

Rocky Flats Environmental Technology Site

Building 776/777

Buried

Equipment

Final

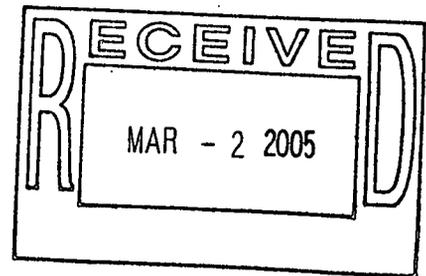
Survey Report

Survey Unit:

776041

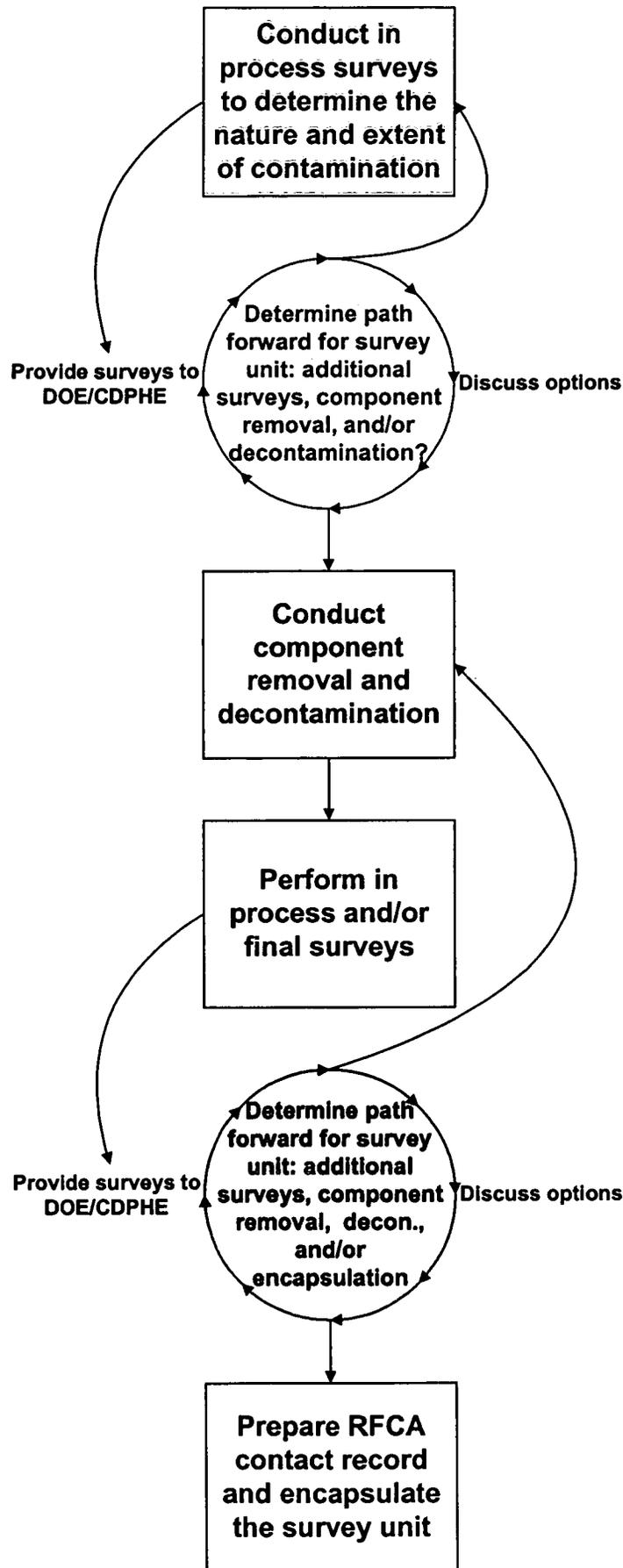
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January 2005



ADMIN RECORD

1/16



Survey Instructions

Building 776 2nd floor
Survey Unit 776041

Purpose:

This instruction provides guidance for collecting gross gamma and removable contamination data to quantify the amount of residual contamination in Survey Unit 776041 prior to demolition.

Equipment and materials:

1. A TSA- MCA-465 with a 2"x 2" NaI attached.
2. One Electra with attached DP-6, calibrated and performance tested daily and prior to use.
3. Calibrated and shiftly performance tested SAC-4

Note: The NE Electra with DP-6 probe and the Eberline SAC-4 shall be used in accordance with RSP- 7.01 and 7.02

Procedure:

1. Collect coupon samples from locations marked as #1 to 23 on the attached map. If a sample cannot be taken at the location marked, in-situ measurements will be taken.
2. Package coupons in zip lock bags and number each bag with the location number from the map.

ALPHA Surveys

3. Obtain at least 10 direct readings and swipes from the floors, 10 from the walls or vertical surfaces and 10 from the ceiling and overhead I-beams. Use professional judgement to select locations with highest potential for contamination. Take at least one set of readings on the pink paint between survey points 28 and 29. Spread all other readings evenly over the survey unit. Use a 60-second count time for both direct measurements and swipes. Record data on standard survey forms.

Gamma Surveys:

The following steps are to be performed only by subject matter experts familiar with operation of TSA-MCA-465.

4. Ensure Region of interest is set such that the low channel is 13 and the high channel is 23.
5. Complete pre-survey performance tests for the sodium iodide detector to ensure the instrument is functioning properly by using NIST traceable Americium-241 source number TS-4620. If one-minute count of the source yields between 137378 counts and 206066 counts and the peak forms in the center of the ROI then the instrument is functioning properly. Record results on MCA-465 data sheet.
6. Count coupon samples for 120 seconds of "live" time using the lead base under the coupon and the shielded NaI over the coupon.
7. Record the total counts and the peak stripped counts for each coupon on the MCA-465 data sheet.
8. If there is not a coupon for each survey location on the attached map, proceed to the locations with the missing coupons and collect the data in-situ.
9. Count in-situ by placing the shielded NaI probe on contact with the survey location and collecting a 60-second, "live" time count. Mark the location where the probe was placed on the floor.
10. Repeat step 7.
11. Perform post survey performance test. Repeat step 5.

Survey Instructions

Building 776 2nd floor

Survey Unit 776041

Surface	Type of Survey	Probe	Placement	Count Time
Floor (Coupon)	Total Alpha Activity	MCA-465	On contact	120 seconds
Floor (In-situ)	Total Alpha Activity	MCA-465	On contact	60 seconds
Vertical Surfaces	Total Alpha Activity	NE-Electra with DP-6	On contact	60 seconds
All Surfaces	Removable Alpha	SAC-4	Swipe placed in tray	60 seconds
Ceiling	Total Alpha Activity	NE-Electra with DP-6	On Contact	60 seconds

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IN-PROCESS SURVEY REPORT

Survey Unit 776041

1) Scope

This report summarizes the in-process characterization surveys of survey unit 776041. Survey unit 776041 includes the unfinished portions of the mezzanine area of the 2nd floor.

a) Historical Review

The area enclosed by the new roof is referred to as the mezzanine area of the second floor. It contained both contaminated and non-contaminated ductwork that acted as supply and exhaust ventilation for portions of B776/B777. The contaminated ductwork has been removed.

This survey unit encompasses the original roof for B777. The 1969 fire impacted the original roof. In 1970 the roof was decontaminated and a new structure was built over it by extending existing columns and placing a new roof and side panels above and around the old roof. The new roof is built with a slight slope so that at its highest point it is approximately 5 to 6 feet above the old roof and less than 3 feet above the old roof along the edges of the building. The tarpaper and other covering materials have been removed from the original roof, some of the exposed metal has pink or purple paint on it. There are many overhead hazards and some sharp edges where the original roof panels meet in what is now the mezzanine floor.

The transite side panels were removed and replaced with non-asbestos bearing panels in early 2004. No new coatings or fixatives have been applied to the new panels or the new roof.

The ceilings of areas II and III in B776/B777 form the underside of the floor for survey unit 776041. These areas have been surveyed and decontaminated using ALARA methods. No areas were identified from below which would indicate the presence of a significant amount of contamination in the mezzanine level.

b) Methods and Techniques

Because there is a low potential for contamination in this survey unit and there are significant hazards associated with performing extensive surveys in the area, a statistical approach was taken to characterize this survey unit.

Surfaces were evaluated for potential contamination under coatings using a sodium iodide (NaI) detector attached to a multi-channel analyzer (MCA) with a region of interest set for the 59 keV gamma-ray (²⁴¹Am). A total of 30 locations were selected on the old roof using a random start grid method. Eight of the locations were evaluated in-situ using a portable MCA attached to a two-inch diameter, two-inch thick NaI probe. In areas that might be affected by

IN-PROCESS SURVEY REPORT

Survey Unit 776041

contaminated surfaces below, such as above the superdry, 22 metal "coupons" were cut from the old roof and then analyzed with the portable MCA in a low background area.

Surfaces which have not had coatings applied to them were evaluated using alpha sensitive instruments. Direct measurements of unpainted vertical surfaces and the new roof were obtained with a NE-Electra attached to a DP-6 probe. Swipes taken at each measurement location were counted on an Eberline SAC-4.

2) Results

The in-process survey plan involved taking measurements at 30 survey points on the floor selected using a random start systematic grid method to select the points. An additional 30 survey points were taken with a DP-6 probe attached to a NE-Electra. The measurements taken with the NE-Electra were selected by a RCT who was directed to take 10 measurements on the floor, 10 on the vertical surfaces and 10 on the ceilings. The RCT was directed to take at least one reading on the pink painted area of the floor and to spread all readings out as much as practical.

The reason more measurements, 30 gamma and 10 alpha readings, were taken on the floor is because it has the highest potential for contamination. The vertical surfaces of the ductwork and I- beams were surveyed as well as the walls because many of the walls are newly installed and the other vertical surfaces have been in place longer.

a) Floors

The 1969 fire affected the floors in survey unit 776041. Shortly after the fire the surface that is now the floor was stripped down to metal with some tar and tarpaper residue. The initial decontamination was thorough. Assays of the coupons and the measurements taken in place with the NaI probe found no contamination above the MDA of the instruments used. Direct alpha measurements of the exposed surfaces found no contamination above 100 dpm/100cm².

b) Walls

The majority of the walls in this survey unit are newly installed. None of the walls were found to have detectable levels of contamination. A vertical surface of a piece of ductwork was found to have 109 dpm/100cm² total alpha with less than 20dpm/100cm² removable on it. This was the highest reading obtained with alpha sensitive instruments in the entire survey unit.

IN-PROCESS SURVEY REPORT

Survey Unit 776041

c) Ceilings

No detectable amounts of contamination were found on the ceilings of survey unit 776041

3) Inaccessible Areas

a) Floors

Because the floor of this survey unit is the ceiling of survey units below, there is little potential for significant contamination levels in inaccessible areas of the floor.

b) Walls

There is no reason to suspect contamination in the inaccessible areas of the walls. The majority of the walls were replaced less than one year ago. The walls that have been in place previously were either not impacted by the 1969 fire or built after the fire.

c) Ceilings

The ceiling was installed in 1970. There has been no event since then that would preferentially deposit contamination in the inaccessible areas of the ceiling.

4) Required Remediation

No additional remediation is required. Surveys for removable contamination indicate no fixative is needed in this area to ensure that less than 20 dpm/100cm² is present.

5) Additional Surveys to be Performed

No additional surveys are required.

IN-PROCESS SURVEY REPORT

Survey Unit 776041

6) Average contamination for survey

Surface	dpm/100cm ²
Floors*	16,705
Walls **	0
Ceilings**	0
Inaccessible Areas (**)	0
Total ASCVu	16,705

* Obtained from MCA-465 data. This average is below the instrument's 95% confidence level MDA

** This surface is not expected to be contaminated above the release limits. No inventory calculation was performed.

7) Inventory for survey

Surface	μCi
Floors	2054
Walls *	0
Ceilings*	0
Inaccessible Areas*	0
Total Inventory	2054

* This surface is not expected to be contaminated above the release limits. No inventory calculation was performed.

Estimate Data and Sodium Iodide Instrument Information

Survey Area:	2nd Floor	Survey Unit:	776041	Survey Date(s):	07/23/04
					07/28/04
					08/03/04

Instrument Specifications

Instrument #	1	2
Meter Model:	TSA-MCA-465	TSA-MCA-465
Meter Serial #:	465069101	465069101
Detector Model:	Teledyne	Teledyne
Detector #:	S-88-1	S-88-1
Detector Size (cm ²):	20	20
Calibration Due Date:	12/17/04	12/17/04
Count Time (min)	1	2
Contact Efficiency	7.66%	7.66%

Ratio Used

Pu to Am - 241	8.1
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Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

ROI = Region Of Interest. ROI for this survey selected using N.I.S.T. traceable source, ID # TS-4620. Channels selected to completely encompass 60 Kev Peak.

Count Times for backgrounds and samples are equal. Background determined using channels on each side of ROI with the "Peak Stripping" function on the TSA-MCA-465.

Efficiency for survey determined using source ID TS-4620

Attenuation Factors: Based on observation. Most coupons had barely visible coating.

Efficiencies (cpm/dpm)

Instrument #	1	2
Thin/No Paint	0.077	0.077
Epoxy	0.069	0.069
Other	0.073	0.073

Coatings

Coatings	Thickness (inches)
Thin/No Paint	0.001
Tar paper	0.125
Tar residue	0.06

Total Alpha Summary

	(dpm/100cm ²)
Minimum:	12,746
Maximum:	24,795
Mean:	16,705
Std Deviation:	3,605

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Total Activity Estimates Using Sodium Iodide Instruments

Survey Area:	2nd Floor	Survey Unit:	776041	Survey Date(s):	07/23/04
					07/28/04
					08/03/04

Sample Location #	Count time (min)	Sample Size (cm ²)	Net counts(CPM)	Critical Level (dpm/100cm ²)	Total Alpha (dpm/100cm ²)
1	2	19.6	7	14,430	14,430
2	2	19.6	8	14,292	14,292
3	2	19.6	13	13,022	14,015
4	2	19.6	14	12,559	15,093
5	2	19.6	7	12,746	12,746
6	2	19.6	10	13,232	13,232
7	2	19.6	7	12,992	12,992
8	2	19.6	4	13,929	13,929
9	2	19.6	9	13,758	13,758
10	2	19.6	17	14,126	18,327
11	2	19.6	10	13,844	13,844
12	2	19.6	16	13,729	16,710
13	2	19.6	3	14,126	14,126
14	2	19.6	16	13,815	17,249
15	2	19.6	4	13,262	13,262
16	2	19.6	7	13,439	13,439
17	2	19.6	22	13,614	23,178
18	2	19.6	23	12,528	24,795
19	2	19.6	13	13,082	14,015
20	2	19.6	8	14,237	14,237
21	2	19.6	8	14,484	14,484
22	1	20.4	4	17,347	17,347
23	1	20.4	10	20,469	20,469
24	1	20.4	16	19,390	19,390
25	1	20.4	0	20,874	20,874
26	1	20.4	9	23,094	23,094
27	1	20.4	6	21,662	21,662
28	1	20.4	3	21,863	21,863
29	1	20.4	1	16,596	16,596
30	1	20.4	6	17,701	17,701

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Total Surface Activity

Survey Area:		2nd Floor	Survey Unit:				776041	
Meter Model:		NE Electra w/ DP6 Probe				Dates Counted:	8/1/04	
Instrument #:		1246	n/a	n/a	n/a	n/a	A priori MDA:	>94
Cal. Due Date:		1/26/05	n/a	n/a	n/a	n/a	Avg. Local Bkgd	2.9
Efficiency (c/d):		0.221	n/a	n/a	n/a	n/a	Avg. Efficiency	0.221
Sample Location #	RCT ID #	Inst. #	Instrument (cpm)	Local Bkgd (cpm)	(dpm/100 cm ²)			
1	1	1246	8	1.0	32			
2	1	1246	6	1.0	23			
3	1	1246	15	4.0	50			
4	1	1246	6	4.0	9			
5	1	1246	4	2.0	9			
6	1	1246	8	2.0	27			
7	1	1246	3	2.0	5			
8	1	1246	2	2.0	0			
9	1	1246	2	3.0	-5			
10	1	1246	10	2.0	36			
11	1	1246	5	2.0	14			
12	1	1246	4	2.0	9			
13	1	1246	6	1.0	23			
14	1	1246	4	1.0	14			
15	1	1246	5	3.0	9			
16	1	1246	2	3.0	-5			
17	1	1246	10	6.0	18			
18	1	1246	5	6.0	-5			
19	1	1246	3	4.0	-5			
20	1	1246	4	4.0	0			
21	1	1246	4	1.0	14			
22	1	1246	3	0.0	14			
23	1	1246	5	3.0	9			
24	1	1246	30	6.0	109			
25	1	1246	4	1.0	14			
26	1	1246	6	1.0	23			
27	1	1246	4	6.0	-9			
28	1	1246	5	6.0	-5			
29	1	1246	4	4.0	0			
30	1	1246	5	3.0	9			
<div style="display: flex; justify-content: space-between; padding: 5px;"> MIN -9 </div> <div style="display: flex; justify-content: space-between; padding: 5px;"> MAX 109 </div> <div style="display: flex; justify-content: space-between; padding: 5px;"> MEAN 14 </div> <div style="display: flex; justify-content: space-between; padding: 5px;"> SD 22 </div>					-9			
					109			
					14			
					22			

-5?

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776041 Removeable Alpha Survey Results
Survey Performed 08/01/04

Sample #	Column	Distance North In Feet	Distance East In Feet	Description	dpm/100cm2 removeable
1	G-17	1	6	FLOOR	<20
2	G-17	1	6	I-BEAM IN OVERHEAD	<20
3	E-17	10	10	FLOOR	<20
4	E-17	10	10	I-BEAM IN OVERHEAD	<20
5	G-20	16	7	FLOOR	<20
6	G-20	16	7	I-BEAM IN OVERHEAD	<20
7	E20	17	18	FLOOR	<20
8	E20	17	18	I-BEAM IN OVERHEAD	<20
9	D-22	18	1	FLOOR	<20
10	D-22	18	1	I-BEAM IN OVERHEAD	<20
11	G-23	10	17	FLOOR	<20
12	G-23	10	17	CEILING	<20
13	L-22	8	15	FLOOR	<20
14	L-22	8	15	I-BEAM IN OVERHEAD	<20
15	K-20	6	3	FLOOR	<20
16	K-20	6	3	I-BEAM IN OVERHEAD	<20
17	B-17	0	2	FLOOR	<20
18	B-17	0	2	I-BEAM IN OVERHEAD	<20
19	B20	0	3	FLOOR	<20
20	B20	0	3	I-BEAM IN OVERHEAD	<20
21	L-23	1	2	WALL	<20
22	L-25	8	4	WALL	<20
23	K-18	6	17	VERTICAL SURFACE	<20
24	J-20	0	7	VERTICAL FACE OF DUCT	<20
25	H-21	15	0	SOUTH FACE ODF DUCT	<20
26	H-19	13	10	SOUTH FACE OF WALL	<20
27	G-17	13	10	VERTICAL SURFACE	<20
28	B-17	0	0	VERTICAL SURFACE I-BEAM	<20
29	B-20	0	0	VERTICAL SURFACE I-BEAM	<20
30	C-21	3	1	CHANNEL IRON CROSSMEMBER	<20

Instrument	Serial #	Cal Due Date	Bkg.	Efficiency	MDA
SAC-4	1411	9/29/04	0.4	0.33	20 dpm
SAC-4	1479	9/29/04	0	0.33	20 dpm
SAC-4	951	10/13/04	0.4	0.33	20 dpm

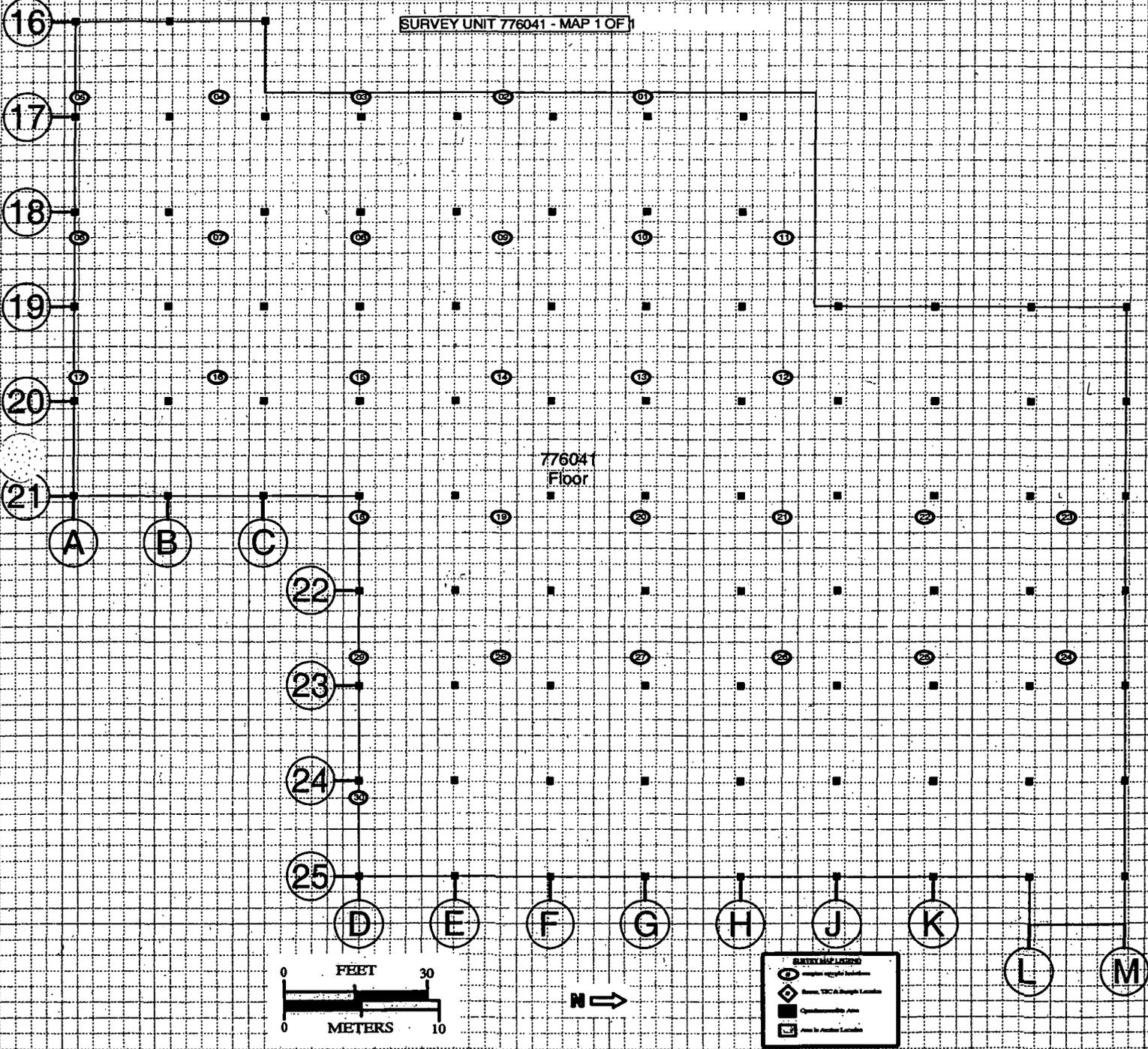
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776041 Punchlist

- 1) Remove contaminated ductwork
- 2) Provide lighting and access to the mezzanine area.

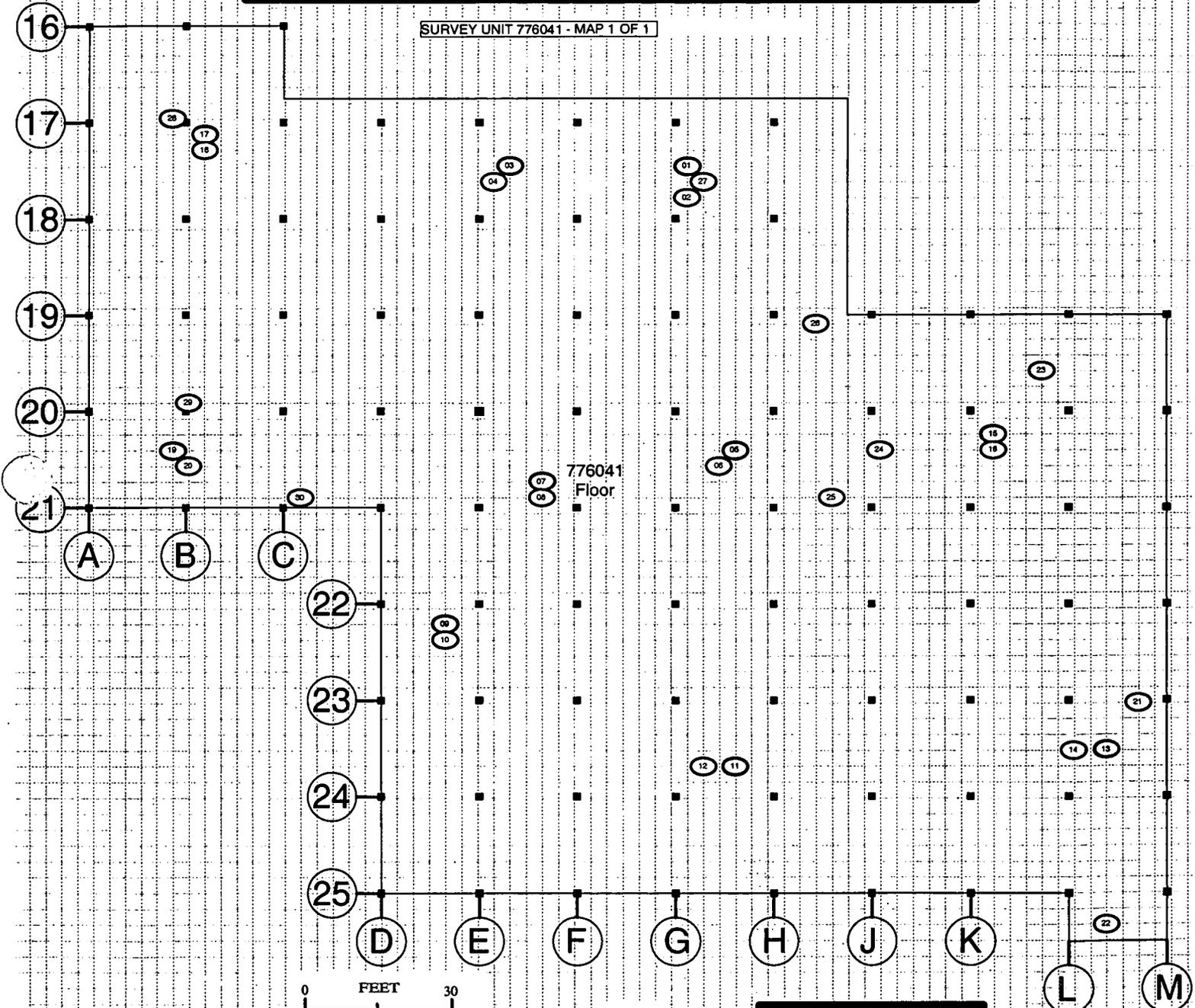
FLOOR SAMPLING LOCATIONS FOR 776041

Survey Area: second floor Survey Unit: 776041 Classification: NA
 Building: 778
 Survey Unit Description: Unit 776041 floor (coupon sampling locations)
 Total Floor Area: 2730 sq. m Total Area: 2730 sq. m Grid Size: 9 x 9 sq. m



SWIPE AND TOTAL ALPHA SURVEY FOR 776041
 Survey Area: second floor Survey Unit: 776041 Classification: NA
 Building: 776 Survey Unit Description: Unit 776041
 Total Floor Area: 2730 sq. m Total Area: 2730 sq. m Grid Size: 9 x 9 sq. m

SURVEY UNIT 776041 - MAP 1 OF 1



-  Floor sample locations
-  Ceiling sample locations
-  Vertical surface sample locations

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