

Archaeological Spatial Structure

- what we see in the archaeological record.
- horizontal spatial patterning in:
 - Features (e.g. structures,, fences pits, etc): "***site structure***"
 - Artifacts (e.g. secondary refuse)
- Culture historians : sites are "homogeneous artifact mines"
- Binford and the new archaeologists: within-site spatial variation is cool.

1. Systemic context processes

1.1 Spatial organization of activities and the facilities with which they are associated

1.2 Spatial organization of discard

2. Post-abandonment processes

- plowing, etc.

Systemic context processes

1.1 Spatial organization of activities and the facilities with which they are associated: a simple model.

The extent to which one activity will be spatially segregated from others is a function of

- benefits of moving ~ scales inversely with interference potential:
 - activities take up lots of space
 - activities are dangerous
 - activities require uninterrupted time
- costs of moving the offending activity ~ scales with distance moved, access frequency

General vs. Special Activity Areas

General Activity Areas

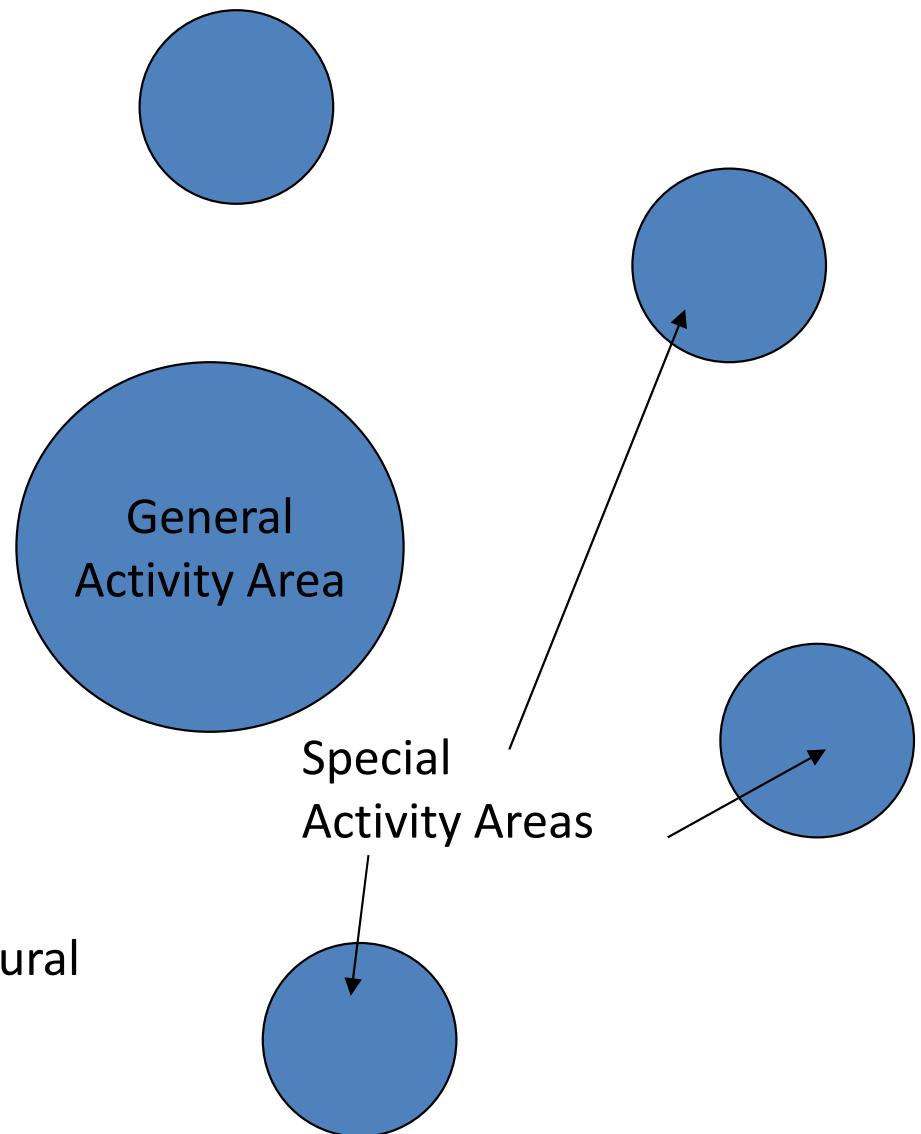
- sleeping, eating, socializing, cooking
- sleeping, cooking often separate within them

- Family (kin based)
- Communal (cross cut kin lines e.g. gender based)

a.k.a,
“nuclear” (John Yellen)
“intensive” (Lewis Binford)
“household” (O’Connell)

Special Activity Areas

- ecologically variable
- e.g. kangaroo roasting, car repair
- cooking for large numbers (signals)
- bulk processing and storage of agricultural produce
- lots of refuse, space, time



Implications for Site Structure

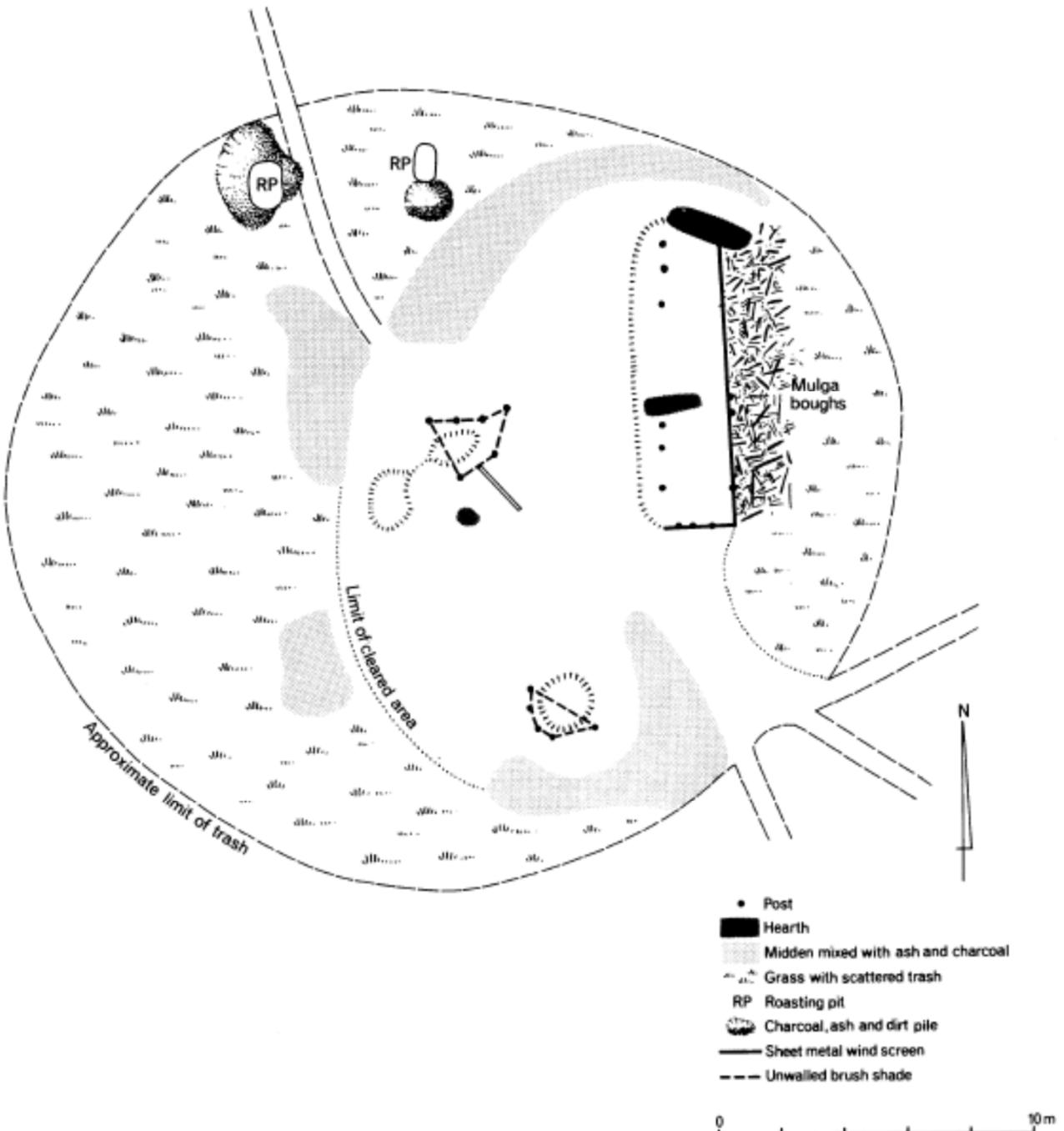


Figure 1. Plan of Alyawara household activity area, adjacent roasting pits, and refuse disposal zone.

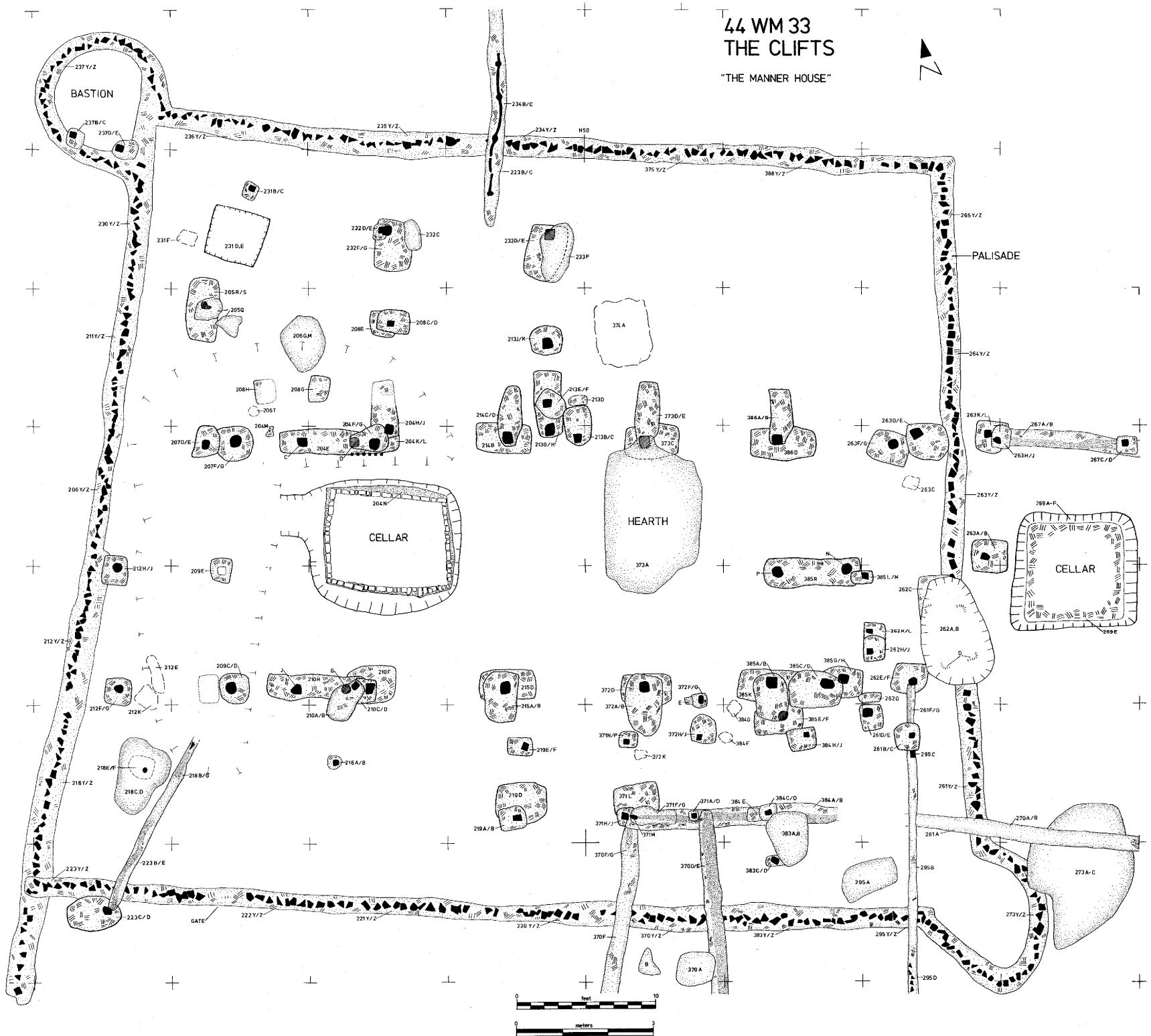


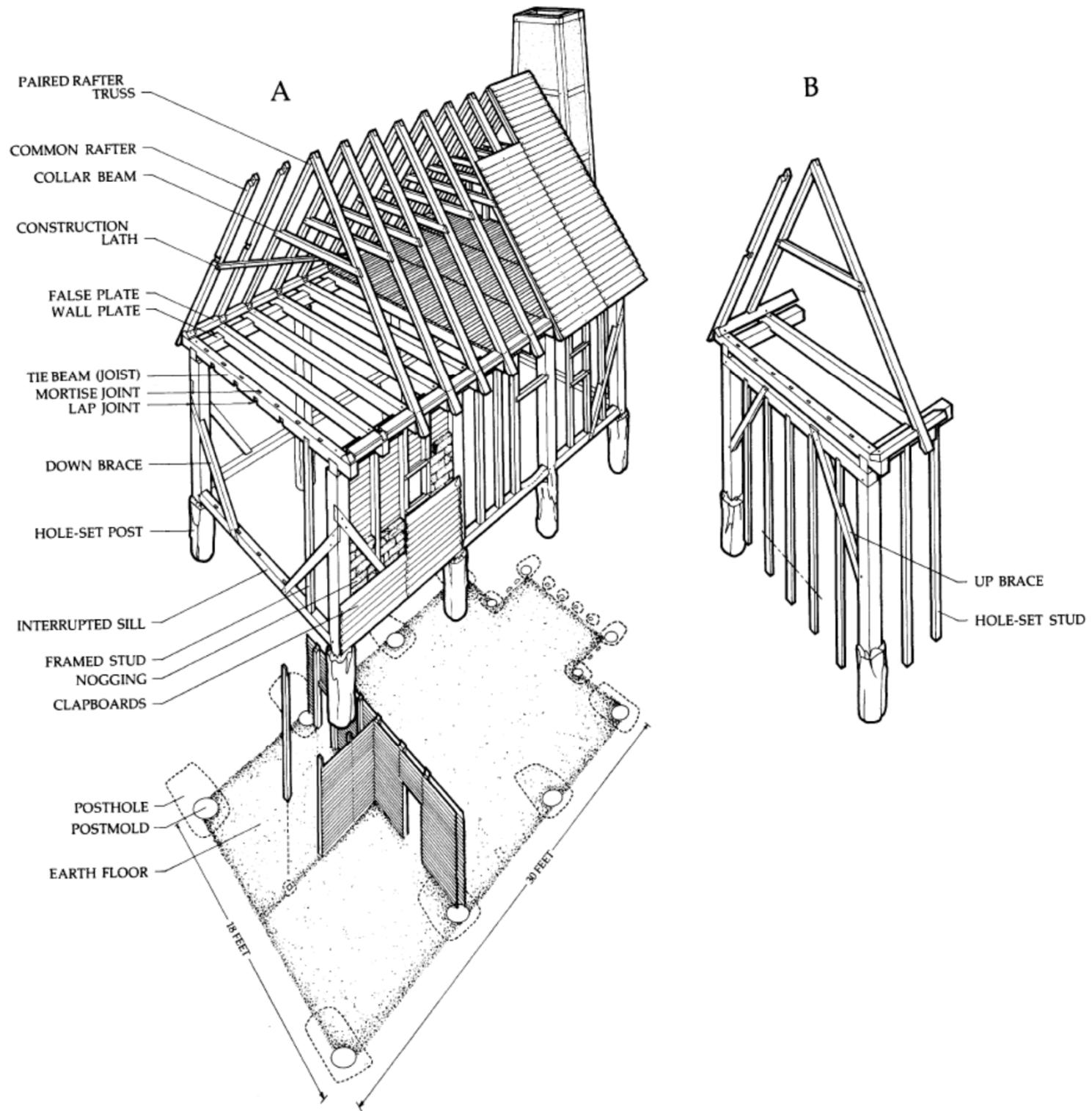




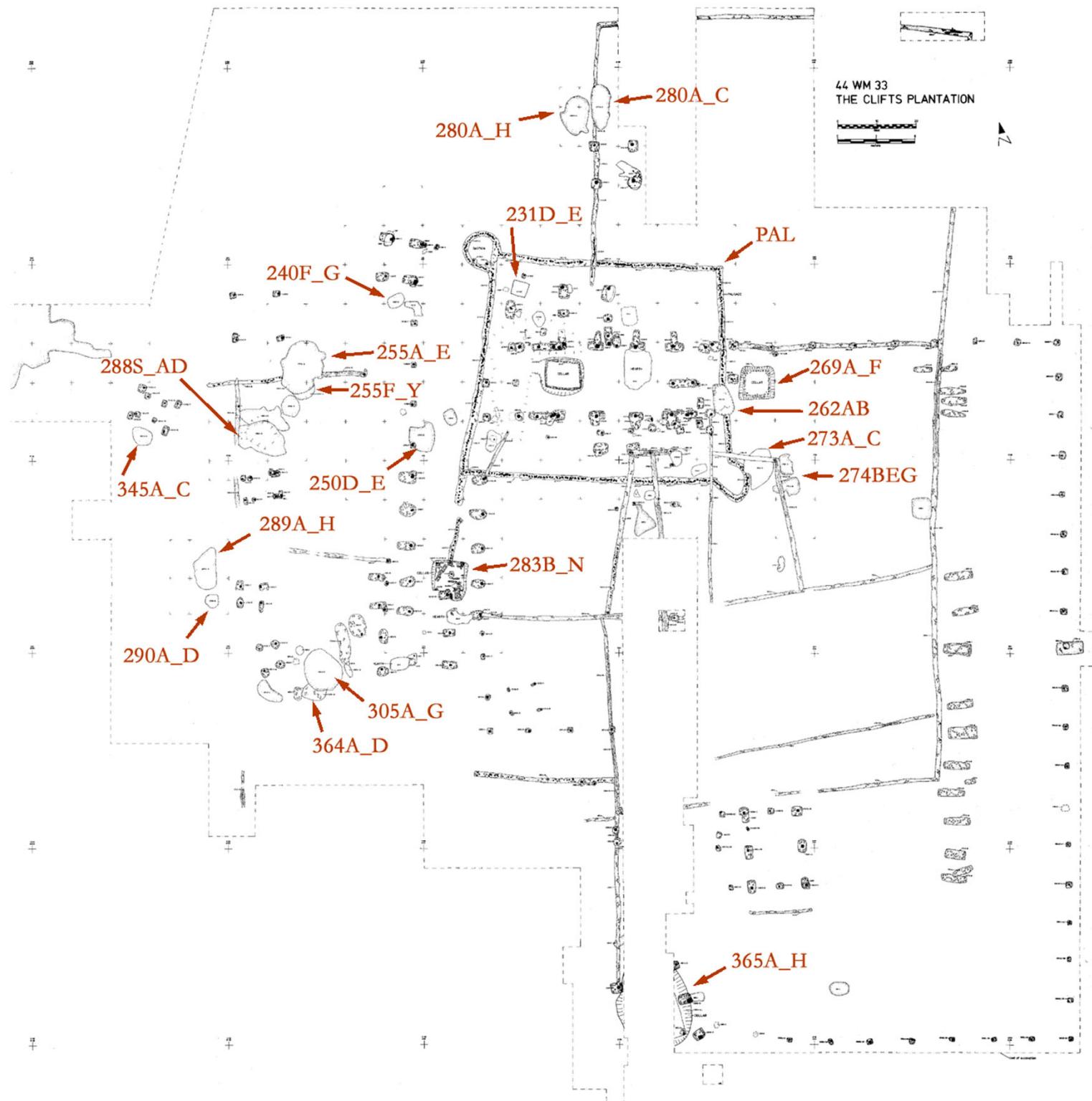
44 WM 33
THE CLIFTS

"THE MANNER HOUSE"

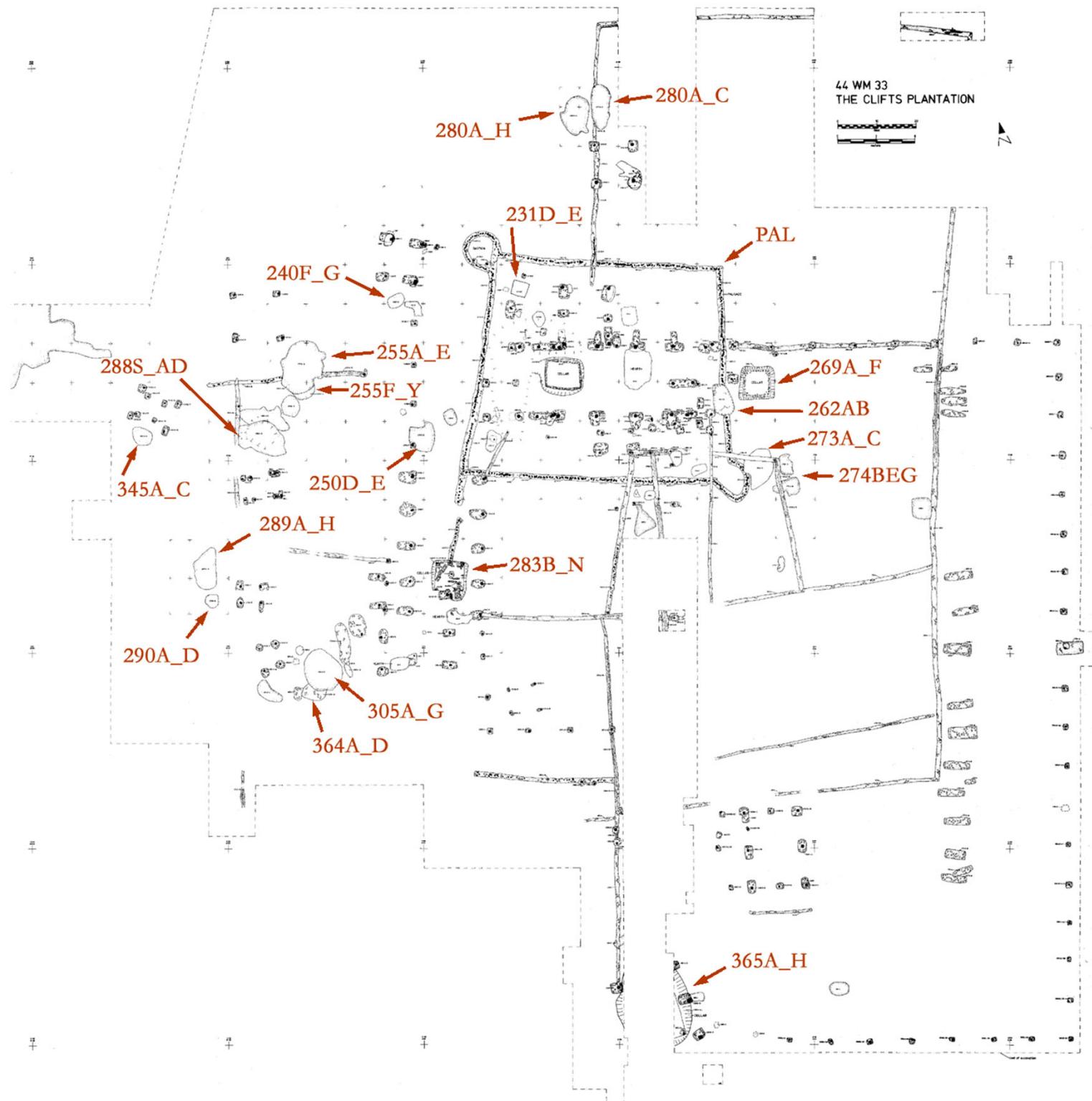








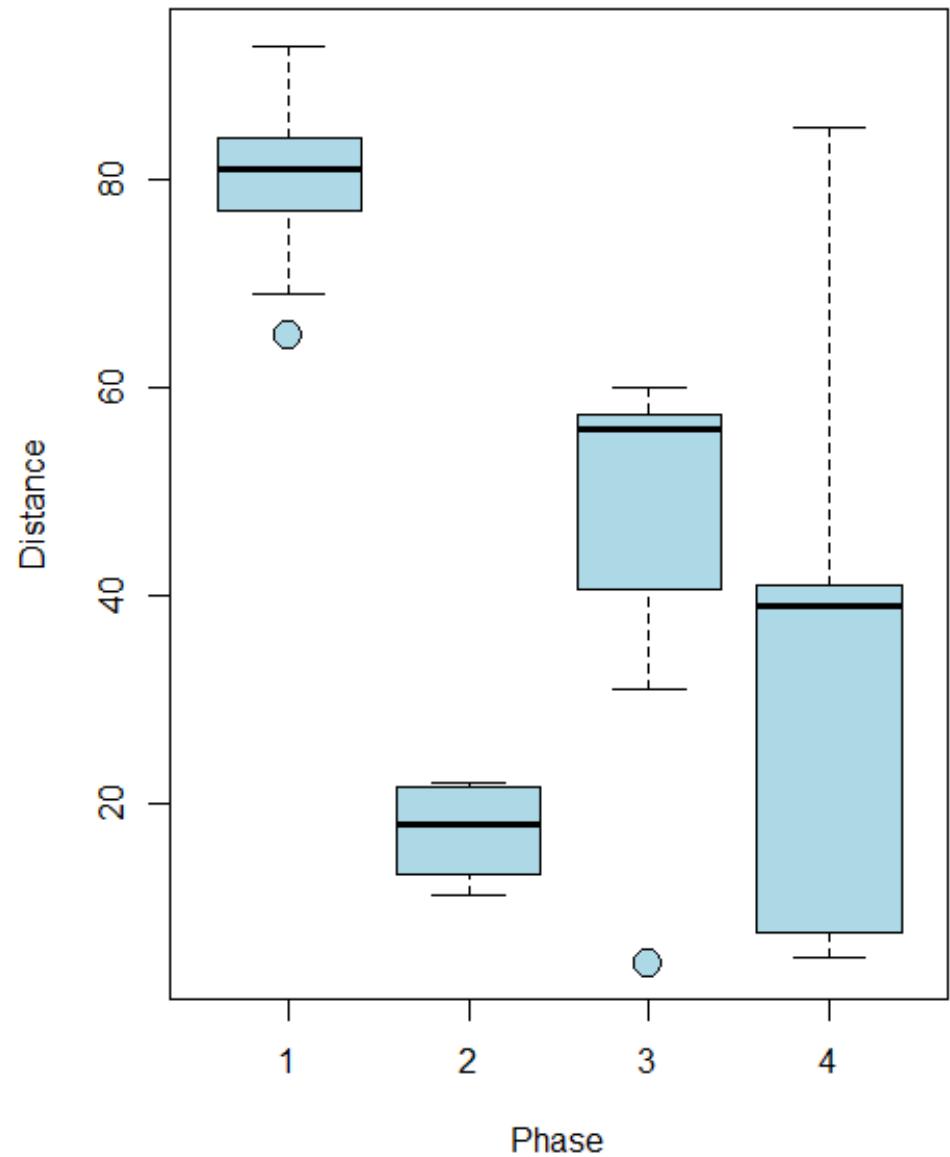
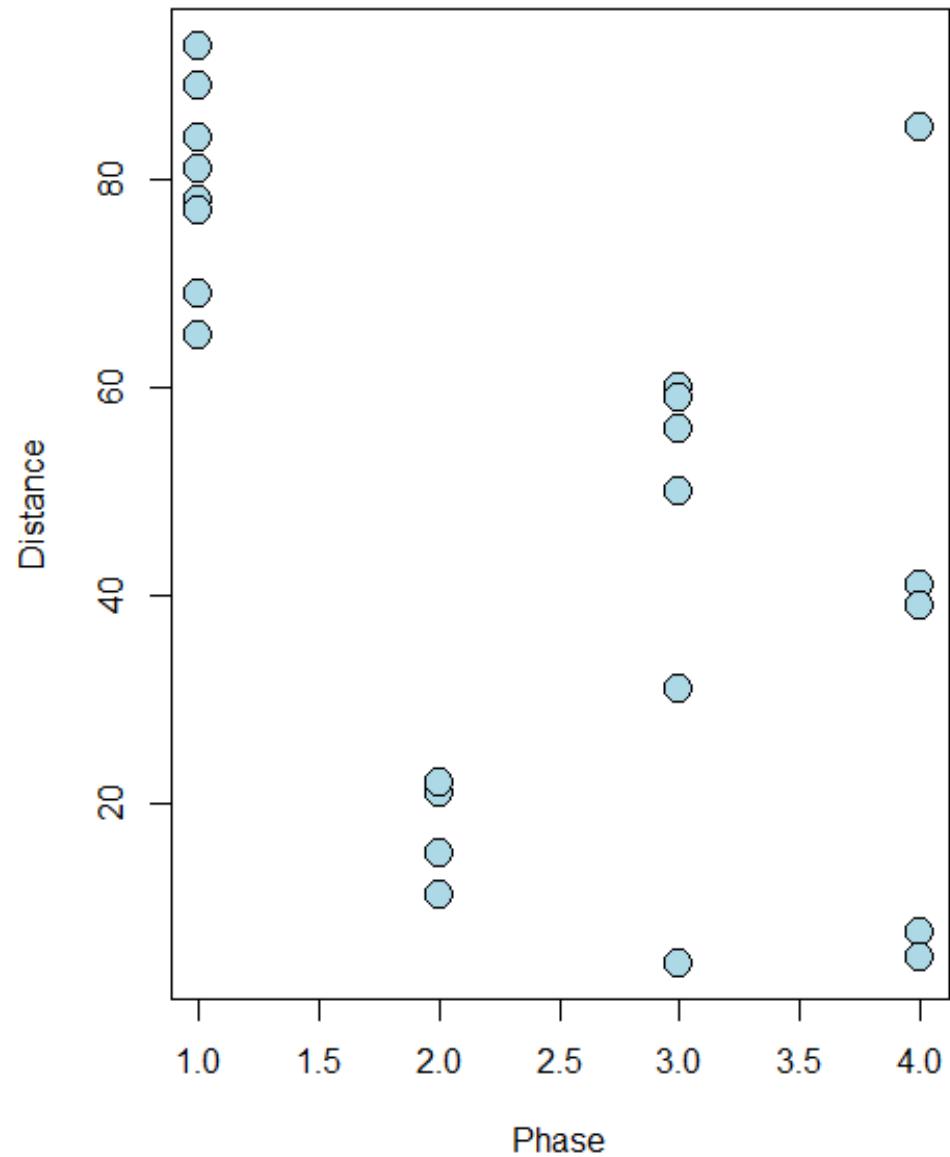




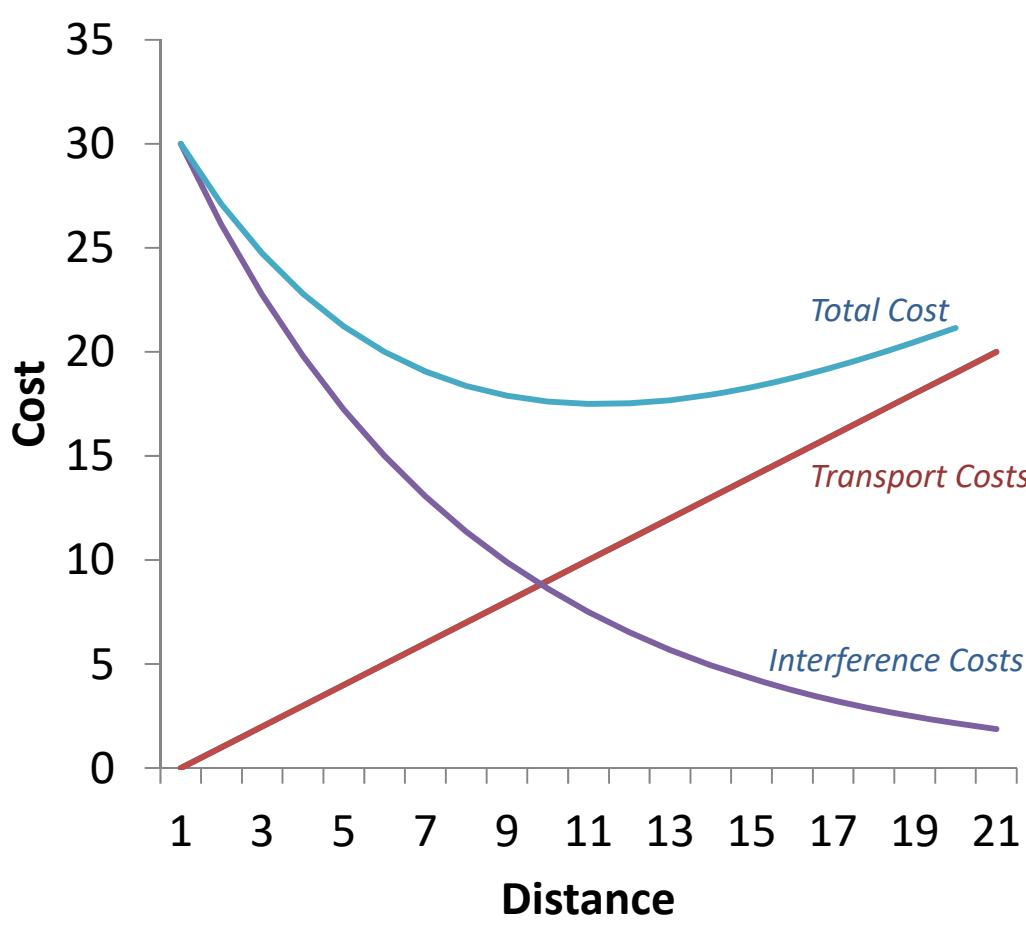
Context	e	Length	Width	Depth	Dist	Phase
					anc	
305A_G		78	10.7	9.7	1.8	1
304A_C		93	7.3	3.5	1.1	1
346A_D_362A_C		84	8.2	5	0.9	1
351B_H		69	10.2	3	1.3	1
356A_C		77	3.7	1.5	0.3	1
390M_N		65	6.2	4.2	0.8	1
360A		81	2	2	0.3	1
290A_D		89	3.5	3	0.6	1
289A_H		84	10.5	5.5	1.7	1
250D_E		21	7.5	6.4	0.7	2
273A_C		15	10	8	1.2	2
274A_B_E_G		22	11	7	1.2	2
295A		11	4.1	2.3	1	2
205G_M		4.5	4	3.1	0.6	3
240F_G		31	4.5	3.1	0.6	3
259A_D		56	5.5	4.5	0.7	3
288C_R		60	12	8.5	1.3	3
288S_AD		59	13.5	4.4	1.2	3
255A_E_Z_AH		50	13.5	10.5	1.1	3
255F_Y		56	5.6	4.5	2	3
309A		56	5.5	5	0.6	3
226B		7.5	4	3	0.3	4
277A_C		41	11.5	4.7	0.5	4
280A_H		39	10	7.4	1.1	4
383A_B		5	3.9	3	0.5	4
345A_D		85	5.4	4.4	1.1	4

Clifts Plantation

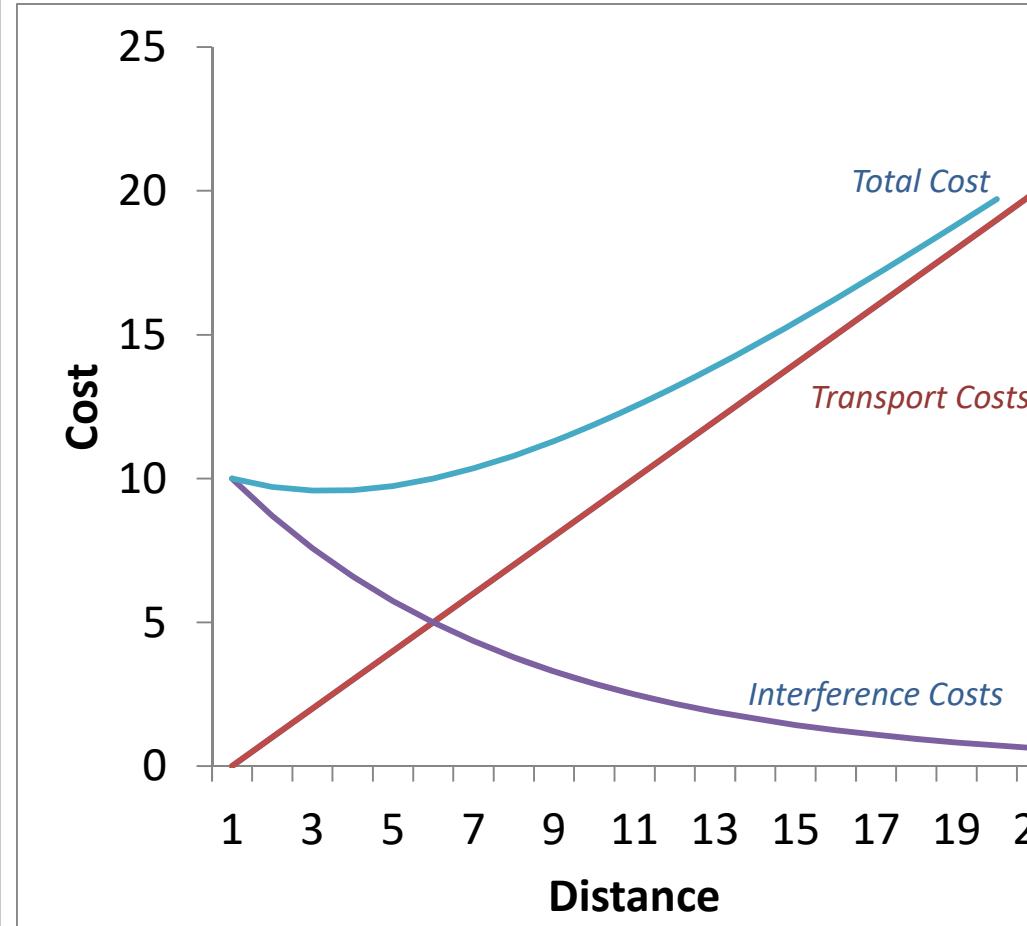
Distances of pits from the main house



Effect of variable pit size



Big Hole – high interference costs.

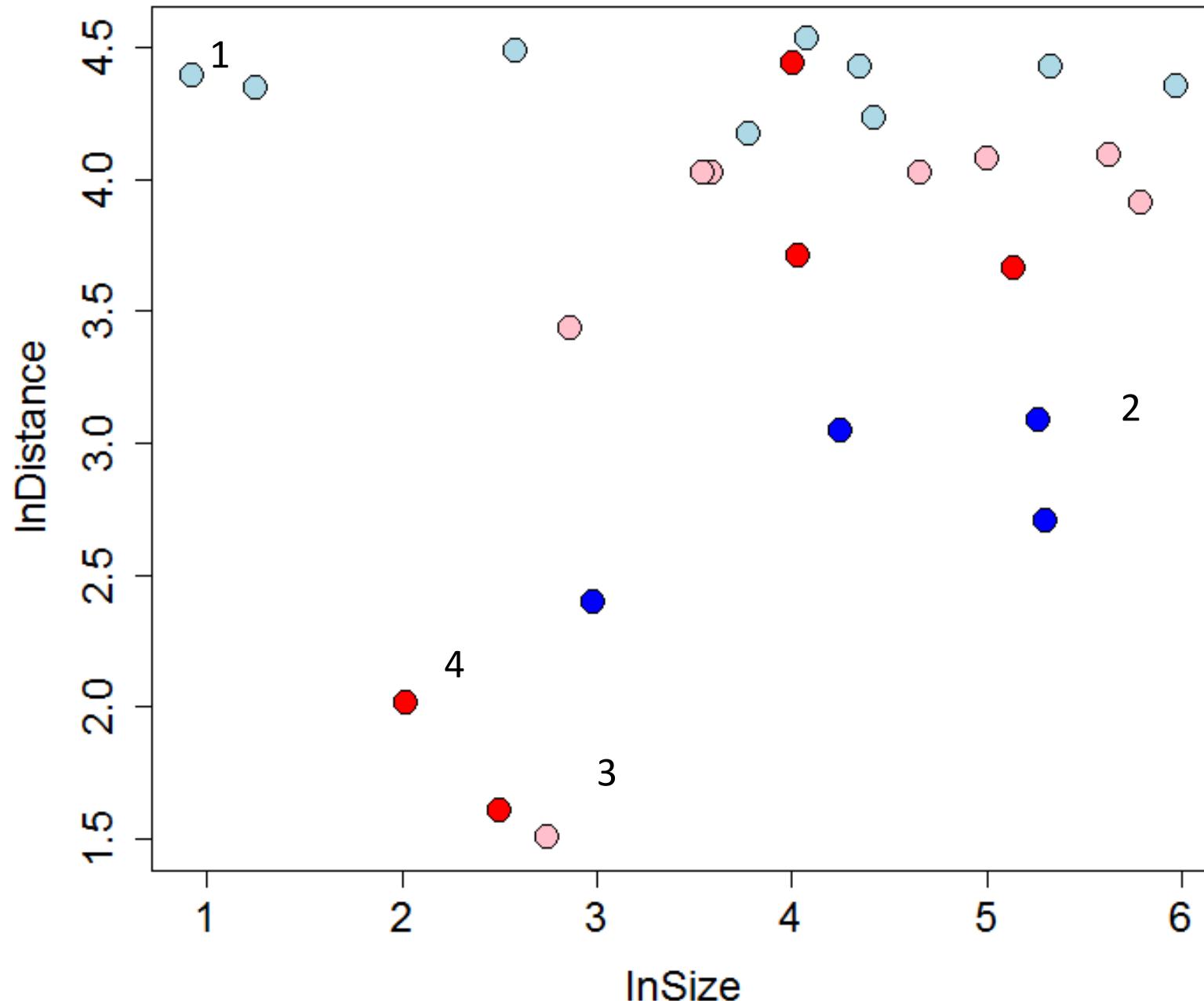


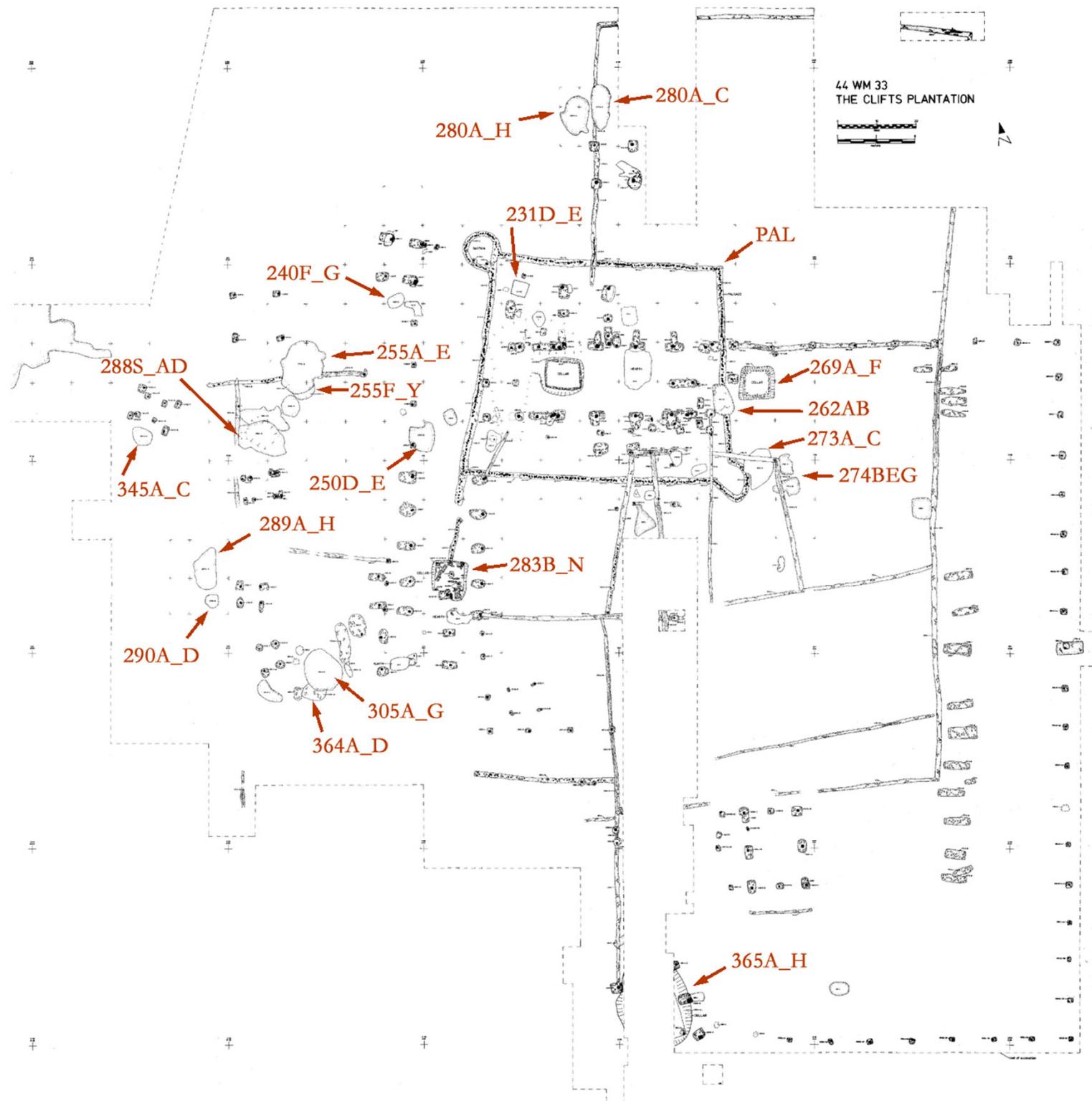
Small hole – lower interference costs.

On the basis of this model, what do we expect the size-distance relationship to look like?

Clifts Plantation

Pit Distances vs. Pit Size (log scale)





Systemic context processes

1.1 Spatial organization of activities and the facilities with which they are associated: a simple model.

-Extent to which one activity will be spatially segregated from others is a function of

1. benefits of moving ~ scale inversely with interference potential:

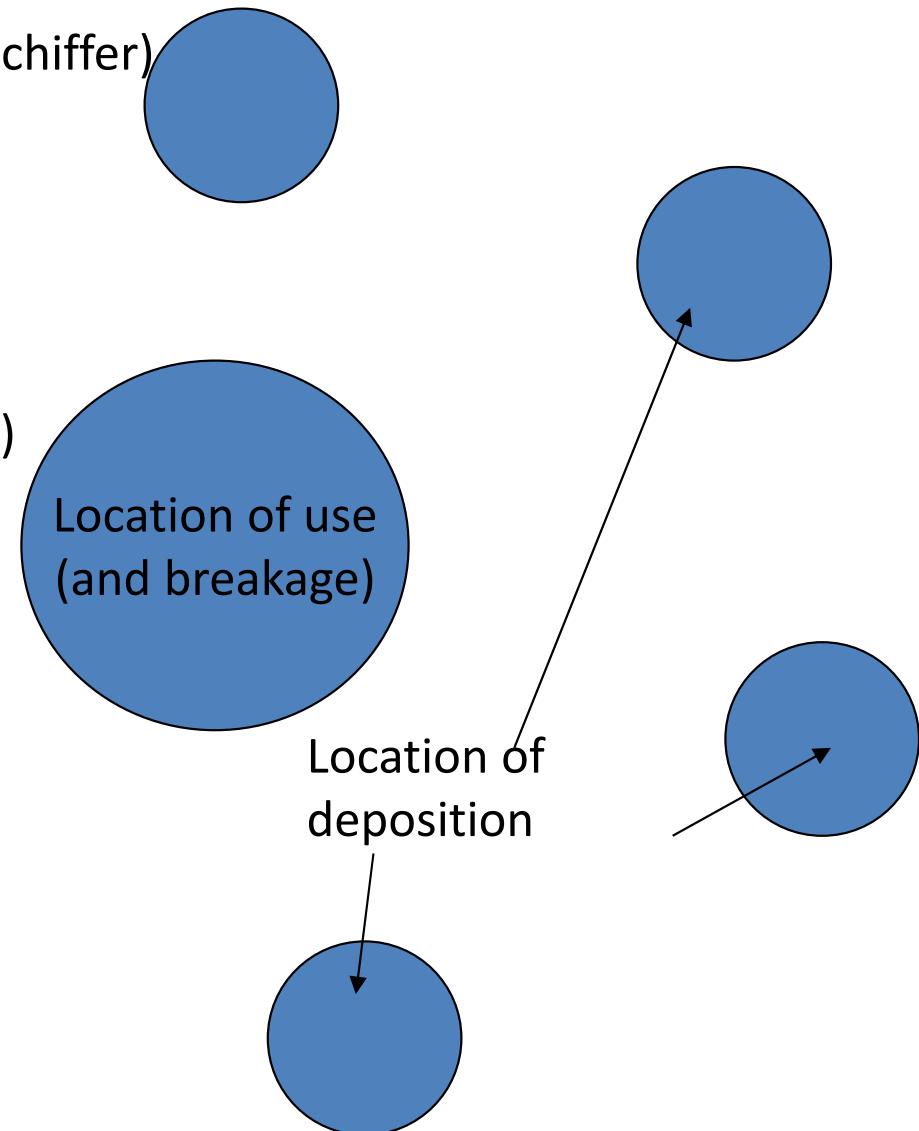
- activities take up lots of space
- activities are dangerous
- activities require uninterrupted time

2. costs of moving the offending activity ~ scales with distance moved, access frequency

Systemic context processes

1.2 Spatial organization discard.

- "The Pompeii Premise"
- primary refuse vs. secondary refuse (Mike Schiffer)
- ***cleaning up*** (creates some patterns, but destroys others)
- ***interference potential*** of primary refuse
 - amount (size, frequency, duration)
 - hazards (*e.g.* glass)
- how far stuff is transported
effects spatial scale at which spatial pattern can be interpreted.
- ***secondary refuse nearly always has useful spatial pattern at some informative scale!!***



Site 8 Example

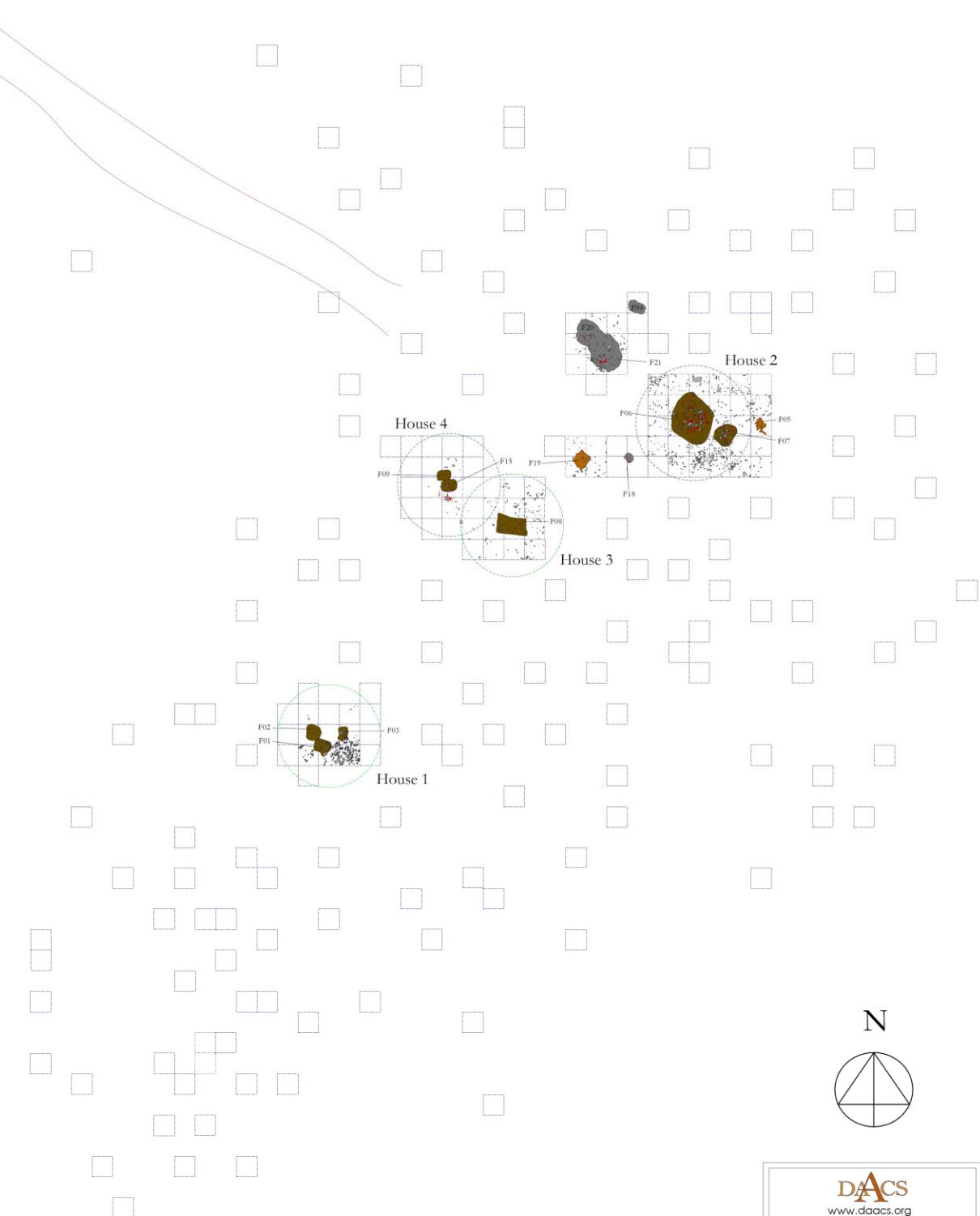
- c. 1770-1800
- heavily plowed
- stratified random sample
- 266 5-foot quadrats

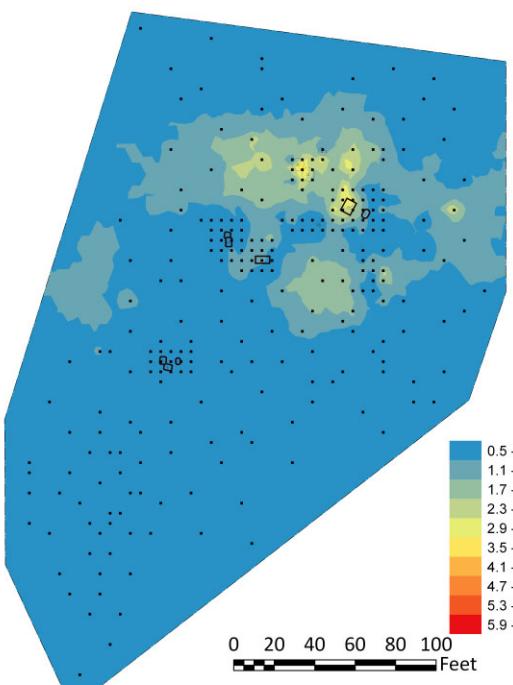
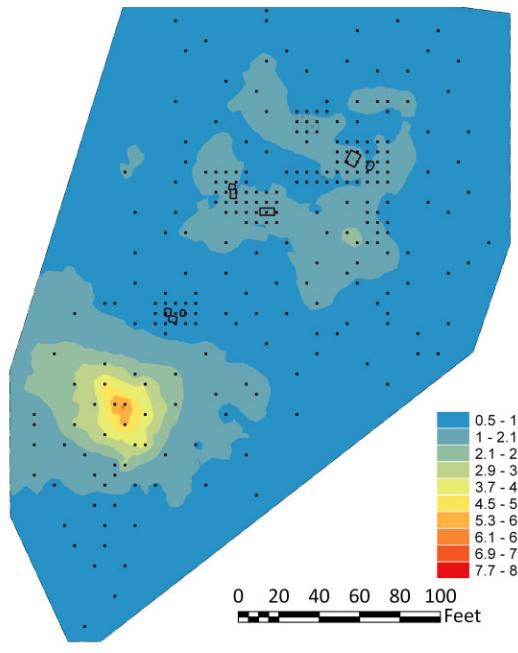
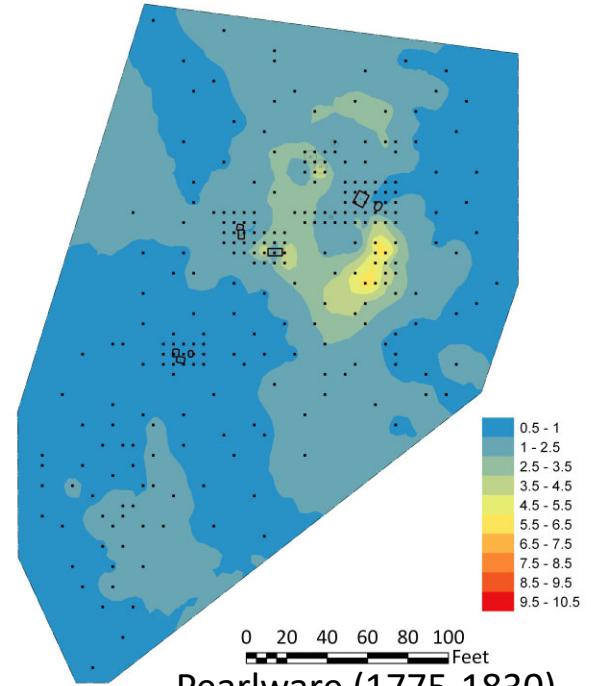
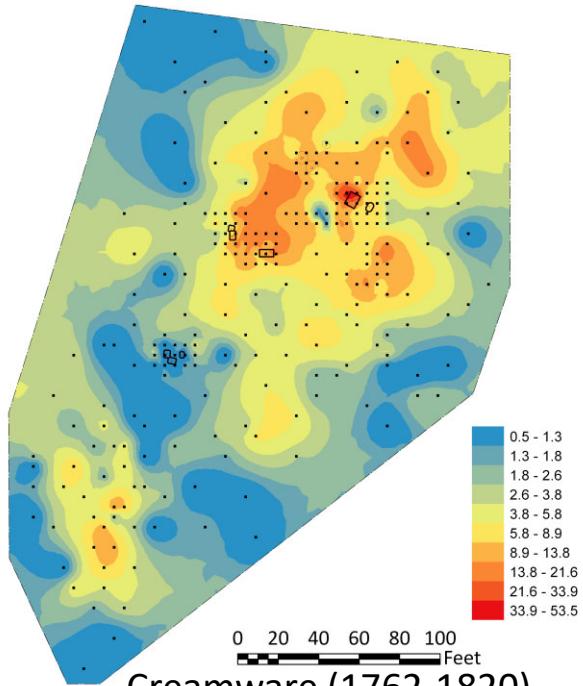
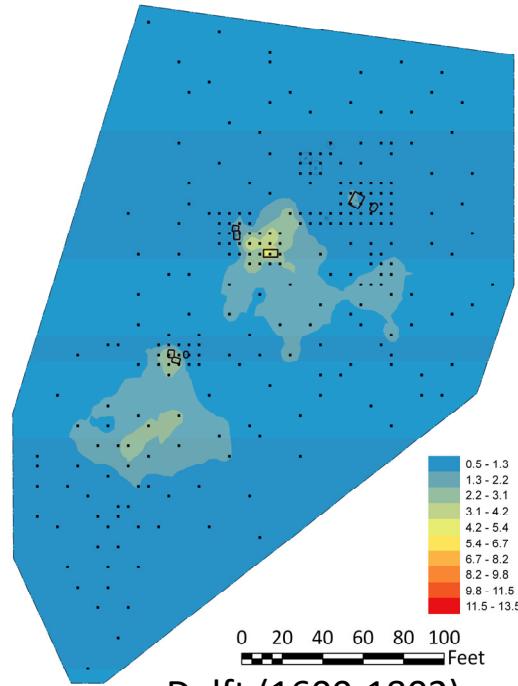
0 25 50



Feet

- = Suspected House Location
- = Subfloor Pit/Cellar
- = Brick
- = Stone
- = Slate
- = Misc. Feature
- = Tree Hole
- = Modern Road



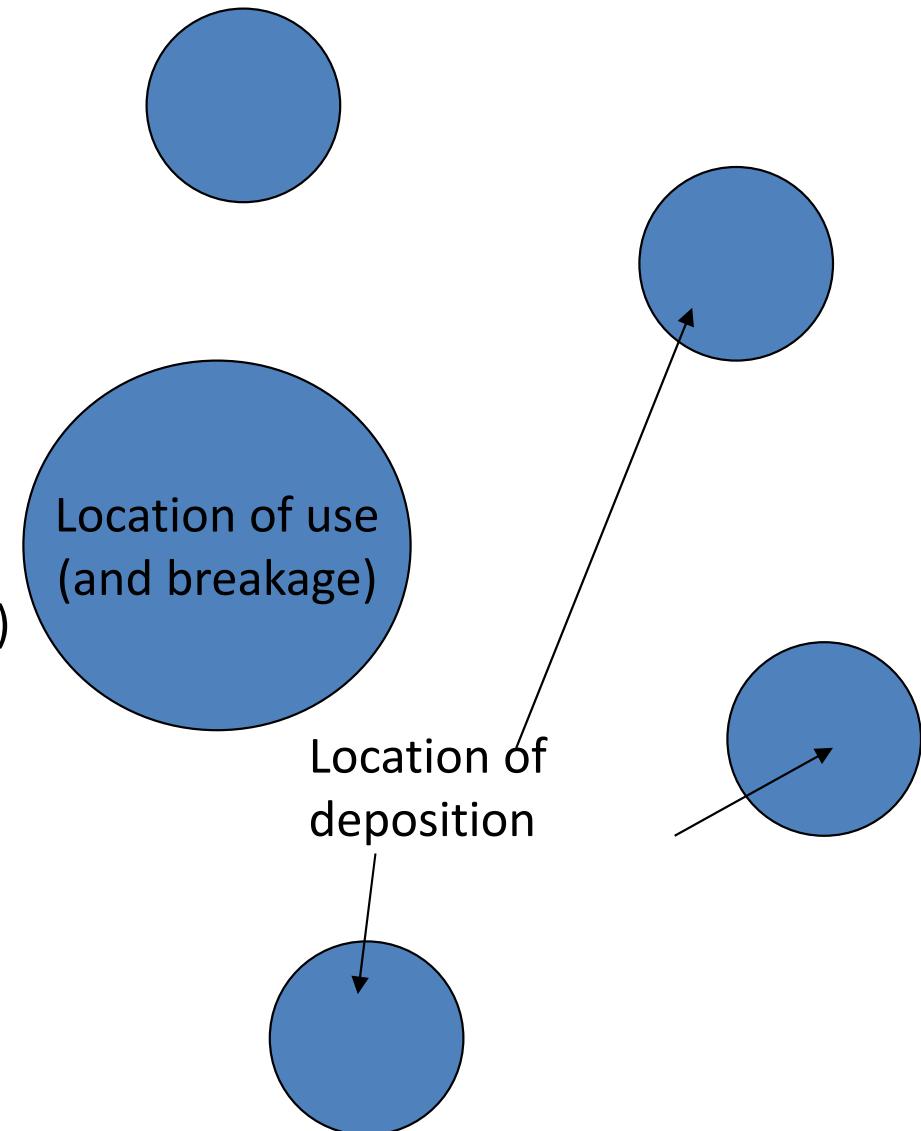


Site 8 (c. 1770-1800)

Systemic context processes

1.2 Spatial organization discard.

- "The Pompeii Premise"
- primary refuse vs. secondary refuse
(Mike Schiffer)
- ***cleaning up*** (creates some patterns, but destroys others)
- ***interference potential*** of primary refuse
 - amount (size, frequency, duration)
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- how far stuff is transported effects spatial scale at which spatial pattern can be interpreted.
- ***secondary refuse nearly always has useful spatial pattern at some informative scale!!***



Systemic context processes

1.2 Spatial organization discard.

- How to recognize cleaning up?
- Ethnoarchaeological evidence: Alyawara men's camp (O'Connell 1987)

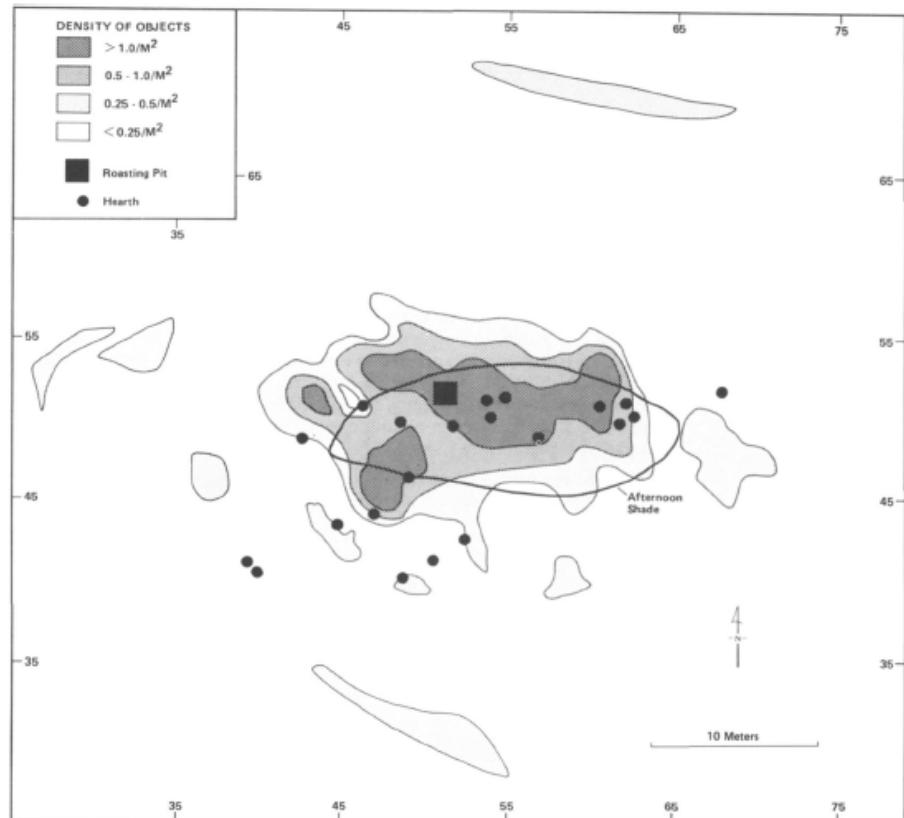


Figure 11. Contour map of refuse density at Bendaijerum *apulla* men's household activity area. Contours computed on refuse distribution data summarized by 2 m square. Total number of refuse items = 972. See Table 7 for description.

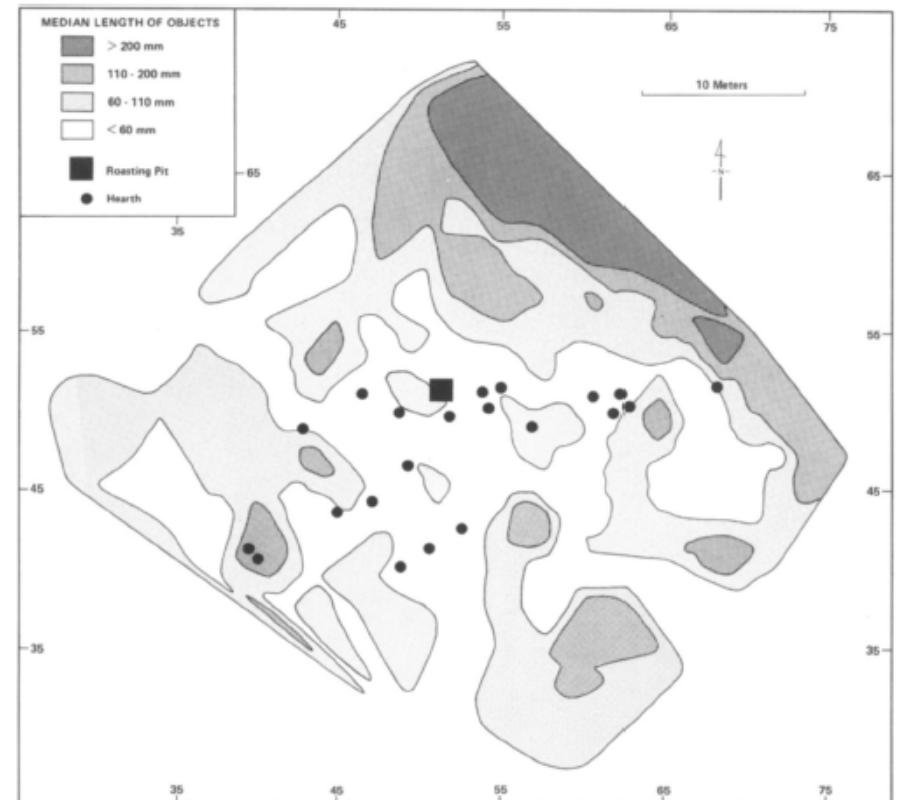


Figure 12. Contour map of median length of non-cloth objects at Bendaijerum *apulla* men's household activity area. Contours computed on data summarized by 2 m square.

The Artifact Size Index

A tool to recognize the size sorting that results from cleaning up.

$$ASI_i = \frac{(x_i - pN_i)}{\sqrt{p - (1 - p)N_i}}$$

x_i = Number of large artifacts from the i 'th quadrat

p = Site-wide proportion of large artifacts

N_i = Total artifacts from the i 'th quadrat

So...

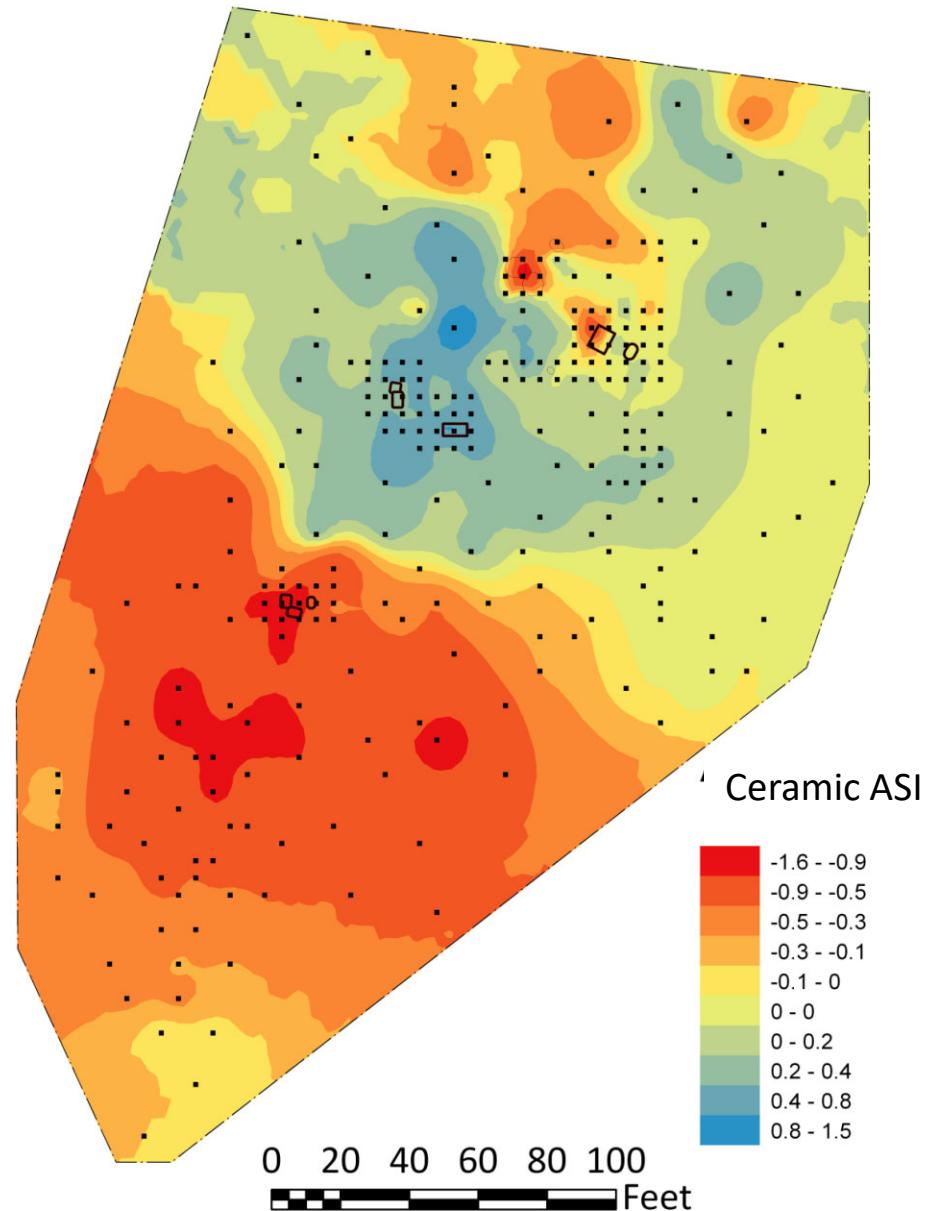
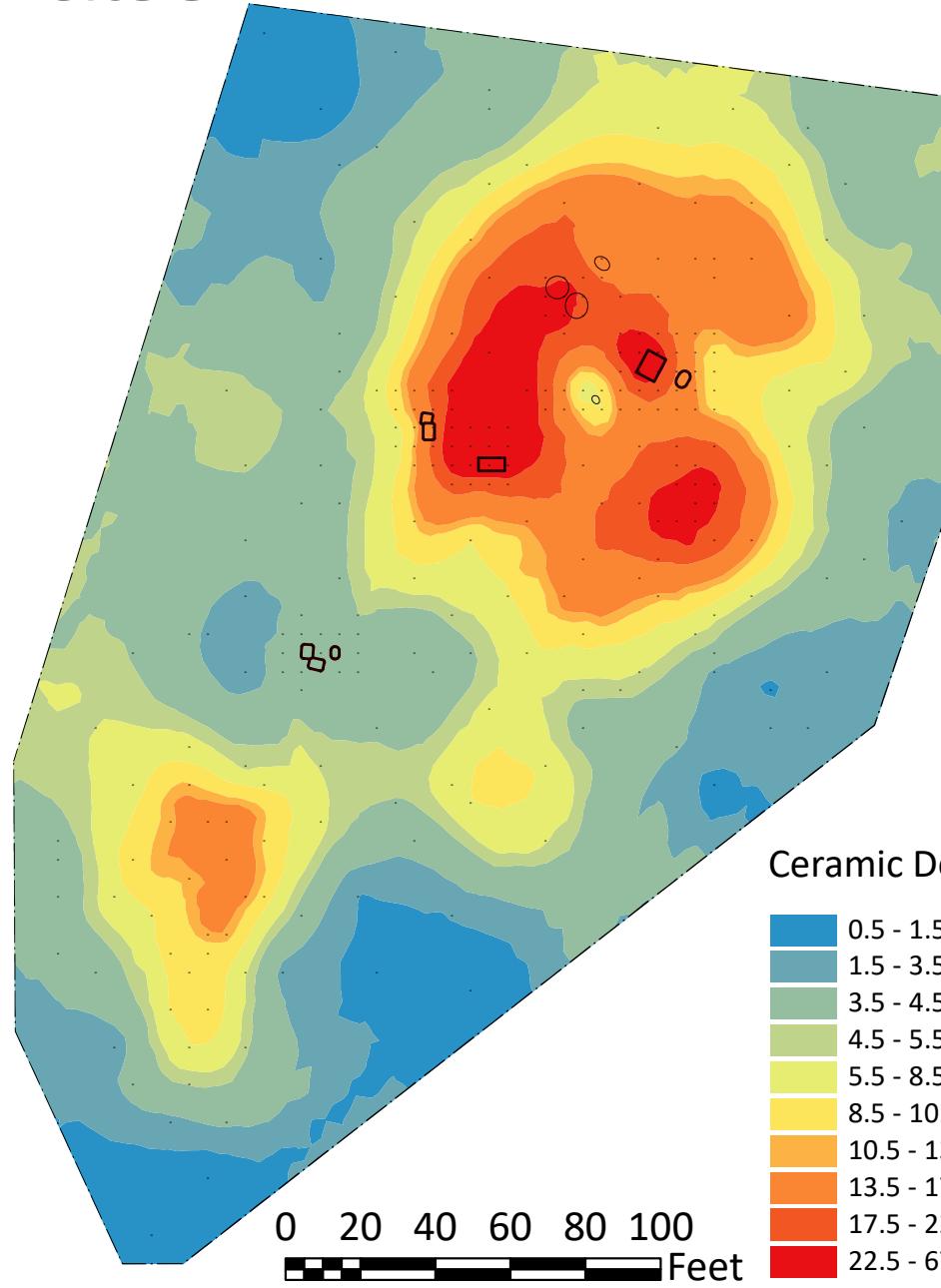
pN_i = Expected number of large artifacts in the i 'th quadrat, if all quads had the site-wide proportion

$\sqrt{p - (1 - p)N_i}$ = Standard deviation of the *Gaussian approximation* to the *binomial distribution*, which is a simple statistical model of the chance of getting 0, 1, 2, 3 ... larger artifacts in a sample of size N_i when the underlying probability of getting a large artifact is p .

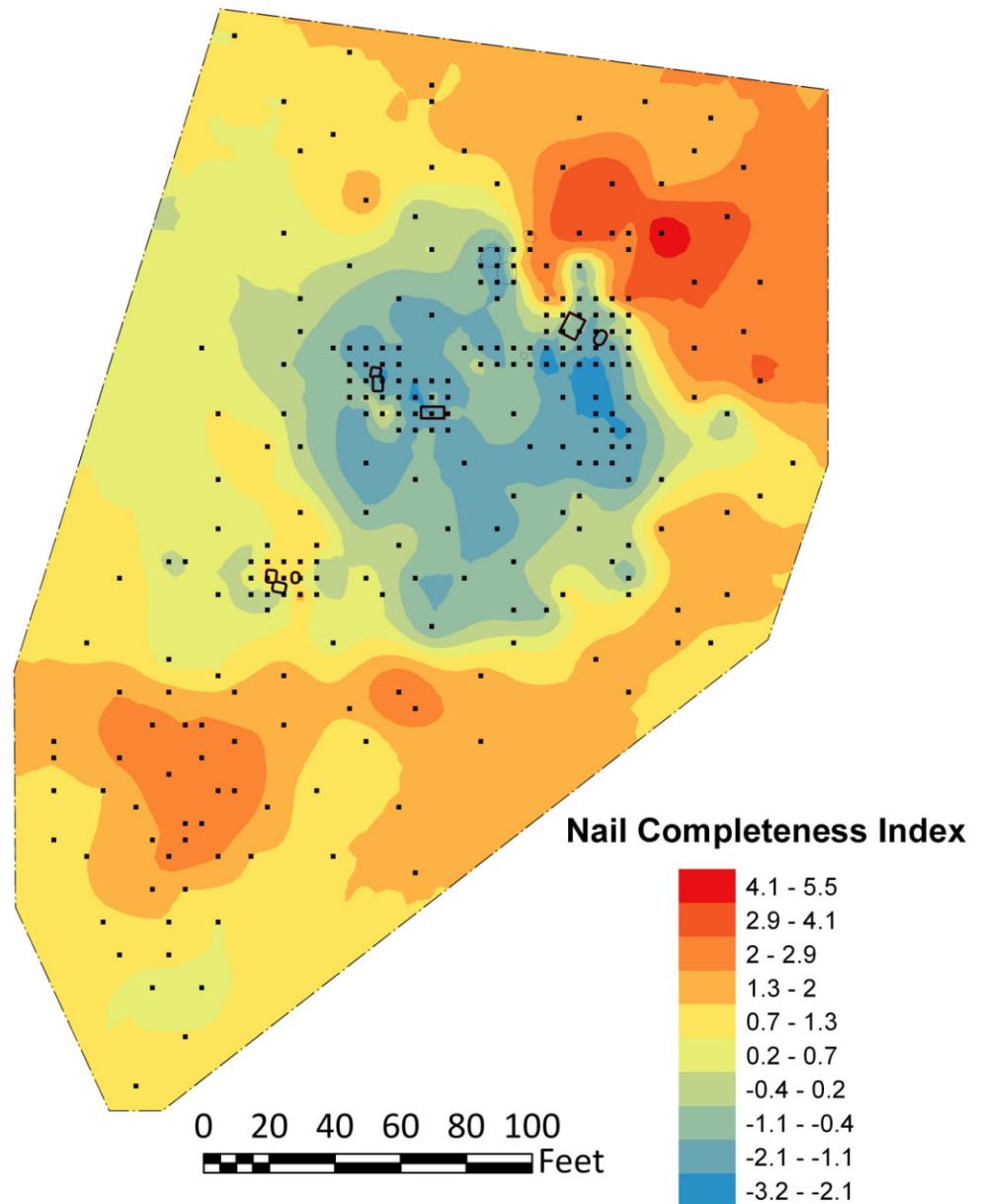
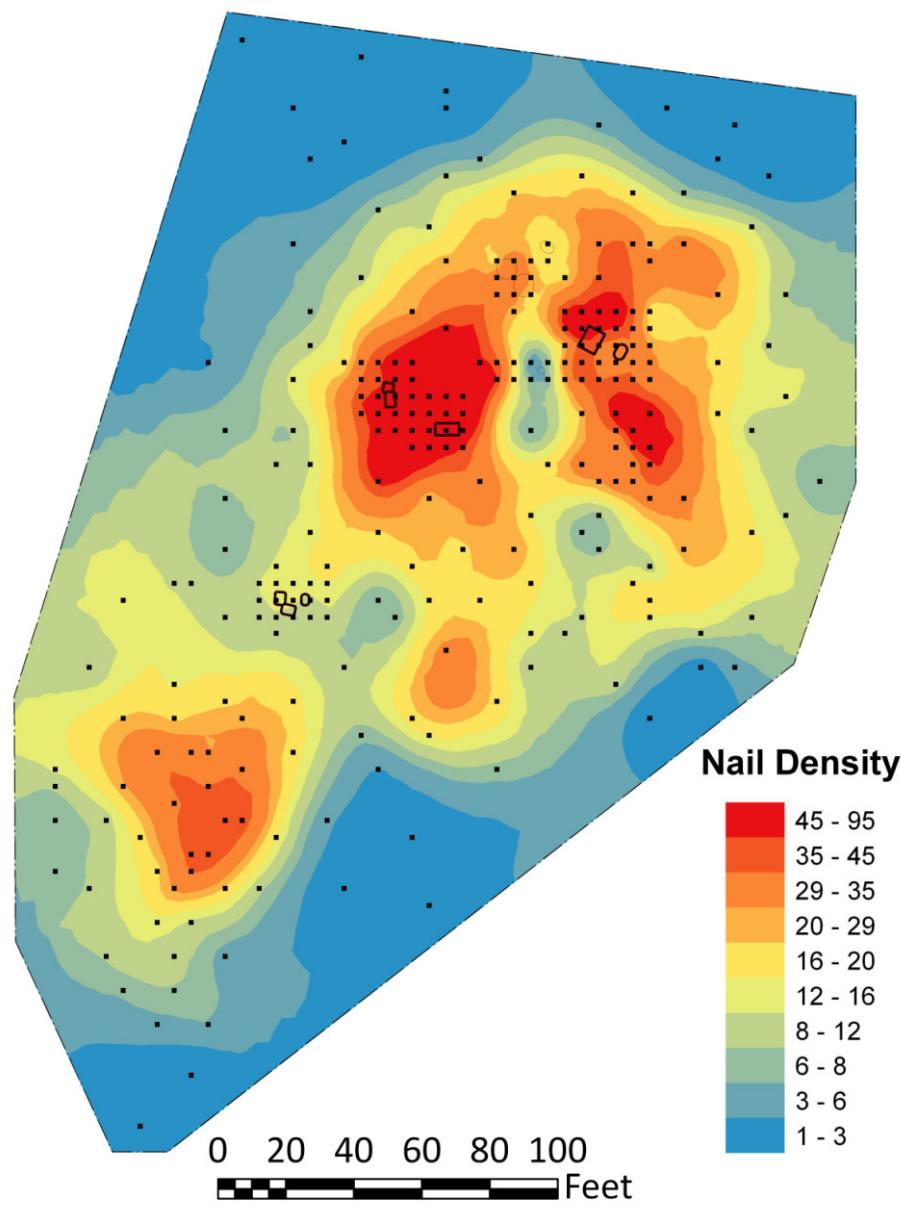
More secret sauce:

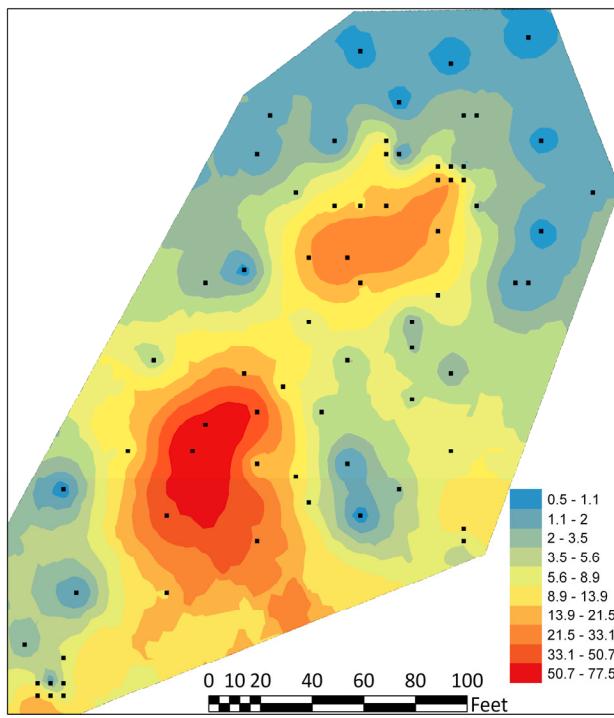
- Krige continuous surfaces

Site 8

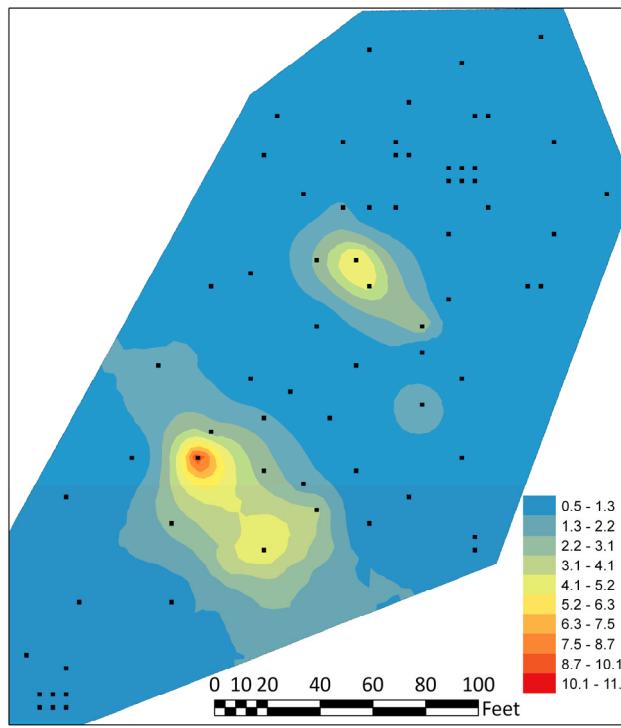


Site 8

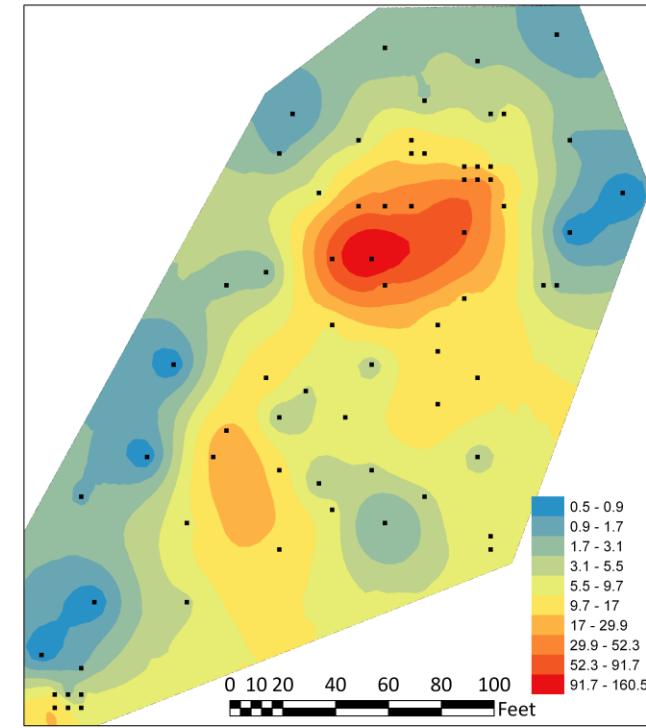




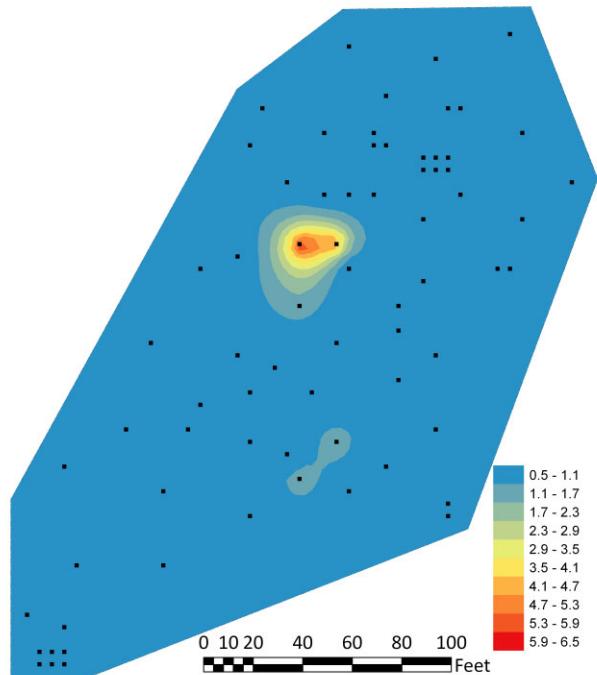
Creamware (1762-1820)



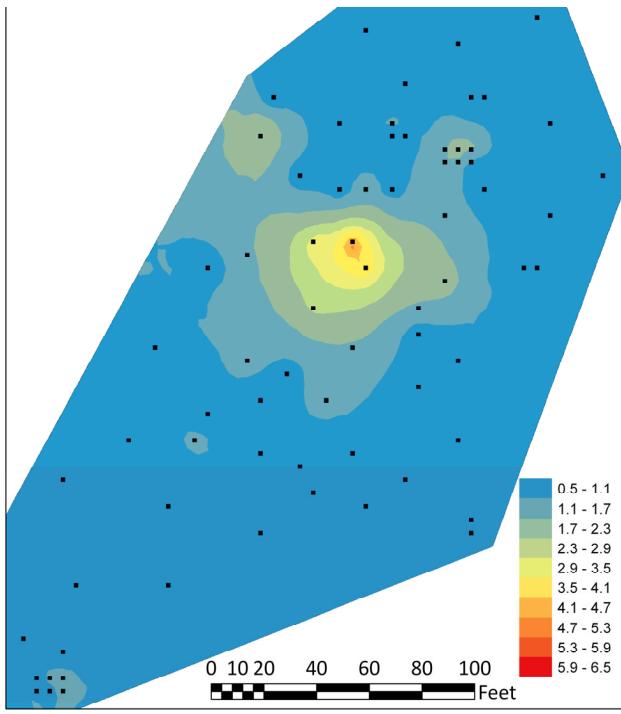
Chinese Porcelain (post 1600)



Pearlware (1775-1830)



Whiteware



American Stoneware

Site 6

Site 6

