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4 The neolithic houses

Pieter van de Velde

Remains of 69 houses have been partially or wholly excavated at the Janskamperveld village; they are analysed and described. Disregarding partially unobservable houses there are 30 three-part or type 1 constructions, 13 two-part or type 2, and 8 one-part or type 3 buildings (resp. Großbauten, Bauten *and* Kleinbauten*). The walls, another major characteristic of LBK houses, have been set up as boards all around (type a, 5 houses), boards around the rear part and wattle-and-daub elsewhere (type b, 13 houses), or as wattle-and-daub only (type c, 29 houses). The widths of the houses hardly differ from 5.1 metres, but lengths vary between 5.7 and 31.2 metres (with central parts generally between 5 and 10 metres), floor areas range from 25 to 190 m^2. In line with the early dating of the village, 42 houses have a corridor separating the central and rear parts, in addition 6 of them also present a corridor between their central and front parts. The interior space of the houses is subdivided by the three-post-rows ('DPR') into bays, in most of the constructions 2 or 3 per part, together some 2 to 7 bays per house.*

4.1 General remarks

In the appendix to this chapter, the tables and plans (figs. 4-6 ff.) list and show details of the 69 Bandkeramik house plans recognized in the excavated part of the Geleen-Janskamperveld settlement. The labels (H-numbers) are the same as those in Schute (1992) and Louwe Kooijmans *et al*. 2002. H 60 and H 61, in accordance with the Schute catalogue, as well as H 66 indicate constructions discovered previously during the housing estate development (Vromen 1985). HH 62-65 and 67-69 were recognized subsequently when the excavation plans were further analysed. The present discussion will not go into every single entry of the summary tables, not even every variable. Just a number of issues raised by Cladders/Stäuble (2003), Pavlů (2000), Coudart (1998), Von Brandt (1988), and Modderman (1970) will be followed up here. Of course, even a short glance at the tables will show that their conceptual background is largely predicated on texts by these authors.

Before entering into details, some remarks on the reliability of the observations are warranted. While analysing the plans, estimates of the quality of the conditions for the different observations were assembled and the weight determined that should be accorded to them, indexed on a five point ordinal scale, the observational quality index *w*. This index ranges from 0 for *'very bad conditions'/'no weight to be accorded'* to 4 for *'excellent conditions'/'reliable observation'* (table 4-1 provides summary definitions). Obviously, a certain amount of subjectivity cannot be avoided; yet an offset of more than one scale point seems unlikely, as earlier experiences have proved (cf. especially Van de Velde 2001). Table 4-2 groups together the observations' qualities of the LBK houses at the Janskamperveld settlement, divided over the structures' main features.

From table 4-2 it is apparent that only seven out of 69 houses are fully observable, while only guesses can be voiced for another eight houses (see column H); though a little skewed, the quality of the observations on the houses is more

w	conditions
4	excellent: reliable
3	good: fair estimate
2	reasonable: estimate
1	bad: poor estimate
0	very bad: mere guess

table 4-1 *w*, an index for the quality or reliability of observations

w	A	B	C	D	E	F	G	H
4	16	26	23	24	31	19	23	**7**
3	9	10	6	7	8	17	8	**15**
2	16	18	15	10	7	14	13	**14**
1	14	9	11	9	5	11	13	**25**
0	14	6	14	19	18	8	12	**8**
sums:	69	69	69	69	69	69	69	69

table 4-2 the quality of observations of structural features of the houses
col. A: overall length of the houses
col. B: partitioning of the plans
col. C: front or SE part
col. D: corridor between front and central parts
col. E: corridor between central and rear parts
col. F: central or middle part
col. G: rear or NW part
col. H: weighted average evaluation

or less normally distributed around bad to reasonable. Clearly the central features (the corridors, the middle part itself; as per columns D, E, and F) are better readable than the front and rear parts (columns C and G). These evaluations will have to be borne in mind in the subsequent paragraphs. Approximately 61% of the surface area of the settlement – as determined by the extension of surface finds in the field – has been investigated. The southern rim of the settlement and small areas to the north and east have only been partially excavated; consequently, a non-negligible number of houses in the settlement could not be analysed.

4.2 General, formal characteristics

It is customary to start a description of LBK houses with the length and width of the plans, as well as their orientation. Regarding the orientation of the houses on the Janskamperveld, fig. 4-1 enumerates the azimuths of their long axes, counted clockwise from north = 000°. House orientation is the point on the horizon to which the front gable and the entrance of the house are directed, roughly southeast in the Northwestern LBK. Given the rather wide spread of the orientations at the Janskamperveld settlement, it is quite unlikely that they refer to constant celestial phenomena such as midwinter sunrise, although this is also in a southeasterly direction[1]. Most astronomical phenomena occur always at the same bearings from a fixed geographical location such as a settlement, so one would expect a narrower distribution around an acutely observable target event than shown by the layout of these houses (only the moon's and planets' risings provide exceptions). It seems more likely that they point to Flombornia[2], from where the ancestors of the settlement's inhabitants came when they first settled in Dutch Limburg (see also, Bradley 2001), within living memory of the builders of the houses on the Janskamperveld. However, other authors have offered other suggestions to explain the phenomenon: e.g., directed toward the upper course of the Danube (Hauzeur 2006, 280-281, fig. 4-233), or the backs turned towards the nearest sea coast (Coudart 1998, 88-89, fig. 4-102).

House orientations are almost impervious to post-depositional disturbances as a single three-post-row ('DPR', from German *Dreipfosten Reihe*) or a few ridge poles suffice to establish them reliably. As can be seen from fig. 4-1, the most extreme orientations are 106° on the left or northern side, and 162° on the right or southern side; the average is 127°, not fully SE (which is 135°). With a standard deviation of 11.5° the distribution is quite flat (widely spread) as already noted. This is not exceptional in the Bandkeramik world, as for instance in nearby and partially contemporary Langweiler 8 (Von Brandt 1988, 218) the 82 houses are orientated between 108° and 161°, only one degree less wide on either side than on the Janskamperveld, their axes' standard deviation being also 11.5°, but averaging 136°.

The overall dimensions of the houses on the Janskamperveld are presented in graphical form in fig. 4-2. Evidently, their widths do not differ very much (range: 4.2 to 6.8 metres; average 5.1 with standard deviation 0.5 m), but the opposite is true for the lengths which range from 5.7 to 31.2 metres (mean 14.4 m, standard deviation 5.9 m). Length to width ratios range accordingly from 1.1 to 5.6, showing as much

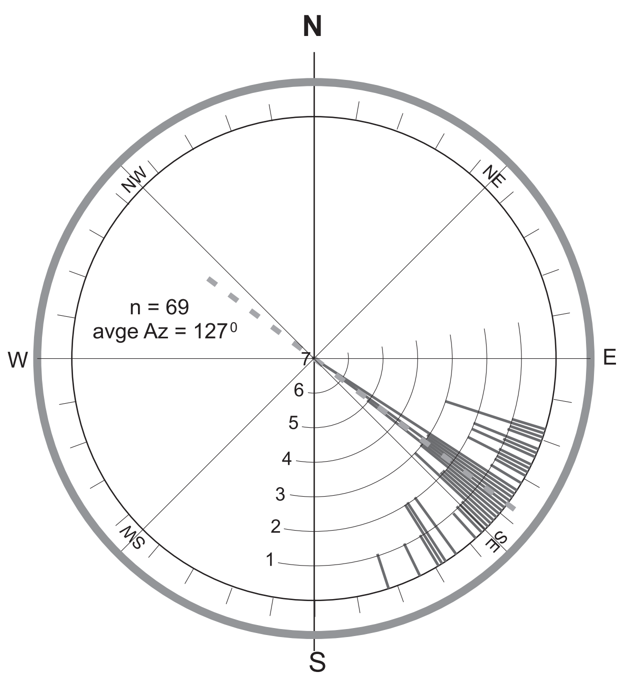


fig. 4-1 the orientation of the LBK-houses at Geleen-Janskamperveld

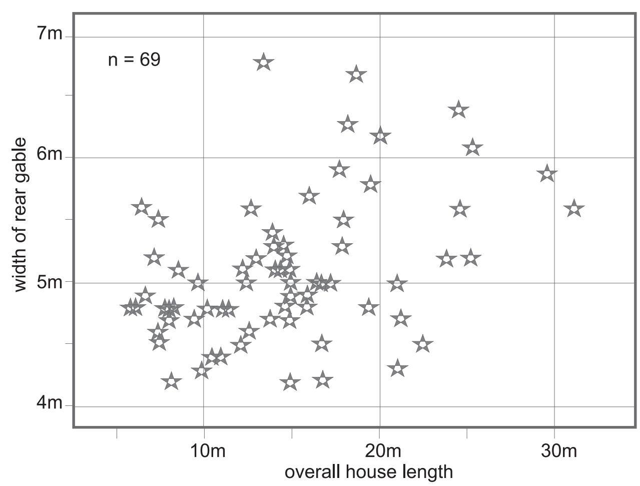


fig. 4-2 house length by width of rear gable (metres) variation as the house lengths. As mentioned earlier, these figures are not exceptional in the Northwestern Bandkeramik, whereas in Central Europe house sizes are even more differentiated. Thus, comparable figures for the 95 LBK houses at Bylany (Czech Republic) are 4.0 to 6.8 m wide (average 5.3 m), and 4.3 to 48.2 m long (average 15.4). There the distribution of lengths is three-modal, and suggests a division into long, medium, and short houses, with class boundaries at 13.5 and 26.0 m (Pavlů 2000, 190). At Geleen-Janskamperveld, however, the distribution of lengths is quite normal without subpeaks or gaps, with 23 houses within 3 metres (half a standard deviation) of the average length, and 14 houses in the lower tail and 16 in the upper tail, omitting lengths with observational qualification $w = 0$. Also, the correlation between length and width of the houses is only 0.40, from which it may be concluded that groupings or subdivisions of the houses according to either surface area or overall length are very much the same, being mainly dependent on length, at least in the present case.

More interesting though, especially from a methodological point of view, are the figures presented in table 4-3 where the relationship between the major houses dimensions and observational quality is detailed. Minimum house length and width are apparently fairly constant data, as the lowest values for the first and the averages of the second do not differ much in general. Yet at first sight the maximum lengths, and also their averages, seem to be correlated with the observational conditions. However, that correlation is only 0.28, or even 0.26 when the entries with a *w*-index value of zero are omitted; so almost negligible. The same holds necessarily for the (estimated) surface areas of the houses: the maxima as well as the averages show trends parallel to the reliability index values, but again this apparent correlation is almost spurious, with r = 0.25. It can even be inferred that less than 10% of the variation in house lengths or surface areas is attributable to bad observational conditions (as the r^2 are equal to 0.08 and 0.06, respectively).

If observational conditions can (almost) be ruled out, what are the causes of the variable lengths of the Bandkeramik houses at Geleen-Janskamperveld? The answer is, of course, the variable partitioning visible in the diversification of the house plans. There should be some relationship between the overall length and the partition, simply because all plans of the LBK houses show constructional coherence, whatever their complexity.

To substantiate that relationship, table 4-4 provides the number of one-, two- and three-part houses (resp., *Kleinbauten, Bauten,* and *Großbauten* in the terminology of Bandkeramik studies) recognized in the excavation plans per visibility category. As elsewhere in Bandkeramia, at Geleen-Janskamperveld houses consist minimally of a single central or middle part (in conventional typology these minimal constructions are labelled 'type 3', or *Kleinbau*), with an entrance in the southeastern wall, the front. This central room is often complemented by a second part or section at the rear, which is always to the northwest in the present Bandkeramik province (labelled 'type 2' or *Bau*, if the house plan is restricted to a combination of these parts). A single extension towards the front has as yet not been observed in this area. An extension with a third room to the front, in a southeasterly direction, yields the most complex house form ('type 1', or *Großbau*). It should be emphasized that the internal configurations of the three parts differ from each other, yet are more or less standard constructions (Modderman 1970, 100-120; Von Brandt 1988, 40-41; Coudart 1998, 27). Because of this early standardization, recognition is relatively easy, and for that reason the distribution of the observational qualities is quite different from that of the summary values in table 4-2 above. Starting with table 4-4[3], in the column for the best conditions ($w = 4$) the number of three-part houses is larger than that of single- and two-part houses combined (as observed long ago for settlements from the older phases of the LBK: Modderman 1970, 112): there are 11 houses of type 1 (three-part houses), as against 4 of type 2 (two-section buildings), and 5 of type 3 (single-part constructions). The column with the fair estimates ($w = 3$) has a similar distribution of counts: 8, 2 and 2 respectively. However, for the lower index values ($w \leq 2$), the distribution of the figures is different, with a preponderance of the smaller types instead.

w	length	range	width	area	range	n
4	17.5	6.4-31.2	5.1	93.6	32.4-189.6	17
3	13.3	7.4-23.9	5,0	69.4	36.0-126.7	9
2	15.4	5.7-25.3	5,1	81.6	26.6-143.0	14
1	13.4	5.9-19.5	5,1	69.8	45.0-95.0	16
0	12.5	6.1-24.5	5,1	65.4	29.5-151.8	13

table 4-3 observational quality and major dimensions of houses average lengths, ranges and average widths in metres; average surface areas and ranges in square metres. All measurements between the axes of the post(hole)s

P*w*	4	3	2	1	0	Σ
FCR	11	8	11	5	0	35
CR	4	2	7	5	1	19
C	5	2	1	3	4	15
	20	12	19	13	5	69

table 4-4 partitioning of the houses by observational quality
P: partitioning; w: quality of observation
House parts: F = front or SE part; C = central or middle part; R = rear or NW part

This poses the problem of total numbers of houses per type in this village: if trends change with the quality of observation, this latter variable may be the cause of that apparent dependency. However, a coincidence of trend shift and visibility problems is difficult to assume, and we could consider other hypotheses. For instance, one based upon the often stated principle that larger houses have deeper postholes than the smaller ones and thus would be longer visible when erosion gradually lowers the surface (e.g., Louwe Kooijmans *et al.* 2002). If this were the case, then roughly half of the 37 badly observable buildings should pertain to the lightest category, *viz*., type 3, and of the remainder, again the larger part to type 2. This would result in approximately 25 houses of type 3 (7 with $w \geq 3$, plus ½×37 ≈ 18 for $w \leq 2$), 18 of type 2 (6 + 37/3 ≈ 12), and 26 of type 1 (19 + [37-18-12] ≈ 7). However from a constructional point of view, larger Bandkeramik houses do not necessarily have heavier foundations: the roof burden is absorbed by longitudinal poles resting on frames on top of the DPRs, and the load to be taken by the DPRs is directly related to the distances between them (cf. Von Brandt 1988, 244-247; Coudart 1998, 62-72). Assuming similar constructions of all houses, every DPR had to assimilate a similar load – as confirmed in the present settlement by the average depths of the DPR postholes: 3.0-3.5 dms, 4.0 dms, and 3.0 dms below the excavation plane for house types 1, 2, and 3 respectively, to which another 6-7 dms should be added towards the original surface. Given the fairly constant distances between the DPRs (see below) only the width of the houses is strongly consequential for the point weight of the roof, and should bear upon the size of the carrying posts – but then, there is not much variation in the width of the houses (fig. 4-2; the averages being 5.2 m, 5.1 m, and 4.8 m for types 1, 2, and 3 respectively), so there may be only a very small effect. In other words, house size/type and solidity of construction are not necessarily related, and cannot be taken to be expressed in differential archaeological preservation.

Ignoring the sturdiness argument, for different reasons house length may have an appreciable effect on our observations: larger houses have more posts than smaller ones, so with a proportional survival rate, the former are more likely to be visible than the latter. If this were the case, with average lengths of 18.5 m, 13.6 m, and 7.5 m (types 1, 2, and 3 respectively), the 69 houses in the excavation could be divided among the types with counts of 32, 24, and 13 respectively, which happens to be not far off from the total numbers in the table 4-above, and different from those estimates based on the previous argument. Again, the near coincidence of the result raises suspicions regarding its validity, for if it were applicable, the observed differences in visibility / recognizability of the houses would play no role. Probably, the assignment on the basis of length-associated probabilities should be restricted to the badly visible houses only: it is clear that there have been houses, but their signatures are unclear. These 37 houses should then be apportioned over the types, which adds 7 to type 3 (making a total of 14), 13 to type 2 (totalling 19), and 17 to type 1 (totalling 36).

There is, however, another argument bearing on the same problem. In fig. 4-3, the visibility of the remains of a Bandkeramik house have been reconstructed as a simple function of the depth of the excavation plane below the original, neolithic surface; the data on which this is based, derive from a nearby settlement excavated in the 1950s (Waterbolk 1959, 127). On average, the excavation plane at the Janskamperveld settlement site has been set at between 5 and 8 dms below the *present* surface, about 2-4 dms below the top soil. It is estimated that the neolithic surface was at about the same level as the present one (Schute 1992, 9; Louwe Kooijmans *et al.* 2002), so generally the situation as reconstructed in fig. 4-3c should obtain; indeed, substantial parts of the excavation plan are readily legible, with w-index values of 3 and 4. In reality however, compared with the neolithic situation the present field surface (and the excavation plane) undulates less due to many centuries of agriculture and its attendant erosion effects (decapitation of tops, filling up of dells; cf. Schalich 1988). Corroboration can be found in the fact that badly visible house plans tend to cluster in the excavation. Thus, the excavation plane is in some places less deep and in other places deeper than the average of 5-8 dms relative to the target situation, so w-indexes of 2 or even less are to be expected in places (fig. 4-3b, and -3e/f). Of course, when the situation in the field is as in fig. 4-3b, the plane will be set deeper, but in the reverse case there is no such way out. This post-occupational levelling of the surface, with its blurring effects, will have affected all of the settlement, not just one house type. For the higher index values, the number of houses per type should therefore reflect ("be representative of") the early situation as the excavation plane is at the right depth below neolithic datum; the unclear remains should be distributed proportionally to the former[4]. On this argument, originally probably some 41 three-section houses (19 derived from $w \geq 3$, and 22 reclassified for the lower index values), 13 two-part houses (6 plus 7), and 15 single room spaces (7 plus 8) were constructed in the excavated part of the Janskamperveld Bandkeramik settlement. In my opinion this argument is the strongest of all, although the relation of house length to probability of recognition may also have some merit, at any rate more than the other ones. If so, then 38-41 tripartite houses have stood within the confines of the excavation, 13-16 were of the two-section type, and about 15 were monopartite constructions. However, the large number of badly recognisable houses (37 out of 69) does lead to reservations about the outcome.

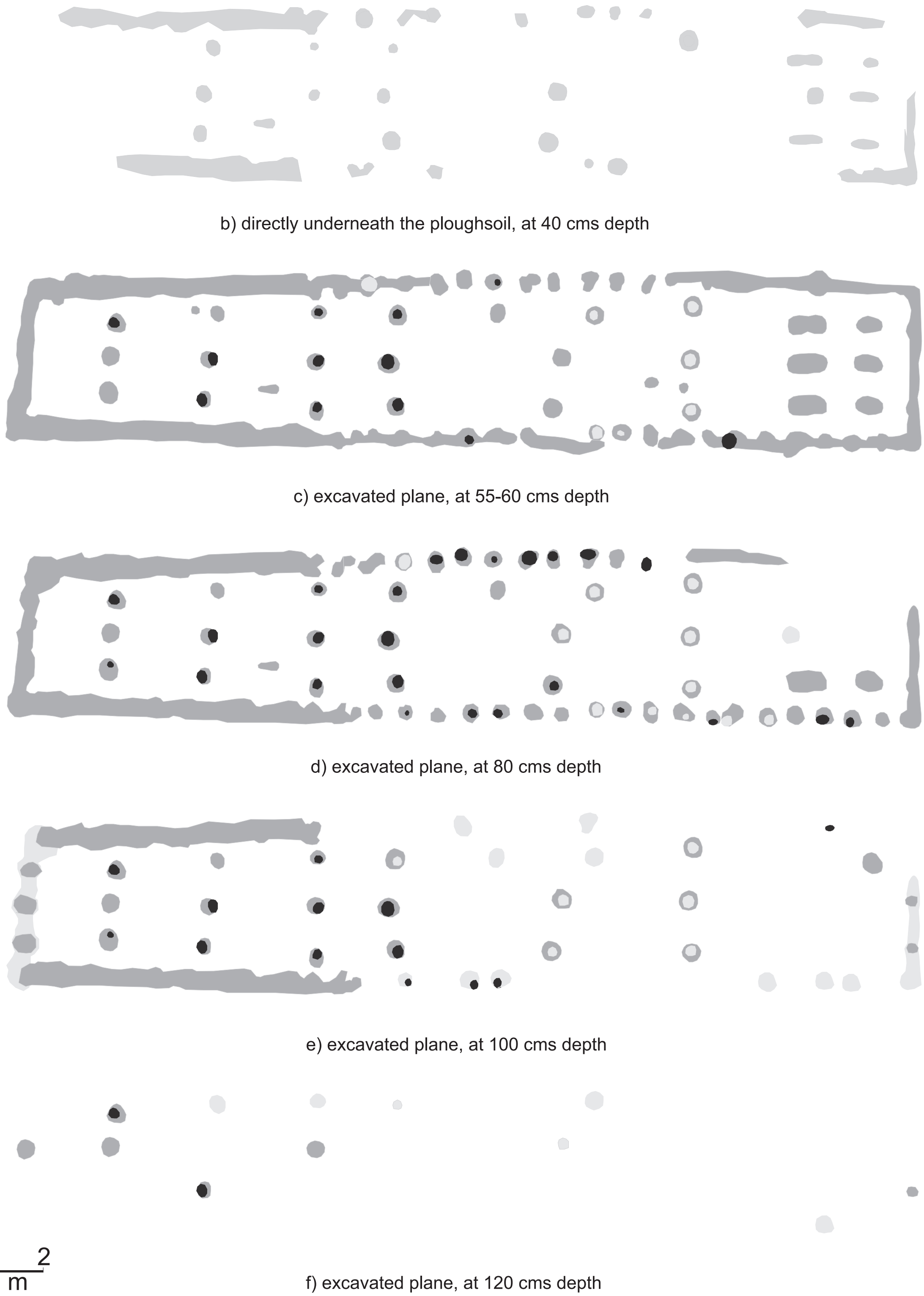


fig. 4-3 The visible remains of a large Bandkeramik house at various depths below the neolithic surface based on data for House W3 at Geleen-De Kluis; Waterbolk 1959

Turning now to more specific issues, the *always* present central parts of the houses (cf. above) show considerable variation in their lengths[5]. This length has a weakly bimodal distribution, with a separation at 7.5 metres: 33 houses have central parts which are not as long, and 33 houses have larger ones. Among one-part houses, 11 fall into the shorter and 3 into the larger category. For two-part houses, the numbers are 7 and 13, respectively; of three-part houses, 15 have central parts less than 7.5 m in length, and 17 have larger ones. Thus type 2 houses show a distribution similar to the larger type 1 buildings (fig. 4-4 is an illustration). At best a tendency towards larger central parts in the more complex constructions can be suggested, but no proof inferred. In comparison with the Janskamperveld settlement, the range of lengths of central house parts in Bylany shows appreciable differences: there, the shortest central part measures only 4.3 metres and the largest 28.9 metres (mean value 14.2 m) (Pavlů 2000, 190-191). There, the distribution of lengths of the central parts has two modes, too, with a separation of the subdistributions again close to the overall mean – in that case at 14.0 m, well beyond the largest central part on the Janskamperveld.

In the next section I shall divide the tripartite houses into three groups; types 1a through 1c (see that section for further details). Here, table 4-5 shows the differences in the main measurements of the component parts. Clearly, all parts of the type 1a houses are larger, as are their total lengths, in comparison with types 1b and 1c – a conclusion that also stands out clearly from fig. 4-4, where the five 1a types have been placed on the left, with the six 1b's, and the 21 1c houses to their right.

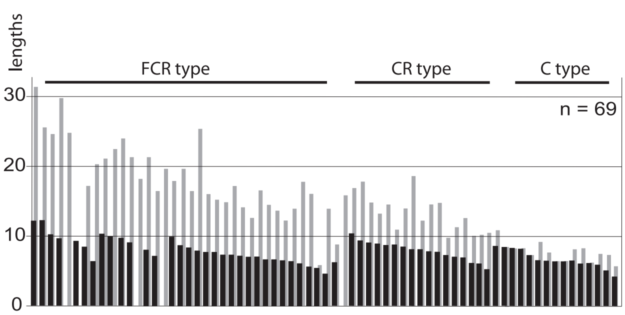


fig. 4-4 house complexity, house length and length of central parts

In the table, four houses have been classified "1x", as their class membership is unclear for various reasons; this applies to HH 18, 25, 39 and 60. Referring to their respective plans and the summary tables in the appendix to this chapter, a few additional remarks are relevant:

=H 18 shows side-wall trenches only, with neither front nor rear gable trenches; the corresponding house sections are also missing. From the sections of the lengths of the side-wall trenches, it can be established that the latter become gradually shallower towards the northwest, to disappear in the rearmost part of the central section of the house (from over 6 dms of depth in the SE to less than 1 dm in the NW). This would suggest a dislevelling of the excavation plane and neolithic surface, which – together with a five to ten centimetres deeper plane in the rear area – could account for the absence of this part. Towards the front of the house, a baulk had to be left standing because of estate development, yet in the ca. four metres between this baulk and the southeastern end of the side trenches no traces whatsoever could be ascertained of a foundation trench or of postholes. The side trenches suggest a type 1a house, and the length of the central part is considerable with 8.5 m (compare the average for the tripartite houses in this settlement which is 8.1 m). The evidence is not sufficient to substantiate that label though; on the other hand, to suppose an exceptional house construction also seems unwarranted, and for that very reason. I tend to consider this house as of type 1a yet maintaining $w = 2$ for its partitioning.

=H 25 seems a prime example of the situation depicted in fig. 4-3, somewhere between e and f, and so its overall evaluation is only $w = 1$. The symmetrical pits in the direction of the front part are suggestive of a fairly long central section of the house, leading to a type 1 proposition; however, neither

	house type	1a	1b	1c	1x	FCR
	n	5	6	21	3	35
front part	avge length	5.6	4.6	3.4	–	4.0
	range	4.5-6.9	2.4-6.7	1.8-6.6	–	1.8-6.9
central part	avge length	10.1	9.0	7.2	8.9	8.1
	range	6.4-12.2	7.1-10.2	4.7-10.0	8.5-9.3	4.7-12.2
rear part	avge length	6.7	5.7	4.0	4.0	4.8
	range	4.7-8.5	4.8-6.7	1.6-8.8	–	1.6-8.8
overall	avge length	26.2	21.0	15.8	20.8	18.5
	range	20.1-31.2	16.5-23.9	5.9-25.3	17.0-24.5	5.9-31.2

table 4-5 length of partitions by a sub-division of type 1 houses
1a, 1b, 1c: according to amended Modderman house typology;
1x: indeterminable

a front gable nor a rear part can be constructed from the very scanty remains. It seems impossible to decide on this house's type, though its possible length of several metres more than the observed 15 m is suggestive of a 1b classification.

=H 39 has many characteristics of a type 1a house on the excavation plan. Its size poses a problem, as with a length of 20.1 m it would be the smallest specimen of this type on the Janskamperveld, the next one in size (H 07) measuring 24.5 m. In a wider perspective, among the 19 houses of this type excavated so far on the Graetheide Plateau there is another small one (Stein-23, with a length of 17.0 m; Modderman 1970, T. 188); the average overall length of this house type in the entire *Siedlungskammer* being 27.5 m (standard deviation 4.9 m). Importantly, the present house has corridors both to the rear and to the front of the central part, a feature shared with all of the 1a type houses at Janskamperveld. Therefore, I am willing to accept this construction as a house of type 1a.

=H 60, finally, does not come with a clear plan mainly because of its location in a street trench, but the length of the observable right-hand side pit is suggestive of a fairly lengthy construction of at least 24.5 m, within the range of houses with three sections; the absence of wall trenches may (but need not) be due to the depth of the observational plane (again, cf. fig. 4-3). It is therefore impossible to decide between the variants of tripartite houses, and of necessity, *w* = 1 for this house.

Also problematic are houses HH 11 and 27, though they do not show up in table 4-5 as they are possibly of simpler construction:

=H 11 is situated on the eastern limit of the excavation, and its possible front part has not been excavated (hence *w* = 1); the house's substantial width, with 5.7 m over one standard deviation above the average of the entire settlement, is a weak lead to suppose a type 1b attribution, which may be countered by the small length of the rear part at only 1.8 m. Since not even the central part could be fully observed, this house will be treated as of type 2.

=H 27 is similarly located on the edge of the excavation; there is a clear rearward corridor visible on the plan, but due to the baulk behind it that could not be investigated, a possible rear part is obscured. No rear wall trench is visible, but then there are no holes for wall posts either, so there is no cue to decide upon this house's configuration, and the primary classification as type 3 is retained.

As holds for almost every combination of variables in the house plans, the correlation between overall house length and length of the central section is rather low at 0.33; which statistically "explains" only 11% of the variation in both variables. Other sources of variation are the conditions of archaeological visibility (less than 10%; see above), and – apparently much more important – those social factors that governed the partition of the houses. Given the low correlation of house width with house length, it is redundant to probe into the relationships between the overall and the several part surface areas: in every house both are dependent upon the same or very similar widths. Yet the lengths of the different parts do correlate one to another rather better than these meagre overall figures: the lengths of the central parts with those of the front yield a correlation of 0.60, rear and central parts 0.27, and rear and front parts 0.62 (zero values ever excluded). Even though these figures are appreciably higher than those presented earlier, they are rather weak statistically speaking: normally, only correlation coefficients with values of 0.7 and higher are considered worthy of attention. Any relationship of 'bigger this, so bigger that' can be ruled out, at least in the formal measurements, and this concurs nicely with one of Von Brandt's conclusions: "In summary, the ranges of the relative lengths of the several parts of the longhouses [in Langweiler 8] are much too wide to allow one to speak of dependent variables" (Von Brandt 1988, 205).

4.3 On typology, and some constructional details

Wall trenches and wall post settings define the perimeter of the Bandkeramik house. Basically, the walls of Bandkeramik houses consisted of upright posts with distances of one to two metres, with in between an infill made of either braided twigs and branches smeared with clay/loess, or of upright planks. The wattle-and-daub walls (as the first variety is called) as such do not register in the archaeological record, and only the postholes remain. Plank walls would have been set in trenches, and these may be preserved and visible in the excavated plan even when the planks themselves have disappeared, either through recycling or rot (table 4-6).

	trench	posts	indet.
front	5	44	20
sides	6	55	8
rear	19	29	21

table 4-6 distribution of wall types over façades
indet.: indeterminable

The two types of walls do not occur randomly; especially the rear part is often fitted out with trenches in which planks have stood. The central and front parts had wattle-and-daub infills predominantly. Table 4-7 lists the combinations on the Janskamperveld. One of the clearest implications of this table is that monopartite houses have been built from posts and wattle-and-daub walls exclusively, no trench at all there. Trenches occur in the larger buildings, either in the rear

walls\houses	C	CR	FCR	
trenches all around	–	–	5	5
tr's rear, posts else	–	6	7	13
posts all around	11	11	7	29
indeterminable	4	4	14	22

table 4-7 wall types by house types

section only, or all around the building in the case of a few tripartite buildings. This is the reason that Modderman has singled out these houses with all-around trenches as a special category, labelled 1a in his house typology; the remaining, more regular three-part houses with only a rear part wall trench, or with post settings all around were labelled 1b (Modderman 1970: 110-112). Recently, a further differentiation between houses with rear wall trenches and those with wall posts / wattle-and-daub all around has been proposed: types 1b and 1c, respectively (Cladders/Stäuble 2003). Being methodically better founded, and also suggestive of Bandkeramik idiosyncrasies (cf. the overall, and central part lengths in fig. 4-4 and table 4-5), I shall follow this specification (table 4-7). In the present settlement there are four (possibly six) 1a houses, and above their lengths have been compared to those of the other subcategories of tripartite houses, to the effect that on average the first group is larger than the second, and the second larger than the third (table 4-5, plus discussion).

The central part of the Bandkeramik houses – also the most frequent part, as it is common to all house types – has drawn special attention because of its diversified construction especially in the Northwestern LBK, and attempts have been made to relate the different configurations to chronology, suggesting an evolutionary trend especially in the Older Period (Modderman 1970, 112-120, 105-106; Von Brandt 1988, 189-191, 42-43). As illustrated in fig. 4-5, the central part of the oldest houses starts out with a configuration of four posts in the form of a regular Y (with the three-way point on the central axis of the building, and the stem pointing to the left perpendicular to the wall), hence christened "Y configuration" in the literature on the subject. This Y is located either halfway the length of the central part or slightly nearer to the front. The precise function of this peculiar construction (apart from the obvious one of roof beam support) has not been ascertained; one of the least exotic proposals is an extra buttress for the roof in snowstorms which usually come in from the NE quadrant in the Bandkeramik homeland which they left some generations previously. The top tips of the Y retain their places in the structure over time but with every new construction the 'stem' of the Y is set gradually further forward, until it arrives abreast of the Y's right (front) top; this configuration and the intermediate ones are called "degenerated Y's". The further forward the position of the stem, the more frequently a second post row is constructed to the rearside of the Y construction (here, dYi or Yi). Later the three-post-row to the rear of the former Y is affected by a constructional experiment as the post between the centre line and the left wall of the house is set further toward the back, to constitute a so-called "J configuration" in the excavated houses. Change does not stop there, for now the two DPRs of the central house part assume slanting lines on the plan, where before they had been either part of the "Y" or perpendicular to the long walls; this configuration is called "MS" (< German *Mittelquerreihe schräg*). Finally, the construction evolves towards three-post-rows perpendicular to the sides of the house, the "MR configuration" (< German *Mittelquerreihe rechtwinklig*). These configurational changes were not applied to standing structures but to new buildings only, suggestive of experiments to overcome perceived though not very important shortcomings of the roof construction.

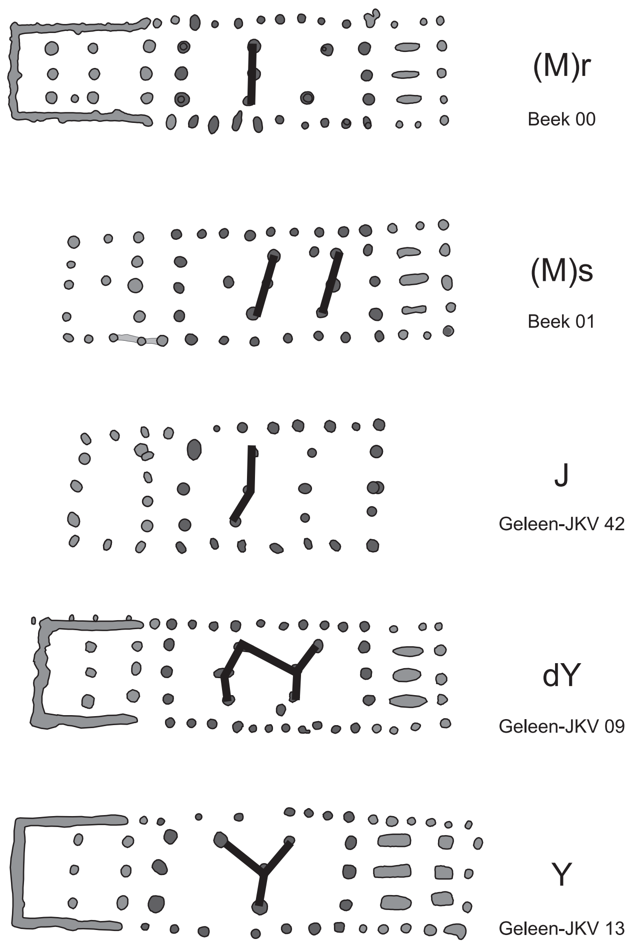


fig. 4-5 the evolution of the Y-configuration

"Pure Y configurations", also called "Geleen-Type"[6], are confined to the Flomborn period (LBK II-a in the German system; phase 1b in the Dutch chronology); "degenerated Y configurations" occur in the subsequent phase (LBK II-b, respectively 1c); "J configurations" and "MS configurations" complete the evolution at the end of the Older Period (LBK III, and 1d, respectively). Along with the "MS configurations", also the regular ("MR", or "Rx") configurations (the "Elsloo Type"[7]) start to appear which ends this development. As the Geleen-Janskamperveld settlement is dated to the Older Period, an interesting set of data on this topic is available here. In the present section I shall only discuss the constructional variations observed in the excavations, keeping the chronological implications for the appropriate chapter. Among the 40 *legible* central parts (listed in table 4-8) in this settlement, 10 show pure Y-configurations, as shown in their plans (with H 13 perhaps the most beautiful). The evolutionary next 'type' brings degeneration of the central Y ("dY"), and one of the peculiarities of the Janskamperveld settlement is the variability among these constructions. Thus, there are Y's that are "leaning" toward the front (e.g., H 57) counter to any regularity known from elsewhere; there are really exemplary degenerates (H 53 providing a fine and H 01 an extreme example). There are also degenerates with incipient additional three-post-rows, not only at the rear branch of the Y setting as it should be (such as H 09; "Y.i"), but also on the front (like H 35; "i.Y"). There is even one house where these supplementary rows[8] or foetal DPRs occur on both sides (H 45; "i.Y.i"). The J configuration – only discernable in complete plans – seems present in one house only (if so at all; the plan is not very clear, but see H 42). The Regular (slightly oblique to perpendicular) three-post-rows in the central parts of the houses are also fairly well represented on this site (the best examples are H 19, H56, and H 65).

config	house nos	n
Y	03,07,12,13,22,24,38,49,54,59	10
dY	01,05,28,53,57,58	6
dYi	09,17,31,48	4
iY, Yi	02,35	2
iYi	45	1
J	42	1
R*	04,06,08,10,11,14,15,18,19,25,26,27,40,41,62,65	16

table 4-8 listing of the houses with various central post configurations; n = 41
unrecognisable configurations omitted

4.4 On the structuration of house space

Then there is the issue of the manifest partition of Bandkeramik houses: their subdivision is quite pronounced in the plans, most of the time. Yet we have no idea how the houses were really subdivided internally: sometimes we get a glimpse of a wall that had once been erected somewhere *within* one of the archaeologically recognizable parts front, centre and rear (on the Janskamperveld the plans of houses 08 and 18 provide examples of cross walls made of boards), but wattle or wattle-and-daub walls evade us totally, as do separations constructed of hides or cloth. Coudart has dealt extensively with the internal organization of space in LBK houses, and her distinction of various types of separations is quite useful, if only to draw attention to possible different manifestations of a similar structure. Essentially, every DPR is considered a *separation* dividing the house's internal space . Their different characteristics give rise to several subclasses, most important those situated between the house's three parts. Even so, not all subclasses recognized by her can be substantiated in the Janskamperveld settlement. Among those that are present, so-called corridors are most prominent, and they are characteristic for the older phases of the Northwestern Bandkeramik. Decades ago Modderman defined them as follows: "In most central parts a relatively small part can be outlined on their north-western [rear] side" (Modderman 1970: 105). Coudart incorporates corridors in the definition of the class of separations between the different house parts. To her, corridors (French *couloirs*) are to be defined as "separations consisting of two close DPRs; the criterion of distance between the rows is clearly to be seen in relation to those between the other DPRs in the house". The other separations distinguished by Coudart are: separations coupled to the Y-configuration, emphasised separations (i.e., marked by strong posts), implied ones, and absent separations (Coudart 1998, 28-29). Corridors are most frequent between the central and the rear parts, though they occasionally also occur between the front and central parts. Yet there are houses where corridors do not appear at all, as in a small number of cases in the Janskamperveld settlement. Table 4-9 lists the frequencies with which the different divisionary features occur at this site. Although the number of separations to the front and the rear seem to be each other's opposite, this is only virtually so: for instance, five out of six houses with a corridor separation between front and centre parts also have corridors between the centre and the rear – the sixth

separation	front	rear
corridor	6(5)	42(35)
emphasised	40(23)	7(3)
none	2(1)	0(–)
indeterminate	21(1)	20(–)

table 4-9 quantified distribution of border features on both ends of central part
all houses ($w \geq 3$ only)

house could not be evaluated. Four out of seven emphasized separations (consisting of heavy posts, either separating central and front parts, or the central part from the outside world in the case of houses with one or two sections) between rear and middle are accompanied by similar constructions between central and front part. Even the unrecognizable separations front and rear are not often found in the same houses: there are only six houses that defy a reasonable guess at both these two major separations. Counting only those 38 houses where the separations can be observed under fair to good conditions ($w \geq 3$), four have corridors on both ends of their central parts (HH 4, 7, 24, 39), 23 have emphasized separations at the front of the middle parts and corridors at the rear (e.g., HH 3, 9; 12, 49; 27, 41), and only two have emphasized separations fore and aft (HH 26, 40). Probably only type 1a houses have corridors at both ends of their central parts, although the evidence for HH 35 and 36 is opaque (after all, $w = 2$ in both of the cases) being not fully legible in the excavation; H 04 (a 1b type) may be the exception (it would not be alone in the Dutch LBK: e.g., at Elsloo, HH 88 and 89, at Stein maybe H 33; Modderman 1970). However that may be, it is clear from this table that when entering a house in the Janskamperveld settlement the (for us visible) first separation encountered is generally less heavily executed with its single row of posts than is the second, double row border or threshold: there is a suggestion of privacy increasing with the depth of the house (as also observed by Coudart 1998, 105) with the apparent exception of those weird 1a types which have double rows at both ends of their central parts suggestive of even more privacy (or secrecy?).

One more general idea about the formal properties of Bandkeramik houses is the possible if not probable concordance of the number of bays (*travées*, Coudart 1998) into which the internal space is subdivided and the total length of the house, a measure of the structuration of the roofed space. As 'defined' by Coudart: "The DPRs divide the length of the house longitudinally in several intervals or bays. The distribution of these DPRs structures the space …" (Coudart 1998, 27). There are several reasons for preferring the count of bays over the number of three-post-rows or DPRs: people live in rooms, rather than between real or fictitious walls or partitions, bays are probably more representative of place than of space. Whether or not to count the corridor DPRs separately thus becomes a moot point as corridors are too narrow to afford true living space or place. Similarly, the bay idea evades the problems posed by the count of Y- and especially of "degenerate Y-configurations" of posts. And also the question of whether or not to count the frequently occurring double posts in the front part of the house as one or two DPR rows is easily bypassed as irrelevant.

bays	F part	C part	R part	full house
–	10	3	6	1
0	28	–	10	–
1	7	–	17	0
2	16	40	25	12
3	8	24	10	9
4		2	1	10
5				11
6	–	–	–	10
7				12
8				2

table 4-10 the number of bays per part and per house

As table 4-10 shows, in this settlement a general preference for two-bay spaces is apparent: for the front, the middle, as well as the rear parts of the houses, the twin bay arrangement is dominant, even for the central parts which are generally larger than the other parts (Von Brandt 1988, 180, 219). It is interesting to note that the central parts of the Janskamperveld houses always consist of two or more bays, never of one single *travée*. For the houses in their entirety, the double or four-bay (2 + 2) arrangements occur most frequently. However, 'predominance' does not imply 'exclusivity', and the frequency of smaller and larger sets per part is far from negligible, as are the larger combinations.

Bays being also extents of space, it seems logical to look for a relationship between the number of bays per house and the length of the houses (as noted above, surface area is very closely tied to the length of the houses on the Janskamperveld, as their widths do not differ much), a relationship easier to establish and also sharper or more discriminating than the simple mono-, bi- and tripartite classification. For those 28 houses with $w(length) \geq 3$, a regression equation of the number of bays on house length can be calculated as: $n(bays) = 0.28 \times Length + 0.55$ – which means that in a house of for instance a length of 20 metres, $0.28 \times 20 + 0.55 \approx 6$ bays may be expected. As it turns out, this equation "explains" (statistically that is) 67% of the variation in the relationship between these two variables. The standard deviation of the error in the outcome is 1.16 bays, which means that deviances of 1.2 bays or less from the calculated estimate may be expected in 68% of the cases (i.e., the normal assumption). Through the regression equation, the expected number of bays for every house in the excavation was computed[9], and compared with the number of bays based on field observations (or estimates, or guesses in the case of low quality observations). It turned out that HH 04, 31, 67 and 68 deviated by 2.4 bays from the expectation, and H 60 was even four bays short. As is clear from the plan of this latter house, the estimate of its length ($w(l) = 0$) is nothing but a guess, as is the estimate of the number of bays. Similar problems exist with H 04 (*w(l)* = 1). For the other houses, the measurements of their lengths have a better foundation (*w(l)* ≥ 3), and therefore I prefer the calculated estimates of bays (H 31, 6 bays; H 67, 5 bays; H 68, 6 bays) to the loose guesses (8 bays, for all three houses in the main table.

The lengths of the bays are rather similar in the front and rear parts (2.1 and 2.4 metres on average, respectively), but considerably larger in the central part (3.2 metres) because of the presence of 23 Y-configurations (i.e., partially twinned cross rows; see above) in the houses of this settlement. Table 4-11 shows that the bays in the central parts of the houses with a more regular arrangement of posts (labelled 'Rx' in the table) with 3.1 metres on average are longer than those in the rear and front parts. Also, although averages and spreads are very much the same for the 28 houses where the central configuration could not be established in the excavation (row 'x') and those in the recognizable houses (row 'overall'), it turns out that almost all of them show deviations in the estimated number of bays of over one standard deviation from the calculated / expected number as derived from the regression equation above. As the deviations are in both directions (estimates either too large or too small) and their number is relatively large, the regression equations are virtually impervious to the exclusion or inclusion of the indeterminate cases.

4.5 Post holes and post ghosts

The relicts of the 69 houses in the excavation (63 were recognized in the field) are combinations of 1549 post holes and 134 wall trenches, of which 1210 have been cut and drawn to profile; 877 showed the ghosts of the former posts. All the ghosts had a cylindrical form, their bases were either flat or slightly rounded; none showed sharpening of the point or cleavage of the trunk. The recorded depths of the post holes have not been reduced to the original surface, although it may be assumed that 50-120 centimetres have to be added to these depths (see the discussion of fig. 4-3). Consequently, even for the single houses conclusions regarding relative depths are hazardous; see, e.g., the excavations at Bylany, where these measures were indeed established, and the slipping of the depths in relation to both the old surface and present datum graphically presented (Pavlů 2000, 199-214). Thus, although on the Janskamperveld *on average* the inner posts of the houses are founded deeper than the wall posts (2.8 dms over 619 posts *vs.* 1.7 dms for 591 wall posts) – which concurs with the general ideas about Older Period LBK houses – there are also cases where the reverse can be observed – as generally in Younger LBK houses. Also, the 1a type houses are founded deeper than the other tripartite and bipartite ones, and these again are dug in deeper than the monopartite houses. In the excavation, average depths were registered of 5.5 to 6.5 dms (type 1a), 3.0 to 4.0 dms (types 1b, 1c, 2), and 1.5 to 3.5 dms (type 3). Central part DPRs are founded deeper than the posts in the front and rear parts; averaging respectively 2.9, 2.6, and 2.5 dms, while especially the posts of the Y configurations show greater depths (averaging 3.4 dms below the plane). Front and rear façades are comparatively superficially set into the soil, with average depths of 1.8 and 1.9 dms (but note again that there is no correction for the depth of the excavation plane below the original surface), although in the case of the 1a houses especially the rear wall trench is much deeper (up to 4.0 to 13.0 dms). These latter houses also stand out because their wall trenches are deeper by several decimetres than the tips of the wall posts, whereas in the other houses with wall trenches (both tri- and bipartite) the post holes in the wall trenches are deeper than the ditches. According to Von Brandt, the DPRs in the front and the separation between rear and central part of the houses are the first to be raised during construction – as shown by the deeper and cylindrical and non-stepped (read: not corrected by the builders) profile of the post *holes* (Von Brandt 1988, 228, 224) – on the Janskamperveld the relative number of stepped holes (read: corrected) in these or any of the other DPRs is very similar to those in all of the constructions together (11.3 *vs.* 13%). In other words: no confirmation can be found for that hypothesis. Neither can Modderman's generalization be confirmed that the separation of rear and central parts is marked by the deepest founded DPR – here the average is 2.7 dms which ranks fifth among the depths of DPRs, behind all three-post-rows in the central part (Modderman 1970, 105).

config	length C part		no of bays	length bay		no of houses
	span	avge		span	avge	
Y	6.2-10.1	8.4	2.6	2.1-5.1	3.4	10
degen Y	6.3-12.2	8.3	2.6	2.3-6.1	3.3	13
J	7.1	7.1	4	1.8	1.8	1
Rx	4.0-9.3	6.6	2.3	1.3-4.7	3.1	17
x	5.4-12.1	7.8	2.2	2.1-6.1	3.8	28
overall		7.7	2.4		3.4	69

table 4-11 configuration of central cross rows *vs.* size and number of bays

Finally, during the excavation reddish burnt lumps of clay, supposedly deriving from wattle-and-daub walls or raised floor constructions, were frequently found in the post holes of the 1a type houses, suggestive of a fiery end to at least some of them. At the end of the excavation in 28 houses some or several reddish traces had been noted, derived from (hypothetical but probable) cooking hearths and/or (hypothetical but in this frequency not so likely) house fires. The problem is how to decide between the two (and possible alternatives), and on a suggestion by Rudolph Kuper[10] (Kuper *et al*. 1973, 44), the solution was sought in the division of the occurrences of baked clay lumps in post *holes* and in post *ghosts*. The fillings of the post holes will have been amassed during construction in the near vicinity of the hole, when and where controlled fires may have been lit for every conceivable household or construction purpose, so there is no need to assume something catastrophic behind the red lumps. The fillings of the ghosts, however, derive from the end of the house's life, when either the posts were torn out or rotted away and subsequently hearth leftovers may have tumbled into the holes, or the houses were consumed by fire and lumps of burnt daub and carbonized particles fell into the holes. To choose between these two possibilities seems impossible; yet 10 houses have red burnt clay lumps in their post ghosts, among which all five 1a houses; again, we'll have to bear in mind that the original surface lay more than 5 dms higher and the ghost holes were that much deeper than in the excavation. Also, the relative number of post ghosts with red traces is much larger in 1a type houses than in the other suspect houses: 17 to 70%, with an average of 50% or half of the ghosts; *versus* less than 10% elsewhere. An explanation can be sought in the all-wood construction of the former versus the substantial amount of clay in the latter buildings. If the burnt clay in the post holes were added, the picture remains the same: 1a type houses have far more of it than the other houses. It is not the first time that a fire has been suggested for the end of 1a houses: the only two type 1a houses in Sittard-Thien Bunder (H 03, and H 49) have also convincing fire damage (Modderman 1959, 48-49; Van Wijk 2001, 32, 81), H 05 in Langweiler 9 as well as H 21 in Langweiler 2 are of the same type, and also have fired clay in the post holes, while some houses of other types also show traces of fire (Kuper *et al*. 1977, Kuper *et al*. 1973, 44). The frequent association of type 1a houses with fire (as against more haphazard traces of burning of other houses) is remarkable at least. If the depth at which LBK house plans are observed in excavations is taken into account, the high incidence of fire in type 1a houses leads to the assumption that *all* type 1a houses were intentionally burnt down for one reason or another, for that depth may go a long way to explain the absence of such traces in cases such as (the 1a type) H 17 in Langweiler 9 (Kuper 1977). On the other hand the non-1a figures suggest one accidental house-fire per 200 or 250 house-years on the Janskamperveld, which translates to a destructive fire (with lightning, or hearth as causes) in this village once every 8 to 10 years – not an outrageous frequency, so it seems.

4.6 *Längsgruben* or side pits, and gutters

Side pits and gutters are discussed at fuller length in the chapter on features; here a few highlights will be presented. As regards side pits, most authors consider these integral to Bandkeramik houses (*"… ein Gebäude mit den angrenzenden Gruben als Einheit [zu] verstehen …"* Modderman 1970, 35). On the Janskamperveld 36 houses show oblong clay pits along both sides and another 14 may be added if one of the pits is hidden below the bank of the excavation while the opposite side of the house clearly exhibits this feature (table 4-12). Six houses seem to have one side pit only (HH 09, 22, 23, 30, 39, 40), while this cannot be unequivocally established for H 50. Furthermore, nine houses are not accompanied by side pits (HH 15, 20, 27, 46, 55, 63, 67, 68, 69) and three houses doubtfully so (HH 28, 54, 59). These twelve houses without apparent side pits all have *w*-indexes of 2 or less (except H 27, of which the possible left side pit may be hidden in an unexcavated street bank), and thus may be instances of the fig. 4-3e/f situation. Consequently, the absence of side pits is not conclusive. As regards H 28, its left side pit (viewed from the front) is obscured by close-by HH 26 and 27 (a right hand pit seems present); H 54 has complexes of pits on both sides into which its possible side pits may have merged; and H 59 shows a side pit on its left side in about the right place, but with an unusual plan (a right hand clay pit seems present). In the case of H 19 ($w = 2$) also some doubt remains: the suspected side pits seem to be situated on either side of where the front façade is supposed to have been, which is unusual; yet the almost perfect symmetry around this house's long axis is an argument for accepting them as (remnants of) side pits and rather questioning the position of the front.

A look at the distribution of the side trenches over the house types (table 4-12) shows nothing unexpected: all

	FCR	CR	R	
two side pits	18	11	7	36
possibly two pits	8	3	3	14
only one side pit	4	1	1	6
possibly one pit	–	–	1	1
no side pits	3	3	3	9
possibly no pits	2	1	0	3
	35	19	15	69

table 4-12: side trenches and the partition of houses

houses occur (many times) with and (sometimes) without side pits. Some comments seem apposite.

There are no serious doubts that the side pits (in German *Längsgruben*) started as quarries for the loam or daub that went into the walls and raised floors (e.g., Modderman 1988, 92), and so the *side* position of these trenches is understandable as far as the side walls have been daubed. Consider also those side walls where the rear part has been executed in boards, e.g., HH 03 and 13. However, why is it that neither front nor rear façades are ever accompanied by *cross* trenches? Also, the daub required for the inner walls (which can be found in quite unexpected places; e.g., HH 08, 18 show cross trenches for walls) must have been dug from aside the houses, as inside pits would be most uncomfortable in my opinion. Perhaps the front and rear gables were closed with hides, horizontal boards, or left open, or plastered with daub from the side trenches to leave the space in front of the entrance free of obstacles. Why the backyard was also kept level, escapes me as I know of no reconstruction with an entrance in the rear façade; nor do I understand why the type 1a houses with boards all around are always accompanied by considerable side pits – unless they were internally subdivided into numerous small cubicles or – as seems more likely – had a raised floor built of clay.

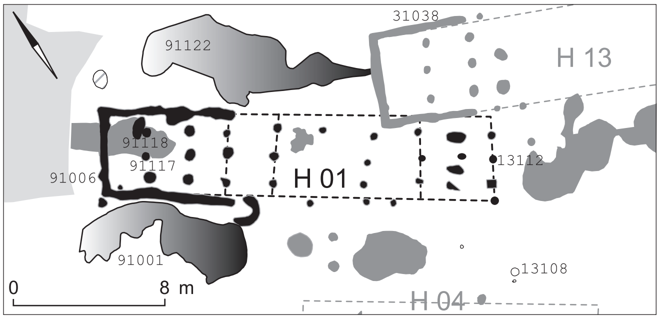
On closer inspection an interesting speciality becomes visible, as inside several houses also remnants of side trenches (German *Außengräben*) appear, situated between the wall posts and the side pits. They have been described as long narrow trenches, generally dug deeper than all other *'hausdefinierenden Befunde'* (house indicators); situated next to the front and central parts, never near the rear parts. Often, these so-called splash gutters are connected to the side pits, yet hardly ever contain finds, which would suggest different functions of the two features. The assumed function is summed by the name they went by previously: *Traufgräben* ('gutters'): it is assumed that they served to catch rain water gushing from the roof of the house and to prevent splashing against the daubed walls – in fact they occur only along wattle-and-daub walls (Lüning 1988). Houses with this peculiarity include: HH 02, 13, 16, 31, 35, and 57. According to the literature these *Außengräben* are restricted in time to the Earliest and First Flomborn phases (Cladders/Stäuble 2003). The houses with this feature in the Janskamperveld village all have Y- or degenerate Y configurations in their central parts, either confirming the chronologically restricted occurrence or underscoring the relatively early date of this village. A few houses in other Bandkeramik settlements in the Netherlands have also been recorded sharing this feature; these are from Elsloo (H 59; Modderman 1970), Geleen-De Kluis (H 1; Waterbolk 1959), and Sittard (H 1; Modderman 1959).

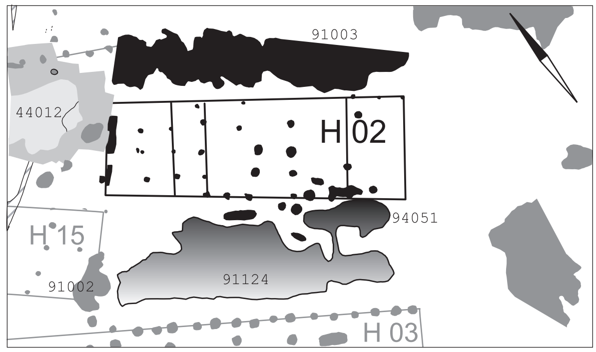
4.7 Summary

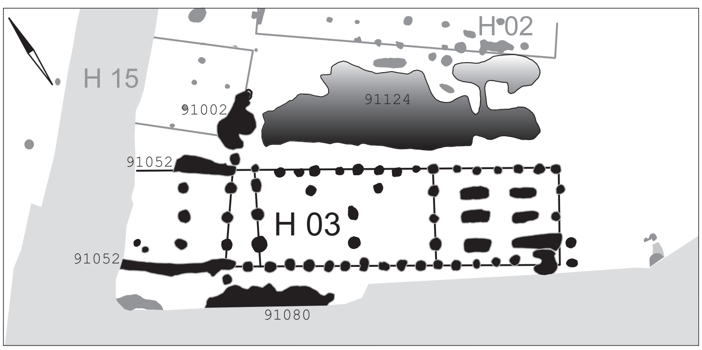
Approximately 61% of the surface area of the settlement – as defined by the extension of surface finds in the field – has been investigated. The southern rim, a small area in the north and the eastside have only partially been excavated. Only seven out of 69 houses are fully observable, another nine houses provide a glimpse of their previous existence only, and the other houses are somewhere in between regarding their completeness. Put another way, the quality of the observations on the houses is more or less normally distributed around bad to reasonable. Central features (the corridors, the middle part itself with the roof support posts) are better recognizable than are the front and rear parts. It is estimated that less than 10% of the variation in house lengths or surface areas is attributable to bad observational conditions (though other variables are much more affected), whereas 76% of this same variation can be attributed to the composition of the houses in terms of the number of bays they were divided into. By itself the number of bays or living places per house will have been governed by social considerations and imperatives.

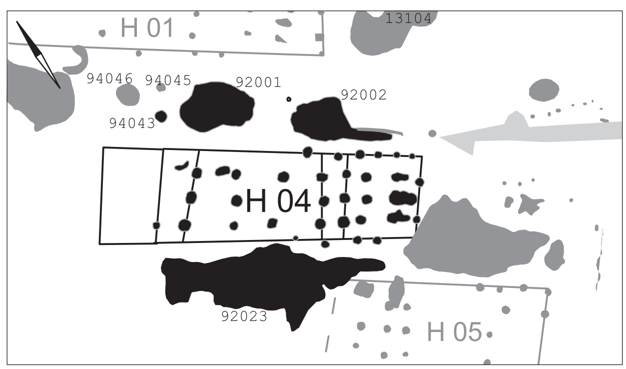
The Bandkeramik houses on the Janskamperveld are roughly orientated towards Flombornia, for the first settlers the area that they left behind, for later generations the Land of the Ancestors. As far as can be seen, house widths do not differ very much, the most variable dimension is house length with a range from 5.7 to 31.2 metres. Perhaps house wall material is another important aspect of these buildings: all types of houses have been constructed entirely from wattle-and-daub walls set between posts, whereas some of the larger houses had walls made of wooden boards in their rear parts, which were also their most private areas. And the five most special houses in the settlement (largest and most complex plans, heaviest founded, etc.) even have wooden boards on all sides. In addition, as if to further emphasize their specialty each of the specials seems to have been burnt down.

Many of the houses on the Janskamperveld are internally divided up by 'separations' between their frontal, central and rear parts; the separations consist either of twin post rows (so-called corridors), or single, rather emphasized DPRs. Houses of type 1a have corridors front and rear; the other houses show mainly corridors on the rear, as against 'fat' DPRs on the front side (types 1b, 1c, 2, and 3); only three (possibly four) houses do not have corridors in their rear, and this occurs only with the type 3 or single compartment houses. The classification of the partition of the individual houses into front, central, and rear parts has suffered from bad visibility conditions. Arithmetically correcting for this, the 69 houses excavated originally probably constituted 38-41 three-part houses (FCR), 13-16 two-part houses (CR), and about 15 single part spaces (C); the uncertainties arise

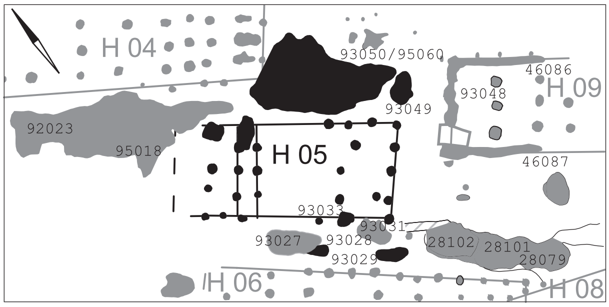


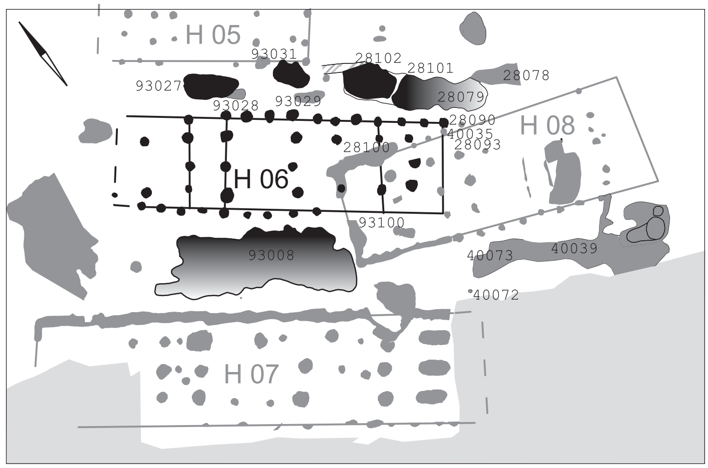


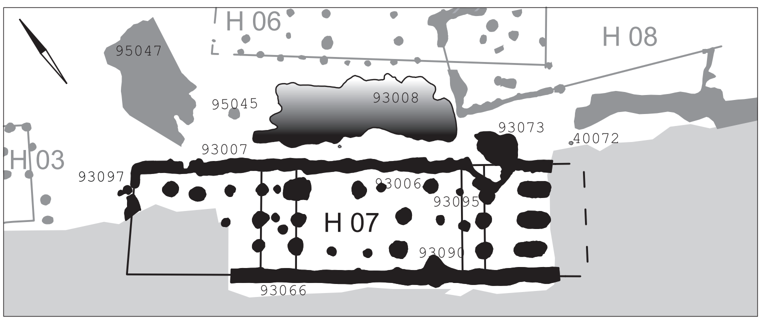




figs. 4-(6-9) plans of individual houses drawn to the same scale







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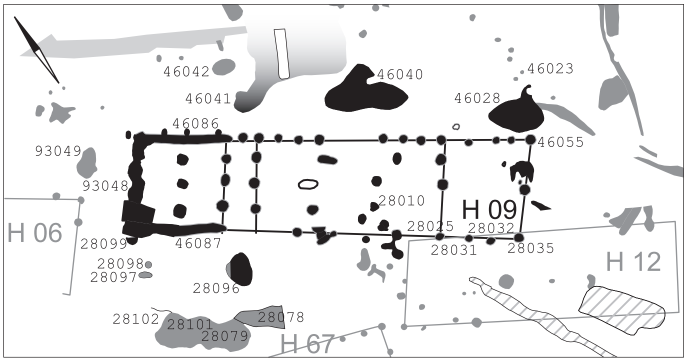

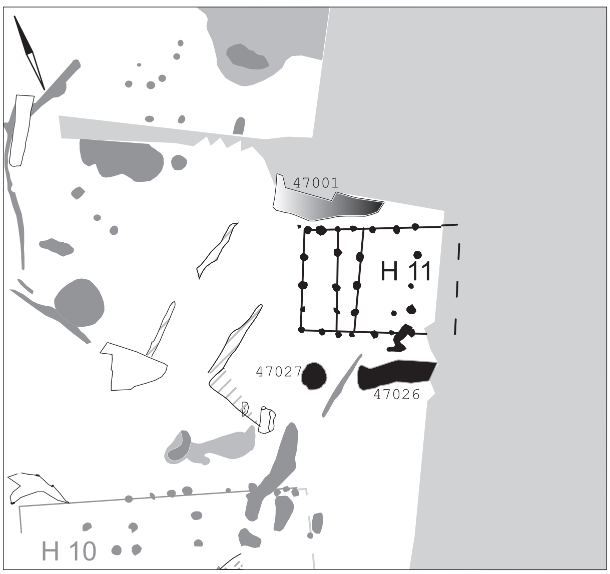

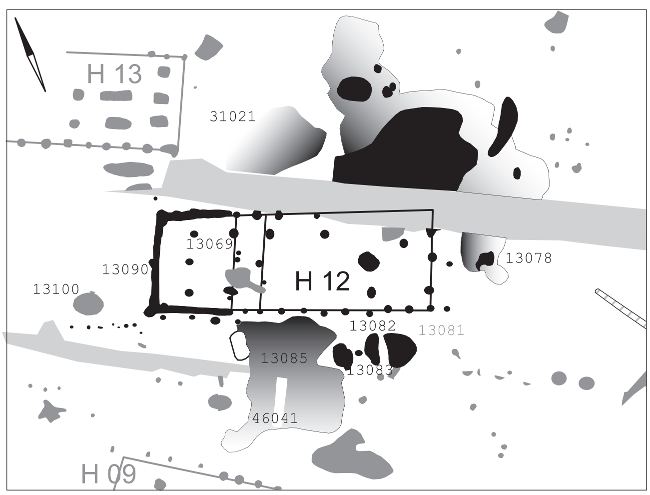

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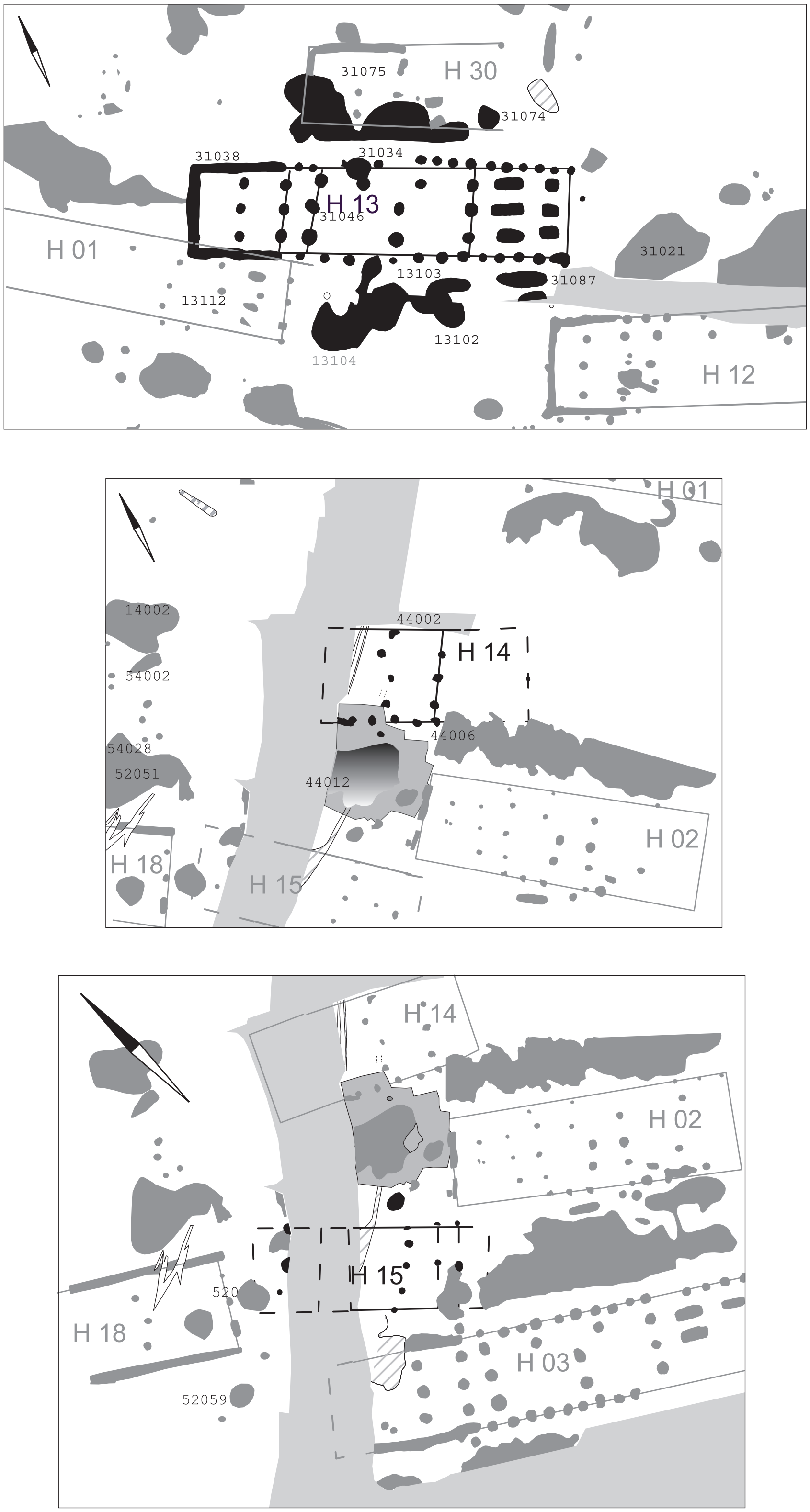

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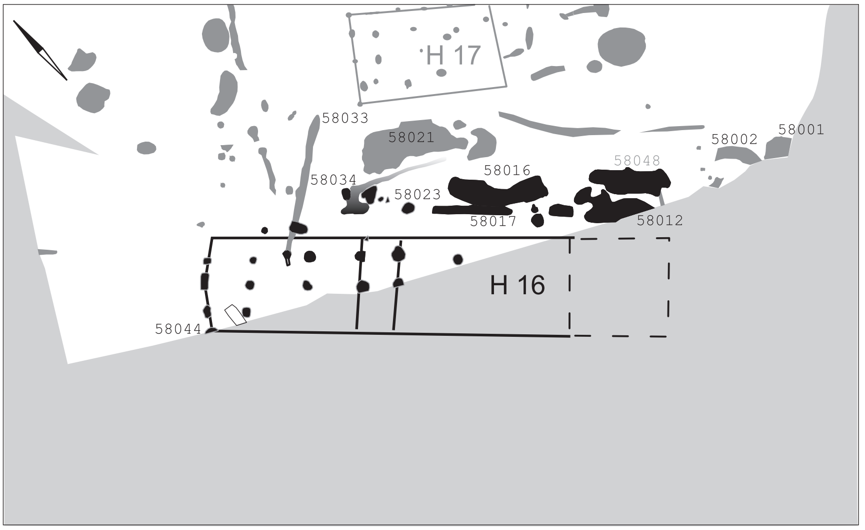

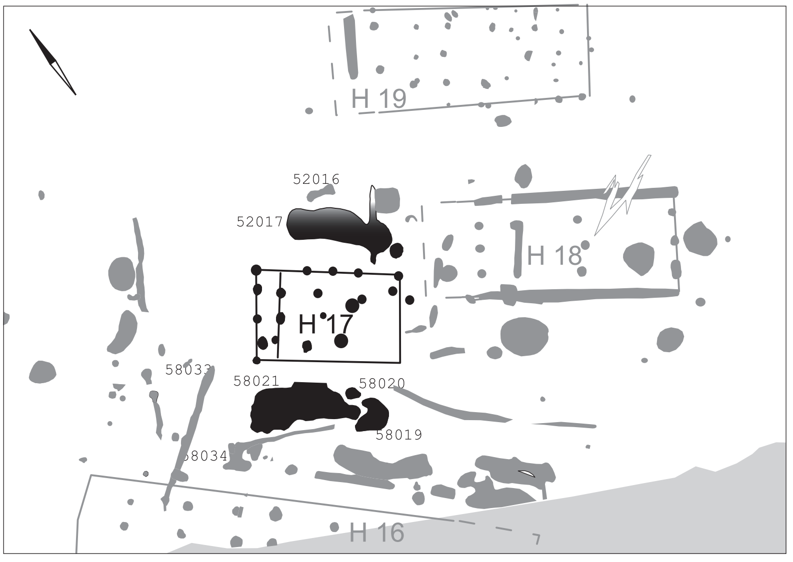

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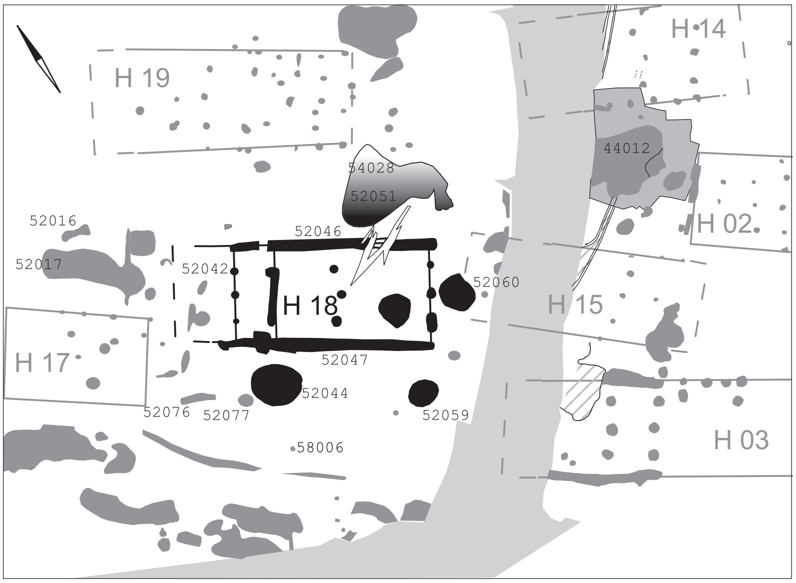

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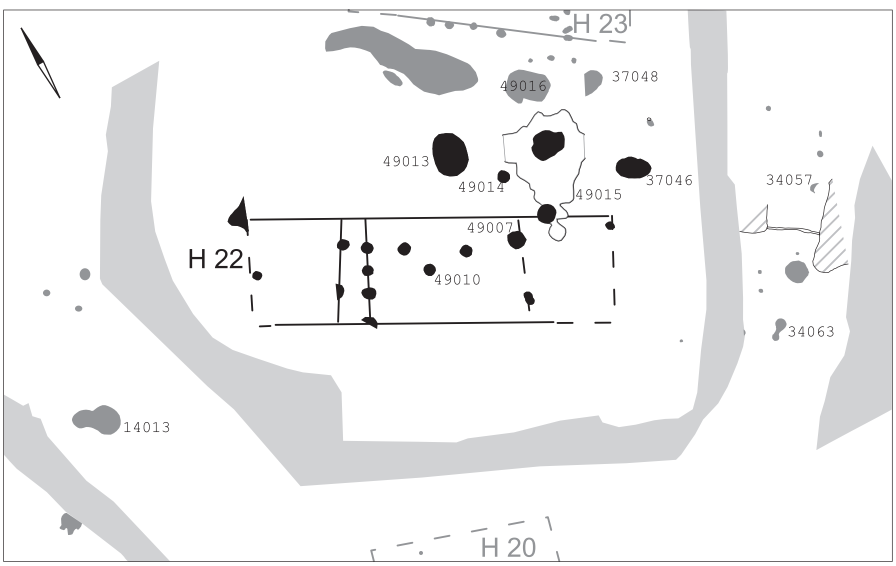

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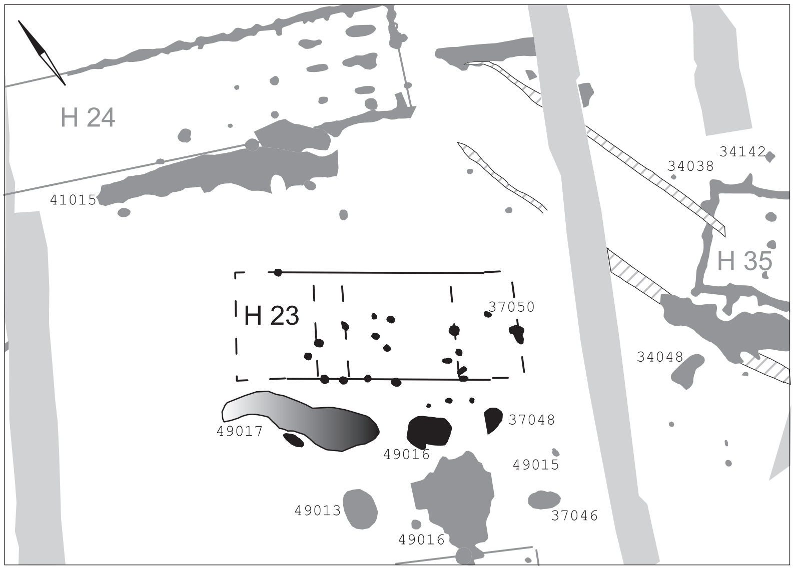

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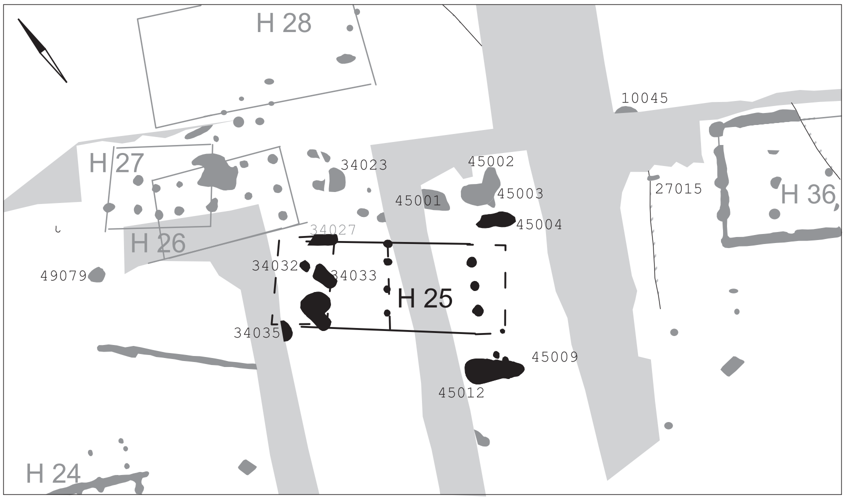

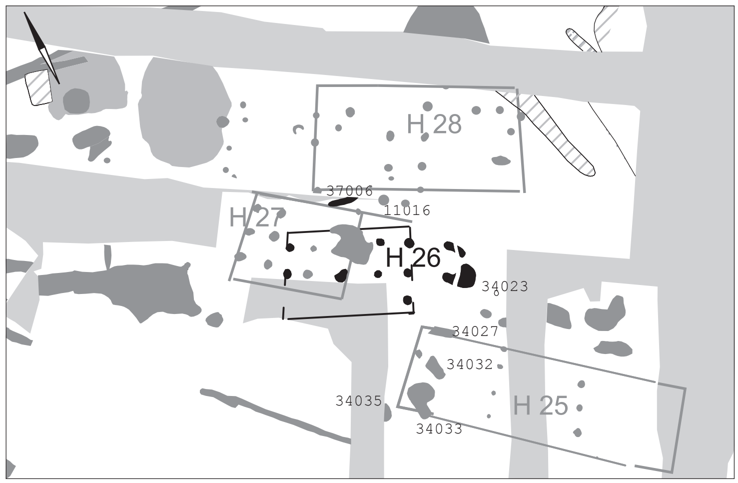

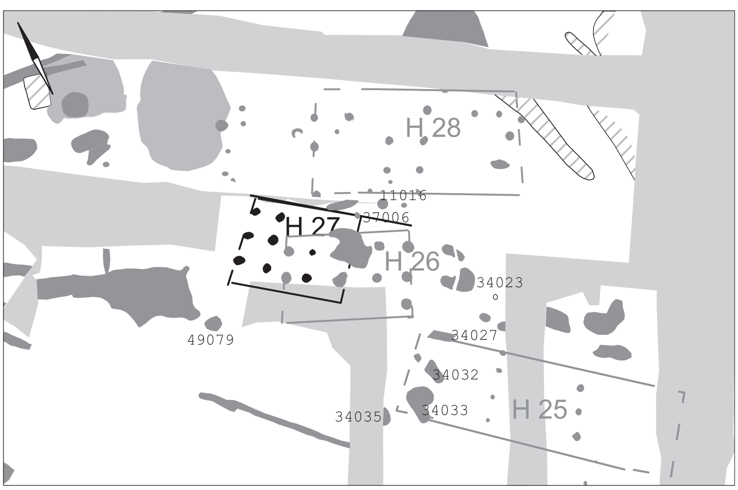

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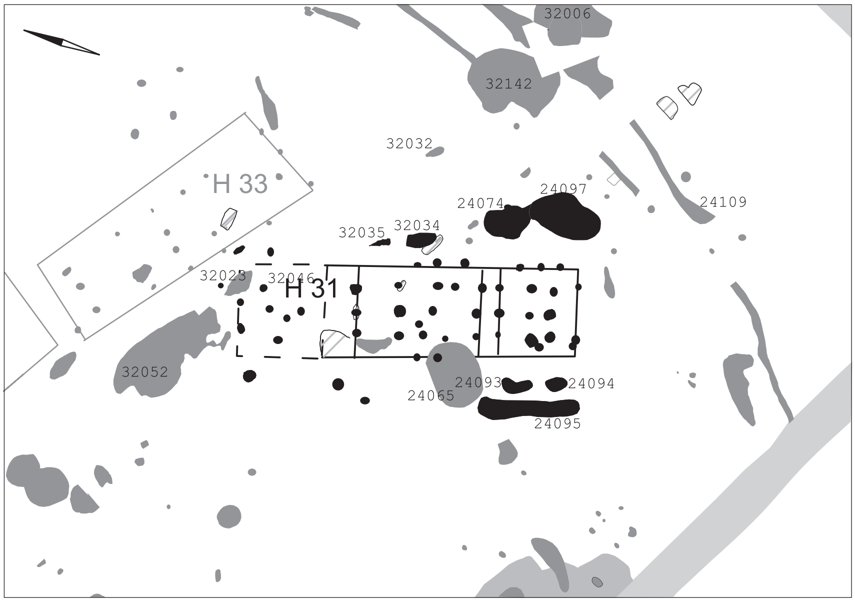
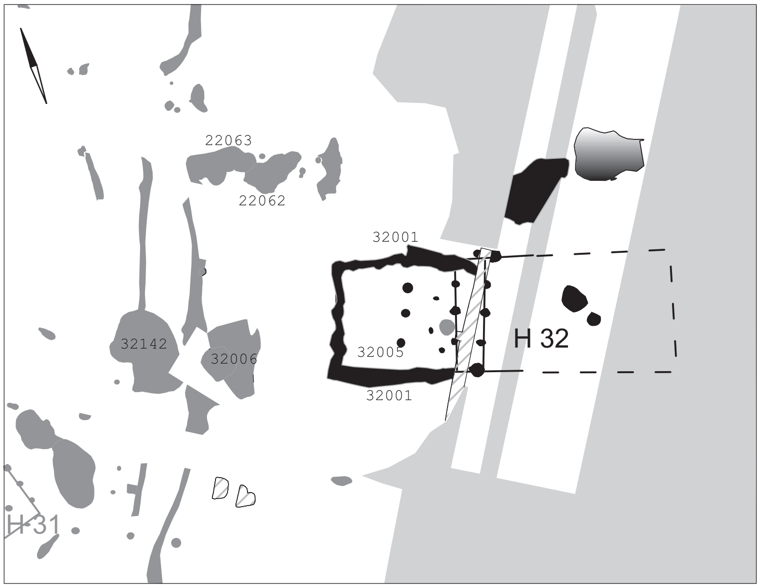
figs. 4-(33-35) plans of individual houses drawn to the same scale





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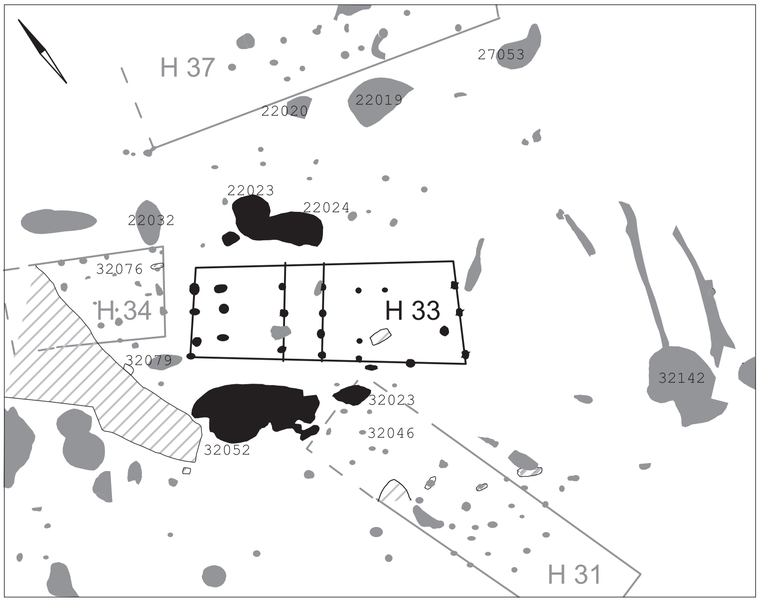
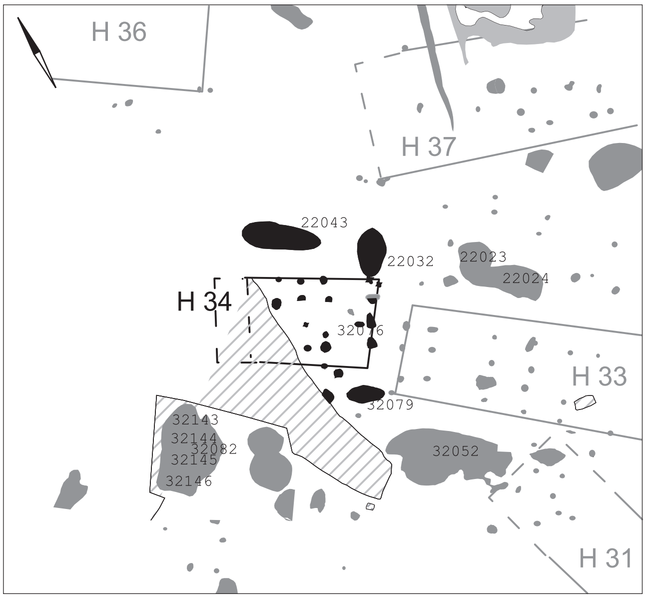
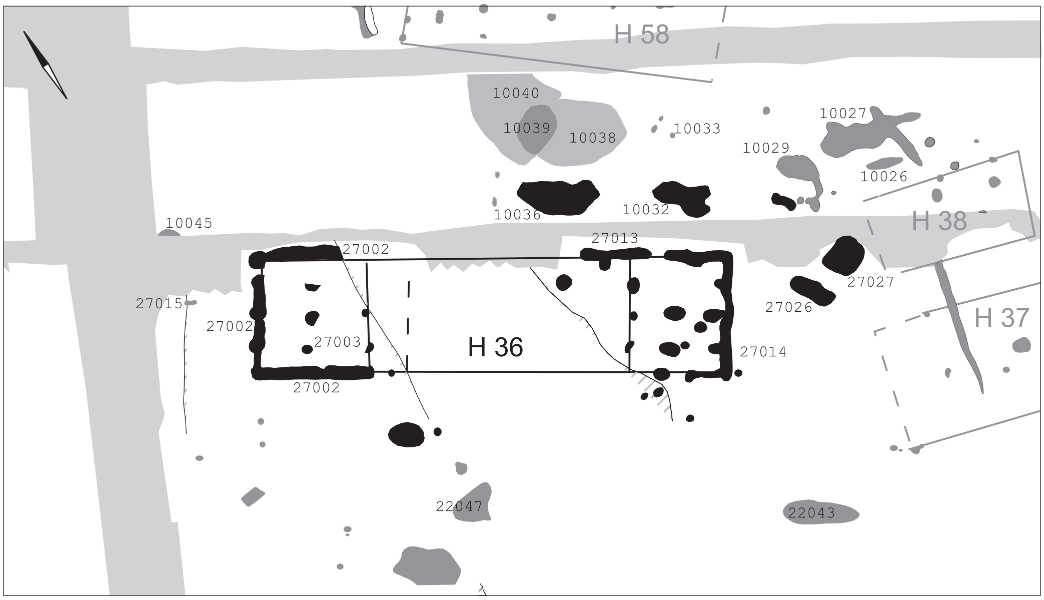




figs. 4-(38-39) plans of individual houses drawn to the same scale



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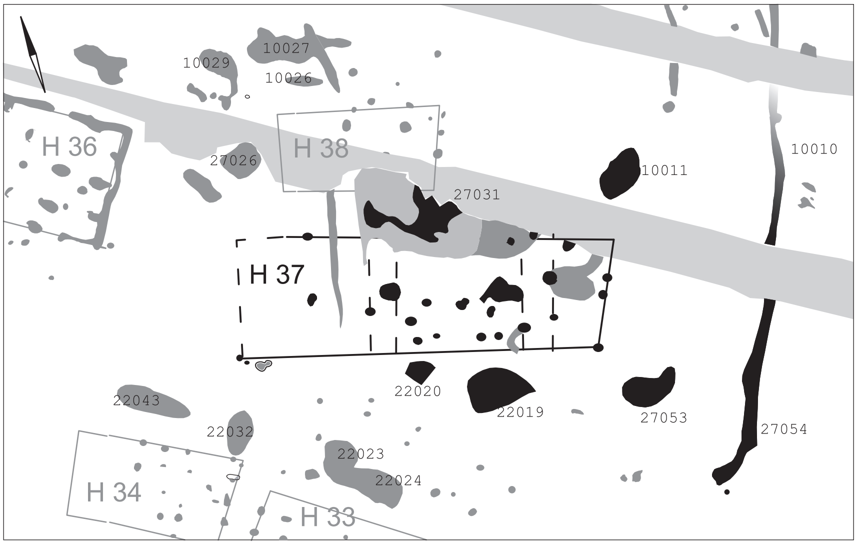
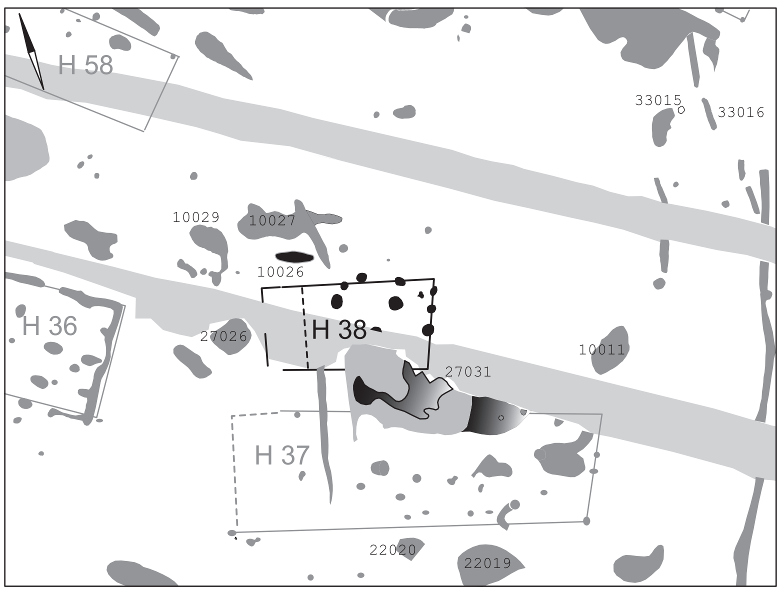
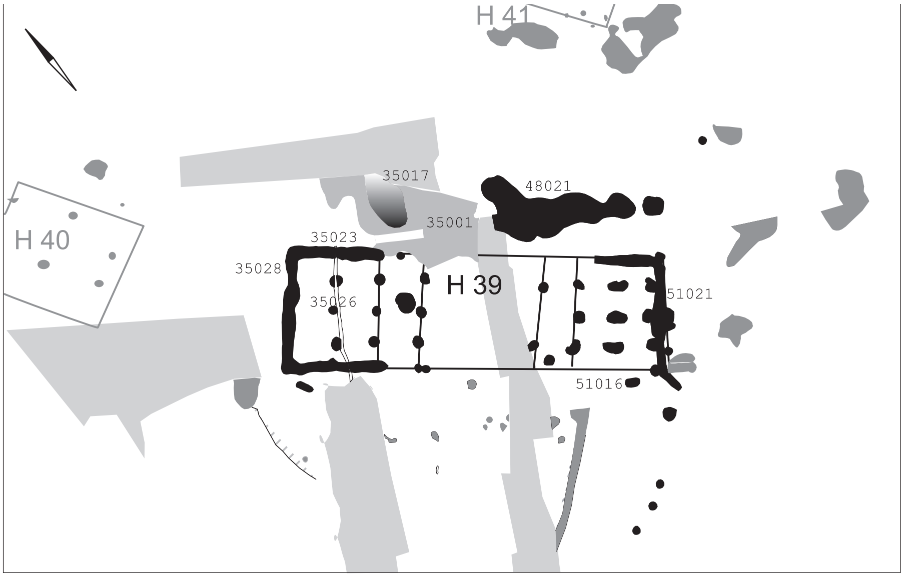
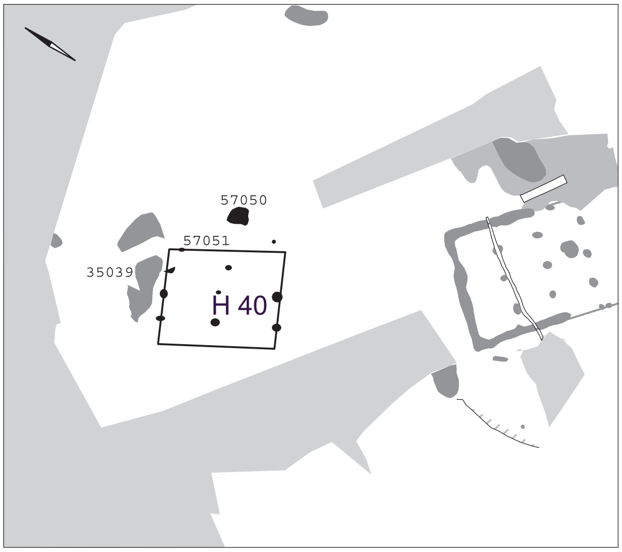


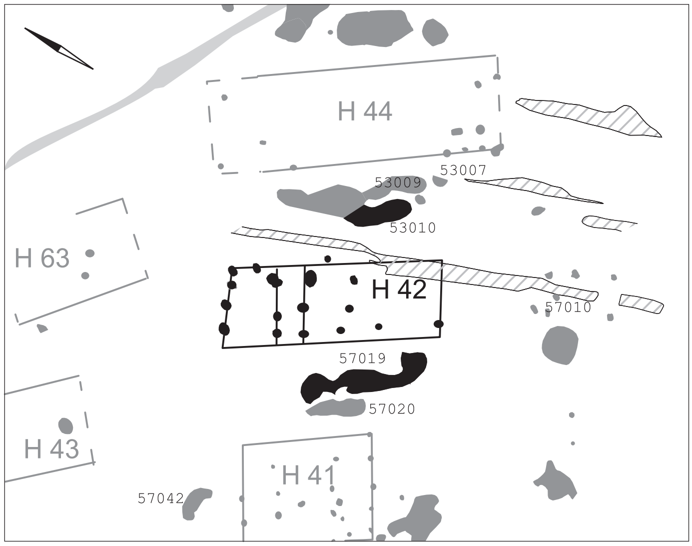


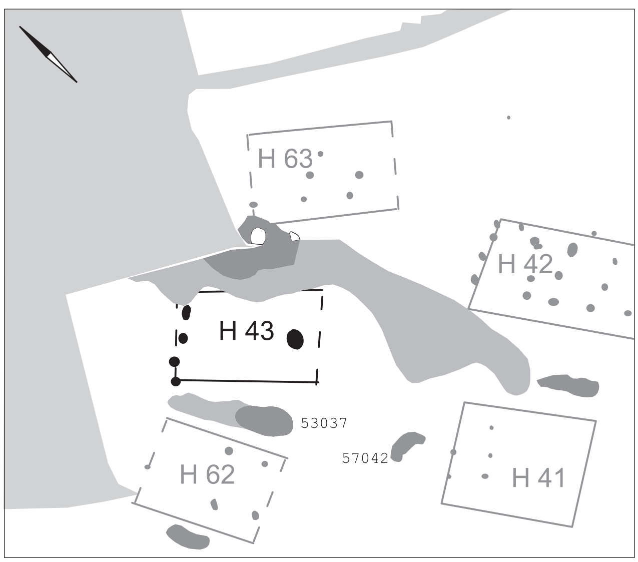
figs. 4-(42-43) plans of individual houses drawn to the same scale



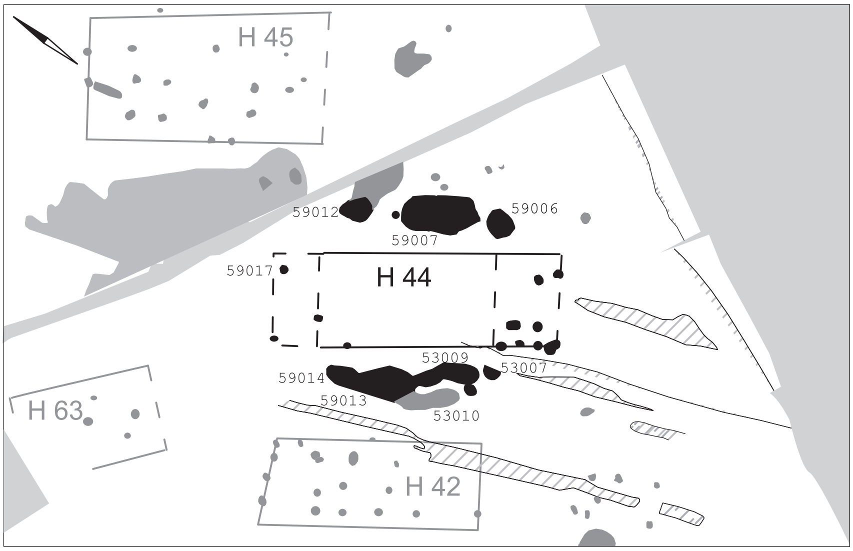


figs. 4-(44-46) plans of individual houses drawn to the same scale

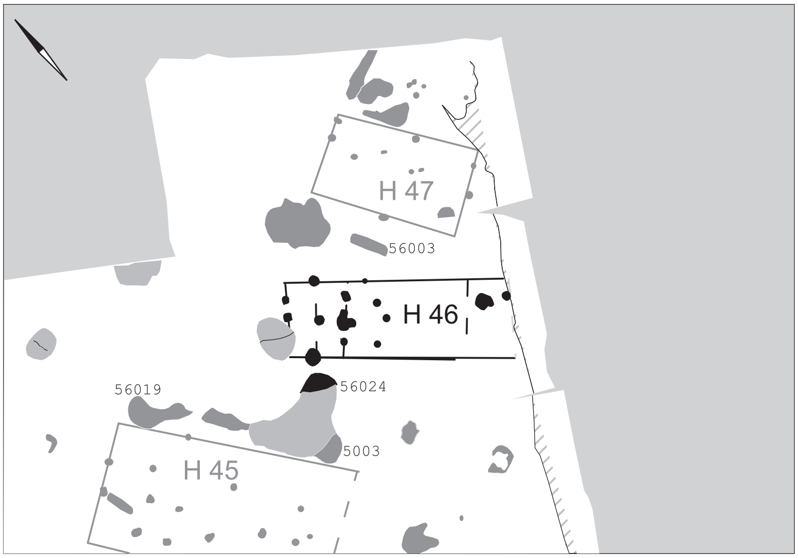




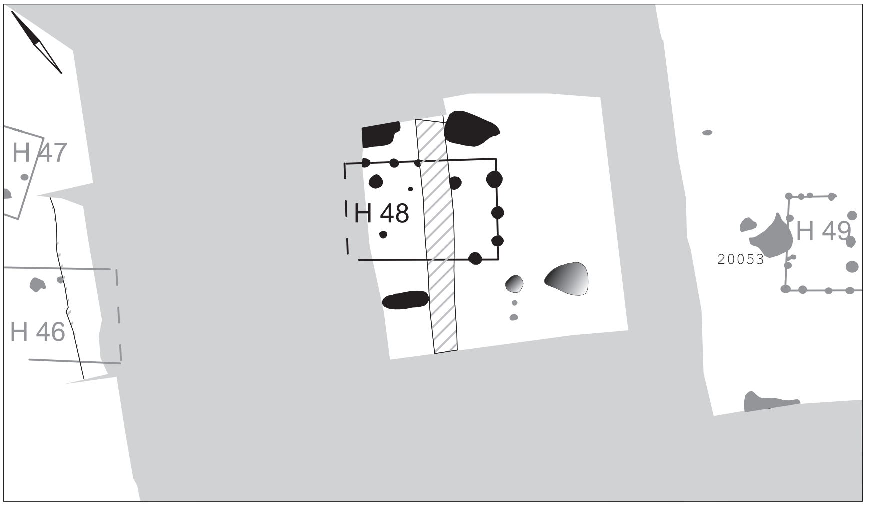
figs. 4-(47-48) plans of individual houses drawn to the same scale



figs. 4-(49-50) plans of individual houses drawn to the same scale



figs. 4-(51-52) plans of individual houses drawn to the same scale



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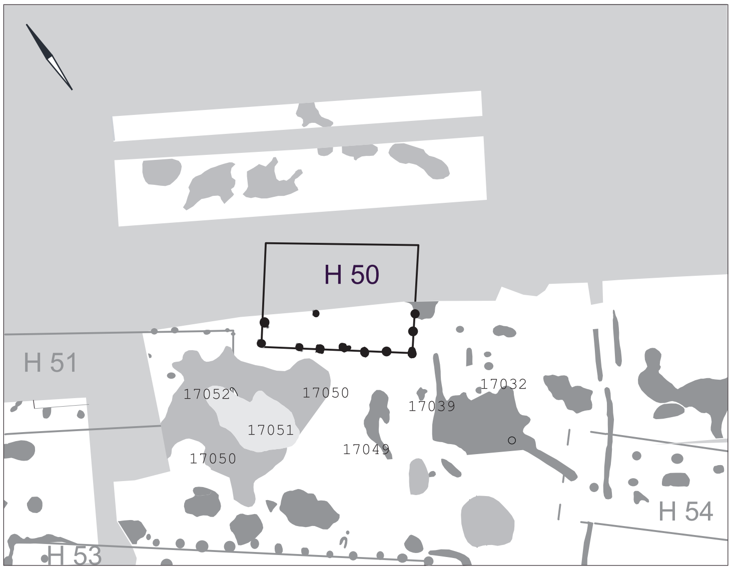

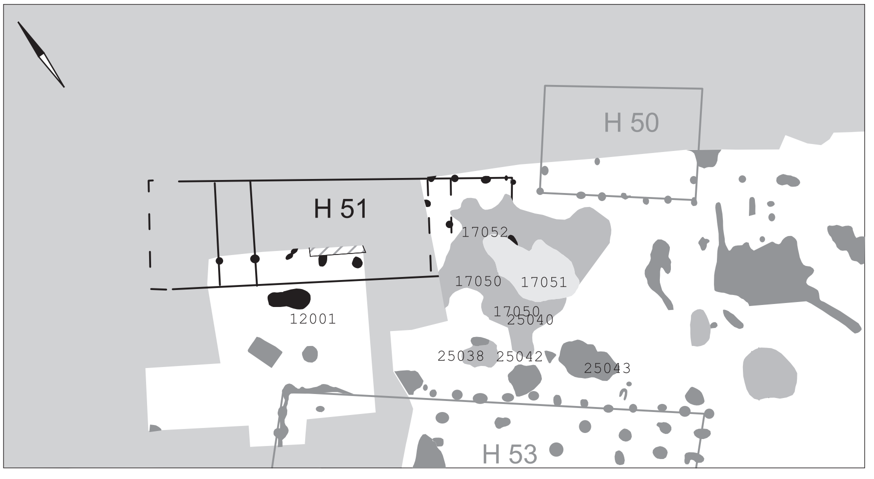

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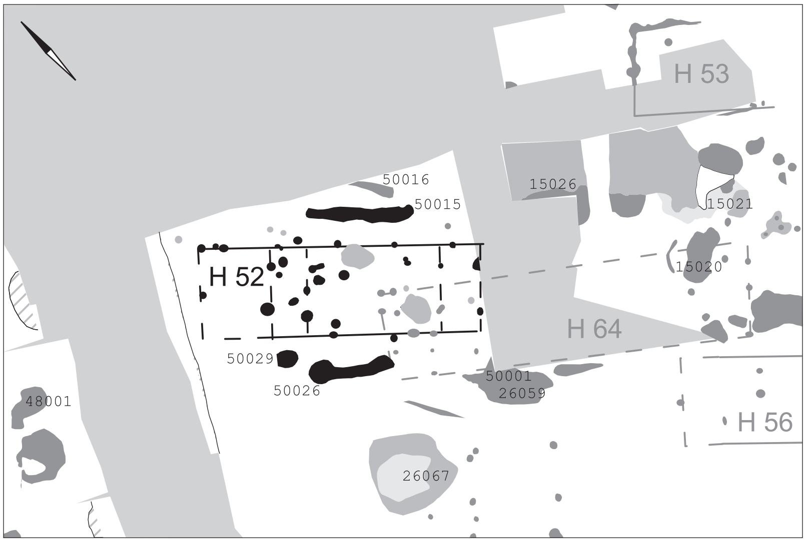
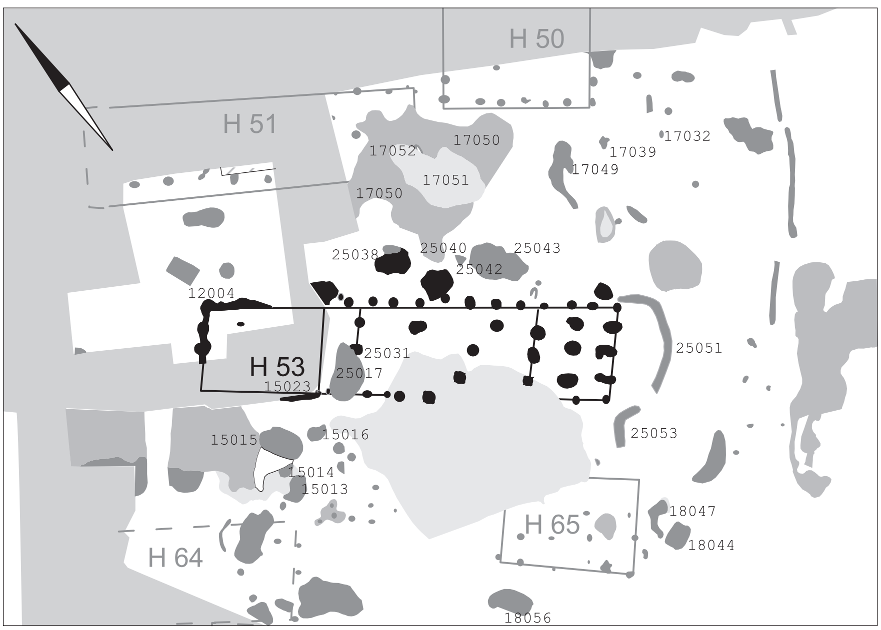
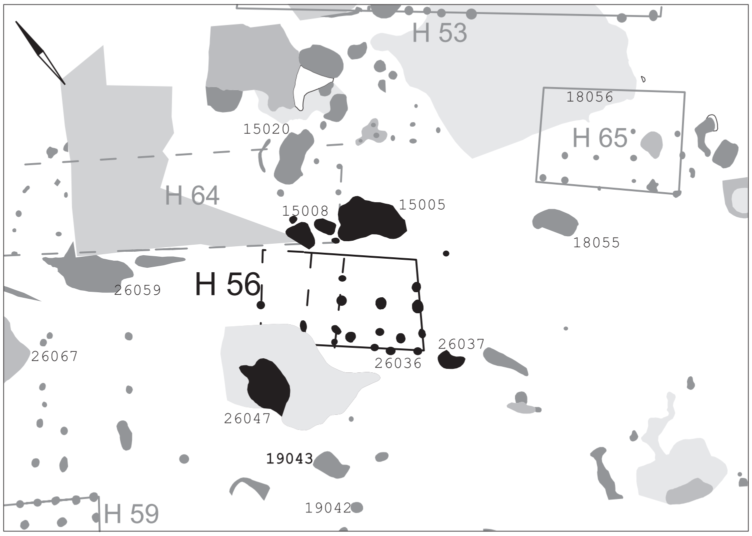




figs. 4-(57-58) plans of individual houses drawn to the same scale

figs. 4-(59-60) plans of individual houses drawn to the same scale



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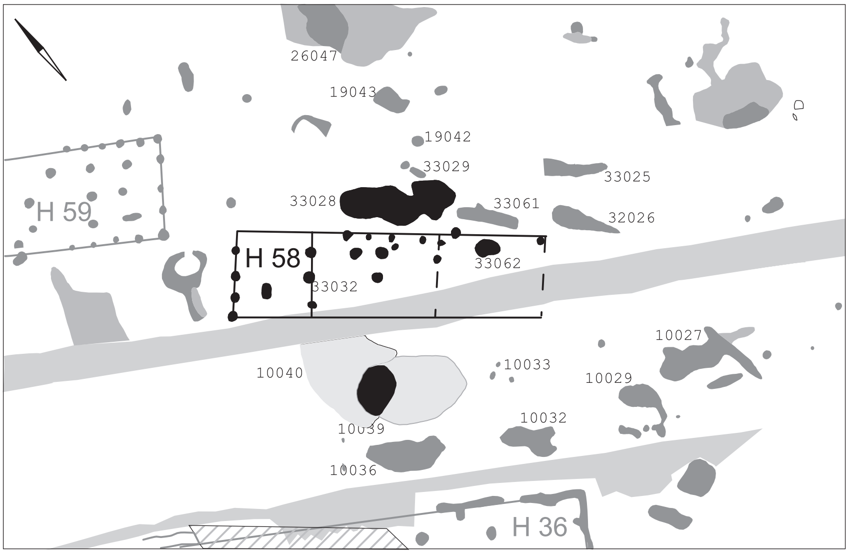
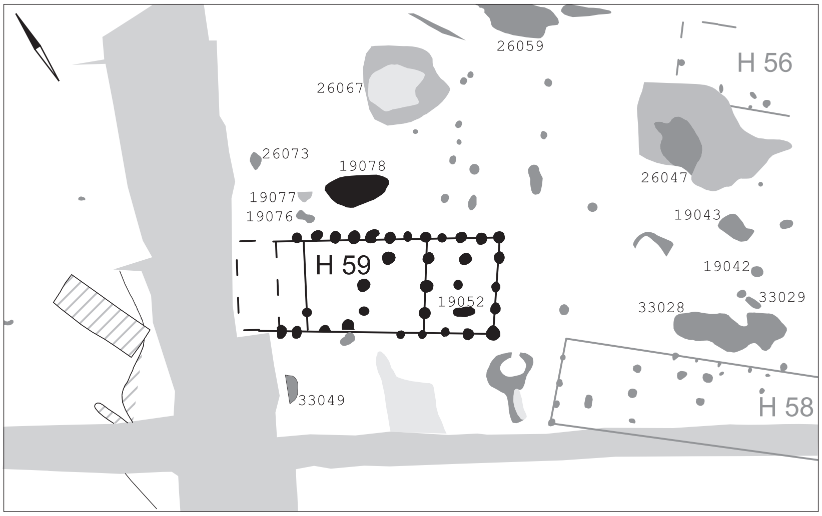
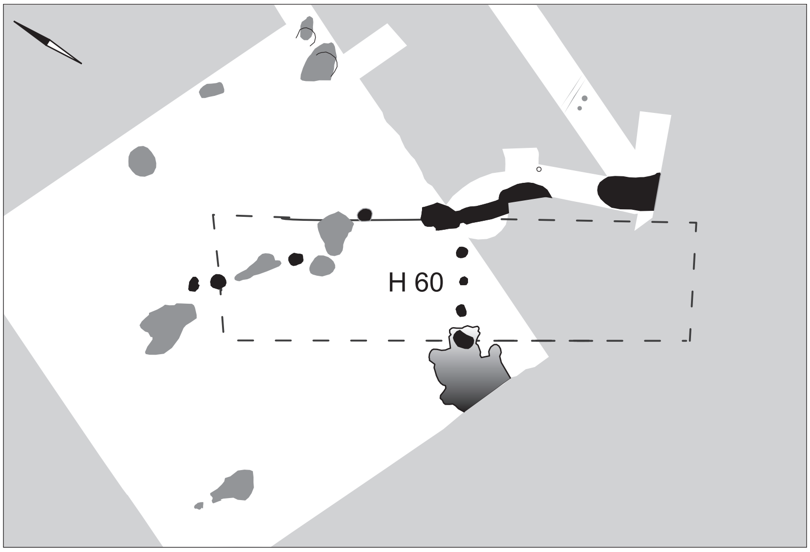
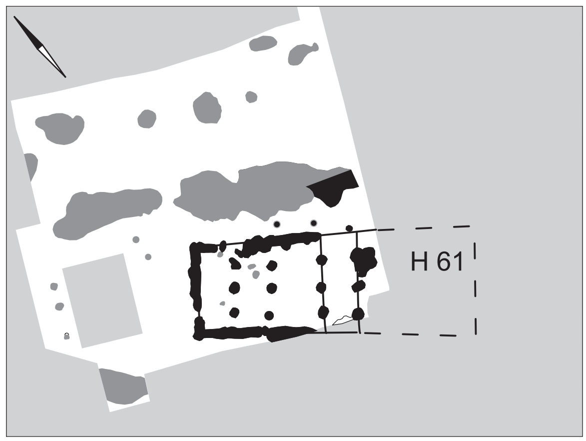
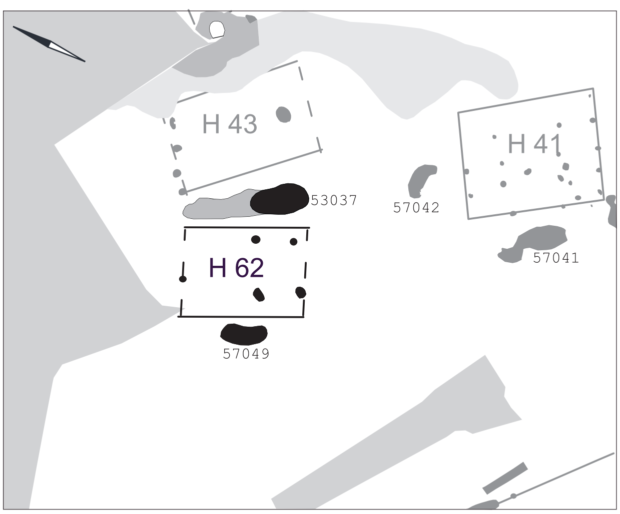




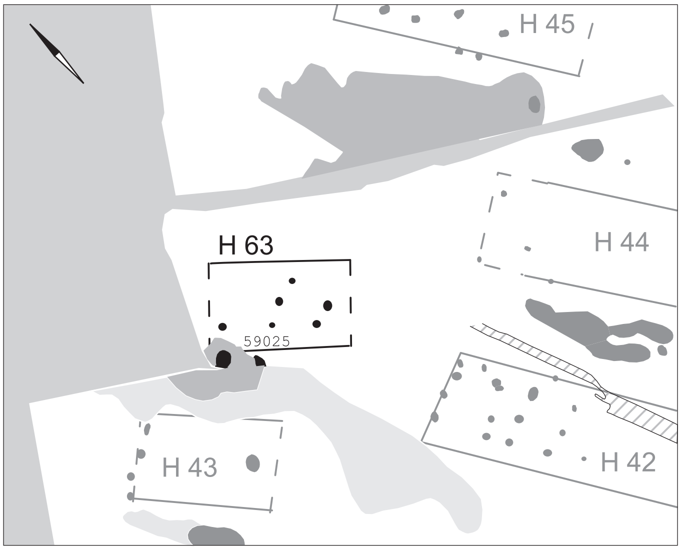
figs. 4-(63-64) plans of individual houses drawn to the same scale

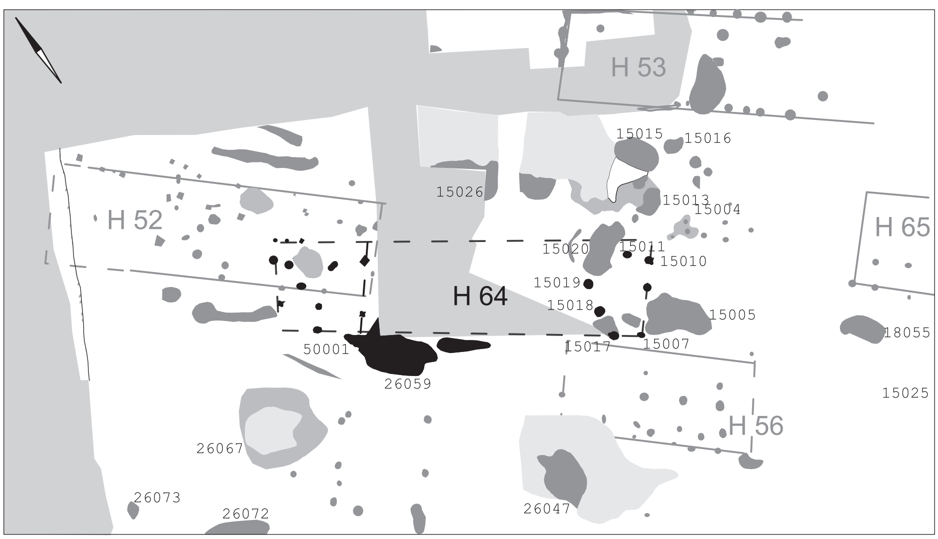




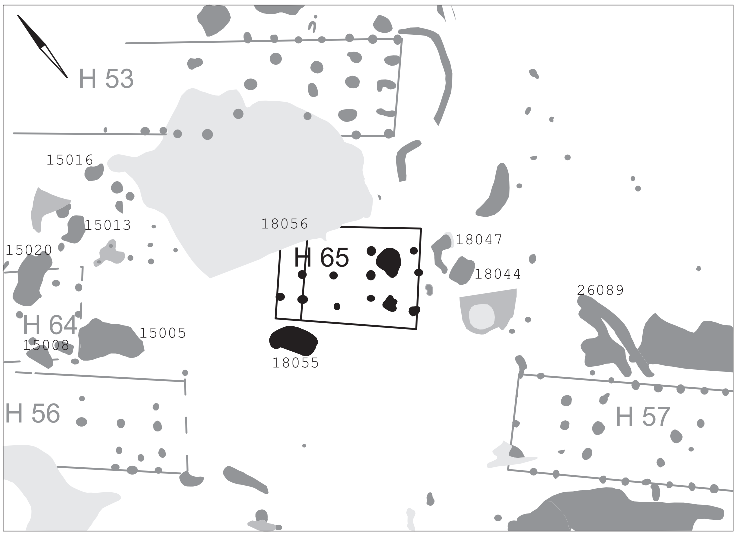


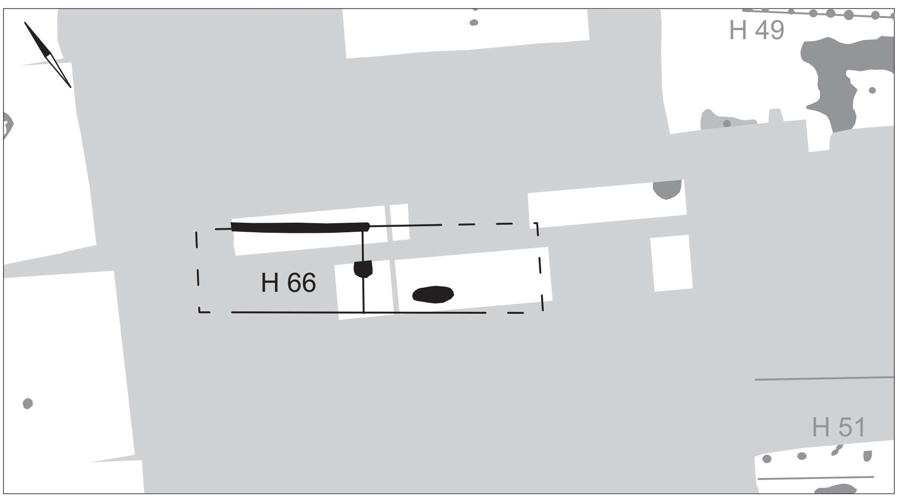
figs. 4-(65-67) plans of individual houses drawn to the same scale



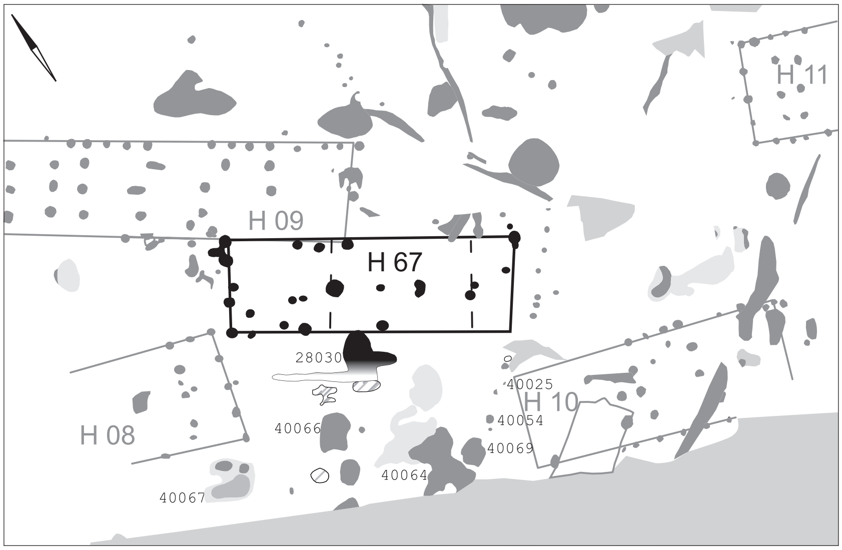


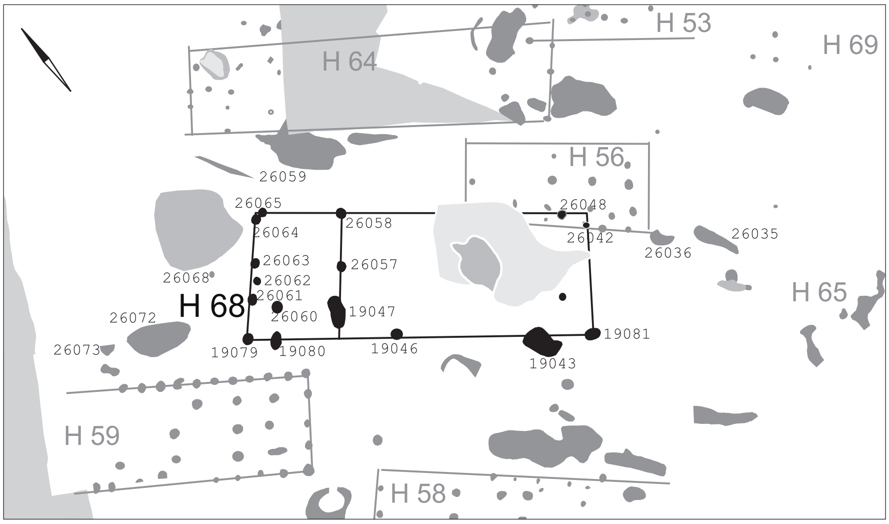
figs. 4-(68-69) plans of individual houses drawn to the same scale



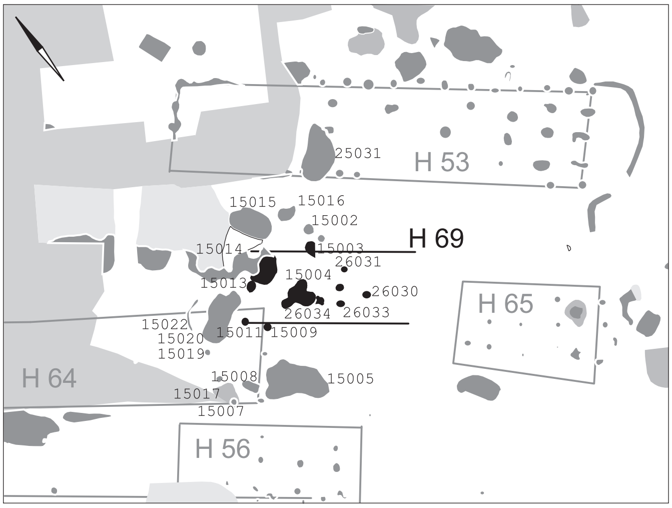


figs. 4-(70-71) plans of individual houses drawn to the same scale





figs. 4-(72-73) plans of individual houses drawn to the same scale



figs. 4-(74) plans of individual houses drawn to the same scale

from the large number (37) of badly legible house plans. Comparable to roughly every combination of variables in the house plans, the correlation between overall house length and length of the central section (all houses counted) is rather low at 0.33, which statistically 'explains' only 11% of the variation in these two variables.

The central parts of the houses in the Janskamperveld settlement offer an interesting view on the 'development' or 'evolution' of the central post configuration. There are 10 houses with a so-called Y-configuration, 14 houses show what is called 'degenerated Y's', and 16 have more or less recognizable regular (perpendicular) cross rows in the centre; a chronological evaluation of this presumed 'evolution' will be given in the chapter on Chronology.

Altogether, the houses in the excavated part of the Janskamperveld Bandkeramik settlement provide a picture of a quite regular Older Period LBK village, with few (if any) exclusive details.

Notes

1 The average direction of the house axes at Geleen-Janskamperveld is 126.5°; at nearby contemporaneosus Langweiler 8 the average alignment of the houses is 136.1°, precisely the direction of the midwinter sunrise at this latitude; the orientation of the Janskamperveld houses is almost 10° offset to the left of the midwinter sunrise.

2 I propose the name Flombornia for the country of the ancestors of the Northwestern Bandkeramians; it was located at the confluence of the Main and the Rhine, i.e., the Wetterau and its wider environment.

3 In this table, the visibility-score of the partitioning has been counted double, of the total length single, and of the other six values added up and averaged; then the sum of these figures was divided by (2+1+1).

4 In a few places in the excavation soil minerals have stained to illegibility patches with diameters of over 10 metres; in these spots the numerical correction below is also formally applicable, though for different material reasons.

5 The lengths of this part have been measured excluding the corridors on either or both ends.

6 Named after the first excavation where this configuration has been recognised: Geleen-De Kluis (Waterbolk/Modderman 1959: 163) situated about three kilometres SSW of the Geleen-Janskamperveld settlement.

7 After the extensive excavations in and publication of the houses at Elsloo-Koolweg (Modderman 1970), situated approximately 7.5 kms SW of the Geleen-Janskamperveld settlement.

8 Many authors consider these "secondary" rows indicative of repairs. However, in the reconstructions of bandkeramik houses which I have seen (e.g., Von Brandt 1988: 39; Coudart 1998: 69), the roof is always supported by longitudinal beams resting on the tops of the DPR poles. If one of these longitudinal beams shows bending or is in need of repair, then one single additional support suffices to deal with the problem, a set of poles is certainly not needed to support the other longitudinal beams.

9 When all houses are incorporated in the calculations, regardless of the *w*-indexes, the resulting regression formula is almost identical: E(bays) = 0.27xLength + 0.55. Consequently, the outcomes do not differ appreciably either.

10 "Especially telling is … that in almost all post holes [of House 21 at Langweiler 2] the post ghosts stand out, as partially their fillings fully consist of burnt loam and of carbonised wood. This finding suggests that the building has come down by fire" (Kuper *et al*. 1973: 44).

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APPENDIX: tables of major house dimensions and characteristics

LEGEND:

H: House identification number
01: Orientation of long axis of house
02: (estimated) length of house
03: *w*-index length estimate
04: width of front gable
05: width of rear gable
06: partitioning
(F = front, C = centre, R = rear)
07: *w*-index partitioning
08: house type according to
Modderman/Schäuble typology
09: no of DPRs in front part
10: no of bays in front part
11: length of front part
12: *w*-index front section
13: separation front side
(C = corridor, W = wall)
14: *w*-index front separation
15: separation rear side
(as col. 12)
16: *w*-index rear separation
17: no of DPRs in central part
18: no of bays in central part
19: central post configuration
20: length of central part
21: *w*-index central part
22: no of DPRs in rear part
23: no of bays in rear part
24: length of rear part
25: *w*-index rear part
26: no of posts observed
27: estimated no of posts
28: estimated no of DPRs
29: *w*-index of estimate of DPRs
30: (estimated) surface area of house
31: surface area within excavation
32: *w*-index estimated surface area
33: type of front façade
(P = posts, T = wall trenches)
34: type of side walls (as col. 33)
35: type of rear walls (as col. 33)
36: overall average of *w*-indices

Lenghts and widths in metres; areas in square metres; ‘99’: indet.

H	01	02	03	04	05	06	07	08	09	10	11	12
01	124	21,0	4	4,5	4,3	FCR	4	1b	1d	2	3,8	4
02	127	15,9	2	5,4	4,9	FCR	4	1c	1	2	2,9	2
03	123	23,9	3	5,1	5,2	FCR	4	1b	2d	3	6,7	4
04	123	14,1	1	4,5	5,1	FCR	4	1c	1+1d	3	4,1	4
05	126	9,7	4	5,3	5,0	CR	4	2	0	0	0,0	4
06	127	16,3	2	5,0	5,0	FCR	4	1c	1	2	3,4	3
07	126	24,5	2	6,1	5,6	FCR	4	1a	1d	2	5,5	2
08	110	16,5	4	6,1	5,0	FCR	4	1b	0	1	2,4	4
09	124	21,1	4	5,4	5,0	FCR	4	1b	0	1	4,6	2
10	108	14,7	2	5,4	5,2	CR	2	2	0	0	0,0	2
11	112	8,8	1	–	5,5	CR	0	>2	99	–	–	0
12	112	15,0	4	5,4	5,0	CR	4	2	0	0	0,0	4
13	114	21,2	4	5,1	4,7	FCR	4	1b	2d	3	5,6	4
14	117	10,5	0	5,2	5,2	FCR	1	1c	0	–	5,0	2
15	135	13,7	1	4,7	4,7	FCR	1	1c?	0	1	1,8	1
16	132	25,3	2	–	5,2	FCR	2	1c?	99	–	6,6	1
17	125	7,7	3	4,6	4,8	C	4	3	0	0	0,0	4
18	123	17,0	1	5,4	5,0	FCR	2	1a?	99	–	–	0
19	123	17,5	2	5,0	5,4	FCR	4	1c	0	1	4,0	2
20	107	10,8	1	4,4	4,4	C	1	3	0	0	0,0	1
21	130	12,6	1	4,4	4,6	FCR	2	1c?	1d	2	2,3	1
22	119	19,4	2	5,8	5,8	FCR	2	1c	1	2	5,0	1
23	126	16,1	1	5,7	5,7	FCR	2	1c	1	2	3,6	2
24	113	29,7	4	6,1	5,9	FCR	4	1a	2d	3	6,9	4
25	128	>15,0	1	4,8	4,9	FCR	2	1x	99	2	–	1
26	116	6,6	2	4,9	4,9	C	4	3	0	0	0,0	4
27	126	5,7	2	4,8	4,8	C	2	3	0	0	0,0	4
28	117	12,7	1	5,6	5,6	CR	2	2	99	0	–	0
29	121	9,9	2	4,5	4,3	CR	2	2	0	0	0,0	4
30	114	16,8	1	5,4	4,2	CR	1	2	0	0	0,0	0
31	162	17,9	3	4,8	5,3	FCR	3	1c	2	3	4,1	4
32	109	17,7	0	6,2	5,9	CR	0	2	99	–	–	0
33	127	14,6	3	5,0	4,8	CR	2	2	0	0	0,0	2
34	118	9,4	0	4,9	4,7	C	0	3	0	0	0,0	1
35	134	31,2	4	6,5	5,6	FCR	4	1a	2d	3	5,8	4

H	01	02	03	04	05	06	07	08	09	10	11	12
36	123	25,4	4	6,3	6,1	FCR	4	1a	1d	2	5,3	3
37	108	19,8	2	5,8	6,7	FCR	1	1c	0	1	2,7	2
38	108	8,2	0	4,8	4,8	C	2	3	0	0	0,0	2
39	129	20,1	4	5,9	6,2	FCR	4	1a	1d	2	4,5	4
40	147	6,4	4	5,6	5,6	C	4	3	0	0	0,0	4
41	144	7,1	4	5,2	5,2	C	4	3	0	0	0,0	4
42	149	11,3	3	4,4	4,8	CR	3	2	0	0	0,0	2
43	136	7,9	0	4,8	4,8	C	0	3	99	0	0,0	0
44	144	15,4	2	5,1	5,1	FCR	3	1c	2	3	3,4	2
45	147	13,3	1	6,8	6,8	CR	1	2	99	0	0,0	0
46	131	12,1	2	4,5	4,5	FCR	2	1c	1d	2	2,3	1
47	148	8,0	3	4,7	4,7	C	3	3	0	0	0,0	3
48	129	8,5	0	5,1	5,1	C	0	3	0	0	0,0	3
49	128	14,0	4	5,3	5,1	CR	4	2	0	0	0,0	4
50	128	8,1	4	4,2	4,2	C	4	3	0	0	0,0	4
51	125	18,0	0	5,5	5,5	FCR	2	1c	99	1	3,5	2
52	133	14,9	2	4,7	4,7	FCR	4	1c?	1d	2	2,1	1
53	128	22,4	4	5,1	4,5	FCR	4	1b	1d	2	4,2	4
54	133	14,5	0	5,3	5,3	FCR	3	1c	1d	2	3,9	4
55	138	11,1	3	4,9	4,8	CR	1	2	0	0	0,0	2
56	128	10,2	1	4,8	4,8	CR	2	2	99	0	0,0	0
57	133	12,2	4	5,3	5,1	CR	4	2	0	0	0,0	4
58	130	16,7	2	4,5	4,5	FCR	3	1c	1d	2	5,7	1
59	123	14,0	0	5,3	5,3	FCR	4	1c	1d	2	3,9	4
60	148	24,5	0	6,4	6,4	FCR	2	1x	99	–	-	0
61	131	15,9	0	5,6	4,8	CR	2	>2	99	–	-	0
62	154	6,1	0	4,8	4,8	C	2	3	0	0	0,0	2
63	132	7,4	0	4,6	4,6	C	0	3	99	–	–	0
64	125	19,5	1	5,1	4,8	FCR	3	1c?	2	3	–	0
65	129	7,4	3	5,4	4,5	C	3	3	0	0	0,0	3
66	124	14,9	1	4,2	4,2	CR	1	>2	–	–	0,0	0
67	123	10,0	2	4,8	5,0	FCR	3	1c	–	1	2,2	3
68	126	18,2	3	6,6	6,3	CR	3	2	–	–	0,0	0
69	126	10,5	0	4,0	4,4	CR	1	>2	–	–	0,0	1

H	13	14	15	16	17	18	19	20	21	22	23	24	25
01	W	4	C	4	1	2	dY	8,0	3	2	3	6,7	4
02	W	2	C	4	2	3	Yi	7,8	4	1	2	3,5	4
03	W	4	C	4	1	2	Y	9,7	4	2	3	6,4	3
04	C	4	C	4	2	3	R2	7,1	4	0	1	2,6	1
05	W	4	C	4	1	2	dY	7,3	3	1	2	3,1	2
06	W	2	C	3	2	3	R2	8,5	4	1	2	4,0	2
07	C	4	C	4	1	2	Y	10,1	4	3	4	6,8	4
08	W	4	C	4	1	2	R1	7,1	3	1	2	5,1	4
09	W	4	C	4	2	3	Yi	10,2	4	1	2	4,8	4
10	W	2	C	4	2	3	R2	8,8	2	1	2	5,2	2
11	x	0	C	4	1	2	Rx	6,3	3	0	1	1,8	4
12	W	4	C	4	1	2	Y	9,1	4	1	2	4,3	4
13	W	4	C	4	1	2	Y	9,0	4	1	2	5,0	4
14	W	3	x	0	1	2	Rx	5,6	2	99	–	–	0
15	x	0	x	0	1	2	Rx	6,7	1	1	2	3,8	1
16	x	0	C	4	1	2	x	8,1	2	2	3	8,5	4
17	W	4	C	4	1	2	Yi	6,6	4	0	0	0,0	4
18	W	4	C	4	1	2	R1	8,5	4	99	1	–	1
19	W	3	C	4	1	2	R2	4,7	3	1	2	5,5	1
20	W	1	C	1	2	3	x	8,6	1	0	1	0,0	1
21	W	1	C	1	2	3,0	x	7,1	1,0	1	2	3	1
22	W	2	C	4	1	2	Y	8,7	3	0	2	4,8	2
23	W	3	C	2	1	2	x	5,8	2	0	2	5,1	1
24	C	4	C	4	1	2	Y	9,7	4	1	2	7,7	4
25	W	0	C	3	99	2	Rx	9,3	1	1	2	4,0	1
26	W	4	W	4	2	3	R2	6,6	2	0	0	0,0	4
27	W	4	C	4	1	2	R1	4,0	4	0	0	0,0	2
28	x	0	C	4	1	2	dY	6,9	3	1	2	3,9	2
29	W	2	x	0	99	2	x	6,2	2	0	1	2,4	1
30	μx	0	C	4	1	2	x	10,4	1	1	2	5,4	4
31	C	4	C	1	2	3	R2	6,3	3	2	3	4,4	3
32	x	0	C	4	1	2	x	9,6	1	1	2	6,5	4
33	W	1	C	3	99	4	x	7,7	2	2	3	4,9	2
34	W	3	x	0	99	2	x	6,6	0	0	0	0,0	0
35	C	4	x	0	2	3	iY	12,2	3	2	3	8,5	2

H	13	14	15	16	17	18	19	20	21	22	23	24	25
36	W	4	x	0	99	3	x	12,1	3	1	2	6,0	4
37	x	0	x	0	99	3	x	7.0	3	99	2	8,8	2
38	W	3	x	0	1	2	Y	6,2	2	99	–	–	0
39	C	2	C	4	1	2	x	6,4	4	1	2	4,7	4
40	W	4	W	4	1	2	R1	6,4	4	0	0	0,0	4
41	W	4	C	4	1	2	R1	5,1	3	0	0	0,0	4
42	W	2	C	3	2	3	J	7,1	2	0	1	2,7	4
43	x	0	W	0	99	2	x	7,9	0	99	0	0,0	0
44	x	0	x	0	99	3	x	9.4	2	99	1	2,4	1
45	x	0	C	3	3	4	iYi	8,9	3	0	1	2,6	3
46	x	0	C	3	2	3	x	6,5	1	0	1	1,6	1
47	W	2	C	2	1	2	x	6,4	2	0	0	0,0	3
48	W	3	x	0	1	2	Yi	8,5	1	99	–	–	0
49	W	4	C	4	1	2	Y	8,3	4	0	1	3,5	4
50	W	4	W	2	99	2	x	8,2	2	0	0	0,0	4
51	W	2	C	3	1	2	x	10,0	2	99	1	2,2	0
52	W	1	C	3	2	3	x	7,4	3	0	1	3,7	2
53	W	4	C	4	1	2	dY	9,9	4	2	3	6,0	3
54	W	2	C	2	1	2	Y	6,8	3	99	1	1,7	0
55	x	1	C	2	99	3	x	8,7	1	99	1	–	0
56	x	1	C	2	2	3	R2	6,1	3	99	1	2,3	0
57	W	4	C	4	1	2	Y	7,9	4	0	1	2,6	4
58	x	0	W	2	1	2	dY	7,0	1	99	2	2,7	1
59	W	4	x	0	1	2	Y	6,4	4	99	1	2,7	0
60	x	0	x	0	99	–	x	–	0	99	–	–	0
61	x	0	C	4	99	–	x	–	0	2	3	6,8	4
62	W	1	W	0	1	2	Rx	6,1	2	0	–	–	1
63	x	0	x	0	2	3	dY	7,4	1	99	–	–	0
64	W	0	x	0	99	–	x	–	0	1	2	4,4	2
65	W	3	C	4	2	3	R2	6,1	4	0	0	0,0	3
66	x	0	x	0	2	3	x	7,7	0	2	3	7,3	2
67	x	1	x	1	2	3	x	7,3	3	2	3	5,7	2
68	x	0	x	0	2	3	x	9,0	0	1	2	4,6	3
69	geen	1	C	1	2	3	x	5,4	0	1	2	5,1	3

H	26	27	28	29	30	31	32	33	34	35	36
01	33	70	10	4	91,0	91,0	4	P	P	T	**4**
02	30	60	8	4	83,8	83,8	3	P	P	P	**3**
03	69	69	12	3	126,7	117,6	3	P	P	T	**4**
04	37	70	11	3	79,6	79,6	2	P	P	x	**3**
05	30	45	6	3	55,6	55,6	3	P	P	P	**4**
06	43	65	9	3	94,4	94,4	3	P	P	P	**3**
07	32	75	12	3	143,0	119,3	3	T	T	T	**3**
08	46	57	7	3	90,7	90,7	4	P	P	T	**4**
09	43	73	9	4	109,0	109,0	4	P	P	T	**4**
10	31	58	7	3	78,6	78,6	3	P	P	T	**2**
11	27	36	-	0	51,3	36,1	1	x	P	P	**1**
12	37	47	6	4	77,5	72,9	4	P	P	T	**4**
13	56	62	11	4	105,5	105,5	4	P	P	T	**4**
14	12	46	>5	2	30,7	23,9	1	P	P	x	**2**
15	11	60	>6	2	65,1	34,8	1	x	P	x	**1**
16	16	79	>10	2	135,6	50,0	2	x	x	T	**2**
17	19	25	5	4	36,3	36,3	4	P	P	P	**4**
18	13	40	>5	2	64,1	64,1	1	P	T	x	**2**
19	36	54	8	2	73,9	73,9	2	P	P	x	**3**
20	12	40	>5	1	45,0	45,0	1	P	P	P	**1**
21	16	52	>10	1	57	51	1	P	P	x	**1**
22	15	55	>8	2	114,4	114,4	2	P	P	T	**2**
23	18	54	>8	1	93,6	93,6	1	P	P	x	**2**
24	57	70	12	4	173,8	167,3	4	T	T	T	**4**
25	11	60	>6	2	68,0	68,0	1	x	P	x	**1**
26	10	31	4	4	32,8	20,8	4	P	x	P	**3**
27	8	26	4	2	26,6	23,6	2	x	x	P	**3**
28	19	49	6	2	74,2	74,2	2	x	P	x	**2**
29	14	40	>6	2	43,2	43,2	2	P	P	x	**2**
30	8	50	>6	1	80,5	80,5	1	x	P	T	**1**
31	44	78	12	3	87,9	87,9	3	P	P	P	**3**
32	12	45	>6	1	111,7	53,0	1	x	P	T	**1**
33	23	61	9	1	74,5	74,5	4	P	P	P	**2**
34	21	35	4	2	42,2	23,9	1	P	P	x	**1**
35	28	89	>13	3	189,6	145,1	4	T	T	T	**4**

H	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
36	27	62	>9	3	157,5	88,9	4	T	T	T	**4**
37	23	57	>7	1	118,8	116,3	2	P	P	x	**2**
38	9	31	>3	2	37,5	18,0	2	P	P	P	**4**
39	31	66	10	3	121,4	110,2	4	T	T	T	**4**
40	10	21	3	4	32,4	32,4	4	P	P	P	**4**
41	16	28	4	4	36,1	36,1	3	P	P	P	**2**
42	17	38	6	2	50,9	50,9	2	x	P	P	**0**
43	5	21	>3	1	38,5	38,5	0	x	x	x	**2**
44	12	54	>8	1	73,5	73,5	2	P	P	P	**1**
45	17	44	7	1	90,2	90,2	1	x	P	P	**1**
46	15	56	8	2	50,6	50,6	1	P	P	P	**3**
47	9	32	4	3	36,0	36,0	3	P	P	P	**1**
48	11	24	>4	0	44,5	37,0	0	P	P	x	**4**
49	44	44	5	4	71,4	71,4	4	P	P	P	**3**
50	9	23	4	1	33,7	17,0	4	P	P	P	**1**
51	11	58	>9	2	93,5	33,5	0	x	P	x	**2**
52	30	61	>8	2	73,3	73,1	0	x	P	x	**4**
53	41	71	10	3	105,2	83,0	4	P	P	T	**1**
54	12	65	>8	0	77,6	77,6	0	P	P	x	**1**
55	25	37	>6	0	58,4	58,4	1	P	P	P	**1**
56	16	42	>6	1	52,0	52,0	0	x	P	x	**4**
57	35	38	5	4	62,0	62,0	4	P	P	P	**1**
58	22	58	>8	0	74,4	56,8	0	x	P	P	**2**
59	33	52	>7	0	70,2	70,2	0	P	P	x	**1**
60	6	52	>5	0	151,8	94,5	1	x	x	x	**1**
61	31	56	>7	2	76,6	47,4	2	x	P	T	**1**
62	5	21	>3	1	29,5	29,5	1	P	x	P	**0**
63	6	26	>4	1	32,7	32,7	0	x	x	x	**1**
64	17	75	>7	0	95,0	60,2	4	P	P	P	**3**
65	12	31	5	3	36,1	36,1	3	P	x	P	**1**
66	1	38	6	0	59,3	25,0	1	x	P	T	**3**
67	26	59	9	3	78,2	78,2	3	P	P	P	**2**
68	16	59	9	2	117,7	117,7	3	P	P	P	**0**
69	12	38	6	0	43,5	43,5	0	x	P	P	**0**