

STATE AND DEVELOPMENT OF THE ENVIRONMENTAL COMPARTMENTS



AIR

WATER

LANDSCAPE

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NOISE



B5 NOISE

B5.1 NOISE ASSESSMENT

Overexposure to excessive noise is, similarly as air pollution, the most serious factor affecting health of inhabitants of large cities. Long-term affecting noise nuisance may result in hearing impairments and disorders yet also cause a number of other diseases as stress, neurosis, pathological changes in blood pressure, etc.

Road traffic is the major source of noise in urban environment and especially the heavily growing automobile transport. Exceptions are the vicinities of airports, railways, or even construction sites. Adverse effects of noise are reinforced due to highly concentrated population on relatively small areas. Prague is the worst affected area of the Czech Republic concerning noise affects on inhabitants. Share of population affected by the excessive noise overexposure is closely below 50 % (a study of the SZÚ, 1994).

The legally established criterion for environmental noise assessment is the equivalent sound pressure level L_{Aeq} . It is average energy of momentary sound pressure level values A over a defined period of time which is 1 hour. It is expressed in decibels (dB). Valid legislation on the assessment of acoustic conditions in ambient environment was in 2007 established by the Act No. 258/2000 Code, on public health, in valid wording, and the related Order of the Government of the Czech Republic No. 148/2006 Code, on health protection against adverse effects of noise and vibrations.

The Act No. 258/2000 Code, imposes on every operator and administrator of noise sources the duty not to exceed the highest acceptable noise levels in the environment. If an operator or administrator is not able to fulfil this duty the Act establishes factual requirements and time limits for their further proceeding in the administrative procedure to the authorities of public health protection.

The Order of the Government of the Czech Republic No. 148/2006 Code, which is the executive regulation to the Act, then establishes, inter alia, acceptable values of noise (“limits”) in the environment:

- a) uses the term of “old nuisance” and establishes the special limit L_{Aeq} 70 dB in day-time and 60 dB in night-time for the “old nuisance”; the noise limit value for “old nuisance” is exceeded even though if any of the limit values of L_{Aeq} for daytime or for night-time is exceeded while uncertainty of the determination must be taken into account as well;
- b) imposes on the operators of noise sources (and also on administrators of roads) the duty to provide for compliance with the special limit through the implementation of measures necessary in those places where the limit value has been exceeded; and
- c) authorises the competent authority of the public health service to agree temporarily with an exceedance of the limit in those places where compliance with the limit required would take a longer time unless such delay endanger health of inhabitants.

In practise other characteristics of the acoustic conditions are also applied except for the descriptor L_{Aeq} as the maximum level of acoustic pressure A , L_{Amax} , (enabling to capture passes of extremely noisy vehicles, for example), minimum level of acoustic pressure A , L_{Amin} , (for the description of background noise), or potentially probability levels L_{An} (L_{A90} is the most frequently applied one).

The highest acceptable equivalent level of acoustic pressure A in outdoor environment (except for noise generated by air traffic) is determined as a sum of the basic noise level $L_{Aeq,T} = 50$ dB and appropriate corrections for daytime or night-time.

Tab. B5.1 Limit values of environmental noise

Annex No. 3 to the Order of the Government of the Czech Republic No. 148/2006 Code

Corrections for the determination of hygiene noise limit values in protected outdoor environment of structures and in protected outdoor environment

Part A

Type of area protected	Correction (dB)			
	1)	2)	3)	4)
Protected outdoor area of structures of medical facilities with accommodation, including spas	-5	0	+5	+15
Protected outdoor area of medical facilities with accommodation, including spas	0	0	+5	+15
Protected outdoor area of other structures and protected other outdoor areas	0	+5	+10	+20

The corrections given in Table cannot be summarised.

For night-time another correction shall be used for the protected outdoor area of structures at the amount of -10 dB, except for railway noise, for which the correction -5 dB shall be applied.

Explanatory notes to table:

- 1) This shall be applied on noise from the public production of music, noise from facilities of services and other noise sources, with the exemption of airports, roads, unless they are purpose communication, and furthermore with the exemption of railways unless they are railway stations providing for train assembling works, namely marshalling of cargo trains, train inspection, and carriage repair.
- 2) This shall be applied on noise from transport on roads except for purpose communications and railways.
- 3) This shall be applied on noise from transport on main roads on the territory where noise from transport on these roads prevails over noise from transport on other roads. This shall be applied on noise from transport on railways within the protection zone of railway.
- 4) This shall be applied on noise in the case of the old noise nuisance on roads and railways when the old noise nuisance shall mean the state of noise level caused by transport on roads and railways, which was created in protected outdoor areas of structures and in protected outdoor areas till 31st December 2000. This correction remains applied even if a new road pavement is laid down, rail top is replaced, or potentially road lanes are widened while maintaining the direction or vertical positioning of the road or railway, in which the existing noise level must not be worsened in the protected outdoor areas of structures and in protected outdoor areas and for short-term bypass routes.

* Section 30 (1) of the Act No. 258/2000 Code.

In the field of legislation on noise the Directive 2002/49/EC on evaluation and control of environmental noise was completely inured in 2007.

The transposition comprises of:

- a) Amended Act No. 222/2006 on integrated pollution prevention and control, which amends the Act No. 76/2002 Code on integrated pollution prevention and control, on the Integrated Pollution Register, and amending certain acts in wording of the following regulations, which amended the Act No. 258/2000 Code on public health protection in its valid wording.

The amended Act No. 258/2000 Code on public health protection in its valid wording in Section 81 imposes duties related to the strategic noise mapping on the Ministry of Transport, Ministry of the Environment, Ministry for Regional Development, and regional authorities of the Czech Republic.

- b) The Decree of the Ministry of Health of the Czech Republic No. 523/2006 Code of 21st November 2006, establishing limit values of noise indicators, their calculations, fundamental requirements for the content of strategic noise maps and action plans, and conditions for the public involvement in their preparation (the decree of noise mapping).
- c) The Decree of the Ministry for Regional Development of the Czech Republic No. 561/2006 Code establishing agglomerations.

Note:

The Ministry of the Environment of the Czech Republic prepares a decree on determining and establishing of silent areas in open landscape.

B5.2 ROAD TRAFFIC NOISE

The most important source of excessive noise affecting the largest portion of the City population is automotive traffic. The number of automobiles and transported volumes have been ever increasing. Although the construction of outer ring road has been ongoing roads in the densely populated built-up areas in the City downtown remain in the state of traffic saturation, that is jammed, for all day. Road pavement condition in many cases contributes to the noise level increase, noise prevention barriers have been implemented along a small portion of the road network only. In the most roads of Prague with intensive traffic the equivalent levels of acoustic pressure reach up to 80 dB in daytime, as in Veletržní, Legerova, and Sokolská Streets, and so on.

B5.2.1 Noise measurements

Regular noise measurements at selected localities of Prague were carried out either within the system of the Prague Environmental Information System (IOŽIP) from 1984 to 2000 at eight localities (see the Year-book 2001). Repeated measurements of noise has been carried out on a long-term basis by the Public Health Authorities namely within the framework of the National Programme of the National Institute for Public Health called “Monitoring of the Environment Aspects Related to Public Health”. Results of all-day measurements confirmed that at localities of stable traffic solution and more or less used traffic capacity noise conditions do not change much either. Due to all-day traffic load the effects of rush hours are minimised. At noisier localities the acceptable values of L_{Aeq} are permanently exceeded all day and night.

Occasional noise measurements, timely limited measurements of noise are carried out mostly as a part of environmental studies of larger investment projects. Studies performed also usually include design of noise prevention barriers and implementation follow-up check of their performance. Further one-time measurements are performed as checks in the course of investigation of complaints or in order to verify results of model calculations.

B5.2.2 Noise maps

Noise maps have become a frequently used tool to describe urban noise nuisance in the world as well as in the Czech Republic. The impulse for essential increase of their importance is undoubtedly the recently adopted directive of the European Parliament and European Council on noise evaluation and control in the environment (Directive 2002/49/EC). The Directive is based on three main principles: harmonisation (noise indicators, noise evaluation, calculation methods, measurement methods, monitoring, strategy, and legislation), collecting of information on noise in the form of noise maps, and informing the public on the current noise conditions and on strategy and financing of noise reduction. Noise maps represent noise levels (values of indicators and their comparison to limit values), then they express population noise nuisance (number of persons or housings in a certain area affected by a certain noise). They are oriented on the application mostly in the land-use planning and urban planning and in strategy development. They are required for large agglomerations, main road and railway routes, and important airports; their update is assumed to be done in 5 years since they have been developed. The strategic noise maps shall be followed up by action plans, which shall be developed by 18th July 2008.

Difference between strategic noise mapping and noise mapping

Concept of “strategic noise mapping” was transposed into legislative of EU Members with the Directive 2002/49/EC.

The objective of this Directive was (and still is) to ensure concerted approach to environmental noise decreasing in Member States of European Union. The Directive advises how to work out strategic noise maps and successive action plans.

Strategic noise maps are determinant step for the environmental noise nuisance decreasing, action plans are operative step for the environmental noise nuisance decreasing. Indicators (used within both steps) are

L_{DAY} 24-hour value and classic L_{Aeq} value for night time. First of aforementioned indicators had not been used at any of Member States of European Union till the Directive 2002/49/EC was worked out.

Strategic noise maps are worked out for open field and height of four metres above terrain. Action plans use indicator values from strategic noise maps.

Very important fact is, that the Directive 2002/49/EC, transposed to legislative of Member States of European Union, **does not violate** legislative on environmental noise of Member States.

Striking differences between noise mapping and strategic noise mapping are as following:

- different sphere of strategic or operative work with noise;
- different indicators setting for environmental noise evaluation;
- taking sound energy from reflectance structures into account or not;
- appreciation of all noise sources in area (strategic noise mapping) on contrary to known (relevant) noise sources in area (noise mapping).

Any of the aforementioned noise mapping types can not be replaced with one another. Any of the aforementioned noise mapping types competes with one another, but it is complementary.

The City of Prague has long-term experience in the field of the noise map development. Concerning time and methodology the noise map development in Prague can be characterised by three development stages as follows:

1. Development of **measurement-based** noise maps. This period covers the period 1976 to 1996 when 5 automotive traffic noise maps for daytime were completed in the 5-year interval. The maps demonstrate noise levels on selected major roads on the City territory. They were developed using the results from a great number of short-term measurements (300–500).
2. The noise map development based on the **combination of long-term and short-term measurements (probes) and follow-up calculations**. This phase has the “transitional” character (both measurements and calculations were applied) and covers period of years 1992 to 1997 when 6 noise nuisance distribution maps (MRHZ) for daytime were successively developed for selected parts of the City territory. This phase was followed by a **pilot project of areal calculated automotive traffic noise map** for daytime for the City District of Prague 2, which was implemented in 1998.
3. The development of **calculated noise maps**. Between 1998 and 2005, 5 calculated noise maps for the whole City of Prague were developed, identifying noise-levels on Prague’s territory, or more precisely in the areas surrounding a selected communication network, for which there are input data on traffic intensity available. These maps include: automotive traffic noise maps for daytime and night-time, tramway traffic noise maps for daytime, aggregated calculated map of automotive and tramway traffic for daytime and night-time. A calculated noise map of automotive traffic for day-time mapping north-western part of Prague in 2000, which was developed using alternative calculation methods, also belongs to this category.

Tab. B5.2 Overview of noise mapping projects in Prague

Project name	Time period	Procedures applied
Noise maps of automotive traffic (HMAD)	1976–1996	measurements (short-term)
Noise nuisance distribution maps (MRHZ)	1992–1997	measurements (short-term, long-term), calculations
Area noise map of automotive traffic in Prague 2	1998	calculation (verification study)
Calculated noise map of automotive traffic (VHMAD)	2000	calculations
Calculated noise map of automotive traffic, Prague – Northwest	2000	calculation (alternative methodology)
Analysis of population load with excessive noise according to the VHMAD	2001	calculation (GIS analysis)
Calculated noise map of tramway traffic in daytime	2002	calculation
Calculated noise map of automotive traffic in night-time	2004	calculation
Summary calculated noise map of automotive and tramway traffic in daytime and night-time	2005	calculation (summary)

Note: The calculated maps developed after the year 2000 were compiled using the same data input on automotive traffic intensity in 2000.

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Basic information concerning the results of regular noise measurements in Prague as well as outputs of noise maps development have been published on regular basis in the Prague Environment Yearbooks since 1989. Since 1997, following the digitalisation and the transformation of noise maps into GIS, noise maps have been included in the Atlas of the Prague's Environment on the Internet at www.premis.cz/atlaszp. These essential outputs of the Prague Environmental Information System (IOŽIP) have been published to serve the needs of the City's management, professionals, and, first of all, the public. They are available in an electronic format (both the Czech and English versions) on the City's website at www.praha-mesto.cz and on the CD-ROM. The summary presentation of noise maps in Prague is available on the CD-ROM Prague – The Environment 6.

The updating of the procedure was set for the old noise nuisance from automotive transport elimination on the Prague territory for 2007.

“Noise Maps of Automotive Traffic for Day-time and Night-time. Prague 2005” publication was carried out on demand of Act No. 258/2000 Code on public health protection in valid wording. Executive regulation to the Order of the Government of the Czech Republic No. 148/2006 Code on health protection against adverse effects of noise and vibrations, determines indicators for evaluating the open space acoustic conditions. There are only two indicators – descriptor L_{Aeq} for day-time (06:00–22:00) and descriptor L_{Aeq} for night-time (22:00–06:00). Contrary to strategic noise maps these noise maps calculate L_{Aeq} value for real conditions in particular area, it means, that sound energy reflectance are calculated from real subject in particular area. “Noise Maps of Automotive Traffic for Day-time and Night-time. Prague 2005” publication results were calculated for height of 4 metres above terrain in 3-D calculation model of the territory of Prague. These results enable operative work with environmental noise on the territory of Prague, assist at old noise nuisance elimination. On the basis of the results (and in cooperation with Public Health Authority) the old noise nuisance elimination working schedule is projected. Realization of the time schedule is checked.

The summary of basic quantitative results

Immission values of L_{Aeq} were calculated for automotive traffic in total for 964,206 calculating points on the territory of the City of Prague. This includes calculation of immission values of L_{Aeq} for 4,821,030 metres of facades of buildings in 120-metres wide vicinity adjacent to the automotive communications. The following tables show numerical overview of sorted zone immission values of L_{Aeq} in 5 dB zone scaling for day-time (06:00–22:00) and night-time (22:00–06:00).

Tab. B5.3 Frequency distribution of L_{Aeq} values in day-time (06:00–22:00); 5 dB scaling

Zones of L_{Aeq} values in dB	Frequency	Relative frequency
$L_{Aeq} \leq 40$	180,930	18.8
$40 < L_{Aeq} \leq 45$	169,496	17.6
$45 < L_{Aeq} \leq 50$	195,998	20.3
$50 < L_{Aeq} \leq 55$	167,354	17.4
$55 < L_{Aeq} \leq 60$	115,227	12.0
$60 < L_{Aeq} \leq 65$	79,507	8.2
$65 < L_{Aeq} \leq 70$	46,402	4.8
$70 < L_{Aeq} \leq 75$	8,991	0.9
$75 < L_{Aeq}$	301	< 0.1
Total	964,206	100.0 %

Tab. B5.4 Frequency distribution of L_{Aeq} values in night-time (22:00–06:00); 5 dB scaling

Zones of L_{Aeq} values in dB	Frequency	Relative frequency
$L_{Aeq} \leq 40$	446,933	46.4
$40 < L_{Aeq} \leq 45$	184,458	19.1
$45 < L_{Aeq} \leq 50$	138,885	14.4
$50 < L_{Aeq} \leq 55$	100,580	10.4
$55 < L_{Aeq} \leq 60$	65,448	6.8
$60 < L_{Aeq} \leq 65$	25,120	2.6
$65 < L_{Aeq} \leq 70$	2,642	0.3
$70 < L_{Aeq} \leq 75$	132	< 0.1
$75 < L_{Aeq}$	8	< 0.1
Total	964,206	100.0 %

The following tables show numerical overview of immission values of L_{Aeq} sorted pursuant to hygiene limits determined in the Order of the Government of the Czech Republic No. 148/2006 Code on health protection against adverse effects of noise and vibrations, for day-time (06:00–22:00) and night-time (22:00–06:00).

Tab. B5.5 Frequency distribution of immission values of L_{Aeq} in day-time (06:00–22:00) pursuant to the Order of the Government of the Czech Republic No. 148/2006 Code

Zones of L_{Aeq} values in dB	Frequency	Relative frequency
$L_{Aeq} \leq 55$	713,778	74.0
$55 < L_{Aeq} \leq 60$	115,227	12.0
$60 < L_{Aeq} \leq 70$	125,909	13.0
$70 < L_{Aeq}$	9,292	1.0
Total	964,206	100.0 %

Tab. B5.6 Frequency distribution of immission values of L_{Aeq} in night-time (22:00–06:00) pursuant to the Order of the Government of the Czech Republic No. 148/2006 Code

Zones of L_{Aeq} values in dB	Frequency	Relative frequency
$L_{Aeq} \leq 45$	631,391	65.5
$45 < L_{Aeq} \leq 50$	138,885	14.4
$50 < L_{Aeq} \leq 60$	166,028	17.2
$60 < L_{Aeq}$	27,902	2.9
Total	964,206	100.0 %

Note:

All calculated values of L_{Aeq} in calculation points were presented by four press outputs in map lists of the territory of the City of Prague (scale fraction 1 : 50,000).

B5.3 AIR TRAFFIC NOISE

The company of Správa letišť Praha, s. p. (Prague Airport Management, Government Enterprise; which was named Letiště Praha, s. p. till 6th February 2008) has been permanently striving for the minimisation of the civil air traffic impact to the airport surroundings, according to legislative regulations of the Czech Republic as well as to regulations of international institutions. The company of Správa letišť Praha, s. p. is conformed to principles of accepted environmental policy. **There has been no enlargement of zone affected by the excessive noise overexposure since 1998 despite of that number of landings and taking-offs has increased.**

In 2007 the company of Správa letišť Praha, s. p. recorded, same to previous years, increase in number of checked-in passengers and number of aircraft movements (landings and taking-offs). Persons of 12.4 million passed through the Prague Airport, and number of taking-offs and landings reached approx. 175,000.

As every year the expert organisation unit The Environment was solving mainly air traffic noise affairs. The Environment unit provides all work connected to environmental protection for the company of Správa letišť Praha, s. p. (the provider of the Airport Prague - Ruzyně).

In the framework of air traffic noise measuring year 2007 can be branded as the turning point. The company of Správa letišť Praha, s. p. prepared and realized procedure to select the new modern system of the aerodrome traffic noise monitoring including the aircraft's corridors. This monitoring system is one of the most important instruments to solve the noise problematic of each airport. The company of Správa letišť Praha, s. p. started the new operation system on 1st January 2008.

On the basis of discussions with both regional hygiene stations (the Hygiene Station of the City of Prague and the Hygiene Station of the Central-Bohemia Region), which are qualified in air traffic noise sphere, the company of Správa letišť Praha, s. p. provided discontinuous measuring in 2007. The measuring was provided by three accredited laboratories in three periods at three places. These places have been monitored for long time especially due to noise test at the margins of the established noise protection zone of the Prague airport. The zone specifies the area, where may be exceeded the noise limits of the aerodrome traffic noise, pursuant the Order of the Government of the Czech Republic No. 148/2006 Code on health protection against adverse effects of noise and vibrations. The monitoring and consequential data classification was carried out according the Methodical Instruction No. OVZ-32.0-19.02.2007/6306, on monitoring and classification of the air traffic noise, issued by the General Public Health Inspector of Czech Republic. Noise monitoring confirmed, that in spite of increasing number of landings and taking-offs, noise protection zone of the Airport Prague - Ruzyně satisfies the mandatory limit of air traffic noise for both day-time ($L_{Aeq D} = 60$ dB) and night-time ($L_{Aeq N} = 50$ dB). Owing to uses the airplanes of lower noise parameters. The noise limits of air traffic noise are calculated according the so called characteristic flying day. It is an average flying day with number of taking-offs and landings in the course of one day. The characteristic flying day is an average value calculated of all taking-offs and all landings in all directions in the six successive months of the dense air traffic (from May to October). Number of day-time and night-time movements is separated. Characteristic flying day represents average operating conditions at the airport. Characteristic flying day answers to the limit definitions of the aforementioned government order.

Results of discontinuous monitoring in 2007

Tab. B5.7 Noise monitoring points in surrounding of the Airport Prague - Ruzyně

Period	Point No.	Locality	Situation A	Situation B
PERIOD I	I - 1	Prague 6 – Bílá Hora – U Boroviček Street	ARR 31	
	I - 2	Prague 6 – Řepy II	ARR 31	
	I - 3	Prague 6 – Na Dědině Street	ARR 31	
	I - 4	Dobrovíz	DEP 31	
	I - 5	Hřebeč	DEP 31	
	I - 6	Lidice	DEP 31	
	I - 7	Běloky	DEP 31	
	I - 8	Prague 6 – Fialka	ARR 31	
	I - 9	Prague 6 – Řepy II – Blatiny	ARR 31	

Period	Point No.	Locality	Situation A	Situation B
PERIOD II	II - 1	Jeneč – maternity school	DEP 24	ARR 06
	II - 2	Červený Újezd – playground	DEP 24	ARR 06
	II - 3	Unhošť – South	DEP 24	ARR 06
	II - 4	Pavlov	DEP 24	ARR 06
	II - 5	Starý Suchdol – sv. Václav	ARR 24	DEP 06
	II - 6	Nový Suchdol – Výhledy	ARR 24	DEP 06
	II - 7	Přední Kopanina – playground	ARR 24	DEP 06
	II - 8	Horoměřice – Na Chotole	ARR 24	DEP 06
	II - 9	Horoměřice – V Průhoně	ARR 24	DEP 06
PERIOD III	III - 1	Červený Újezd – Na Ohradě	DEP 24	ARR 06
	III - 2	Unhošť – West	DEP 24	ARR 06
	III - 3	Nový Suchdol – Za Hájem	ARR 24	DEP 06
	III - 4	Na Padesátníku	ARR 24	DEP 06
	III - 5	Kněževés – West	ARR 24	DEP 06
	III - 6	Tuchoměřice	ARR 24	DEP 06
	III - 7	Hostouň	DEP 24	ARR 06
	III - 8	Přední Kopanina – U Háje	ARR 24	DEP 06
	III - 9	Hostivice – Jeneček	DEP 24	

Source: Správa letiště Praha (Management of the Prague Airport)

Tab. B5.8 Resultant levels of acoustic pressure of air traffic in day-time and night-time in the characteristic flying day in 2006, gained by noise monitoring the surrounding of the Airport Prague - Ruzyně in 2007

Point No.	Situation	L _{Aeq D} (dB)	L _{Aeq N} (dB)
I - 1	ARR 31	56.5	47.9
I - 2	ARR 31	42.2	33.6
I - 3	ARR 31	43.7	35.0
I - 4	DEP 31	53.7	44.6
I - 5	DEP 31	48.9	39.9
I - 6	DEP 31	49.3	40.3
I - 7	DEP 31	49.8	40.8
I - 8	ARR 31	53.4	44.7
I - 9	ARR 31	49.2	40.5
II - 1	DEP 24 + ARR 06	57.0	50.8
II - 2	DEP 24 + ARR 06	51.3	45.1
II - 3	DEP 24 + ARR 06	54.4	48.0
II - 4	DEP 24 + ARR 06	55.0	48.7
II - 5	ARR 24 + DEP 06	55.9	49.2
II - 6	ARR 24 + DEP 06	52.3	45.6
II - 7	ARR 24 + DEP 06	55.3	48.1
II - 8	ARR 24 + DEP 06	58.0	51.4
II - 9	ARR 24 + DEP 06	52.5	45.6
III - 1	DEP 24 + ARR 06	54.3	48.1
III - 2	DEP 24 + ARR 06	53.0	46.7
III - 3	ARR 24 + DEP 06	49.7	43.0
III - 4	ARR 24 + DEP 06	44.4	39.4
III - 5	ARR 24 + DEP 06	50.7	43.2
III - 6	ARR 24 + DEP 06	47.6	40.2
III - 7	DEP 24 + ARR 06	49.6	43.4
III - 8	ARR 24 + DEP 06	52.2	45.1
III - 9	DEP 24	46.3	40.1

LEGEND:

Points inside noise protected zone
Points outside noise protected zone
Points at the range of noise protected zone

Source: Správa letiště Praha

New monitoring system

The monitoring system ANOMS8 of Astralian company LOCHARD was selected on the basis of selection procedure. The system is provided by local company MaREXCOM. New sophisticated monitoring system of air traffic noise and flying tracks (NTMS = Noise and Track Monitoring System) was set to pilot operation in October 2007, the real operation started on 1st January 2008. System belongs to absolute world's top. It is developed to satisfy all known and assumed demands of noise problematic solutions.

NTMS consists of:

- 13 stationery monitoring stations so called EMU including 13 meteorological stations;
- 2 mobile monitoring stations;
- central station;
- operational data terminal of the company of Správa letiště Praha;
- data transmission hardware;
- data processing and archiving software.

Tab. B5.9 Localities of the stationary monitoring stations

No. of EMU	Monitoring point	No. of EMU	Monitoring point
1	Jeneč	8	Horoměřice – community centre
2	Červený Újezd	9	Přední Kopanina
3	Unhošť	10	Horoměřice – South-East periphery
4	Pavlov	11	Řepy
5	Hostivice	12	Bílá Hora
6	Dobrovíz	13	Suchdol
7	Kněžves		

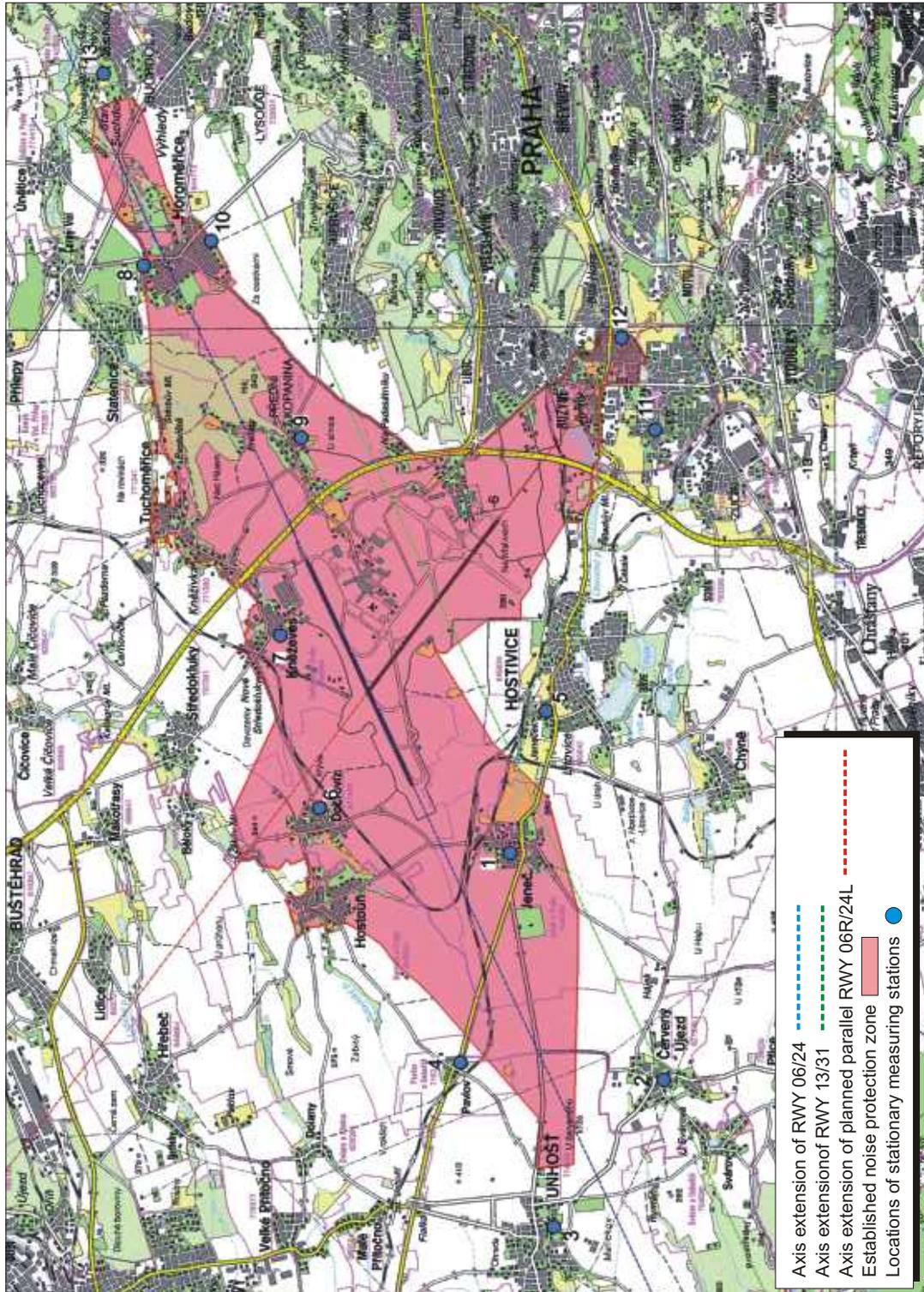
Source: Správa letiště Praha

The monitoring stations are situated in selected localities in the surrounding of Airport Prague - Ruzyně (see the map), so the monitoring would relevant. Each monitoring point has more objectives. Main objectives are:

- checking the margins of noise protection zone;
- checking of hygiene limits of air traffic noise for protected exterior and for protected exterior of buildings;
- checking of the rated track compliance and flight routine primarily in night-time;
- exceedance check of the margins of noise tolerance of detached stations.

All stations serve to point out the total noise burden of surrounding of the Airport Prague - Ruzyně.

Fig. B5.1 Noise protection zone of the Prague - Ruzyně Airport with the stationary monitoring stations placing



Source: Letiště Praha, s. p.