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PROCESSING OF PROPOSALS FOR LAND CONSOLIDATION IN THE FOOTHILLS CONDITIONS

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Abstract

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Land consolidation, made pursuant to the Act No. 139/2002 Coll., have different variations and elaborateness according to specific conditions. The hilliness of the terrain, sloping, systems of transport connecting the plots, water in the landscape, the size of the plots and number of owners are the decisive factors for the preparation of the land consolidation. They influence the possibility of changes, decisions on the shapes of the plots, total difficulty in reaching the best situational layout and transport accessibility, reduction of erosion danger as well as incorporation of elements that increase the ecological stability of the plots of individual owners. The experience and knowledge collected during the implementation of land consolidation in the district of Ústí nad Orlicí provides the first opportunity to describe and evaluate the impact of specific conditions associated with the design and implementation of land consolidation in the different morphological, soil and climatic areas. The selected method was to compare some outputs of the land consolidation proposals as well as natural and other conditions of individual land consolidation from different cadastre territories of the Ústí nad Orlicí district, where the land consolidation has already been terminated or shall be terminated.

complex land consolidation projects, surveying, design work, climatic and morphological conditions

The execution of land consolidation (hereinafter only "LC") that, among others, ensures the conditions for the improvement of the environment, the protection and reclamation of soils, water management and the improvement of the ecological stability of the landscape (Act No. 139/2002 Coll. as amended, § 2), has its specifics in different land conditions, especially regarding the methodology of its treatment. The area where the LC is executed, specified by the type of land, hilliness, sloping, soil conditions, and hydrological conditions, influences the overall difficulty, i.e. labor-intensiveness and price of the LC, the difficulty of discussing it and many other factors that influence the execution of the LC.

A typical example of a specific solution is the experience with the specifics of the LC proposal under the conditions of permanent row crops or plots of bench terraces, where the possibility of arrangement of the location of all the plots is significantly limited by these conditions.

The comparison and assessment of the various factors and the study of their influence on the selected area can improve the knowledge necessary for planning and management of the LC, the knowledge about the progress of project works, their labor-intensiveness and, therefore, the costs of the design works under different terrain, climatic and water-management conditions, but also production and social conditions.

The LC is performed as an execution of the public administration powers by the Land Settlement Board. The Land Settlement Boards make decisions on the LC and organize their execution (Act No. 139/2002 Coll., as amended, § 20, sec. 1b). The execution of the public administration consists of contractual preparation of the documents necessary for the decision in cooperation with persons especially entitled to perform geometry, project and other specialized works. The relation between the Land Settlement Board and the entitled developer or geode-

sist is set by a contract for works. The quality of the work is also influenced by the quality of the assignment specifications. The proper preparation of the specification documents requires a great deal of information on the territory, farming and the owners of the plots, as well as local cultural and historical specifics. Therefore, the examination of the conditions and special factors that influence the settlement of owner rights relationship towards the plots and the situation in the landscape belong to the methods of preparation of quality assignment specifications, its continuous control and management, as well as qualified decision making.

MATERIAL AND METHODOLOGY

The hilliness of the terrain, sloping, systems of transport connecting the plots, water in the landscape, the size of the plots and number of owners are the decisive factors for the preparation of the LC. They influence the possibility of changes, decisions on the shapes of the plots, total difficulty in reaching the best situational layout and transport accessibility, reduction of erosion danger as well as incorporation of elements that increase the ecological stability of the plots of individual owners. At the same time, the consolidation can only be successful if a required majority of owners agrees with the proposal of the LC. The difficulty of the task is directly influenced by these factors. The aim of the LC was the creation of a "mosaic" of plots that shall be rationally managed and, on the other hand, shall create a base for an ecologically stable and aesthetically valuable landscape (SKLENIČKA, 2003).

The selected method was to compare some outputs of the LC proposals as well as natural and other conditions of individual LC from different cadastral territories of the Ústí nad Orlicí district, where the LC has already been terminated or shall be terminated during 2010. The aim was to find relations between the characteristics of the areas and the frequency and extension of individual proposed works, for example, the preparation of assignment specification.

The monitored territories were divided methodologically into two groups:

- 1st group of complex LC – foothills territories (with average altitude 714 m a.s.l.),
- 2nd group of complex LC – other territories (with average altitude 371 m a.s.l.).

This division was performed according to natural characteristics of the monitored territories.

- Altitude above the sea level,
- hilliness of the territory (with the help of the average length of contour lines by 2 m of altitude on 1 ha of the territory).

A subsidiary aspect was the share of the soils included among the major soil units (MSU) 40 and 41, i.e. sloping and very sloping lands, occurring in the investigated area, according to the methodology of evaluation of agricultural lands. The average size of LPIS blocks as well as the size of the plots of individual owners is a combination of indicators.

The individual monitored cadastre territories in the Ústí nad Orlicí district, according to the above stated characteristics, are listed in the Table I.

The individual phases of the LC are monitored for all particular LC (Fig. 1), divided into the two abovementioned 1st and 2nd groups. They are compared between the 1st group of complex LC of hilly areas in major altitudes and the 2nd group of complex LC of more plain areas in minor altitudes.

The factors that influence the geodetic works

The individual factors that influence the complexion of the LC in foothills areas, compared to plain low-lands are: the variety of locations and altitudes that is expressed by the length of the borders of the plots to be surveyed, regardless the ownership, other areas, streams, borders of two plots, including the edge of the slopes, the borders of humid plots and wetlands, borders of other planimetric, and hypsometric phenomena that are always a potential border of the plot (see Fig. 2a, b). Another factor can be the dissipation of the built-up area, i.e. single houses with plots that are frequent in foothills conditions. As the information on real estate is not always consistent, it is at least appropriate to include plots with buildings not owned by the state or plots that by function are connected to such buildings, including the access roads and fenced plots, especially gardens, into the LC. (Act No. 139/2002 Coll., as amended, § 3, section 3).

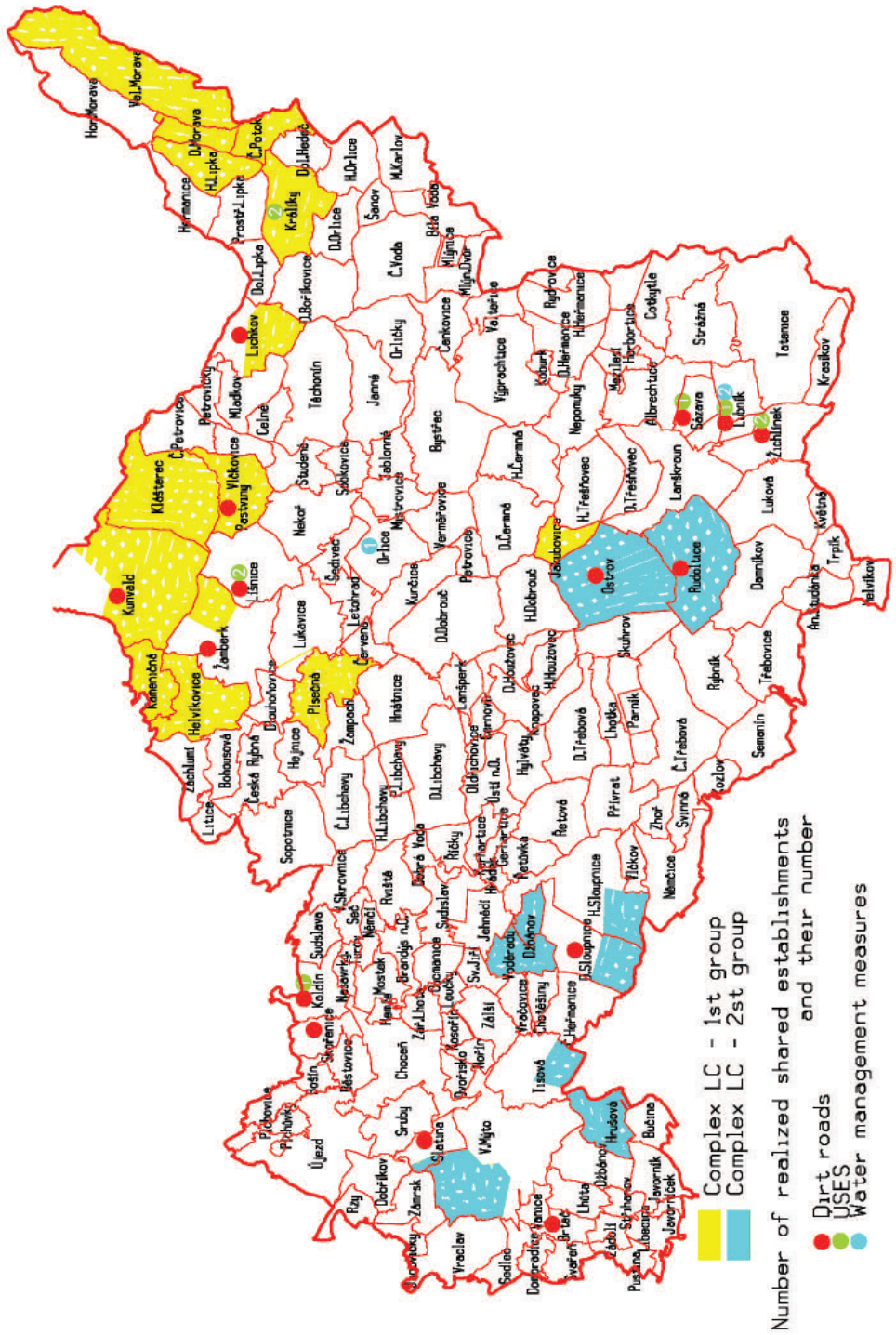
During the surveying of the monitored territory, it is necessary to examine and, subsequently, survey these phenomena in the district of the LC. In the case of a detailed measurement of the planimetry, apart from the cadastre map, the elements necessary for the LC proposal are also surveyed in a necessary extension (e. g. drain pits, irrigation water hydrants, water sources, surface run-off, balks, underground networks, woody species outside the forests, slip roads, passes, waterways of concentrated surface runoff, fences and construction of permanent brushwood) and, if necessary, also hypsography content is included (Order of the Ministry of Agriculture No. 545/2002 Coll., § 7, Sec. 7). During the survey of the monitored plot, it is also necessary to consider the run-off of water from the plot, as the original drainage grooves have generally acquired the appearance of ameliorative channels on non-settled plots from the proprietary point of view. These channels make the network of recipients more thick, frequently with a bend of stream-side brushwood that have to be considered as separate plots. If there are more steep plots, it is necessary to regard them in a different way, compared to less steep plots; it is also necessary to survey the transition of the slope to its surroundings, i.e. the edge of the hill and its base.

The setting of the perimeter of the LC, especially the inner perimeter, is a separate part of the geodetic works. To find the inner perimeter of the LC and

find the border of the LC is not as easy as it seems to be. From the point of view of the ownership, the perimeter is set to be on the border of an owner plot which separates the built-up from the agriculturally exploited territory. In most cases, these are croft roads, boundaries and garden fences. The transition area between the municipality and the landscape is a specific area that requires an increased attention when selecting the green areas to join the residential area with the landscape. The green areas at the borders of the village join the residential areas and the landscape and help to form its silhouette (PRUDKÝ, FLEKALOVÁ; 2008). It is more difficult to set this border in an area with more plots (dealing with more owners) and also the number of measurement units (MU) is greater than in low-lands. In the assignment areas in the Ústí nad Orlicí district, the inner perimeter couldn't even be set, as the plots of the unfinished assignment dealings reach the residential part of the municipality. In the case of such findings, the Cadastre Office frequently sets a requirement to include the whole cadastral territory into the LC; therefore, there is no need to set the transition zone. From the point of the view of the creation of the landscape, this becomes to be the best solution. Subsequently, the Land Settlement Offices can take care of the most organic joining of the green zones within the shared establishments of the com-

I: *The list of monitored land consolidations, characteristic of natural conditions*

The title of complex land consolidation	**total area of the cadast. terr.**	**area of the LC**	**length of contour lines, per 1 ha of the cadastre**	**altitude above the sea level**	**av. precip.**	**av.temp.**	**MSU 40**	**MSU 41**
units	**ha**	**ha**	**m**	**m. a. s. l.**	**mm**	**°C**	**ha**	**ha**
1st group of complex LC – foothills territories								
Lichkov	912	803	656.8	520–680	861	6.7	65	0
Velká Morava	2 188	794	739.8	580–1 374	1 182	1.7	95	0
Červený Potok	505	505	610.5	531–720	861	5.5	0	42
Dolní Morava	363	296	717.9	580–868	800	5.0	44	0
Horní Lipka	670	670	541.5	650–900	861	6.8	18	0
Jakubovice	352	325	409.4	390–500	826	6.5	0	0
Králíky II	1 067	550	369.1	532–740	841	6.7	20	0
Kameničná	858	561	330.8	410–530	773	6.9	4	0
Pastviny u Klášterce nad Orlicí	837	615	708.9	520–620	800	5.5	58	5
Žamberk	1 691	330	402.4	413–488	837	7.0	6	0
Helvíkovice	1 073	975	347.8	430–530	837	7.0	0	0
Klášterec nad Orlicí	1 791	1 575	708.8	500–1 090	800	5.5	62	132
Kunvald	2 919	2 818	532.1	450–500	828	5.5	0	40
Písečná u Žamberka	885	1 030	712.9	340–467	792	7.0	0	8
2nd group complex LC – other territories								
Džbánov u Litomyšle	262	246	263.6	410–500	750	7.5	0	0
Voděrady u Českých Heřmanic	518	473	347.3	370–430	750	7.5	18	0
Dolní Sloupnice	1 055	492	270.7	320–370	729	7.7	8	0
Horní Sloupnice	1 693	372	465.0	370–480	729	7.7	19	0
Hrušová	608	551	161.5	280–359	680	8.2	0	0
Slatina u Vysokého Mýta	430	41	180.1	280	680	8.2	0	3
Tisová u Vysokého Mýta	1 097	160	192.8	280	680	8.2	11	0
Vysoké Mýto	2 758	621	204.6	280–350	680	8.2	0	17
Vraclav	974	880	281.0	255–373	680	8.2	0	0
Ostrov u Lanškrouna	1 854	1 843	483.1	370–590	764	7.7	18	0
Rudoltice u Lanškrouna	1 593	1 025	450.0	350–550	764	7.7	10	0
Žichlínek	1 075	802	172.1	340–370	744	7.7	0	0
Dolní Třešňovec	638	590	297.9	375–450	764	6.5	43	55
Luková	1 280	1 065	260.3	340–380	764	7.7	0	0



1: *General map of monitored land consolidations in the Ústí nad Orlicí district*

plex LC in the transition area with the municipality (PRUDKÝ, FLEKALOVÁ; 2008).

The numbers of MU of the planimetric measurement and the numbers of building plots counted on 1 ha in the area of the LC are listed in the Table II.

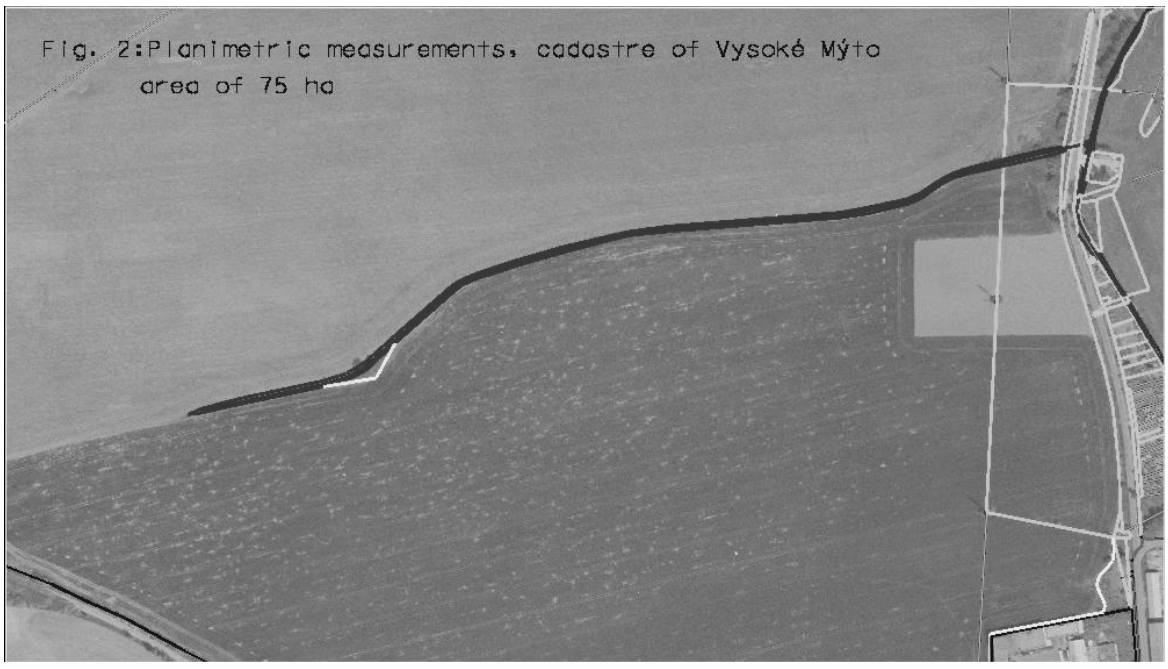
Project works

The main possibilities of restoration of ecological stability of landscape consist of the realization of the LC, mainly the common facilities in complex LC. An LC that respects the proprietary, ecological, economical, water-management, transport and other

conditions is the basic provision to apply the principles of protection against erosion (JANEČEK and others, 2007) in the case of active cooperation of the farmer farming on the plots endangered by the erosion.

The elaboration of surveys and analyses on the territory is related to the identification and description of a large number of phenomena and objects, including the evaluation of a large number of details.

It is especially necessary, difficult and demanding to find the border between two ecotones. The most important transitions, regarding its quality, are usually on the borders of totally different ecosystems, such as forest-field, forest-meadow, meadow-



2: *Planimetric measurements, cadastral territories of Klášterec nad Orlicí and Vysoké Mýto (illustrative picture)*

II: *Realized geodetic works*

The title of complex land consolidation	total area of the cadastre territory	area of the land consolidation	planimetric measurements	counted per 1 ha of the complex LC	number of plots	counted per 1 ha of the complex LC
units	ha	ha	m	m.ha^{-1}	number	number. ha^{-1}
1st group of complex LC – foothills territories						
Lichkov	912	803	92 637	115.36	49	0.06
Velká Morava	2 188	794	231 181	291.16	197	0.25
Červený Potok	505	505	176 233	348.98	108	0.21
Dolní Morava	363	296	76 647	258.94	27	0.09
Horní Lipka	670	670	242 971	362.64	185	0.28
Jakubovice	352	325	72 669	223.60	3	0.01
Králíky II	1 067	550	50 776	92.32	44	0.08
Kameničná	858	561	175 575	312.97	80	0.14
Pastviny u Klášterce nad Orlicí	837	615	190 849	310.32	92	0.15
Žamberk	1691	330	80 857	245.02	31	0.09
Džbánov u Litomyšle	262	246	82 267	334.42	2	0.01
Helvíkovice	1 073	975	325 857	334.21	67	0.07
Klášterec nad Orlicí	1 791	1 575	605 593	384.50	331	0.21
Kunvald	2 919	2 818	930 445	330.18	283	0.10
Písečná u Žamberka	885	1 030	214 777	208.52	35	0.03
Voděrady u Českých Heřmanic	518	473	128 768	272.24	0	0.00
2nd group complex LC – other territories						
Dolní Sloupnice	1 055	492	89 581	182.08	27	0.05
Horní Sloupnice	1 693	372	87 696	235.74	0	0.00
Hrušová	608	551	210 706	382.41	5	0.01
Slatina u Vysokého Mýta	430	41	8 508	207.51	0	0.00
Tisová u Vysokého Mýta	1 097	160	40 631	253.94	1	0.01
Vysoké Mýto	2 758	621	87 572	141.02	63	0.10
Vraclav	974	880	202 879	230.54	6	0.01
Ostrov u Lanškrouna	1 854	1 843	434 110	235.55	259	0.14
Rudoltice u Lanškrouna	1 593	1 025	653 421	637.48	15	0.01
Žichlínek	1 075	802	155 204	193.52	27	0.03
Dolní Třešňovec	638	590	144 389	244.73	30	0.05
Luková	1 280	1 065	199 350	187.18	10	0.01

water areas, etc. (TRNKA, 2008). Generally, the borders between the matrix landscape and the inside landscape elements are considered the most important ecotones. From the point of view of the intermediation of ecological stability, these borders are usually among the most important (SKLENIČKA, 2003). Although in the nature it is logically not a border in the form of a line, it is necessary to set it like a line for the purpose of the measurement. The identification of some phenomena has to have the form of a commission examination with subsequent measurements.

The subject of the survey, examination and subsequent measurement is a range of other details. These details begin with current road network, gradient sections, sections with small radius, waterlogged and rutted sections with unstable roads, higher number of crossings with other line objects, especially crossings with streams, drainage channels, evaluation of flow profiles, capacity of bridges and passes, longer channels for collected drainage, the behavior of water in the basin (such as recessing or, vice versa, sedimentation). There are also a large number of landscape elements, groups of trees and bushes and individual woody species. For many reasons, the identification of the border between the plots with different falling gradient, especially of boundary values over 7°, over 12° and steeper, the

III: *Realized proposal works*

The title of complex land consolidation	total area of the cad. terri.	area of the LC	length of road net-work	counted per 1 ha of the complex LC	num. of consi-dered profiles	counted per 1 ha of the complex LC	total length of con-sid. pro-files	counted per 1 ha of the complex LC	number of LPIS blocks in the complex LC	total area of the LPIS blocks in the complex LC	counted per 1 ha of the complex LC	average area of 1 LPIS block
units	**ha**	**ha**	**m**	**m.ha^{-1}**	**number**	**number. ha^{-1}**	**m**	**m.ha^{-1}**	**number**	**ha**	**number. ha^{-1}**	**ha/1block**
1st group of complex LC – foothills territories												
Lichkov	912	803	7830	9.75	42	0.0523	12 045	15.00	65	373	0.0809	5.74
Velká Morava	2 188	794	13 405	16.88	0	0.0000	0	0.00	97	357	0.1222	3.68
Červený Potok	505	505	15 718	31.12	19	0.0376	6 253	12.38	50	386	0.0990	7.72
Dolní Morava	363	296		0.00	38	0.1284	11 119	37.56	45	276	0.1520	6.13
Horní Lipka	670	670	21 616	32.26	11	0.0164	6276	9.37	72	463	0.1075	6.43
Jakubovice	352	325	11 025	33.92	67	0.2062	17 411	53.57	28	274	0.0862	9.79
Králíky II	1 067	550	16 775	30.50	16	0.0291	6 150	11.18	51	417	0.0927	8.18
Kameničná	858	561	21 490	38.31	11	0.0196	7 085	12.63	123	393	0.2193	3.20
Pastviny u Klášterce nad Orlicí	837	615	17 375	28.25	30	0.0488	6 892	11.21	102	341	0.1659	3.34
Žamberk	1 691	330	4 279	12.97	10	0.0303	2426	7.35	43	161	0.1303	3.74
Helvíkovice	1 073	975	41 259	42.32	90	0.0923	14 703	15.08	163	619	0.1672	3.80
Klášterec nad Orlicí	1 791	1 575	60 452	38.38	72	0.0457	17 190	10.91	235	817	0.1492	3.48
Kunvald	2 919	2 818	92 441	32.80	37	0.0131	16 665	5.91	417	1656	0.1480	3.97
Písečná u Žamberka	885	1 030	29 915	29.04	45	0.0437	8 710	8.46	66	470	0.0641	7.12
2nd group complex LC – other territories												
Džbánov u Litomyšle	262	246	8 836	35.92	2	0.0081	1 110	4.51	17	152	0.0691	8.94
Voděrady u Českých Heřmanic	518	473	16 295	34.45	4	0.0085	3 165	6.69	75	398	0.1586	5.31
Dolní Sloupnice	1 055	492	9 120	18.54	28	0.0569	10 030	20.39	53	443	0.1077	8.36
Horní Sloupnice	1 693	372	6 085	16.36	28	0.0753	7 430	19.97	55	425	0.1478	7.73
Hrušová	608	551	11800	21.42	12	0.0218	6200	11.25	48	558	0.0871	11.63
Slatina u Vysokého Mýta	430	41	1210	29.51	0	0.0000	0	0.00	4	51	0.0976	12.75
Tisová u Vysokého Mýta	1 097	160	3 905	24.41	3	0.0188	989	6.18	15	124	0.0938	8.27
Vysoké Mýto	2 758	621	19 365	31.18	7	0.0113	2915	4.69	37	504	0.0596	13.62
Vraclav	974	880	21 769	24.74	17	0.0193	8141	9.25	48	715	0.0545	14.90
Ostrov u Lanškrouna	1 854	1 843	45 955	24.93	213	0.1156	61 958	33.62	145	1 098	0.0787	7.57
Rudoltice u Lanškrouna	1 593	1 025	16 770	16.36	95	0.0927	32 213	31.43	58	797	0.0566	13.74
Žichlínek	1 075	802	24 015	29.94	48	0.0599	21 932	27.35	39	737	0.0486	18.90
Dolní Třešňovec	638	590	18 852	31.95	36	0.0610	14 932	25.31	60	440	0.1017	7.33
Luková	1 280	1 065	30 025	28.19	88	0.0826	37 091	34.83	42	983	0.0394	23.40

detection of the length of the fall line (see Table III) and the description of the exposition towards the cardinal points, are also necessary. The borders of forest plots, road plots, rails, and plots with stream channels have to be set by commission. On a more plain and panoramic area, the examination is easier from the point of view of the number of phenomena in the area.

In the Table III you can see the numbers of MU of the proposed road network necessary to make the plots accessible and the number of MU used for the evaluation of erosion phenomena, recalculated for 1 ha of the perimeter of the LC.

The variability of the terrain establishes the need of a more detail setting of the location of the plots on which the roads are proposed to be. The directional and altitudinal ratios of the roads are subject to the condition of the terrain (ČSN 736109). The plots for shared establishments have to make it possible to place not only a road on them, but also other elements, at least a longitudinal drainage by a one-side channel complemented, if possible, by the placement of green areas with the possibility of stabilization of its extension by planting woody species. If the road is led across the slope, it can be considered a technical soil conservation measure to prevent the soil from soil erosion rate in the closest steep surroundings. In a similar situation, it is also difficult to situate the exits from the road to adjacent plots; these cannot be placed anywhere, but only where the terrain enables it, with the aim to serve at least two adjacent plots on their shared proprietary border.

A larger variability, especially concerning the sloping, brings an increased labor intensiveness and severity of the layout proposal for the shared establishments, compared to plain territory, especially when planning roads. The length of the proposed roads (see Table III) is not the only indicator of their severity, but it is also the need of area, especially if the road shall bear more functions than simple access. It should be stated that the proposed road network has to respect current changes in agricultural production, especially regarding the density of the network and the necessity of land for such network. The original road network had to connect the plots with the farm, since the farm was the place for gathering, processing or consuming the products of the plots and the place where farm fertilizers were gathered. The current road network only has to connect the plots with other reinforced roads or serve for the transport towards the place of a common storage or processing of the product; also where the location of cattle slurry or farmland manure is concentrated and the main aim of the roads is to minimize the impact of driving on the soil. The length of the roads is not in a direct proportion with increased variability of the terrain; the major variability of the terrain makes the roads more expensive and more demanding from the point of view of their directional and altitudinal orientation. The comparison of the number and size of LPIS blocks (See Table III) clearly shows a relation with the proposed length and density of the road network.

It is an especially complicated task to prepare the proposal of a new situational layout of the plots, so that they meet the criteria of increased protection of the soil from erosion, by way of appropriate shape of the plots and the location of roads by the plot. In foothills conditions, the original layout was the so-called strap lay-out where the plots are markedly longer than wider. Originally, the majority of works were performed by the fall line. This way of situational layout of the plots became more difficult by the breaking down of possession of lands and was improved by the possible reallotment. Until 1940, it was not possible to proceed to the reallotment based only on legal provisions; it was only possible as voluntary and with 100% acknowledgement of all participants. The strap layout of the plots was otherwise logical because it divided the plots according to the quality of the land, especially the granularity and water retention capacity but also the distance from the farm, which were all very important factors.

The plots in the strap were separated by meadows in depressions and by the alternation of crops so that the longitudinal segments of the plot had a different vegetation cover which served as protection from soil erosion. For the current proposal of the LC it is difficult to design especially smaller plots so that they fulfill the required parameters, meet the normative adequacy of the area, price and distance, and so that the plots are of a good shape and near to the road network.

For the case of individual use of a small proposed plot, we have to bear in mind the possible changes in agricultural production, especially the separation of cattle breeding from farming on a small area, orientation towards market crops, i.e. lower possibility to use a suitable vegetation cover. Although such small plots are used only for small farming, other fields are usually cultivated together with others in larger blocks; the legal provisions do not know such situations and they always speak about the plot as the object of cultivation on the part of the owner. Such situation usually cannot be sorted out in practice by the LC and in case the developer wants to take care of the shape, location, protection from soil erosion and the accessibility of small plots, the proposal does not usually comply with all the requirements. Therefore, the solution concerning the small plots should be seen especially in the possibility of creating and consolidating a block of plots within a territory bordered by natural phenomena or objects. The characteristics of individual plots, especially the small inner plots, can only be set in terms of appropriate size and access as factors necessary for their use and important for the creation of market price; the soil conservation measures is then realized by a common measure for all neighboring plots. The LC would need to be satisfied only with the consolidation of such blocks and their only subsequent division into the individual plots of the owners, without keeping the aims of fulfilling all the targets of the consolidation (shape, location and accessibility of the plots).

The side effect of the LC is the creation of conditions for sale and purchase of the plots where the small plots are usually bought by larger owners and then they therefore merge.

The lowering of the soil erosion rate on the plots is one of the important parts of the proposal. The choice of profiles is a combination of the slope inclination and length and it is necessary to evaluate and, possibly, calculate the erosion danger for all plots. For the evaluation of the endangerment of agricultural lands by water erosion and the evalua-

tion of the efficiency of the proposed soil conservation measures in the Czech Republic, as well as in other countries, the "Universal Soil Loss Equation – USLE" by Wischmeier and Smith is used (JANEČEK and others, 2007). The selection of the profiles (see Table III) on the selected area, where the soil erosion rate shall be calculated, is usually based upon a subjective opinion or experience of the developer, as well as the decisions on where to have the drain lines and evaluate whether it is sufficiently interrupted. The balk cannot be considered an efficient interruption of the length of the plot on the fall line; only collecting or retaining lowering or channel that prevent the water from flowing onto a lower area can (TOMAN, 1996). A significant result in the lowering of the soil erosion rate can be reached by decreasing the slope length, selection of appropriate vegetation cover, use of special technologies. The decreasing the slope length is related to the proposed shape of the plots or to the technical measures proposals. The selection of vegetation cover is unfortunately given by the production orientation where other elements have greater importance than the erosion endangerment. The dales, valleys, saddles and basins shall be covered by grass. It is the reinforcement of the line of collected drainage after torrential rains and spring snow melting (KVÍTEK and others, 1995). In case of LC we have an exceptional chance to influence the factors of the soil erosion rate for a long term by significant technical action. The technical line element of the soil erosion control can create a permanent obstacle th2at interrupts usually very long length of the slopes and limit the influence of the surface drainage (JANEČEK and others, 2007). Therefore, bearing in mind the costs related to such measurement and its otherwise difficult realization, it is important to do a detailed analyses, calculation and preparation.

The evaluation of the soil according to the Evaluated Soil Ecological Units (ESEU)

Although the re-assessment of the quality is not a direct part of the LC, the actualization based on the measured situation and real-time exploration on the spot is an integral part of the settlement of the requirements. The geomorphological conditions also are very important here. In a variable terrain, the actualization of the ESEU, as well as the re-award of quality is a more difficult task than on the territory with homogeneous soils. The main soil units (MSU) usually differ in granularity and maybe also water regime. On a hilly territory, the influence of gley soil formation process, gley process, as well as steepness, skeletonity and exposure can be noted.

After 1989, when significant changes occurred in the owner rights relationships towards agricultural properties and during the renovation of owner rights towards the land, it was found out that the applied precision of the ESEU definition (> 3 ha for the ESEU in case of non-contrast character and > 0.5 ha for contrast ESEU) is insufficient (MAŠÁT and others, 2002), the re-awarding of quality means a significant increase in the existence of changes in the map of the isoclines ESEU. This is related to a rather large extension of the planimetry changes in the definition of forest plots which are not awarded the quality level, although they were included in the original quality awarding.

The definition of the MSU 40 and 41 based on the measurement becomes a base for the preparation of new plots and the definition of the types of the plots. The land on the slopes major than 17 degrees has to be transformed to the plots that are used to fulfill the function of forest, (DUMBROVSKÝ *et al.*, 2004) and other sloping land shall be changed from arable land to permanent grass vegetation.

In the Table I, you can see the area in ha of the MSU 40 and 41 in particular monitored LC that generally reflects the separately delimited plots, for their sloping.

DISCUSSION AND CONCLUSION

The aim of this paper is mainly to point out the proper complications and difficulties in the preparation of the LC. From the data collected, it is yet not possible to draw any important conclusion on the dependence between the factors and methods of work. On the other hand, it is possible to monitor some relations and, as minimum, accept them as a hypothesis for further verifications. Generally, it is beneficial to concentrate on the topic of the elaboration of the proposal and not be limited only to a methodological process for every action, but also, in every occasion, contribute to the seriousness, responsibility and complex attitude to the subject of the paper, i.e. the territory in the whole picture, cultural and historical connections of the development of the territory, bearing in mind that it is even possible to promote the development if there is necessary work invested into the basic links, rules and relations so that its use helps to cultivate and enrich it. The founding of new long-term ownership relations and other relations between people and the territory can help to achieve this.

SUMMARY

Land Settlement Boards carry out land consolidation (according to the Act No. 139/2002 Coll.), which differ according to specific conditions of the territory. Land consolidation processes are carried out under contracts and yet are paid in full by the state budget, as the state administration performance.

One of the goals of the land consolidation is to organize ownership of land, ensure its rational cultivation and simultaneously propose measures to improve the environment. To achieve these objectives, there are proper procedures for designing and implementing the land consolidation. Land consolidation processes, performed mostly within one cadastral area, differ from each other due to different landscapes and specific conditions in their elaborateness, difficulty, and hence also costs.
The differences according to selected conditions and their impact on character, extent, or peculiarities in the implementation of the analysis of the area, including detailed geodetic surveying, drafting of common facilities, design of optimal adjustment of plots and priorities in the implementation of common facilities, were monitored in cadastral territories with already closed land consolidation processes.
The aim was to explore the interdependencies between the characteristics of the treated area and the frequency and extent of work proposed, for example, for the preparation of procurement documentation.
Individual land consolidation processes were divided into groups according to the character of the area and various preparatory and design works were monitored.
An amount of results was achieved, the base of which are given here. These are mainly the results reflecting the activities associated with the preparatory works (site surveying) and the activities associated with designing, in particular the road network for accessing the plots.
The most expensive part of the land consolidation process is geodetic surveying; the cost volume is based on the morphology of the treated area. If we make a simplified statistical comparison of the number of length units of planimetric measurement on 1 ha of the area, we find out that it is necessary to have at least 3–4 MU (1 MU = 100 m), compared to a plain territory, where this indicator is only 1.5–2.5 MU. Since the cost of the geometric works is more than a half of the costs of the whole LC proposal, it is clear that it has an important impact on the labor-intensiveness and price of the LC proposal.
The important part of the project is a proposal to reduce soil loss on endangered plots and is heavily influenced by the experience of the designer, how he is able to include all the requirements into a particular landscape.
Humans influence the development of the landscape in many ways. Agriculture is one of the oldest human activities. In each historical period the man has created a special landscape "matrix" formed by the specific arrangement of land use - fields, vineyards, orchards, forests, water, settlements, etc. (ŠARAPATKA, NIGGLI, 2008). The land consolidation seeks to do well to the countryside, but also to adjust the ownership so as to ensure access of the owners to the plots, ensure suitable shapes of plots and no exposure to the risk of erosion. Landscape can thrive only when the interests of users and the landscape are not in conflict. For example, the river landscape is best assured when the land is in public ownership and is used without the goal of profit. This is possible only exceptionally, in the foothill area with the allotment system, where there is plenty of state land and grant policy consistently supports the landscape, rather than agricultural exploitation.

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