

**Rancho Seco**  
**Final Status Survey Summary Report**  
**October 31, 2007**  
**"A" Warehouse (interior)**  
**Survey Unit F8400001**

Prepared By: Dan A Tallman  Date: 10/31/2007  
FSS Engineer

Reviewed By:  Date: 10/31/07  
Lead FSS Engineer

Approved By:  Date: 11-13-07  
Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8400001, "A" Warehouse (interior)

### Survey Unit Description:

Operating History: This structure was used as a primary site warehouse with attached office space. This area was not reported to have been used for the storage of radioactive material. Operating records and the HSA document no occurrences of radioactive material with the potential for a release of radioactivity associated with this survey area.

Site Characterization: Direct measurements were made of the interior and exterior surfaces of the structure which confirmed the absence of plant-derived radionuclides. Direct measurements interior showed a mean gross activity level of 1,941 dpm/100 cm<sup>2</sup> and a maximum value of 3,397 dpm/100 cm<sup>2</sup>. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the area was determined to be a Class 3 area.

HSA Events: None

### 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 234 m<sup>2</sup> were scanned for approximately 5% 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**

<b>Survey Design Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Survey Area:</b>	F840	"A" Warehouse (interior)
<b>Survey Unit:</b>	0001	Structure Surface
<b>Class:</b>	3	LTP Table 5-4
<b>SU Area (m<sup>2</sup>):</b>	4548	
<b>Evaluator:</b>	DA Tallman	
<b>DCGL (dpm/100 cm<sup>2</sup>):</b>	43000	Gross Activity DCGL
<b>Area Factor:</b>	N/A	Class 3
<b>Design DCGL<sub>me</sub></b> (dpm/100 cm <sup>2</sup> ):	N/A	Class 3
<b>LBGR (dpm/100 cm<sup>2</sup>):</b>	21500	Default = 50% DCGL
<b>Design Sigma (dpm/100 cm<sup>2</sup>):</b>	495	
<b>Type I Error:</b>	0.05	
<b>Type II Error:</b>	0.05	
<b>Predominant Nuclide:</b>	Cs-137	
<b>Sample Area (m<sup>2</sup>):</b>	N/A	Class 3
<b>Scan Area (m<sup>2</sup>):</b>	234	
<b>Scan Coverage (%):</b>	5%	Class 3
<b>Z<sub>1-α</sub> :</b>	1.645	
<b>Z<sub>1-β</sub> :</b>	1.645	
<b>Sign P:</b>	0.99865	
<b>Calculated Relative Shift:</b>	43.4	
<b>Relative Shift Used:</b>	3	Uses 3.0 if Relative Shift is >3
<b>N-Value:</b>	11	
<b>Design N-Value + 20%:</b>	14	NUREG-1575 Table 5-5
<b>Design Min Samples N:</b>	14	Class 3
<b>Grid Spacing L:</b>	N/A	Class 3

### Survey Results:

A total of 14 direct measurements were made in F8400001. 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 2,123 to 6,573 dpm/100 cm<sup>2</sup>, 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 <sup>2</sup> )
F8400001-X0001BD	1613
F8400001-X0002BD	1458
F8400001-C0003BD	1852
F8400001-X0004BD	1639
F8400001-X0005BD	1380
F8400001-C0006BD	1873
F8400001-C0007BD	1691
F8400001-U0008BD	1800
F8400001-X0009BD	1530
F8400001-T0010BD	2760
F8400001-M0011BD	661
F8400001-U0012BD	1276
F8400001-X0013BD	1354
F8400001-M0014BD	794
Mean:	1549
Median:	1572
Standard Deviation:	501
Range:	661 - 2760

**Table 3. Removable Surface Activity Results**

<b>Measurement ID</b>	<b>Surface Beta Activity (dpm/100 cm<sup>2</sup>)</b>
F8400001X0001SM	3.58
F8400001X0002SM	9.98
F8400001X0003SM	6.14
F8400001X0004SM	-0.27
F8400001X0005SM	2.29
F8400001X0006SM	-0.27
F8400001X0007SM	7.42
F8400001X0008SM	-1.55
F8400001X0009SM	6.14
F8400001X0010SM	3.58
F8400001X0011SM	-0.27
F8400001X0012SM	2.29
F8400001X0013SM	3.58
F8400001X0014SM	8.7
	9.98
Mean:	4.09
Median:	3.58
Standard Deviation:	3.84
Range:	-1.55 to 9.98

**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. While the sample standard deviation was not less than the design standard deviation, both values for sigma resulted in a relative shift of greater than three (3) so no additional samples were required.

**Table 4. Data Assessment Results**

<b>Survey Results Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Material Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A	Average Ambient BKG = 0
<b>Ambient Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A	
<b>Actual Direct Measurements (N):</b>	14	
<b>Median</b> (dpm/100 cm <sup>2</sup> ):	1572	
<b>Mean</b> (dpm/100 cm <sup>2</sup> ):	1549	
<b>Direct Measurement Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	501	Based on samples and backgrounds.
<b>Total Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	501	
<b>Maximum</b> (dpm/100 cm <sup>2</sup> ):	2760	
<b>Material Type:</b>	N/A	
<b>Sign Test Final N Value:</b>	14	
<b>S+ Value:</b>	14	Background Subtract Not Applied
<b>Critical Value:</b>	10	
<b>Sufficient Samples Collected:</b>	Yes	
<b>Maximum Value &lt; DCGL:</b>	Yes	
<b>Median Value &lt; DCGL:</b>	Yes	
<b>Mean Value &lt; DCGL:</b>	Yes	Class 3 No additional sample required
<b>Maximum Value &lt; DCGL<sub>emc</sub>:</b>	N/A	
<b>Total Standard Deviation &lt;= Sigma:</b>	Investigate	
<b>Pass the Sign Test?</b>	Yes	
<b>Reject the Null Hypothesis?</b>	Yes	
<b>Does the Survey Unit Pass All Criteria?</b>	Investigate	The survey unit passes all conditions: no additional samples required

**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. While the variability of the survey results was not less than the characterization data used for survey design, no additional samples were required. 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 cm<sup>2</sup> 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.

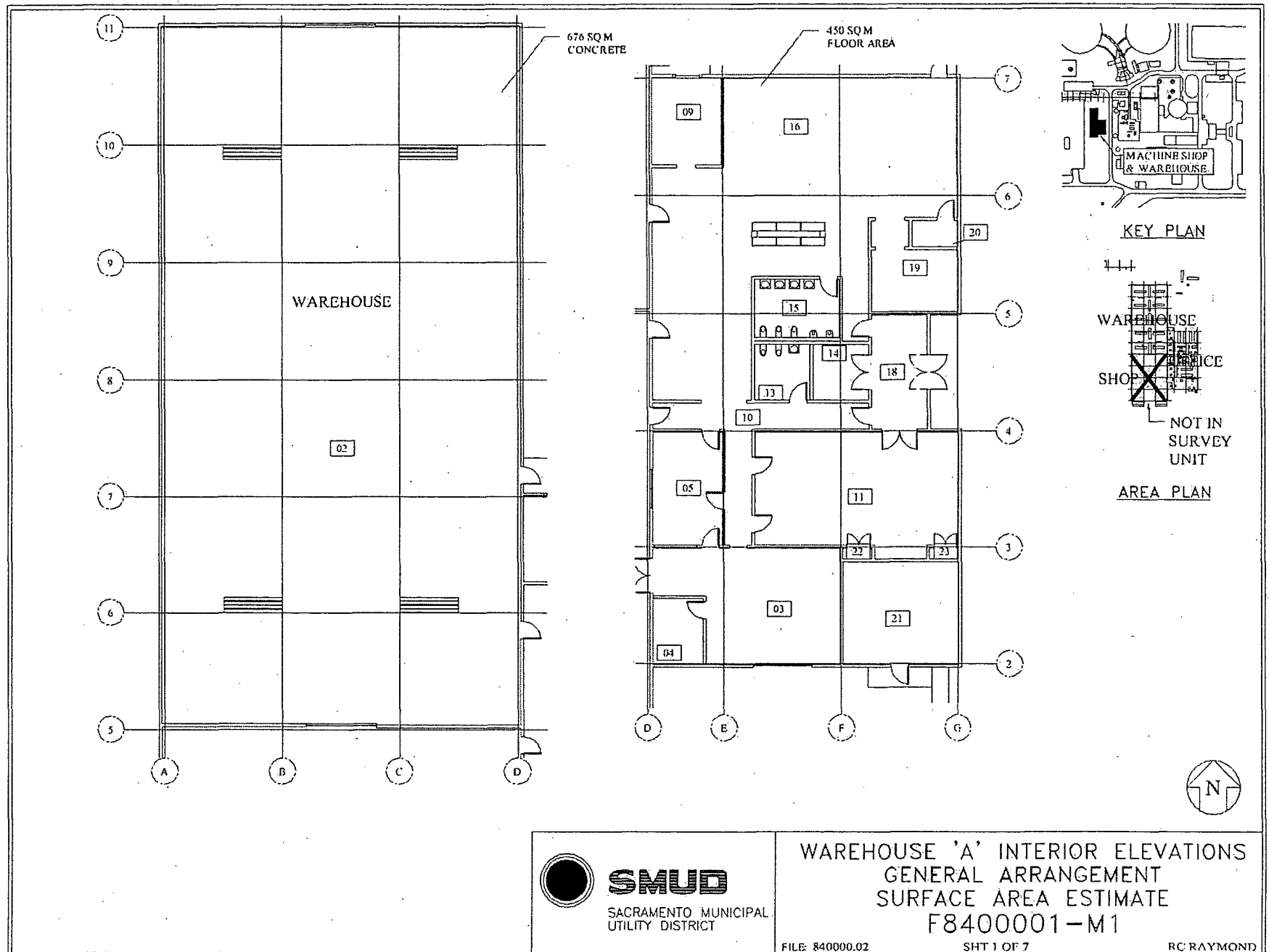
It is concluded that survey unit F8400001 meets the release criteria of 10CFR20.1402.

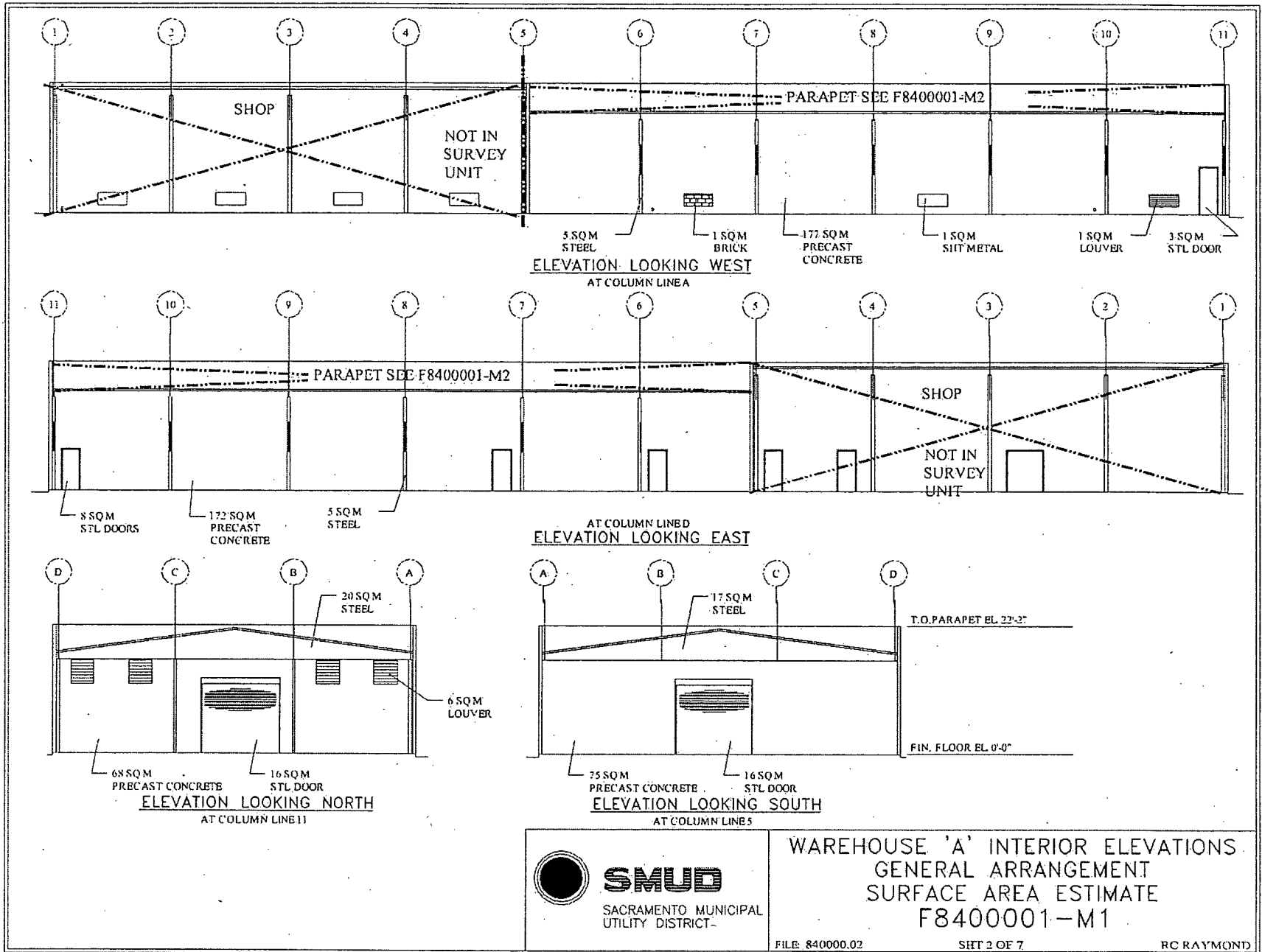
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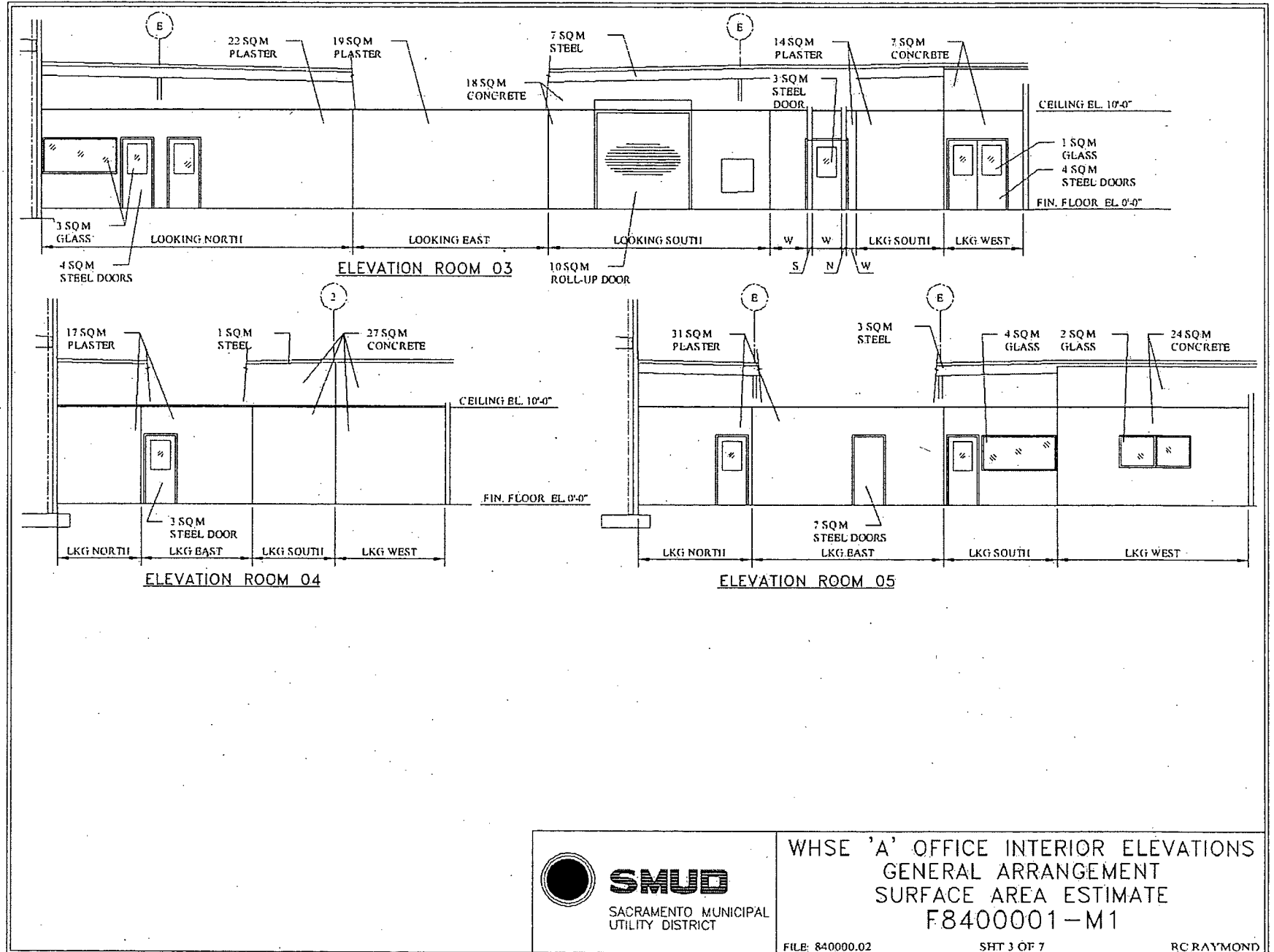
**Maps**

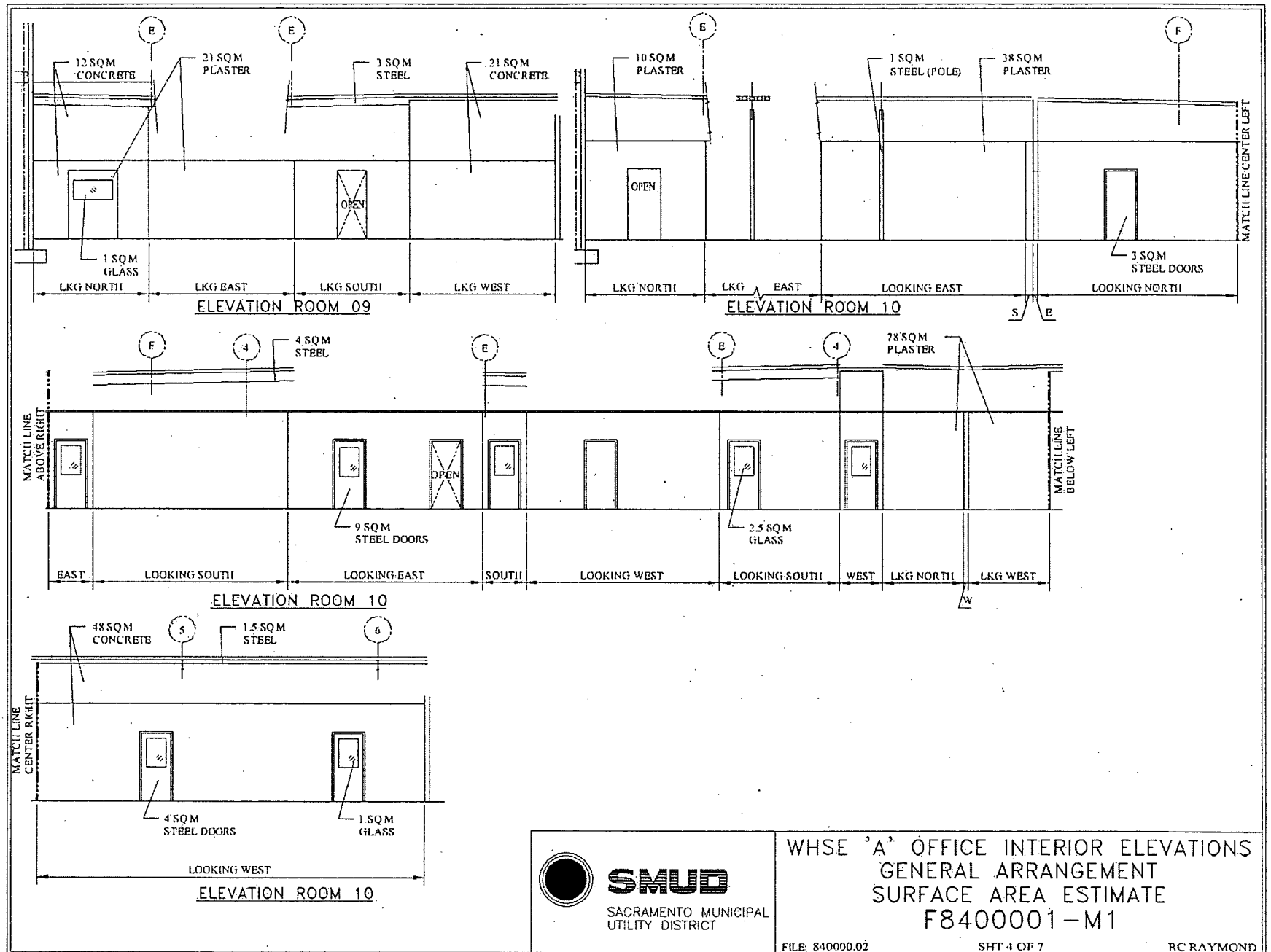
**October 31, 2007**

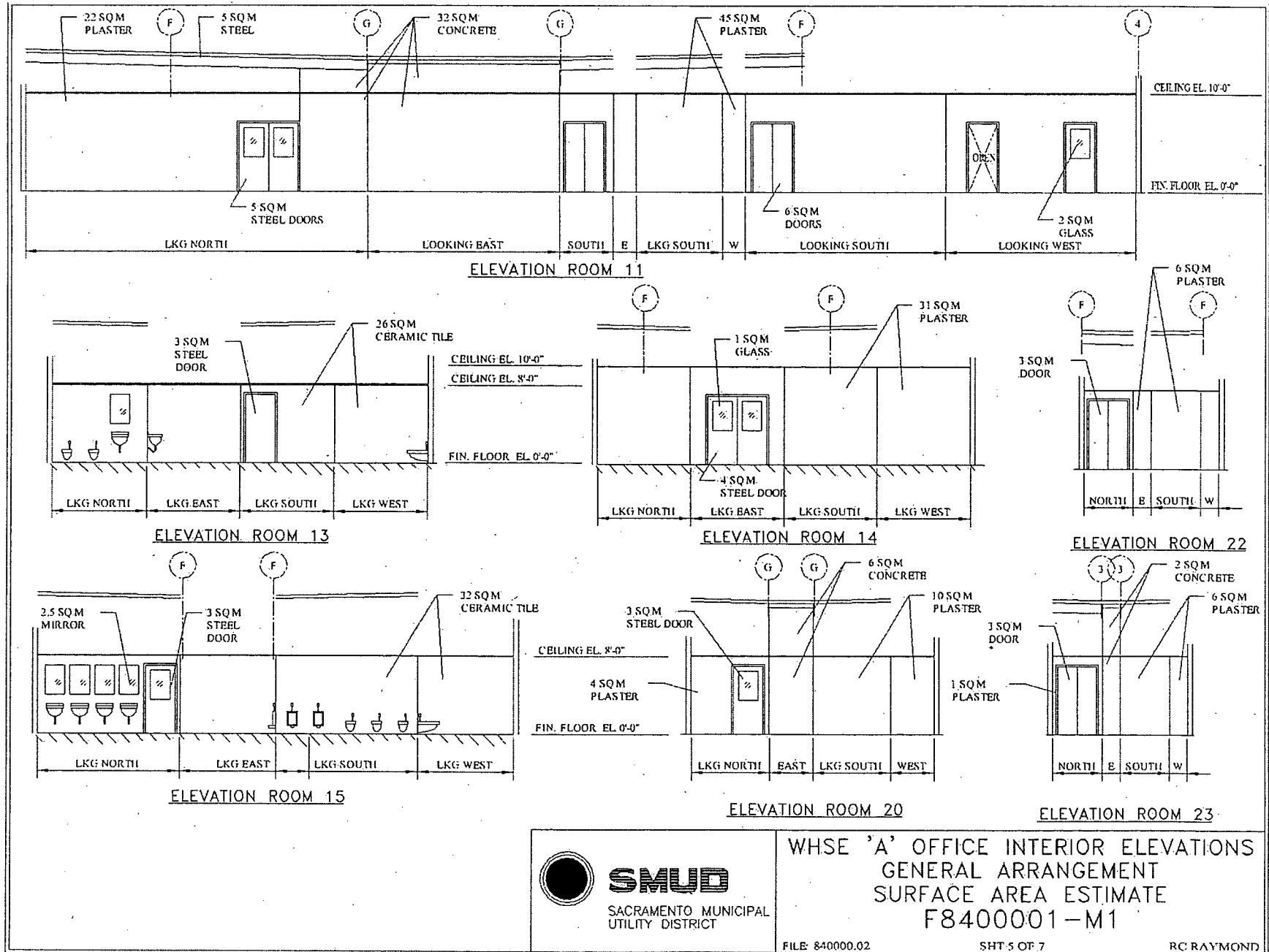
**Survey Unit F8400001**

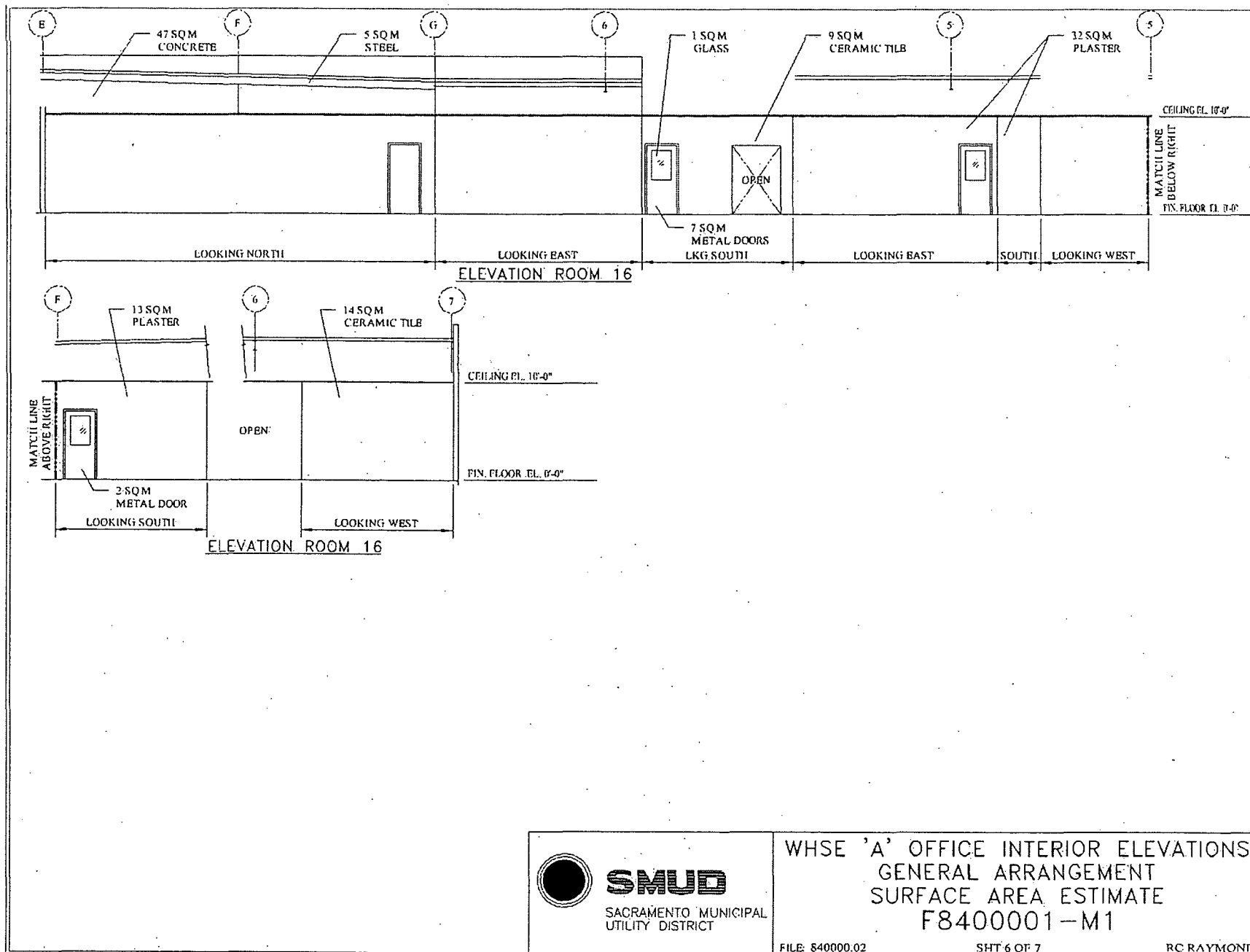












**SMUD**

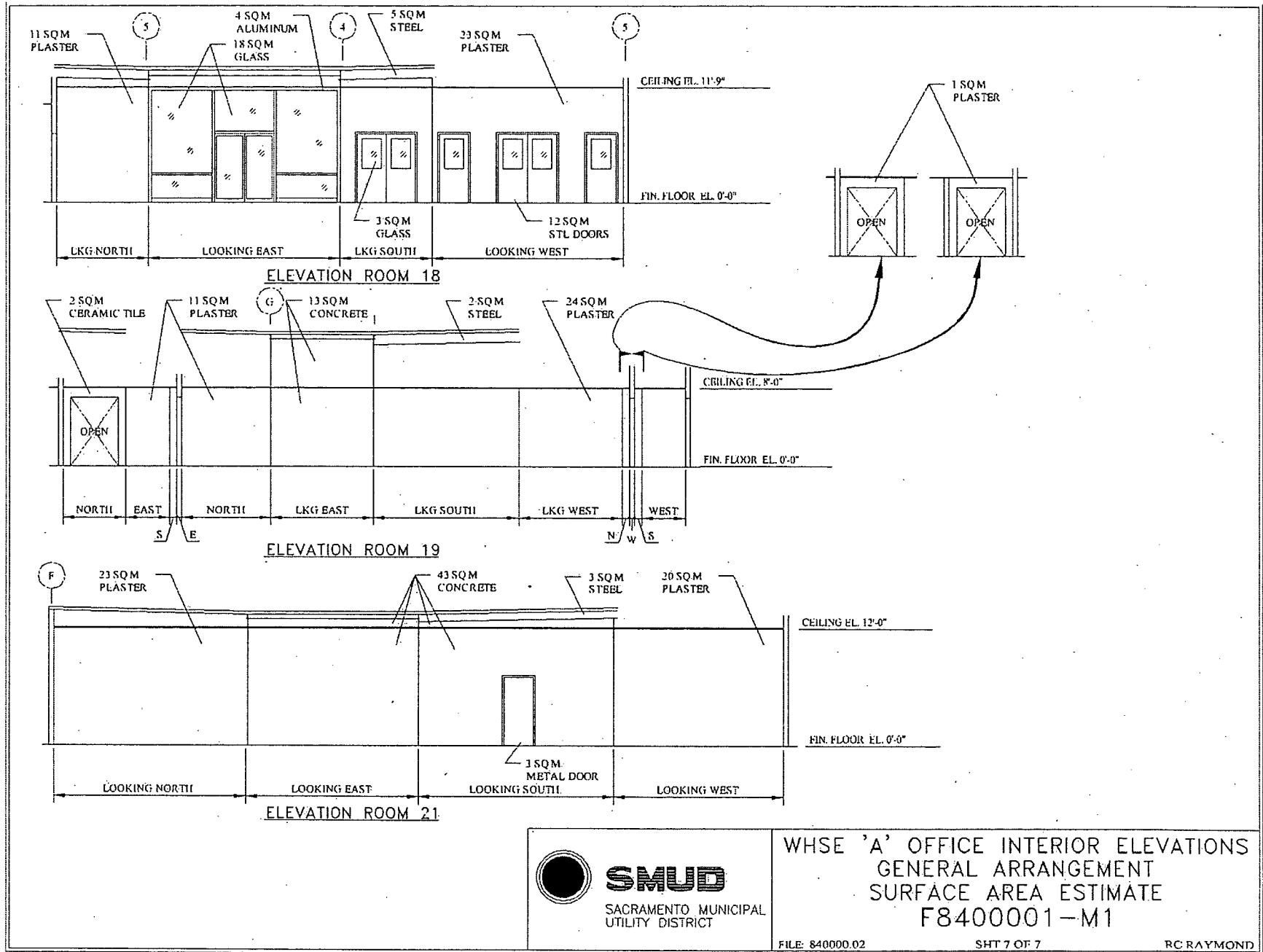
SACRAMENTO MUNICIPAL  
UTILITY DISTRICT

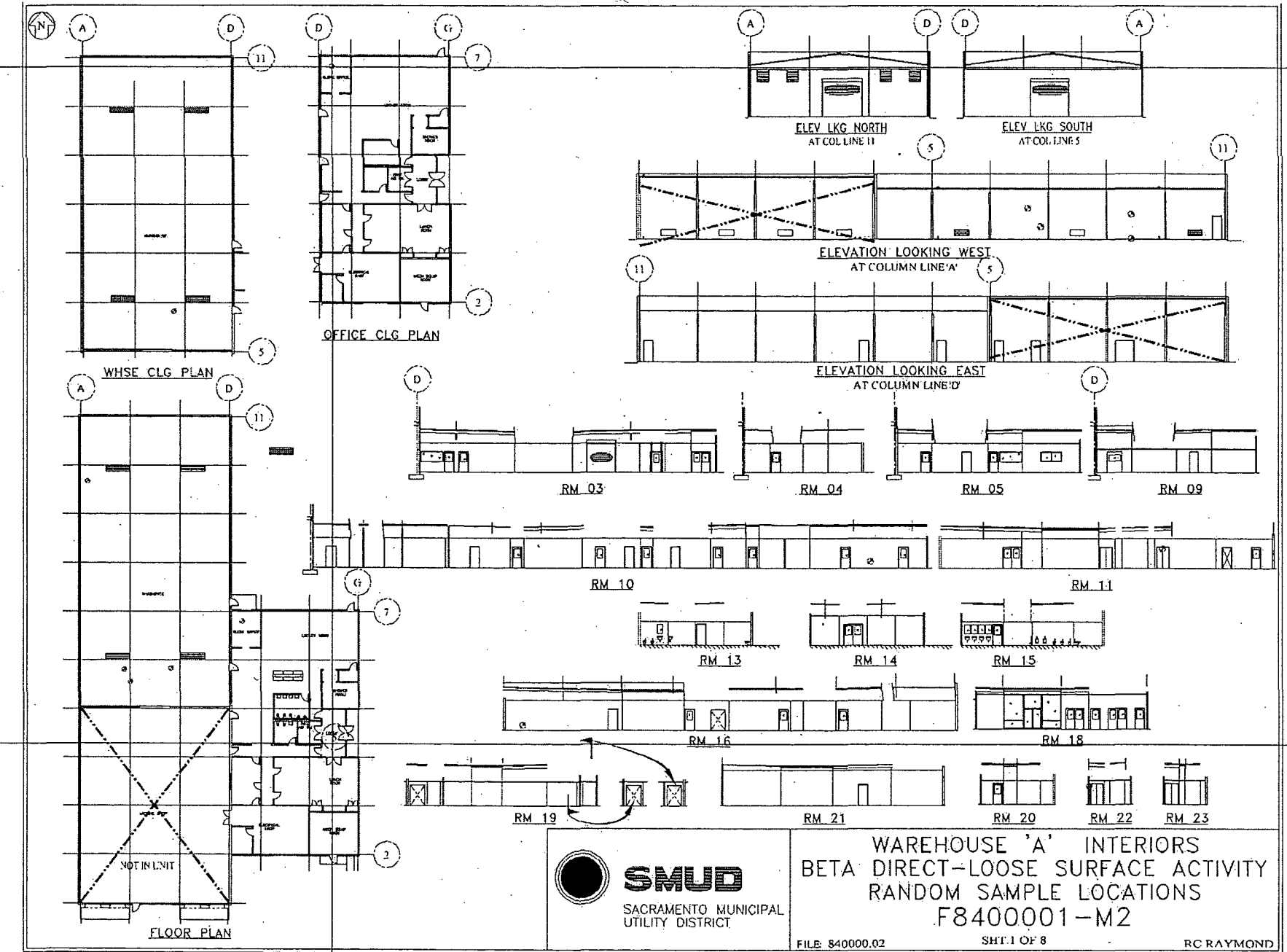
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GENERAL ARRANGEMENT  
SURFACE AREA ESTIMATE  
F8400001-M1

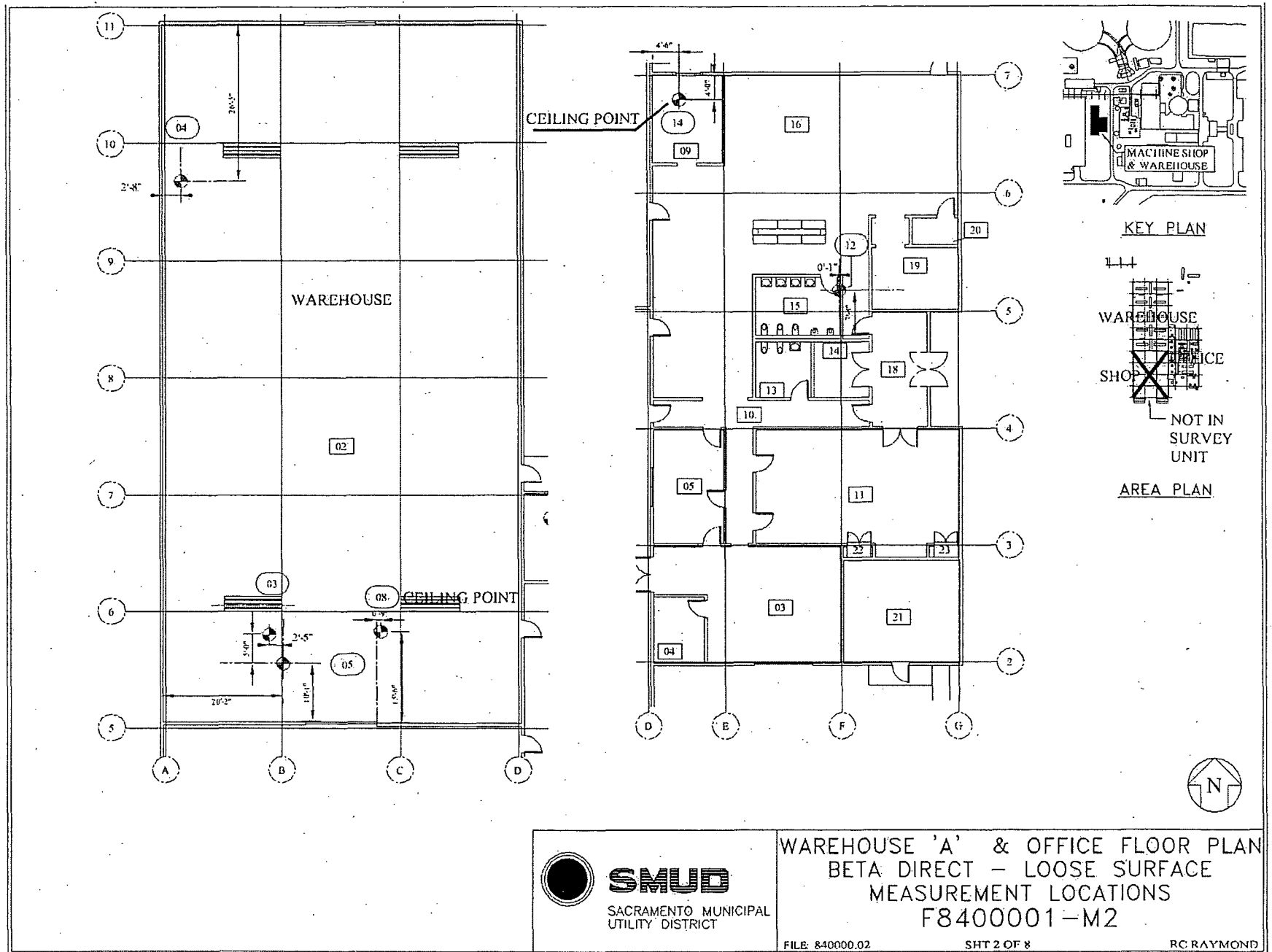
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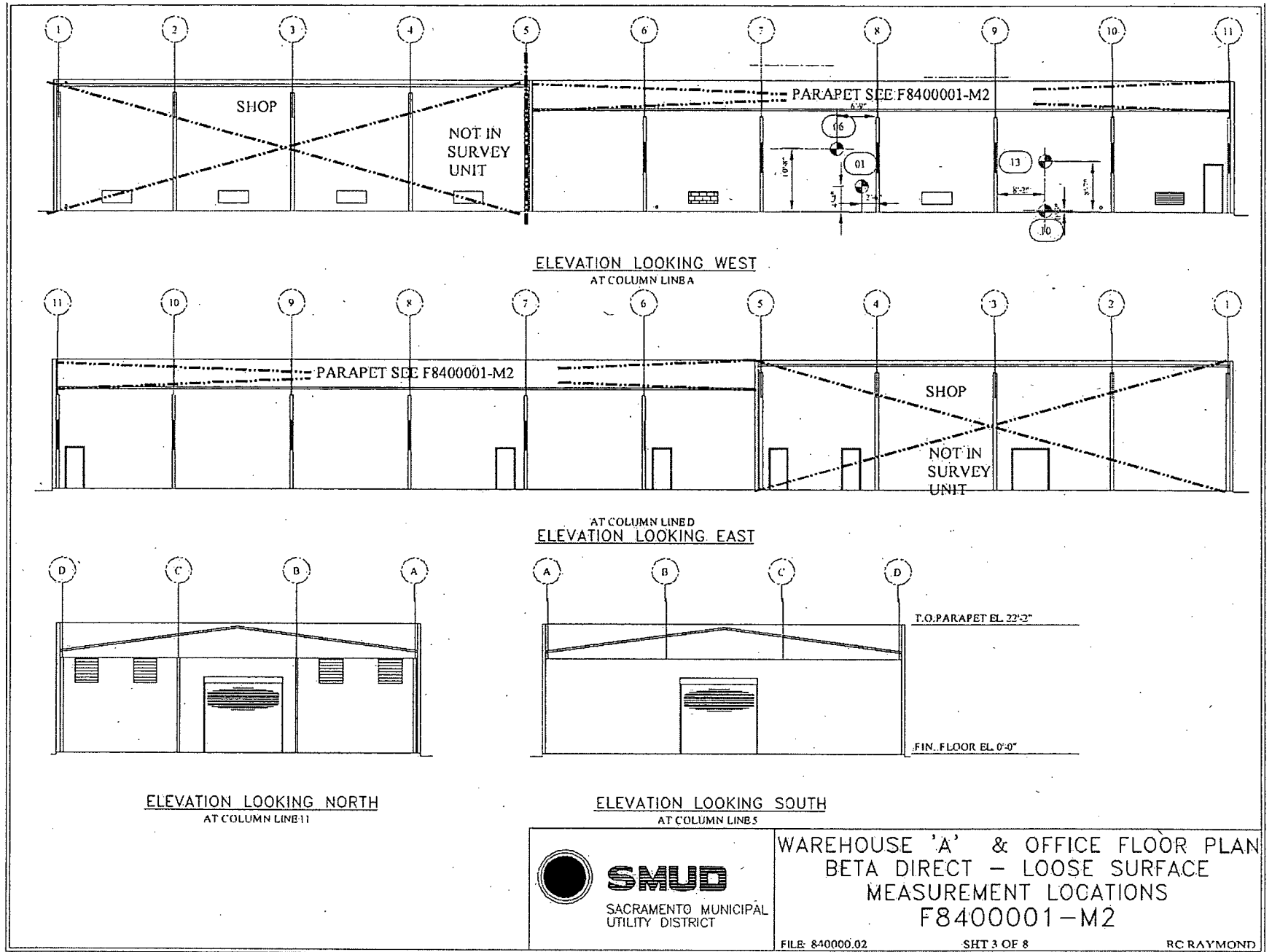
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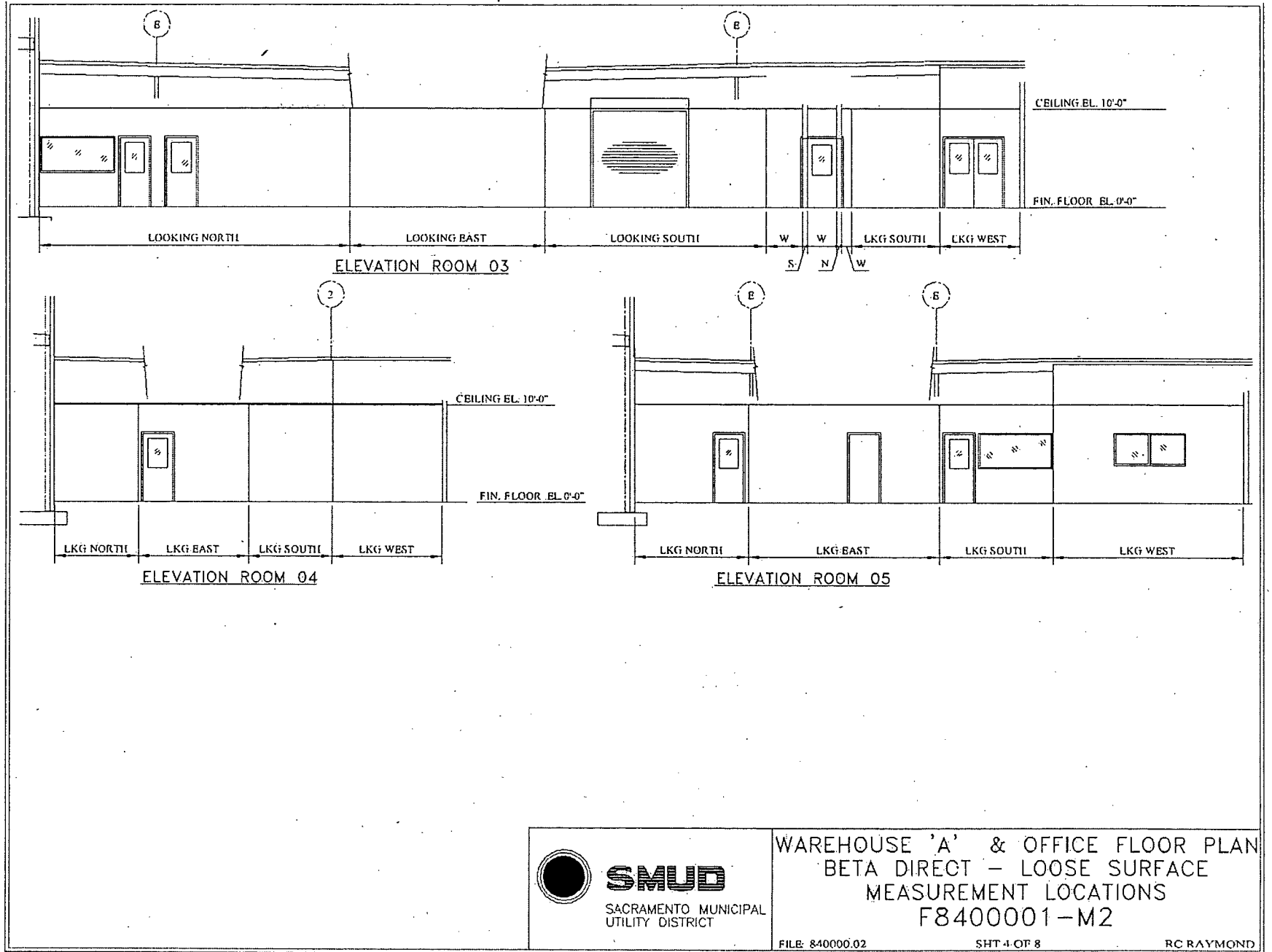
RC RAYMOND

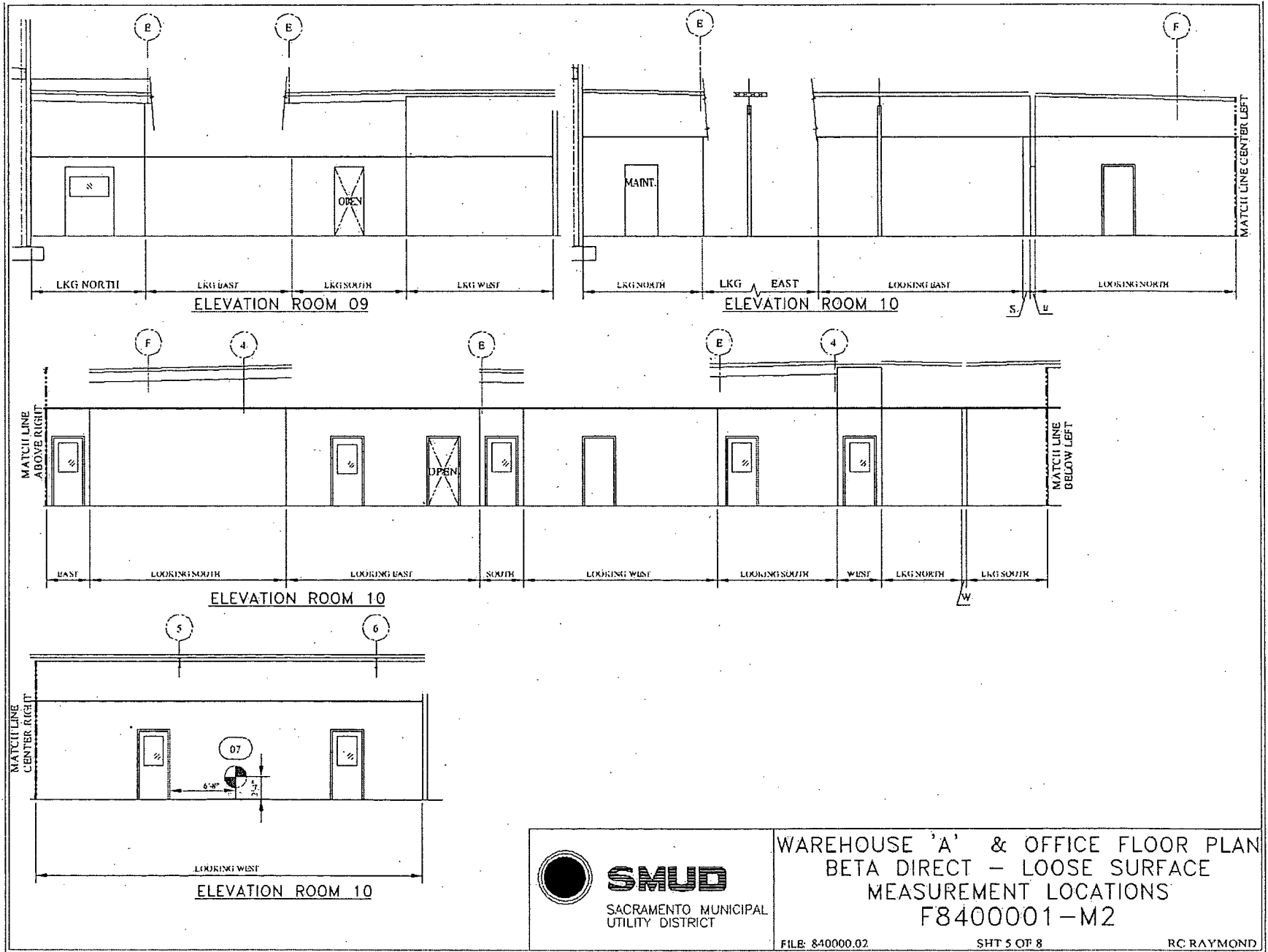


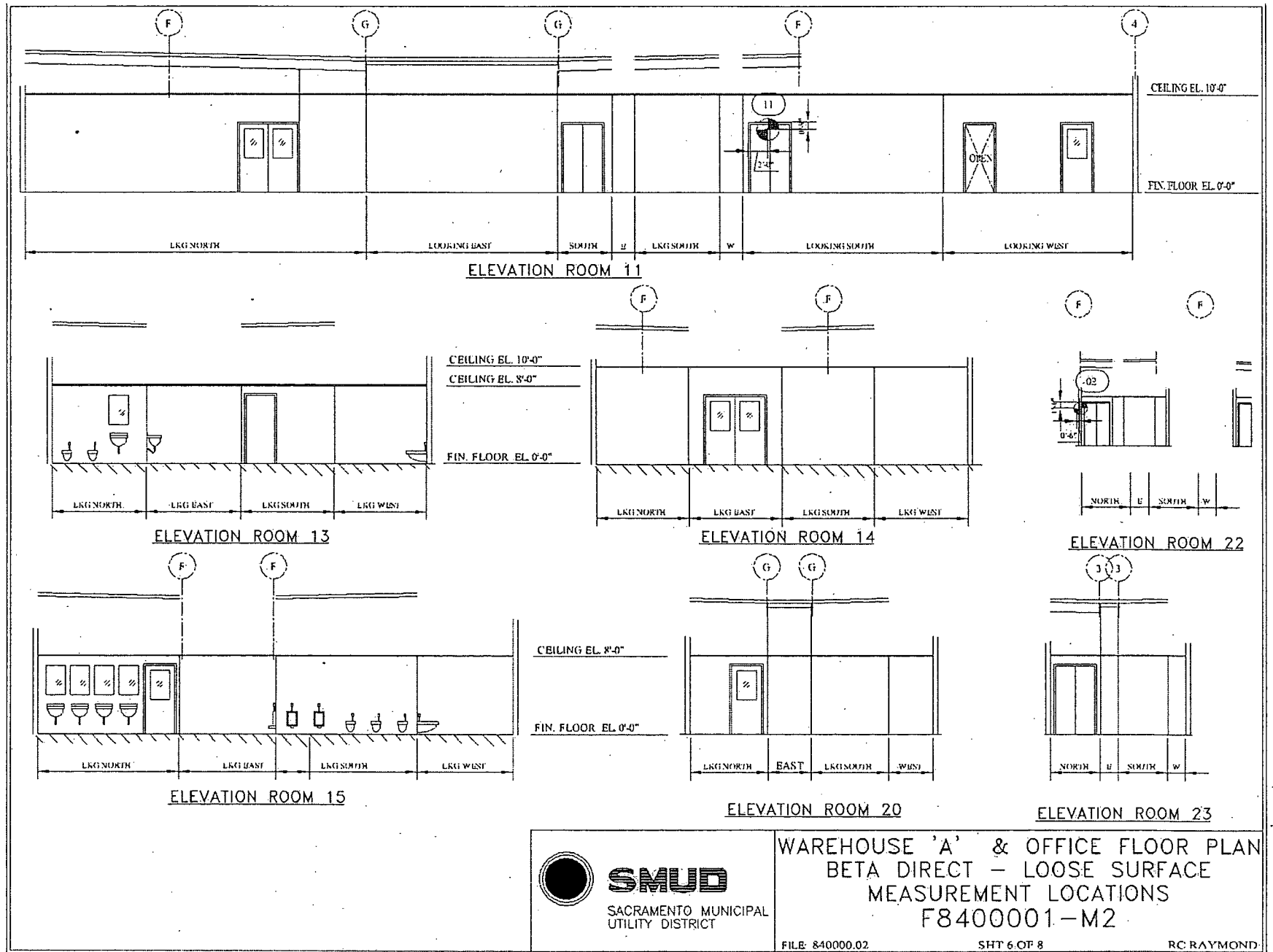


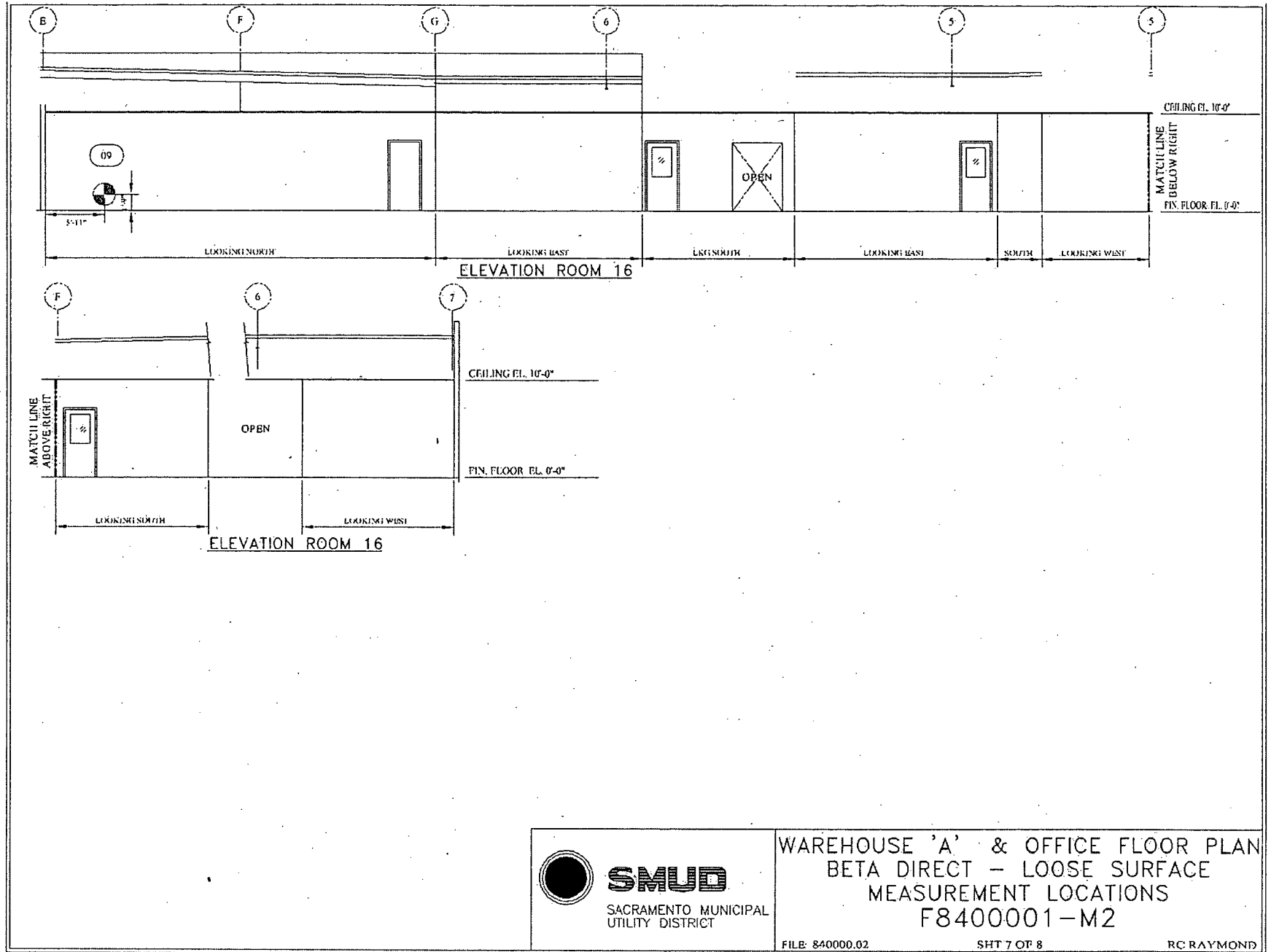


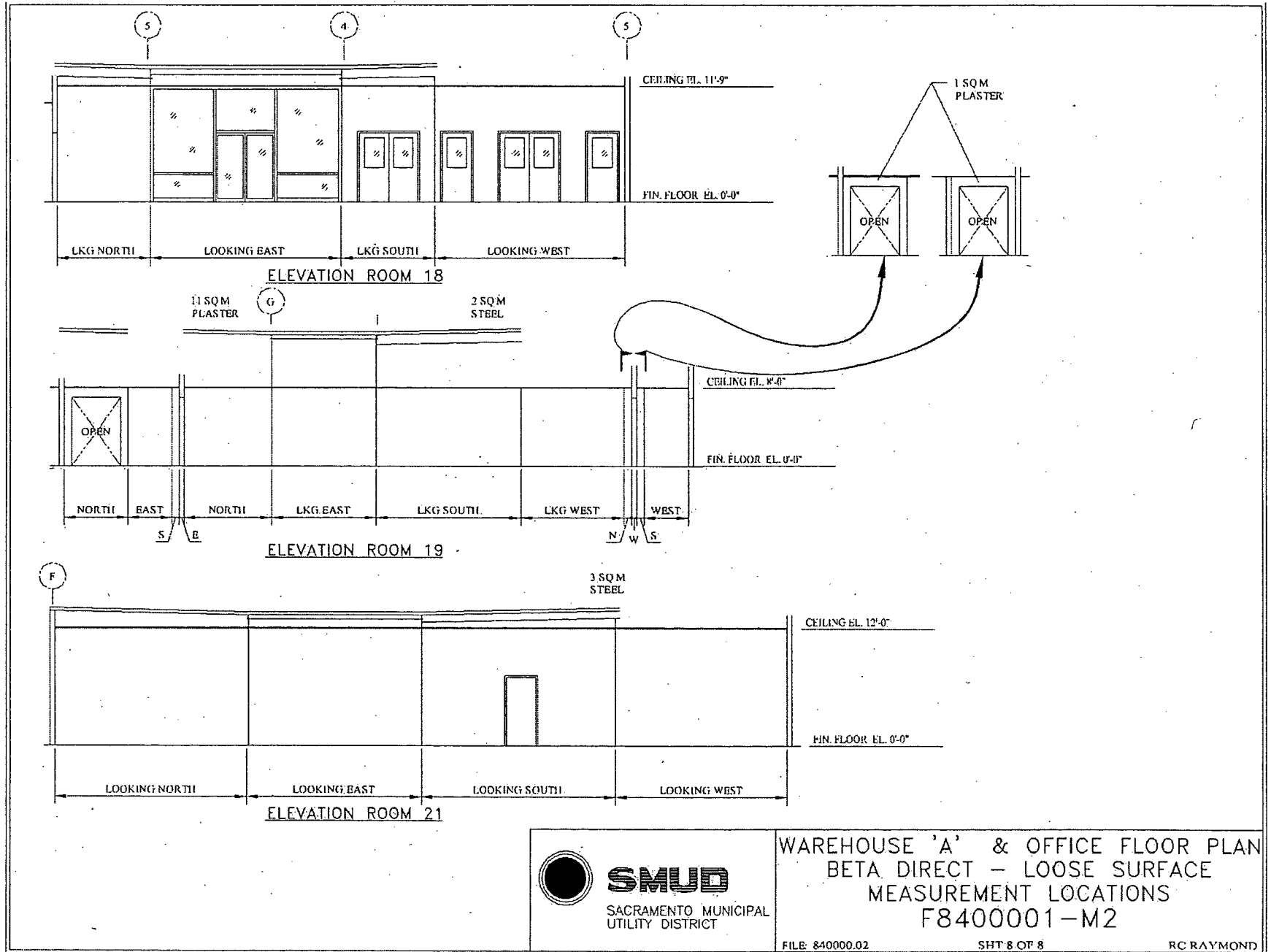


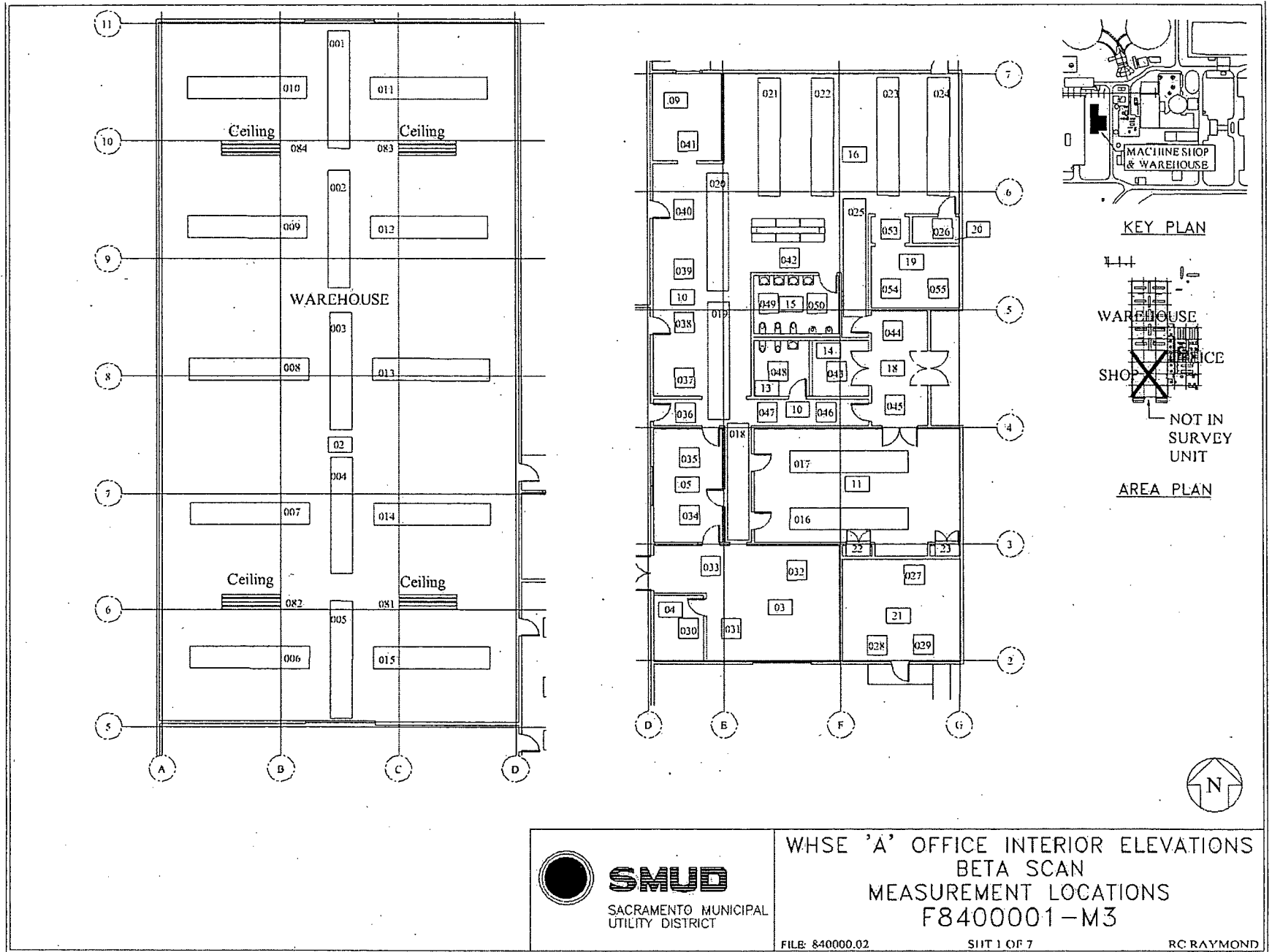












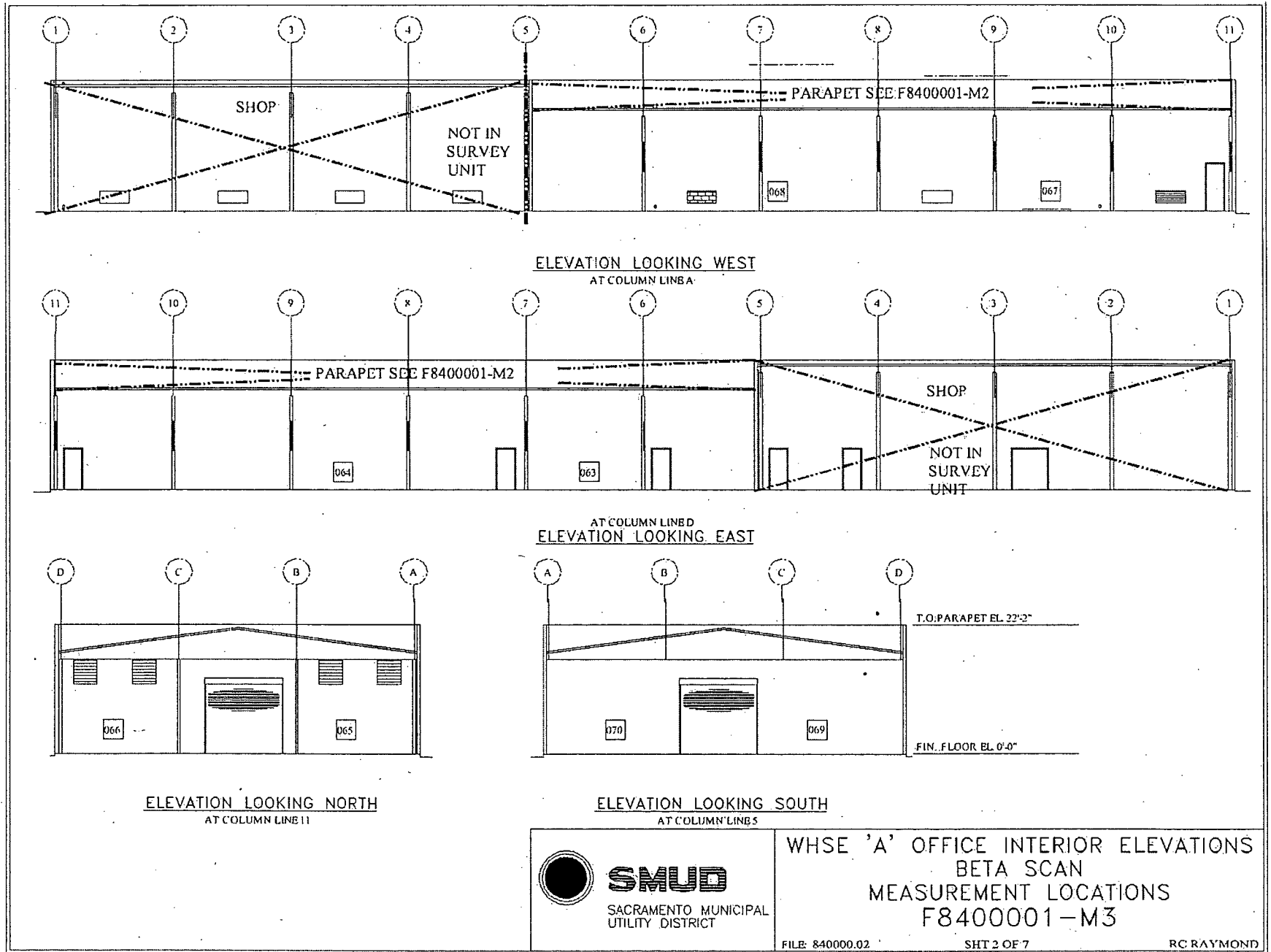
SACRAMENTO MUNICIPAL  
UTILITY DISTRICT

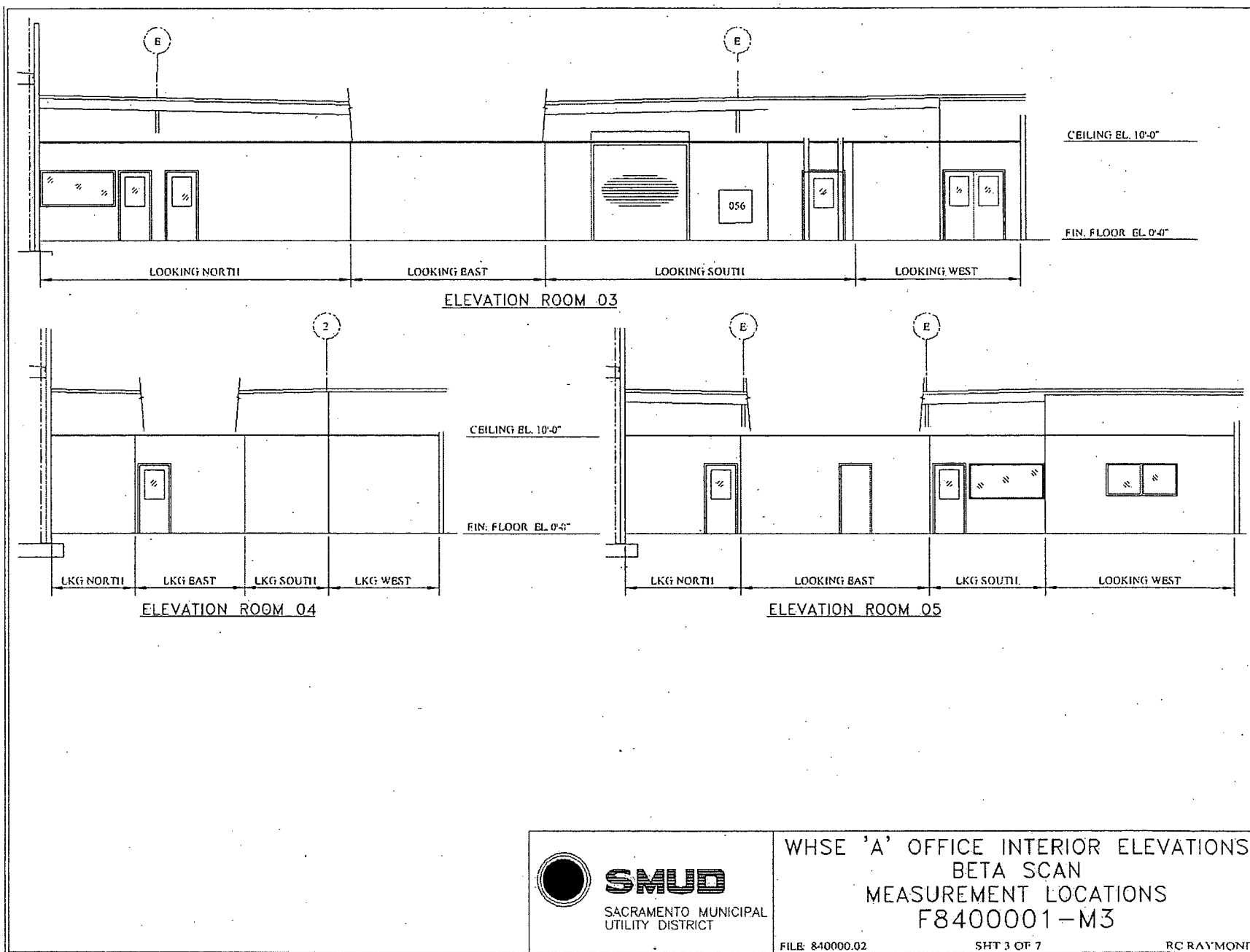
WHSE 'A' OFFICE INTERIOR ELEVATIONS  
BETA SCAN  
MEASUREMENT LOCATIONS  
F8400001-M3

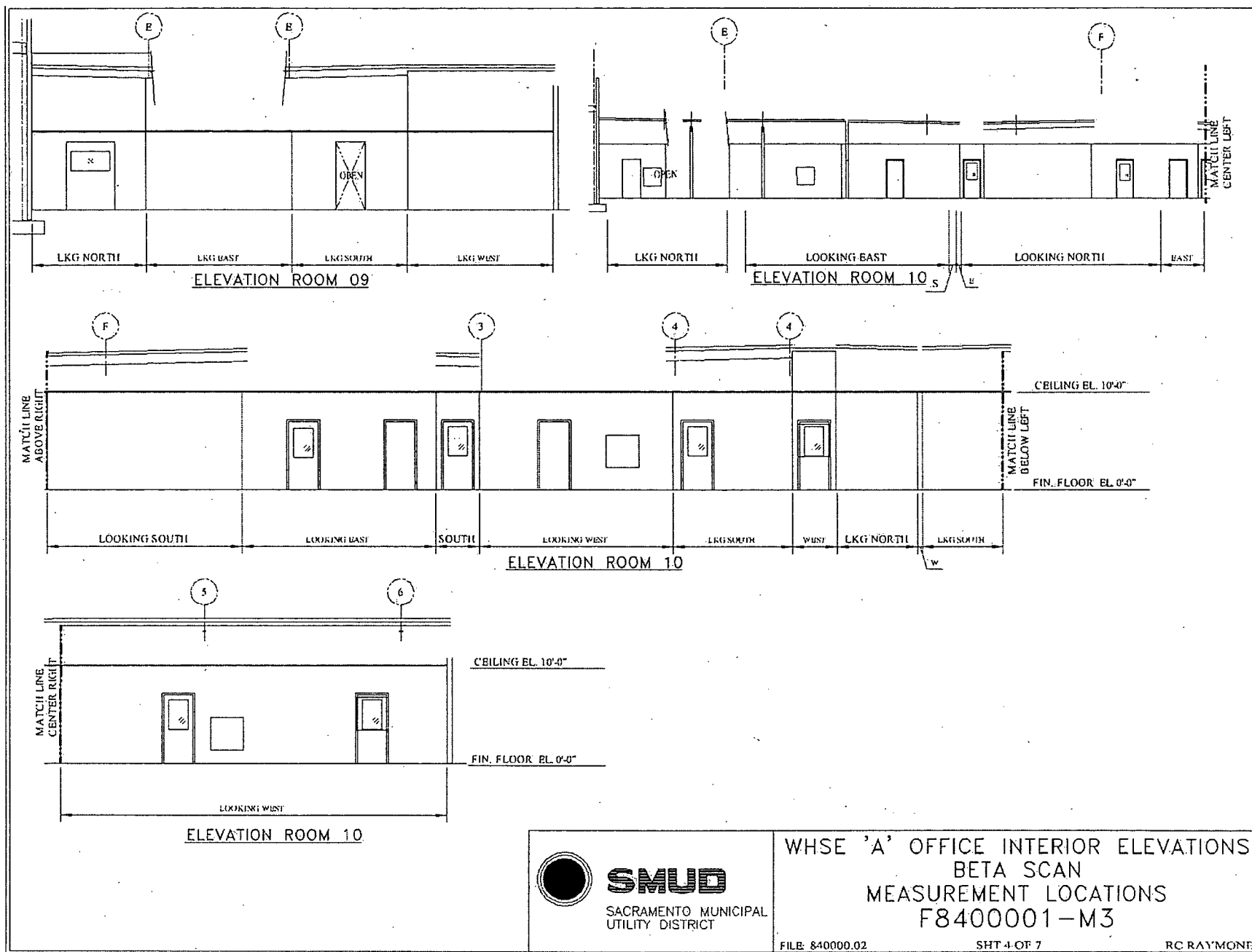
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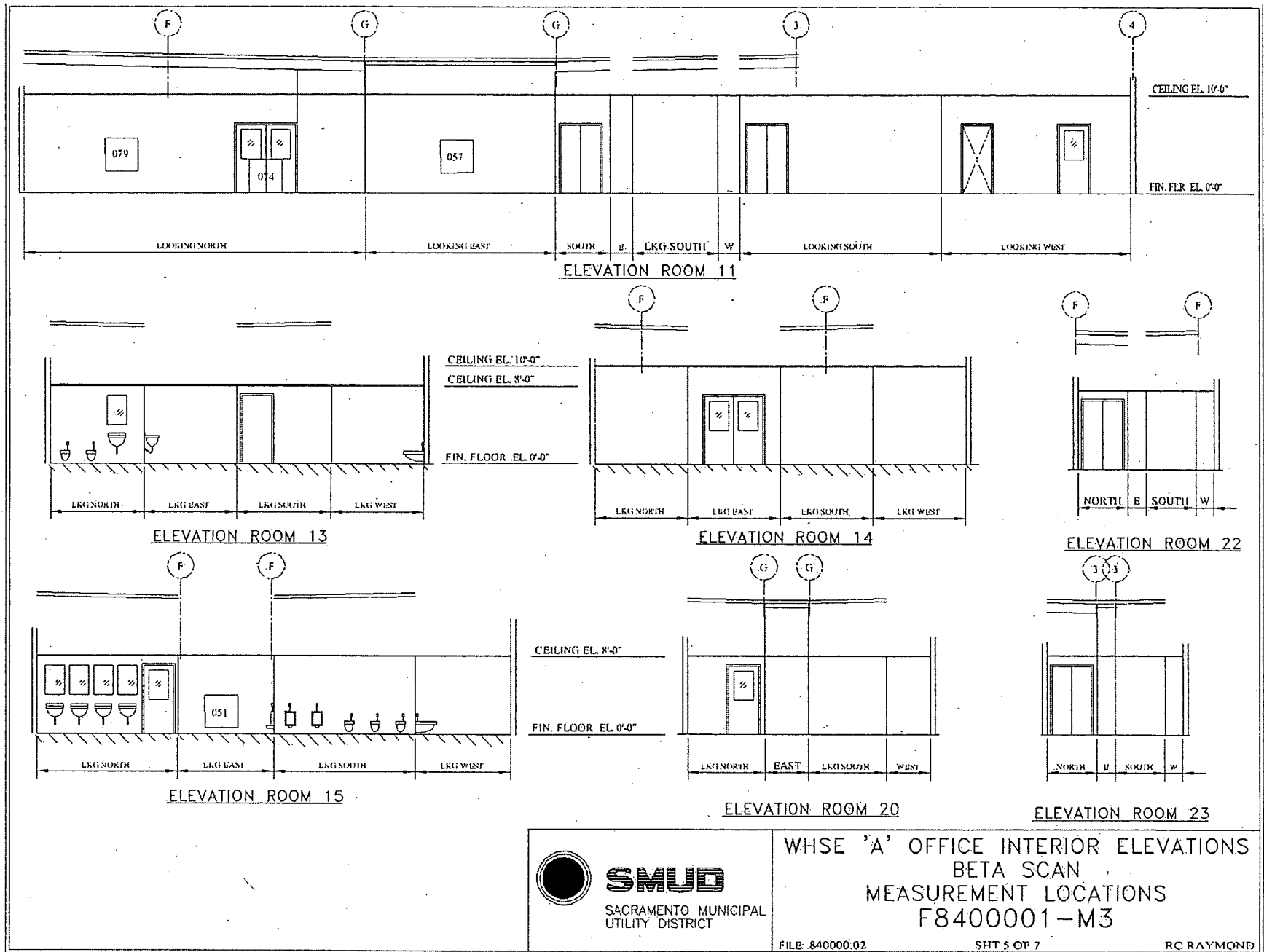
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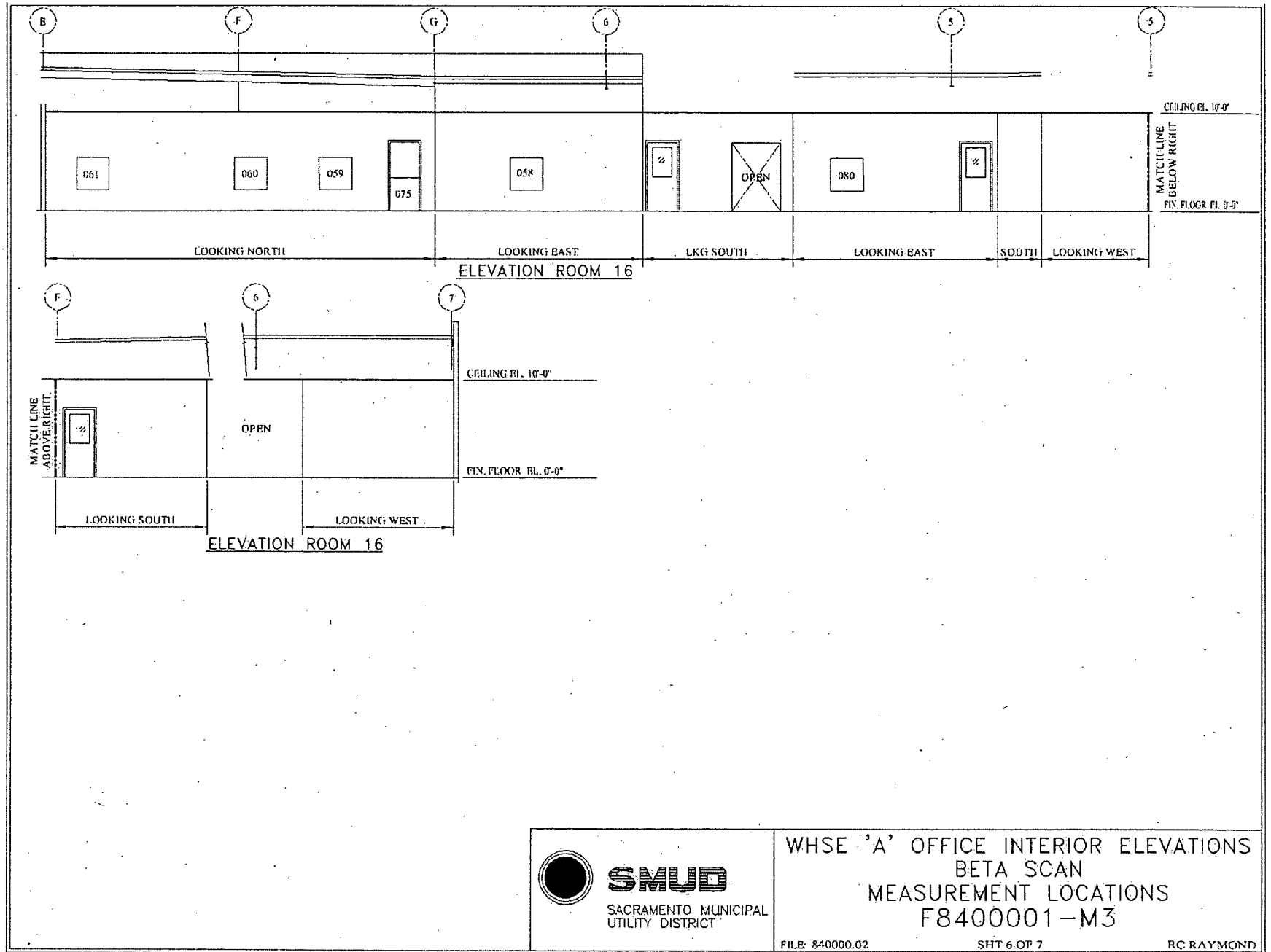
RC RAYMOND

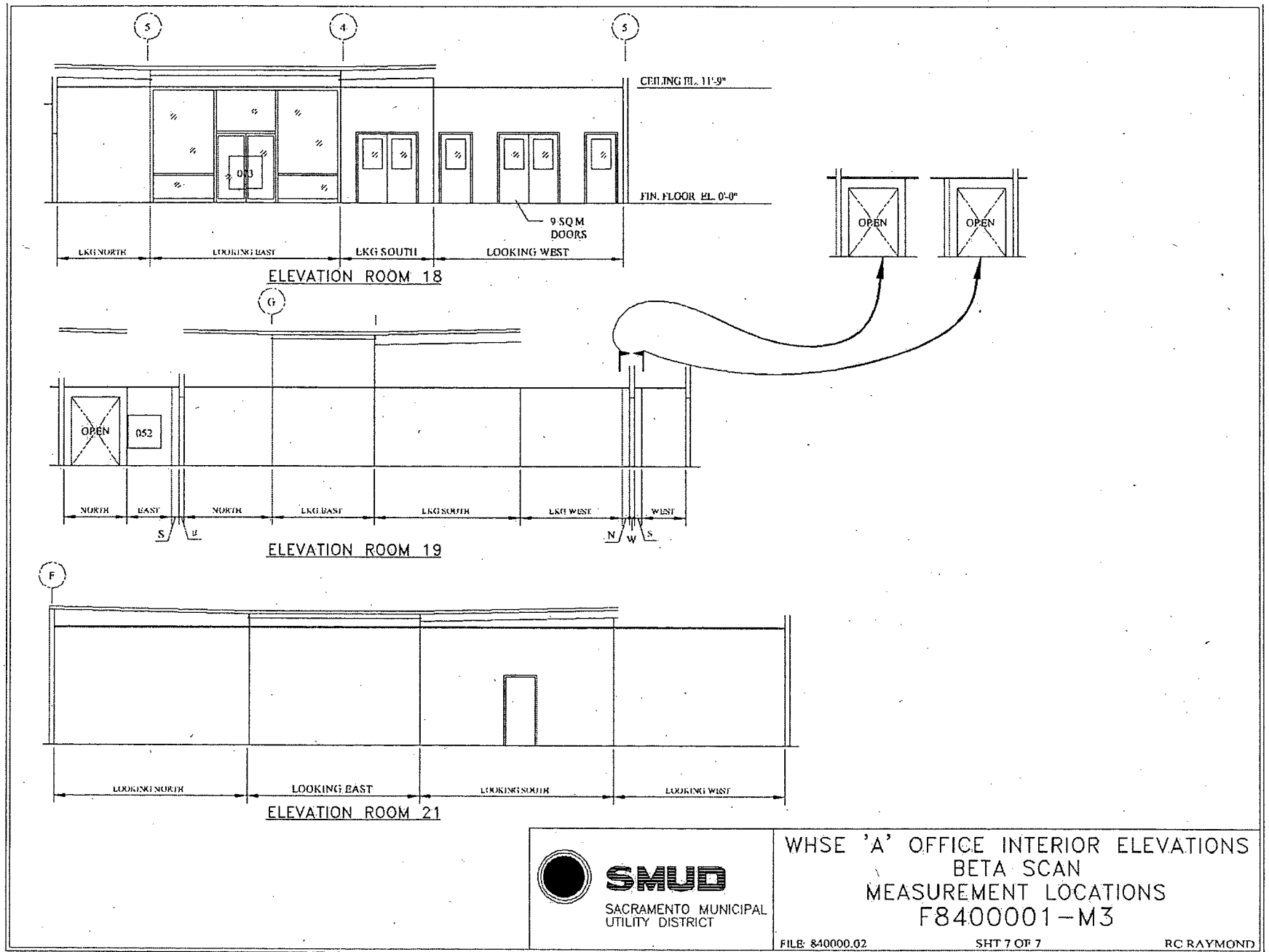












**Attachment 2**

**Instrumentation**

**October 31, 2007**

**Survey Unit F8400001**

**Table 2-1. Survey Unit Instrumentation**

<b>Instrument Model; Serial No.</b>	<b>Detector Model; Serial No.</b>	<b>MDC Static (dpm/100 cm<sup>2</sup>)</b>	<b>MDC Scan (dpm/100 cm<sup>2</sup>)</b>
M2350; 149802	43-68B; 148453	433	1033
M2350; 149802	43-68B; 148453	256 <sup>1</sup>	611 <sup>1</sup>
M2350; 142499	43-37; 148502	198	616
Tennelec; 0401171	N/A	5 dpm $\alpha$ , 11 dpm $\beta$	N/A

<sup>1</sup> Metal

**Table 2-2. Investigation Criteria and DCGL**

<b>Parameter</b>	<b>Value (dpm/100 cm<sup>2</sup>)</b>
Investigation Criteria - Direct	21500
Investigation Criteria - Scan	43000
DCGL <sub>w</sub>	43000
DCGL <sub>EMC</sub>	N/A

**Attachment 3**

**Investigation**

**October 31, 2007**

**Survey Unit F8400001**

**(none required)**

**Attachment 4**

**Data Assessment**

**October 31, 2007**

**Survey Unit F8400001**

