
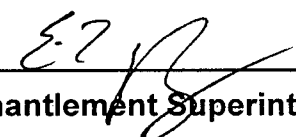


Rancho Seco
Final Status Survey Summary Report
October 15, 2008
T&R, AB, NSEB +40' Bridge
Survey Unit F8140003

Prepared By: Dan A. Tallman  Date: October 16, 2008
FSS Engineer

Reviewed By:  Date: 11/13/08
Lead FSS Engineer

Approved By:  Date: 2-27-09
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8140003, T&R, AB, NSEB +40' Bridge

Survey Unit Description:

Operating History: The Survey Unit consists of the access corridor between the Training and Records Building, Auxiliary Building, and Nuclear Service Electrical Building at the + 40' elevation. The floors, walls, and ceiling are included within this survey unit. This area is referred to as the "tunnel" in some drawings. During the survey of each interface with this interconnecting feature, no provision was made for survey of the tunnel.

Site Characterization: Direct measurements on the +40' elevation of the AB showed a mean gross activity level of 3,288 dpm/100 cm² and a maximum value of 24,781 dpm/100 cm². Characterization surveys performed of the uncontrolled side of the AB resulted in a mean gross activity of 1982 dpm/100 cm² with a maximum of 2360 dpm/100 cm² and a standard deviation of 160.8 dpm/100 cm². Direct measurements of the T&R building showed a mean gross activity level of 1,865 dpm/100 cm² and a maximum value of 2,995 dpm/100 cm². Direct measurements of the NSEB showed a mean gross activity level of 1,913 dpm/100 cm² and a maximum value of 2,669 dpm/100 cm².

Based on the classification procedure (DSIP-0020) and levels of gross activity reported in the region of the survey unit, the "tunnel" was determined to be Class3.

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 60 m² were scanned for approximately 14% 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:	F814	T&R, AB, NSEB +40'
Survey Unit:	0003	Bridge
Class:	3	Structure Surface
SU Area (m²):	431.4	LTP Table 5-4
Evaluator:	D.A.Tallman	
DCGL (dpm/100 cm²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL_{emc} (dpm/100 cm ²):	N/A	Class 3
LBGR (dpm/100 cm²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	3627	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Class 3
Scan Area (m²):	60.8375	
Scan Coverage (%):	14%	Class 3
Z_{1-α} :	1.645	
Z_{1-β} :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	5.9	
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 F8140003. 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 1731 to 3153 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)
F8140003-G0001BD	1598
F8140003-G0002BD	1006
F8140003-G0003BD	939
F8140003-G0004BD	846
F8140003-G0005BD	1520
F8140003-G0006BD	1063
F8140003-G0007BD	980
F8140003-G0008BD	1063
F8140003-G0009BD	1535
F8140003-G0010BD	877
F8140003-G0011BD	975
F8140003-G0012BD	887
F8140003-G0013BD	1401
F8140003-G0014BD	840
Mean:	1109
Median:	993
Standard Deviation:	277
Range:	840 - 1598

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8140003G0001SM	-2.24
F8140003G0002SM	-4.82
F8140003G0003SM	-3.53
F8140003G0004SM	-2.24
F8140003G0005SM	-2.24
F8140003G0006SM	-2.24
F8140003G0007SM	-4.82
F8140003G0008SM	-3.53
F8140003G0009SM	-3.53
F8140003G0010SM	-3.53
F8140003G0011SM	-2.24
F8140003G0012SM	-4.82
F8140003G0013SM	-4.82
F8140003G0014SM	-3.53
Mean:	-3.44
Median:	-3.53
Standard Deviation:	1.03
Range:	-4.82 to -2.24

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	Average Ambient BKG = 0
Ambient Background Used (dpm/100 cm ²):	N/A	
Actual Direct Measurements (N):	14	
Median (dpm/100 cm ²):	993	
Mean (dpm/100 cm ²):	1109	
Direct Measurement Standard Deviation (dpm/100 cm ²):	277	Based on samples and backgrounds.
Total Standard Deviation (dpm/100 cm ²):	277	
Maximum (dpm/100 cm ²):	1598	
Material Type:	N/A	
Sign Test Final N Value:	14	
S+ Value:	14	Background Subtract Not Applied
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	
Total Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
Does the Survey Unit Pass All Criteria?	Yes	Class 3

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 and the EMC criterion has been met), 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.

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.

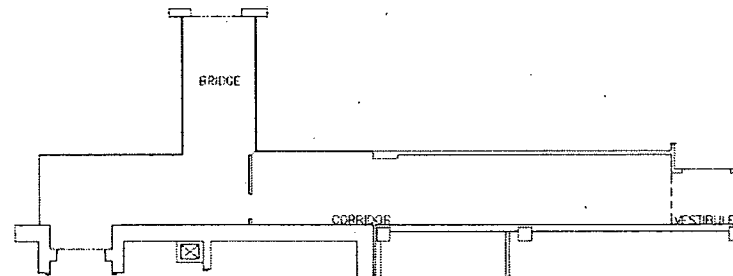
It is concluded that survey unit F8140003 meets the release criteria of 10CFR20.1402.

Attachment 1

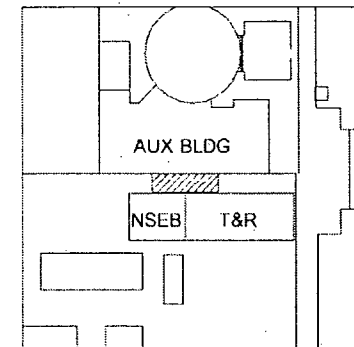
Maps

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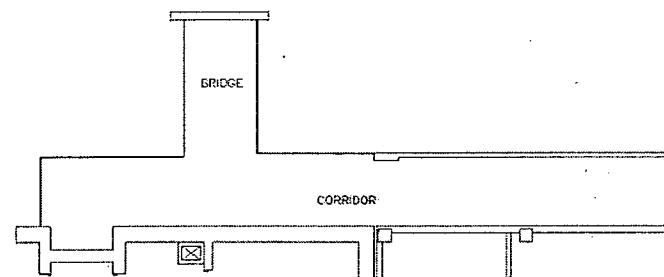
Survey Unit F8140003



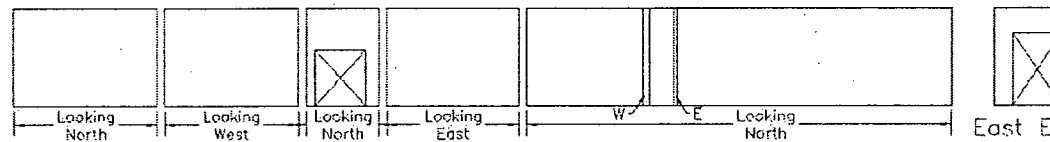
PLAN VIEW FLOOR



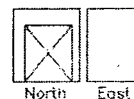
KEY PLAN



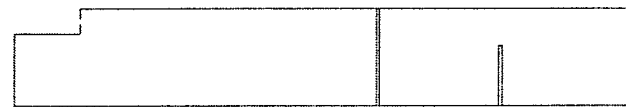
REFLECTED CEILING



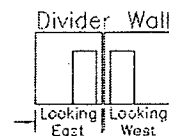
DEVELOPED NORTH WALL



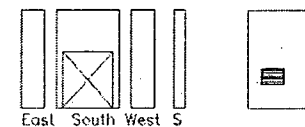
East End Vestibule Walls



South Wall



Divider Wall



West End Vestibule Walls Corridor Wall

Estimated Surface Areas

Ceiling	81.9 m ²
Walls	260.9 m ²
Floor	88.6 m ²
Total	431.4 m ²

SCALE FEET

$\frac{3}{64} = 1 \text{ FOOT}$

SCALE METER

0 1 2 3 4 5



SMUD

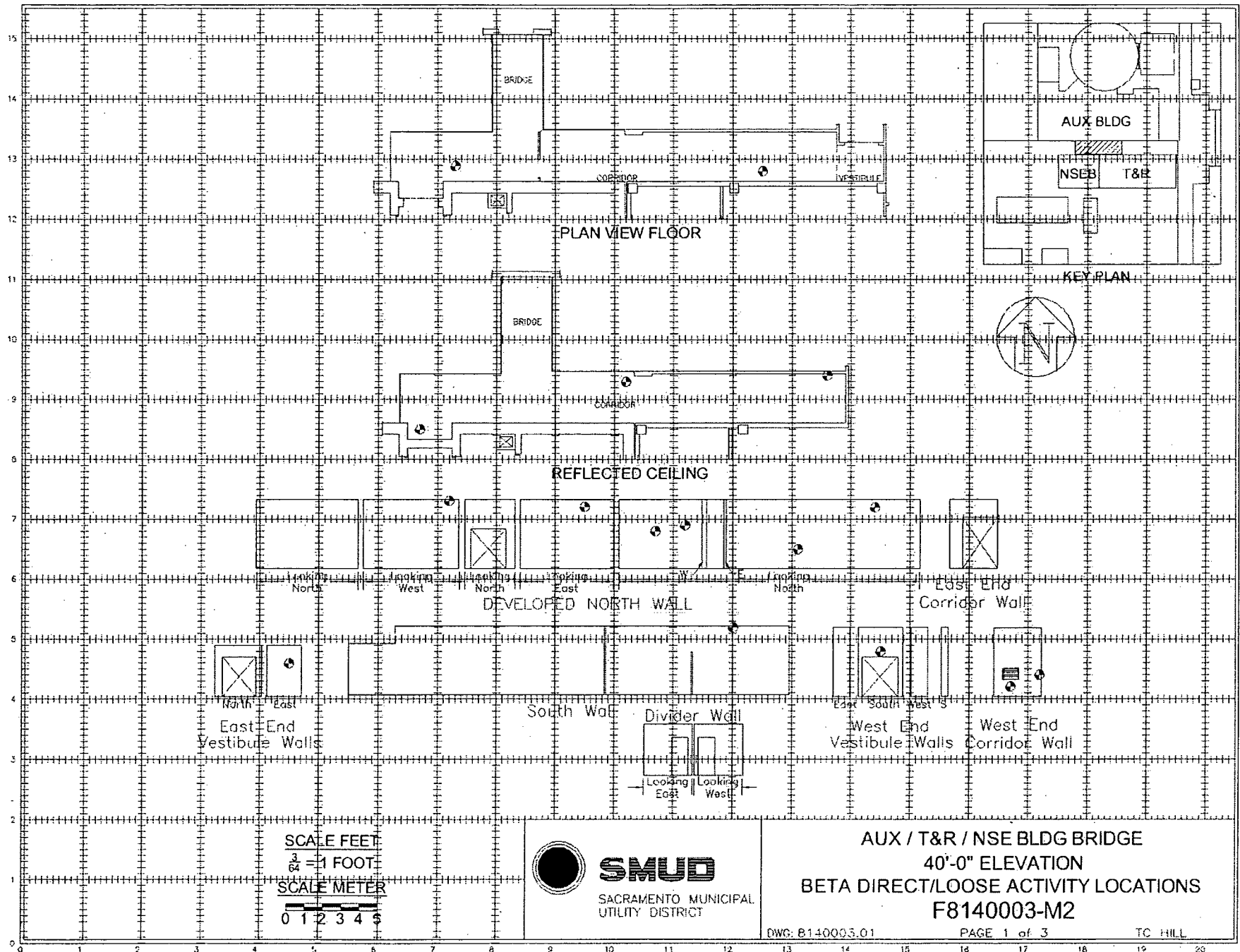
SACRAMENTO MUNICIPAL
UTILITY DISTRICT

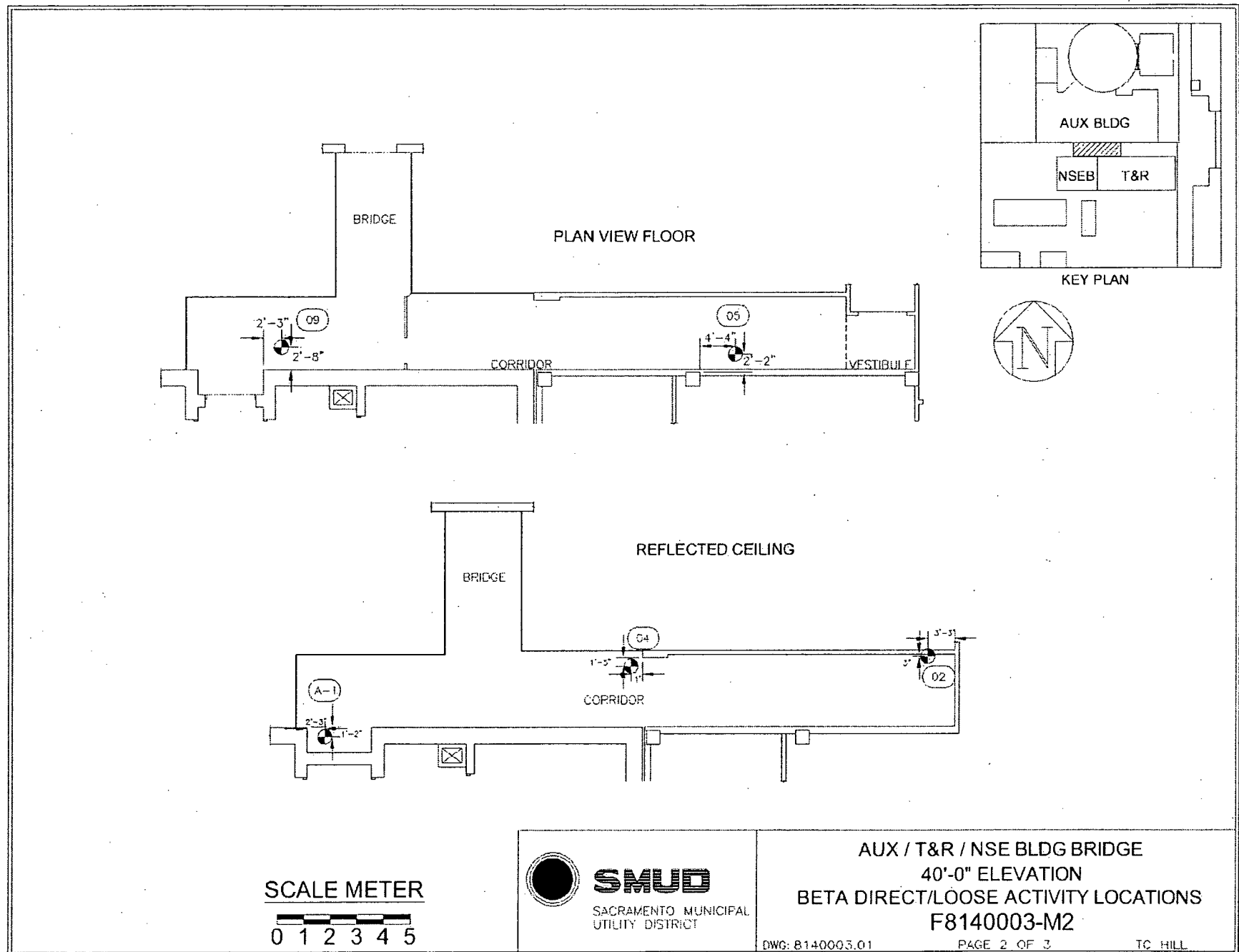
AUX / T&R / NSE BLDG BRIDGE
40'-0" ELEVATION
GENERAL SURFACE AREA ESTIMATES
F8140003-M1

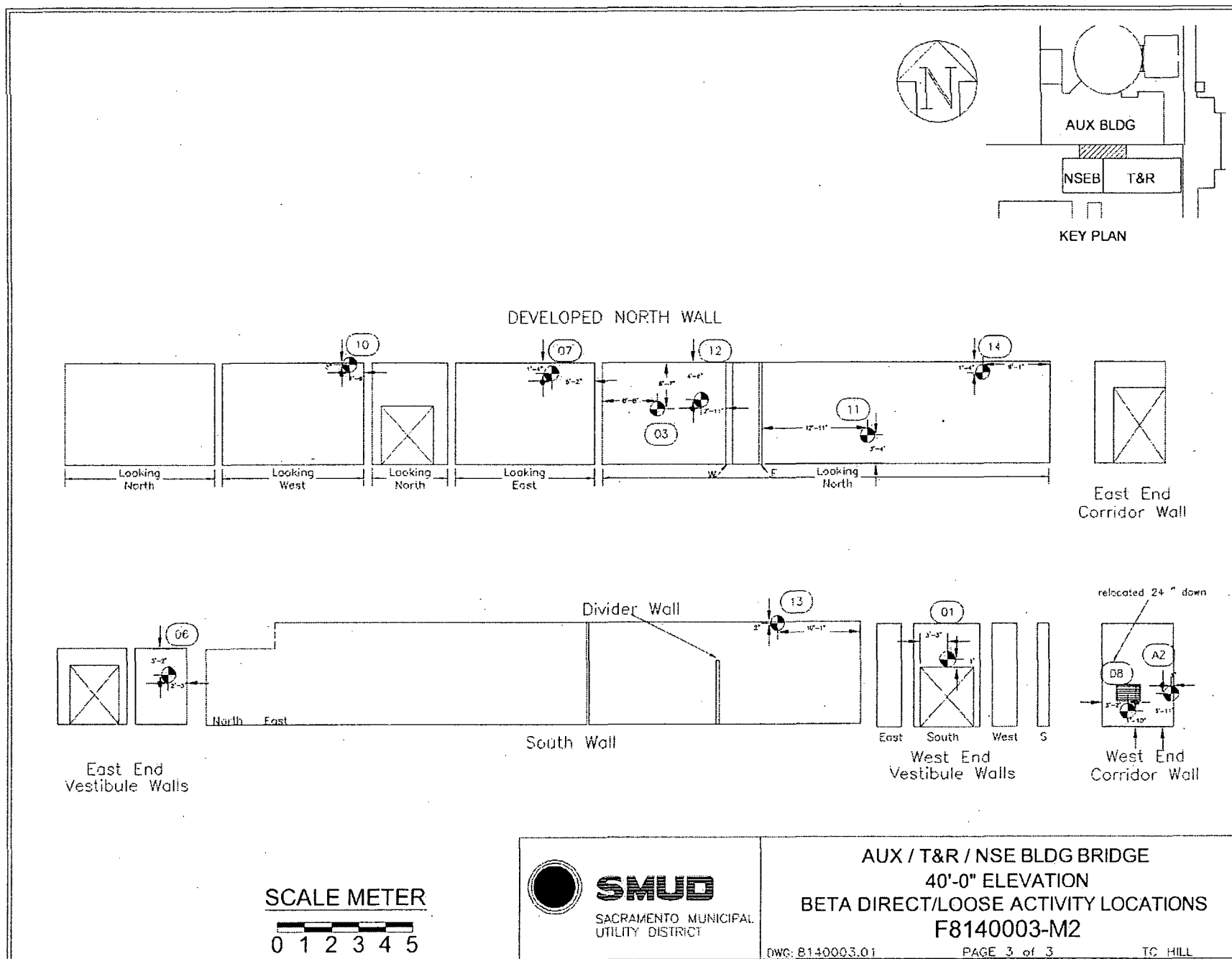
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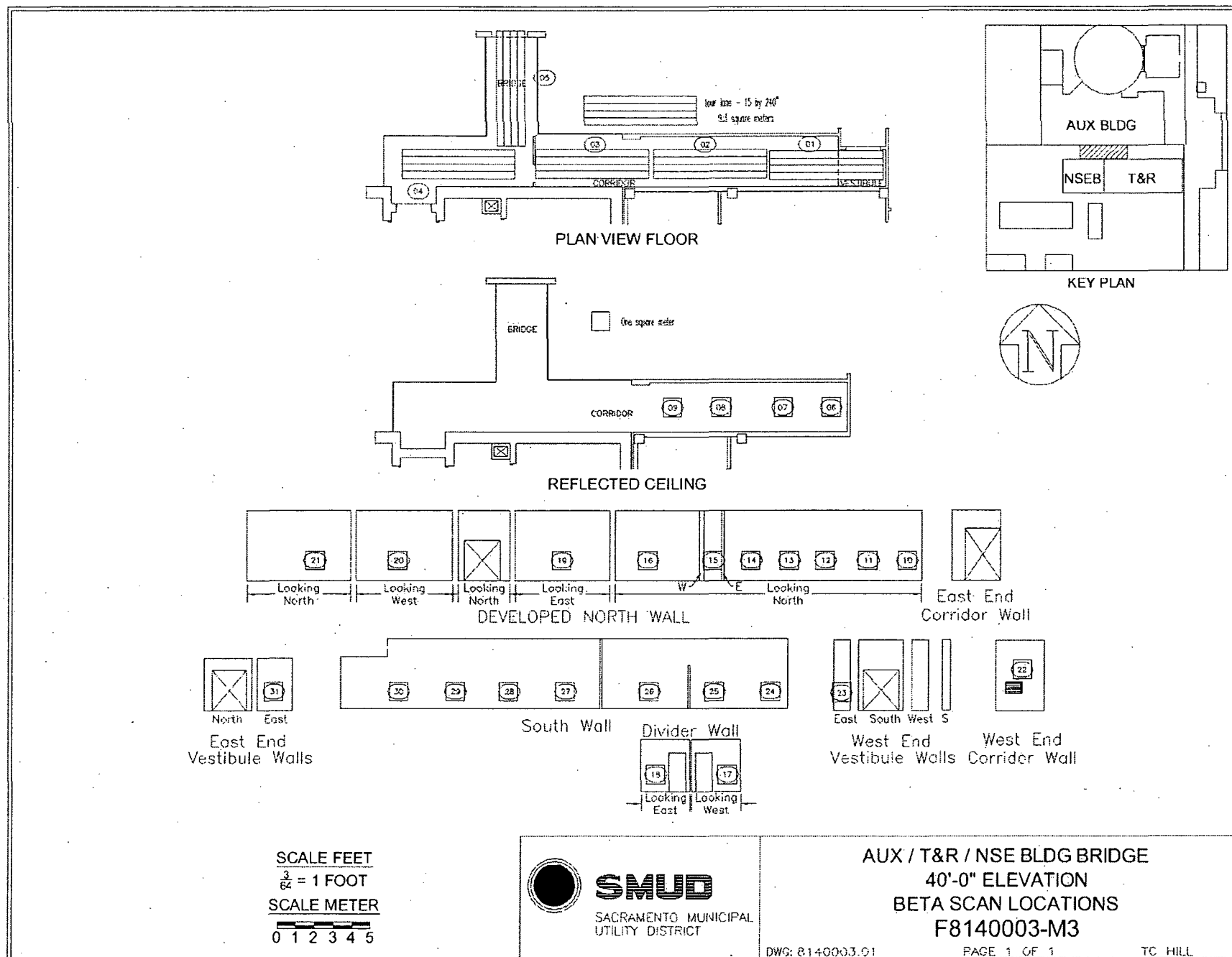
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Attachment 2

Instrumentation

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Survey Unit F8140003

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
M2350; 142499	43-37; 148502	N/A	616
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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Survey Unit F8140003

