efficient windows etc. These extra costs, on average 8% higher than for LEH standard construction, can be set against the dramatically lower energy costs for heating; consumption decreases by around 80 %.

The social-environmental investment bank *Kreditanstalt für Wiederaufbau (kfw)* also finances Passive House construction with special loans at extremely favourable terms (as of 14 November 2006 an effective annual rate of 2.78% and a nominal rate of 2.75% over 10 years). With additional subsidies of up to 6,000 € from 'proKlima Der energy-Fonds' a Passive House can already be built today to break even on costs. Unlike the incalculable and unforeseeable developments in energy prices, the loan costs are fixed in the medium to long term (kfw loans for up to 30 years), so that a Passive House built today will become the house with the lower overall construction and running costs.

2 Rainwater

Aim

The purpose of a semi-natural rainwater management system is to retain the existing natural water and groundwater run-off arrangements before building development as far as possible after development, and to protect natural water stocks. In principle this means infiltrating, retaining or using rainwater as close as possible to where it falls (see *Naturnaher Umgang mit Regenwasser*, papers on municipal environmental protection, No. 30, Hannover, May 2000). The requirement to retain precipitation is also explicitly expressed in § 31d of the federal law on flood protection (*Hochwasserschutzgesetz*), in force since 3 May 2005.

A) Existing Standards

1. Development planning

Infiltration of rainwater takes priority over connection to rainwater canalisation. Since 1996 the City of Hannover wastewater regulations have stipulated that rainwater must be infiltrated on every property where this is technically possible. Further rainwater management happens with retention (cistern, green roofs or infiltration) according to the drainage zoning plan for the city area.

For green roofs, which also play a part in rainwater storage and retention, the City Administration has internal guidelines on their specification in the development plans (see No. 10 in the series of papers on municipal environmental protection).

Since 1993 every development plan has been inspected as to whether it is possible as a matter of the highest priority to allow rainwater to infiltrate instead of being channelled into the rainwater canalisation. If the inspection proves both technically and legally positive, rainwater infiltration is required as part of the planning permission procedure. If all rainwater can be infiltrated, charges for feeding rainwater into the canalisation network are waived. Rainwater management is a permanent feature of urban development planning. In every development planning procedure a multi-stage process determines whether and to what extent the subsoil is suitable for rainwater management/infiltration and which infiltration/retention system is suitable.

To minimise the area of impermeable surfaces, requirements are regularly set by the development plans e.g., on surface materials for parking spaces or on building on sections of the property (prohibition of outbuildings).

Taking all factors into consideration, when there is no reason not to infiltrate rainwater on site this is stipulated in the development plan. Rainwater infiltration is one of the possible statutory measures to compensate for development impact on the natural environment.

Both the Lower Saxony Water Statute (*NWG*) and the amending bylaws passed by Hannover City Council assign rainwater management⁶ priority over drainage systems. The *NWG* does not differentiate between private and public areas.

Suitable areas are reserved from the start for rainwater management in the development plans. This applies to both private and public areas.

Within the context of compensatory measures for environmental impact of development under nature protection law, during planning procedures for public areas it is also considered whether, for example, an infiltration system is appropriate. If this is the case, the requirement to infiltrate rainwater is recorded in the development plan. This requirement applies to both private and public areas.

2. Residential development

According to the old wastewater laws (in force from 16 May 1991) Hannover City Council decided whether a property must be connected to the public rainwater drains. With the amendment to the Lower Saxony Water Statute (*NWG*) in 1992 the property owner became responsible for rainwater disposal (§ 149 Abs. 3 *NWG*) with just two exceptions:

- The City Council passes a bylaw to require connection to and use of the public system, or
- infiltration would not be in the common good.

When there was no development plan requiring rainwater infiltration – and to clarify the legal situation with regard to wastewater disposal obligations – property owners had to provide a professional assessment that their soil was permeable enough before the City Wastewater Treatment Services would release them from the obligation to connect to and use the

⁶ Management of precipitation includes all methods: rainwater retention, infiltration, evaporation and controlled release based on the natural run-off volumes before development – set at 3 l / (s x ha) for the City of Hannover by the lower water authority at the 'Region Hannover' for many years now.

rainwater drain system. To make this more citizen-friendly the amended regulations of 2 Dec. 2004 – the municipal wastewater regulations – effectively removed the obligation to connect to and use the drainage system. Citizens are no longer required to prove the permeability of the soil on their properties but must or may, if they wish to infiltrate rainwater, act on their own responsibility.

When, in an older development area without rainwater management requirements set by the development plan, those wishing to build can let rainwater infiltrate on site but nevertheless wish to feed their rainwater into the existing rainwater canalisation, despite the general requirement to infiltrate rainwater they are not refused a connection. In an older development area in which rainwater infiltration is required by the development plan, this connection will be refused.

The City Water Treatment Services can provide a 'preliminary checklist on rainwater infiltration for residential development'. The list can provide the following information:

- examples of rainwater management
- approximate groundwater levels in the city districts of Hannover
- approximate soil permeability values in the city districts of Hannover
- recommendations on the minimum space between the infiltration facility and the highest groundwater level or buildings.

The 'Region Hannover' authority as the lower water authority is not involved in these cases.

Exception:

If courtyard drainage or the car parking space of a residential development is connected to an underground infiltration facility, a permit is required and the 'Region Hannover' must be involved. The permit is not necessary when surface of the courtyard area or the car parking space is permeable or precipitation is infiltrated on the surface, through the topsoil.

3. Commercial development

In commercial areas, because of contamination of run-off water from emissions, stricter standards are imposed than for residential areas. A permit from the 'Region Hannover' authority is necessary.

Legal background:

Infiltrated rainwater passes into the groundwater. This effectively constitutes the use of a watercourse and also the influencing of a watercourse according to § 4 Para. 1, 6 and Para.

2, 2 of the NWG. Precipitation infiltration thus requires a permit under water law (§§ 3 and 10 NWG). Exceptionally, feeding precipitation into the groundwater requires no permit according to § 136 Abs. 4 NWG when the precipitation falls on the roofs, courtyards or paths of residential properties and is to be infiltrated, used for irrigation or diverted to infiltration beds; for the feeding in of precipitation on the courtyard area this only applies, however, if the infiltration, irrigation or bed treatment is into the topsoil.

It follows that rainwater infiltration on commercial areas is always subject to permit.

4. Costs

Rainwater management systems are economically viable both for every private property and for public areas:

1. Infiltration and retention systems with vegetation can be set off as compensation areas for environmental impact of development according to nature conservation law.
2. Laying management systems alongside roads saves the area that would otherwise be needed for a conventional rainwater retention basin within the development area.
3. When rainwater management is consistently pursued through the development planning procedures, dispensing with a rainwater drainage system offers considerable savings potential in the services costs, with a positive effect on access and services charges for the adjacent building plots.
4. For private properties there is a cost advantage in reducing rainwater disposal charges. If rainwater is completely infiltrated no charges are levied.

B) Future Higher Standards

1. Development planning

The existing standards listed above are basically sufficient, and exemplary in comparison to other municipalities. Their application will be optimised in future; the possibilities for rainwater management will be more systematically examined over several stages in every development plan.

The following priorities and planning variants (from 1-optimal to 6-to be avoided if possible) will be adhered to in future:

1. (complete) rainwater infiltration in hollows
2. (complete) rainwater infiltration in hollow-and-gravel-trench systems
3. rainwater run-off into hollows and retention in basins (dry/wet)
4. rainwater run-off via hollows into watercourses/ditches
5. rainwater run-off via hollows into drainage canalisation
6. (preferably no longer) rainwater run-off from roads and roofs into drainage canalisation

2. Residential and commercial development

Here, too, the existing standards are sufficient. In future more concerted efforts will be made to avoid construction of public rainwater drains in streets by using decentral infiltration on both private and public areas. This will lead to reductions in utility service charges for the adjacent properties.

In certain cases it can make sense for development plots for sale to be larger if the drainage hollows to collect run-off water from the road can be located on the private property rather than alongside the road. In this connection it would be possible that the private property owners maintained the hollows; the City Administration has practical experience with such a solution. The financial advantages of dispensing with rainwater canalisation and infiltration on public land could be passed to the property owners for undertaking this work. The City Administration will draw up a calculation model and suggested procedure for this.

Soil

Objectives

The City Council and Administration are responsible, by pursuing a policy of sustainable development, for ensuring that future generations will not be hampered in their development by soil contamination and that the natural goods and conservation elements of soil and groundwater are protected and retained. These responsibilities imply the following objectives:

- Reduce additional land take for new settlement and transport, prioritise internal urban development
- Preserve, enhance and network ecologically important open spaces by means of preventive soil protection
- Pursue remedial and reinstatement measures for areas of land (land recycling)
- Minimise sealed (impermeable) surfaces
- Check indications of inherited pollution (contaminated sites)
- Set prevention-oriented soil quality targets for sensitive land uses.

A) Existing Standards

1. Land-use planning

Increasing land demand for settlement and transport requires comprehensive soil protection, addressed by federal statute - § 1 a Abs. 2 und § 1 Abs. 6 Nr. 7 a) of the BauGB (federal planning law). Soil protection objectives are primarily to reduce the extent of sealed, impermeable surfaces and secondly to stimulate the ecological functions of the soil. For land-use planning, this sets a quantitative objective (sparing use of land) and a qualitative objective (low ecological impact).

Sparing use of soil:

Economical use of soil is reinforced by the Federal Government's sustainability strategy that the rate of land take for settlement should be drastically reduced by the year 2020 (to 30 ha/day from around 130 ha/day at present). There is no specific target for land-use planning in Hannover.

The objectives of sparing and careful use of soil must be subjected to balanced consideration. Reducing land take, specifically by preferring internal development to the hitherto expansive development of designated areas on the city margins, is an objective to

be clarified at land-use planning level for the entire city area. If equally appropriate possibilities to achieve the planning objectives within the existing settlement structure are available, they are exploited.

Considering the soil's ecological functions (preventive soil protection) must, however, also be included in procedures at land-use planning level. Possible ways of limiting the extent of sealed, impermeable areas are considered in devising urban planning concepts.

Additionally, the requirements of development plans offer instruments to control the amount of sealed surface through:

- limitations on parking spaces and garages
- limitations on secondary structures,
- definition of private greenspace,
- protection and maintenance measures.

Limitations on new soil sealing can be supplemented in certain cases by unsealing (renaturation) e.g. as compensatory measures for environmental impact.

2. Contractual aspects of residential and commercial developments

2.1 Land sale contracts

Before the purchase or sale of municipally-owned land, in every case the degree of soil contamination (inherited pollution) will be clarified, analogue to development planning procedures. Appropriate clauses on dealing with soil and soil contamination can then be included in the land sale contracts governed by civil law. Experience has shown that considerable business risks can arise if contamination issues are not thoroughly investigated in advance.

Reference is made to the recycling of uncontaminated soil material by the 'GENAMO GmbH' municipal holding as an alternative in all tendering calls by the city water treatment services, although delivering soil to GENAMO is not compulsory.

2.2 Planning permission contracts

Along with land sale contracts, planning permission contracts are another important instrument for preventive soil quality enhancement, for example when specific decontamination targets for the soil or for dealing with excavated soil are to be set. The decontamination targets can be more stringent than those of the federal statutory regulations

(BBodSchG) to avert environmental hazards, as in the planning permission contract for the Telefunken site (Development Plan 1646).

Furthermore, soil decontamination plans and contracts can be drawn up for especially complex cases of inherited pollution to achieve preventive soil quality targets.

Calls for tender refer to the possibility of recycling uncontaminated soil by GENAMO GmbH. Delivering soil to GENAMO is, however, not compulsory.

3. Dealing with inherited pollution

In drawing up development plans, all indications of suspected soil contamination must be followed up, not only to meet ecological quality targets but also to minimise decontamination and/or removal and disposal costs. If it becomes plain during the planning procedure that levels of contamination render the site unsuitable for the intended use – e.g., detached houses with gardens - and are thus subject to § 9 Para. 5 No. 3 of the federal construction statutes (BauGB), the municipality will devise an appropriate soil decontamination solution. This applies not only to soil contamination (soil as protected resource) but also to groundwater contamination (groundwater as protected resource).

Dealing with suspected contaminated sites and inherited pollution in development planning procedures is defined within the City Administration and laid down in a handbook (*Altlastenerkundung in Hannover, Band 2: Verdachtsflächen und Altlasten im Bebauungsplanverfahren, Schriftenreihe kommunaler Umweltschutz, Heft Nr. 24, 1998*). The recent establishment of the 'Region Hannover' local government body, and statutory amendments to align German with European law (EAGBau), have not brought any fundamental changes to this.

For new outdoor areas for kindergartens, and for playgrounds, the applicable preventive measure is the Hannover 'Minimum investigation programme' (MUP), as play areas for children are a highly sensitive use category. The standardised form of the MUP meets business viability criteria and facilitates project planning. The procedure is published in the Hannover environmental protection series: *Schriftenreihe kommunaler Umweltschutz, Heft Nr. 39, 2004*.

B) Future higher standards

1. Land-use planning

The present standards are already very high, both for residential and commercial developments. In single cases, improvements could be made to soil management in designating parking spaces. Vehicle parking areas should be arranged to minimise land take, the main way of achieving this being multi-storey arrangements such as parking decks. Among other measures, Hannover City Council has resolved in Council Paper 0810/2003 that parking spaces will be required and approved according to Building Regulations guidelines. It should also be determined to what extent commercial parking spaces can be used outside business hours by local residents. Trees on the site are to be included in any plan for parking areas.

In the light of the definition of soil quality targets it is the task of local authorities to devise their own objectives, as soil quality values to meet the prevention requirements are not anchored in law. These preventive values must be significantly more stringent than those set by the hazard prevention limits in the federal soil protection statute (BBodSchVO). Soil quality standards are defined case-by-case for development planning in Hannover. Experience has shown, however, that drawing up development plans is considerably simplified with uniform and consistent rules. The City Administration will include soil quality values specific to Hannover in future development planning. When limit values are exceeded, complete decontamination is not always necessary; more often, measures are determined for the specific case. Soil quality values are graded according to use; commercial areas are subject to significantly less stringent requirements than e.g. residential developments.

2. Contracts for residential and commercial development

The aims of urban land-use planning listed under point 1 are also considered when drawing up planning permission and land sale contracts.

3. Indicators for land take

The requirement to reduce demand for building land and soil is not only set at federal and state level. Hannover City Council has set itself the challenge, by signing the Aalborg Commitments, to “improve soil quality, preserve ecologically productive land and [...] avoid urban sprawl, prioritising brownfield site development.”

There is a lack of suitable indicators and decisions on targets for quantifying the actual land-take or use of ecologically productive land, and evaluating it within the land-use planning process. Data on the number of recycled brownfield site hectares and of other built-up areas are unrevealing and can create an overly negative picture. In this kind of land auditing, such positive effects as soil improvement during land recycling are not included in the balance.

The City Administration is devising appropriate indicators and target values.

Along with indicators and target values for land and soil consumption, a land monitoring system is being set up that will enable the Administration's scientific departments to trace and present sustainable developments over time for environmental reporting and land-use planning procedures.