Cultural Master Masons Archaeological Rehabilitation Areas:

North Hālawa Valley and Luluku Sites

Halawa-Luluku Interpretive Development Project

January 2014

Hālawa-Luluku Interpretive Development Project

Honolulu, Hawai‘i

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CONTENTS

North Hālawa Valley Project Area **1**
North Hālawa Valley Archaeological Rehabilitation Work: 2
North Hālawa Valley Design and Build Areas 3
Luluku Project Area **33**
Luluku Archaeological Rehabilitation Work 34
Luluku Design/Build and Areas 35

LIST of FIGURES

Figure 1: Plan View Map of Site 2137 (CMM Design/Build) 4
Figure 2: Site 50-80-10-2137 Area Subdivision (CMM Design/Build) 5
Figure 3: Site 2137, Area 1 Plan View Map (CMM Design/Build) 6
Figure 4: Hālawa, Site 50-80-10-2137, Area 1 Wall Measurement Guide 7
Figure 5: Site 2137, Area 2 Plan View Map (CMM Design/Build) 9
Figure 6: Hālawa, Site 50-80-10-2137, Area 2 Wall Measurement Guide 10
Figure 7: Site 2137, Area 3 Plan View Map (CMM Design/Build) 12
Figure 8: Hālawa, Site 50-80-10-2137, Area 3 Wall Measurement Guide 13
Figure 9: Site 2137, Area 4 Plan View Map (CMM Design/Build) 15
Figure 10: Hālawa, Site 50-80-10-2137, Area 4 Wall Measurement Guide 16
Figure 11: Site 2137, Area 5 Plan View Map (CMM Design/Build) 18
Figure 12: Hālawa, Site 50-80-10-2137, Area 5 Wall Measurement Guide 19
Figure 13: Site 2137, Area 6 Plan View Map (CMM Design/Build) 21
Figure 14: Hālawa, Site 50-80-10-2137, Area 6 Wall Measurement Guide 22
Figure 15: North Hālawa Valley Site 2010 Conceptual Plan (CMM Design Only) 24
Figure 16: Area Subdivision of Site 2010 (CMM Design Only) 25
Figure 17: Site 2010, Area A (CMM Design Only) 29
Figure 18: Site 2010, Area B (CMM Design Only) 30
Figure 19: Site 2010, Area C (CMM Design Only) 31
Figure 20: Site 2010, Area D (CMM Design Only) 32
Figure 21: Luluku Conceptual Plan 37
Figure 22: Site 50-80-10-1887 All Areas 38
Figure 23: Luluku, Site 50-80-10-1887, Area 2 (CMM Design/Build) Plan View Drawing 39
Figure 24: Site 1887, Area 1 Stone Wall Measurement Guide 40
Figure 25: Luluku, Site 50-80-10-1887, Area 2 (CMM Design/Build) 42
Figure 26: Luluku, Site 50-80-10-1887 Area 2 Wall Measurement Guide 43
Figure 27: Site 1887, Area 1 Stream Water Diversion for *Loʻi* Use (CMM Design/Build) 46
Figure 28: Site 1887, Area 3 (CMM Design Only) 47
Figure 29: Luluku Site -1887, Area 7 (CMM Design/Build) Plan View Drawing 49
Figure 30: Site 1887, Area 7 Stone Wall Measurement Guide 50

DRAFT

LIST of TABLES

Table 1: North Halawa Valley Archaeological Site Recommendations 2
Table 2: Design/Build Features for North Hālawa Valley 3
Table 3: Halawa, Site 50-80-10-2137 Area 1 Feature Measurements 8
Table 4: Hālawa, Site 50-80-10-2137, Area 2 Feature Measurements 11
Table 5: Hālawa, Site 50-80-10-2137, Area 3 Feature Measurements 14
Table 6: Hālawa, Site 50-80-10-2137, Area 4 Feature Measurements 17
Table 7: Hālawa, Site 50-80-10-2137, Area 5 Feature Measurements 20
Table 8: Halawa, Site 50-80-10-2137, Area 6 Feature Measurements 23
Table 9: Hālawa, Site 50-80-10-2010 Feature Descriptions 26
Table 10: Luluku Archaeological Site Recommendations 34
Table 11: Site 1887 Design/Build Areas 35
Table 12: Luluku Site 50-80-10-1887, Area 1 Build Feature Dimensions 41
Table 13: Luluku, Site 50-80-10-1887, Area 2 Build Feature Dimensions 44
Table 14: Luluku, Site 50-80-10-1887, Area 3 Features (CMM Design Only) 48
Table 15: Luluku Site 50-80-10-1887, Area 7 Build Feature Dimensions 51

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North Hālawa Valley Project Area

North Hālawa Valley Archaeological Rehabilitation Work:

Archaeological sites fall into either a Preservation or Rehabilitation category based on traditional site function, integrity and the presence of burials. HLID intends to have the Cultural Master Masons and Archaeologists comply with all applicable National Historic Preservation Act laws and relevant Hawaii Administrative Rules when performing rehabilitative work. Archaeologists working for HLID under a separate contract will collaboratively work with the Cultural Master Masons during the "Condition Assessment" on features to be rehabilitated. Cultural Master Masons will have a worksheet and questionnaire to follow which is designed to ensure compliance with National Park Service (NPS) rehabilitation standards. Archaeologists working with Master Masons during a site "Condition Assessment" will aid the CMM with completing the questionnaire. It is during this Condition Assessment when the Cultural Master Masons will provide their design services. The goal of the "Condition Assessment" for the Cultural Master Masons is to identify which features require rehabilitation or stabilization and to locate features in need of repair, alteration, or replacement. Features in need of rehabilitation will then need to have their architectural style documented. The questionnaire is specifically designed to ascertain the information needed to document the architectural style. A Preservation Plan will be written by the archaeologist after completion of the "Condition Assessment". We will have SHPD to comment and review the recommendations made by the Cultural Master Masons and the archaeologists.

Additional archaeological information and drawings can be found in the 2003 and 2004 archaeological reports of North Hālawa Valley, which are available online:

http://www.bishopmuseum.org/research/cultstud/h3reports.html

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Table 1: North Halawa Valley Archaeological Site Recommendations

Site# 50-80-10-	NRHP Criteria	Integrity	Date	Function	Features	HLID Recommendation	Phase
-2137	D**	Excellent	Traditional and Post- Contact	Agricultural, Habitation, Religious, Burial	Petroglyphs, terraces, *imu*, rock alignments and mounds	Rehabilitation	I
-2010	C, D	Excellent	Post-Contact	Agricultural, Habitation, Religious, Burial	Fire pit, boulder alignment	Stabilization*	II

Note: (*) Only "Design" services, vegetation clearing, and stabilization will be provided by the Cultural Master Masons for this site.

Initially, the Archaeologist will hire a vegetation clearing crew to delineate where the buffer zone around all archaeological sites within the HLID Project boundaries will be. However, later vegetation work to facilitate the rehabilitation work will be carried out by the Cultural Master Masons during the "Build" portion of the Project. The Cultural Master Mason will be provided with a flora inventory for the area once the Environmental Review process is completed by our Environmental Contractor operating under a separate contract.

North Hālawa Valley Design Build Areas:
Below is a Table summarizing sections requiring Design/Build work by the Cultural Master Masons.

Table 2: Design/Build Features for North Hālawa Valley

Design or Build	Site Number (50-80-10-_____)	Area #	Feature Quantity to be Rehabilitated	Acres	Lineal Feet (Built Features)	Total Cubic Feet (Built Features)	Total Cubic Yards (Built Features)
Design/Build	-2137	1	21	.57	474.1	8194.7	303.5
Design/Build	-2137	2	12	.46	477.1	7944.4	294.2
Design/Build	-2137	3	13	.77	430.9	1795.1	66.5
Design/Build	-2137	4	18	.59	458	4745.4	175.7
Design/Build	-2137	5	15	1.38	464	3207.6	118.8
Design/Build	-2137	6	4	.36	136	1006.4	37.3
Design	-2010	A*	69	3.11	N/A	N/A	N/A
Design	-2010	B*	19	.94	N/A	N/A	N/A
Design	-2010	C*	21	.07	N/A	N/A	N/A
Design	-2010	D*	64	1.5	N/A	N/A	N/A

Note: (*) Although all areas of Site 2010 are set only for "Design", the area will need to be **stabilized** during the "Build" portion of the Project. This will include vegetation clearing and erosion control necessary to preserve the sites in their current condition. This task will be initiated during the "Build" portion of the Project. Exact measurements of Built Features for Site 2010 are Not Applicable (N/A) to estimating price of proposed (offeror) work.

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Note: The estimated Volume and Lineal Feet for built features is likely less than what will be discovered during the Condition Assessment. This is primarily due to the fact that during the older archaeological surveys, some dimensions for built features were not recorded if they were heavily covered with vegetation or eroded dirt.

Total Design Features: 256
Total Design Area: 9.75 Acres

Total Build Features: 83
Total Build Area: 4.13 Acres
Total Build Lineal Feet: 2,440.1 Feet
Total Build Cubic Feet: 26,593.6
Total Bid Volume: 18,615.5 ft^3 (estimate of actual "Build" work to use when calculating Unit Price for Rehabilitation, see CMM RFP OHA 14-12 Attachment M)

Total Vegetation Clearance Area: 9.75 Acres (Site 2010 and 2137)
Total Stabilization Area: 5.62 Acres (Site 2010)

All proposed rehabilitative work will require SHPD approval, as portrayed by the acceptance of the Preservation Plan. This may require revisions to be made to proposed rehabilitation work. However, we ask that the Cultural Master Masons bidding for this job estimate "Build" services based on the plan view drawings provided. The digital copy presented here has been scanned at a high resolution so that the bidder can "zoom in" on features or areas for more detail. An actual site visit may also be arranged upon request if the bidder feels this will allow them to provide a more accurate cost estimate for "Build" services.

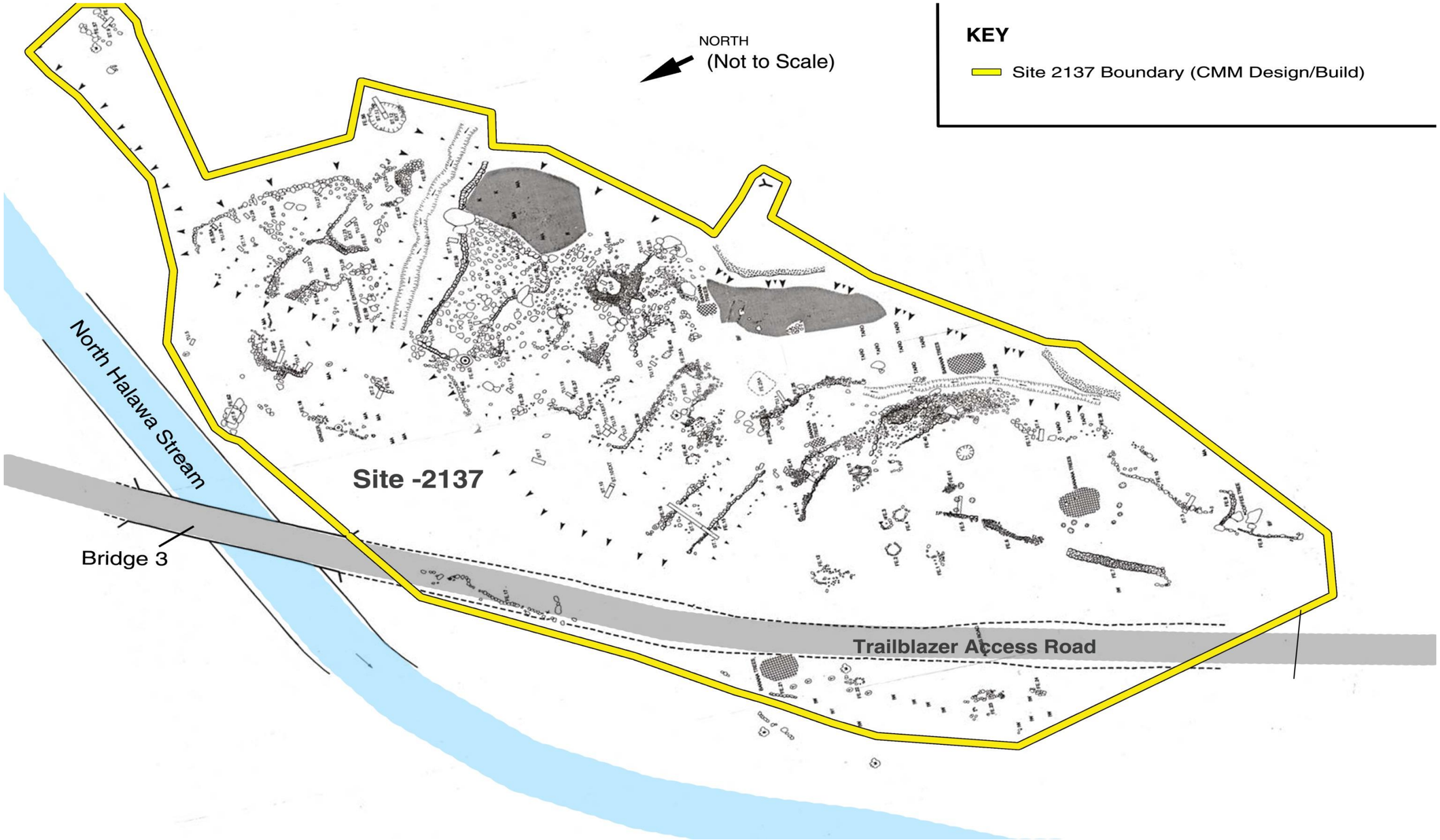
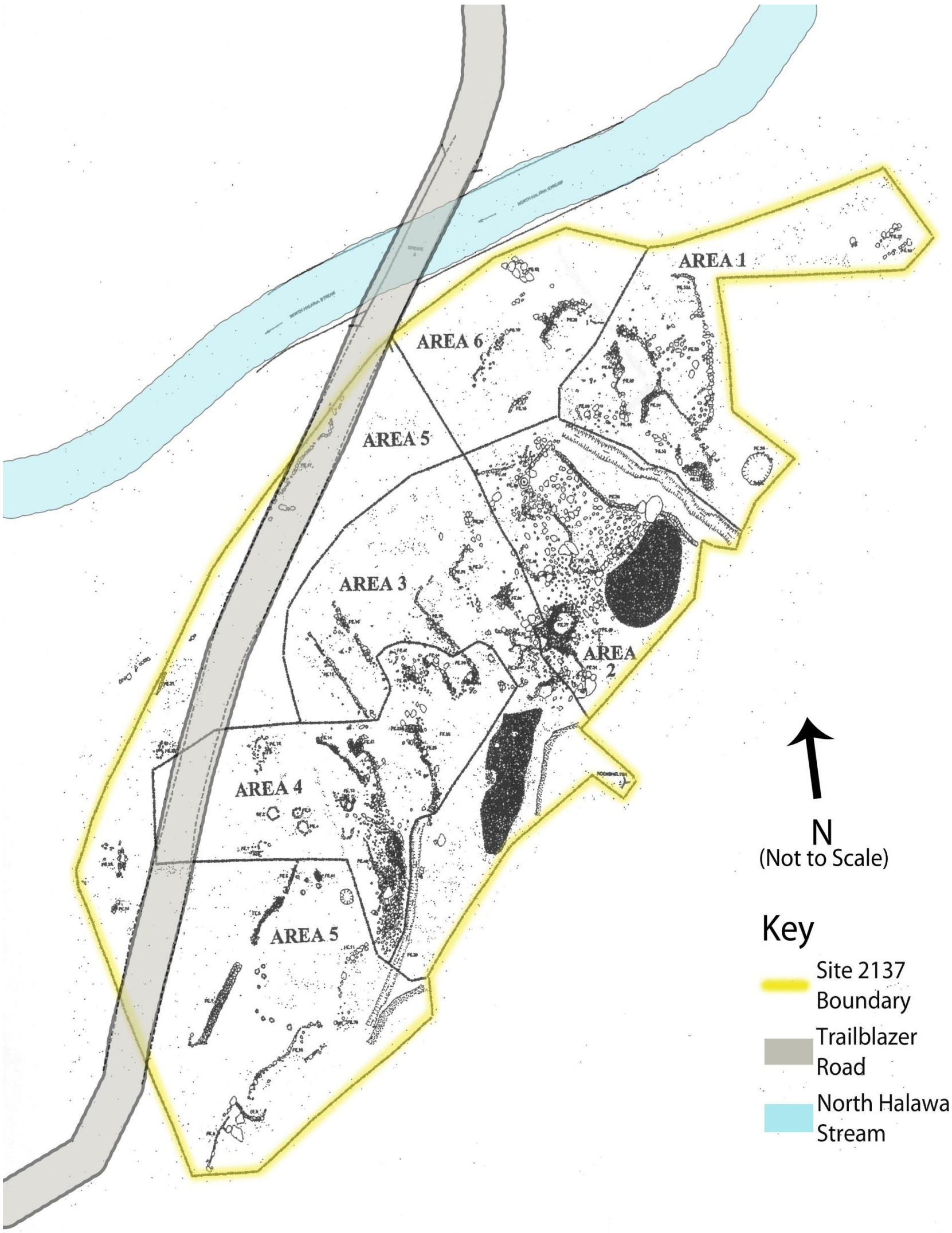


Figure 1: Plan View Map of Site 2137 (CMM Design/Build)

Total Design/Build Area: 4.13 Acres Total Lineal Feet of Built Features: 2,440.1 Feet Total Build Volume: 26,593.6 ft^3



Site 2137 showing the distribution of surface features and site Areas 1–6.

Figure 2: Site 50-80-10-2137 Area Subdivision (CMM Design/Build)

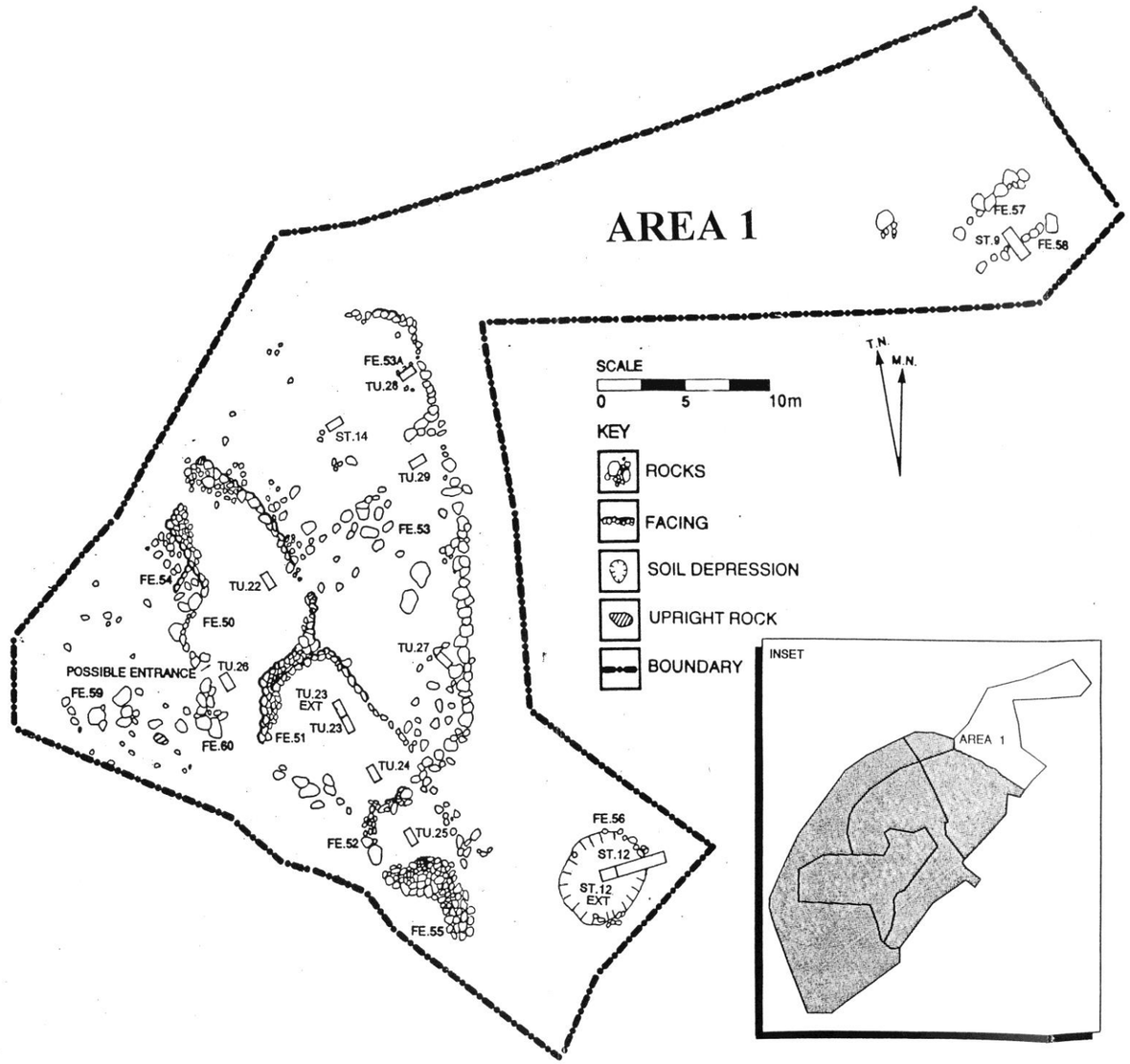


Figure 3: Site 2137, Area 1 Plan View Map (CMM Design/Build)

Total Design/Build Area: .57 Acres Total Lineal Feet of Built Features: 474.1 Feet Total Build Volume: 81947.7 ft^3 (303.5 yd^3)

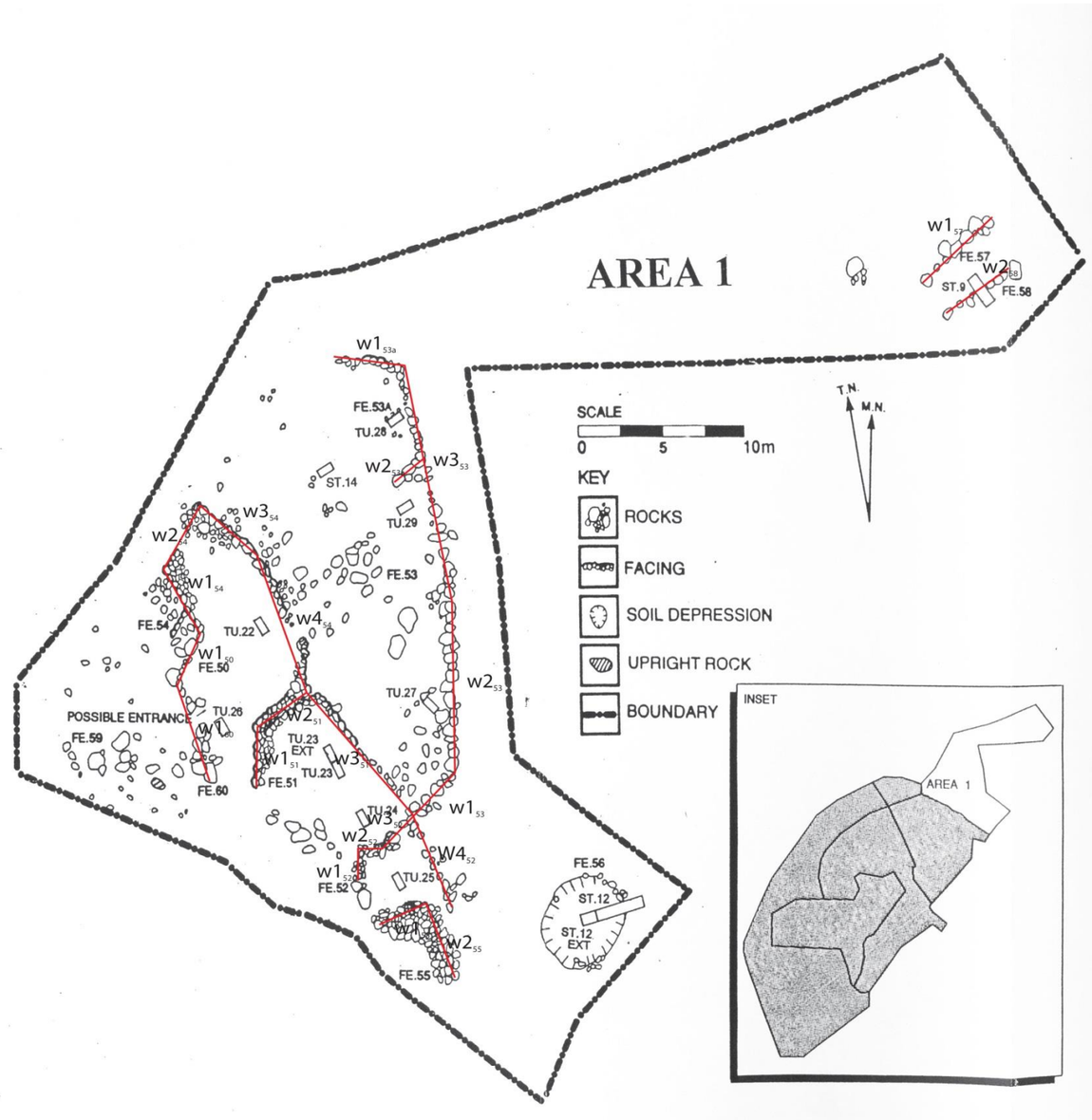


Figure 4: Hālawa, Site 50-80-10-2137, Area 1 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 3 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 3: Halawa, Site 50-80-10-2137 Area 1 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
50	1	Terrace	Habitation	W1	11.5	4.5	5.3	274.275
51	1	Terrace	Habitation	W1	14	5	5.2	364
				W2	15.8	5	5.2	410.8
				W3	37.5	4	3	450
51.01	1	Alignment	Undetermined	N/A	-	-	-	-
51.02	1	Depression	Fire Feature	N/A	-	-	-	-
51.03	1	Depression	Fire Feature	N/A	-	-	-	-
51.04	1	Pit	Postmold	N/A	-	-	-	-
51.05	1	Pit	Postmold	N/A	-	-	-	-
51.06	1	Pit	Postmold	N/A	-	-	-	-
51.07	1	Pit	Postmold	N/A	-	-	-	-
52	1	Terrace	Habitation	W1	9	4	5.9	212.4
				W2	4.8	4	6	115.2
				W3	11.6	4	3	139.2
				W4	25	4	3	300
52.01	1	Depression	Possible *imu*	N/A	-	-	-	-
53	1	Enclosure	Habitation/Religious	W1	28.5	4	6	684
				W2	43.8	4	6	1051.2
				W3	54.3	4	6	1303.2
53a	1	Enclosure	Undetermined	W1	17.5	4	6	420
				W2	10	4	6	240
54	1	Terrace	Habitation	W1	20	5.5	1.6	176
				W2	17.6	4	3	211.2
				W3	19	4	3	228
				W4	32.5	4	3	390
55	1	Rock Concentraton	Undetermined	W1	11	7.5	2	165
				W2	14.5	7.5	2	217.5
56	1	Depression	Possible *imu*	N/A	-	-	-	-
57	1	Terrace	Agriculture	W1	28.4	4	3.3	374.88
58	1	Terrace	Agriculture	W1	27	3.5	3.3	311.85
59	1	Circular Enclosure	Undetermined	N/A	-	-	-	-
60	1	Terrace	Habitation	W1	20.8	2.5	3	156
60.01	1	Charcoal Concentration	Undetermined	N/A	-	-	-	-
						Total Cubic Feet		8194.705
						Total Cubic Yards		299.9

Note: N/A =Not Applicable; Designations given to items that do not involve stone work

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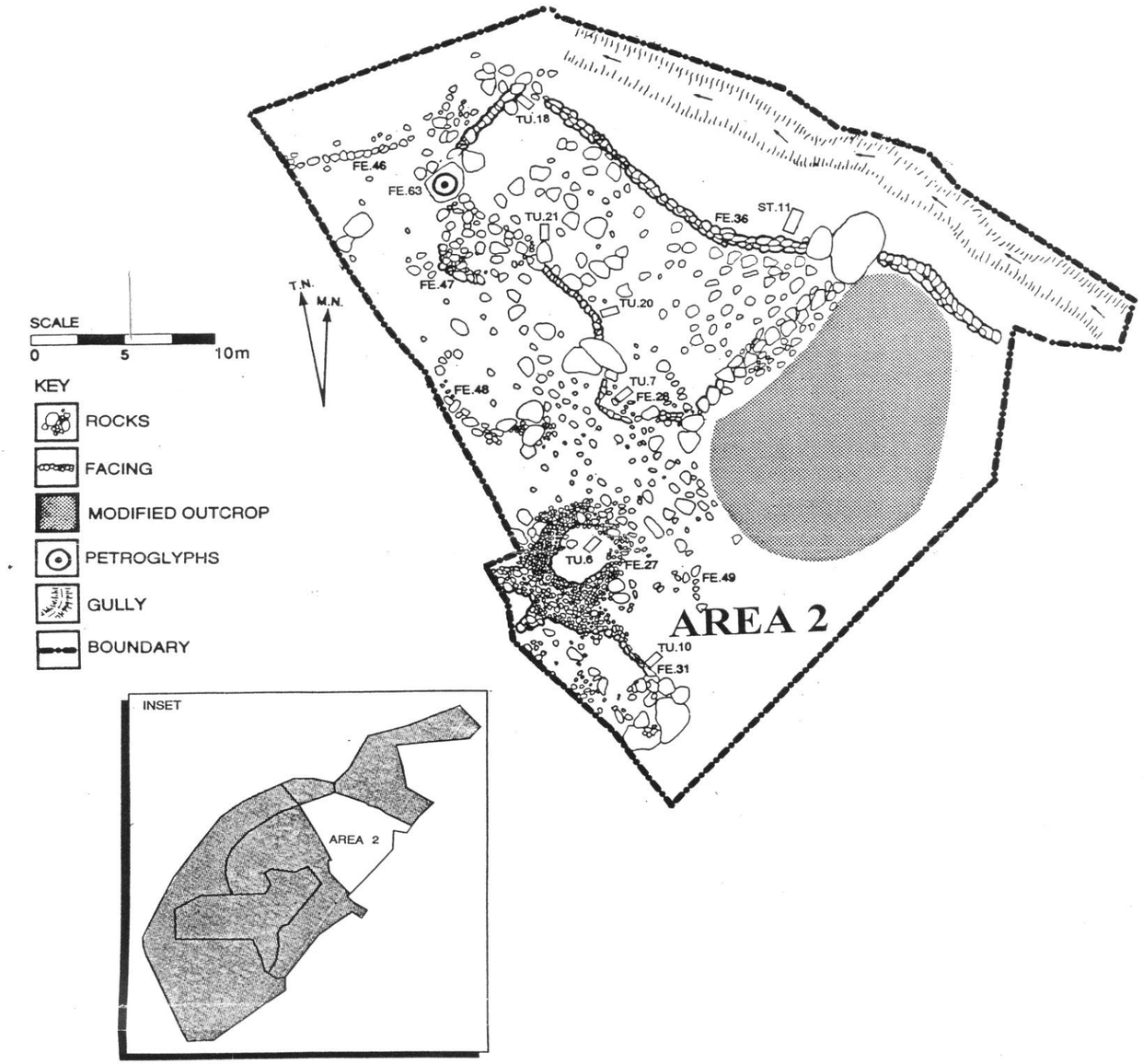

Figure 5: Site 2137, Area 2 Plan View Map (CMM Design/Build)

Total Design/Build Area: .46 Acres Total Lineal Feet of Built Features: 477.1 Feet Total Build Volume: 7944.4 ft^3 (294.2 yd^3)

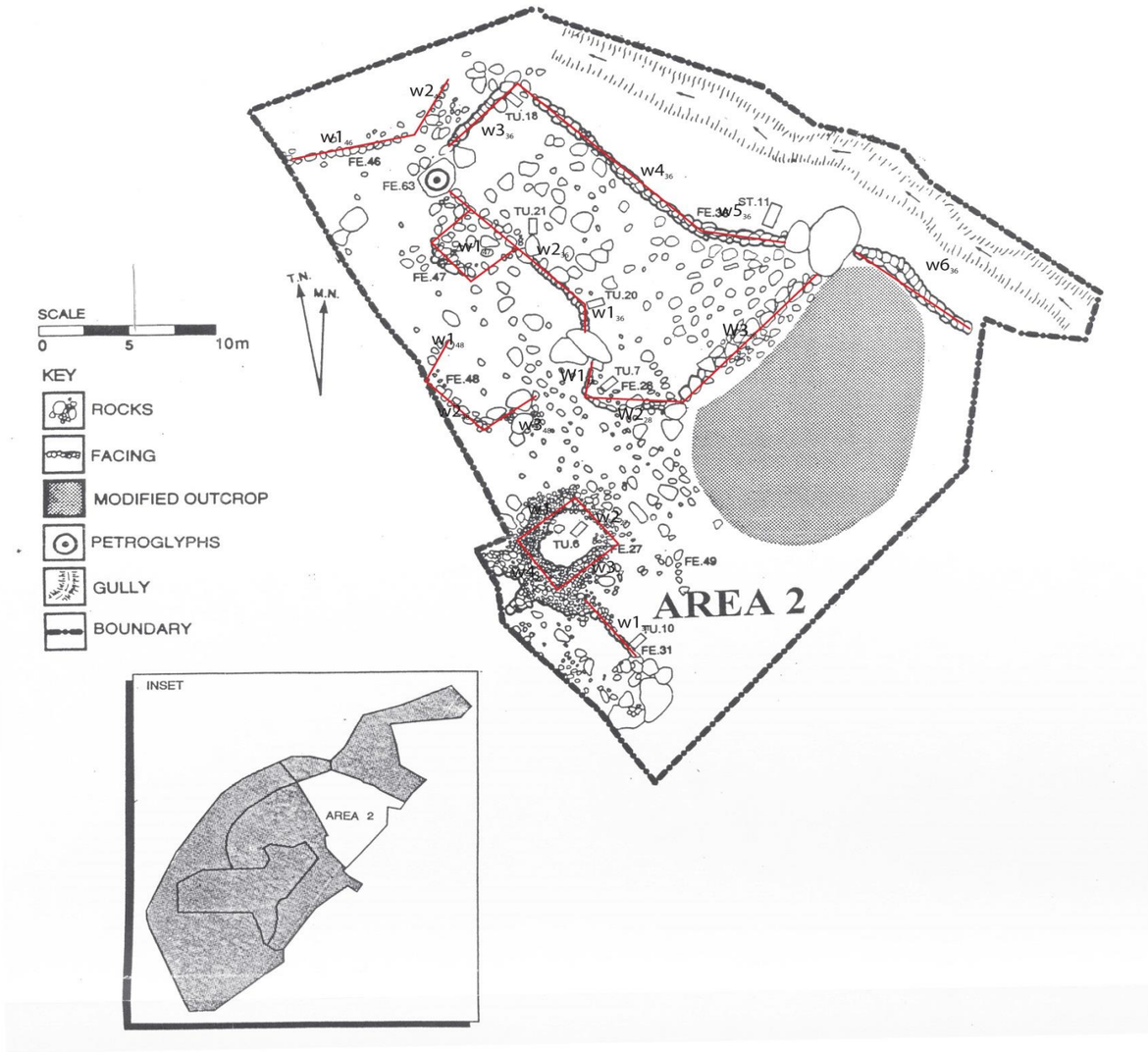

Figure 6: Hālawa, Site 50-80-10-2137, Area 2 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 4 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 4: Hālawa, Site 50-80-10-2137, Area 2 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
27	2	Enclosure	Habitation	W1	21	5	3.9	409.5
				W2	15	5	3.9	292.5
				W3	17	5	3.9	331.5
				W4	21	5	3.9	409.5
28	2	Enclosure	Undetermined	W1	10	5	3.6	180
				W2	24	5	3.6	432
				W3	49	5	3.6	882
31	2	Terrace	Agriculture	W1	17	3.5	2.6	154.7
36	2	Enclosure	Habitation/Religious	W1	6	5	3.6	108
				W2	29	5	3.6	522
				W3	28.6	5	3.6	514.8
				W4	60.5	5	3.6	1089
				W5	20	5	3.6	360
				W6	35.8	5	6.2	1109.8
36.01	2	Depression	Undetermined	N/A	-	-	-	-
36.02	2	Alaignment	Undetermined	N/A	-	-	-	-
36.03	2	Charcoal Concentration	Undetermined	N/A	-	-	-	-
46	2	Alignment	Possible Trail Marker	W1	31.8	2.5	2	159
				W2	18	2.5	2	90
47	2	Mound	Clearance/Agriculture	W1	16.8	12	1.9	383.04
48	2	Terrace	Habitation/Agriculture	W1	11.75	4	2.6	122.2
				W2	21.8	4	2.6	226.72
				W3	14	4	2.6	145.6
49	2	Terrace	Soil Retention	W1	9	2.5	1	22.5
63	2	Petroglyphs	Religious	N/A	-	-	-	-
						Total Cubic Feet		7944.4
						Total Cubic Yards		294.2

Note: N/A = Not Applicable; features that do not involve stone work.

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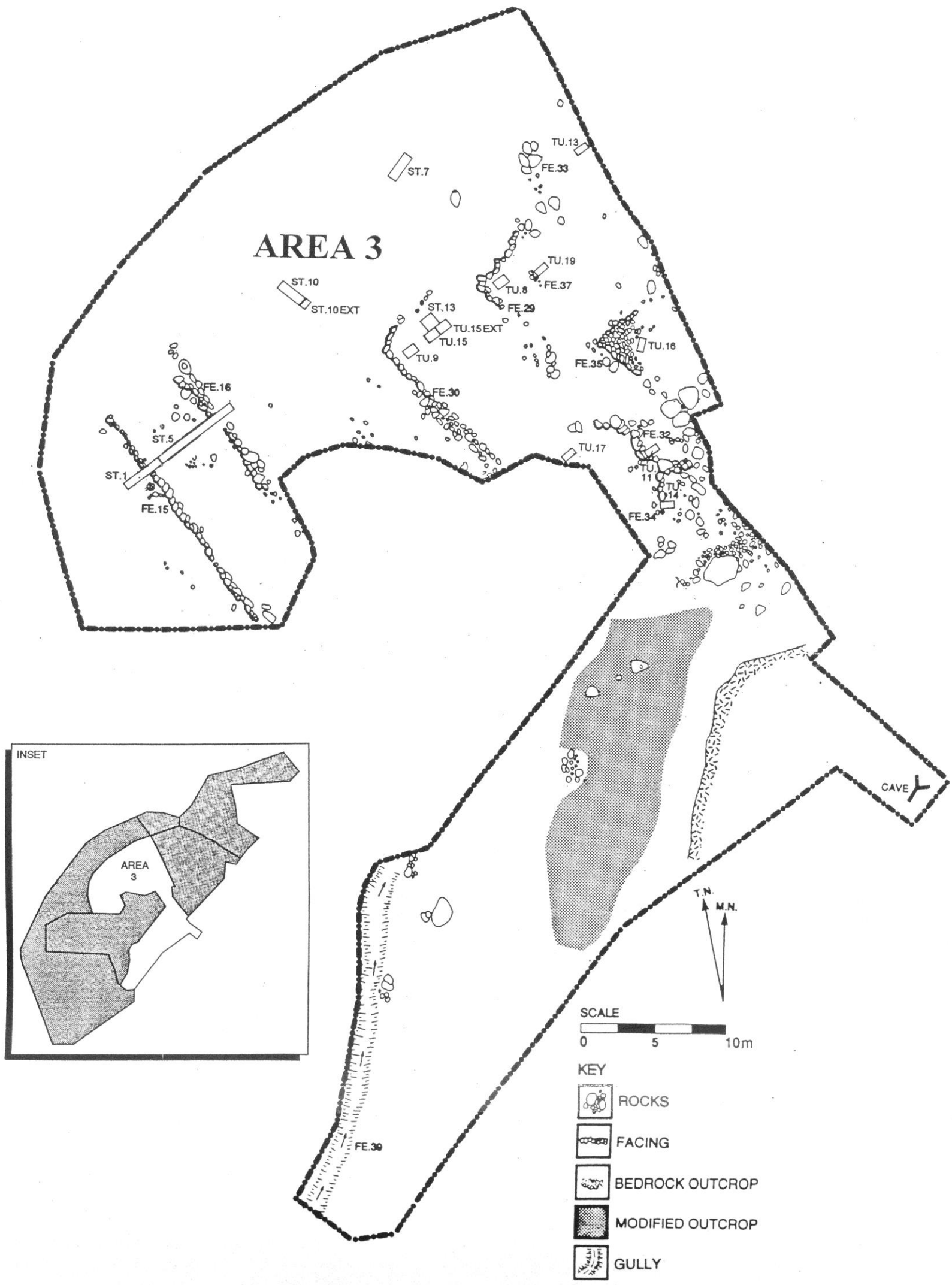
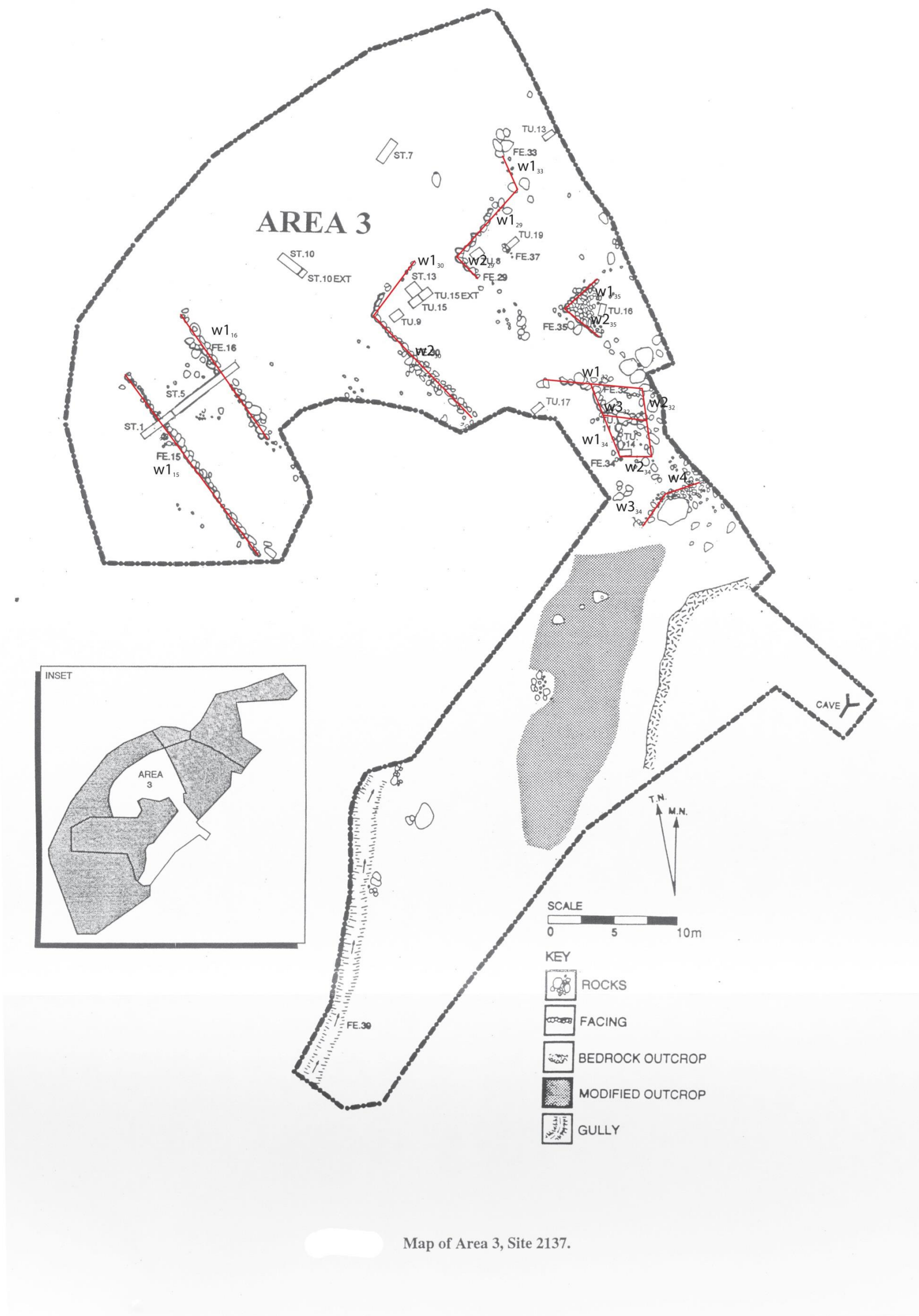


Map of Area 3, Site 2137.

Figure 7: Site 2137, Area 3 Plan View Map (CMM Design/Build)

Total Design/Build Area: .77 Acres Total Lineal Feet of Built Features: 430.9 Feet

Total Build Volume: 1795.1 ft^3 (66.5 yd^3)



Map of Area 3, Site 2137.

Figure 8: Hālawa, Site 50-80-10-2137, Area 3 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 5 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 5: Hālawa, Site 50-80-10-2137, Area 3 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
15	3	Terrace	Agriculture	W1	70.3	2.5	2.6	456.95
16	3	Terrace	Agriculture	W1	48.6	2.5	3.6	437.4
29	3	Terrace	Agriculture	W1	31	2	2.3	142.6
				vv	12	2	2.3	55.2
30	3	Terrace	Habitation	W1	26	3.5	2.6	236.6
				W2	47	3.5	2.6	427.7
30.01	3	Depression	Possible Imu	N/A	-	-	-	-
30.02	3	Pavement	Undetermined	NP	-	-	-	-
32	3	Terrace	Agriculture	W1	35.8	3	1	107.4
				W2	24.7	3	1	74.1
				W3	15	3	1	45
33	3	Terrace	Agriculture	W1	18	2	2.3	82.8
34	3	Terrace	Agriculture	W1	25	3	1	75
				W2	11.5	3	1	34.5
				W3	10	3	1	30
				W4	25	3	1	75
35	3	Terrace	Undetermined	W1	15	4	3.3	198
				W2	16	4	3.3	211.2
37	3	Pit	Historic Hearth	N/A	-	-	-	-
						Total Cubic Feet		1795.1
						Total Cubic Yards		66.5

Note: N/A = Not Applicable; assigned to features that do not involve stone work.

NP = Not Provided; information not available in the archaeological reports.

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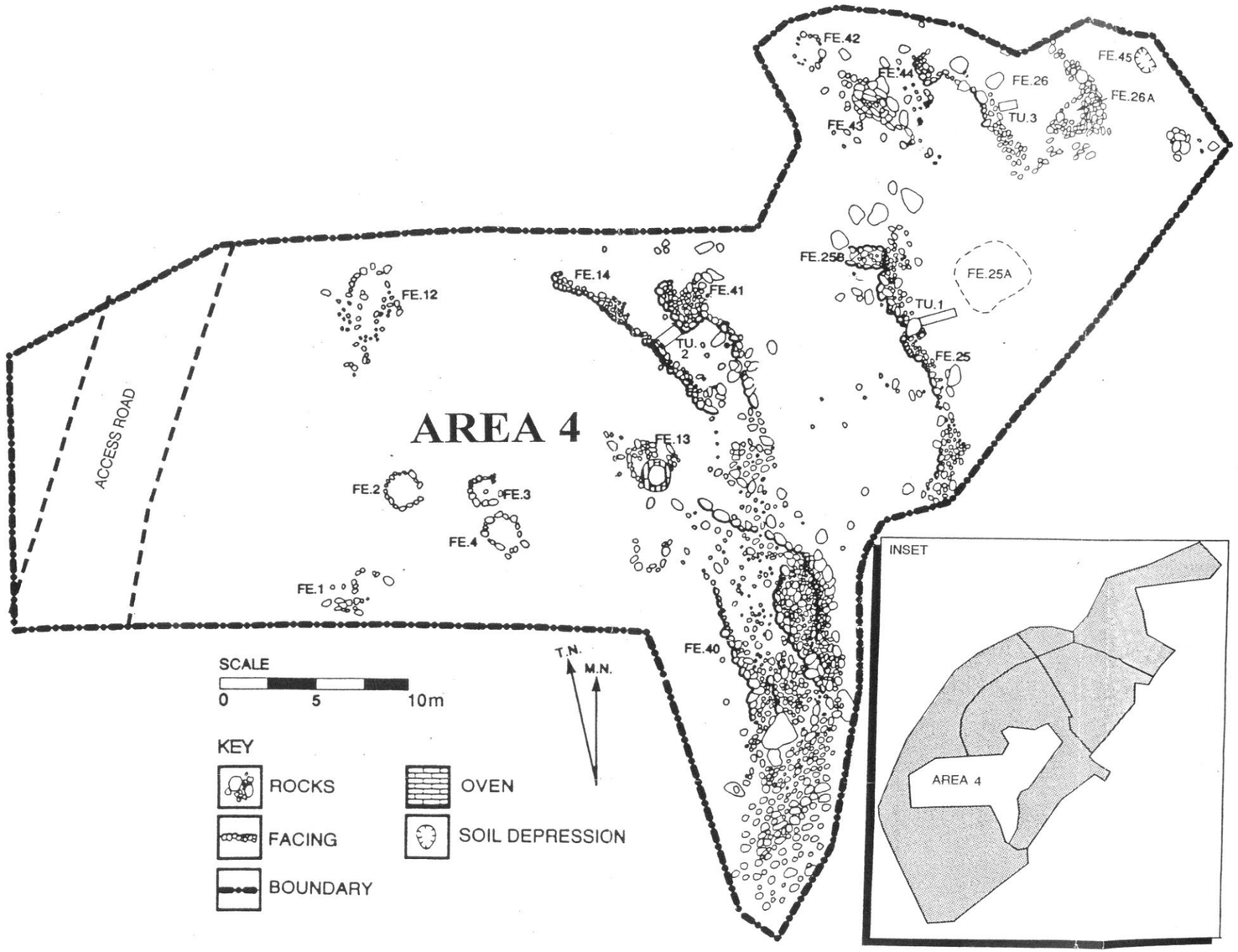


Figure 9: Site 2137, Area 4 Plan View Map (CMM Design/Build)

Total Design/Build Area: .59 Acres Total Lineal Feet of Built Features: 458 Feet Total Build Volume: 4745.4 ft^3 (175.7 yd^3)

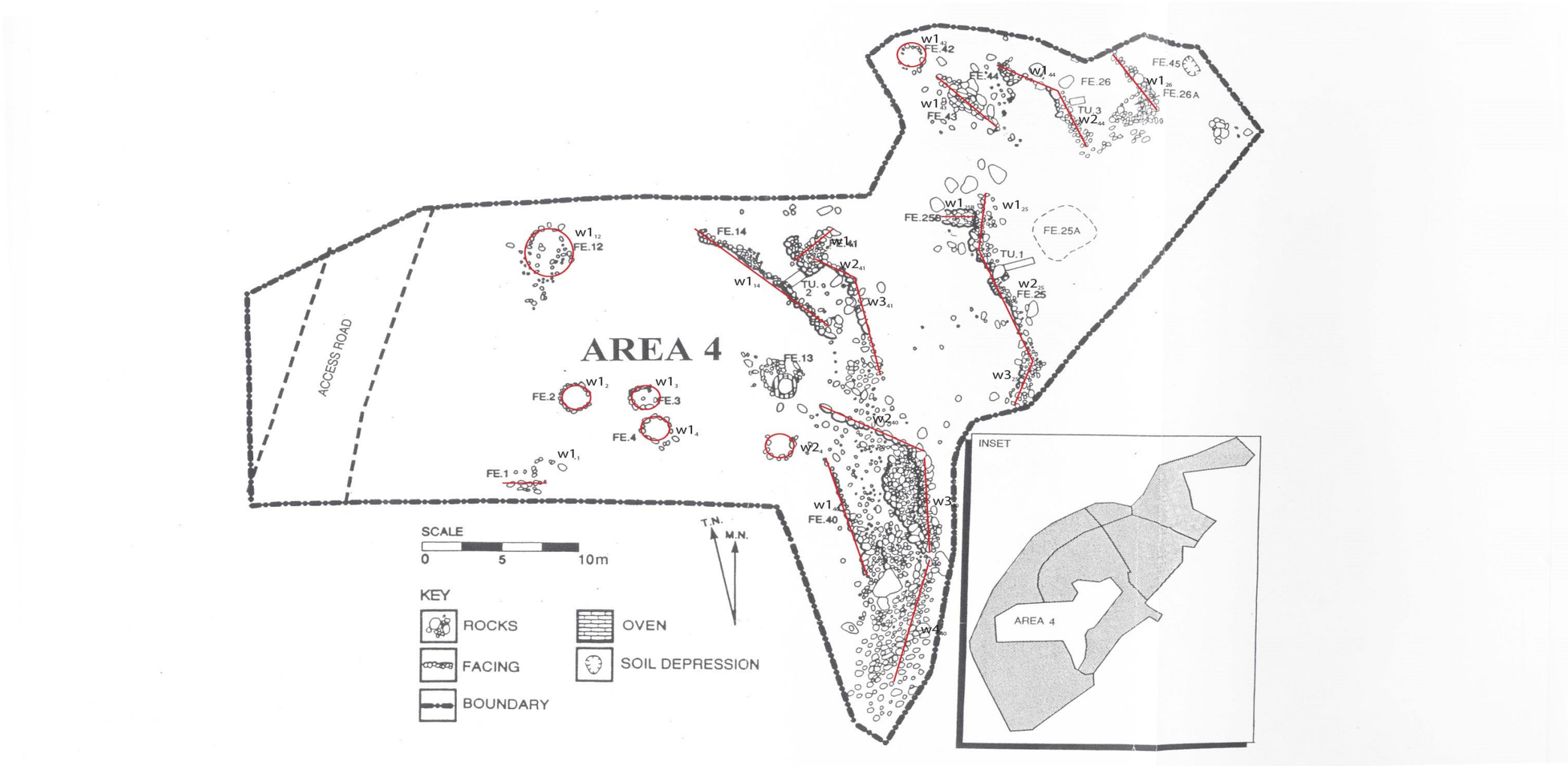


Figure 10: Hālawa, Site 50-80-10-2137, Area 4 Wall Measurement Guide

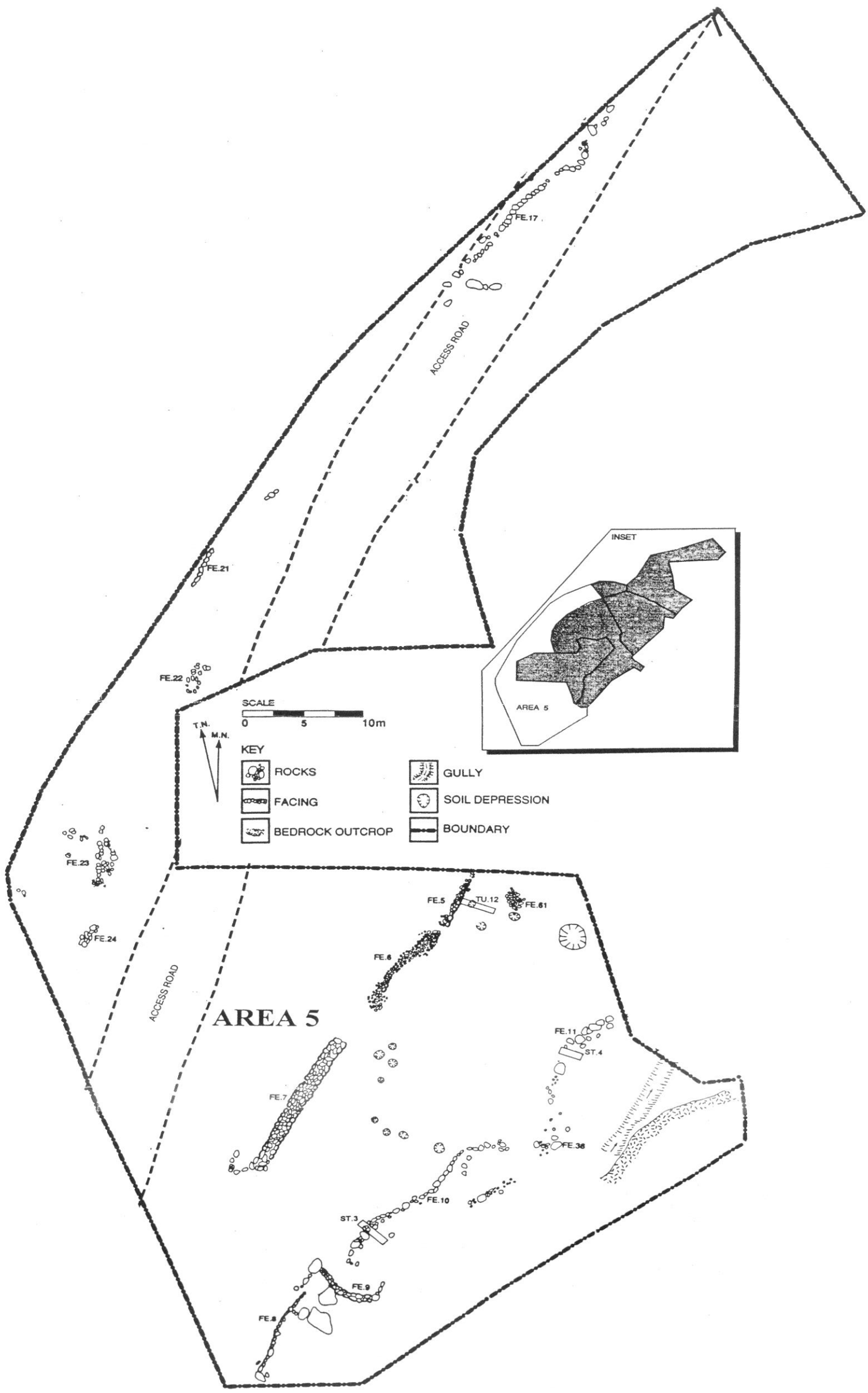
Note: Redlines represent approximation of a rectangular or circular (circumference) wall shape.

Use Table 6 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 6: Hālawa, Site 50-80-10-2137, Area 4 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
1	4	Rock Concentration	Undetermined	W1	11	2	1.3	28.6
2	4	Circular Enclosure	Possible Chicken Coop	W1	25.1	1.5	0.7	26.355
3	4	Circular Enclosure	Possible Chicken Coop	W1	22.6	2	0.7	31.64
4	4	Circular Enclosure	Possible Chicken Coop	W1	25.1	2	0.9	45.18
				W2	25.1	2	1	50.2
12	4	Rock Concentration	Undetermined	W1	43	2	1.3	111.8
13	4	Oven	Cooking	N/A	-	-	-	-
14	4	Terrace	Habitation	W1	50	3	2.3	345
25	4	Terrace	Habitation	W1	13	4	3.6	187.2
				W2	40	4	3.6	576
				W3	26.5	4	3.6	381.6
25a	4	Rock Concentration	Habitation	N/A	-	-	-	-
25b	4	Pavement	Walkway	W1	12	6	0.5	36
26	4	Terrace	Habitation	W1	23	3.5	2	161
26a	4	Enclosure	Undetermined	N/A	-	-	-	-
40	4	Terrace	Soil Retention	W1	40	2	2	160
				W2	32	3.8	3.6	437.76
				W3	30	3.8	3.6	410.4
				W4	44	3.8	3.6	601.92
41	4	Terrace	Habitation	W1	15	3.5	3.6	189
				W2	8	3.5	3.6	100.8
				W3	32	3.5	3.6	403.2
42	4	Rock Concentration	Fire Feature	W1	25.12	2	0.7	35.168
43	4	Mound	Clearance/Agriculture	W1	22	4	2	176
44	4	Platform	Walkway	W1	14	4	1.6	89.6
				W2	23	3.5	2	161
45	4	Depression	Undetermined	N/A	-	-	-	-
						Total Cubic Feet		4745.423
						Total Cubic Yards		175.7

Note: N/A = Not Applicable; assigned to features that do not involve stone work.

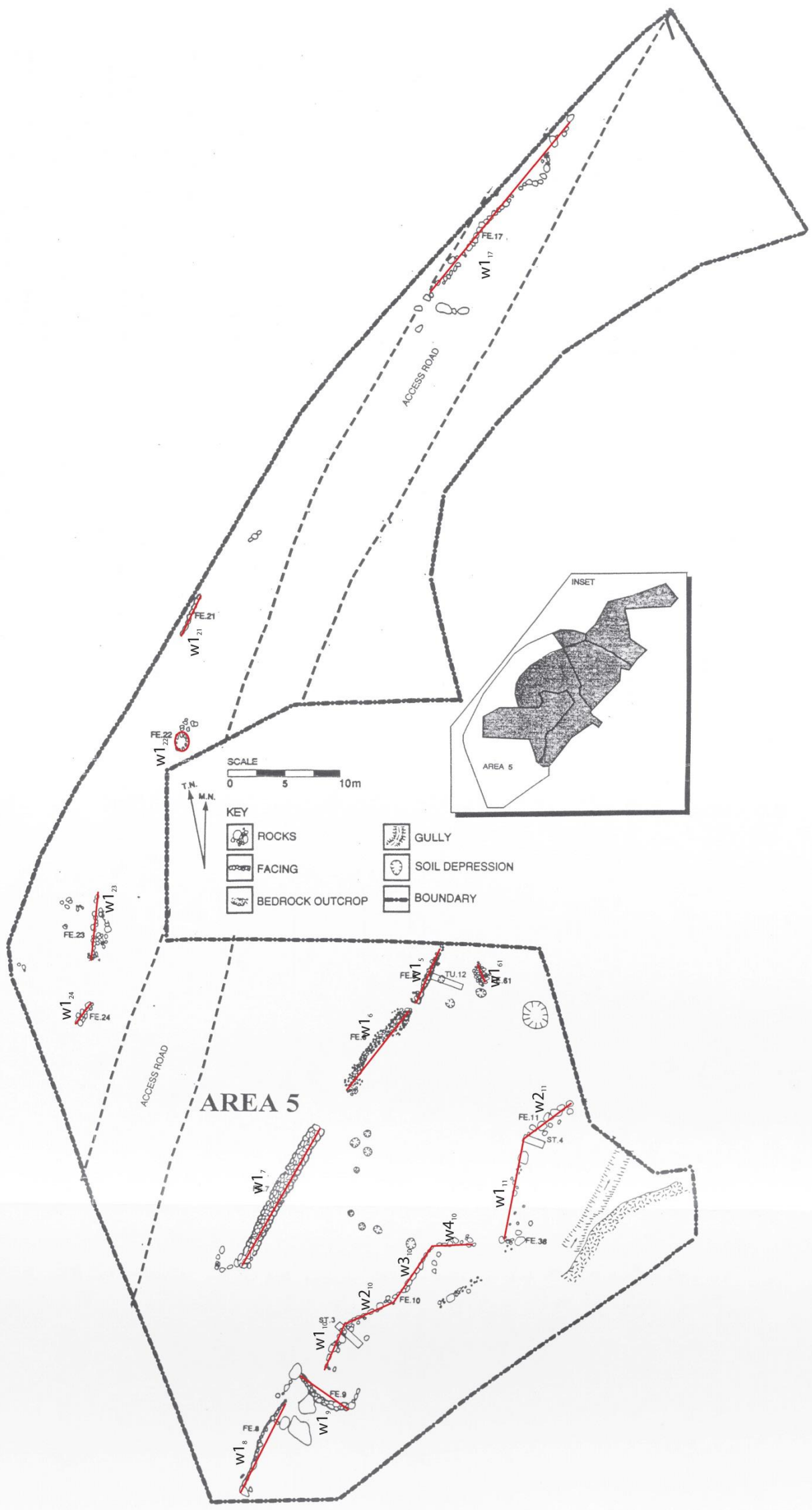


Map of Area 5, Site 2137.

Figure 11: Site 2137, Area 5 Plan View Map (CMM Design/Build)

Total Design/Build Area: 1.38 Acres Total Lineal Feet of Built Features: 464 Feet

Total Build Volume: 3207.6 ft^3 (118.8 yd^3)



Map of Area 5, Site 2137.

Figure 12: Hālawa, Site 50-80-10-2137, Area 5 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 7 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 7: Hālawa, Site 50-80-10-2137, Area 5 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
5	5	Linear Mound	Clearing or Boundary	W1	22	2	2	88
6	5	Linear Mound	Clearing or Boundary	W1	38	3.5	1.6	212.8
7	5	Wall	Undetermined	W1	60	6	2	720
8	5	Terrace	Agriculture	W1	44	2	2.6	228.8
9	5	Wall	Agriculture	W1	21	3.5	3.3	242.55
10	5	Terrace	Agriculture	W1	18	2	2.3	82.8
				W2	23	2	2.3	105.8
				W3	23	2	2.3	105.8
				W4	14	2	2.3	64.4
				W2	20	3.5	1	70
17	5	Alignment	Undetermined	W1	94	3	1.3	366.6
21	5	Terrace	Agriculture	W1	16.6	2	1.3	43.16
22	5	Circular Enclosure	Possible Agriculture	W1	18	1.5	0.6	16.2
23	5	Wall	Undetermined	w1	24	3	1.6	115.2
24	5	Wall	Undetermined	w1	10	4	2	80
38	5	Mound	Clearance/Agriculture	W1	41	2.5	6.2	635.5
39	5	Channel	Irrigation	N/A	-	-	-	-
61	5	Mound	Clearance/Agriculture	W1	10	5	0.6	30
						Total Cubic Feet		3207.61
						Total Cubic Yards		118.8

Note: N/A = Not Applicable; assigned to features that do not involve stone work.

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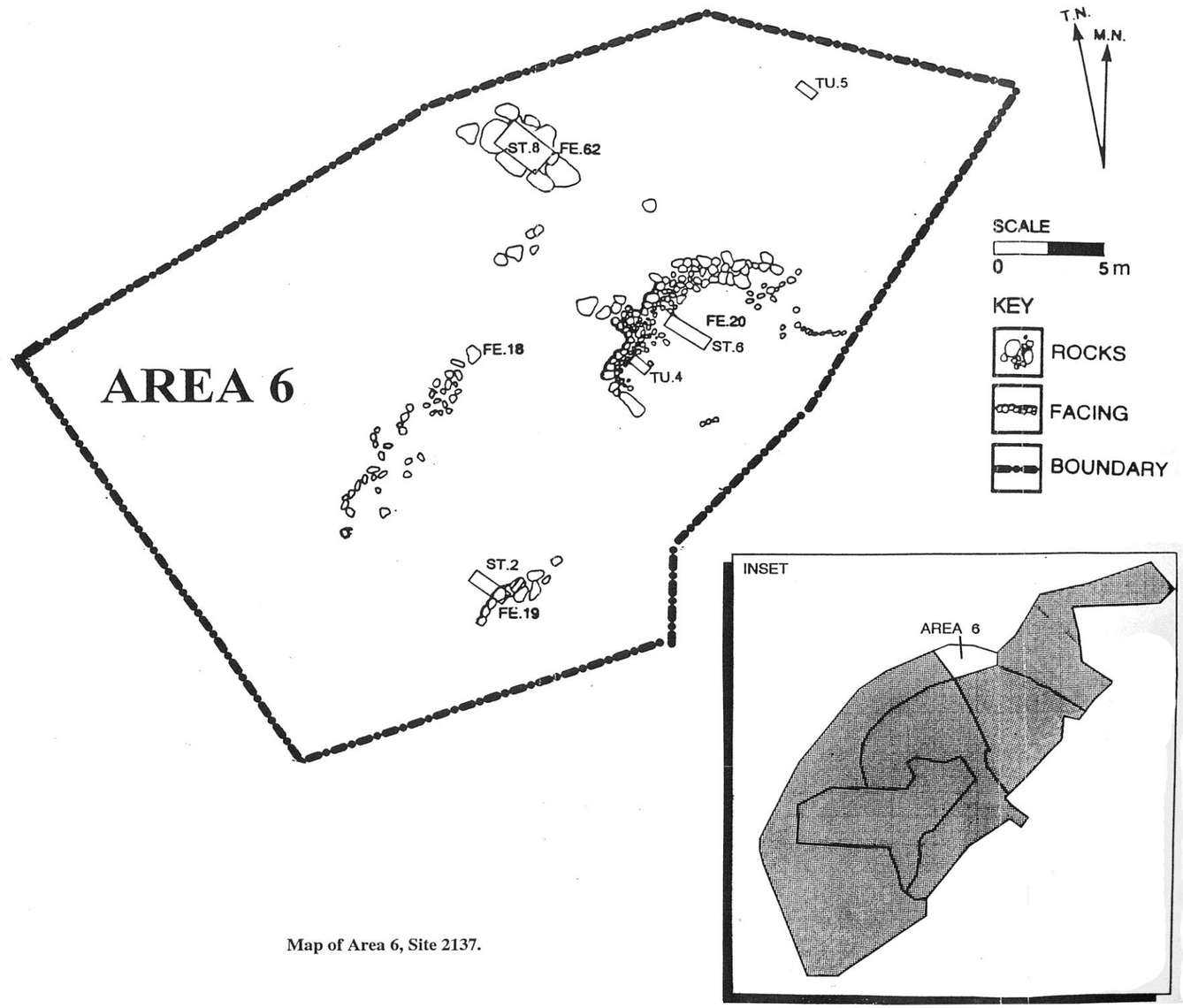

Map of Area 6, Site 2137.

Figure 13: Site 2137, Area 6 Plan View Map (CMM Design/Build)

Total Design/Build Area: .36 Acres Total Lineal Feet of Built Features: 136 Feet Total Build Volume: 1006.4 ft^3 (37.3 yd^3)

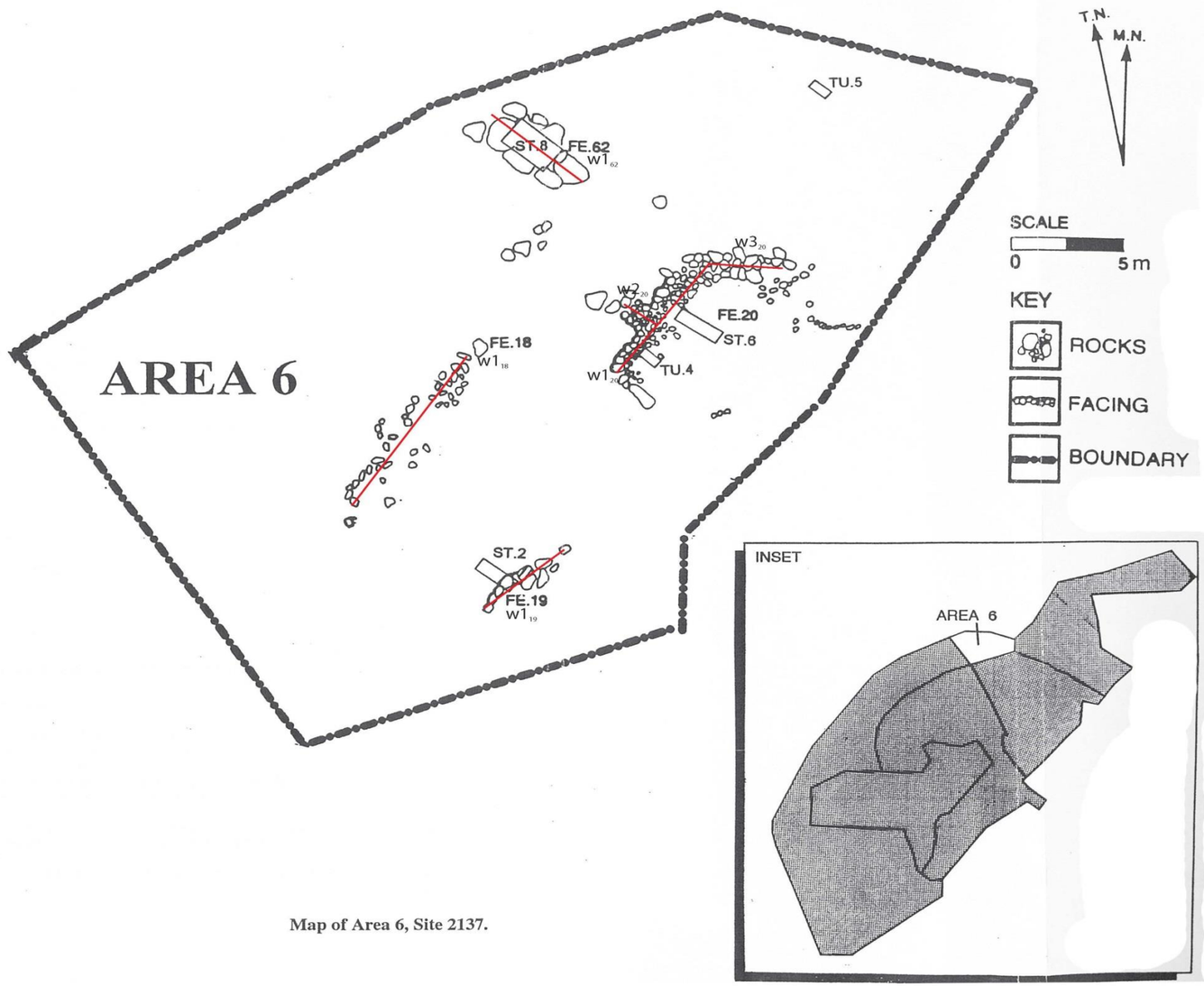

Figure 14: Hālawa, Site 50-80-10-2137, Area 6 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 8 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 8: Halawa, Site 50-80-10-2137, Area 6 Feature Measurements

Feature	Area #	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume
18	6	Linear Mound	Possible Agriculture	W1	43	2	1.6	137.6
19	6	Terrace	Water Control	W1	20	2	2	80
20	6	Terrace	Undetermined	W1	31	4	3.2	396.8
				W2	6	4	3.2	76.8
				W3	10	4	3.2	128
62	6	Mound	Clearance/agriculture	W1	18	8	1.3	187.2
						Total Cubic Feet		1006.4
						Total Cubic Yards		37.3

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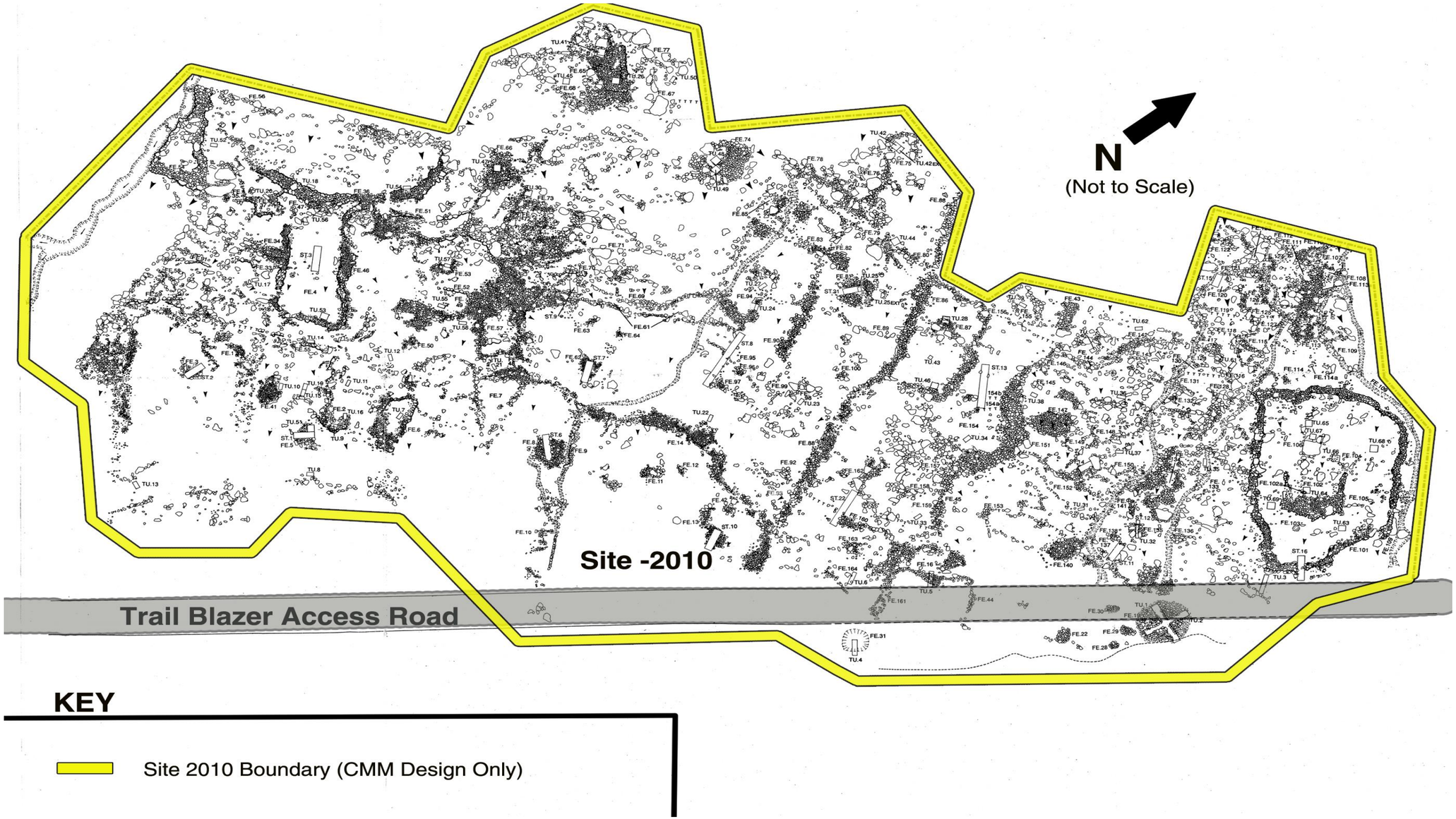

Figure 15: North Hālawa Valley Site 2010 Conceptual Plan (CMM Design Only)

Total Design Area: 5.62 Acres

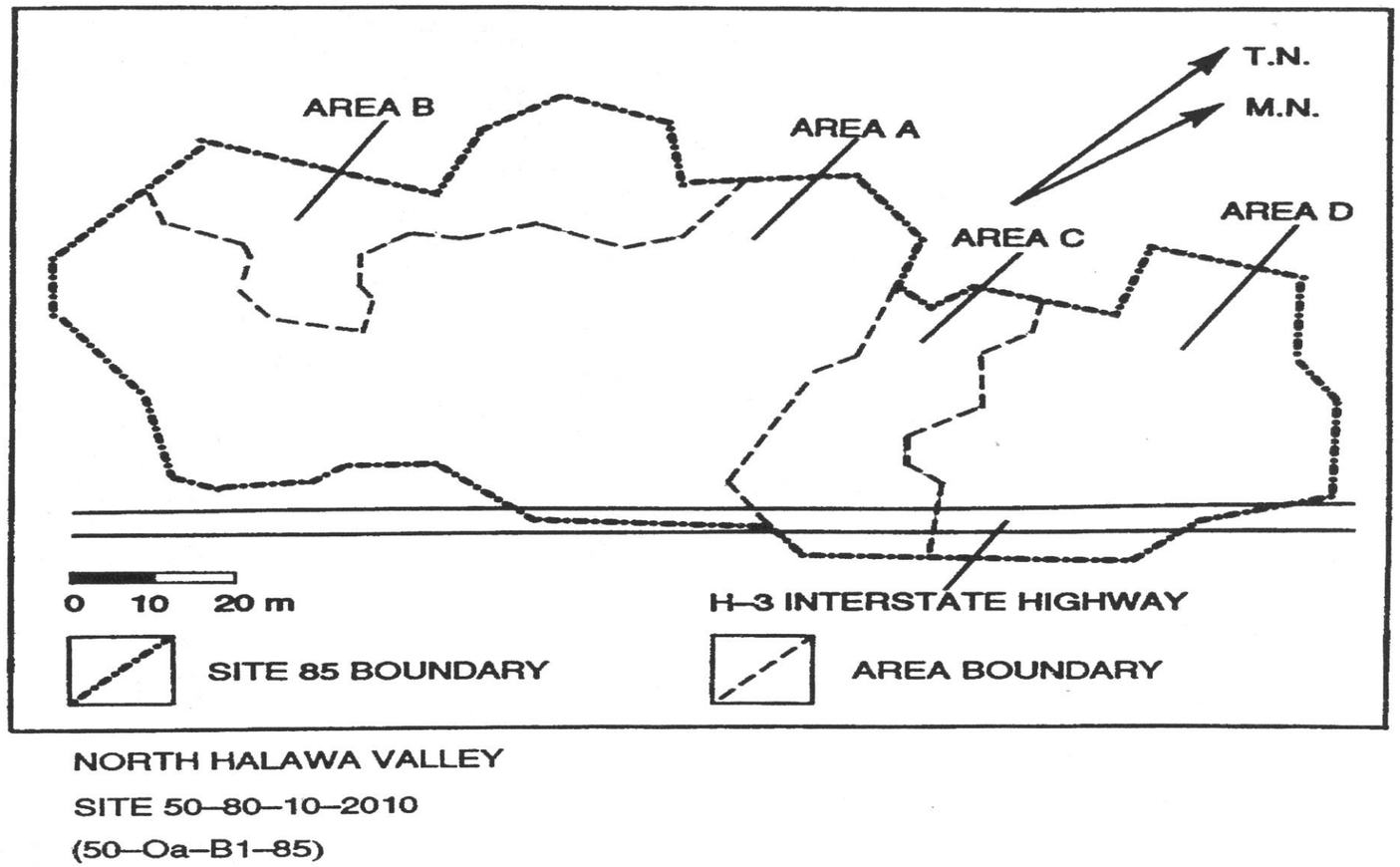

Figure 16: Area Subdivision of Site 2010 (CMM Design Only)

Table 9: Hālawa, Site 50-80-10-2010 Feature Descriptions

Feature	Area #	Description	Function	Length (ft)	Width (ft)	Height (ft)	Volume (ft^3)
4	B	Enclosure	Habitation	68.88	29.52	4.92	10004.02
5	A	Rock Mound	Habitation/ Activity Area	14.76	8.86	0.23	30.01
5.01	A	Pit	Postmold	0.03	0.03	0.10	0.00
6	A	Terrace	Activity Area	36.08	18.04	0.23	149.44
7	A	U-Shaped Terrace	Activity Area	36.08	26.24	0.16	155.27
8	A	Rock Mound	Activity Area	18.70	18.37	0.23	78.85
9	A	Alignment	Boundary	44.61	1.64	1.97	143.97
10	A	Alignment	Undetermined	32.80	4.92	0.13	21.17
11	A	Rock Mound	Agriculture/Clearing	8.53	4.92	0.98	41.29
12	A	Rock Mound	Agriculture/Clearing	4.59	3.28	0.98	14.82
13	A	Rock Mound	Activity Area/Agriculture/Soil Retention	26.57	13.12	0.98	343.00
14	A	Terrace	Agriculture	157.44	29.52	1.31	6097.69
16	C	Terrace	Agriculture/Activity Area	35.75	11.48	2.30	942.35
19	D	Platform	Activity Area	26.24	22.96	2.95	1778.49
22	D	Rock Mound	Agriculture/Clearing	6.89	5.90	0.98	40.02
28	D	Rock Mound	Agriculture/Clearing	5.58	4.59	1.64	41.99
29	D	Rock Mound	Agriculture/Clearing	9.18	8.20	0.98	74.10
30	D	Rock Mound	Agriculture/Clearing	7.87	4.92	1.31	50.81
31	C	Depression	Undetermined	14.76	14.76	1.64	357.29
33	B	Terrace	Activity Area	16.40	6.56	0.98	105.86
34	B	Terrace	Activity Area	26.24	6.56	3.28	564.60
35	B	Terrace	Activity Area	6.56	6.56	1.31	56.46
36	B	Wall	Boundary/Activity Area	80.36	6.56	3.28	1729.09
36.01	B	Pit	Undetermined	0.98	0.98	0.98	0.95
37	B	Terrace	Activity Area	13.12	9.18	1.31	158.09
37.01	B	Pit	Firepit	0.98	0.98	1.64	1.59
41	A	Rock Mound	Agriculture/Clearing/Activity Area	15.74	9.18	2.30	331.99
41.01	A	Depression	Interment	1.64	3.28	0.98	5.29
42	A	Rock Mound	Agriculture/Clearing	8.20	4.92	0.98	39.70
43	C	Wall	Boundary	19.68	8.20	2.30	370.52
44	C	Terrace	Agriculture/ Activity Area	24.27	2.95	2.30	164.51
45	C	Linear Rock Mound	Boundary/Agriculture	31.82	3.28	1.64	171.14
46	B	Terrace	Undetermined	13.12	6.56	2.30	197.61
47	B	Terrace	Activity Area	11.48	8.20	-	-
48	A	Terrace	Activity Area	16.40	14.10	0.98	227.60
48.01	A	Pit	Undetermined	0.33	0.33	0.33	0.04
49	A	Terrace	Activity Area	32.80	16.40	3.94	2117.25
50	A	Rock Mound	Agriculture/Clearing	9.84	5.58	1.31	71.99
51	A	Terrace	Soil Retention	36.08	14.10	0.98	500.73
52	A	Alignment	Boundary/Activity Area	9.84	1.97	1.31	25.41
53	A	Terrace	Activity Area	14.10	10.50	0.98	145.67
54	B	Terrace	Activity Area	52.48	26.24	5.90	8130.25
55	A	Terrace	Activity Area	53.46	9.84	1.31	690.22
56	B	Linear Rock Mound	Boundary	36.08	6.56	2.30	543.43
57	A	Enclosure	Permanent Habitation/Activity Area	19.68	16.40	1.97	635.18
58	A	Terrace	Agriculture	13.12	4.92	2.62	169.38
59	A	Terrace	Agriculture	32.80	13.12	-	-
60	A	Terrace	Agriculture	50.84	3.28	1.97	328.17
61	A	Terrace	Activity Area	88.56	9.84	3.28	2858.29
62	A	Rock Mound	Clearing	14.10	10.82	1.64	250.37
63	A	Rock Mound	Clearing	8.20	4.92	0.98	39.70
64	A	Rock Mound	Clearing	6.56	3.94	1.64	42.35
65	B	Platform	Religious	28.54	16.40	1.97	921.01
66	B	Terrace	Activity Area	26.90	12.14	3.28	1070.62
67	B	Terrace	Habitation/ Activity Area	22.96	16.40	4.92	1852.60
68	B	Terrace	Activity Area/ Food Preparation	31.16	22.96	3.28	2346.62
68.01	B	Pit	*Imu*	3.28	3.28	2.95	31.76

Table 9, Cont…

Feature	Area #	Description	Function	Length (ft)	Width (ft)	Height (ft)	Volume
69	A	Terrace	Activity Area	68.88	9.84	1.64	1111.56
69.01	A	Depression	Firepit	1.64	1.64	0.66	1.76
70	A	Terrace	Activity Area	55.76	9.84	3.28	1799.67
71	A	Terrace	Activity Area	65.60	6.56	1.64	705.75
72	A	Terrace	Activity Area	21.65	6.56	4.92	698.69
73	A	Terrace	Activity Area	42.64	6.56	4.92	1376.21
74	B	Terrace	Religious	33.46	25.26	6.56	5542.97
75	A	Terrace	Activity Area/ Food Preparation	13.12	9.84	3.28	423.45
75.01	A	Pit	Imu	3.28	3.28	1.97	21.17
75.02	A	Pit	Firepit	0.98	0.33	0.33	0.11
75.03	A	Pit	Firepit	0.98	0.66	0.33	0.21
75.04	A	Pit	Firepit	0.66	0.66	0.33	0.14
75.05	A	Pit	Firepit	2.30	2.30	0.33	1.73
76	A	Terrace	Activity Area	19.68	17.06	3.28	1100.97
77	B	Terrace	Activity Area	26.24	11.48	1.64	494.03
78	A	Terrace	Activity Area	52.48	8.20	1.64	705.75
79	A	Terrace	Activity Area/ Soil Retention	65.60	6.56	1.64	705.75
80	A	Terrace	Activity Area	17.06	8.20	3.28	458.74
81	A	Terrace	Activity Area	17.06	15.09	3.28	844.08
82	A	Terrace	Activity Area	18.04	6.56	-	-
83	A	C-Shaped Terrace	Activity Area	14.76	12.79	1.64	309.65
84	A	Terrace	Activity Area	18.04	11.48	3.28	679.29
85	A	Rock Mound	Clearing	21.65	11.15	2.30	554.30
86	C	Enclosure	Permanent Habitation	62.32	39.36	2.30	5631.89
87	C	Terrace	Habitation	27.55	19.02	3.28	1719.21
88	A	Linear Rock Mound	Boundary	164.00	4.92	2.30	1852.60
89	A	Terrace	Activity Area	41.00	6.56	1.64	441.09
90	A	Linear Rock Mound	Boundary	60.68	4.92	1.64	489.61
91	A	Terrace	Agriculture	27.22	2.62	3.94	281.17
92	A	Rock Mound	Clearing	9.84	3.28	2.30	74.10
93	A	Terrace	Agriculture	26.24	2.30	1.64	98.81
94	A	Terrace	Activity Area	31.16	27.55	2.30	1971.16
95	A	Terrace	Agriculture	26.57	1.64	-	-
96	A	Mound	Clearing	4.92	3.94	0.98	19.06
97	A	Terrace	Agriculture	55.76	4.92	1.97	539.90
98	A	Terrace	Agriculture	18.04	6.56	2.95	349.35
99	A	Terrace	Agriculture	12.79	8.86	2.30	260.10
100	A	C-Shaped Terrace	Agriculture	24.93	19.02	1.64	777.74
101	D	Enclosure	Permanent Habitation	98.40	68.88	3.28	22231.16
101.01	D	Pit	Firepit	0.98	0.98	0.66	0.64
102a	D	Pit	Firepit/ Hearth	2.30	1.97	-	-
102	D	C-Shaped Terrace	Habitation	27.88	19.02	3.28	1739.68
102.01	D	Ash Lens	Fire Feature	-	0.98	0.33	-
103	D	Depression	Undetermined	5.25	5.25	0.33	9.03
104	D	Depression	Undetermined	3.61	3.61	0.33	4.27
104.01	D	Wall	Undetermined	-	-	-	-
105	D	Upright Boulder	Religious	3.61	2.62	2.30	21.74
106	D	Cupboard	Storage	9.84	8.20	-	-
107	D	Terrace	Agriculture	11.81	6.23	0.98	72.41
108	D	Terrace	Agriculture	11.81	5.58	0.98	64.79
109	D	Drainage	Water Control	164.00	3.61	-	-
110	D	Terrace	Agriculture/Water Control	16.40	9.84	0.98	158.79
111	D	Terrace	Agriculture	22.96	16.40	1.97	741.04
112	D	Terrace	Agriculture	41.00	8.86	1.64	595.48
113	D	Linear Rock Mound	Agriculture	26.24	11.48	1.31	395.22
113a	D	Upright Boulder	Religious/ Boundary Marker	0.98	0.98	1.97	1.91

Table 9, Cont…

Feature	Area #	Description	Function	Length (ft)	Width (ft)	Height (ft)	Volume
114	D	Terrace	Agriculture	27.22	6.89	0.33	61.51
114a	D	Upright Boulder	Religious/ Boundary Marker	2.30	0.98	1.97	4.45
115	D	Terrace	Agriculture	16.40	9.84	1.31	211.73
116	D	Terrace	Activity Area	26.24	6.56	2.30	395.22
117	D	Terrace	Activity Area	19.68	14.76	1.64	476.38
118	D	Terrace	Agriculture	22.63	5.90	0.98	131.48
119	D	Terrace	Agriculture	22.63	7.22	2.30	374.97
120	D	Terrace	Agriculture	18.70	9.51	0.98	174.99
121	D	Terrace	Agriculture	20.99	6.56	1.64	225.84
122	D	Terrace	Agriculture	13.12	5.58	0.98	71.99
123	D	Terrace	Agriculture/ Water Control	7.87	7.22	1.64	93.16
124	D	Terrace	Agriculture	13.78	7.54	1.64	170.44
125	D	Terrace	Agriculture	19.68	10.82	2.30	489.09
126	D	Rock Mound	Agriculture/Clearing	15.09	12.14	1.31	240.24
127	D	Terrace	Agriculture	11.48	7.54	0.98	85.22
128	D	Wall	Water Control	36.08	6.56	3.94	931.59
129	D	Terrace	Agriculture	17.06	3.28	1.31	73.40
130	D	Terrace	Agriculture	22.96	3.28	1.97	148.21
131	D	Terrace	Agriculture	27.22	6.56	2.30	410.04
132	D	Terrace	Agriculture	27.88	7.22	1.97	395.93
133	D	Terrace	Activity Area	38.70	22.96	2.95	2623.28
134	D	Terrace	Activity Area	36.08	22.96	2.95	2445.43
135	D	Rock Mound	Water Control/ Clearing	10.17	9.84	3.61	360.99
136	D	Terrace	Agriculture	17.38	4.92	1.97	168.32
137	D	Terrace	Agriculture	19.68	4.59	1.64	148.21
138	D	Terrace	Agriculture	19.68	9.84	1.64	317.59
139	D	Terrace	Agriculture	21.32	3.28	1.64	114.68
140	D	Rock Mound	Agriculture	21.65	12.46	52.48	14160.19
141	D	Rock Mound	Clearing	10.82	10.82	2.30	269.00
142	D	Terrace	Agriculture	39.36	10.50	2.30	948.53
143	D	Terrace	Agriculture	41.33	6.89	2.62	746.97
144	D	Terrace	Agriculture	25.91	10.17	0.98	259.26
145	D	Terrace	Agriculture	50.84	9.84	1.97	984.52
146	D	Terrace	Agriculture	25.58	6.89	0.98	173.40
147	D	Terrace	Activity Area	28.86	18.37	3.28	1738.97
148	D	Terrace	Agriculture	23.29	11.48	0.98	263.07
149	D	Terrace	Agriculture	17.38	10.17	0.98	173.93
150	D	Terrace	Agriculture	21.65	10.17	0.98	216.59
151	D	Terrace	Agriculture	54.45	10.82	1.31	773.22
152	D	Terrace	Agriculture	49.20	7.87	0.98	381.11
153	D	Terrace	Agriculture	45.92	4.26	0.98	192.67
154	C	Terrace	Activity Area	31.82	31.16	1.64	1625.87
154a	C	Terrace	Activity Area	21.32	6.56	1.31	183.50
154b	C	Terrace	Activity Area/ Agriculture	20.99	20.34	1.64	700.11
155	C	Terrace	Agriculture	36.08	10.50	1.31	496.85
156	C	Terrace	Agriculture	32.14	12.14	0.66	255.91
157	C	Terrace	Agriculture	37.72	10.50	2.30	909.01
158	C	Terrace	Agriculture	26.24	12.79	2.30	770.68
159	C	Terrace	Agriculture	20.01	15.42	1.64	505.85
160	C	Terrace	Agriculture/ Activity Area	62.32	9.84	1.64	1005.70
160.01	C	Wall	Firepit	1.97	1.97	0.66	2.54
161	C	Pit	Boundary	14.76	6.56	0.98	95.28
162	C	Wall	Boundary	26.24	6.23	1.64	268.19
163	C	Wall	Clearing	10.82	6.56	2.62	186.32
164	C	Terrace	Agriculture	10.17	6.23	1.64	103.92
170	A	Pit	Firepit	1.31	1.31	0.66	1.13
171	A	Pit	*Imu*	3.61	3.61	1.64	21.35

Note: NP = Not Provided; information not available in archaeological reports

Figure 17: Site 2010, Area A (CMM Design Only)

Total Design Area: 3.11 Acres

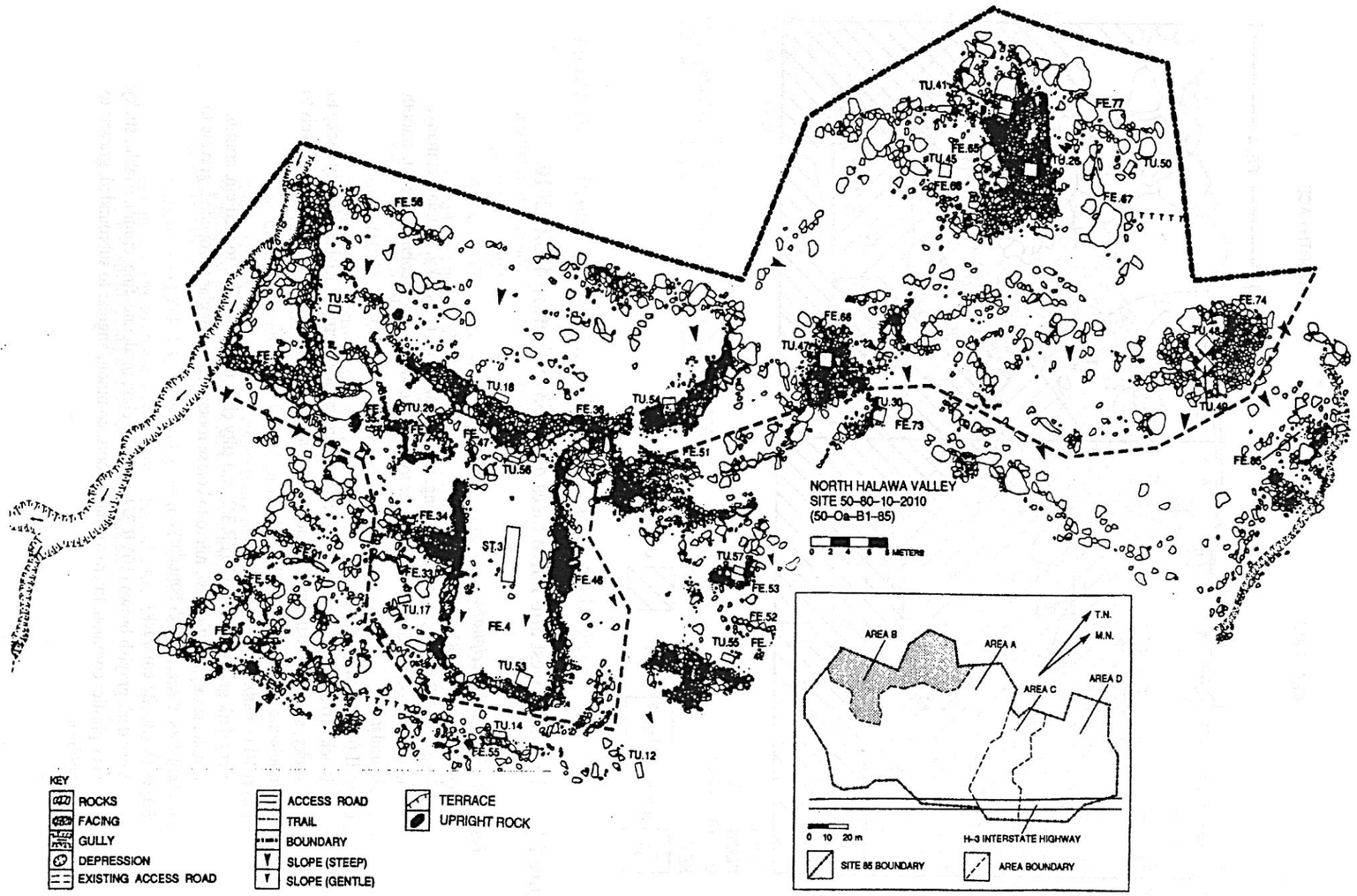

Figure 18: Site 2010, Area B (CMM Design Only)

Total Design Area: .94 Acres

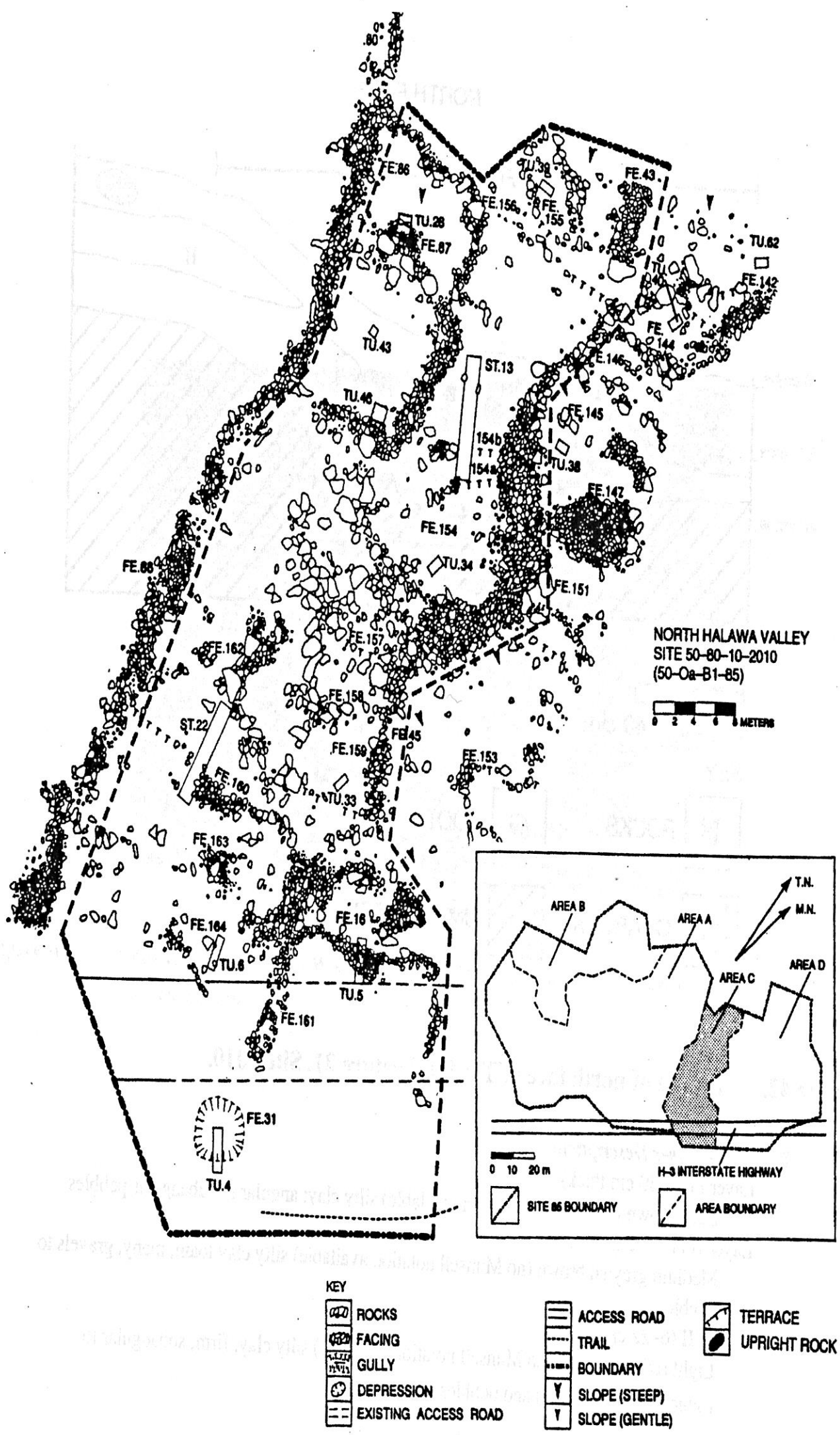

Figure 19: Site 2010, Area C (CMM Design Only)

Total Design Area: .07 Acres

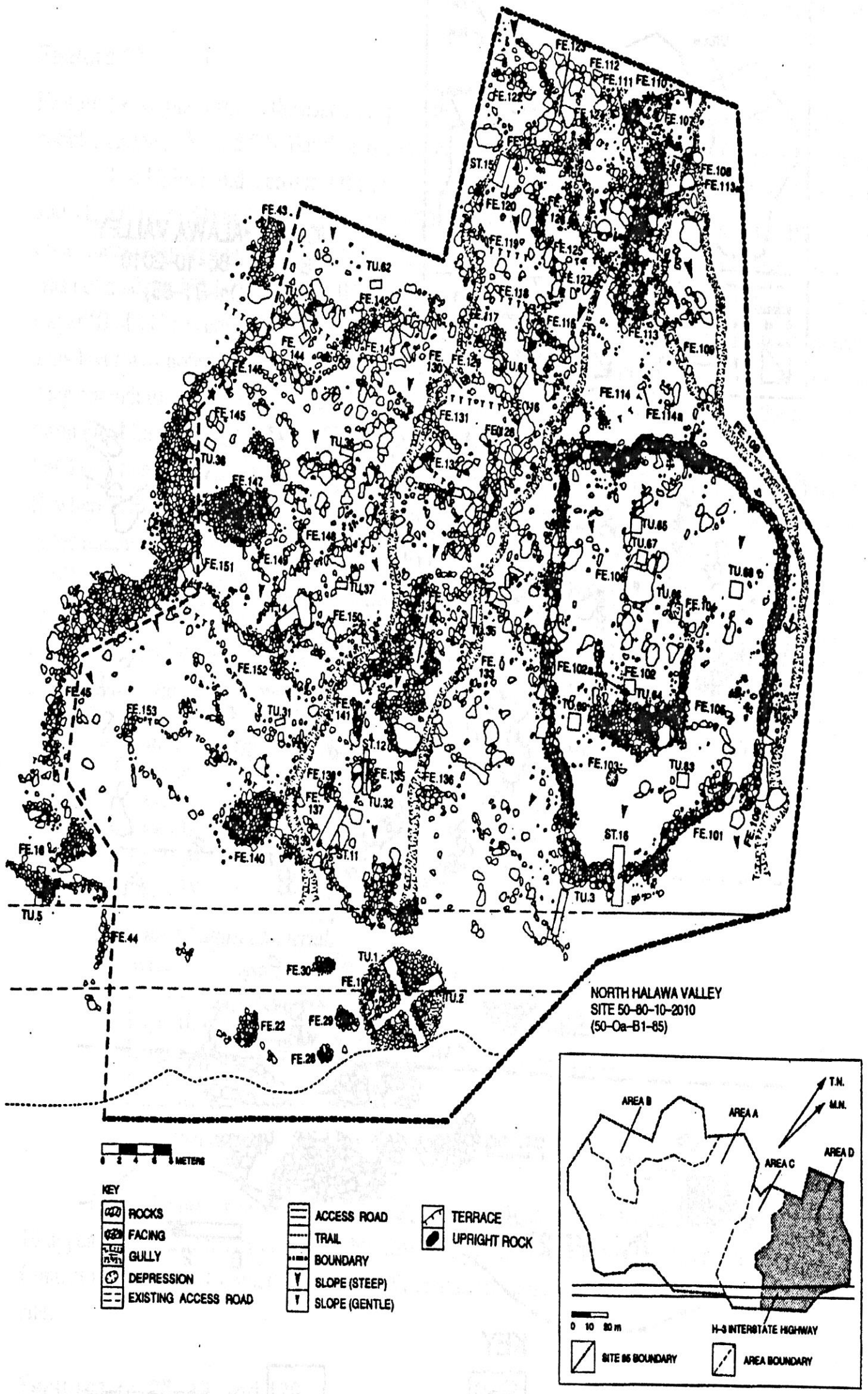

Figure 20: Site 2010, Area D (CMM Design Only)

Total Design Area: 1.5 Acres

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Luluku Project Area

Luluku Archaeological Rehabilitation Work

Archaeological sites fall into either a Preservation or Rehabilitation category based on traditional site function, integrity and the presence of burials. HLID intends to have the Cultural Master Masons and Archaeologists comply with all applicable National Historic Preservation Act laws and relevant Hawaii Administrative Rules when performing rehabilitative work. Archaeologists working for HLID under a separate contract will collaboratively work with the Cultural Master Masons during the "Condition Assessment" on features to be rehabilitated. Cultural Master Masons will have a worksheet and questionnaire to follow which is designed to ensure compliance with National Park Service (NPS) rehabilitation standards. Archaeologists working with Master Masons during a site "Condition Assessment" will aid the CMM with completing the questionnaire. It is during this Condition Assessment when the Cultural Master Masons will provide their design services. The goal of the "Condition Assessment" for the Cultural Master Masons is to identify which features require rehabilitation or stabilization and to locate features in need of repair, alteration, or replacement. Features in need of rehabilitation will then need to have their architectural style documented. The questionnaire is specifically designed to ascertain the information needed to document the architectural style. A Preservation Plan will be written by the archaeologist after completion of the "Condition Assessment". We will have SHPD to comment and review the recommendations made by the Cultural Master Masons and the archaeologists.

A table is provided below summarizing prior archaeological descriptions, HLID's recommendations, and phasing. Site 1887 is highlighted since it is the only site recommended for rehabilitation. The only site not recommended for rehabilitative or preservation work in Luluku is Site -4483. According to an archaeological study in 2002 (Allen et al.), this site had been destroyed and has already yielded the necessary archaeological information to satisfy mitigation. Additional archaeological information and drawings can be found in the 2003 and 2004 Bishop Museum archaeology reports, which are available online:

http://www.bishopmuseum.org/research/cultstud/h3reports.html

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Table 10: Luluku Archaeological Site Recommendations

Site# 50-80-10-	NRHP Criteria	Integrity	Date	Function	Features	HLID Recommendation	Phase
-1887	*A, C, D	Mostly Excellent, Some Poor	Traditional and Post- Contact	Agricultural, Habitation	*Lo'i* terraces, rock alignments, pits	Rehabilitation and Stabilization	I and II
-1905	*A, C, D	Excellent	Post- Contact	Burial	Rectangular rock alignments	Avoidance	I
-1895	*A, C, D	Good	Traditional and Post- Contact	Habitation, burial	imu	Avoidance	I
-1897	*A, C, D	Good to Fair	Traditional and Post- Contact	Habitation, burial, charcoal kiln	Cobble and rock mounds, rock alignments	Avoidance	I
-1900	*A, C, D	Good	Undetermined	Agricultural	Linear rock mound, rock dam, trail segment/marker	Avoidance	I
-4483	D	Poor (Destroyed)	Traditional and Post- Contact	Habitation	Imu, charcoal kiln, postmolds	No Action	I

Note: (*) Eligible as Luluku Archaeological Discontiguous District (SIHP# 50-80-10-2914)

Initially, the Archaeologist will hire a vegetation clearing crew to delineate where the buffer zone around all archaeological sites within the HLID Project boundaries will be. However, later vegetation work to facilitate the rehabilitation and stabilization work will be carried out by the Cultural Master Masons during the "Build" portion of the Project. The Cultural Master Mason will be provided with a flora inventory for the area once the Environmental Review process is completed by our Environmental Contractor operating under a separate contract.

Luluku Design/Build Areas
Below is a Table summarizing sections requiring Design/Build work by the Cultural Master Masons.

Table 11: Site 1887 Design/Build Areas

Design or Build	Site Number (50-80-10-_____)	Area #	Feature Quantity to be Rehabilitated	Acres	Lineal Feet (Built Features)	Cubic Feet (Build)	Total Cubic Yards (Built Features)
Design/Build	-1887	1	10	.6	922.5	4171.0	154.5
Design/Build*	-1887	2	42 (Design/Build); 16 (Design Only)	1.6; .6	2832.3	17055.5	631.7
Design	-1887	3**	32 (Design Only)	2.29	N/A	N/A	N/A
Design/Build*	-1887	7	5	.1	63	335.6	12.4

Note: (*) Only specific features designated per Tables 12 and 13 will have Design/Build services. Features not listed on Table 7 will only require Design services and are to be stabilized.

Note: (**) Although Area 3 is set only for "Design", the area will need to be **stabilized**. This will include vegetation clearing and erosion control necessary to preserve the sites in their current condition. This task will be initiated during the "Build" portion of the Project. Exact measurements of built features for Area 3 are Not Applicable to estimating a price for proposed (offeror) work.

Note: The estimated Lineal Feet for built features is likely less than what will be discovered during the Condition Assessment. This is primarily due to the fact that during the older archaeological surveys, some dimensions for built features were not recorded if they were heavily covered with vegetation or eroded dirt.

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Total Design Features: 115
Total Design Area: 5.2 Acres

Total Build Features: 57
Total Build Area: 2.3 Acres
Total Build Lineal Feet: 3,817.8 Feet
Total Build Cubic Feet: 21,562.1 Feet^3
Total Bid Volume: 15,093.5 ft^3 (estimate of actual "Build" work to use when calculating Unit Price for Rehabilitation, see CMM RFP OHA 14-12 Attachment M)

Total Vegetation Clearance Area: 5.2 Acres (Site 1887: Areas 1, 2, 3, and 7)
Total Stabilization Area: 2.9 Acres (Site 1887, Area 3; and select features of Area 2)

All proposed rehabilitative work will require SHPD approval, as conveyed by the acceptance of the Preservation Plan. This may require revisions to be made to proposed rehabilitation work. However, we ask that the Cultural Master Masons bidding for this job estimate "Build" services based on the plan view drawings and measurements provided. The digital copy presented here has been scanned at a high resolution so that the bidder can "zoom" in on features or areas for more detail. An actual site visit may also be done upon request if the bidder feels this will allow them to provide a more accurate cost estimate for "Build" services.

Site 1887 Area 2 in Luluku will require water diversion from Luluku Stream to fully rehabilitate the *loʻi* for contemporary use. This will require the Cultural Master Masons and Archaeologists to locate optimal areas for inlet/outlet points from Luluku Stream. Possible locations for water diversions are suggested in Figure 27. Locating this inlet/outlet and proposing a design is part of the "Design" job for

the Luluku Project Area. This “Design” information will be presented to the appropriate approving agencies for necessary permitting. After the permitting is approved, the water diversion inlet/outlet points are to be constructed by the Cultural Master Masons during the “Build” portion of the Project.

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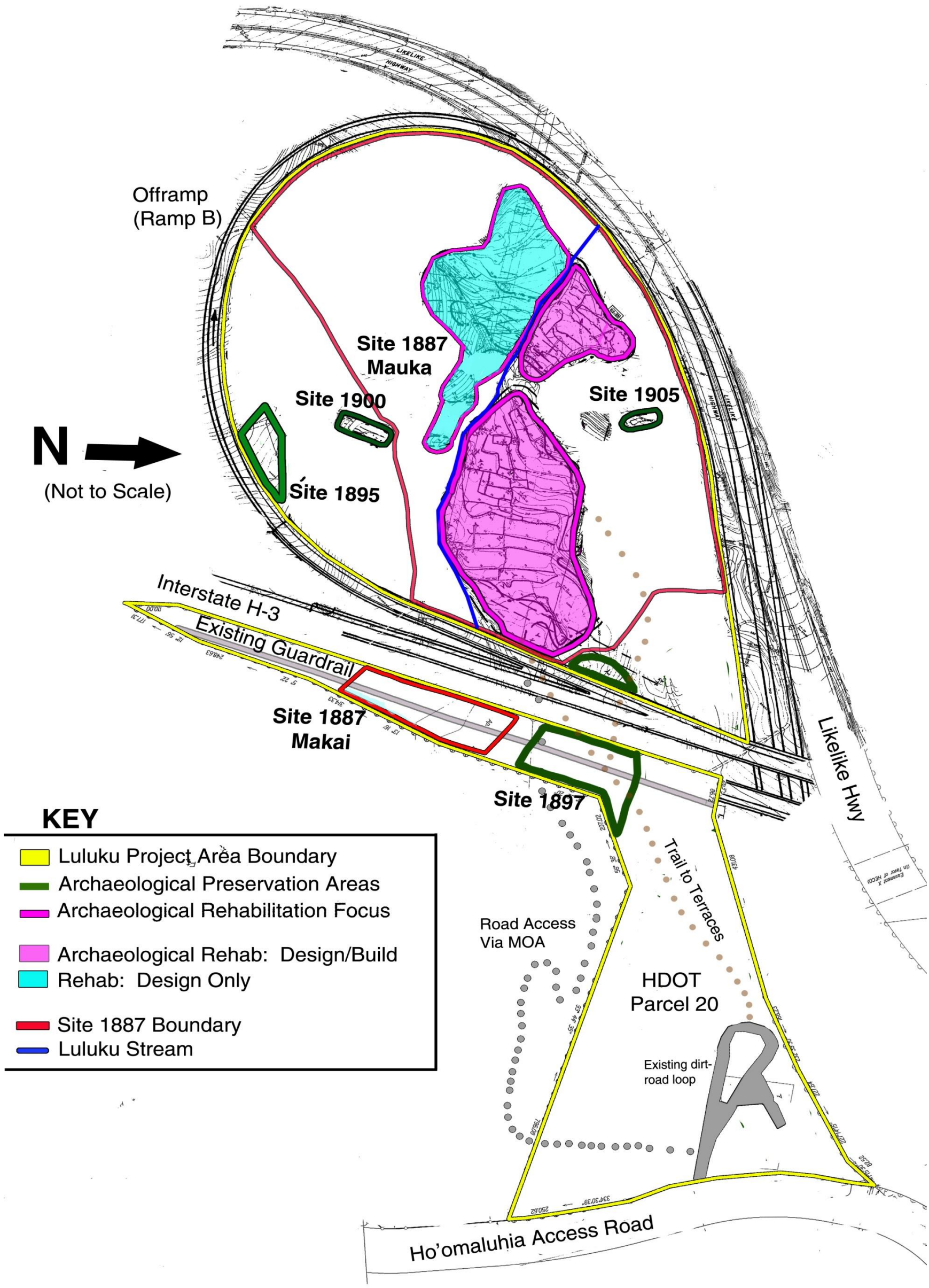

Figure 21: Luluku Conceptual Plan

Note: Only select portions of Area 2 will be rehabilitated. See Table 12 and 13 for feature numbers to be rehabilitated.

Total Design Area: 5.2 Acres Total Build Area: 2.3 Acres

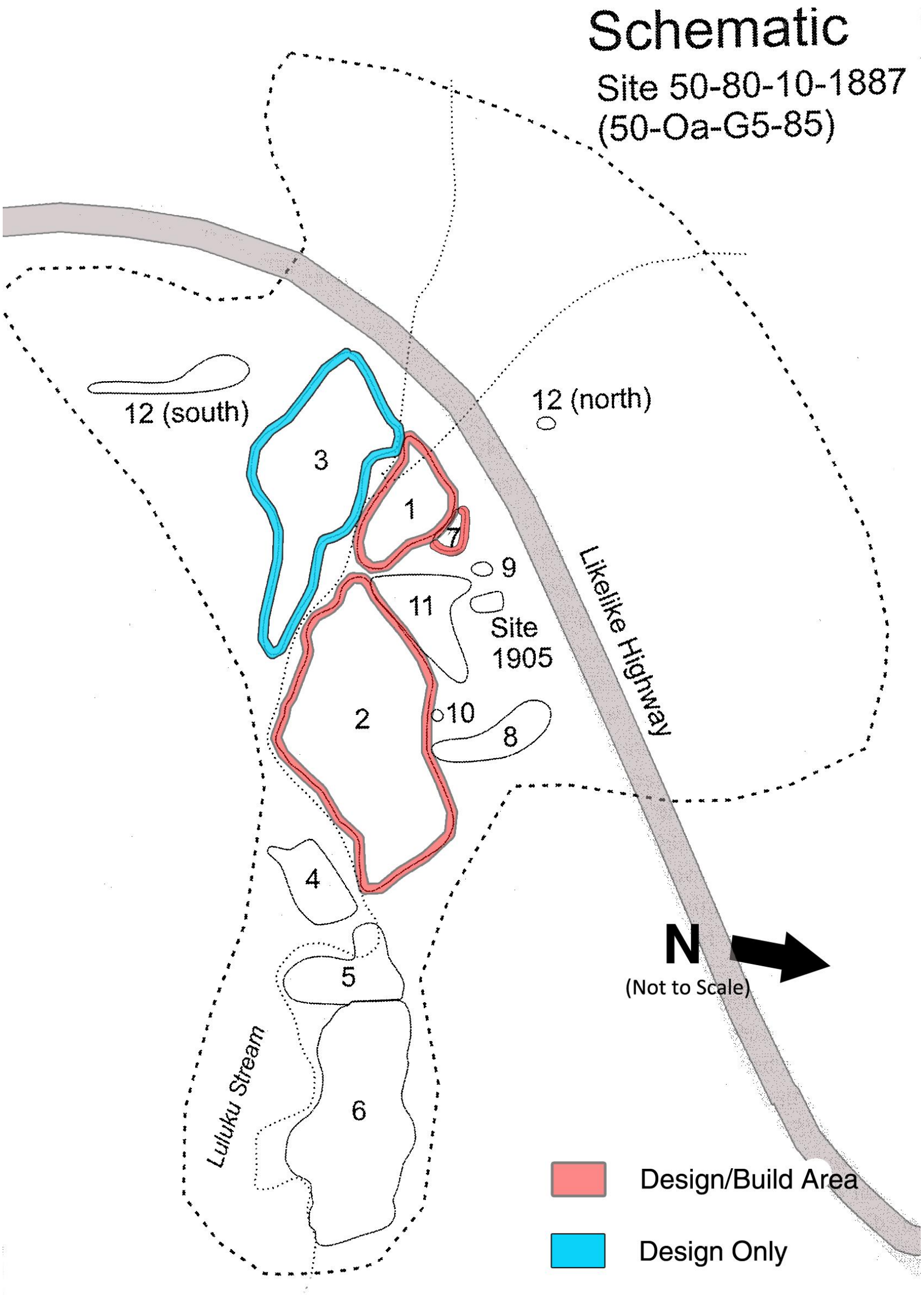

Figure 22: Site 50-80-10-1887 All Areas

Note: Only select portions of Area 2 and 7 will be rehabilitated. See Tables 12, 13, and 15 for feature numbers to be rehabilitated.

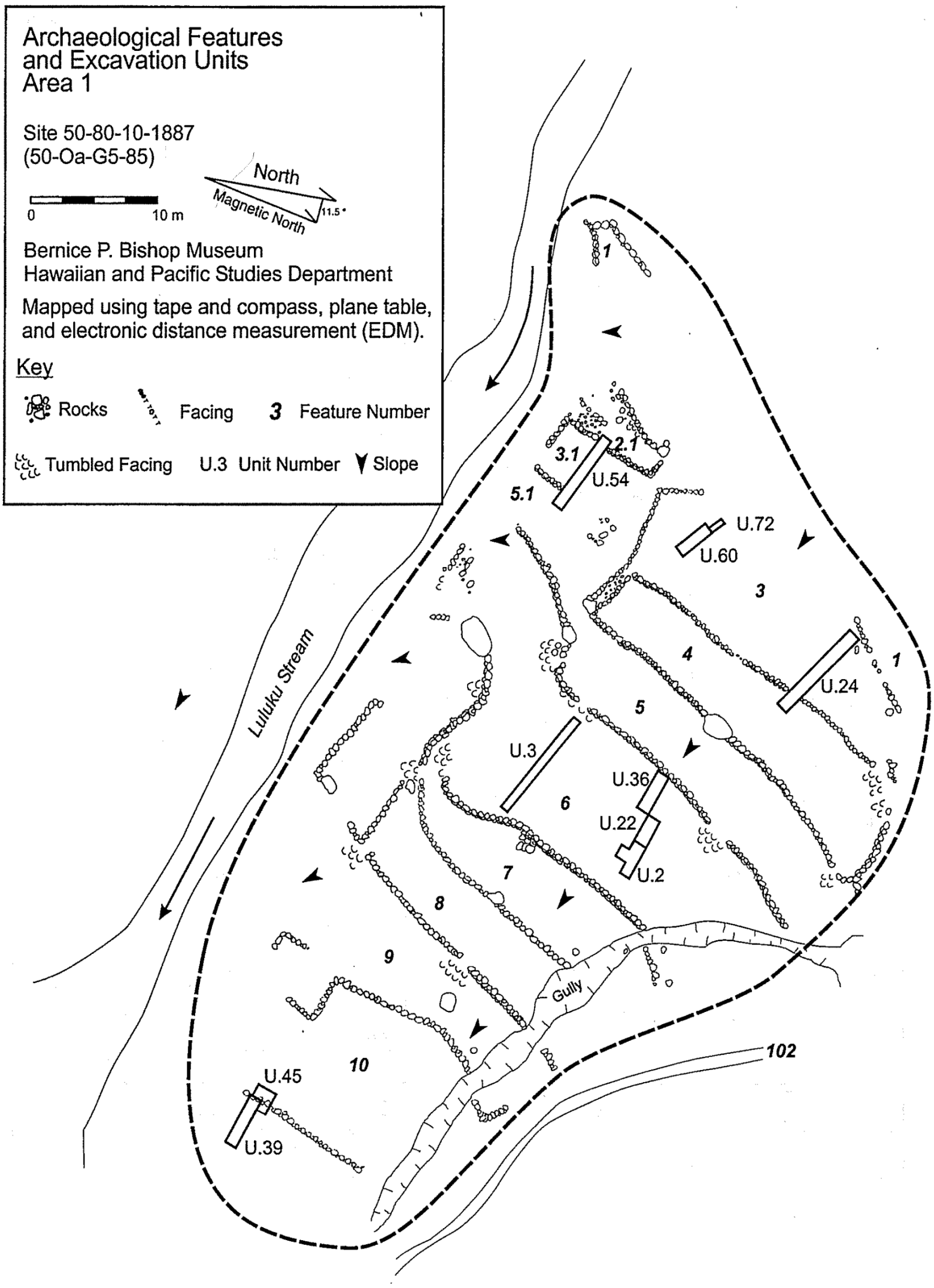

Figure 23: Luluku, Site 50-80-10-1887, Area 2 (CMM Design/Build) Plan View Drawing

Note: Total Design/Build Area .6 Acres Total Lineal Feet of Built Features: 922.5 Feet

Total Cubic Feet: 4171.0 Total Cubic Yards: 154.5

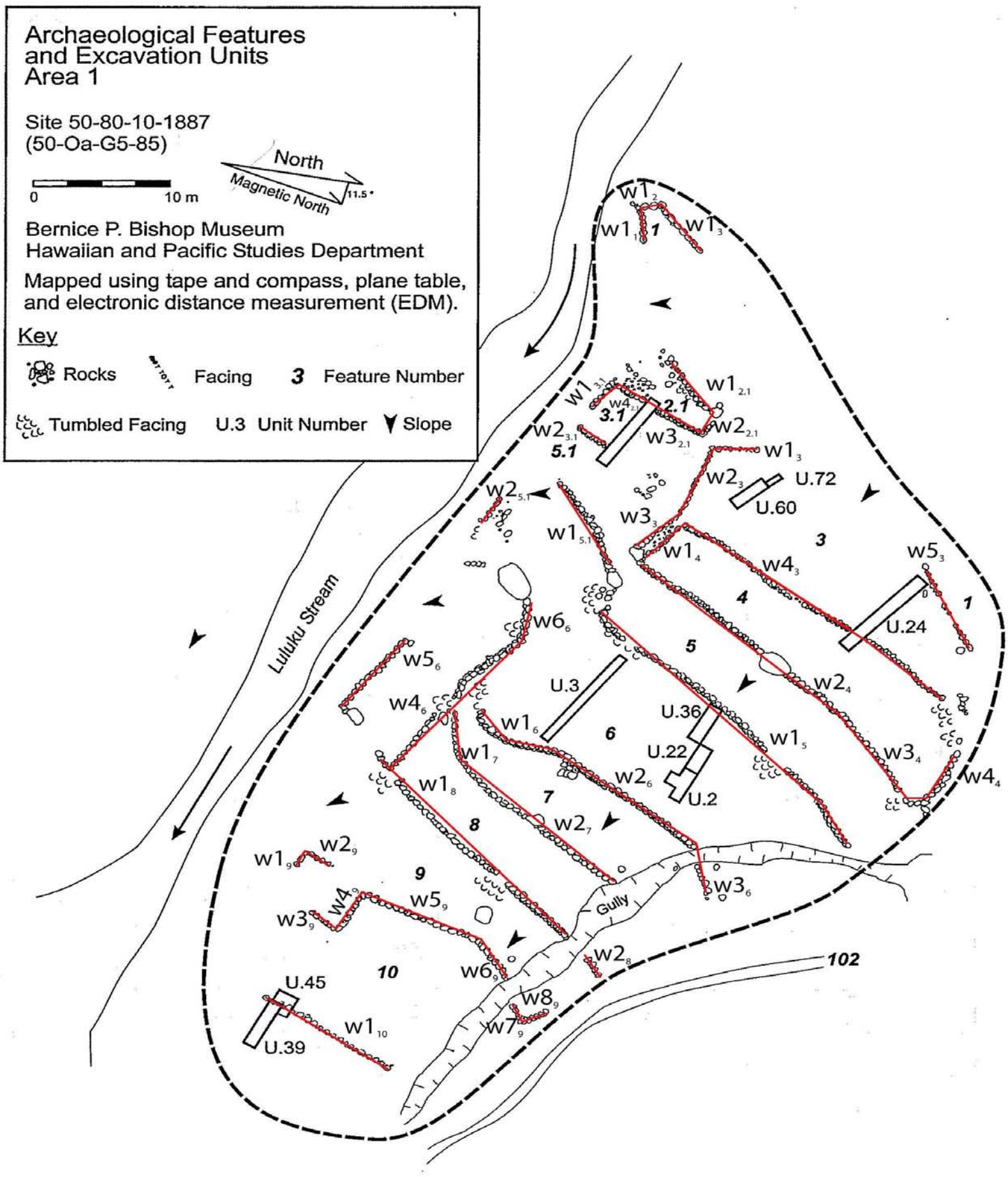

Figure 24: Site 1887, Area 1 Stone Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 12 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 12: Luluku Site 50-80-10-1887, Area 1 Build Feature Dimensions

Feature	Area #	Vegetation Survey (1987)	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume (cubic feet)
1	1	Banana	Facing	Slope Retention Feature	W1	11.5	2	2.1	48.3
					W2	5	2	2.1	21
					W3	17	2	2.1	71.4
2.1	1	NP	Terrace	Agricultural	W1	16.6	2	1.3	43.16
					W2	4.8	2	1.3	12.48
					W3	13.7	2	1.3	35.62
					W4	11.3	2	1.3	29.38
3	1	Banana	Terrace	Agricultural	W1	12	2	2.6	62.4
					W2	20.8	2	2.6	108.16
					W3	13	2	2.6	67.6
					W4	78	2	2.4	374.4
					W5	26.8	2	2.6	139.36
3.1	1	NP	Terrace	Agricultural	W1	14	2	2.3	64.4
					W2	12.8	2	2	51.2
4	1	Banana	Terrace	Agricultural, Pondfield	W1	13.5	2	2.6	70.2
					W2	65	2	2.6	338
					W3	25	2	2.6	130
					W4	20	2	2.6	104
5	1	Banana	Terrace	Agricultural	W1	93.4	2.5	2	467
5.1	1	NP	Terrace	Agricultural	W1	26.1	2.5	2	130.5
					W2	8	2	2	32
6	1	Banana	Terrace w/mound	Agricultural, Pondfield with Spillway	W1	19	2	2.2	83.6
					W2	38.6	2	2.2	169.84
					W3	7.6	2	2.2	33.44
					W4	48.5	2	2.2	213.4
					W5	24	2	2.2	105.6
					W6	11.2	2	2.2	49.28
7	1	Banana	Terrace	Agricultural, Pondfield	W1	15.8	2	2.2	69.52
					W2	49.5	2	2.2	217.8
8	1	Banana	Terrace	Agricultural	W1	62.8	2	2.2	276.32
					W2	7	2	2.2	30.8
9	1	Banana	Terrace, Platform	Agricultural, Pondfield/Stream Exclusion	W1	5	2	2	20
					W2	10	2	2	40
					W3	8	2	2	32
					W4	11.8	2	2	47.2
					W5	28.8	2	2	115.2
					W6	15	2	2	60
					W7	6.8	2	2	27.2
					W8	6.8	2	2	27.2
10	1	Banana	Terrace	Agricultural, Pondfield	W1	38	2	2	152
							Total Cubic Feet		4171.0
							Total Cubic Yards		154.5

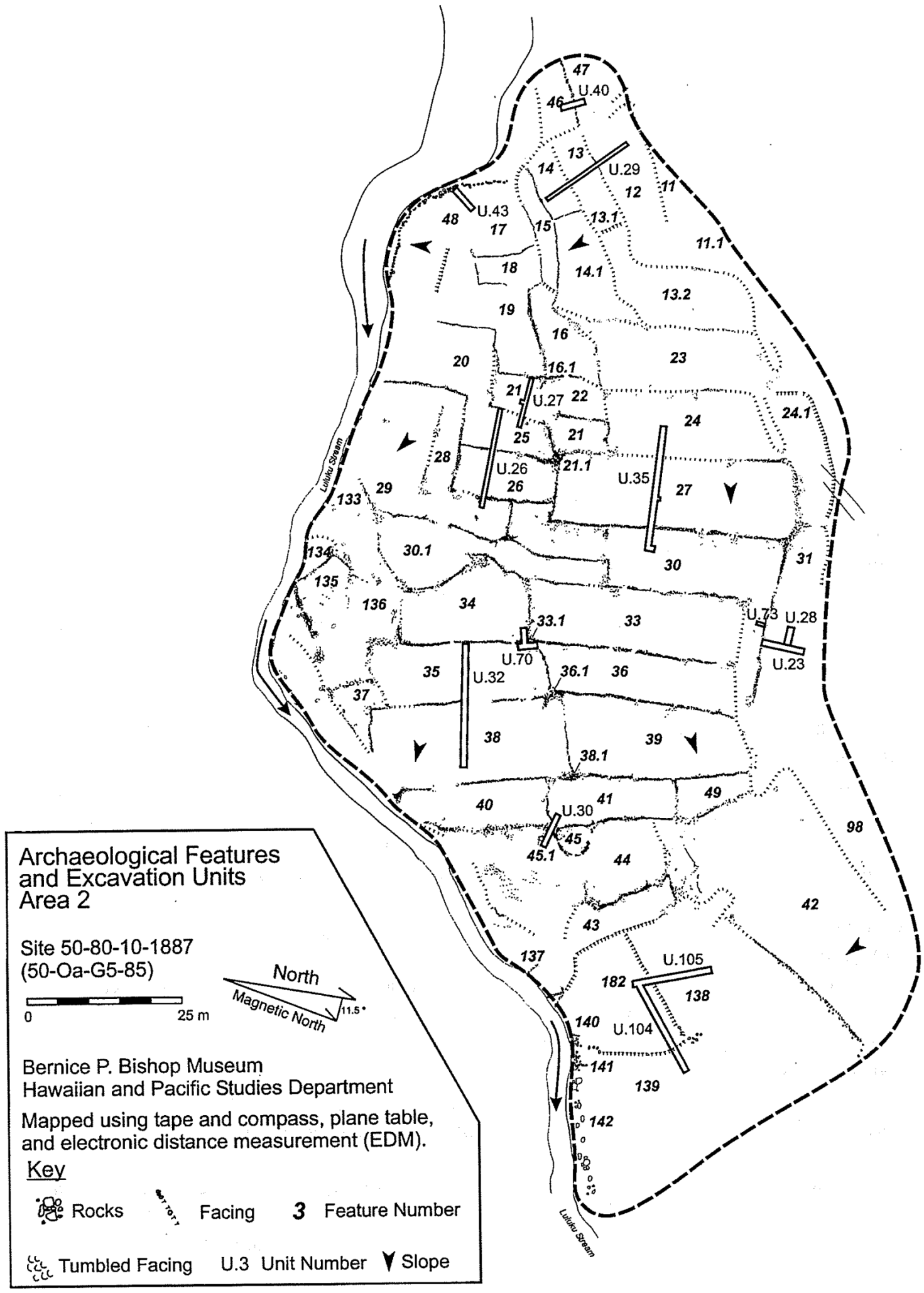

Figure 25: Luluku, Site 50-80-10-1887, Area 2 (CMM Design/Build)

Note: Total Design/Build Area 1.6 Acres Total Lineal Feet of Built Features: 2832.3 Feet

Total Design Only: .6 Acres

Total Cubic Feet: 17,055.5 Total Cubic Yards: 631.7

Note: The following features are excluded from "Build" services since they are not listed as eligible for rehabilitation per the 1987 MOA: 45, 45.1, 46, 47, 48, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, and 182.

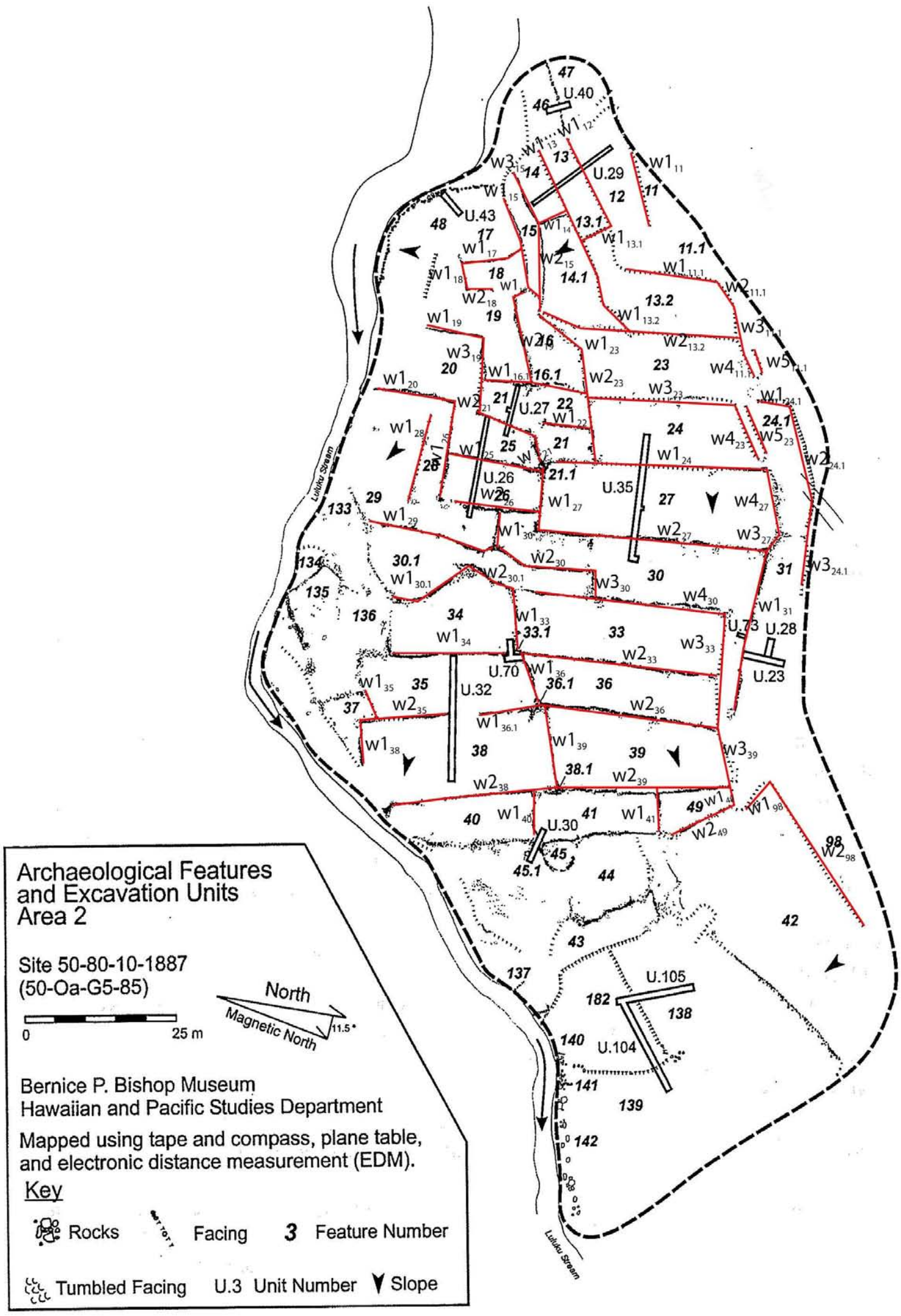

Figure 26: Luluku, Site 50-80-10-1887 Area 2 Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape.

Use Table 13 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 13: Luluku, Site 50-80-10-1887, Area 2 Build Feature Dimensions

Feature	Area #	Vegetation Survey (1987)	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume (cubic feet)
11	2	Banana	Terrace	Agricultural, Pondfield	W1	36	2	2.6	187.2
11.1	2	NP	Terrace	Agricultural	W1	48	2	2.6	249.6
					W2	12	2	2.6	62.4
					W3	22	2	2.6	114.4
					W4	12	2	2.6	62.4
					W5	13	2	2.6	67.6
12	2	Banana	Terrace	Agricultural, Pondfield	W1	51.5	2	3.1	319.3
13	2	Hau	Terrace/Ditch	Pondfield/Irrigation or washout	W1	80	2	3.1	496
13.1	2	NP	Terrace	Agricultural	W1	16	2	3.1	99.2
13.2	2	NP	Terrace	Agricultural	W1	18.8	2	2.6	97.76
					W2	74.8	2	2.6	388.96
14	2	Hau	Terrace	Agricultural, Pondfield	W1	12.6	2	2.6	65.52
14.1	2	Hau	NP	NP	W1	17	2	2.6	88.4
15	2	Hau	Terrace w/ Mound	Agricultural, Pondfield with Mounds	W1	47.5	2	2.6	247
					W2	38.5	2	2.6	200.2
					W3	27	2	2.6	140.4
16	2	Hau	Terrace w/ Mound	Agricultural, Pondfield with Mounds	W1	6	2	2.6	31.2
16.1	2	NP	Terrace	Agricultural	W1	50.6	2	2.6	263.12
17	2	Hau	Terrace	Agricultural, Pondfields	W1	27.4	2	2.6	142.48
18	2	Hau	Terrace	Agricultural, Pondfields	W1	14	2	2.6	72.8
					W2	13	2	2.6	67.6
19	2	Hau	Terrace	Agricultural, Pondfields	W1	26.4	2	2.6	137.28
					W2	41	3	2.6	319.8
					W3	34.8	2	2.6	180.96
20	2	Hau	Terrace	Agricultural, Pondfields	W1	39.5	2	2.6	205.4
21	2	Hau	Terrace w/ Mound	Agricultural, Pondfields with Spillway	W1	13	2	1.6	41.6
					W2	26	2	1.9	98.8
22	2	Hau	Terrace	Agricultural, Pondfields	W1	24.5	2	4.3	210.7
23	2	Hau	Terrace	Pondfields Agricultural	W1	28	3	2.6	218.4
					W2	47.5	2	2.6	247
					W3	68	2	3.3	448.8
					W4	28	2	3.3	184.8
					W5	25.8	2	3.3	170.28
24	2	Hau	Terrace	Agricultural, Pondfields	W1	108	2	4.3	928.8
24.1	2	NP	NP	NP	W1	15.5	2	1	31
					W2	56	2	1	112
					W3	40.8	2	1	81.6
25	2	Hau	Terrace	Agricultural, Pondfields	W1	42	2	2.6	218.4
26	2	Hau	Terrace	Agricultural, Pondfields	W1	44	2	2.6	228.8
					W2	46	2	2.6	239.2
27	2	Hau	Terrace	Agricultural, Pondfields	W1	31	2	4.3	266.6
					W2	110	2	4.3	946
					W3	7.6	2	4.3	65.36
					W4	28	2	4.3	240.8
28	2	Hau	Terrace	Agricultural, Pondfields	W1	40	2	2.6	208
29	2	Hau	Terrace	Agricultural, Pondfields	W1	57.8	2	2.6	300.56
30	2	Hau	Terrace w/ Mound	Agricultural, Pondfields with Spillway	W1	18	2	2.6	93.6
					W2	47	2	2.6	244.4
					W3	11.5	2	2.6	59.8
					W4	101.8	2	3.6	732.96
30.1	2	Hau	NP	NP	W1	42	2	3	252
					W2	17.5	2	3	105

Table 13 Cont…

Feature	Area #	Vegetation Survey (1987)	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume (cubic feet)
31	2	Hau	Terrace	Agricultural, Pondfields	W1	74.8	2	4.6	688.16
33	2	Hau	Terrace w/ Mound	Pondfields with Spillway	W1	27.5	2	4.2	231
					W2	95	2	3.6	684
					W3	52	2	2.6	270.4
33.1	2	NP	NP	NP	N/A	-	-	-	0
34	2	Hau	Terrace	Agricultural, Pondfields	W1	56	2	3	336
35	2	Hau	Terrace	Agricultural, Pondfields	W1	14	2	3	84
					W2	43.5	2	3	261
36	2	Hau	Terrace w/ Mound	Pondfields with Spillway	W1	24	2	3.3	158.4
					W2	87.1	2	3.3	574.86
36.1	2	Hau	NP	NP	W1	26.5	2	3	159
37	2	Hau	Platform	Stream Exclusion Structure	TBD	-	-	-	0
38	2	Hau	Terrace w/ Mound	Pondfields with Spillway	W1	20.5	2	2.6	106.6
					W2	80.8	2.5	2.6	525.2
39	2	Hau	Terraces	Pondfields	W1	34.8	2	2.6	180.96
					W2	80	2	2.6	416
					W3	26.8	2	2.6	139.36
40	2	Hau	Terraces	Agricultural, Pondfields	W1	23.8	2	2.6	123.76
41	2	Hau	Terraces	Agricultural, Pondfields	W1	20	2	2.6	104
42	2	Hau	Terraces	Agricultural, Pondfields	N/A	-	-	-	0
49	2	Hau	Terraces	Agricultural, Pondfields	W1	8	2	2.6	41.6
					W2	35.5	2	2.6	184.6
98	2	Hau	Terraces	Agricultural, Pondfield	W1	18	2	2.6	93.6
					W2	79	2	2.6	410.8
							Total Cubic Feet		17055.5
							Total Cubic Yards		631.7

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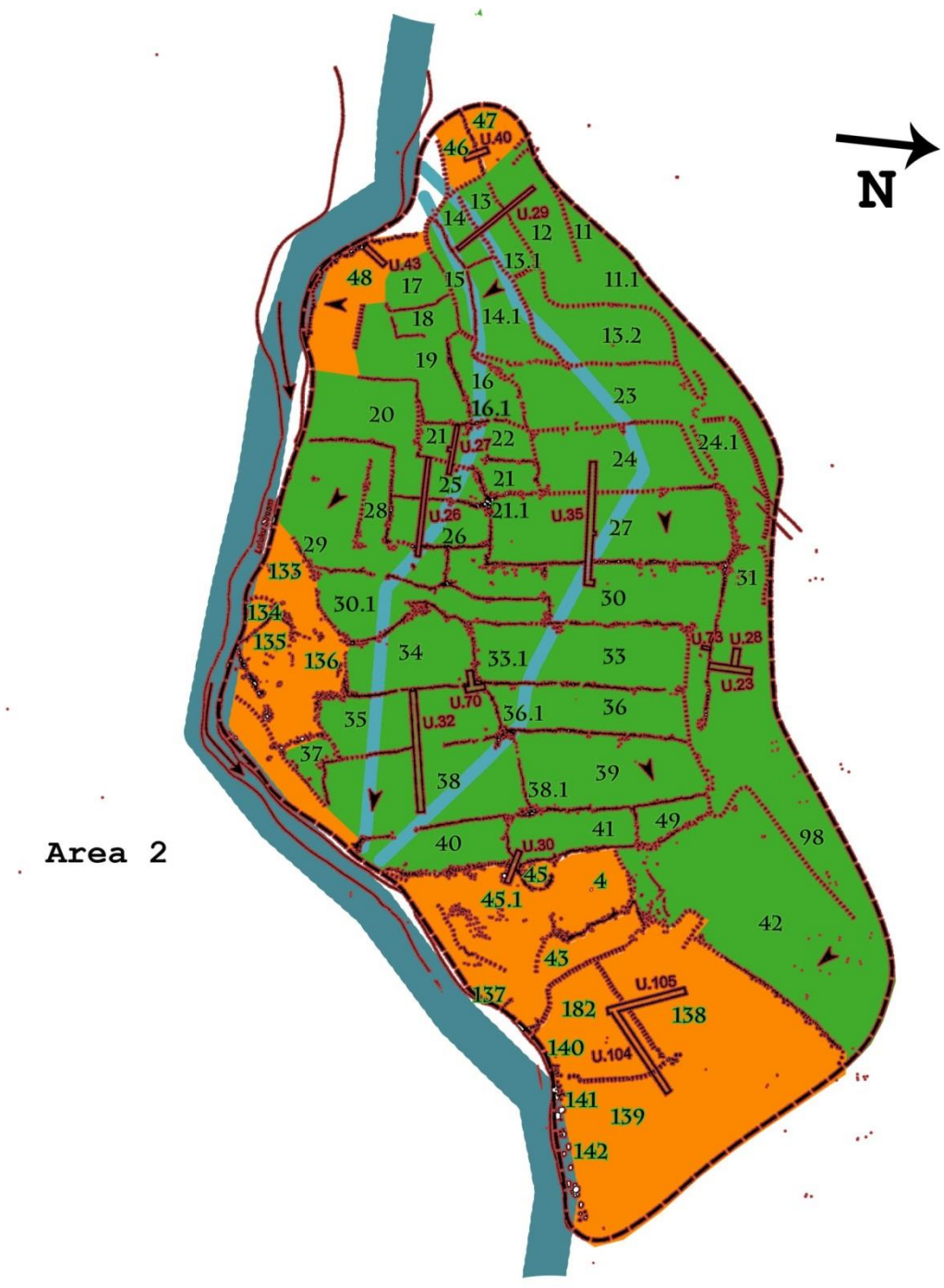
Note: NP = Not Provided; Information not listed in archaeological report

TBD = To be determined; Assigned to features that are unclear to define based on the current data.

N/A = Not applicable; Assigned to features that do not involve stone work.



Legend:

Design/Build Areas
Design Only

Luluku Stream
Stream Diversions

(Note: Possible Location Only, Inlet/outlet location to be determined during the design process. Once permitting is done, than the necessary work can be completed to actually construct water diversion areas)

Figure 27: Site 1887, Area 1 Stream Water Diversion for *Loʻi* Use (CMM Design/Build)

Note: Water inlet and return points must be assigned during the "Design" portion of the contract. Luluku Stream currently flows on the South side of Area 2. If the design is approved and the necessary permits received by HLID's environmental contractor (separate contract), the Cultural Master Mason will "Build" their water and inlet return designs during the "Build" portion of the contract. The projected cost for construction is to be included in the "Build" summary total.

Note: Estimated Area of Water coverage = 1 to 1.6 Acres

Estimated Water draw = 25,000 to 50,000 Gallons per day.

Note: Singular inlet and return ports from Luluku Stream assumed.

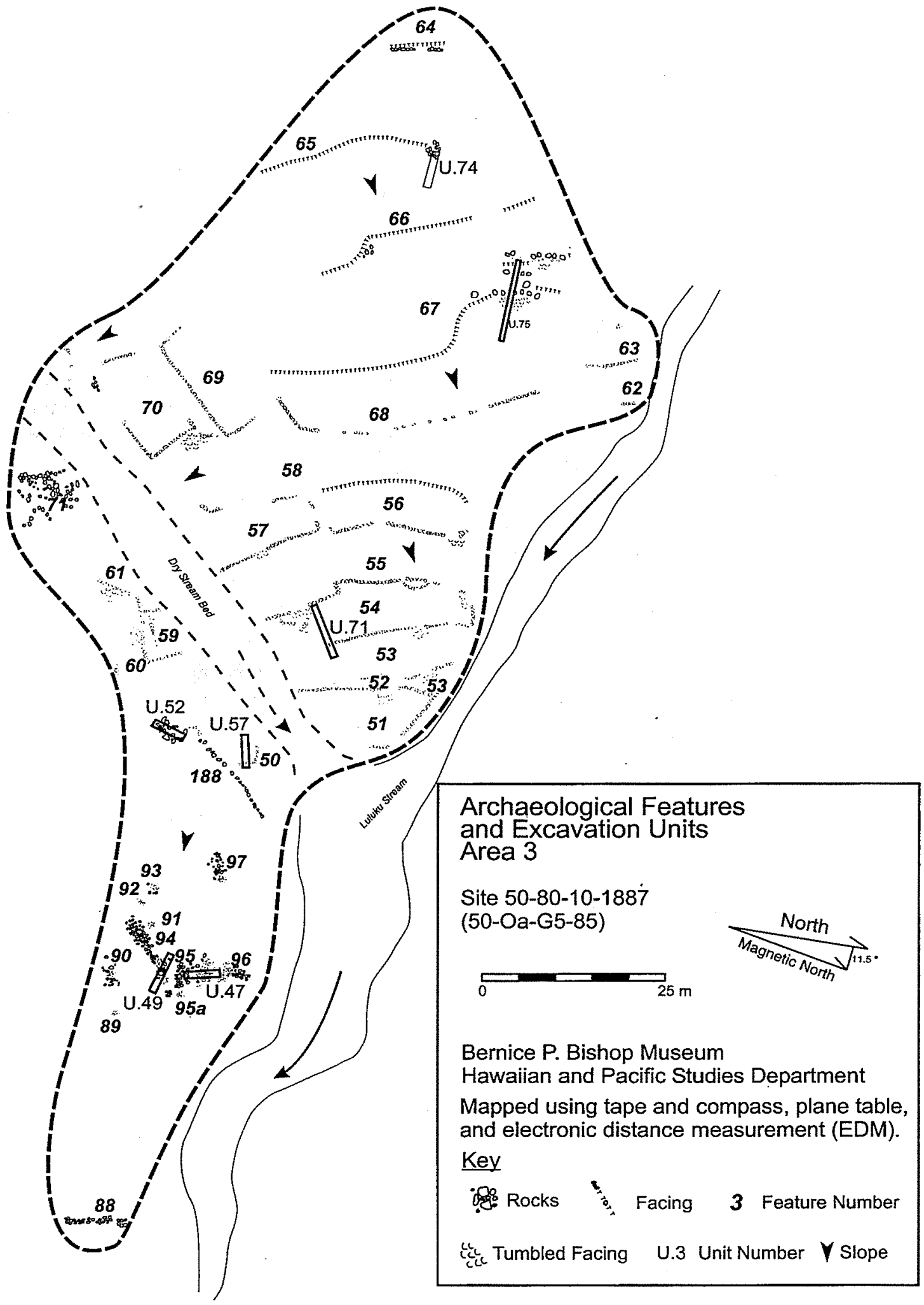


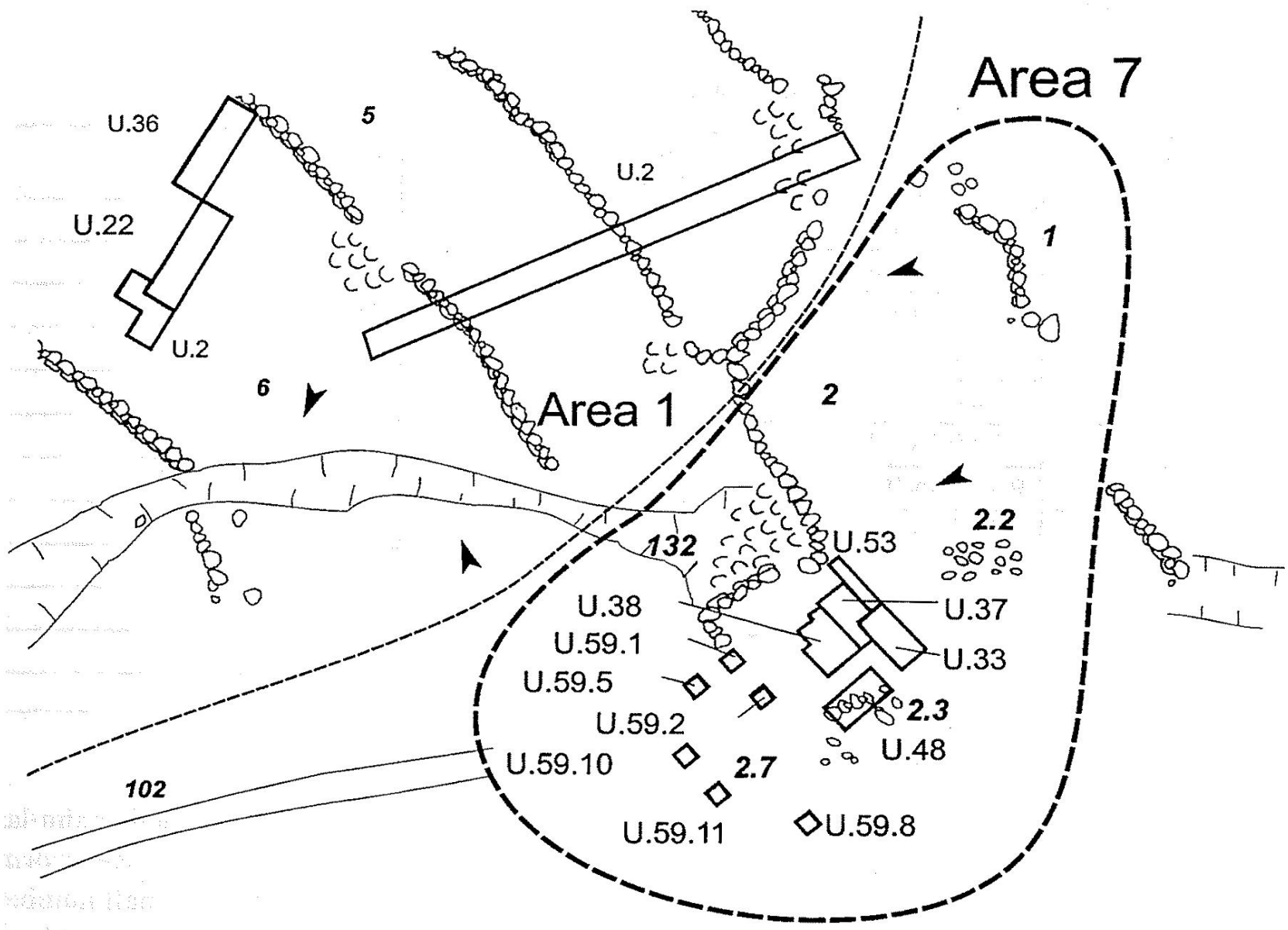
Figure 28: Site 1887, Area 3 (CMM Design Only)

Note: Total Design Area: 2.29 Acres

Table 14: Luluku, Site 50-80-10-1887, Area 3 Features (CMM Design Only)

Feature	Area #	Vegetation Survey (1987)	Description	Function	L (ft)	W (ft)	D (ft)
50	3	Banana	Terraces	Agricultural, Pondfield	14.8	14.8	2.6
51	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
52	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
53	3	Banana	Terraces	Agricultural, Pondfield	55.8	22.3	1
54	3	Banana	Terraces	Agricultural, Pondfield	80.7	22.3	1.6
55	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
56	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
57	3	Banana	Terraces w/ Alignments	Pondfields with Spillway	NP	NP	NP
58	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
59	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
60	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
61	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
64	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
65	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
66	3	Banana	Rock Face, Terrace	Agricultural, Pondfield	105	49	2
67	3	Banana	Rock Face, Terrace	Agricultural, Pondfield	137.8	49	5.2
68	3	Banana	Rock Face, Terrace	Agricultural, Pondfield	108.3	32.8	3.2
69	3	Banana	Terrace	Agricultural, Pondfield	NP	NP	NP
70	3	Banana	Terrace	Agricultural, Pondfield	NP	NP	NP
88	3	Banana	Terraces	Agricultural, Pondfield	NP	NP	NP
89	3	Banana	Mound	Agricultural, Pondfield	NP	NP	NP
90	3	Banana	Mound	Agricultural, Pondfield	NP	NP	NP
91	3	Banana	Mound	Agricultural, Pondfield	NP	NP	NP
92	3	Banana	Mound	Agricultural, Pondfield	NP	NP	NP
93	3	Banana	Mound	Agricultural, Pondfield	NP	NP	NP
94	3	Banana	Rock Mound	Agricultural, Pondfield	16.4	6.9	0.98
95	3	Banana	Rock Mound	Agricultural, Pondfield	31.8	6.6	0.32
96	3	Banana	Rock Mound	Agricultural, Pondfield	36.1	13.1	1
97	3	Banana	Rock Mound	Agricultural, Pondfield	NP	NP	NP
188	3	NP	Boulder Alignment	Agricultural	82	7.2	0.7

Note: NP=Not provided; Information not listed in archaeological reports.



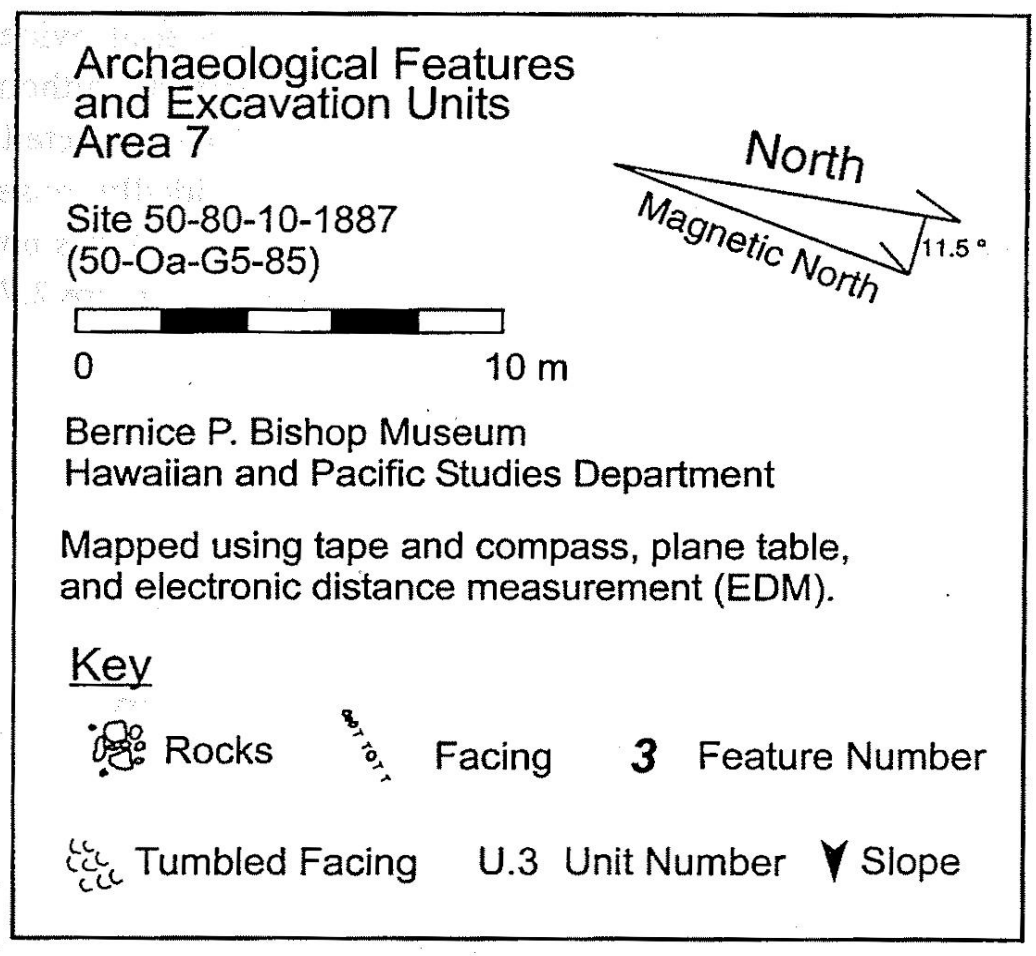


Figure 29: Luluku Site -1887, Area 7 (CMM Design/Build) Plan View Drawing

Note: Total Design/Build Area .1 Acres Total Lineal Feet of Built Features: 63 Feet

Total Cubic Feet: 335.6 Total cubic Yards: 12.4

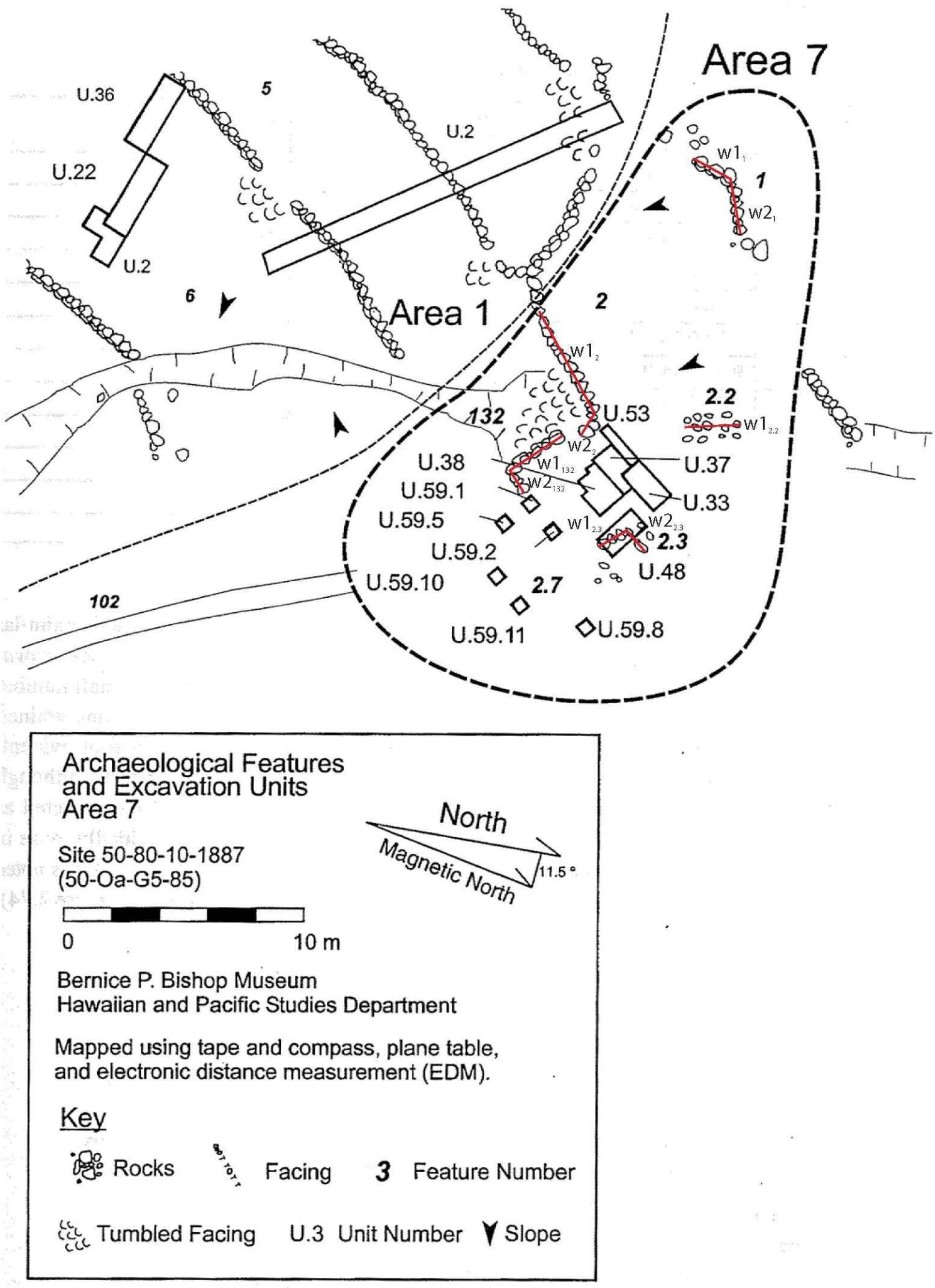


Figure 30: Site 1887, Area 7 Stone Wall Measurement Guide

Note: Redlines represent approximation of a rectangular wall shape

Use Table 15 on next page to find approximate measurements for each wall. Length, width, and height are provided in feet.

Table 15: Luluku Site 50-80-10-1887, Area 7 Build Feature Dimensions

Feature	Area #	Vegetation Survey (1987)	Description	Function	Wall	Length (ft)	Width (ft)	Height (ft)	Volume (cubic feet)
1	7	Banana	Rock Face, Terrace	Activity Area, Agriculture	W1	6.5	2	2.1	27.3
					W2	6.9	2	2.1	28.98
2	7	NP	Terrace	Undetermined	W1	17.6	1.6	6.2	174.592
					W2	3.1	2	6.2	38.44
2.2	7	Banana	Rock Concentration	Undetermined	W1	8	4	0.3	9.6
2.3	7	NP	Rock Alignments	Undetermined	W1	4.8	1.5	0.3	2.16
					W2	4	1	0.3	1.2
2.4	7	Banana	Paving	Floor	N/A	-	-	-	N/A
2.5	7	Banana	Subsurface Alignment	Water Control	N/A	-	-	-	N/A
2.6	7	NP	Charcoal Concentration	Fire Feature	N/A	-	-	-	N/A
2.7	7	Banana	Artifact Scatter	Discard Area	N/A	-	-	-	N/A
132	7	Banana	Rock Facing	Water Control	W1	9	1.5	2.9	39.15
					W2	3.5	1.4	2.9	14.21
							Total Cubic Feet		335.6
							Total Cubic Yards		12.4

Note: N/A = Not Applicable; assigned to features that do not involve stone work

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