

Rancho Seco
Final Status Survey Summary Report
February 8, 2009
Cooling Tower Buffer (South)
Survey Unit F8080031

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Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8080031, Cooling Tower Buffer (South)

Survey Unit Description:

Operating History: The cooling towers and basins were part of the condenser cooling water system. The paved area comprising the basins was not reported to have been used for the storage of radioactive material. Operating records and the HSA document one event with the potential for a release of radioactivity associated with this survey area.

Site Characterization: Direct measurements were made of the exterior surfaces of the structure which confirmed the presence of plant-derived radionuclides. Direct structure measurements showed a mean gross activity level of 4,952 dpm/100 cm² and a maximum value of 6,289 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the area was determined to be a Class 2 area.

HSA Events: PDQ-930036.

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 determined using a random-start, fixed grid pattern and 1498 m² were scanned for approximately 20% coverage. 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:	F808	Cooling Tower Buffer (South)
Survey Unit:	0031	Open Land Area
Class:	2	LTP Table 5-4
SU Area (m²):	7500	
Evaluator:	Erin L. Brown	
DCGL Cs137 surrogate (pCi/g):	51.2	
Area Factor:	N/A	Class 2
Design DCGL_{emc} (pCi/g):	N/A	Class 2
LBGR (pCi/g):	25.6	Default = 50% DCGL
Design Sigma (pCi/g):	0.92	LTP, Table 5-4C, Rev. No. 1
Type I Error:	0.05	
Type II Error:	0.05	
Nuclide:	Cs137	
Sample Area (m²):	536	Class 2
Total Area Scanned (m²):	1498	
Scan Coverage (%):	20%	Class 2
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	27.8	
Relative Shift Used:	3	Uses 3.0 if Rel Shift >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Grid Spacing L:	23.1	Class 2

Survey Results:

A total of 20 direct measurements were made in F8080031. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. None of the ISOCS scan measurements indicated activity above the MDC (3.23E-01 to 4.09E-01) for Cs-137.

Table 2. Direct Measurement Results
(all activity values in pCi/g)

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
Mean:		9.66E-01	
Median:		9.77E-01	
Standard Deviation:		6.52E-02	
Range:	7.40E-01 to 1.06E00		
F8080031 A0001GD	1.04E00	< 1.04E00	
F8080031 A0002GD	7.40E-01	< 7.40E-01	
F8080031 A0003GD	9.93E-01	< 9.93E-01	
F8080031 A0004GD	1.00E00	< 1.00E00	
F8080031 A0005GD	1.02E00	< 1.02E00	
F8080031 A0006GD	9.85E-01	< 9.85E-01	
F8080031 A0007GD	1.03E00	< 1.03E00	
F8080031 A0008GD	9.80E-01	< 9.80E-01	
F8080031 A0009GD	9.59E-01	< 9.59E-01	
F8080031 A0010GD	9.79E-01	< 9.79E-01	
F8080031 A0011GD	9.75E-01	< 9.75E-01	
F8080031 A0012GD	1.06E00	< 1.06E00	
F8080031 A0013GD	9.45E-01	< 9.45E-01	
F8080031 A0014GD	9.26E-01	< 9.26E-01	
F8080031 A0015GD	9.59E-01	< 9.59E-01	
F8080031 A0016GD	9.80E-01	< 9.80E-01	
F8080031 A0017GD	9.35E-01	< 9.35E-01	
F8080031 A0018GD	9.56E-01	< 9.56E-01	
F8080031 A0019GD	9.39E-01	< 9.39E-01	
F8080031 A0020GD	9.26E-01	< 9.26E-01	

Survey Unit Data Assessment:

The survey design required 20 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 3. 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 3. Data Assessment Results

Survey Results Parameter	Value	Comment
Actual Direct Measurements (N):	20	
Median (pCi/g):	9.77E-01	
Mean (pCi/g):	9.66E-01	
Standard Deviation (pCi/g):	6.52E-02	
Maximum (pCi/g):	1.06E00	
Sign Test Final N Value:	20	
S+ Value:	20	
Critical Value:	14	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{emc}:	N/A	Class 2
Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
The survey unit passes all conditions?	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 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 2 land 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 2 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. All of the direct measurements were less than 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.

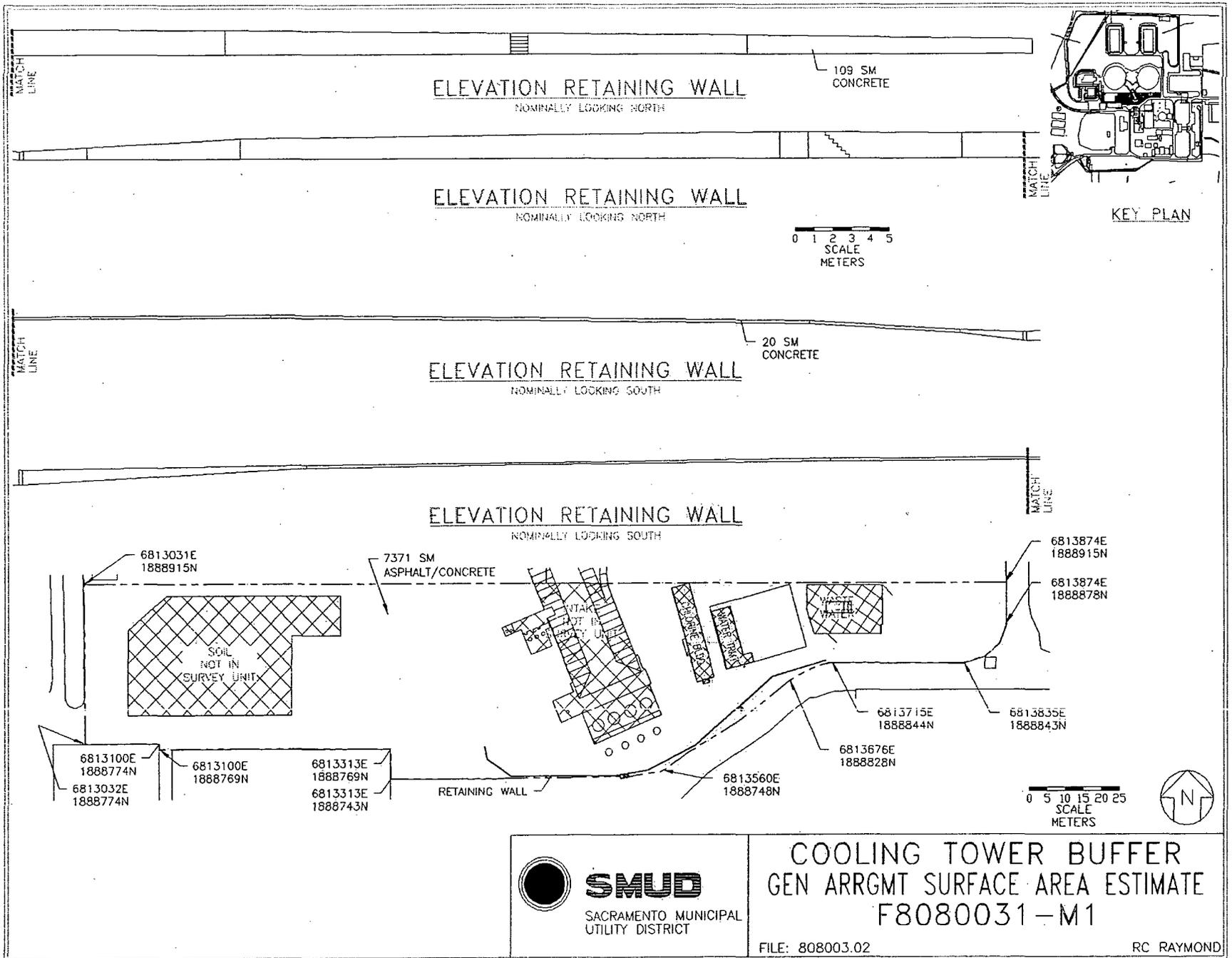
It is concluded that survey unit F8080031 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

February 8, 2009

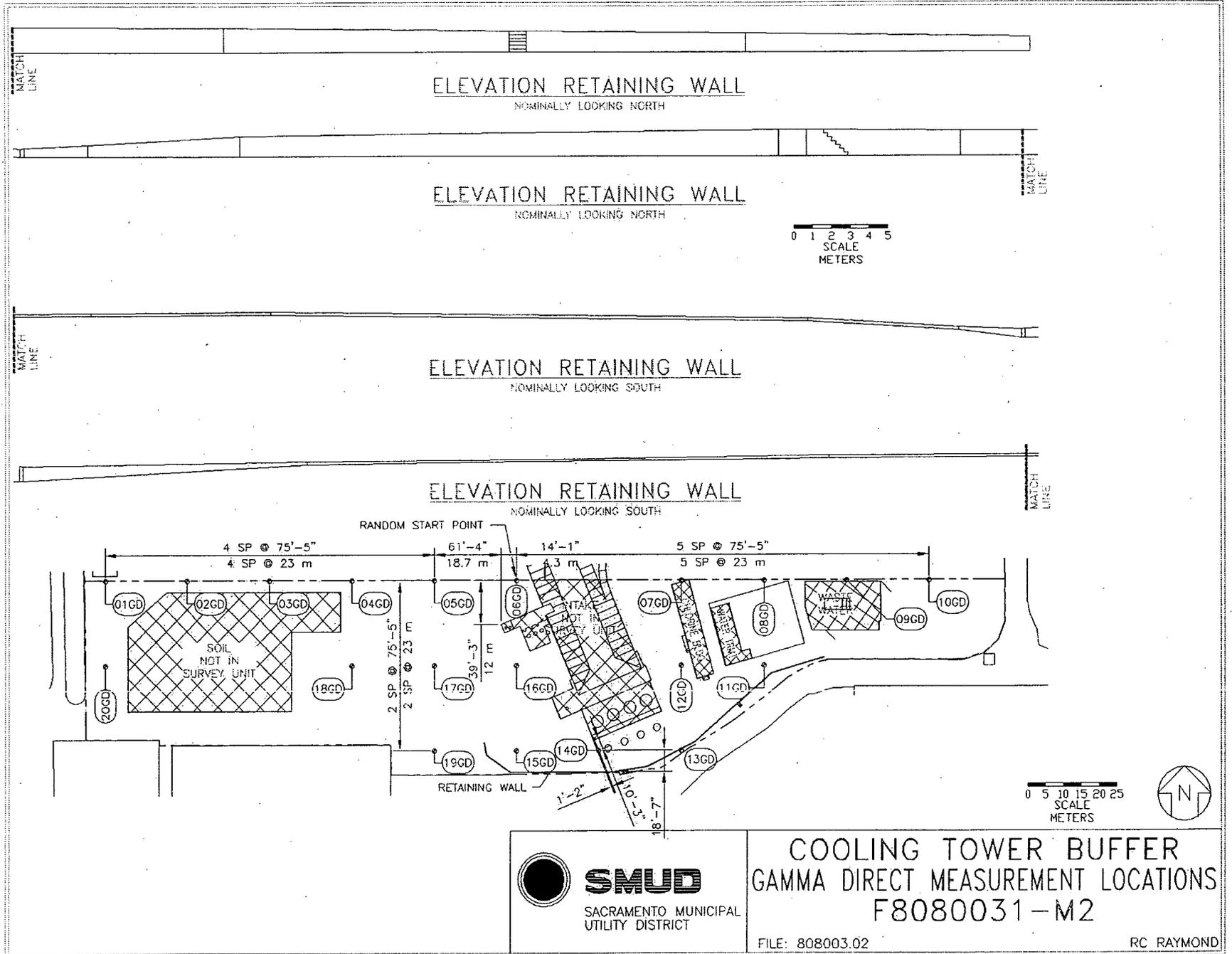
Survey Unit F8080031

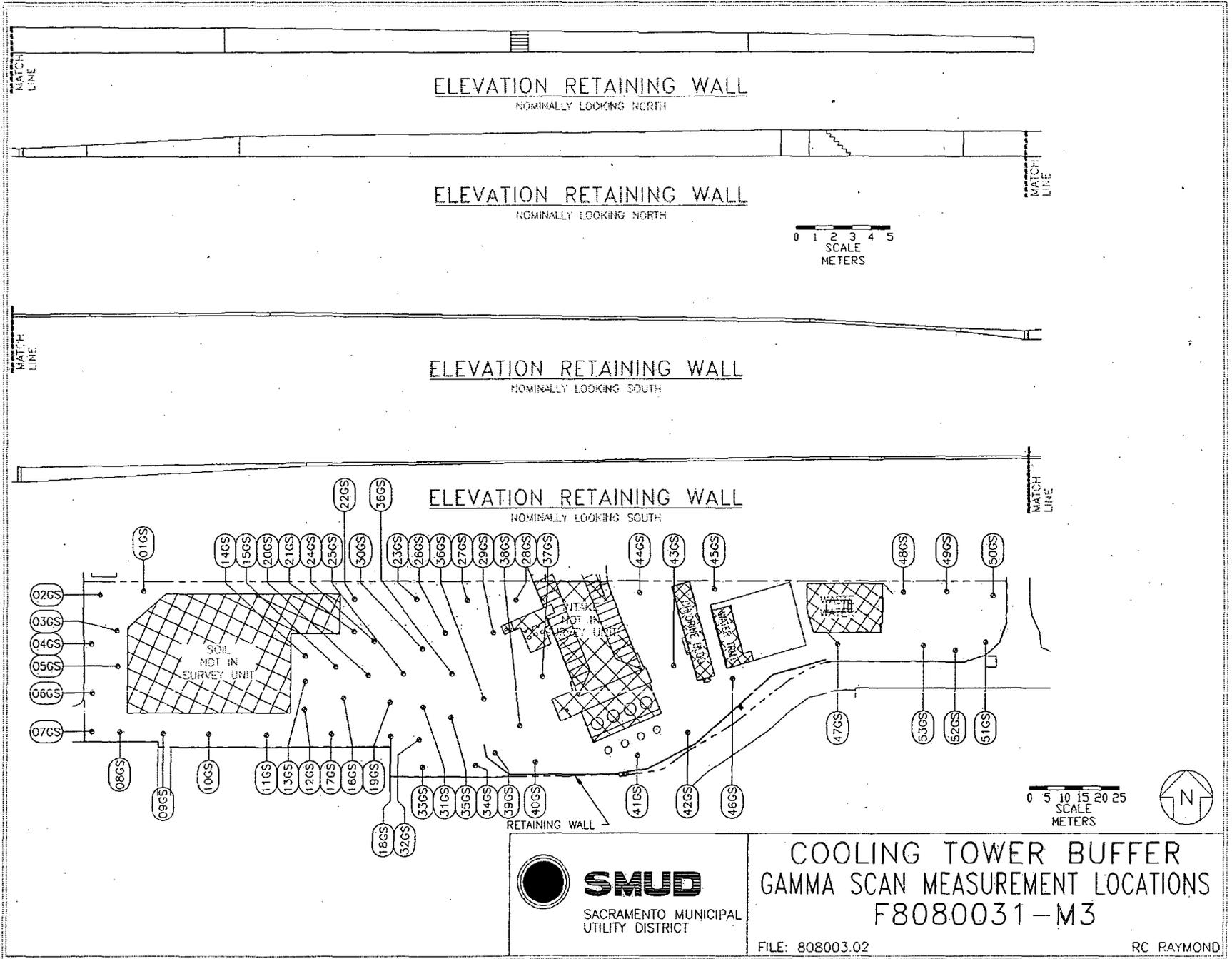


SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT

**COOLING TOWER BUFFER
GEN ARRGMT SURFACE AREA ESTIMATE
F8080031-M1**

FILE: 808003.02 RC RAYMOND






SMUD
SACRAMENTO MUNICIPAL
UTILITY DISTRICT

COOLING TOWER BUFFER
GAMMA SCAN MEASUREMENT LOCATIONS
F8080031-M3

FILE: 808003.02

RC RAYMOND

Attachment 2
Instrumentation
February 8, 2009
Survey Unit F8080031

Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
Inspector	N/A	03069793	Asphalt – 4.09E-01 pCi/g Cs-137 Asphalt – 1.04E+00 pCi/g Co-60
ISOCS	N/A	2983947	Asphalt – 1.06E00 pCi/g Cs-137 Asphalt – 2.88E-01 pCi/g Co-60

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
ISOCS	Investigation Criteria - Scan	Asphalt – 23 pCi/g Cs-137
All	DCGL _w	51.2 Cs-137 12.6 Co-60
All	DCGL _{EMC}	N/A

Attachment 3
Investigation
February 8, 2009
Survey Unit F8080031

(none required)

Attachment 4
Data Assessment
February 8, 2009
Survey Unit F8080031

