Tempo of a Mega-henge: A New Chronology for Mount Pleasant, Dorchester, Dorset

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APPENDIX S1: AN ALTERNATIVE CHRONOLOGY FOR MAIDEN CASTLE: CAUSEWAYED ENCLOSURE & BANK BARROW

We outline an alternative chronology for the Maiden Castle causewayed enclosure and bank barrow (Figs S1.a–d) to that presented in Whittle *et al.* (2011, figs 4.41–4.45), based on an alternative reading of part of the stratigraphic sequence by Niall Sharples, the excavator. Key to this alternative reading of the overall sequence is the interpretation that context 299 in Trench I (Sharples 1991, fig. 49) was a fill, not of the apparent pre-enclosure feature, 2233, but of the inner ditch itself; divisions between layers being difficult to distinguish in this part of the sequence. This is significant because two disarticulated animal bone fragments (401 299/A and 401 299/B) from 299 were dated on the grounds that they provided *termini post quos (TPQ*s*)* for the rest of the inner ditch sequence, and the dates were modelled accordingly to provide an estimated construction date for the ditch in the 36th century cal BC (Whittle *et al.* 2011, 181; fig. 4.47).

In the reading presented here the two samples (GrA-29112 and OxA-14834) from layer 299 (originally interpreted as part of the surviving uppermost fill of feature 2233) provide *TPQ* for the infilling of the ditch (Fig. S1.b: After[1] 299), since their disarticulation means that they could have been redeposited and their stratigraphic position in the ditch is no longer entirely clear. A further implication of this revised reading of the inner ditch sequence is that OxA-15097, measured on oak sapwood charcoal from the chalk rubble fills in Trench 1, no longer only provides a *TPQ* for its context (Whittle *et al.* 2011, 184–5; fig. 4.42).

Due to the fact that OxCal v4.3 (Bronk Ramsey 2009; 2017; Bronk Ramsey & Lee 2013) can no longer calculate an estimate of the last dated event [`Last`] for a group [`Phase`] of parameters that have all been defined as *TPQ* [After] (unlike previous versions of OxCal), we have had to remodel the sequence for the outer ditch of the enclosure as defined in the original model (Whittle *et al.* 2011, fig. 4.43). In the original model for the outer ditch all the radiocarbon dates are from samples that could be residual as they are not articulating or refitting, since this interpretation holds true in the alternative model we have simply treated all the dated samples as deriving from unordered groups [Phase] thus ignoring the stratigraphic relationships defined in Whittle *et al.* (2011, fig. 4.43).

The model for Maiden Castle is shown in Figs S1.a–d. It has good overall agreement (Amodel: 65).[2] The implication of the alternative reading is that the construction of the inner ditch circuit of the causewayed enclosure starts considerably earlier, in *3695–3640 cal BC* (*95% probability*; Fig. S1.b; *dig Maiden inner*) probably *3670–3640 cal BC* (*68% probability*), than previously estimated (Fig. S1.e; Table S1.a). The difference between the two estimates for the completion of the inner ditch (Fig. S1.e) is *75–145 years* (*95% probability*; distribution not shown), probably *85–120 years* (*68% probability*).

In the original model (Whittle *et al.* 2011, figs 4.41–4.45) the construction date for this ditch was very close to that of the outer (Whittle *et al.* 2011, fig. 4.47), with the suggestion that the entire enclosure was relatively short lived; built and used within a single generation (Whittle *et al*. 2011, 188). In the alternative model the causewayed enclosure has a much longer currency (Fig. S1.f) of between *75–185 years* (*95% probability*; calculated as Difference *dig Maiden inner/fill Maiden outer;* Fig. S1.g), probably *100–150 years* (*68% probability*).

Redefining the model for the outer ditch of the causewayed enclosure in this way (Fig. S1.c), ie, estimating the digging and infilling of the outer ditch from the most recent dated samples, provides estimates that are not importantly different from those in Whittle *et al.* (2011, 186, Table S1.a). Therefore, the interpretation remains valid that the outer ditch was dug and filled with dramatic rapidity, taking at most 35 years to infill (Whittle *et al*. 2011, 189)

This revised longer overall duration of the causewayed enclosure helps to explain the finds-rich 'midden' layers in the upper fills of the inner ditch (Sharples 1991, 51), the accumulation of which was difficult to explain using the previous short chronology. Rather than rapidly infilling, this ditch can now be seen to have filled over a period of some 100 years. During this period the site existed as a single-ditched enclosure, where gatherings and activities took place. The construction of the outer ditch can now be seen as a possible 'closing' event, a rapid digging and infilling that perhaps marked the end of the occupation and use of the enclosure. The revised construction date for Maiden Castle means that this enclosure is now closely contemporary with the creation of other large causewayed enclosures in central Southern England, in particular, the main enclosure at Hambledon Hill and the first circuit of ditches at Windmill Hill. (Fig S1.h).

TABLE S1.a. COMPARISON OF THE HIGHEST POSTERIOR DENSITY INTERVALS FOR KEY CONSTRUCTIONAL EVENTS OBTAINED FROM THE ALTERNATIVE MODEL FOR MAIDEN CASTLE & THE ONE PUBLISHED IN WHITTLE *ET AL*. (2011)

Source	*Construction of the inner ditch* (dig Maiden inner) cal BC	*Construction of the outer ditch* (dig Maiden outer) cal BC	*Construction of the long mound* (start Maiden long mound) cal BC
Whittle *et al.* 2011 (figs 4.41–4.45)	*3575–3535*	*3580–3525*	*3550–3500 (40% probability) or 3480–3385 (55% probability)*
Alternative model (Figs S1.a–d)	*3695–3640*	*3585–3485*	*3560–3500 (22%) or 3485–3380 (73%)*

All estimates are quoted at *95% probability* unless otherwise stated. The Whittle *et al*. (2011; figs 4.41–45) modelling was undertaken using OxCal v3.10 (Bronk Ramsey 1995; 1998; 2001) and the calibration data IntCal09 (Reimer *et al*. 2009). The alternative modelling was undertaken using OxCal v4.3 (Bronk Ramsey 2009; 2017; Bronk Ramsey & Lee 2013) and the atmospheric calibration curve for the northern hemisphere (IntCal13) published by Reimer *et al.* (2013).

Endnotes

1 Text in `Courier` denotes OxCal CQL2 keywords (http://c14.arch.ox.ac.uk/).

2 The chronological model presented here has been constructed using the program OxCal v4.3 (Bronk Ramsey 2009; 2017; Bronk Ramsey & Lee 2013) and the atmospheric calibration curve for the northern hemisphere (IntCal13) published by Reimer *et al.* (2013). The algorithms used are defined exactly by the brackets and OxCal keywords on the left-hand side of Figs S1.a–d (http://c14.arch.ox.ac.uk/). The posterior density estimates output by the model are shown in black, with the unconstrained calibrated radiocarbon dates shown in outline. The other distributions correspond to aspects of the model. For example, the distribution '*dig Maiden inner'* (Fig. S1.b) is the posterior density estimate for the date when the inner ditch circuit was dug. In the text and tables, the Highest Posterior Density intervals of the posterior density estimates are given *in italics*.

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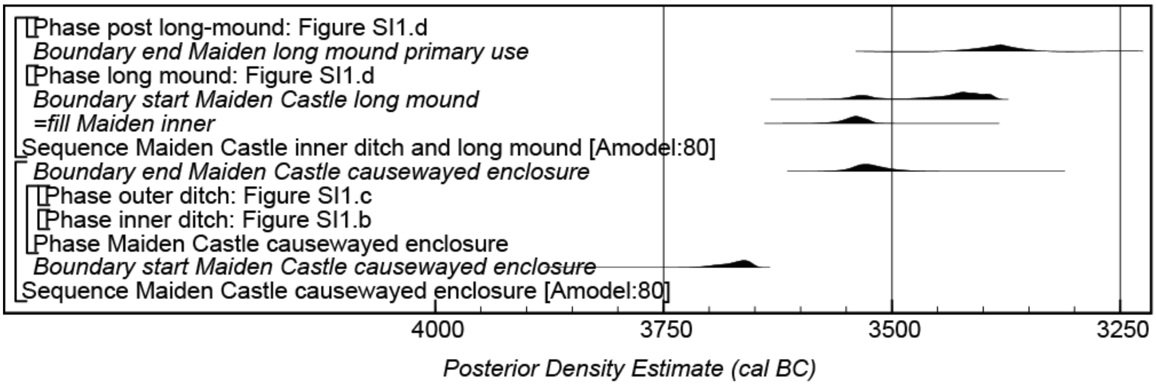

Fig. S1.a.
Overall structure for the model for the chronology of Maiden Castle. The component sections of this model are shown in detail in Figs S1.b–d. The large square brackets down the left-hand side of these figures along with the OxCal keywords define the model exactly

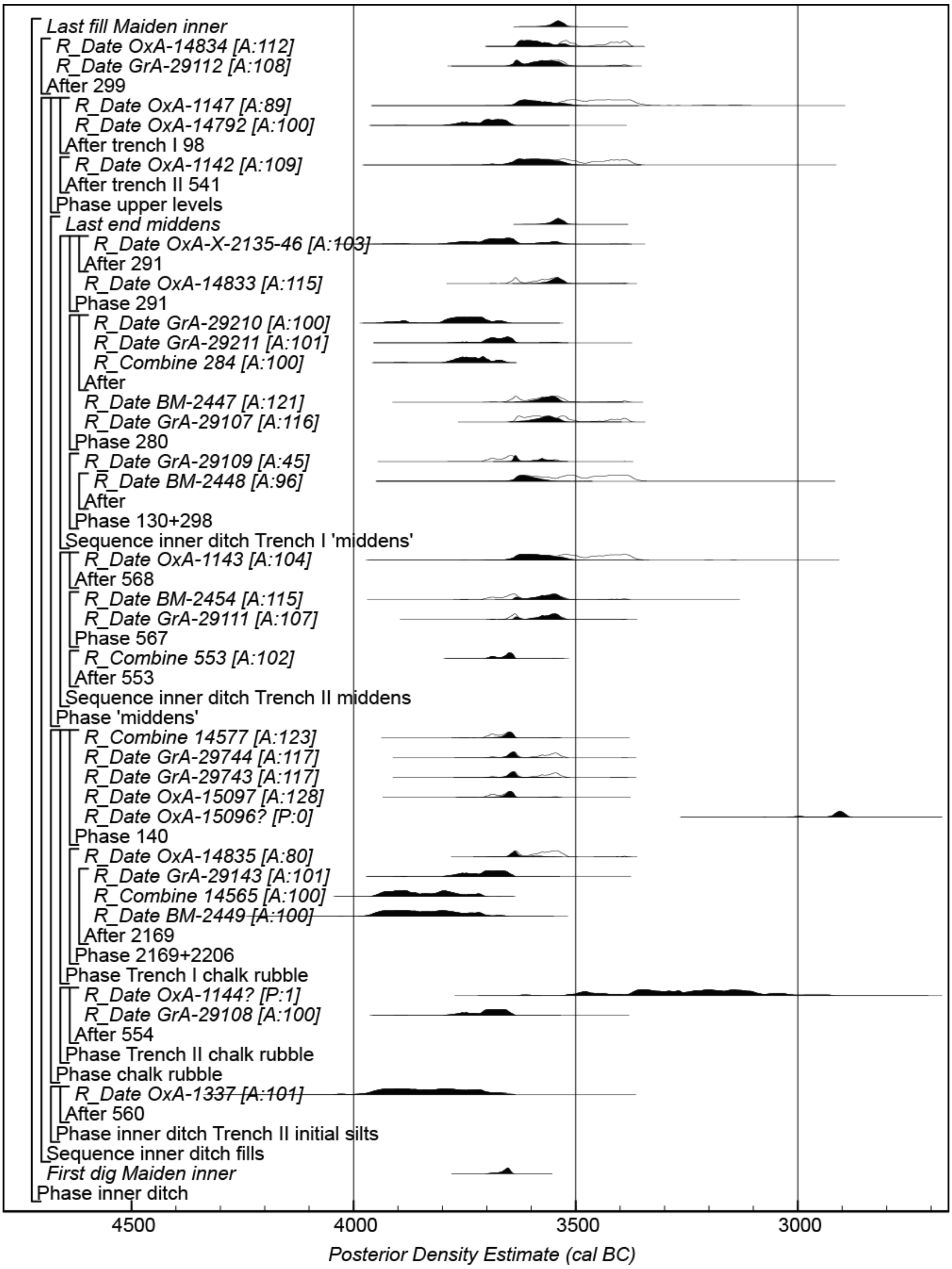

Fig. S1.b.

Probability distributions of dates from the inner ditch of the causewayed enclosure. Each distribution represents the relative probability that an event occurred at a particular time. For each of the dates two distributions have been plotted, one in outline which is the result produced by the independent calibration of the radiocarbon measurement and a solid one which is based on the chronological information provided by the model. For example, the distribution '*dig Maiden inner*' is the posterior density estimate for the date when the Inner ditch circuit was dug. The overall structure of this model is shown in Fig. S1.a, and its other components in Figs S1.c–d

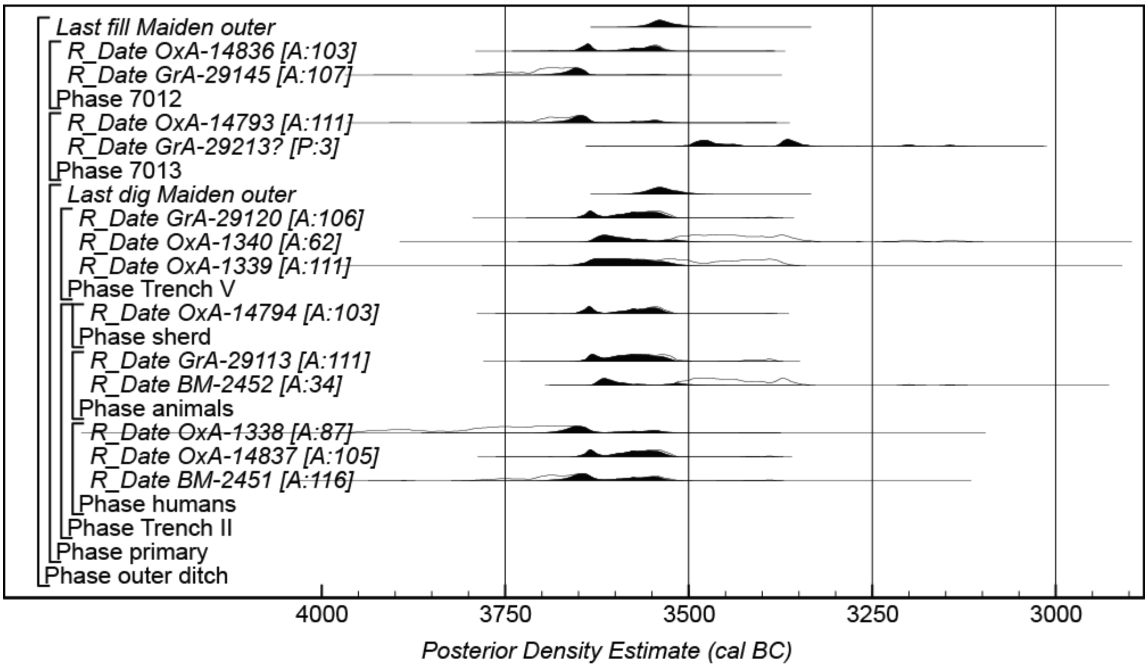

Fig. S1.c.

Probability distributions of dates from the outer ditch of the causewayed enclosure. The format is identical to Fig. S1.b. The overall structure of this model is shown in Fig. S1.a, and its other components in Figs S.b and S.d

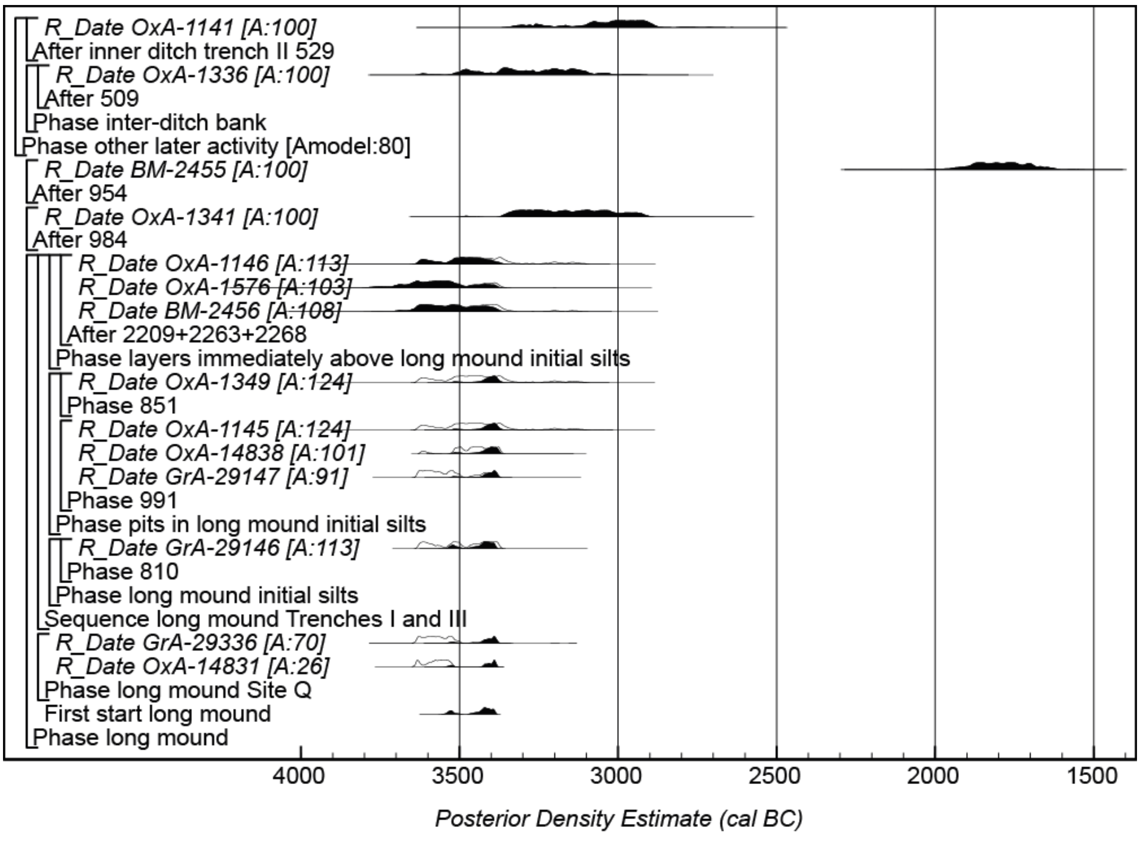

Fig. S1.d.

Probability distributions of dates from the long mound and from Neolithic contexts later than the long mound. The format is identical to Fig. S1.b. The overall structure of this model is shown in Fig. S1.a, and its other components in Figs S1.b and S1.c

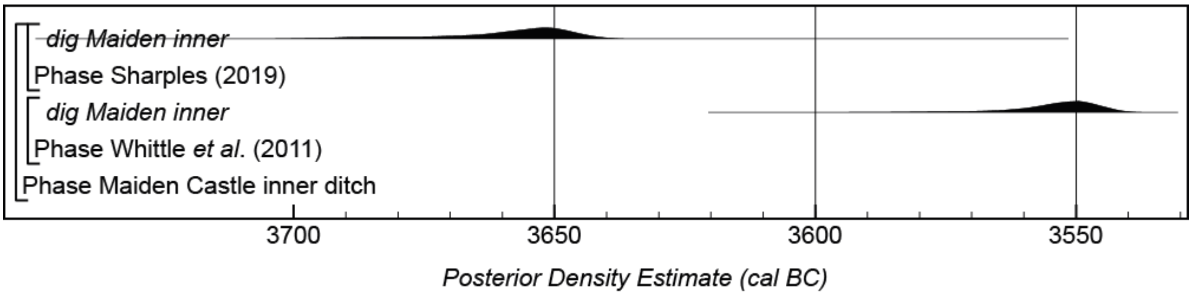

Fig. S1.e.
Probability distributions of estimates for the digging of the Inner ditch. The distributions have been taken from the models defined in Whittle *et al*. (2011; figs 4.41–45) and Figs S1.a–d

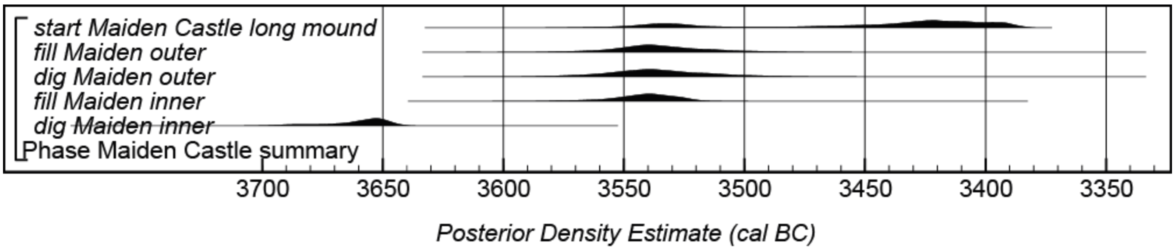

Fig. S1.f.
Probability distributions of key parameters from Maiden Castle, derived from the model defined in Figs S1.a–d

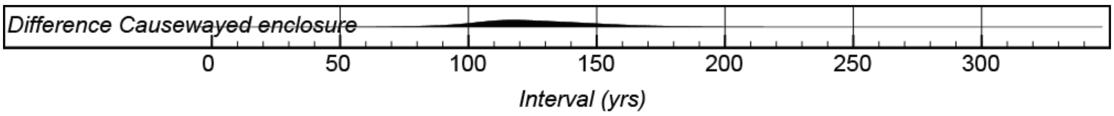

Fig. S1.g.
Probability distribution of the number of years the causewayed enclosure was in use (calculated as Difference *dig Maiden inner/fill Maiden outer*), derived from the model defined in Figs S1.a–d

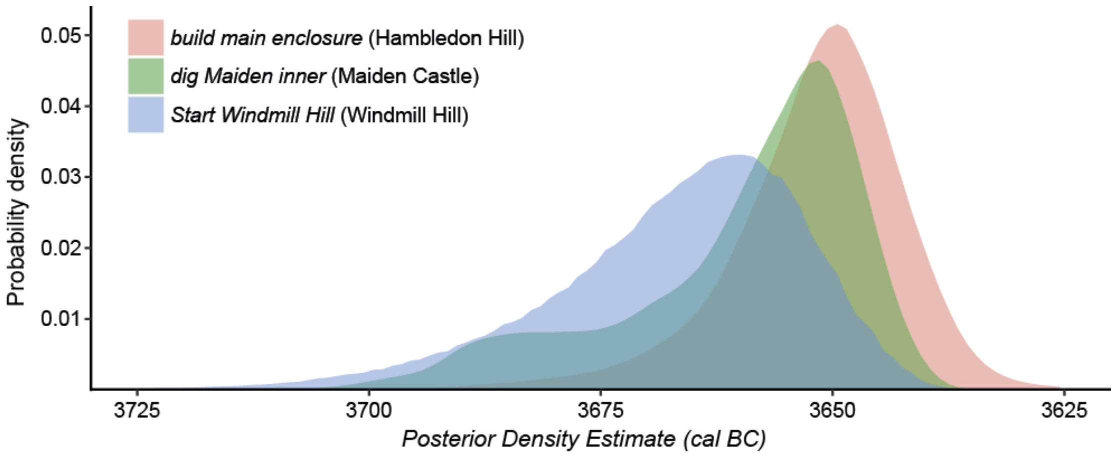

Fig. S1.h.
Probability distribution of the key constructional events at Hambledon Hill, Maiden Castle, and Windmill Hill. The distributions are derived from the models defined in Figs S1.a–d. (Maiden Castle), Whittle e*t al.* 2011 (figs 4.7–4.13; Hambledon Hill), and Whittle e*t al.* 2011 (figs 3.8–3.11; Windmill Hill), rerun with IntCal13 (Reimer *et al*. 2013) where appropriate

APPENDIX S2: RADIOCARBON METHODS & SUMMARY OF THE PRIOR INFORMATION INCORPORATED INTO THE CHRONOLOGICAL MODEL SHOWN IN FIGS 7–10

Radiocarbon methods

Radiocarbon samples of animal bone, antler, and charcoal dated as part of the original post-excavation programme were measured by liquid scintillation counting of benzene at the British Museum Research Laboratory using methods described by Burleigh (1972; 1979). A single sample of charcoal was measured at the Radiocarbon Dating Laboratory, University College, Cardiff during the setting-up of the laboratory in 1974. This sample, which may be a true replicate of a sample previously dated by the British Museum (BM-668; the documentation is not clear) was pre-treated, combusted to CO_2 converted to methane, and dated by gas proportional counting (Dresser 1985).

Pre-treatment, combustion, graphitisation, and measurement by Accelerator Mass Spectrometry (AMS) of antler and charcoal samples at the Scottish Universities Environmental Research Centre (SUERC) followed the methods outlined in Dunbar *et al*. (2016). Samples of antler, bone, and charcoal processed at the Oxford Radiocarbon Accelerator Unit were pre-treated and combusted as described in Brock *et al*. (2010), graphitised (Dee & Bronk Ramsey 2000), and dated by AMS (Bronk Ramsey *et al*. 2004). The ^{14}CHRONO Centre, The Queen's University, Belfast, processed antler and charcoal samples using methods outlined in Reimer *et al.* (2015). All samples were graphitised using zinc reduction (Slota *et al.* 1987) and dated by AMS. At ETH Zurich samples of antler were gelatinised and ultrafiltered as described by Hajdas *et al.* (2007; 2009) and charcoal was pre-treated using the acid-base-acid protocol outlined in Hajdas (2008), with the acid- and alkali-insoluble fraction selected for dating. All samples were combusted in an elemental analyser and graphitised using the fully automated system described by Wacker *et al*. (2010b). Graphite targets were dated using a 200 kV, MICADAS AMS as described by Wacker *et al*. (2010c), with data reduction undertaken using BATS (Wacker *et al*. 2010a). Stable isotopic ratios were obtained on sub-samples of the pre-treated antler using a ThermoFischer Flash-EA 1112 elemental analyzer coupled through a Conflo IV interface to a ThermoFisher Delta V Isotope Ratio Mass Spectrometer.

Five groups of replicate measurements are available on samples of antler that were divided and submitted for dating to different laboratories. In all cases the results are statistically consistent at 95% confidence (Table 1; Ward & Wilson 1978). Four of these groups also have replicate carbon and nitrogen stable isotopic ratios. All the replicate groups are statistically consistent at 95% confidence (Ward & Wilson 1978), except for the $\delta^{13}C$ values for the antler pick from Layer 11, Cutting XXIX (OxA-35739, UBA-34292, and ETH-86494). The reported value from Oxford is slightly depleted compared with the observed range for antler values from the site, and together with the fact that the UBA and ETH values are statistically consistent (-23.1 ± 0.02; $T'=0.2$, $T'(5\%)=3.8$, $\nu=1$), suggests this measurement may be erroneous.

Summary of the prior information incorporated in the chronological model shown in Figs 7–10

Figures S2.a–c summarise the stratigraphic sequences (prior information) that were used to model the radiocarbon dates for Mount Pleasant. Figures S2.d–f provide estimates for the length of time between the construction of the various constituent parts of Mount Pleasant. Table S2.A provides the full set of probabilities for the sequence of construction for these various elements (henge, palisade, Conquer Barrow, Site IV ditch, and the burning layers within Site IV ditch) and Table S2.B provides the highest posterior density intervals for the number of years between the construction of these parts of Mount Pleasant.

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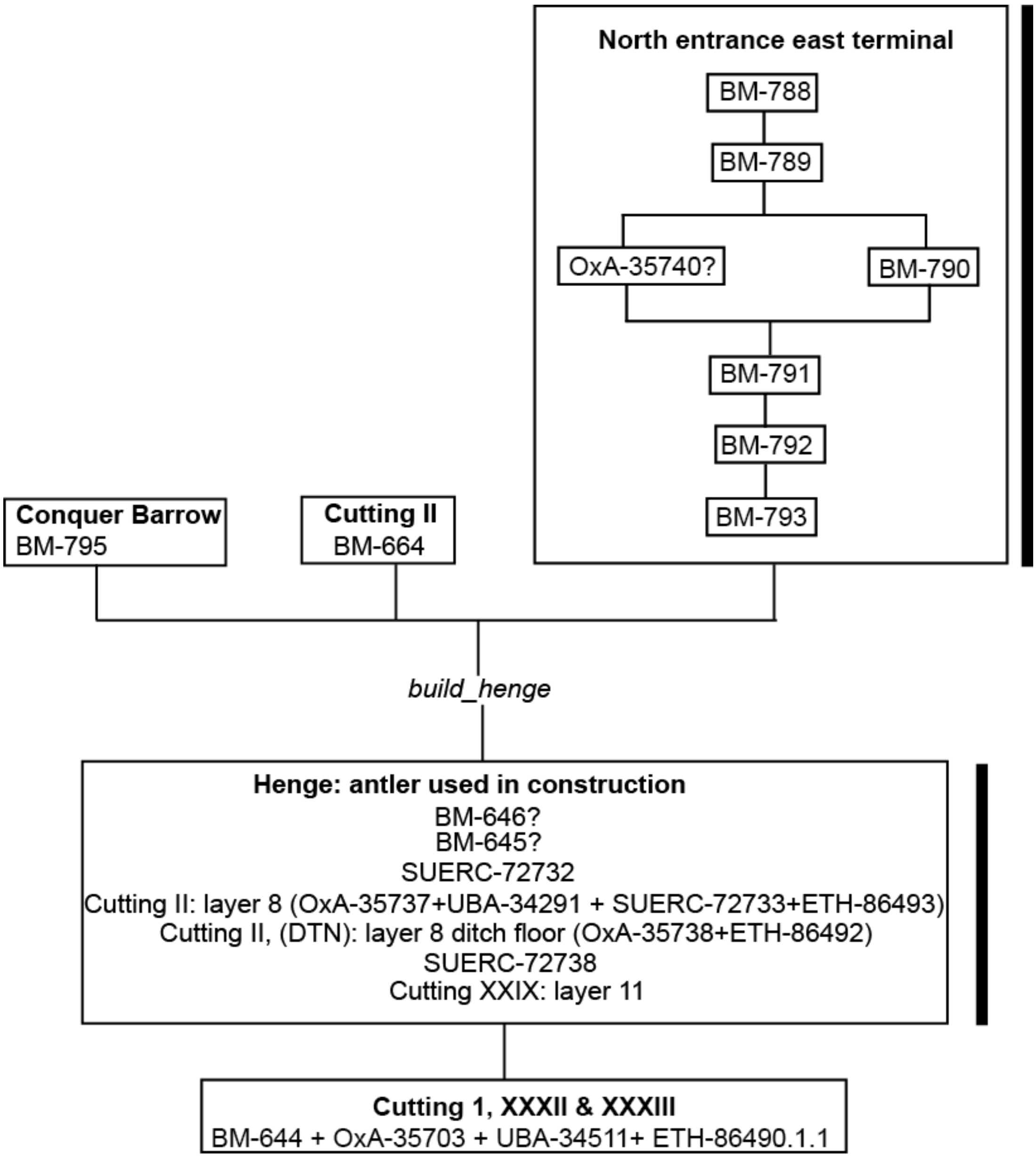

Fig. S2.a.
Summary of the prior information from the henge and Conquer Barrow incorporated into the chronological model shown in Figs 7–10. The stratigraphic relationships between samples are shown with the earliest at the bottom, the solid bars down the right-hand side represents uniformly distributed phases of activity. Stratigraphic sequence based on published excavations (Wainwright 1979).

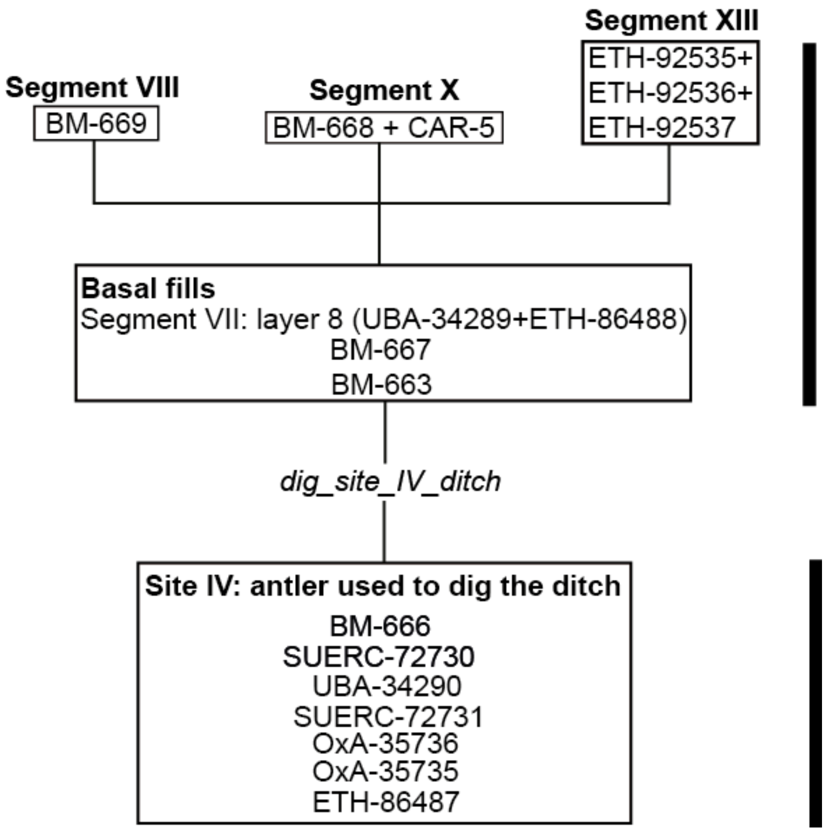

Fig. S2.b.
Summary of the prior information from the palisade incorporated into the chronological model shown in Figs 7–10. The stratigraphic relationships between samples are shown with the earliest at the bottom, the solid bars down the right-hand side represent uniformly distributed phases of activity. Stratigraphic sequence based on published excavations (Wainwright 1979).

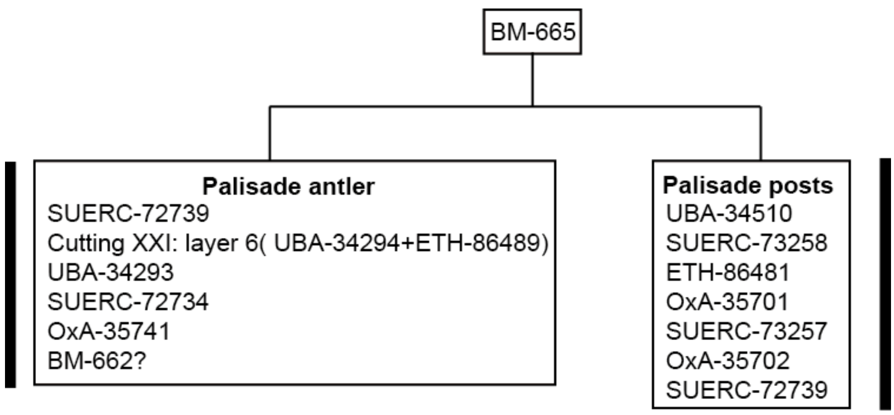

Fig. S2.c.
Summary of the prior information from the palisade incorporated into the chronological model shown in Figs 7–10. The stratigraphic relationships between samples are shown with the earliest at the bottom, the solid bars down the left-hand and right side represents a uniformly distributed phase of activity. Stratigraphic sequence based on published excavations (Wainwright 1979).

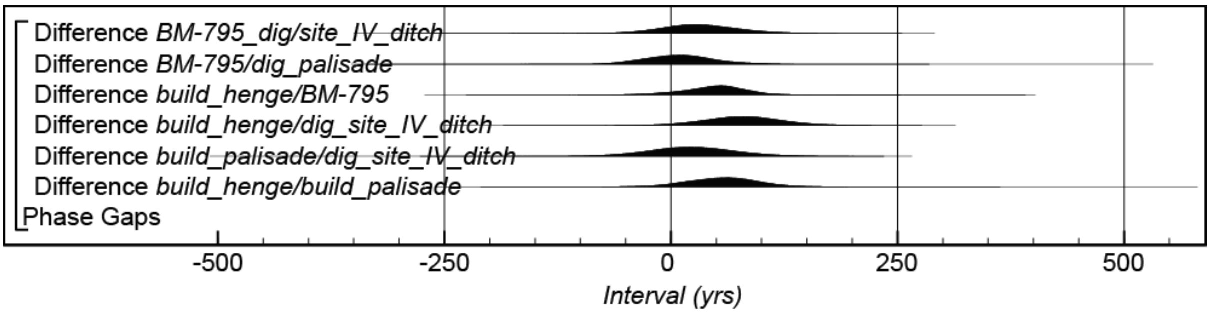

Fig. S2.d.
Probability distributions of the number of years between the construction of the henge, Conquer Barrow, palisade and Site IV ditch derived from the models shown in Figs 7–10

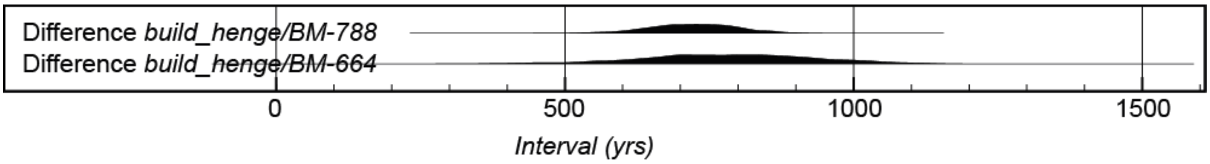

Fig. S2.e.
Probability distributions of the minimum number of years between the construction of the henge and the latest dated layers in the Northern entrance (*BM-788*) and Western entrance (*BM-664*), derived from the models shown in Figs 7–10

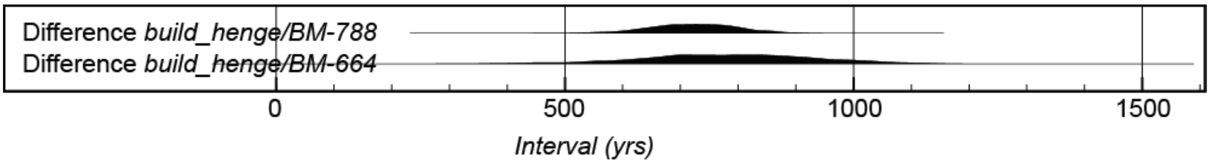

Fig. S2.f.
Probability distribution of the number of years between the digging of the Site IV ditch and the formation of layer 5 is segment XIII of the ditch derived from the models shown in Figs 7–10

TABLE S2.A. PERCENTAGE PROBABILITIES OF THE RELATIVE ORDER OF THE CONSTRUCTION OF THE HENGE, PALISADE, CONQUER BARROW (BM-795), SITE IV DITCH, AND THE FORMATION OF LAYER 5, SEGMENT XIII, IN THE SITE IV DITCH

	build_henge	*BM_795*	*build_palisade*	*dig_site_IV_ditch*
build_henge		90.0	92.4	96.2
BM_795	10.0		58.5	76.4
build_palisade	7.6	41.5		68.6
dig_site_IV_ditch	3.8	23.6	31.4	

The cells show the probability of the distribution in the left-hand column being earlier than the distribution in the top row. For example, the probability that Site IV ditch was dug before the construction of the palisade is 31.4%

TABLE S2.B. HIGHEST POSTERIOR DENSITY INTERVALS FOR THE NUMBER OF YEARS BETWEEN THE CONSTRUCTION OF THE HENGE, CONQUER BARROW, PALISADE AND SITE IV DITCH, DERIVED FROM THE MODELS SHOWN IN FIGS 7–11 AND ILLUSTRATED IN FIG. S2.E

Parameters	*Highest Posterior Density interval (95% probability) years*	*Highest Posterior Density interval (68% probability) years*
build_henge- build_palisade	*−25–140*	*15–100*
build_palisade-BM-795	*−75–105*	*−35–50*
build_henge-dig_site_IV_ditch	*−15–175*	*35–125*
build_palisade-dig_site_IV_ditch	*−75–120*	*−25–70*
build_henge- BM-795	*−24–125*	*15–90*
BM-795-dig_site_IV_ditch	*−60–135*	*−15–75*

APPENDIX S3: ALTERNATIVE MODELS FOR CONQUER BARROW & SITE IV, SEGMENT VII

Alternative models which acknowledge the possibility that there is no stratigraphic relationship between the Conquer Barrow and the henge, and that the Conquer Barrow is earlier than the henge are shown in Figures S3.a–d and S3.e–h respectively.

The chronology of Mount Pleasant: Conquer Barrow sensitivity analysis

The model shown in Figures S3.a–d incorporates the possibility the Conquer Barrow has no relationship with the henge and therefore the antler dated from the barrow ditch (BM-795) does not act as a constraint for the construction of the henge. The model that incorporates this reading has good agreement (Amodel=99; Bronk Ramsey 1995) and a summary of the key dated constructional events derived from this reading are given in Figure S3.i and Table S3.a. Given that *BM-795* does not act as a constraint on the completion of the henge earthworks in this model and all the dated samples from the ditch fills only provide *termini post quos,* the end of antler collection (*end_henge_antlers*; Fig S3.b) has been taken as providing the best estimate for the construction of the earthworks.

TABLE S3.a. HIGHEST POSTERIOR DENSITY INTERVALS FOR THE DATES OF KEY CONSTRUCTIONAL EVENTS AT MOUNT PLEASANT, DERIVED FROM THE ALTERNATIVE MODEL SHOWN IN FIGS S3.a–d & ILLUSTRATED IN FIG. S3.i

Parameters	*Highest Posterior Density interval (95% probability) cal BC*	*Highest Posterior Density interval (68% probability) cal BC*
BM-795 (Conquer Barrow)	*2865–2800 (16%) or 2760–2475 (79%)*	*2850–2810 (12%) or 2735–2725 (1%) or 2695–2565 (47%) or 2525–2495 (8%)*
dig_site_IV_ditch	*2550–2400*	*2515–2440*
build_palisade	*2560–2440*	*2530–2465*
*end_henge_antler**	*2615–2465*	*2580–2550 (43%) or 2510–2490*

*for the reasons outlined in the text this parameter is taken as providing the best estimate for the construction of the henge earthworks

The model shown in Figures S3.e–h incorporates the possibility the Conquer Barrow is earlier than the construction of the henge and therefore the antler dated from the barrow ditch (BM-795) acts as a constraint for this event. The model that incorporates this reading has good agreement (Amodel=99; Bronk Ramsey 1995) and a summary of the key dated constructional events derived from this reading are given in Fig S3.i and Table S3.b.

TABLE SI3.b. HIGHEST POSTERIOR DENSITY INTERVALS FOR THE DATES OF KEY CONSTRUCTIONAL; EVENTS AT MOUNT PLEASANT, DERIVED FROM THE ALTERNATIVE MODEL SHOWN IN FIGS 7–10, S3.e–h, & ILLUSTRATED IN FIG. S3.j

Parameters	*Highest Posterior Density interval (95% probability) cal BC*	*Highest Posterior Density interval (68% probability) cal BC*
BM-795 (Conquer Barrow)	*2870–2800 (20%) 2780–2550 (71%) or 2535–2500 (4%)*	*2850–2810 (14%) or 2740–2730 (3%) or 2695–2565 (51%)*
dig_site_IV_ditch	*2550–2400*	*2515–2440*
build_palisade	*2560–2440*	*2530–2670*
*end_henge_antler**	*2615–2460*	*2580–2550 (39%) or 2510–2485 (29%)*

*for the reasons outlined in the text this parameter is taken as providing the best estimate for the construction of the henge earthworks

The two models based on alternative readings of the relationship between the Conquer Barrow and henge both show good agreement (Bronk Ramsey 1995) as does that shown in Figures 7–10, and thus for all three the radiocarbon dates conform with the different archaeological interpretations. It is not currently statistically possible to determine which of these models is more credible and thus our choice of a preferred model (Figs 7–10) is based on the evidence of the archaeological earthwork sequence as outlined in the main text.

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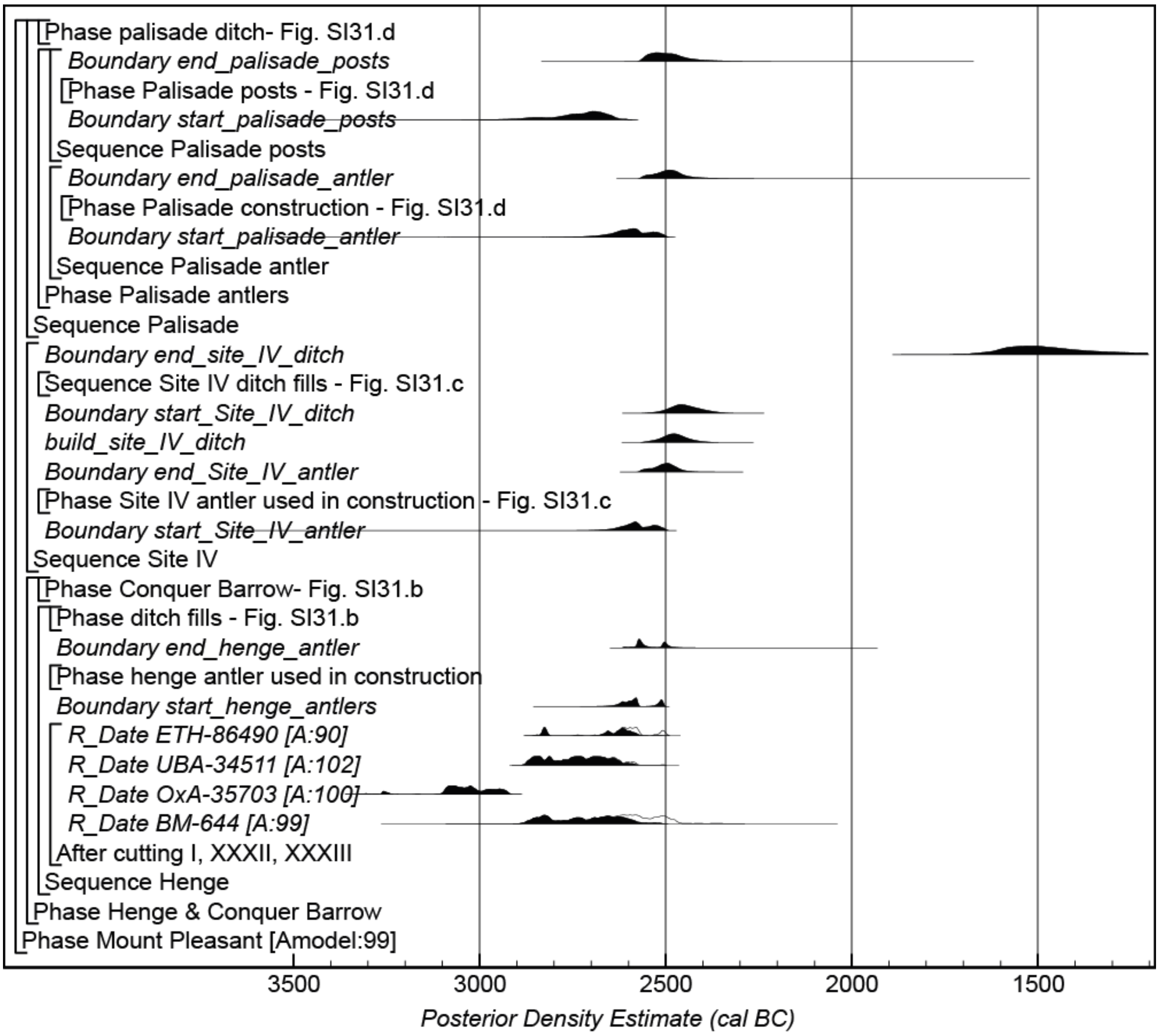

Fig. S3.a.

Overall structure of the chronological model for activity at Mount Pleasant. The component sections of this model are shown in detail in Figs S3.b–d. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

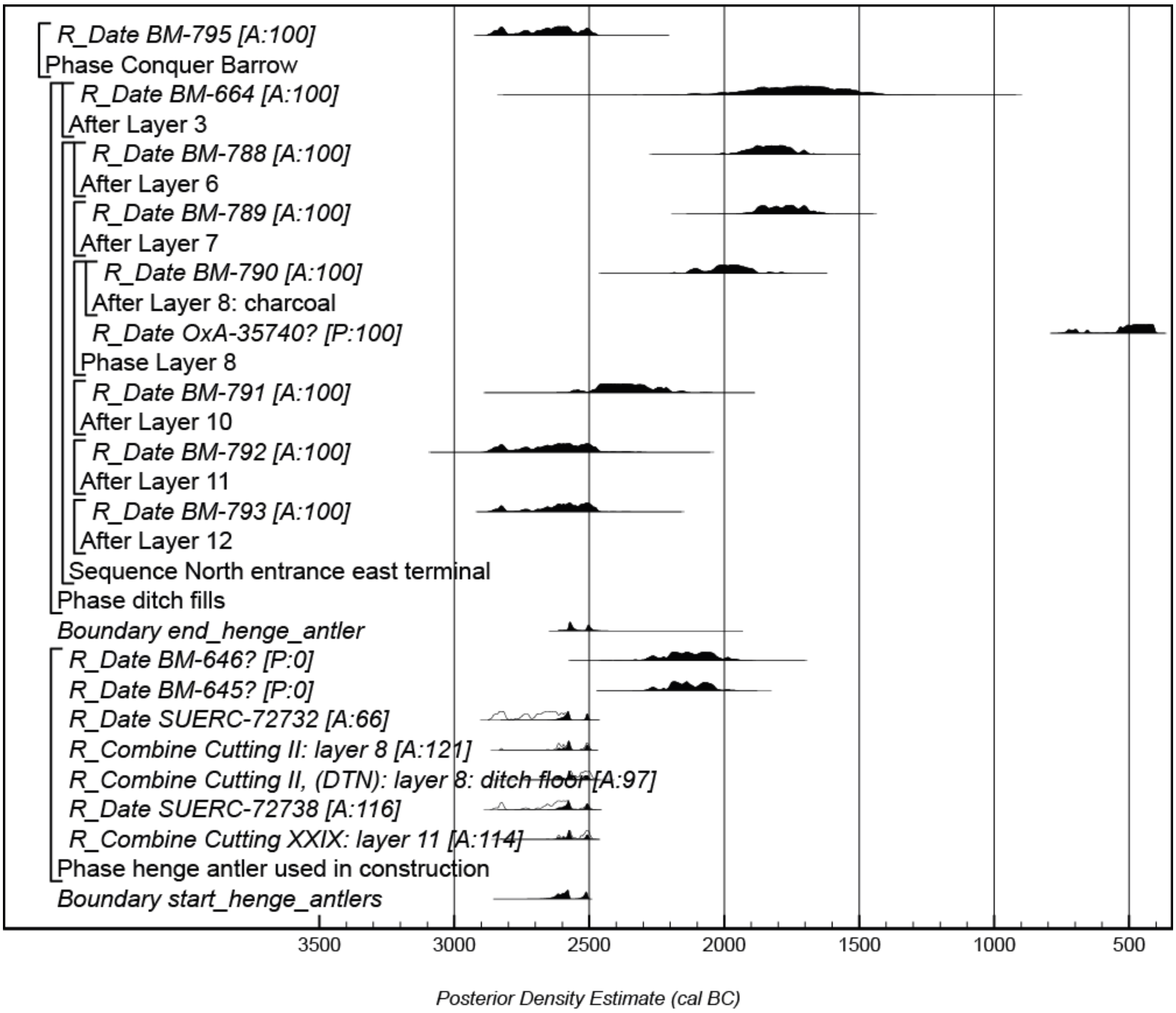

Fig. S3.b.

Probability distributions of dates from the henge. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Measurements followed by a question mark have been excluded from the model for the reasons explained in the text and are simple calibrated dates (Stuiver & Reimer 1993). The other component sections of this model are shown in Figs S3.a and S3.c–d. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

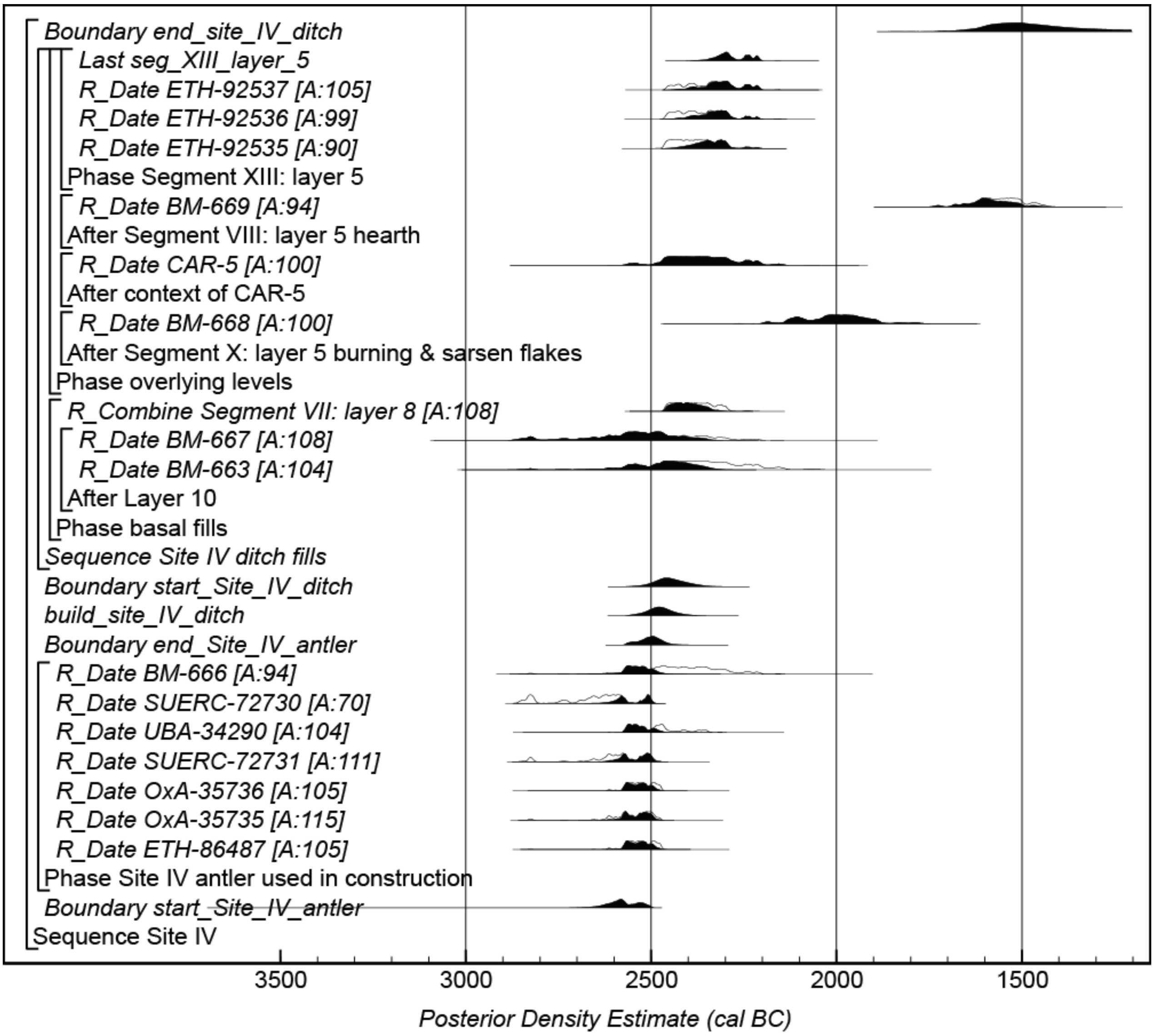

Fig. S3.c.

Probability distributions of dates from the Site IV ditch. The format is identical to that of Fig. S3.b. The other component sections of this model are shown in Figs S3.a–b and S3.d. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

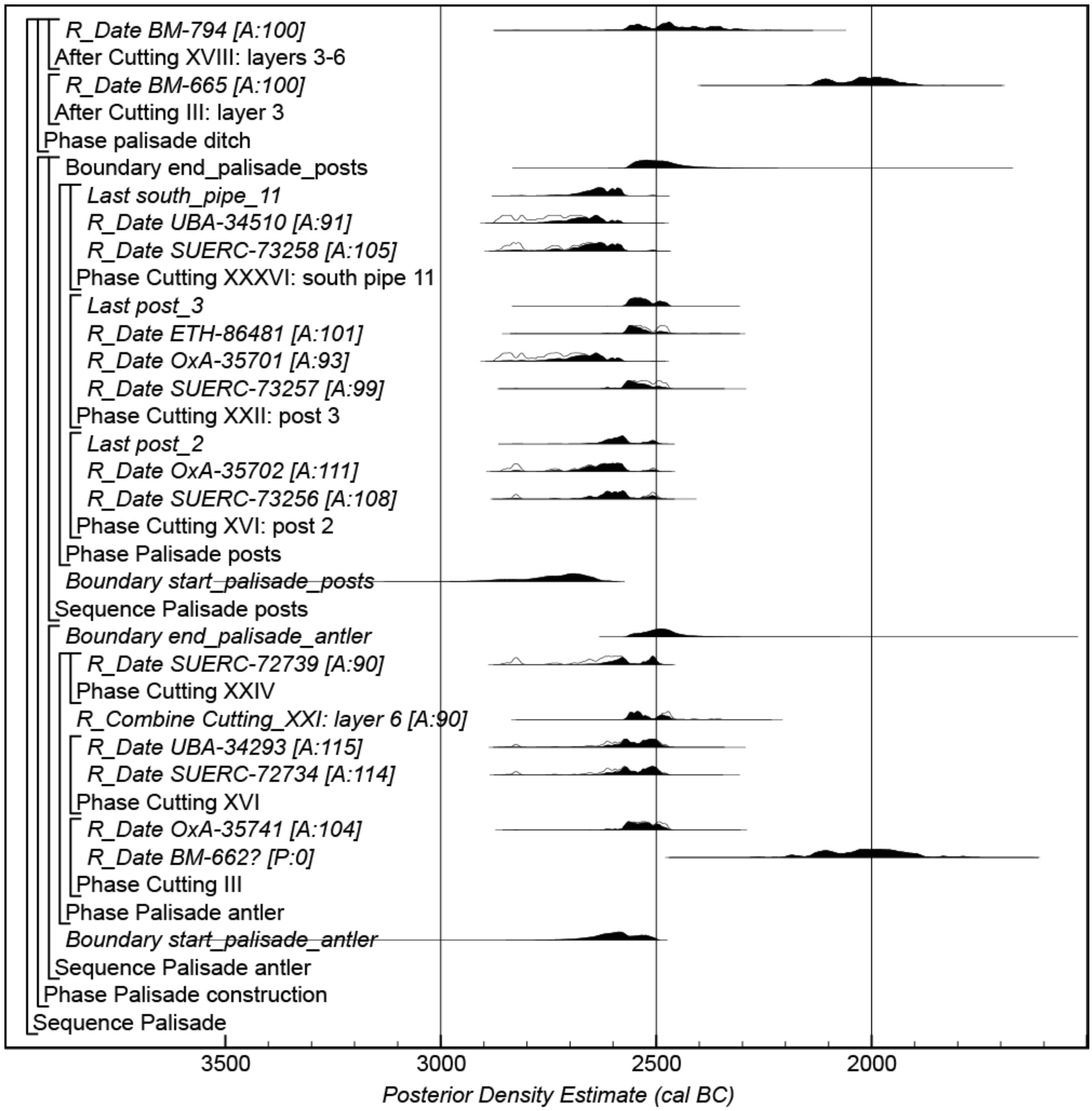

Fig. S3.d.

Probability distributions of dates from the palisade. The format is identical to that of Fig S3.b. The other component sections of this model are shown in Figs S3.a–c. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

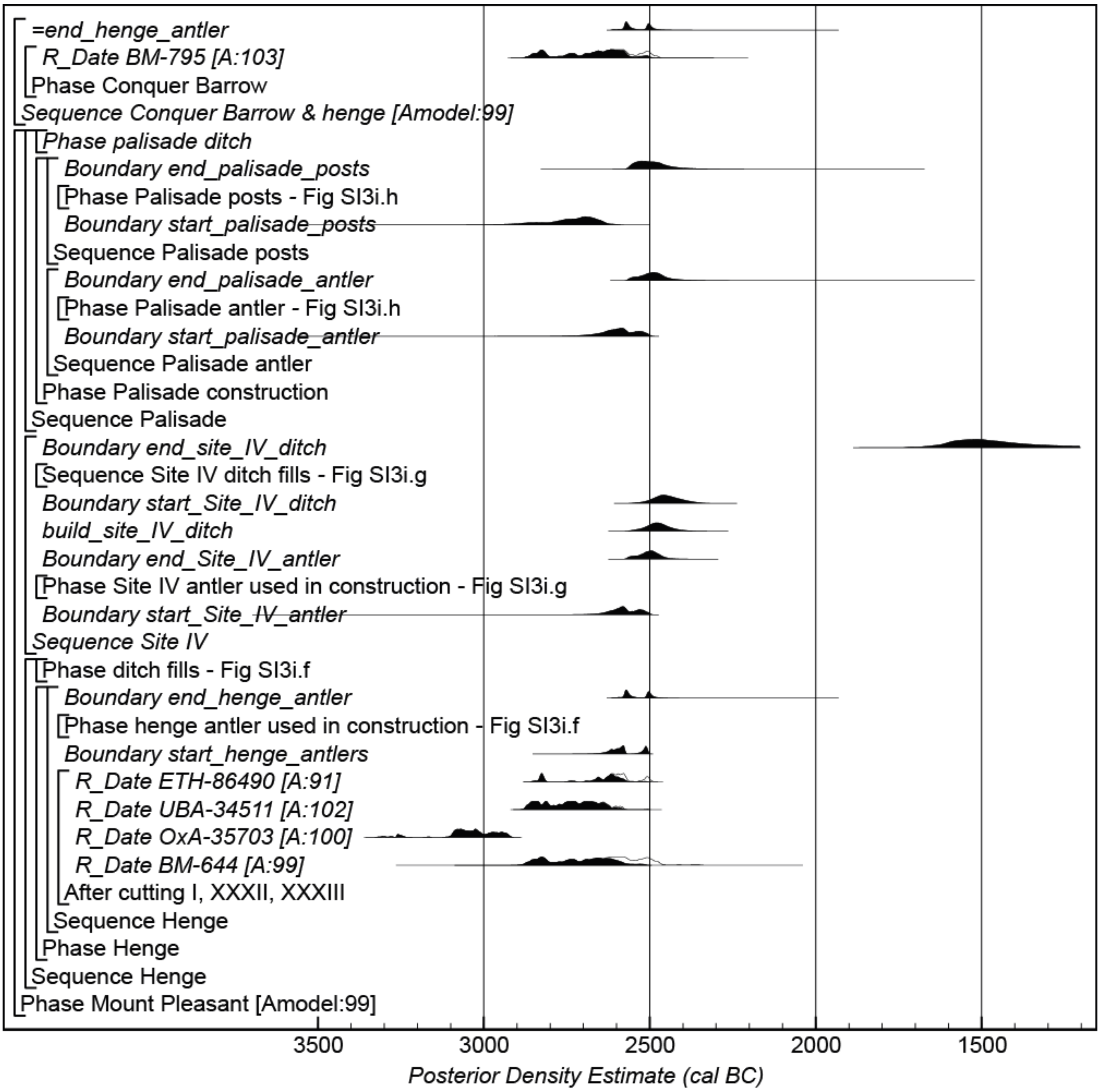

Fig. S3.e.

Overall structure of the chronological model for activity at Mount Pleasant. The component sections of this model are shown in detail in Figs S3.g–i. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

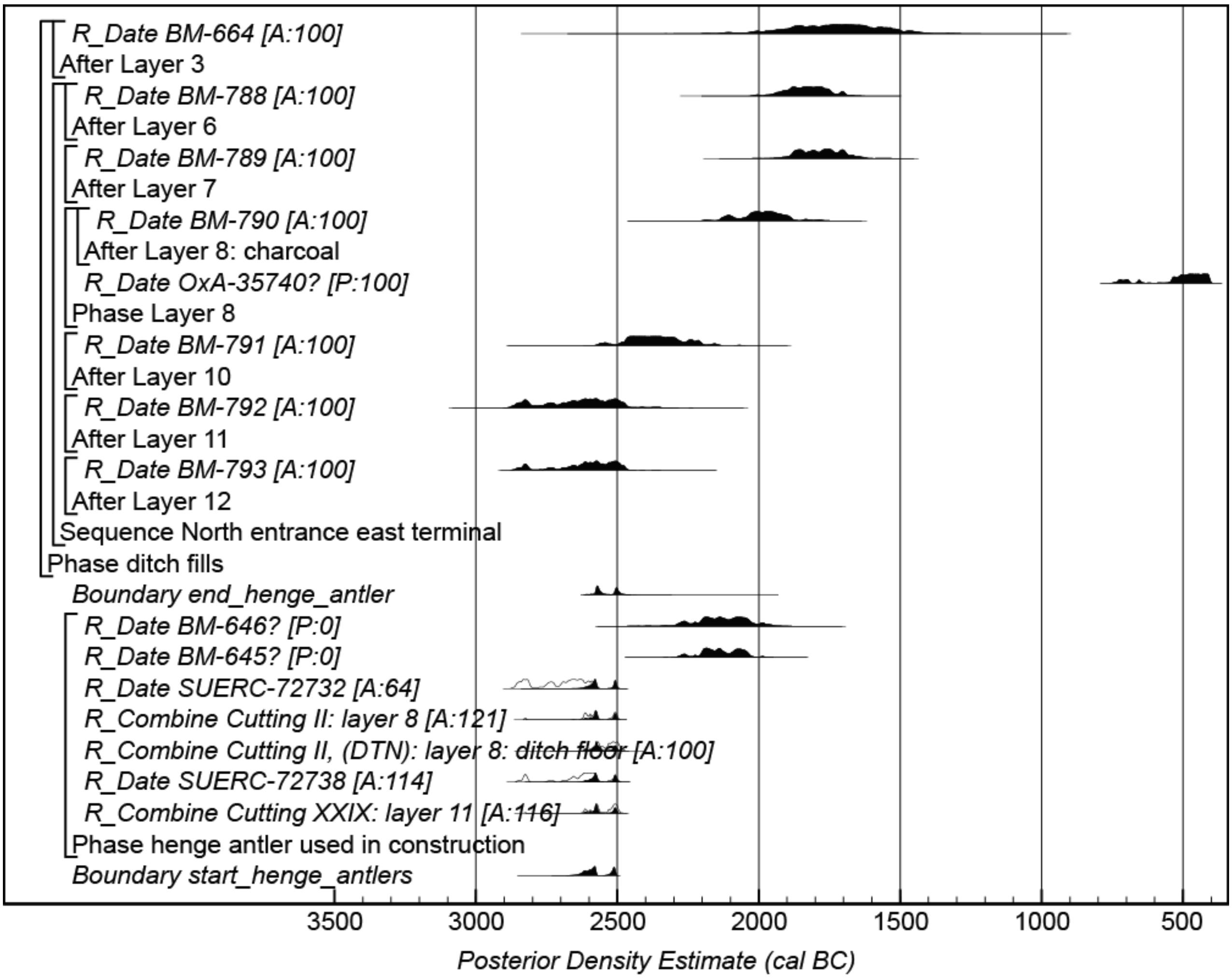

Fig. S3.f.

Probability distributions of dates from the henge. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Measurements followed by a question mark have been excluded from the model for the reasons explained in the text and are simple calibrated dates (Stuiver & Reimer 1993). The other component sections of this model are shown in Figs S3.e and S3.g–h. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

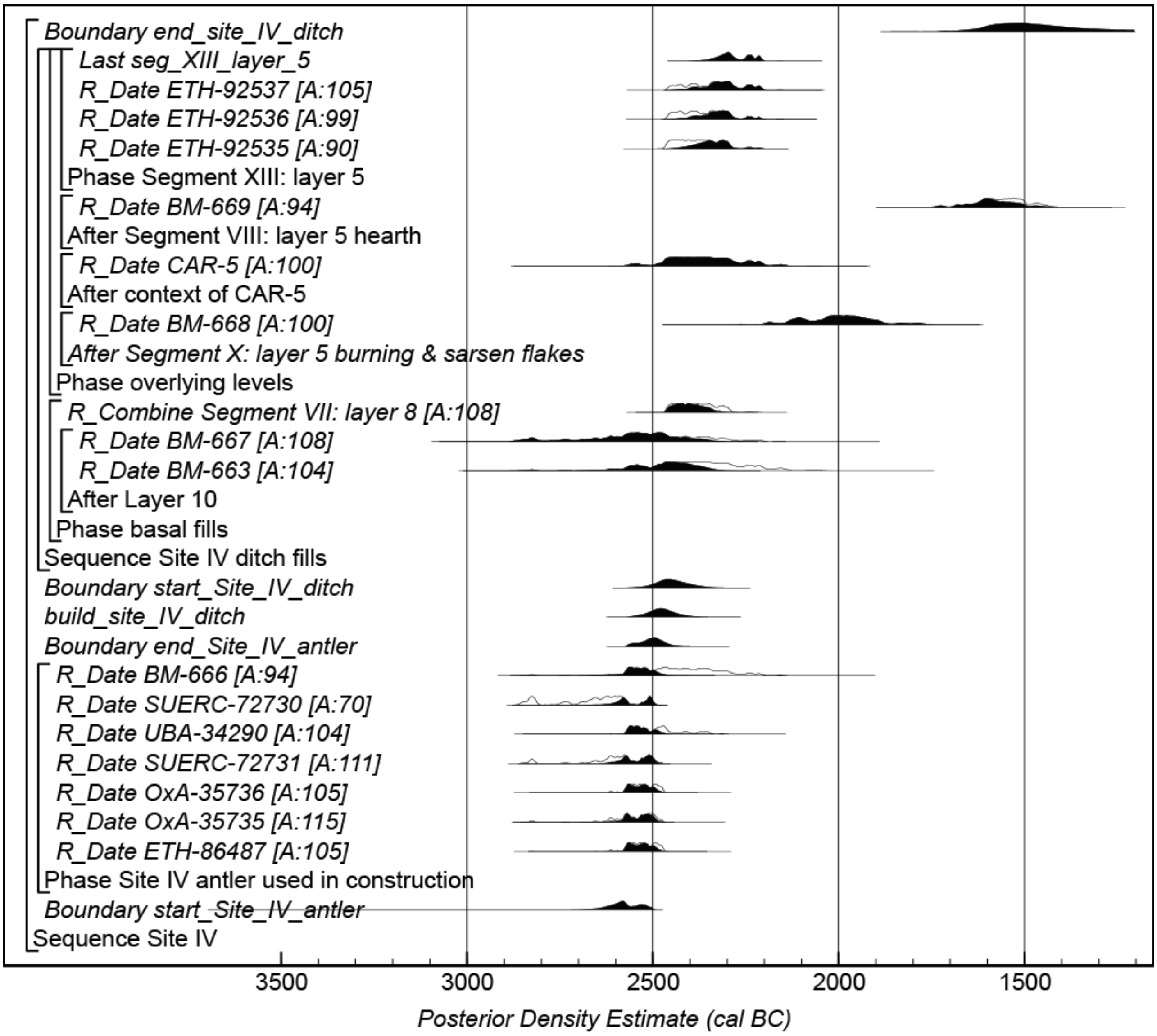

Fig. S3.g.
Probability distributions of dates from the Site IV ditch. The format is identical to that of Fig. S3.e. The other component sections of this model are shown in Figs S3.e–f and S3.h. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

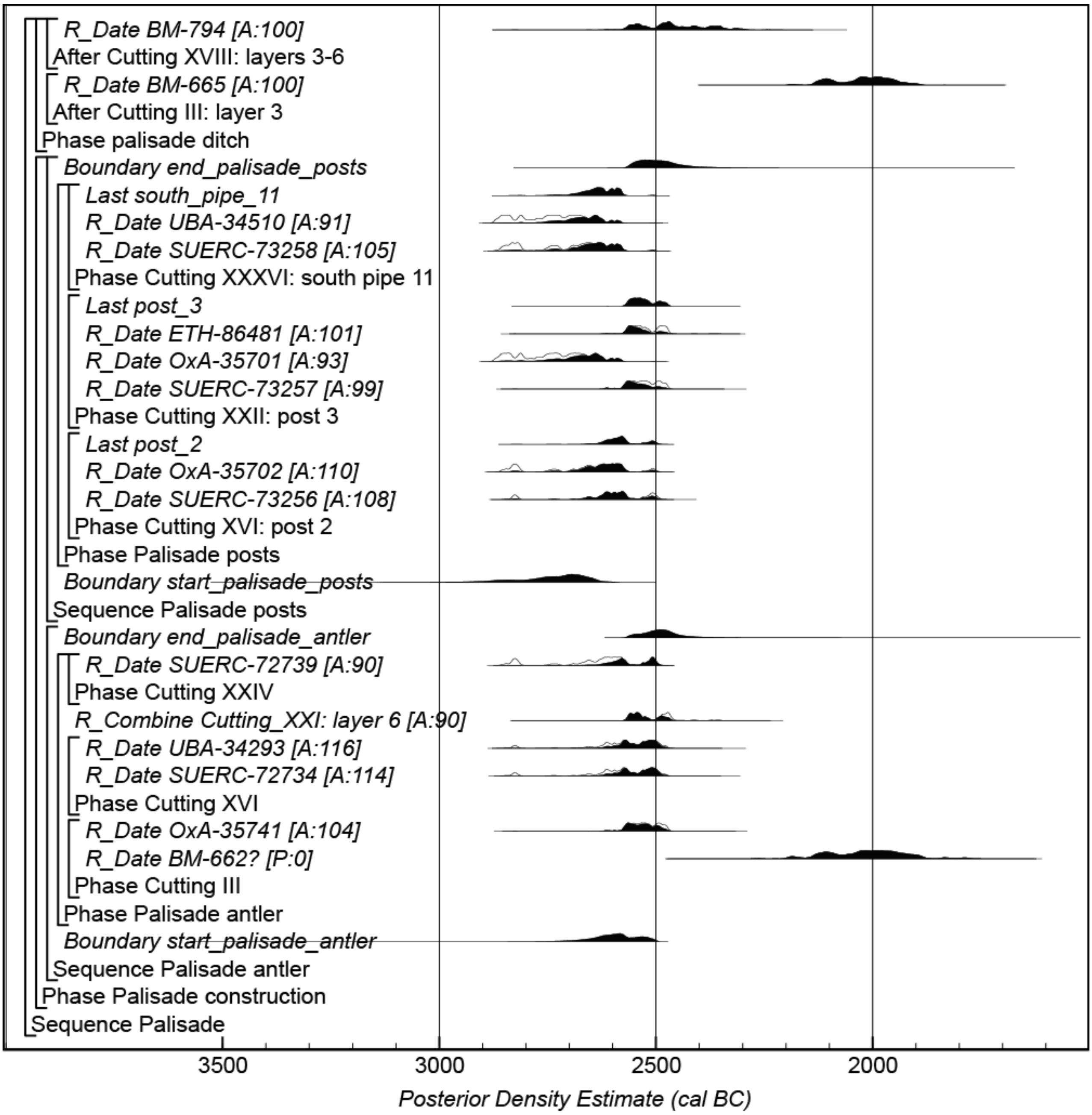

Fig. S3.h

Probability distributions of dates from the palisade. The format is identical to that of Fig. S3.e. The other component sections of this model are shown in Figs S3.e–g. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

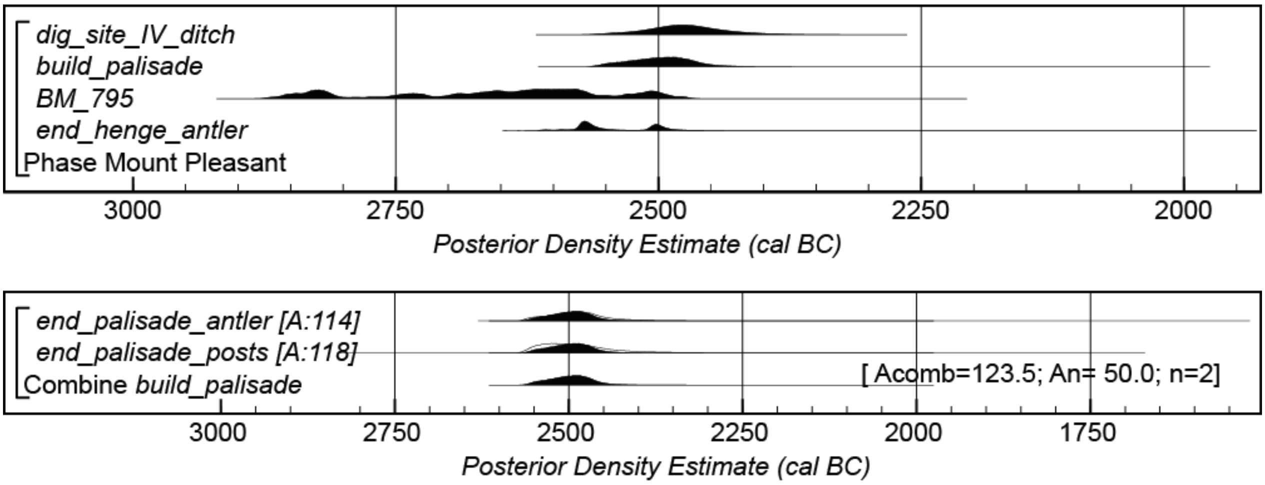

Fig. S3.i.
Combined probability distribution estimating the construction date of the palisade enclosure, if it is interpreted as representing a single planned construction and probability distributions of dates of major archaeological events derived from the model shown in Figs S3.a–d

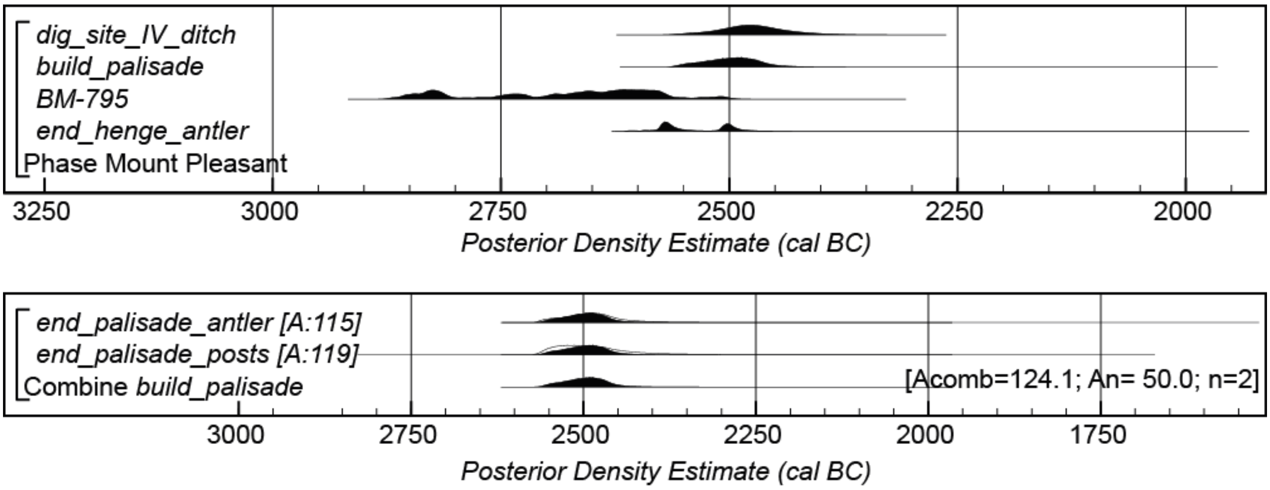

Fig. S3.j.
Combined probability distribution estimating the construction date of the palisade enclosure, if it is interpreted as representing a single planned construction and probability distributions of dates of major archaeological events derived from the model shown in Figs S3.e–h

Site IV ditch sensitivity analysis

Two alternative models, which acknowledge the different readings of the Site IV ditch, Segment VII sequence as either a single-phase ditch as outlined in Wainwright (1979, 10–22) or as a pre-ditch pit (Needham 2006, 18) are shown in Figs S3.k–n and S3.o–r.

The model shown in Figs SI3ii.k–n that incorporates the dated antler from Layer 8 (Segment VII: layer 8) as deriving from the construction of the henge ditch has good agreement (A:model=101; Bronk Ramsey 1995) and a summary of the key dated constructional events derived from this reading are given in Fig S3.s and Table S3.c.

TABLE S3.c HIGHEST POSTERIOR DENSITY INTERVALS FOR THE DATES OF KEY CONSTRUCTIONAL; EVENTS AT MOUNT PLEASANT, DERIVED FROM THE ALTERNATIVE MODEL SHOWN IN FIGS S3.k–n

Parameters	*Highest Posterior Density interval (95% probability) cal BC*	*Highest Posterior Density interval (68% probability) cal BC*
BM-795 (Conquer Barrow)	*2580–2465*	*2525–2475*
dig_site_IV_ditch	*2470–2365*	*2465–2420*
build_palisade	*2560–2440*	*2530–2465*
build_henge	*2610–2495*	*2580–2530*

The model shown in SI3ii.o–r that incorporates the dated antler from Layer 8 (Segment VII: layer 8) as deriving from the digging of a pit that predated the henge ditch has good agreement (A:model=76; Bronk Ramsey 1995) and a summary of the key dated constructional events derived from this reading are given in Fig SI3ii.t and Table SI3ii.d.

TABLE S3.d HIGHEST POSTERIOR DENSITY INTERVALS FOR THE DATES OF KEY CONSTRUCTIONAL; EVENTS AT MOUNT PLEASANT, DERIVED FROM THE ALTERNATIVE MODEL SHOWN IN FIGS S3.o–r

Parameters	*Highest Posterior Density interval (95% probability) cal BC*	*Highest Posterior Density interval (68% probability) cal BC*
BM-795 (Conquer Barrow)	*2580–2460*	*2525–2475*
dig_site_IV_ditch	*2465–2360*	*2455–2405*
build_palisade	*2560–2440*	*2530–2465*
build_henge	*2610–2495*	*2580–2530*

The two models based on alternative readings of the Site IV ditch, Segment VII sequence show good agreement (Bronk Ramsey 1995) as does that shown in Figures 7–10, and thus for all three the radiocarbon dates conform with the different archaeological interpretations. It is not currently statistically possible to determine which of these models is more credible and thus our choice of a preferred model (Figs 7–10) is based on the archaeological evidence as outlined in the main text.

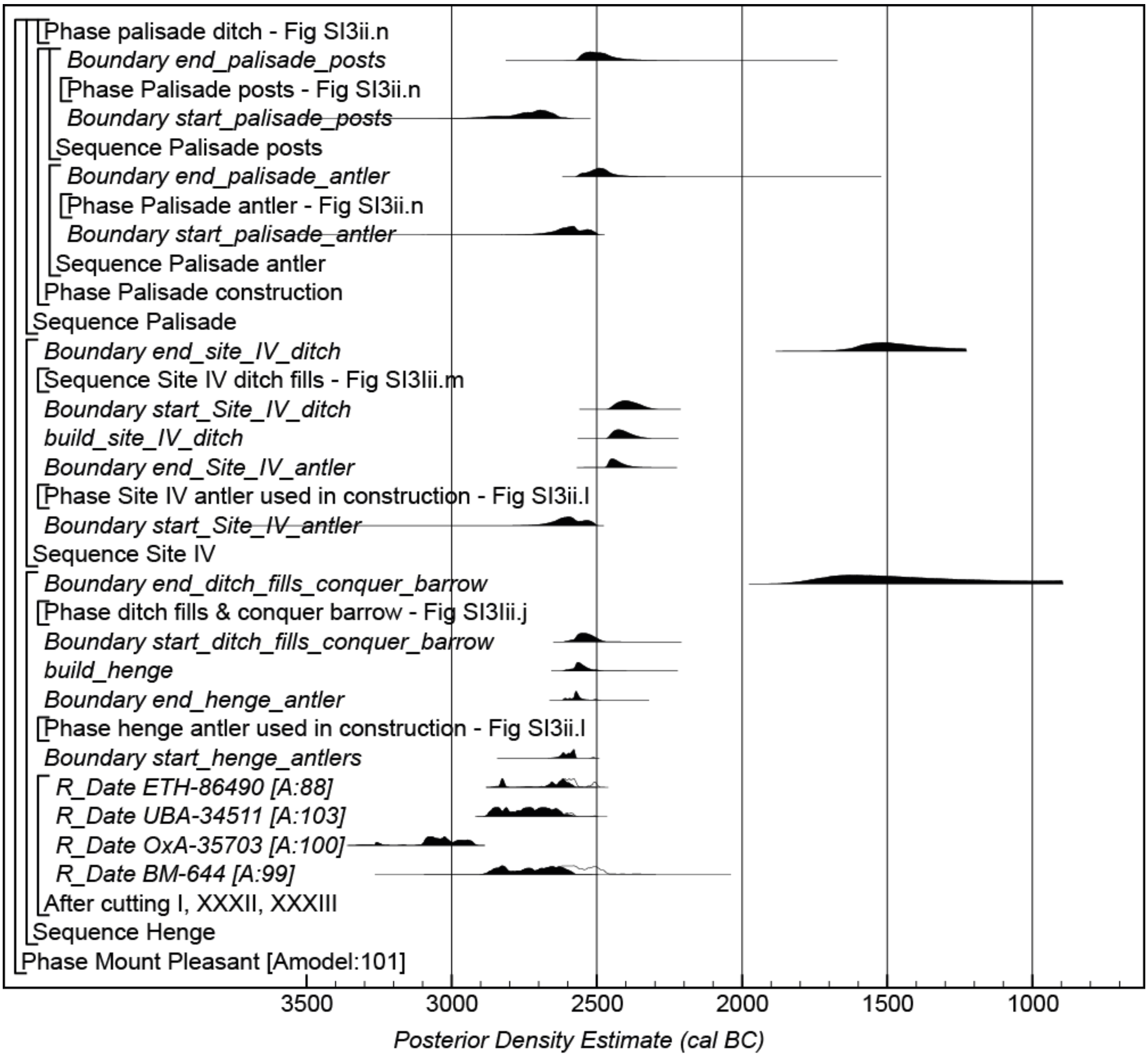

Fig. S3.k.
Overall structure of the chronological model for activity at Mount Pleasant. The component sections of this model are shown in detail in Figs S3.l–m. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

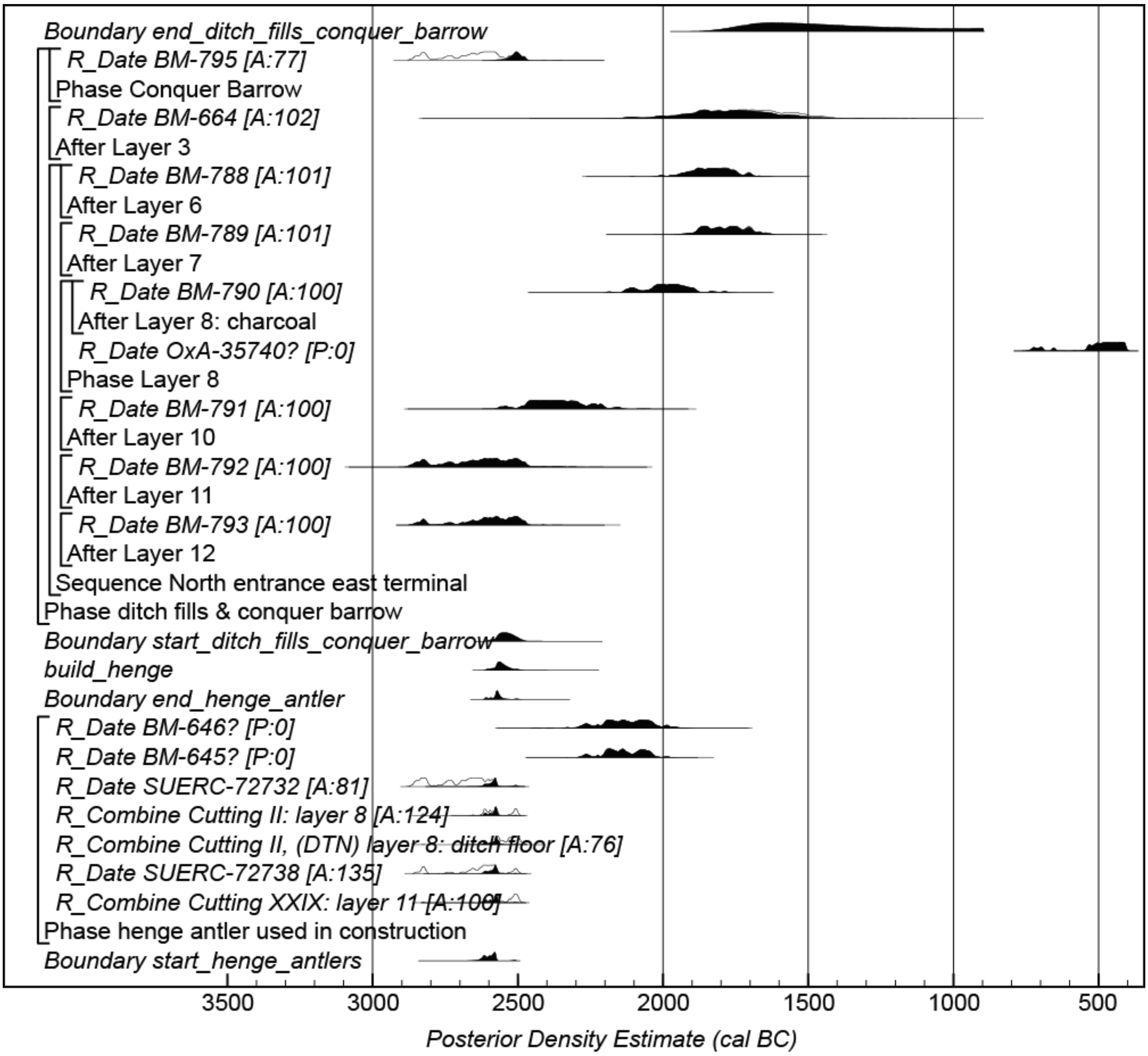

Fig. S3.l.

Probability distributions of dates from the henge. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Measurements followed by a question mark have been excluded from the model for the reasons explained in the text and are simple calibrated dates (Stuiver & Reimer 1993). The other component sections of this model are shown in Figs S3.k and S3.m–n. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

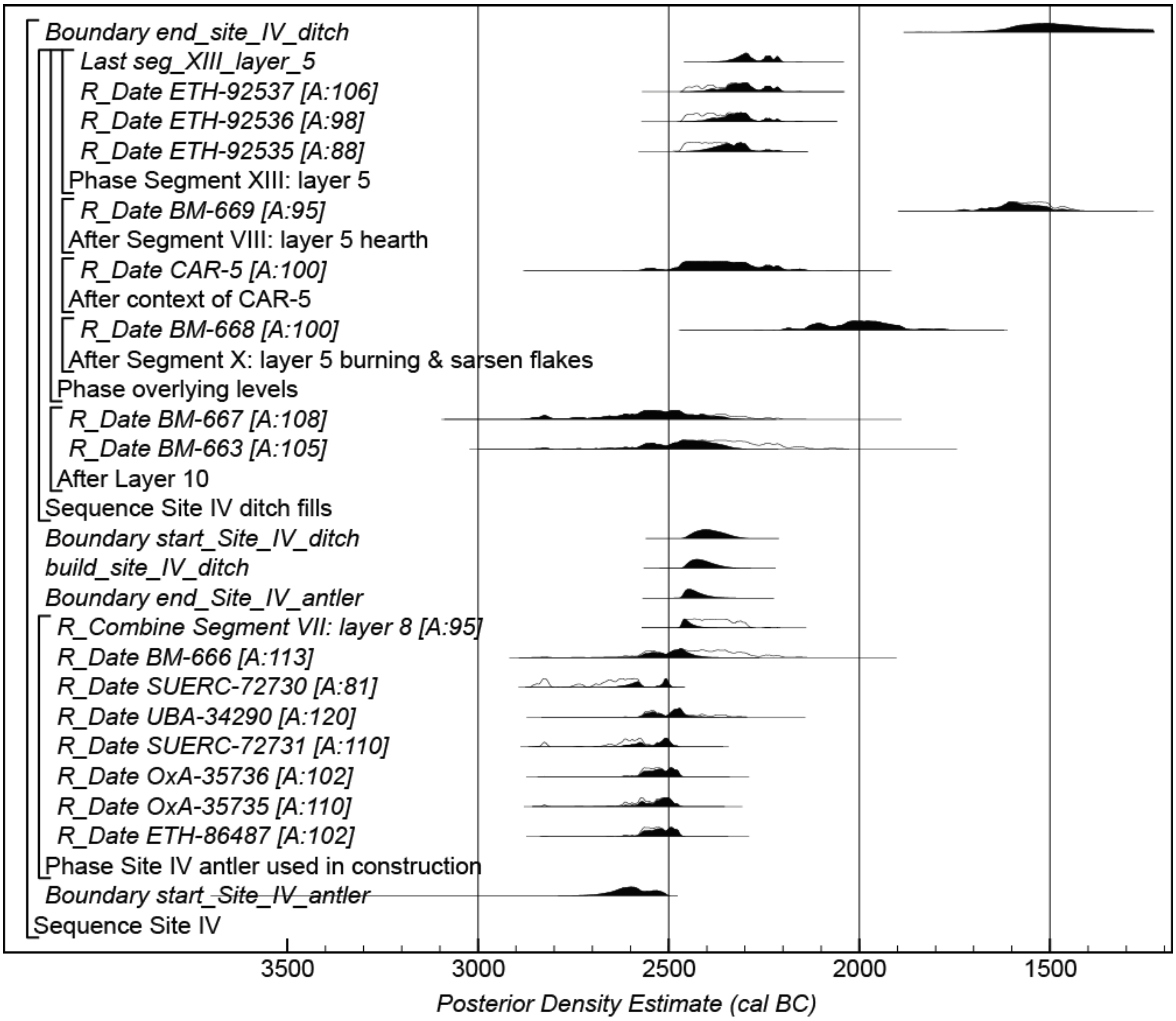

Fig. S3.m.

Probability distributions of dates from the Site IV ditch. The format is identical to that of Fig S3.k. The other component sections of this model are shown in Figs S3.k–l and S3.n. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

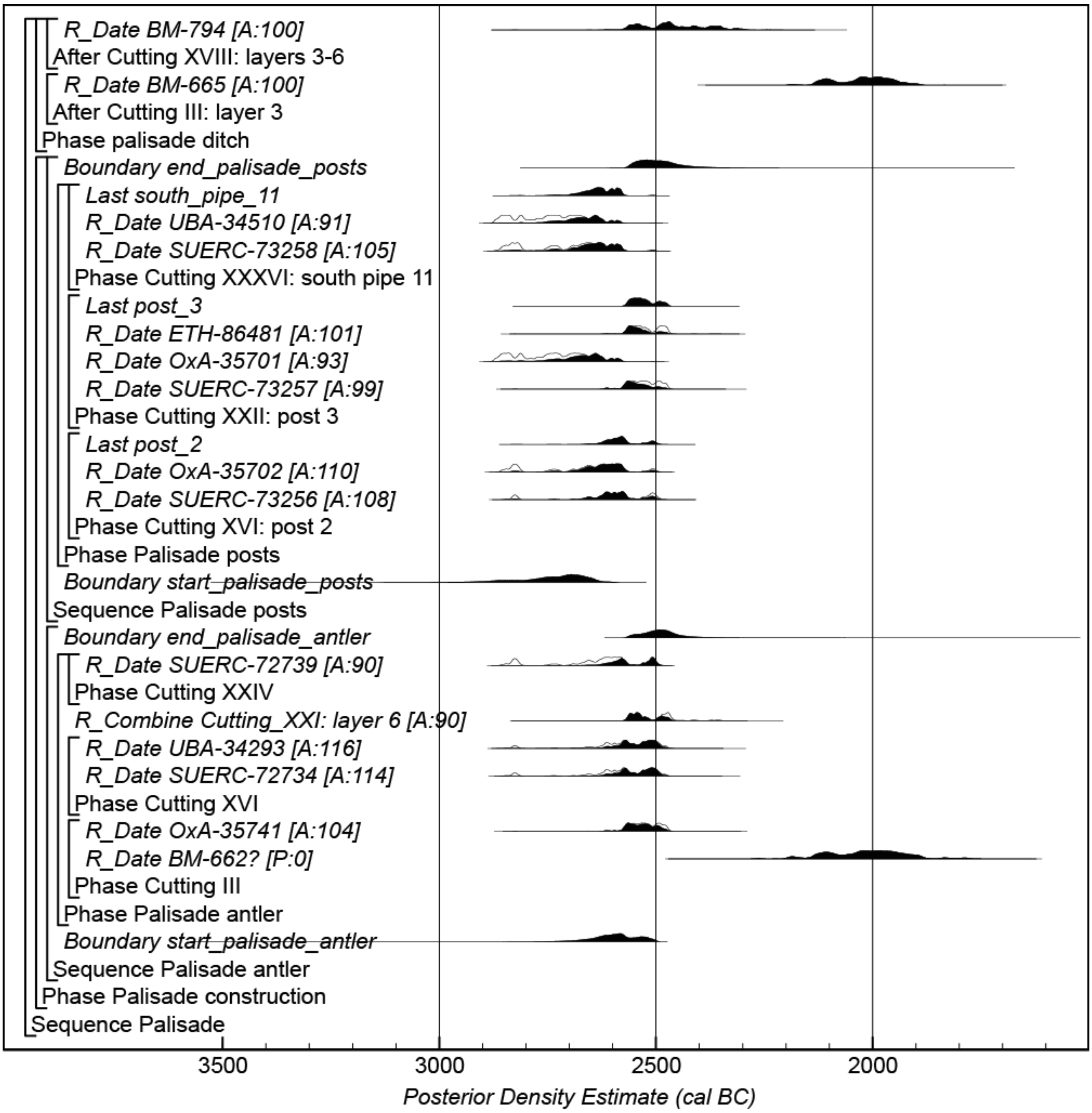

Fig. S3.n.

Probability distributions of dates from the palisade. The format is identical to that of Fig S3.k. The other component sections of this model are shown in Figs S3.l–m. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

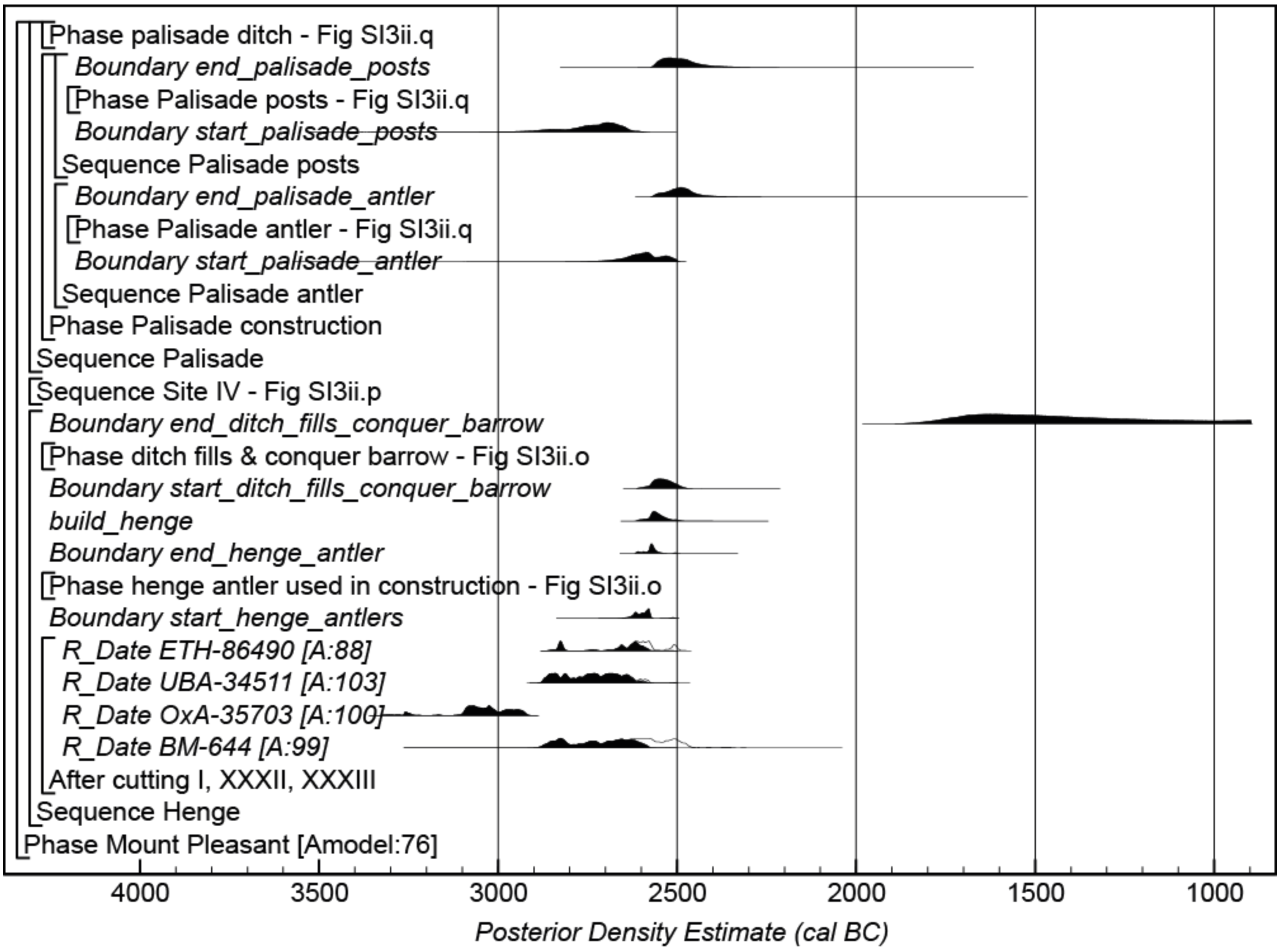

Fig. S3.o.
Overall structure of the chronological model for activity at Mount Pleasant. The component sections of this model are shown in detail in Figs S3.p–q. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

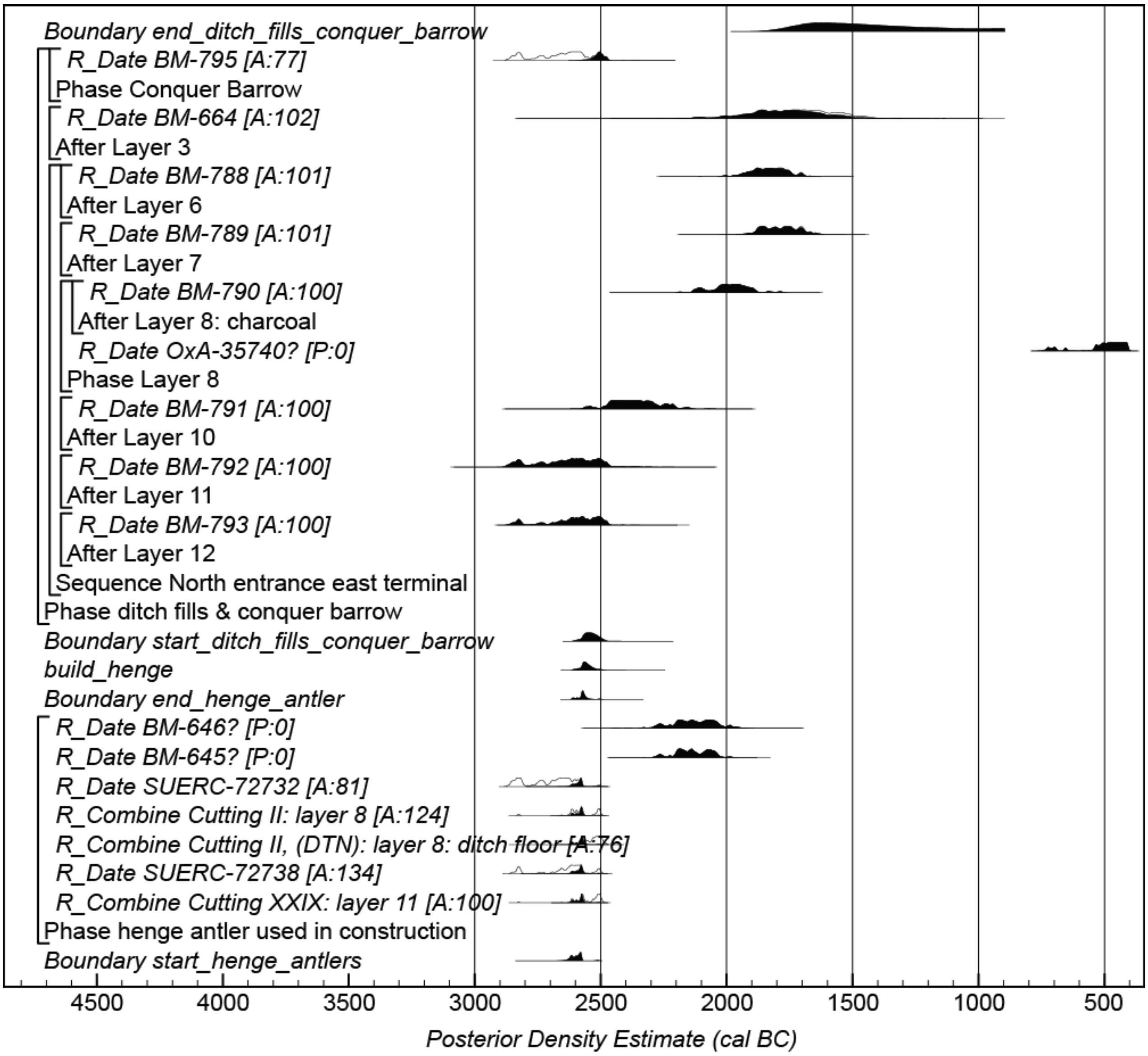

Fig. S3.p
Probability distributions of dates from the henge. Each distribution represents the relative probability that an event occurs at a particular time. For each of the dates two distributions have been plotted: one in outline, which is the result of simple radiocarbon calibration, and a solid one, based on the chronological model used. Measurements followed by a question mark have been excluded from the model for the reasons explained in the text and are simple calibrated dates (Stuiver & Reimer 1993). The other component sections of this model are shown in Figs S3.o and S3.q–r. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

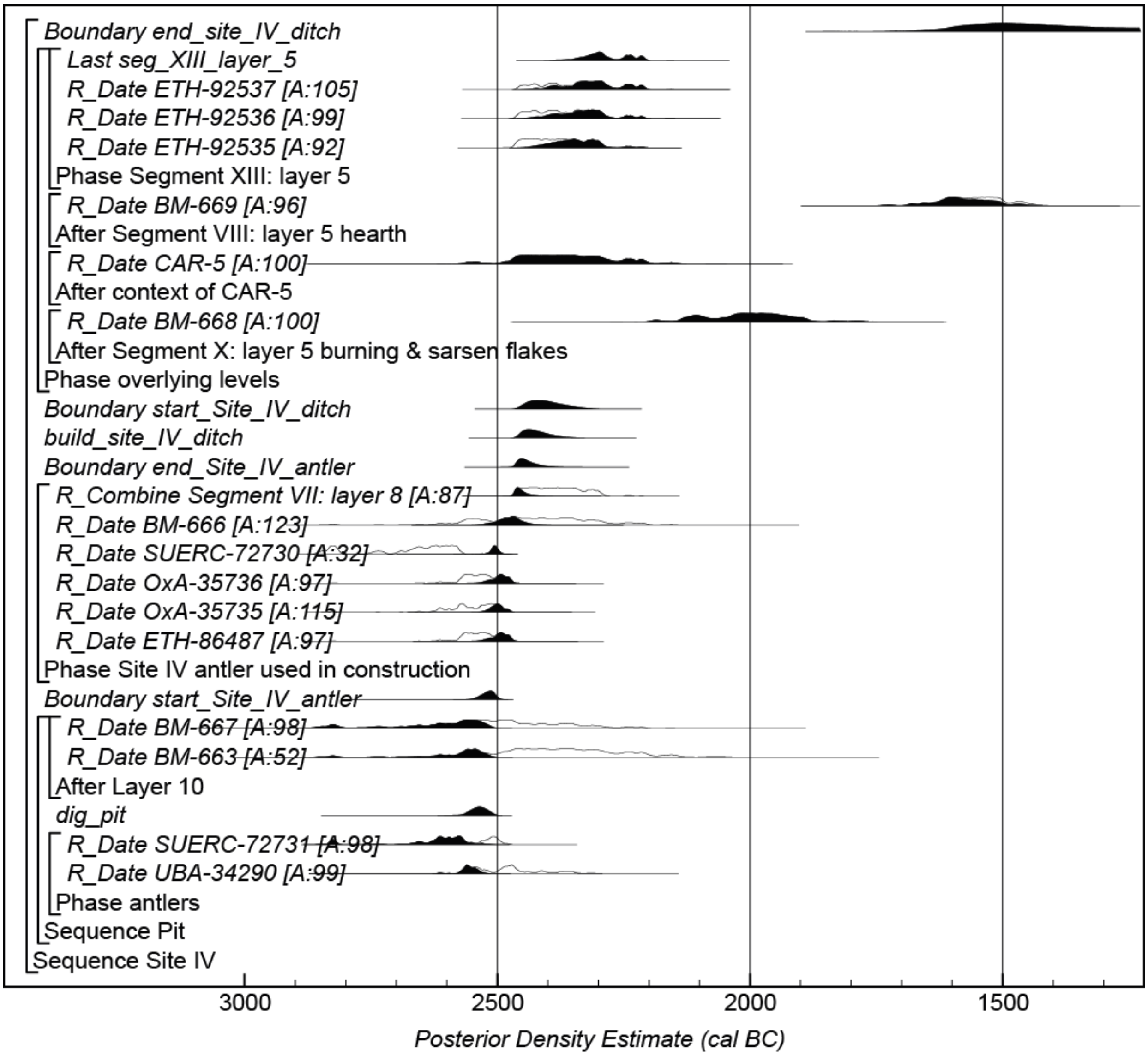

Fig. S3.q.

Probability distributions of dates from the Site IV ditch. The format is identical to that of Fig S3.o. The other component sections of this model are shown in Figs S3.o–p and S3.r. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

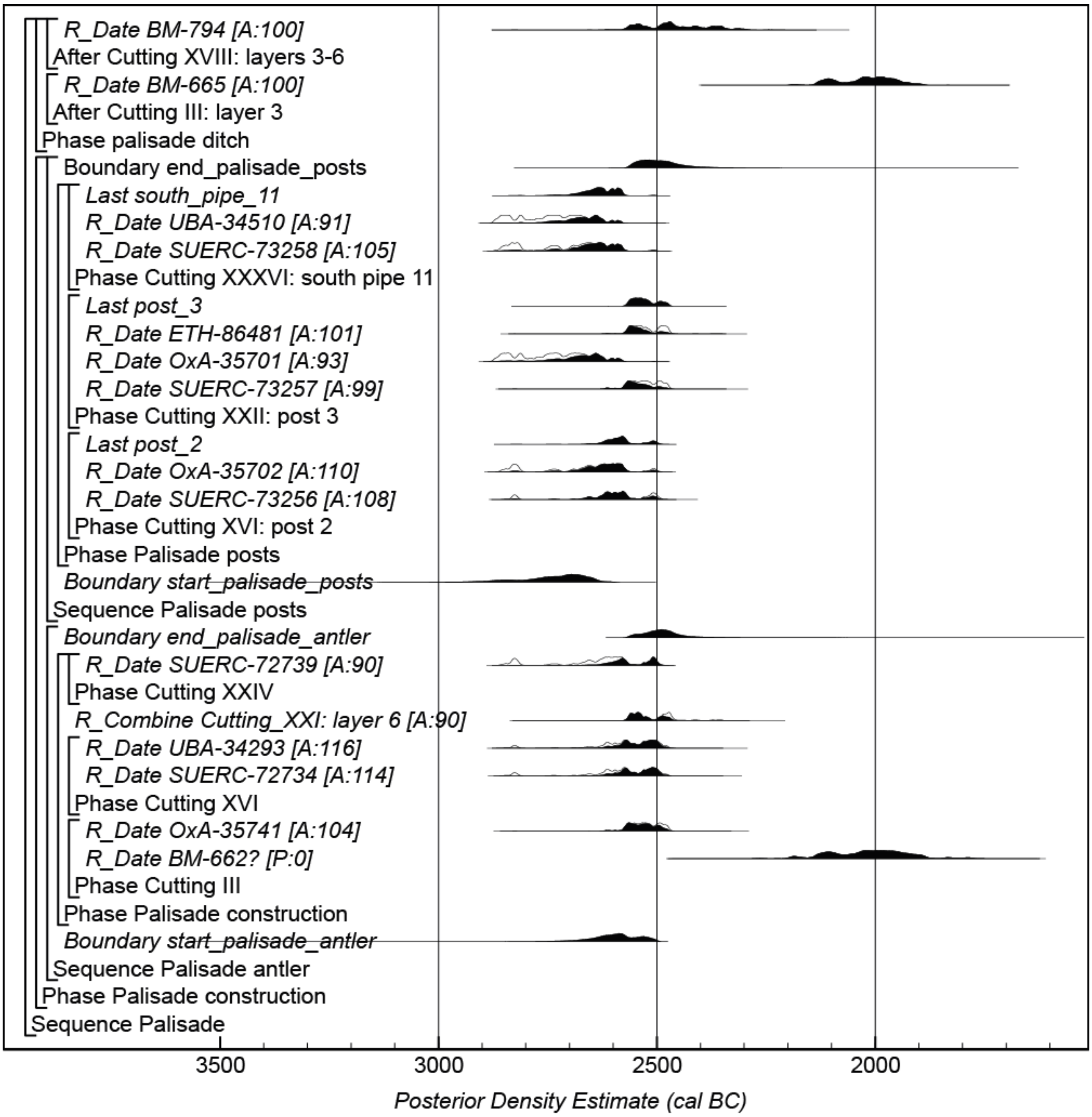

Fig. S3.r
Probability distributions of dates from the palisade. The format is identical to that of Fig S3.p. The other component sections of this model are shown in Figs S3.o–q. The large square brackets down the left-hand side of the diagram, along with the OxCal keywords, define the overall model exactly (http://c14.arch.ox.ac.uk/)

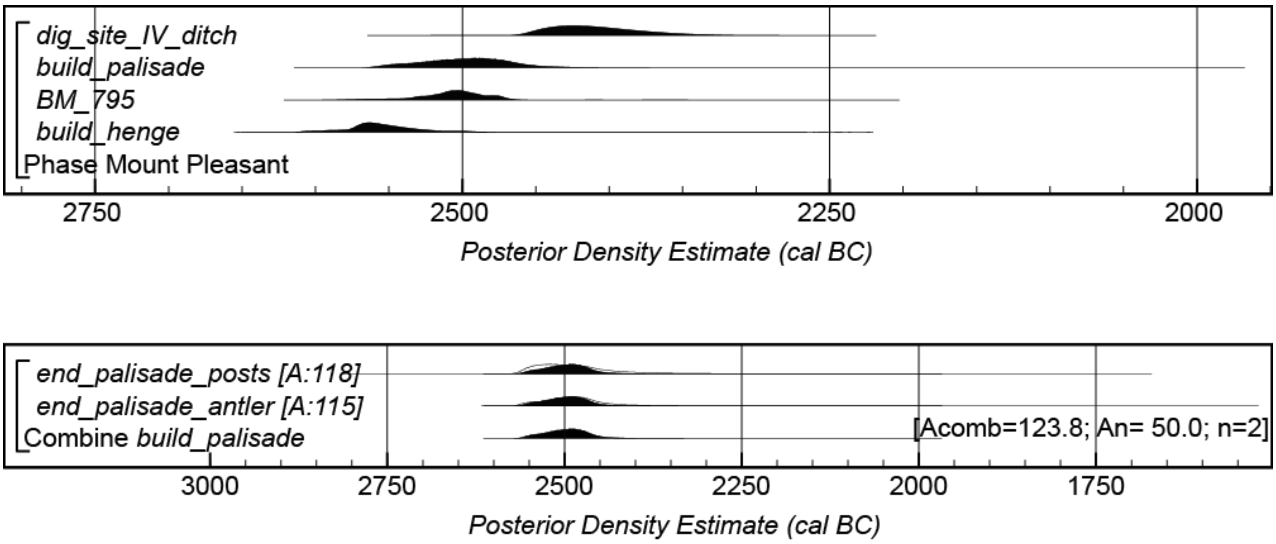

Fig. S3.s.
Combined probability distribution estimating the construction date of the palisade enclosure, if it is interpreted as representing a single planned construction and probability distributions of dates of major archaeological events derived from the model shown in Figs S3.k–n

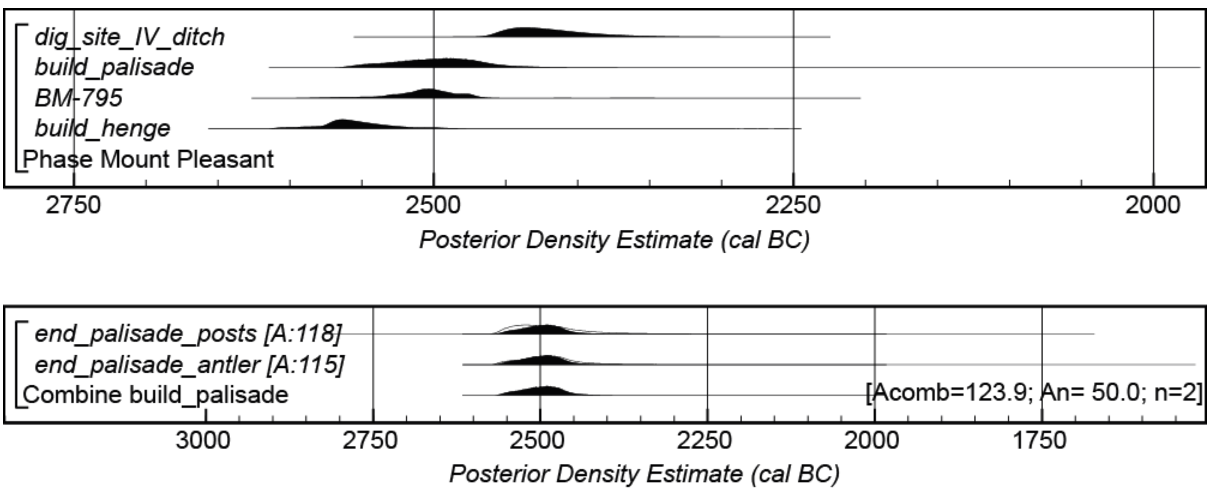

Fig. S3.t.
Combined probability distribution estimating the construction date of the palisade enclosure, if it is interpreted as representing a single planned construction and probability distributions of dates of major archaeological events derived from the model shown in Figs S3.o–r

APPENDIX S4: THE CURRENCY OF PALISADED ENCLOSURES IN BRITAIN AND IRELAND

Details of all the scientific dates included in our review of the currency of palisaded enclosures in Britain and Ireland are provided in the references listed in Table S4.a. Radiocarbon measurements for Leadketty and Ballynahatty are given in Tables S4.b and S4.c respectively. All the chronological modelling has been undertaken using the program OxCal v4.3 (Bronk Ramsey 2009a; 2009b; Bronk Ramsey & Lee 2013) and the atmospheric calibration curve for the northern hemisphere published by Reimer *et al*. (2013). The algorithms used are defined exactly by the brackets and OxCal CQL2 keywords on the left-hand side of the technical graphs which define each model (http://c14.arch.ox.ac.uk/). The posterior density estimates output by the model are shown in black, with the unconstrained calibrated radiocarbon dates shown in outline. The other distributions correspond to aspects of the model. For example, *build_Forteviot* is the estimated date when the Forteviot palisaded enclosure was constructed (Fig. S4.a).

TABLE S4.a. SUMMARY OF SCIENTIFIC DATING EVIDENCE USED FOR MODELLING THE CURRENCY OF PALISADED ENCLOSURES IN BRITAIN AND IRELAND

Site	*No. ^{14}C results*	*No. ^{14}C results (TPQ)*	*References*
Hindwell	4		Gibson 1999; Bayliss *et al.* 2017, table 17.3
Hindwell double	5	2	Jones & Gibson 2017, table 5
Walton	2		Jones & Gibson 2017; table 5
Greyhound Yard, Dorchester	7		Woodward *et al.* 1993; Bayliss *et al.* 2017, table 17.3
Marne Barracks	20	7	Hale *et al.* 2009; Bayliss *et al.* 2017, table 17.3
Forteviot	8		Noble & Brophy 2007; 2011, Bayliss *et al.* 2017, table 17.3
Meldon Bridge	4	1	Burgess 1976; Speak & Burgess 1999; Bayliss *et al.* 2017, table 17.3
Dunragit	6	1	Thomas 2015; Bayliss *et al.* 2017, table 17.3
Blackshouse Burn	1	1	Lelong & Pollard 1998; Bayliss *et al.* 2017, table 17.3
Ballynahatty	9	1	Hartwell 2002; Gormley 2004, 174–7
Leadketty	1		Brophy *et al*. 2012; Wright 2017; 2018
Mount Pleasant	16*	2	Wainwright 1979; table 1

*1 date excluded

TABLE S4.b. RADIOCARBON MEASUREMENTS FROM LEADKETTY

Lab. no.	*Material & context*	*Radiocarbon age (BP)*
SUERC-59114	Charcoal oak, from post-pipe (1019), fill of southern post-hole [1018]; part of 4-poster within palisaded enclosure	4112±29
SUERC-59116	Charcoal oak, from post-pipe (3076) of avenue post [3005] which appeared to have been burnt *in situ*; part, of palisaded enclosure	4035±29
SUERC-65637	Charcoal oak, from arc of charcoal from large post (2126) at centre of mini-henge within palisaded enclosure	3824±30

TABLE SI4.c. RADIOCARBON MEASUREMENTS FROM BALLYNAHATTY

Lab. no.	*Material & context*	*Radiocarbon age (BP)*
	Palisaded enclosure (BNH5) and Annex	
UB-3402	Charcoal (unidentified, bulk) from secondary fill of post-hole of outer ring of enclosure BNH5 (Cut 64)	4293±30
UB-3403	Charcoal (unidentified, bulk) from secondary fill of one of 'north–south' row of post-holes in annex (Cut 46)	4355±26
UB-3404	Charcoal (unidentified, bulk) From secondary fill of one of 'north–south' row of post-holes in annex (Cut 22)	4062±21
	Four-poster (BNH6) and eastern setting	
UB-4295	Charcoal (unidentified, bulk) from post-hole of outer ring of BNH6 (Cut 799, Fill 819)	3950±46
UB-4296	Charcoal (unidentified, bulk) from post-hole of central square feature of BNH6 (known as 'excarnation platform') (Fill 927, Cut 926).	4915±37
UB-4292	Charcoal (unidentified, bulk) from primary fill (ie, packing) of post-hole of eastern setting (Fill 62, Cut 31)	4070±26
UB-4293	Charcoal (unidentified, bulk) from secondary fill of post-hole of 4-poster entrance (Fill 373, Cut 417)	4152±24
UB-4297	Charcoal (unidentified, bulk) from secondary fill of E post-hole of 4-poster (Cut 948, Fill 644)	4114±26
UB-4294	Charcoal (unidentified, bulk) from secondary fill of post-hole of inner ring of BNH6 (Fill 634, Cut 635)	4106±27

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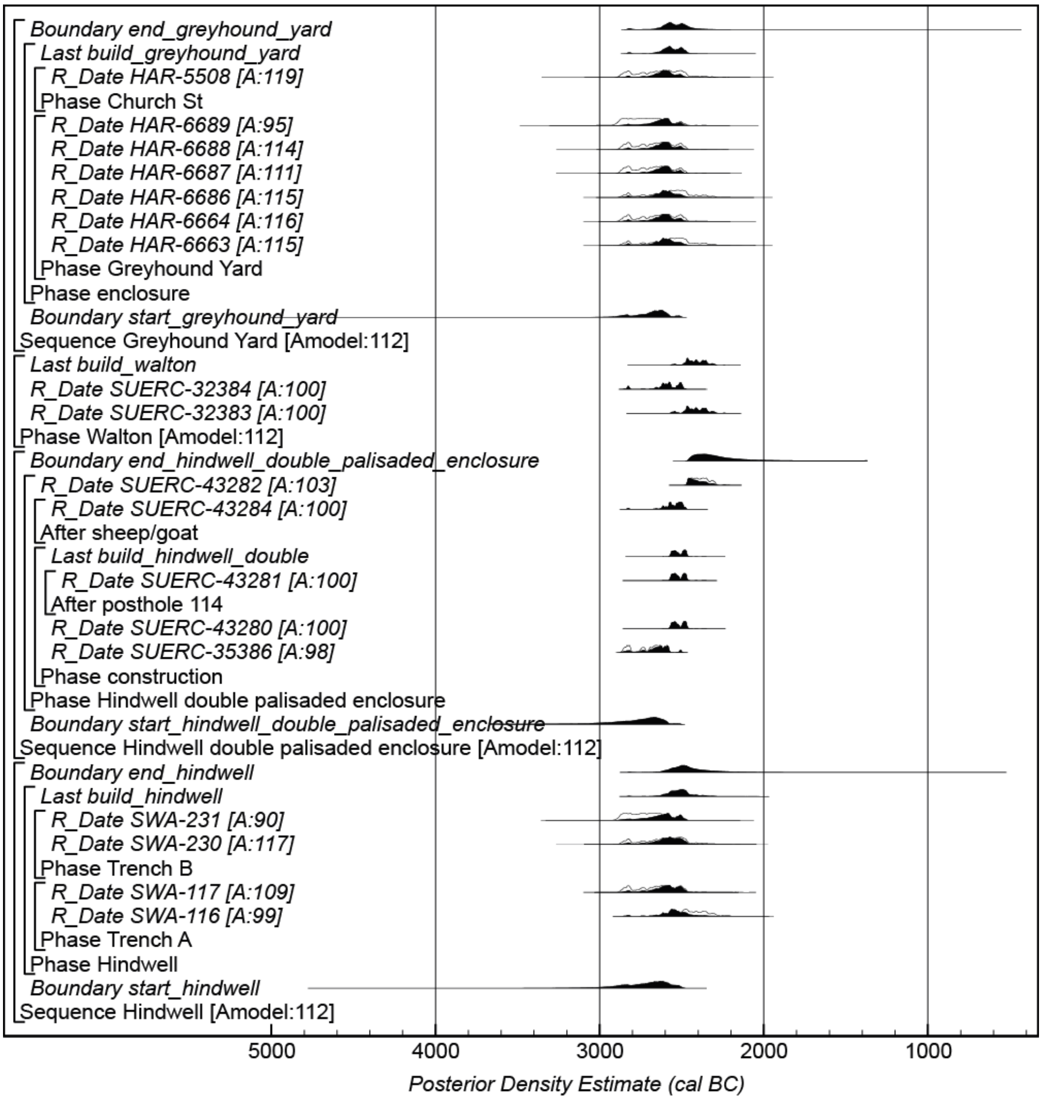

Fig. S4.a-i.
Probability distributions of dates from other palisade enclosures in Britain. The format is identical to that of Fig. 7

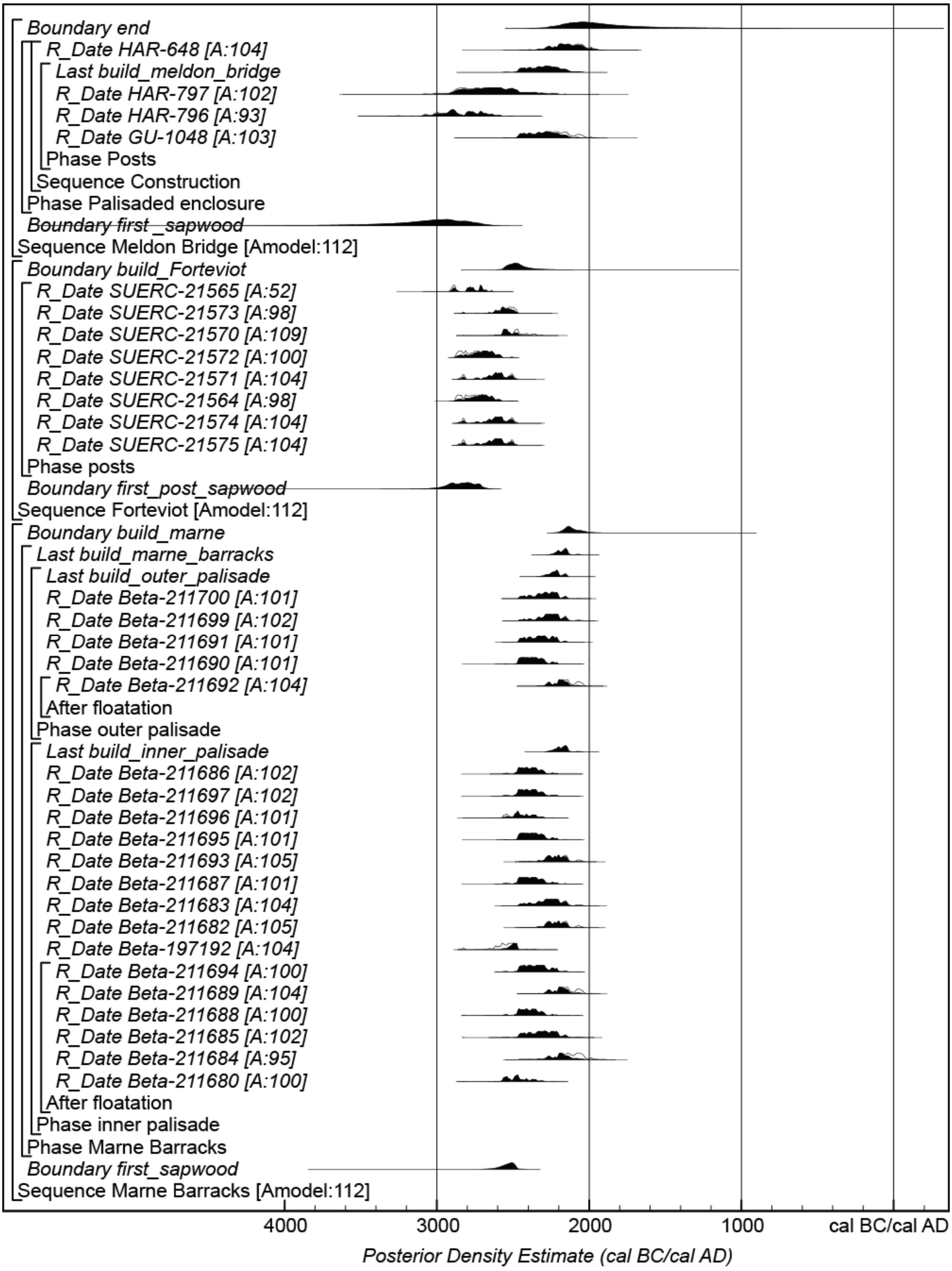

Fig. S4.a-ii.
Probability distributions of dates from other palisade enclosures in Britain. The format is identical to that of Fig. 7

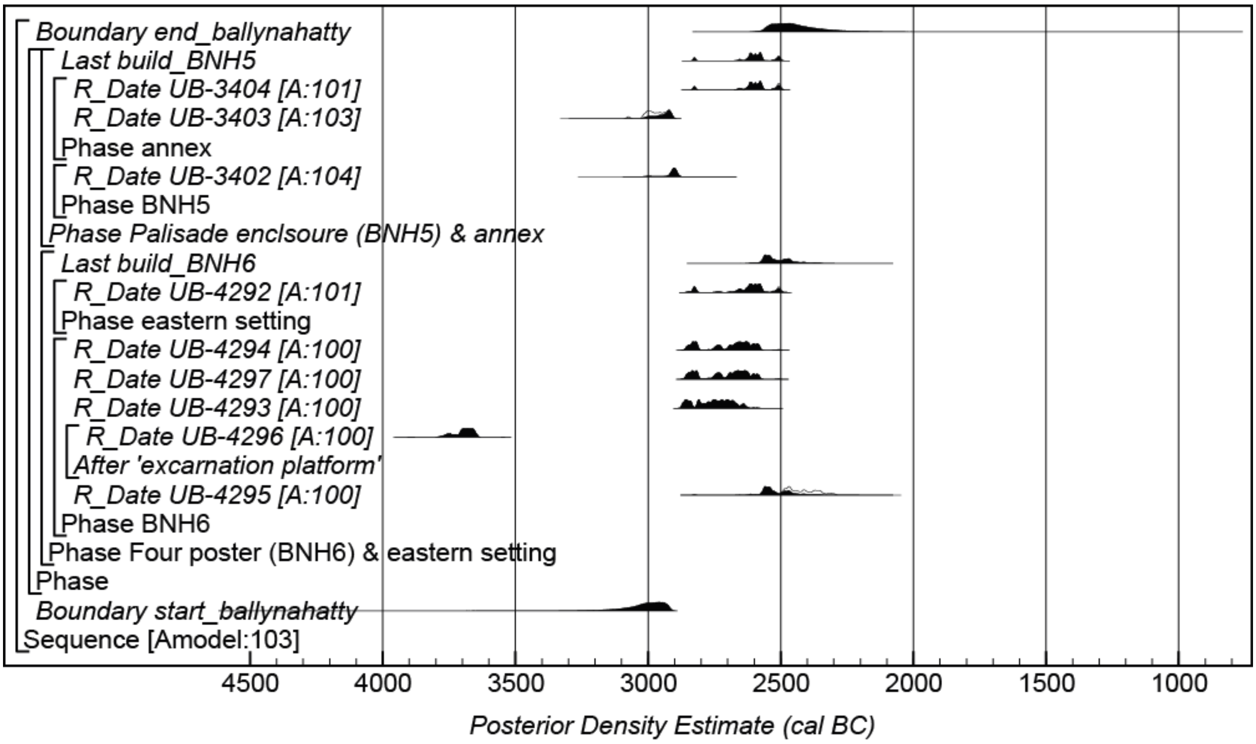

Fig. S4.b.
Probability distributions of dates from Ballynahatty. The format is identical to that of Fig. 7

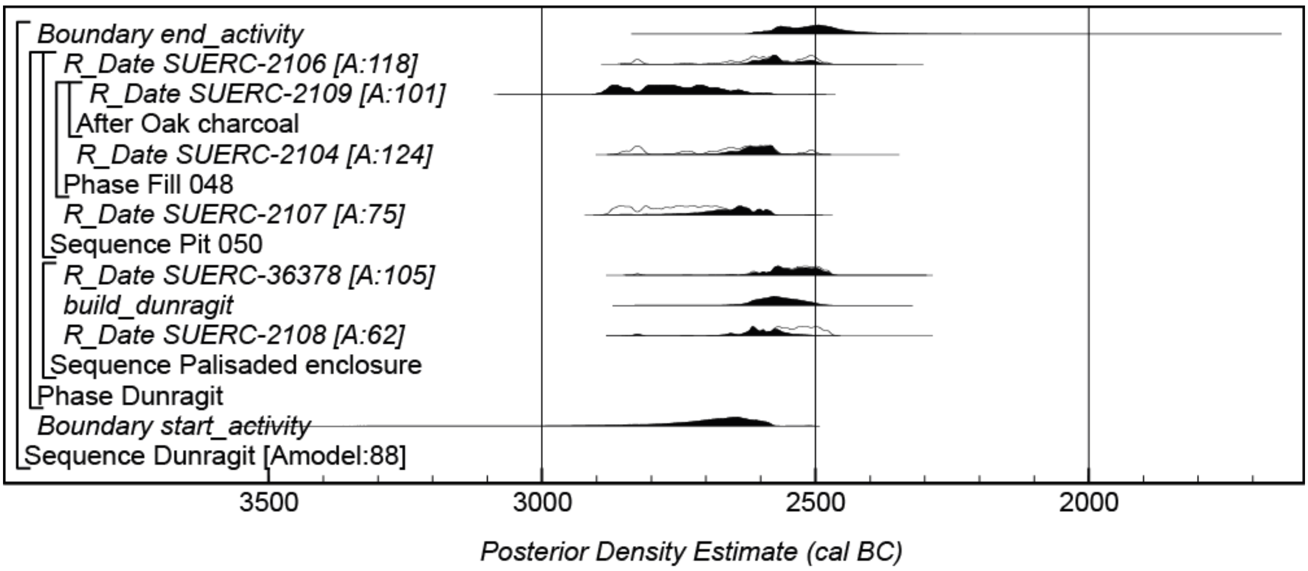

Fig. S4.c.
Probability distributions of dates from Dunragit. The format is identical to that of Fig. 7

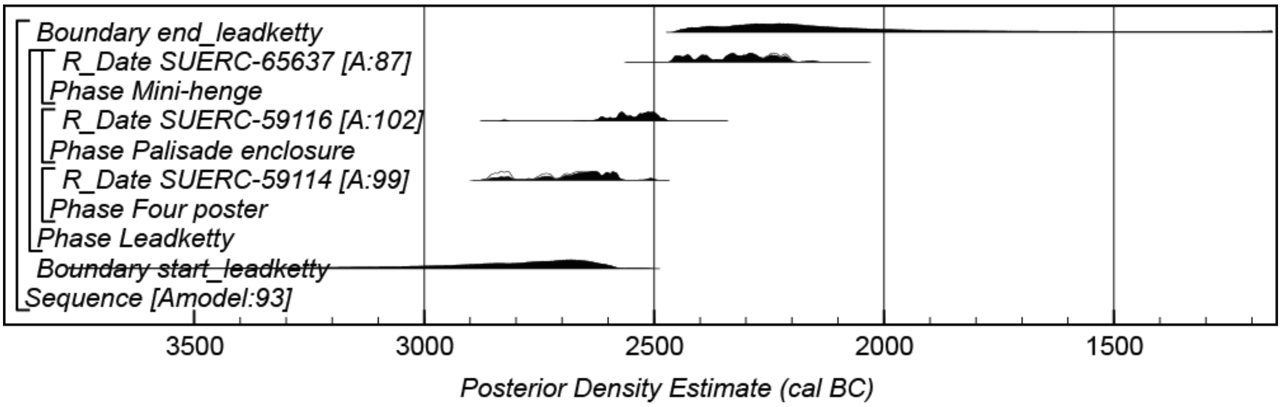

Fig. S4.d.
Probability distributions of dates from Leadketty. The format is identical to that of Fig. 7

APPENDIX S5: RADIOCARBON AND ASSOCIATED STABLE MEASUREMENTS FROM SQUARE-IN-CIRCLE AND RELATED ELABORATE CONCENTRIC TIMBER STRUCTURES IN BRITAIN AND IRELAND

Lab. no.	*Sample reference, material and context*	*δ¹³C IRMS (‰)*	*Radiocarbon age (BP)*	*Interpretation*
	Greenbogs, Aberdeenshire			
SUERC–20998	Charcoal (*Alnus* sp.) from northern–most large post-hole of 4–post setting A4–051, Structure A (Noble *et al.* 2011, table 5)	−27.3	4100±40	Alder likely to have been construction material; posts had rotted *in situ*. As old wood effect possible, this date provides a TPQ for construction.
SUERC–33430	Charcoal (*Alnus* sp.) from outer ring post-hole A26, Structure A (Noble *et al.* 2011, table 5)	−23.6	4125±30	Same as SUERC–20998.
SUERC–28269	Charcoal (*Alnus* sp.) from southernmost large post-hole of 4–post setting B4–065, Structure B (Noble *et al.* 2011, table 5)	−24.1	4165±40	Same as SUERC–20998.
	Machrie Moor, Arran			
GU–2316	Charcoal (mixed: *Quercus* sp., *Corylus* sp. & *Alnus* sp.) from post-hole F1271 of main ring of Site 1 (Haggarty 1991, 63)		4470±50	Mixed species sample, not definitely related to post.
GU–2325	Charcoal (*Quercus* sp.) from post-hole F1280 of main ring of Site 1 (Haggarty 1991, 63)		3980±180	Likely to be construction material but old wood effect possible, therefore can only act as a TPQ.
GU–2324	Charcoal (mixed: *Corylus* sp. & *Quercus* sp.) from post-hole F1326 of outer ring of Site 1 (Haggarty 1991, 63)		4080±90	Mixed species sample, not definitely related to post.
	Leadketty, Perth & Kinross			
SUERC–59114	Charcoal (*Quercus* sp.) from post-pipe 1019, fill of southern post-hole 1018 of 4–poster within palisaded enclosure (Brophy *et al.* 2012, 11; Wright 2018, 4).		4112±29	Likely to be construction material but old wood effect possible, therefore can only act as a TPQ.
	Forteviot, Perth & Kinross			
SUERC–37779	Charcoal (*Quercus* sp.) from fill of post-hole 6065 (Noble & Brophy forthcoming)		4180±22	Combined with next result to form mean.
SUERC–37780	Charcoal (*Quercus* sp.) from fill of post-hole 6065 (Noble & Brophy forthcoming)		4180±22	
SUERC–37781	Charcoal (*Quercus* sp.) from fill of post-hole 6074 (Noble & Brophy forthcoming)		3918±22	Combined with next result to form mean.
SUERC–37782	Charcoal (*Quercus* sp.) from fill of post-hole 6074 (Noble & Brophy forthcoming)		3918±22	

Lab. no.	*Sample reference, material and context*	*δ13CIRMS (‰)*	*Radiocarbon age (BP)*	*Interpretation*
SUERC–37867	Charcoal (*Salix* sp.) from Layer 6087, in lower fill of the henge ditch terminal, associated with Beaker pottery (Noble & Brophy forthcoming)		2496–2299 cal BC	Calibrated date only available. If ditch can be presumed later than timber structure, provides TAQ for structure.
	Pittentian, Perth & Kinross			
SUERC–58129	Charcoal (*Alnus* sp.) from post-hole C379 of outer post ring (Alistair Becket pers. comm.)	−26.4	4239±29	Possibly structural. If so, only provides TPQ for construction as could be affected by old wood.
SUERC–58125	Charcoal (*Alnus* sp.) from post-pipe C304 of post-hole C303. Post-pipe contained 5 identifiable types of charcoal (*Alnus* sp., *Corylus* sp., *Malus* sp., *Prunus* sp., & *Quercus* sp.) (Alistair Becket pers. comm.)	−26.7	4419±29	Unlikely to be structural given mix of charcoal in post-pipe.
SUERC–61741	Charcoal (Maloideae sp.) from post-pipe C259 of post-hole C260 (Alistair Becket pers. comm.)	−28.9	4457±34	Unlikely to be structural, probably residual.
SUERC–58128	Charcoal (A*lnus* sp.) from post-pipe fill C273 of post-hole C373, 1 of central 4 posts (Alistair Becket pers. comm.)	−26.4	4212±29	Possible structural. If so, provides TPQ for construction as could be affected by old wood.
SUERC–61743	Charcoal (C*orylus* sp.) from post-pipe C532 of post-hole C502 which had a varied assemblage of charcoal taxa (Q*uercus* sp., *Alnus* sp., *Corylus* sp. etc) (Alistair Becket pers. comm.)	−26.7	4319±34	Unlikely to be structural, probably residual.
SUERC–61760	Cremated human metatarsal from cremation deposit C405, on top of pit (C406) (Alistair Becket pers. comm.)	−19.9	4375±34	TAQ for construction of timber structure (although not if curated).
SUERC–61755	Charcoal (*Alnus* sp.) from upper post-pipe C262 within post-hole C267, which contained a significant quantity of alder charcoal with occasional oak fragments (Alistair Becket pers. comm.)	−28.2	4283±34	Given diversity of charcoal within post–pipe, not possible to say this is structural.
SUERC–61754	Charcoal (*Salix* sp.) from lower post-pipe C262 within the post-hole C267, which contained occasional fragments of oak & willow charcoal (Alistair Becket pers. comm.)	−25.6	4032±34	Same as SUERC–61755.
SUERC–58133	Charcoal (*Corylus* sp.) from fill C073 of circular pit C146 within structure (Alistair Becket pers. comm.)	−24.8	3906±29	Unknown relation to structure, possibly relates to use.
SUERC–61750	Charcoal (*Corylus* sp.) from fill C111 of oval pit C391 close to centre of 4–post setting, also contained *Quercus* sp. & *Prunus* sp. charcoal, burnt sandstone slabs, fire-cracked pebbles & burnt bone (Alistair Becket pers. comm.)	−25.1	4000±34	Unknown relation to structure, possible relates to use.

Lab. no.	*Sample reference, material and context*	*δ¹³C~IRMS~ (‰)*	*Radiocarbon age (BP)*	*Interpretation*
	Balfarg, Fife			
GU–1163	Charcoal (*Quercus* sp.) from main timber circle, Feature A11, block of charcoal from base of feature incorporated into backfilling. Timber over 20 cm diameter (Mercer 1981, 144)		4315±60	Could be interpreted as remains of post. Large wood, could be affected by old wood. Provides possible TPQ for construction.
GU–1160	Charcoal (*Alnus* sp.) from main timber circle, Feature A7, from base of feature incorporated in backfilling. Timber over 20 cm diameter (Mercer 1981, 145)		4180±50	Same as GU–1163.
GU–1161	Charcoal (*Alnus* sp.) from main timber circle, Feature A11, from backfill of feature. Timber over 20 cm diameter (Mercer 1981, 145)		4035±50	Less likely to be remains of post than GU–1163 or GU–1161.
GU–1162	Charcoal (*Quercus* sp.) from main timber circle, Feature A11, from backfill of feature. Timber over 20 cm diameter (Mercer 1981, 145)		4270±60	Same as GU–1161.
	Catholme, Staffordshire			
OxA–16050	Charcoal (*Quercus* sp.) single frag. roundwood, F253/2085, from upper fill of post-pit, innermost ring of 'woodhenge' monument (Chapman *et al*. 2010, 155)	−25.7	4108±31	Unlikely to be structural as roundwood but provides potential TPQ for construction of posts.
OxA–16049	Charcoal (*Quercus* sp.), single frag. sapwood, F224/2061, from middle fill of post-pit, 3rd ring of 'woodhenge' monument (Chapman *et al*. 2010, 155)	−25.5	4018±30	Likely to be part of a post, dates construction.
SUERC–11070	Charcoal (*Quercus* sp.), single frag. sapwood, F234/2061, from single fill of post-pit, 4th ring of 'woodhenge' monument (Chapman *et al*. 2010, 155)	−25.4	3975±35	Same as OxA–16049.
OxA–16048	Charcoal (*Quercus* sp.), single frag. sapwood, F213/2010, from primary fill of post-pit, 4th ring of 'woodhenge' monument (Chapman *et al*. 2010, 155)	−25.6	4095±30	Same as OxA–16049.
SUERC–11069	Charcoal (*Quercus* sp.), single frag. sapwood, F213/2018, from single fill of post-pit, outermost 5th ring of 'woodhenge' monument (Chapman *et al*. 2010, 155)	−24.6	4115±35	Same as OxA–16049.
OxA–16052	Charcoal (*Betula* sp.), single frag. fairly large roundwood, F112.01/1022(A), from primary fill of ditch (Chapman *et al*. 2010, 155)	−25.6	4011±30	Provides estimate for date of digging of ditch.
SUERC–11072	Charcoal (*Alnus* sp.), single frag. roundwood, F105.01/1022(B), from primary fill of ditch (Chapman *et al*. 2010, 155)	−26.4	3980±35	Same as OxA–16052.

Lab. no.	*Sample reference, material and context*	*δ¹³C$_{IRMS}$ (‰)*	*Radiocarbon age (BP)*	*Interpretation*
OxA–16051	Charcoal (*Alnus* sp.), single frag. roundwood, F105.01/1030(A), from primary fill of ditch recut (Chapman *et al*. 2010, 155)	−26.5	3997±30	Provides estimate for recutting of ditch.
SUERC–11071	Charcoal (*Alnus* sp.), single frag. roundwood, F105.01/1030(B), from primary fill of ditch recut (Chapman *et al*. 2010, 155)	−26.2	4020±35	Same as OxA–16051.
	Ballynahatty BNH6, Co. Antrim			
UB–4295	Charcoal (unidentified, bulk), from post-hole of outer ring of BNH6 (Cut 799, Fill 819) (Gormley 2004, 174–81)		3950±46	Interpreted as remains of burnt post. If so, this unidentified charcoal could be affected by old wood, so provides only a TPQ for construction.
UB–4292	Charcoal (unidentified, bulk), from primary fill (ie, packing) of post-holes of E setting (Cut 31, Fill 62) (Gormley 2004, 174–81)		4070±26	Charcoal may be residual in packing, providing a TPQ for construction only
UB–4293	Charcoal (unidentified, bulk), from secondary fill of post-hole of 4–poster entrance (Cut 417, Fill 373) (Gormley 2004, 174–81)		4152±24	Same as UB–4295. Note that secondary fills interpreted as remains of burnt posts.
UB–4297	Charcoal (unidentified, bulk), from secondary fill of E post-hole of four–poster (Cut 948, Fill 644) (Gormley 2004, 174–81)		4114±26	Same as UB–4295.
UB–4294	Charcoal (unidentified, bulk), from secondary fill of post-hole of inner ring of BNH6 (Cut 635, Fill 634) (Gormley 2004, 174–81)		4106±27	Same as UB–4295.
	Knowth, Co. Meath			
GrA–445	Charred residue from interior surface of Grooved Ware sherd in post-pit 16 (Eogan & Roche 1997, 136; Smyth 2009, 120)		4130±35	Date estimate for deposition associated with timber circle.
GrA–448	Charred residue from interior surface of Grooved Ware sherd in post-pit 7 (Eogan & Roche 1997, 136; Smyth 2009, 120)		3985±35	Date estimate for deposition associated with timber circle.
UBA–14781	Hazel nutshell, fill of post-pit 8, K91:31:24 (Schulting & McClatchie 2018, table A4.2)		3987±27	Single frag. may date deposition but could be residual.
	Newgrange pit–and–post circle, Co. Meath			
GU–1619	Charcoal (unidentified) from Pit 3, Cutting 1 (Sweetman 1985, 218)	−25.0	3885±70	Dates use of pit-and-post circle for burning & deposition of cremations & burnt animal bone. TPQ as could be old wood.
GU–1771	Charcoal (unidentified) from charcoal deposit in Pit 18, Cutting 3 (Sweetman 1985, 206–7, 218)	−25.5	3935±70	Same as GU–1619.
GU–1772	Charcoal (unidentified) from clay-lined Pit 23, Cutting 4 (Sweetman 1985, 207, 218)	−25.9	3900±60	Same as GU–1619.

Lab. no.	*Sample reference, material and context*	$\delta^{13}C_{IRMS}$ (‰)	*Radiocarbon age* (BP)	*Interpretation*
GU–1773	Charcoal (unidentified) from large charcoal deposit near surface of fill of Pit 28, Cutting 2 (Sweetman 1985, 218)	−25.6	3975±60	Same as GU–1619.
GU–11802	Charcoal (unidentified) from Pit 6, outer arc of pits, Cutting 1 (Sweetman 1985, 218)	−25.0	4030±35	Same as GU–1619.
GU–1617	Charcoal (unidentified) from Pit 1, outer arc of pits, Cutting 1 (Sweetman 1985, 218)	−25.0	4050±65	Same as GU–1619.
UB–2393	Charcoal (unidentified) from sample 10, from pit of circle in Square 32c (O'Kelly *et al*. 1983, fig 4b, 21)		3985±45	Same as GU–1619.
UB–2394	Charcoal (unidentified) from sample 11, from pit of circle in Square 32c (O'Kelly *et al*. 1983, fig 4b, 21)		3875±90	Same as GU–1619.
UB–2392	Charcoal (unidentified) from sample 9, from pit of circle in Square 29f (O'Kelly *et al*. 1983, fig 4b, 21)		3875±90	Same as GU–1619.
GrN–11800	Charcoal (unidentified) from animal cremation (Burial 7) inserted into S side of Pit 14, inner arc, Cutting 1 (Sweetman 1985, 200–1, 218)	−25.0	4070±40	Same as GU–1619.
GrN–11801	Charcoal (unidentified) from clay-lined Pit 11, Cutting 1 (Sweetman 1985, 199, 218)	−25.0	4070±60	Same as GU–1619.
GU–1618	Charcoal (unidentified) from Pit 2, inner arc, Cutting 1 (Sweetman 1985, 218)	−25.0	3980±75	Same as GU–1619.
GU–1620	Charcoal (unidentified) from animal cremation deposit (Burial 5), Cutting 3 (Sweetman 1985, 218)	−25.0	4000±65	Same as GU–1619.
GU–1621	Charcoal (unidentified) from animal cremation deposit (Burial 25), Cutting 3 (Sweetman 1985, 218)	−25.0	3890±75	Same as GU–1619.
GU–1774	Charcoal (unidentified) from animal cremation deposit (Burial 31), Cutting 3 (Sweetman 1985, 205–6, 218)	−25.6	3965±65	Same as GU–1619.
	Lagavooren, Co. Meath			
SUERC–31931	Burnt fragment of animal bone from post-hole (IAC 2016)		4050±30	Does not relate directly to construction, provides date estimate for deposition at site.
SUERC–31930	Burnt fragment of animal bone from post-hole (IAC 2016)		4205±30	Same as SUERC–31931.
SUERC–31935	Burnt fragment of animal bone from post-hole (IAC 2016)		4005±30	Same as SUERC–31931.

Lab. no.	*Sample reference, material and context*	*δ¹³CIRMS (‰)*	*Radiocarbon age (BP)*	*Interpretation*
		Annaghilla (Site 4), Co. Tyrone		
SUERC–21655	Charcoal (*Quercus* sp.) from Structure 1 post-hole (Dunlop & Barkley 2016, 28, 182)	−26.5	4080±40	Unknown whether heartwood or sapwood, so could be affected by old wood, provides only a TPQ for construction.
SUERC–21642	Charcoal (*Corylus* sp.) from Structure 1 post-hole (Dunlop & Barkley 2016, 28, 182)	−28.5	4055±40	May not relate to structure.
SUERC–21331	Charcoal (*Quercus* sp.) from Structure 1 post-hole (Dunlop & Barkley 2016, 28, 182	−25	4060±30	Same as SUERC–21655.
SUERC–21320	Charcoal (*Quercus* sp.) from Structure 2 (Dunlop & Barkley 2016, 28, 182)	−25.3	3995±30	Same as SUERC–21655, unknown context.
		Armalughey (Site 20), Co. Tyrone		
SUERC–20787	Charcoal (*Quercus* sp.) from Phase 1 pre-timber circle 4-post structure post-hole (Dunlop & Barkley 2016, 161)	−25.3	4320±30	Could be affected by old wood. Provides TPQ for Phase 1 structure, TAQ for Phase 2 structure.
SUERC–20788	Charcoal (*Quercus* sp.) from Phase 1 pre-timber circle 4-post structure post-hole (Dunlop & Barkley 2016, 162)	−24.9	4315±30	Same as SUERC–20787.
SUERC–20796	Unidentified burnt bone from upper fill of Phase 1 pre-timber circle 4-post structure post-hole (unknown phase) (Dunlop & Barkley 2016, 162)	−25	4045±30	Phase 1 post-holes appear to have remained at least partially open during Phase 2 as upper fills contained Beaker pottery (Dunlop & Barkley 2016, 39). Only dates deposition at the site in general.
SUERC–20785	Charcoal (*Quercus* sp.) from Timber Circle B (inner ring), Phase 2a (Dunlop & Barkley 2016, 162)	−27.2	4110±30	Could be affected by old wood. Provides TPQ for Phase 2 structure.
SUERC–20779	Charred hazel nutshell from Timber Circle B (inner ring), Phase 2a (Dunlop & Barkley 2016, 162)	−21.3	4040±30	Unknown specific context, may be residual or relate to use/deposition at site.
SUERC–20784	Charcoal (*Quercus* sp.) from Timber Circle B (inner ring), Phase 2a (Dunlop & Barkley 2016, 162)	−23.6	4030±30	Same as SUERC–20785.
SUERC–20789	Charcoal (*Quercus* sp.) from Timber Circle façade, Phase 2a (Dunlop & Barkley 2016, 162)	−25.8	4155±30	Same as SUERC–20785.
SUERC–20794	Charcoal (*Quercus* sp.) from Timber Circle façade, Phase 2a (Dunlop & Barkley 2016, 162)	−26.5	4080±30	Same as SUERC–20785.
SUERC–20774	Charred hazel nutshell from Timber Circle, central Structure C (Phase 2a) (Dunlop & Barkley 2016, 162)	−22	4045±30	Same as SUERC–20779.
SUERC–20780	Cremated human bone from Timber Circle, central Structure C (Phase 2a) (Dunlop & Barkley 2016, 162)	−25.8	4105±30	Estimate for deposition at site.

Lab. no.	*Sample reference, material and context*	*δ*[13]*C*IRMS *(‰)*	*Radiocarbon age (*BP*)*	*Interpretation*
SUERC–20795	Charcoal (*Alnus* sp.) from Timber Circle D, ring of stake-holes outside main structure, Phase 2a (Dunlop and Barkley 2016, 162). Circle D appears to have been built prior to radial arms of main structure (& by association the outer ring), which have an irregular line here (Dunlop & Barkley 2016, 44)	−24.1	4110±30	If structural for Circle D, provides TPQ for construction of radial arms.
SUERC–20770	Charcoal (*Salix* sp.) from Timber Circle A (outer ring), Phase 2b (Dunlop & Barkley 2016, 162). Outer ring & radial arms appear to be unitary construction & post-date Circle D (Dunlop & Barkley 2016, 40)	−26.2	4135±30	If structural, provides TPQ for construction of outer ring.
SUERC–20778	Charcoal (*Quercus* sp.) from Timber Circle A (outer ring), Phase 2b (Dunlop & Barkley 2016, 162)	−26	4135±30	Same as SUERC–20778.
SUERC–20777	Charcoal (*Salix* sp.) from Timber Circle A (outer ring), Phase 2b (Dunlop & Barkley 2016, 162)	−26.1	4070±30	Same as SUERC–20778.
SUERC–20786	Charcoal (*Salix* sp.) from radial arm of timber circle, Phase 2b (Dunlop & Barkley 2016, 162)	−23.6	4060±30	If structural, provides TPQ for radial arm.
SUERC–20790	Charcoal (*Alnus* sp.) from radial arm of timber circle, Phase 2b (Dunlop & Barkley 2016, 162)	−26.3	4020±30	Same as SUERC–20790.
	Kilmainham, Co. Meath, Structure 1			
UBA–12081	Hazel nutshell from C63, single fill of post-hole C64 of Structure 1 (Whitty 2011, 9, cxxv)	−22.3	4138±27	May be residual or relate to use/deposition at site.
UBA–12082	Hazel nutshell from C66, upper fill (black silty sand with burnt bone) of possible cremation pit C65, Structure 1 (Whitty 2001, 10, cxxv)	−25.8	4085±30	Same as UBA–12082.
UBA–12094	Hazel nutshell from secondary fill C215 of possible cremation pit C222, associated with Structure 3 (Whitty 2011, X, cxxvi)	−24.9	4164±25	May be residual or relate to use/deposition at site.
UBA–12092	Hazel nutshell from fill C252 of porch pit/post-hole C265, Structure 3 (Whitty 2011, 19, cxxvi)	−22.8	4261±27	Same as UBA–12092.
UBA–12093	Hazel nutshell from single fill C72 of large pit C223 to E of and associated with Structure 3 (Whitty 2011, 20, cxxvi)	−27.1	4079±28	Same as UBA–12092.
	Scart, Co. Kilkenny			
POZ–25476	Charcoal (*Corylus* sp.) from SE central post-hole of Structure 1 (Laidlaw 2017, 36, 52)		3960±40	Unlikely to be structural, as majority of charcoal from this post-hole was oak.
POZ–25477	Charcoal (*Quercus* sp.) from line of post-holes to S of Structure 1 (Structure 1a) (Laidlaw 2017, 38, 52)		3980±40	Could be affected by old wood. Provides TPQ for Structure 1a.

Lab. no.	*Sample reference, material and context*	*δ¹³C_{IRMS} (‰)*	*Radiocarbon age (BP)*	*Interpretation*
POZ–25479	Charcoal (*Fraxinus* sp.) from large hearth 3 m NE of Structure 2 (Laidlaw 2017, 38, 52)		3890±40	Dates activity likely to be contemporary with Structure 2.
UBA–15539	Charcoal (*Fraxinus* sp.) from 1 of the 4 central post-holes of Structure 3 (Laidlaw 2017, 39, 52)	−29.1	3941±27	Could be affected by old wood, provides TPQ for Structure 3.
UBA–13992	Charcoal (*Fraxinus* sp.) from the south–western of 4 central post-holes of Structure 4 (Laidlaw 2017, 39, 52)	−29.3	4027±32	Could be affected by old wood, provides TPQ for Structure 4.
	Whitewell, Co. Westmeath			
GrN–25734	Charcoal (unidentified) from entrance post-hole F15 (38), structure appeared to have been burnt. Associated with Grooved Ware (Grogan *et al*. 2007, 350)		3990±45	Likely to have been structural post, provides TPQ for construction.
GrN–25726	Charcoal (unidentified) from outer ring post-hole F29 (41). Associated with Grooved Ware (Grogan *et al*. 2007, 350)		4040±40	Same as GrA–25734.
	Prumplestown Lower, Co. Kildare			
UBA–8744	Hazel nutshell from fill (026) of pit (Bolger *et al.* 2015, 165)	−24.1	4054±23	Dates activity likely to be contemporary with structure.
UBA–8745	Hazel nutshell from fill (051) of pit (Bolger *et al.* 2015, 165)	−25.4	4061±24	Same as UBA–8744.
UBA–8746	Hazel nutshell from fill (027) of pit (Bolger *et al.* 2015, 165)	−22.8	4098±24	Same as UBA–8744.
UBA–4070	Charcoal (*Quercus* sp.) from basal fill (029) of post-hole (Bolgar *et al.* 2015, 165)	−26.9	4070±31	Interpreted as remains of post, could be old wood, therefore TPQ only.
	Kilbride, Co. Mayo			
Beta–217655	Charcoal (*Quercus* sp.) from C44, fill of structural post-hole C45, NW post-hole of central setting of timber circle (Cotter 2008, 14)	−25.2	4210±40	Likely remains of post, could be old wood, therefore TPQ only.
Beta–217656	Charcoal (*Corylus* sp.) from C58, middle fill of pit C59, interpreted as possible hazel wattle, *c*. 6 m to S of timber circle, part of ceremonial approach setting (Cotter 2008, 14). Pit also contained burnt bone & Grooved Ware (Cotter 2008, 10)	−26.1	4080±60	Although not structural, this hazel charcoal was in a pit closely associated with the use of this structure.
Beta–217657	Charcoal (*Alnus* sp.) from C69, fill of C70, post-hole forming a curving line along with 62–4, 72–3 in Area B *c*. 20 m SW of timber circle (Cotter 2008, 11, 13)	−26.2	4310±40	Not closely related to timber circle.

Lab. no.	*Sample reference, material and context*	*δ13CIRMS (‰)*	*Radiocarbon age (BP)*	*Interpretation*
		Wyke Down, Dorset		
WK–18751	Charcoal (unidentified) from post burnt *in situ* in post-hole associated with House 1 (Green 2007, 84)		4203±33	Likely to be construction material but as unidentified can only be treated as a TPQ for construction.
WK–18752	Charcoal (unidentified) from post burnt *in situ* in post-hole associated with House 2 (Green 2007, 84)		4117±40	Same as WK–18751.
		Southern Circle, Durrington Walls, Wiltshire		
SUERC–30992	Antler pick from post-hole 1876, part of Phase 1 4-post structure (Noble *et al.* 2011, 164)		4025±35	Date estimate for construction.
OxA–14976	Antler pick from recut pit in top of post-hole 099 within 4th ring 2C, Phase 2 (Parker Pearson *et al.* 2007, 631)		3966±33	TAQ for Phase 1 4-post structure & TAQ for Phase 2 concentric timber circle.
BM–396	Charcoal (unidentified) from base of post-hole 92, Phase 2 (Wainwright 1971, 37)		3950±90	TAQ for Phase 1 4-post structure. As unidentified charcoal which could be affected by old wood, only a TPQ for Phase 2
BM–395	Antler from Layer 8, packing of post-hole 92, Phase 2 (Wainwright 1971, 37)		3900±90	TAQ for Phase 1 4-post structure, estimate for construction of Phase 2
BM–397	Bulk animal bone from Layer 8, packing of post-hole 92, Phase 2 (Wainwright 1971, 37)		3850±90	Bulk animal bone, may derive from several different dates, unlikely to provide precise date for construction.
NPL–239	Bulk antler from Phase 1 post-holes 133–4, 141, 193–4 (Wainwright 1971, 30)		3760±148	Bulk antler – not certain whether tools functionally related to construction & from several post-holes. Unlikely to provide precise date for construction.
		Northern Circle, Durrington Walls, Wiltshire		
NPL–240	Antler pick from second phase post-hole 42 (Wainwright 1971, 44).		3905±110	TAQ for Phase 1 4-post structure.
		Woodhenge, Wiltshire		
BM–677	Antler pick from pile of 10 antler picks within SE side of ditch, from floor of ditch (Evans & Wainwright 1979, 73).		3817±74	Likely to be functionally related to digging of ditch.
BM–678	Collection of animal bone (unidentified) from primary chalk rubble in ditch (Evans & Wainwright 1979, 73)		3755±54	Bulked animal bone, does not state if articulated. Could be residual.

Lab. no.	*Sample reference, material and context*	*δ¹³C_{IRMS} (‰)*	*Radiocarbon age (BP)*	*Interpretation*
	Coneybury Henge, Wiltshire			
OxA–1409	Animal bone (unidentified) from fill 1447, middle chalky fill of SW pit 1601 of 4-poster (Richards 1990, 137, 260). Context is above deliberate tipped material (packing, 2250) & lower chalky fill (2249)		4370±90	Report does not state if animal bone was articulated. Could be residual.
OxA–1408	Dog bone (from dispersed but complete skeleton) from fill 2306, lowest primary fill of ditch (Richards 1990, 129, 260)		4200±110	Estimate for date of ditch digging.

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