

Rancho Seco

Final Status Survey Summary Report

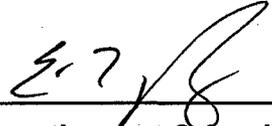
June 13, 2008

AB Western Stairwell -10' to grade including TF transition

Survey Unit F8130091

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FSS Engineer

Reviewed By: Robert F. Decker  Date: 6/18/08
Lead FSS Engineer

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Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8130091, AB Western Stairwell -10' to grade including TF transition.

Survey Unit Description:

Operating History: The Auxiliary Building is a reinforced concrete structure that contained the RadWaste processing and supporting systems. The building contained six main elevations. Residual radioactive material was known to be present on all levels of the interior of the building. Operating records and the HSA document several events with the potential for a release of radioactivity inside this structure.

Site Characterization: Direct measurements were made of each of the interior elevation surfaces as well as the exterior surfaces of the structure. These measurements confirmed the presence of plant-derived radionuclides. The direct measurements on the -20' elevation showed a mean gross activity level of 247,831 dpm/100 cm² and a maximum value of 10,080,000 dpm/100 cm². Direct measurements on the grade elevation showed a mean gross activity level of 373,758 dpm/100 cm² and a maximum value of 5,800,000 dpm/100 cm². Direct measurements on the building exterior, including the mezzanine roof, showed a mean gross activity level of 1,897 dpm/100 cm² and a maximum value of 2,990 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, Survey Unit 8130091 within the interior, transitioning to the exterior of the auxiliary building was determined to be a Class 3 area.

HSA Events: HSA Report pg. 63.

Survey Unit Design Information:

The Survey Unit Design Parameters are presented in Table 1 below. The survey unit and measurement locations are depicted on the maps in Attachment 1. Direct measurement locations were randomly determined and 20 m² were scanned for approximately 11% coverage. Samples of removable contamination were collected at each direct measurement location. The instrumentation used for the survey along with the MDC values are listed in Tables 2-1 and 2-2 in Attachment 2.

Table 1. Survey Unit Design Parameters

Survey Design Parameter	Value	Comment
Survey Area:	F813	AB Western Stairwell -10' to grade including TF transition
Survey Unit:	0091	Structure Surface
Class:	3	LTP Table 5-4
SU Area (m²):	178.1	
Evaluator:	D.A.Tallman	
DCGL (dpm/100 cm²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL_{emc} (dpm/100 cm²):	N/A	Class 3
LBGR (dpm/100 cm²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	6935	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Class 3
Scan Area (m²):	20	
Scan Coverage (%):	11%	Class 3
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	3.1	
Relative Shift Used:	3	Uses 3.0 if Relative Shift is >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Design Min Samples N:	14	Class 3
Grid Spacing L:	N/A	Class 3

Survey Results:

A total of 14 direct measurements were made in F8130091. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. None of the scan measurements indicated areas of elevated activity. Scan activity ranged from 2912 to 7175 dpm/100 cm², based on a surveyor efficiency of 0.5 and no background subtracted. Samples for removable surface activity were all less than 10% of the DCGL as shown in Table 3. Removable surface activity samples were counted for alpha activity and none was detected at the MDC shown in Table 2-1 of Attachment 2.

Table 2. Direct Measurement Results

Measurement ID	Gross Activity (dpm/100 cm ²)
F8130091-C0001BD	1198
F8130091-C0002BD	2505
F8130091-C0003BD	1069
F8130091-C0004BD	1266
F8130091-C0005BD	1136
F8130091-C0006BD	1380
F8130091-C0007BD	1494
F8130091-C0008BD	1302
F8130091-C0009BD	1281
F8130091-C0010BD	1203
F8130091-C0011BD	1198
F8130091-C0012BD	1292
F8130091-C0013BD	1266
F8130091-C0014BD	1369
Mean:	1354
Median:	1273
Standard Deviation:	348
Range:	1069 - 2505

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8130091C0001SM	-2.24
F8130091C0001SM	-4.82
F8130091C0002SM	-0.95
F8130091C0003SM	-3.53
F8130091C0004SM	-2.24
F8130091C0005SM	-4.82
F8130091C0006SM	-3.53
F8130091C0007SM	1.64
F8130091C0008SM	-3.53
F8130091C0009SM	-2.24
F8130091C0010SM	2.93
F8130091C0011SM	-3.53
F8130091C0012SM	0.34
F8130091C0013SM	1.64
F8130091C0014SM	-2.24
Mean:	-1.81
Median:	-2.24
Standard Deviation:	2.42
Range:	-4.82 to 2.93

Survey Unit Data Assessment:

The survey design required 14 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 4. The sample mean and median values were less than the DCGL. The sample standard deviation was less than the design standard deviation so no additional samples were required.

Table 4. Data Assessment Results

Survey Results Parameter	Value	Comment
Material Background Used (dpm/100 cm ²):	N/A	
Ambient Background Used (dpm/100 cm ²):	N/A	Average Ambient BKG = 0
Actual Direct Measurements (N):	14	
Median (dpm/100 cm ²):	1273	
Mean (dpm/100 cm ²):	1354	
Direct Measurement Standard Deviation	348	
(dpm/100 cm ²):		
Total Standard Deviation (dpm/100 cm ²):	348	Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	2505	
Material Type:	N/A	Background Subtract Not Applied
Sign Test Final N Value:	14	
S+ Value:	14	
Critical Value:	10	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{emc}:	N/A	Class 3
Total Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
Does the Survey Unit Pass All Criteria?	Yes	

Survey Unit Investigations and Results:

No investigations were required for either direct or scan measurements and no investigation results are reported.

ALARA Statement:

As stated in Chapter 4 of the LTP, as long as the residual activity within the survey unit is less than the DCGL (i.e. the survey unit average activity is less than the DCGL), the ALARA criterion has been met.

Changes in Initial Survey Unit Assumptions:

The survey unit was designed as a Class 3 structure survey and the sample results are consistent with that classification. The variability of the survey results was less than the characterization data used for survey design. No potential areas of elevated activity were detected.

Conclusion:

The FSS of this survey unit was properly designed as a Class 3 survey based on Table 5-4 of the LTP. The required number of direct measurements was made and the scan coverage met the requirement of Table 5-6 of the LTP. No direct measurements exceeded the DCGL of 43000 dpm/100 cm² and none of the removable surface activity measurements exceeded 10% of the DCGL. No investigations were required.

The direct measurement data support rejection of the null hypothesis, providing high confidence that the survey unit satisfied the release criteria and that the data quality objectives were met.

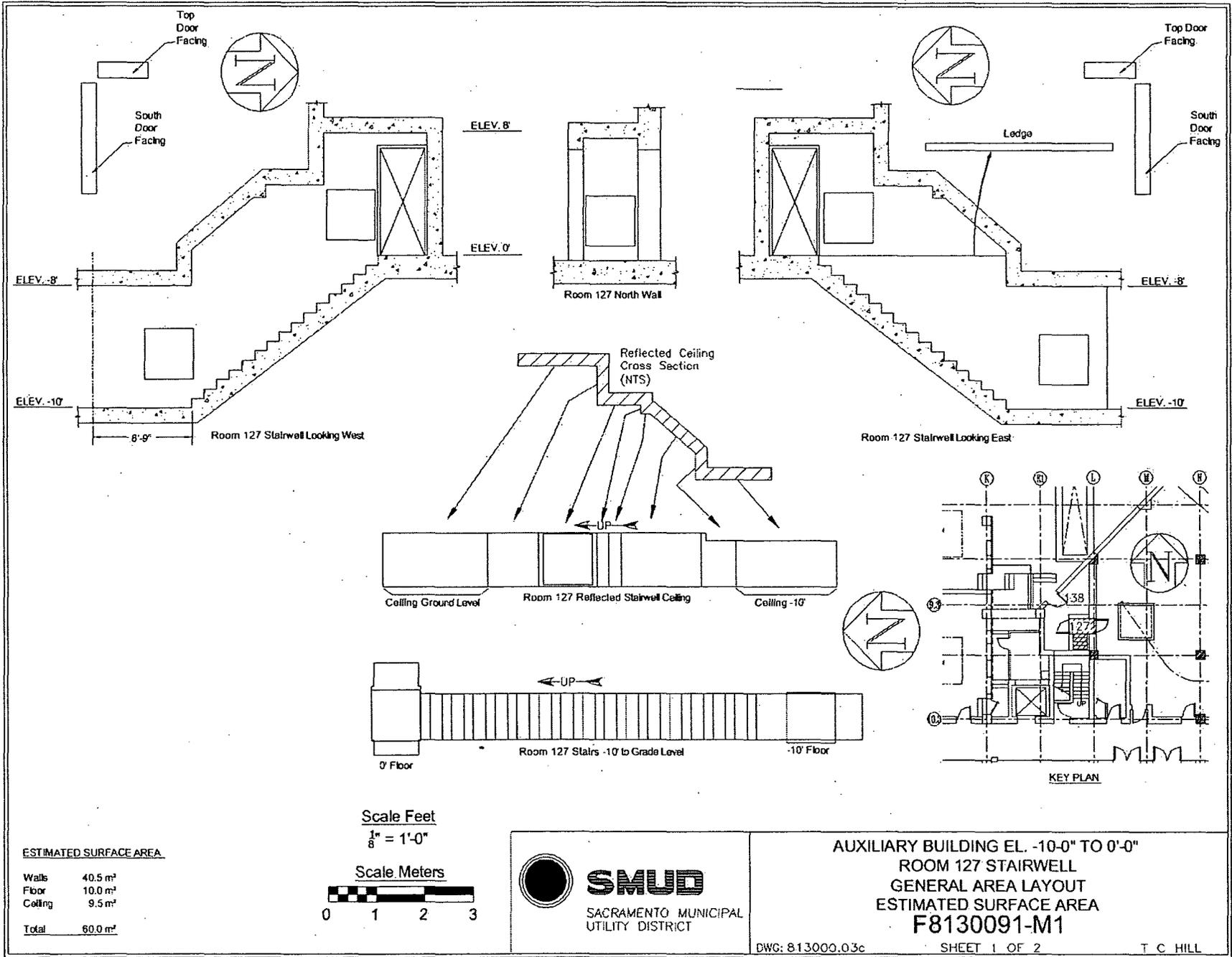
It is concluded that survey unit F8130091 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

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Survey Unit F8130091



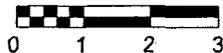
ESTIMATED SURFACE AREA

Walls	40.5 m ²
Floor	10.0 m ²
Ceiling	9.5 m ²
Total	60.0 m²

Scale Feet

$\frac{1}{8}'' = 1'-0''$

Scale Meters



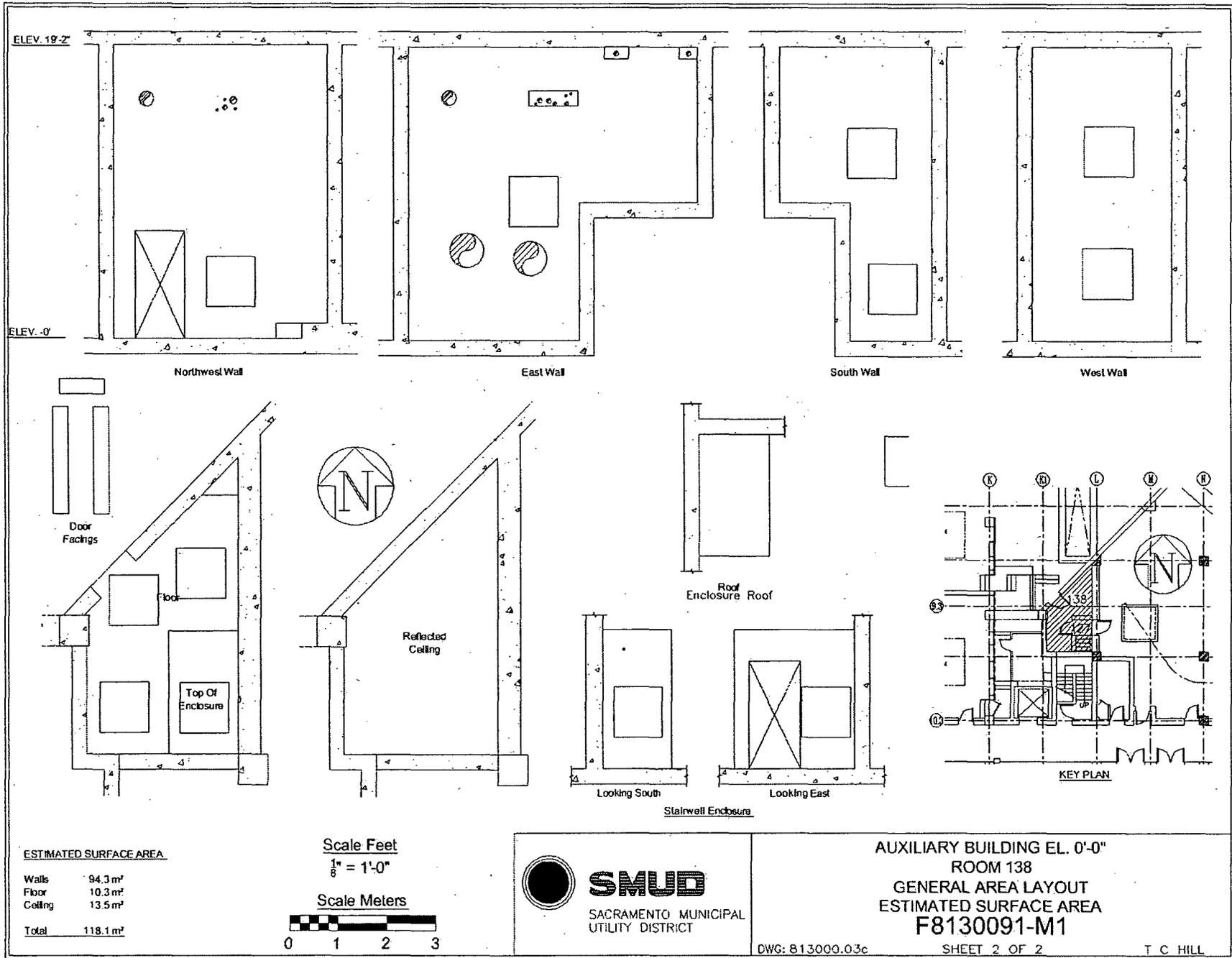
SACRAMENTO MUNICIPAL UTILITY DISTRICT

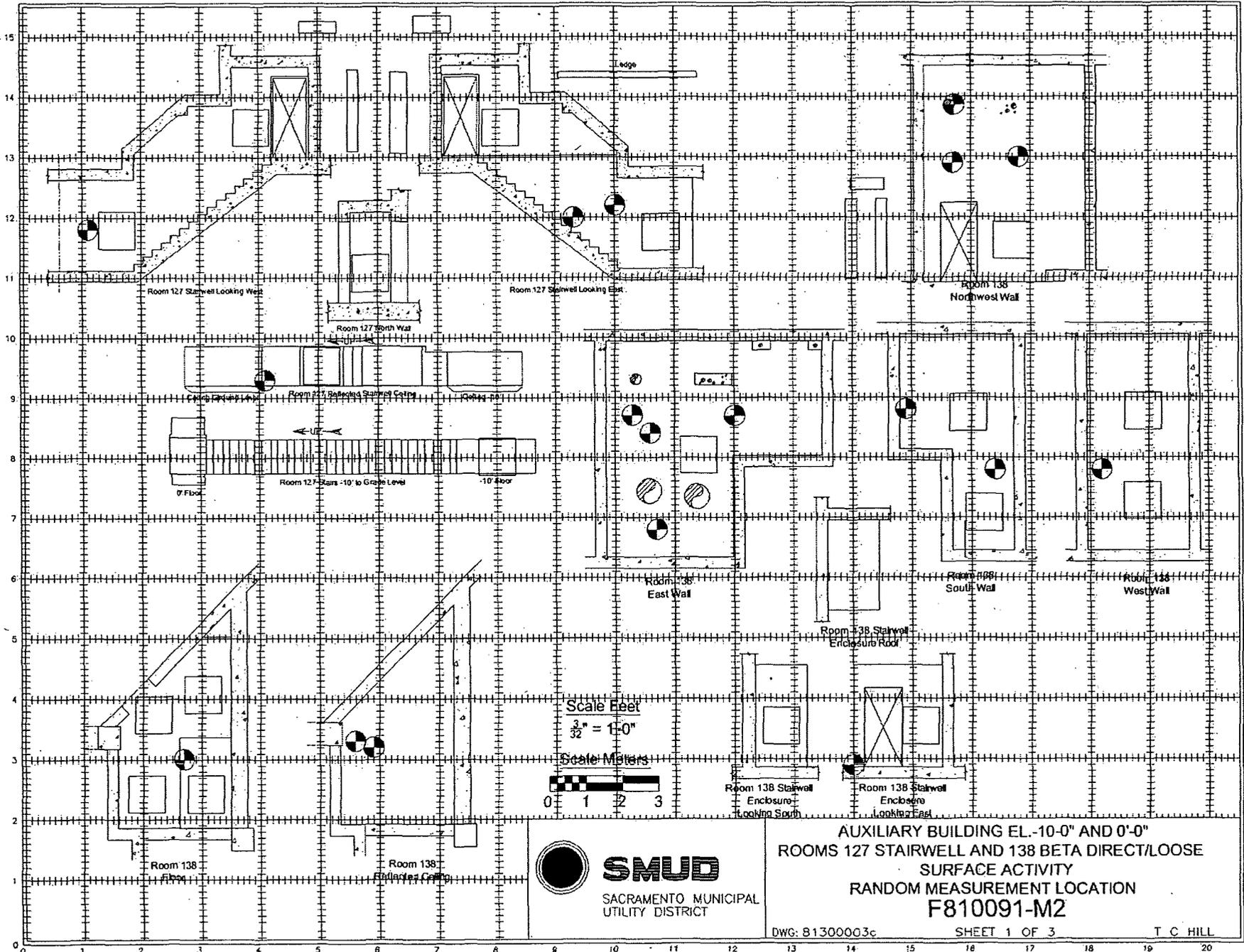
AUXILIARY BUILDING EL. -10'-0" TO 0'-0"
 ROOM 127 STAIRWELL
 GENERAL AREA LAYOUT
 ESTIMATED SURFACE AREA
F8130091-M1

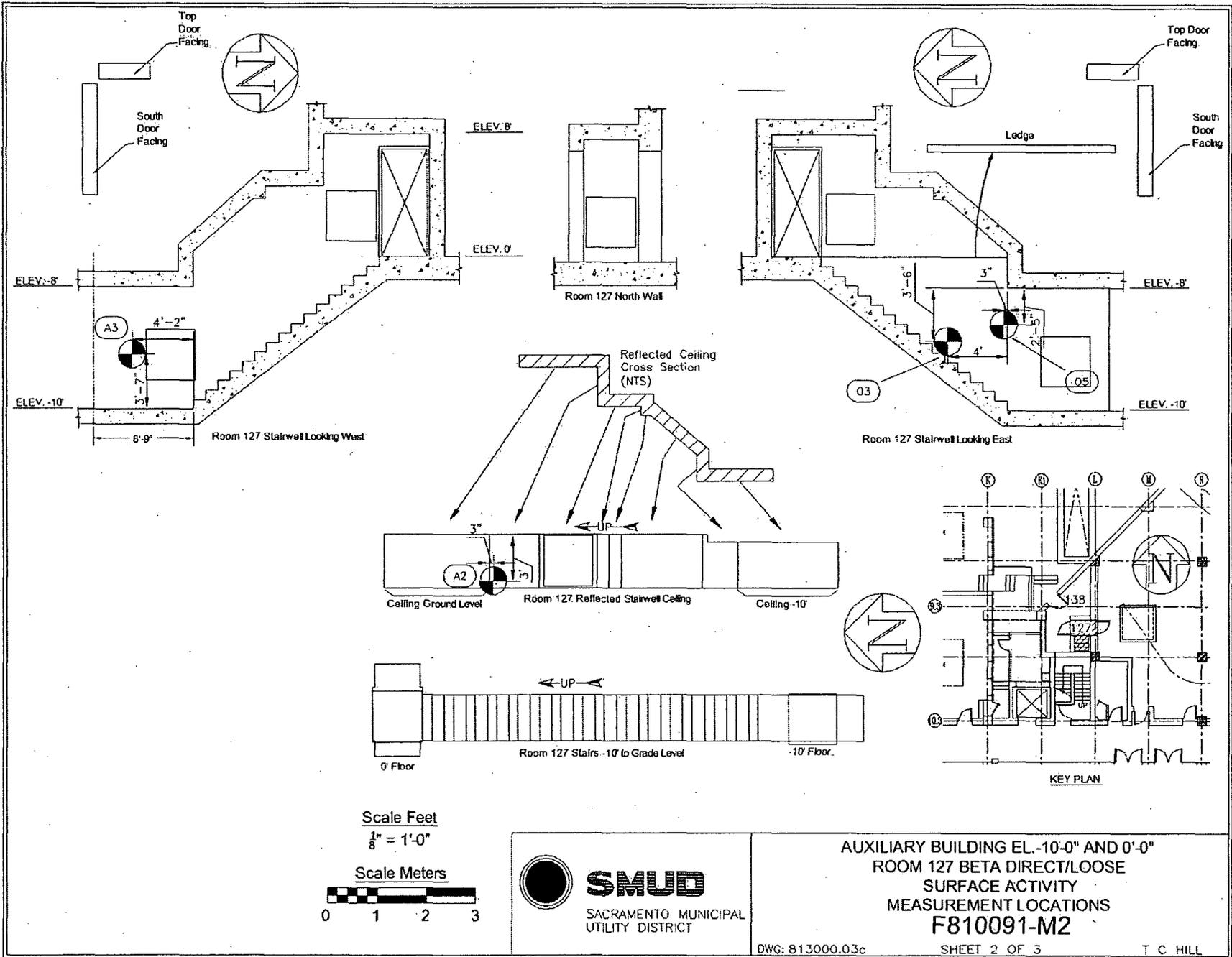
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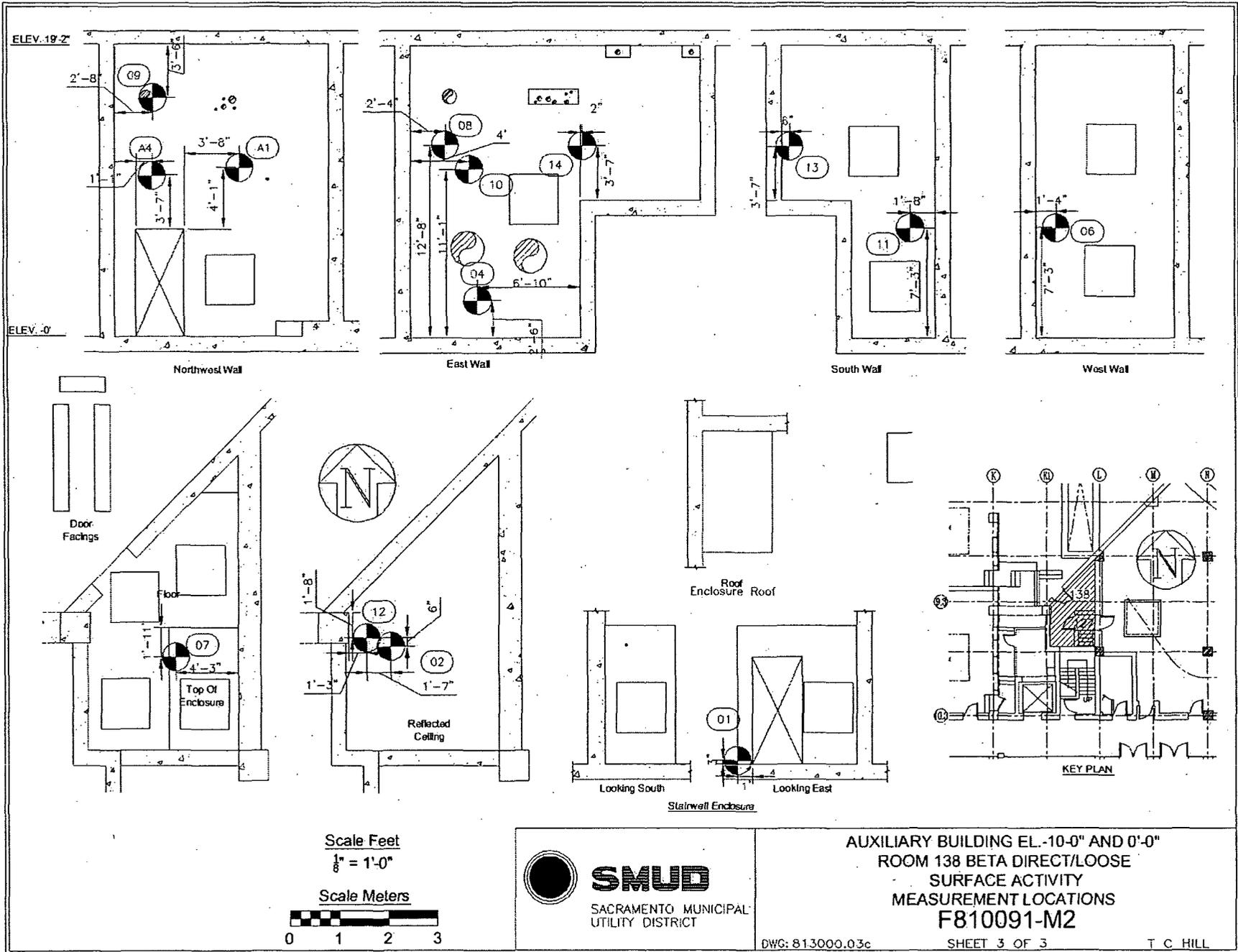
SHEET 1 OF 2

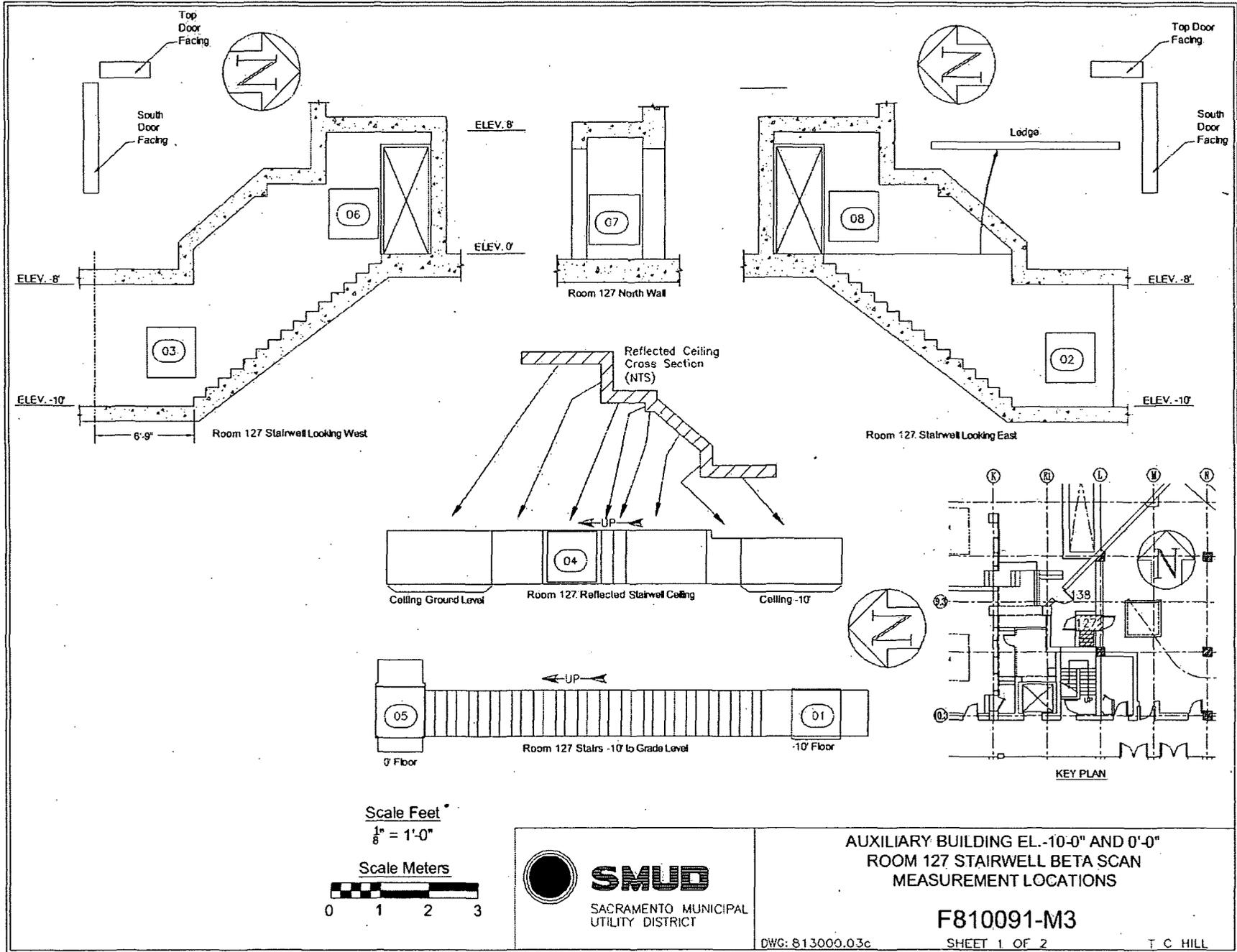
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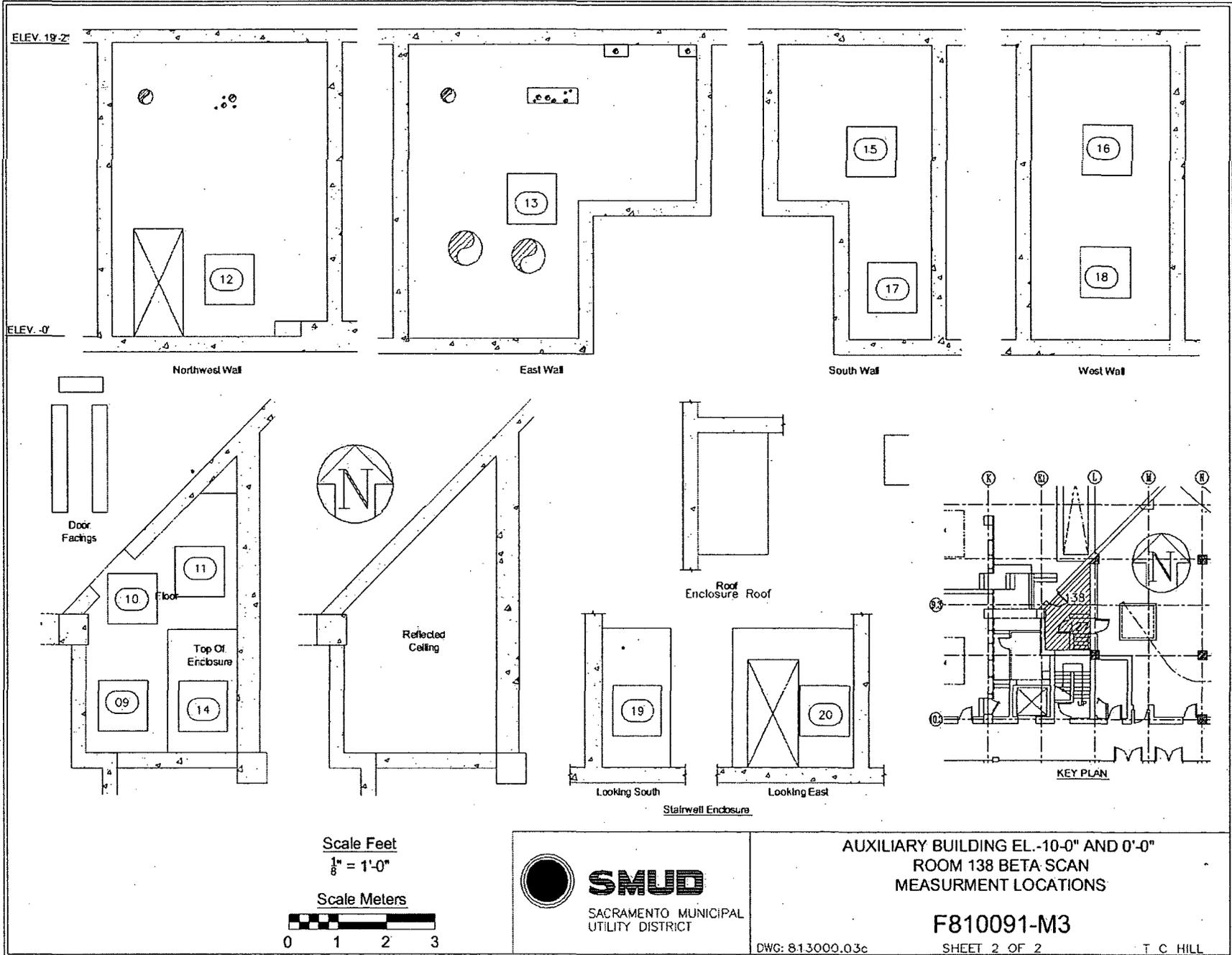












Attachment 2

Instrumentation

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Survey Unit F8130091

Table 2-1. Survey Unit Instrumentation

Instrument Model; Serial No.	Detector Model; Serial No.	MDC Static (dpm/100 cm²)	MDC Scan (dpm/100 cm²)
M2350; 203486	43-68B; 190476	433	1033
Tennelec; 0401171	N/A	6 dpm α , 12 dpm β	N/A

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm²)
Investigation Criteria - Direct	21500
Investigation Criteria – Scan	43000
DCGL _w	43000
DCGL _{EMC}	N/A

Attachment 3

Investigation

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(none required)

Attachment 4

Data Assessment

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