Final Radiological Sampling Amendment To Marine Corps Air Station (MCAS) El Toro Radiological Survey Plan

Prepared by:
Weston Solutions, Inc.
Mare Office
Vallejo, California

February 2004

Naval Facilities Engineering Command
Southwest Division
Contract No. N68711-01-D-6010 DO-0002; Modification No. 4
Document Control No. 2010

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132 - 5190

5090
Ser 06CC.AP/0210
February 23, 2004

Ms. Nicole Moutoux
Remedial Project Manager
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street, Mail Code STD-8-2
San Francisco, CA 94105-3901

Mr. Manny Alonzo, Chief
Southern California Base Closure and Reuse Unit
California Department of Toxic Substances Control
Office of Military Facilities
5796 Corporate Ave.
Cypress, CA 90630-4700

Mr. John Broderick
Remedial Project Manager
California Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Fellow Federal Facility Agreement (FFA) Representatives:

SUBJECT: FINAL RADIOLOGICAL SAMPLING AMENDMENT AND RESPONSE TO COMMENTS ON THE DRAFT RADIOLOGICAL SAMPLING AMENDMENT, RADIOLOGICAL SURVEY PLAN; FORMER MARINE CORPS AIR STATION EL TORO, CALIFORNIA (FEBRUARY 2004)

Submitted for your records are the enclosed subject documents. In addition to the areas in enclosure (1) where we addressed your review comments, please note that we added 2 new figures and 2 new appendices as follow:

Figure A-I-10 – Swipe Sample Locations for Building 296 at El Toro MCAS
Figure A-I-11 – Swipe Sample Locations for Building 297 at El Toro MCAS
Appendix D – Survey Data Sheet for Solid Samples (Gamma Radiation)
Appendix E – Survey Data Sheet for Buildings (Alpha-Beta Radiation)

Thank you for your continued support in this program. Should you have questions or need additional information, please contact Mr. Gordon Brown, Remedial Project Manager, at (619) 532-0796 or Ms. Content Arnold, Lead Remedial Project Manager, at (619) 532-0790.

Sincerely,

F. ANDREW PISZKIN
Base Realignment and Closure Environmental Coordinator
By direction of the Commander

M60050.003049
MCAS EL TORO
SSIC NO. 5090.3

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QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

5090
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Enclosures: 1. Final Radiological Sampling Amendment to the Radiological Survey Plan, Marine Corps Air Station El Toro of February 2004
2. Response to Comments on the Draft Radiological Sampling Amendment to the Radiological Survey Plan, Marine Corps Air Station El Toro of February 2004

Copy to:
Commandant of the Marine Corps
Attn: LCDR Tricia Samora, USN
2 Navy Annex, Room 3109 (LFL)
Washington, D.C. 20380-1775

Commander
Attn: AC/S ENVIRON MGT
Marine Corps Air Bases, Miramar
P.O. Box 452001
San Diego, CA 92145-2001

Mr. Jim Kikta
Marine Corps BRAC Project Manager
MCAS El Toro
7040 Trabuco Road
Irvine, CA 92618

Ms. Deirdre Dement (2 copies)
California Department of Health Services
P.O.Box 942732
Sacramento, CA 94105-3901

Mr. Steve Dean
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Dr. Steven Doremus
Environmental Programs Director
MWS, Drawer 260
Yorktown, VA 23691-0260

Ms. Pat Haworth (2 copies)
Naval Sea Systems Command Det
Radiological Affairs Support Office
Building 1971
Naval Weapons Station Yorktown
Yorktown, VA 23691-5000

Mr. Robert L. Woodings
Community Co-Chair
El Toro Restoration Advisory Board
23161 Lake Center Drive, Suite 100
Lake Forest, CA 92630

Ms. Marcia Rudolph
Subcommittee Chair
El Toro Restoration Advisory Board

Ms. Polin Modanlou
County of Orange
300 North Flower Street, 3rd Floor
Santa Ana, CA 92703

Mr. Daniel Jung
City of Irvine
PO Box 19575
Irvine, CA 92623-9575

Mr. Crispin Wanyoike
Senior Program Director
300 Oceangate, Suite 700
Long Beach, CA 90802

Response to Comments to the Marine Corps Air Station (MCAS) El Toro Draft Radiological Sampling Amendment to the Radiological Survey Plan dated October 2003

The following agencies have commented to the MCAS El Toro Draft Radiological Sampling Amendment. The responses to those comments are provided herein:

1. California Department of Health Services (DHS) comments dated November 24, 2003

2. US Environmental Protection Agency (EPA), Region IX comments dated November 24, 2003

Response to California DHS Comments of November 24, 2003 to the MCAS El Toro Draft Radiological Sampling Amendment to the Radiological Survey Plan dated October 2003

General Comment 1 – Because two landfills, IRP Sites 2 and 17/APHO-44, are to remain under the control and management of the Federal government, they will not require a release, restricted or unrestricted, from DHS. IRP Sites 2 and 17/APHO-44 were released for restricted use by the Navy in August 2003.

Response – Comment acknowledged.

General Comment 2 – For all the sites noted or in tables, please designate their MARSSIM classifications, Class I, II or III.

Response – The MARSSIM classifications have been added to the Final Radiological Sampling Amendment, Sections A-2.4.1 and A-3.4.1 for outdoor and indoor sites respectively. The actual classification for each survey unit is specified in Table 5 or 6, as applicable.

General Comment 3 – Along with the MARSSIM classifications, the area of each survey unit should be shown in units of square meters. MARSSIM suggests a maximum area for structures and land areas based on the survey unit's classification. This was meant to ensure that the survey units have adequate data points. Please include this information in the next revision.

Response – The surface area of each survey unit has been converted to units of square meters in Tables 5 and 6 for outdoor and indoor sites respectively.

Response to US EPA Comments of November 24, 2003 to the MCAS El Toro Draft Radiological Sampling Amendment to the Radiological Survey Plan data October 2003

Comment – Section A-1.3, page 2:

This section misrepresents the radiological release criteria requirements set forth by US EPA's Superfund Program. Under the NCP and CERCLA statutes radionuclides are NOT privileged pollutants. As such they must be characterized using the same cancer risk assessment protocols as required for all other carcinogenic substances. Using approved Superfund lifetime cancer risk models, a risk assessment is performed based on the actual soil concentrations of the radionuclide contaminant rather than on an annual radiation dose level or a TEDE.

The acceptable upper bounds of the risk must be less than one additional cancer incidence in 100,000 [sic] people (10^{-4}). But ideally, areas released for unrestricted use should have a total cancer risk of less than one additional cancer in a population of one million (10^{-6}). It is important to note, however, that the risk assessment requirement applies to CERCLA releases, i.e. releases to the environment. Contaminants inside buildings are generally not considered CERCLA releases unless there is a demonstrable pathway to the environment.

This section should be revised to reflect the fact that cancer risk assessment is the appropriate method of establishing radiological release criteria for CERCLA releases of radiological contamination at MCAS El Toro.

Response – Navy concurs with using approved Superfund lifetime cancer risk models to estimate risk based on actual soil concentrations of the radionuclide contaminant. Using the USEPA Risk Calculation program for Ra-226 plus daughters, the previously agreed to radiological release criteria for unrestricted residential reuse of 1 pCi/g above background yields a risk of 8.1×10^{-5}. This release criterion meets the requirement for an incremental cancer risk in the range of 10^{-4} and 10^{-6} above background. In addition, the Navy considers that this Ra-226 concentration is as low as is reasonably achievable (ALARA). MARSSIM guidance regarding ALARA specifies that radioactive materials should be managed to reduce the collective doses as far below regulatory limits as is reasonably achievable considering economic, technological, and social factors, among others.

The Final Radiological Sampling Amendment, Section A-1.3 has been revised to state that the incremental residual risk will be estimated, using EPA approved

protocols, and that 1pCi/g above background, which equates to an incremental risk of 8.1×10^{-5}, will be used as the release criteria for unrestricted residential reuse at outdoor sites.

Regarding potential contaminants located inside buildings at MCAS El Toro, there is no demonstrable pathway to the environment. Therefore, these buildings are not considered CERCLA releases.

Final Radiological Sampling

Amendment

to

Marine Corps Air Station El Toro

Radiological Survey Plan

Prepared by:
Weston Solutions, Inc.
Mare Office
Vallejo, California

For

Naval Facilities Engineering Command
Southwest Division

February 2004

Naval Facilities Engineering Command
Southwest Division
Contract No. N68711-01-D-6010 DO-0002; Modification No. 4
Document Control No. 2010

FINAL RADIOLOGICAL SURVEY PLAN

DATED 29 JANUARY 2001

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.000859**

DRAFT RADIOLOGICAL SAMPLING AMENDMENT TO RADIOLOGICAL SURVEY PLAN

DATED 01 FEBRUARY 2004

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **M60050.003018**

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A-1 INTRODUCTION

A-1.1 General Information

This is an Amendment to the Final Radiological Survey Plan for MCAS El Toro, dated January 2001. The parent survey document will be referred to as the 2001 Survey Plan throughout this amendment. All abbreviations/acronyms, references, data sheets and radiation detection instruments specified in the 2001 Survey Plan are applicable to this Amendment. The original Site Specific Health and Safety Plan, Appendix A, has been updated for this work.

In 1998, radiological survey and sampling work was also performed in Buildings 296 and 297 at MCAS El Toro. This work was conducted as a result of the existence of a radium room, which was located on the northeast mezzanine floor of Building 296.

Subsequent to the conduct of the radiological survey and sampling at MCAS El Toro in 1998 and 2001, based on site modeling, utilizing the sampling data, it was determined that further sampling was necessary to fully evaluate potential areas of concern. Additional solid samples (outdoor sites) and dry swipe samples (indoor sites), using a random/systematic and judgmental sampling protocol as specified in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), will be collected to evaluate the survey areas in accordance with current release criteria. In some instances, previous radiation and dose release levels, established in the 2001 Survey Plan, have been revised, and the new release criteria are provided in this Amendment.

A-1.2 Purpose of Amendment

Additional Sampling - Based on the results of the radiological survey and sampling data collected in 1998 and 2001, it was determined that the final assessment of some of the areas surveyed was dependent on additional sampling data. The purpose of this Amendment is to provide specific instructions for collecting, analyzing and evaluating these additional samples.

The surveys and sampling performed in 1998 and 2001 provided data, which identified several areas with elevated radiation levels, greater than the established investigation levels (IL). These locations were further investigated, through the collection of both solid samples and dry swipe samples. In some outdoor sites, radioactive anomalies were determined to be the cause of the elevated readings. Solid samples, collected from outdoor sites, were analyzed by a certified laboratory to identify any radionuclides of concern, and swipe samples were collected and counted for the presence of alpha and beta radiation particles.

From the analyses of 191 solid samples collected at outdoor sites, those showing elevated levels of activity (24 total samples) contained elevated concentrations of only the radionuclide radium (Ra)-226. The concentrations of Ra-226 in those 24 samples were greater than 1 picocurie per gram (pCi/g) above background; all other radionuclides of concern were indistinguishable from levels found in background

samples. Therefore, although the random/systematic and judgmental samples collected in accordance with this Amendment will be analyzed for the original isotopes of concern, based on the above, the main focus of this Sampling Amendment will be to assess the samples for elevated concentrations of Ra-226.

A total of 38 swipe samples were collected in building 296 in conjunction with the radium room work performed in 1998 and 64 swipe samples were collected from the nine buildings surveyed in 2001. None of the swipe samples contained levels of alpha or beta contamination greater than the permissible removable levels specified.

The locations of the solid and swipe samples previously collected for analyses were limited to the areas containing elevated survey readings. To fully characterize the sites surveyed, additional solid or swipe sampling, as applicable, using a random/systematic and judgmental sampling protocol as specified in the MARSSIM will be performed. The random sampling strategies are specified in Sections A-2 (solid samples) and A-3 (swipe samples) of this Amendment. Based on the results of the additional solid and swipe sampling, the need for further action will be determined.

A-1.3 Radiological Release Criteria

The radiological release process assures that residual radioactivity at an area will not result in individuals being exposed to unacceptable levels of radiation or radioactive materials.

For outdoor sites, regulatory agencies establish radiation lifetime cancer risk models to estimate risk based on actual soil concentrations of the radionuclide contaminant present above background levels. Residual levels of radioactive material that correspond to allowable radiation cancer risk standards in the range of 10^{-4} to 10^{-6} are calculated (derived) by analysis of various pathways and scenarios (direct radiation, inhalation, ingestion, etc.) through which exposures could occur. For outdoor sites, these derived levels, known as derived concentration guideline levels (DCGL's), are presented in terms of total radionuclide activity concentration. The radionuclide of concern at MCAS El Toro is Ra-226, for which a DCGL of 1 pCi/g has been established. The incremental residual risk will be estimated, using EPA approved protocol. A Ra-226 concentration of 1 pCi/g above background equates to an incremental risk of 8.1 X $10^{-5}$and will be used as the release criteria for unrestricted residential reuse at outdoor sites.

For indoor sites (i.e., buildings), the DCGL's are based on total residual surface activity detected in the areas of concern. Indoor surface DCGL's are established in accordance with the AEC Regulatory Guide 1.86 (REGUIDE 1.86) and are expressed in disintegrations per 100 centimeter^2 (dpm/100 cm^2).

DCGL's (see Sections A-2.2 and A-3.2) refer to average levels of radiation or radioactivity above established background levels. The DCGL or actual measured radiation levels can also be used to determine a total effective dose equivalent (TEDE) to an average member of the critical group.

The 2001 Survey Plan was based on the Nuclear Regulatory Commission's (NRC's) Title 10, Code of Federal Regulations, Part 20, and United States Environmental Protection Agency's (USEPA's) Risk Assessment Guidance for Superfund. NRC's directive specifies that areas will be considered acceptable for unrestricted use if the residual radioactivity results in a TEDE to an average member of the critical group that does not exceed 25 millirem per year (mrem/y) and the residual radioactivity has been reduced to levels that are as low as is reasonably achievable (ALARA). Navy considers that the DCGL's established at MCAS El Toro for outdoor sites (Ra-226 residual concentration of 1 pCi/g) and for buildings (REGUIDE 1.86) are ALARA.

A-2 OUTDOOR SOLID SAMPLING STRATEGY

A-2.1 Solid Sampling Criteria

The sampling criteria used for this Sampling Amendment is based on guidance contained in the MARSSIM. Quantities and locations of the random samples were determined using the applicable subsections in MARSSIM, Section 5. In addition, judgmental samples will be collected at each location where previous solid sample results indicated Ra-226 levels greater than 1 pCi/g above background. Judgmental samples may also be collected from other locations in order to fully evaluate the areas of concern. The evaluation of the sample results will be based on the subsection for interpretation of survey results contained in MARSSIM, Section 8. The detailed random sampling procedures, including sampling criteria, numbers of samples to be collected and sample locations are provided below. Maps showing the grid location of each random solid sample at the outdoor sites are provided in Figures A-O-1 through A-O-10.

A-2.2 Solid Sampling Objectives and Limits

The sampling objective is to collect sufficient solid samples, based on MARSSIM guidelines, in each designated survey area to permit a final evaluation of the status of the outdoor survey units (SUs). These samples will be analyzed for Ra-226. The results of the sample analyses will be compared to concentrations of the same radioisotopes from background (reference area) samples. The background samples will be taken from representative areas to those being evaluated (see subsection A-2.3).

The sample concentration release limits are based on recent comments received from the California DHS and USEPA. Since the primary radionuclide of concern at MCAS El Toro is Ra-226 (see discussion in subsection A-1.2 above), the derived concentration guideline levels (DCGL) are established based on Ra-226. The $DCGL_W$ of 5 pCi/g from the 2001 Survey Plan has been revised downward to a value considered to be as low as reasonably achievable (ALARA) for unrestricted use ($DCGL_{ALARA(U)}$) as shown in Table 1. The $DCGL_{ALARA(U)}$ for unrestricted reuse is 1 pCi/g.

Table 1
Solid Sample Concentration Levels (DCGL) - Radionuclide of Concern

Radionuclide of Concern	$DCGL_W$ - pCi/g (1998 and 2001 Survey Plan)	$DCGL_{ALARA(U)}$ - pCi/g (2003 Sampling Amendment)
Ra-226	5	1

A-2.3 Sample Background (Reference Area) Location Determination

Sampling background reference areas are locations known not to be impacted, in areas up gradient or cross gradient from the areas being sampled. Six (6) reference areas were sampled during the initial radiological surveys conducted in 2001. Nine additional reference areas have been selected from locations known not to be radiologically impacted. These additional nine reference areas will be sampled to ensure that the Station background is thoroughly characterized. Descriptions of the outdoor solid sampling reference areas (past and current) are listed in Table 2.

Table 2
Solid Sample Background Reference Areas

BG No.	Outdoor SU Sites Previously Sampled (Additional Samples may be Collected) (See Table 5)	Reference Area Locations Sampled during 2001 Survey (NO ADDITIONAL SAMPLES WILL BE COLLECTED)
1	DRMO Yard 1 (IRP Site 8) – Inside Fence	Rocky soil and asphalt located north of DRMO Yard 1, near Buildings 324, 326 or 599 - ***Complete***
2	Former Industrial Waste Treatment (IWT) Plant (IR Site 12)	Soil located north of IWT Plant in the vicinity if Building 529 - ***Complete***
3	Original Landfill (IRP Site 3)	Rocky soil located near storage tank northwest of IRP site - ***Complete***
4	Perimeter Rd. Landfill (IRP Site 5/APHO 46)	Soil located north of DRMO Yard 3 near aircraft taxiway - ***Complete***
5	Magazine Rd. Landfill (IRP Site 2) and Communication Sta. Landfill (IRP Site 17)	Rocky soil located next to road that connects IRP Site 2 and IRP Site 17 - ***Complete***
6	EOD Range (IR Site 1) – Burn Pit Area	Soil at north end of EOD Range, at perimeter fence, up gradient of burn pits - ***Complete***

BG No.	Outdoor SU Sites from which Additional Samples will be Collected (See Table 5)	Additional Reference Areas Samples will be Collected (ONE SAMPLE - EACH LOCATION)
7	Anomaly Area 3	Soil located up-gradient of Anomaly Area 3, near to Wherry Housing
8	Suspected Former Site of the Radium Plaque Adaptometer (RPA) Building	Soil located north of the RPA site near building 263 or 718.
9	DRMO Yard 3 (AOC 264)	Rocky soil up-gradient of DRMO Yard 3
10	DRMO Yard 1 (IRP Site 8) – Scrap yard, Outside Fence	Crushed rock with soil, located up-gradient of the scrap yard
11	Aircraft Parts Storage Yard	Soil located up-gradient of the yard near Building 22
12	Bee Canyon Wash (IR Site 25 - partial)	Soil located in the Bee Canyon Wash upstream of the IRP Site 12 outfall
13	NBC Complex	Soil located up-gradient from NBC Complex
14	N/A	Soil located up-gradient from APHO 44 west of Quarry Rd.
15	N/A	Rocky soil located up-gradient of IRP Site 17

A-2.4 Solid Sampling Process

A-2.4.1 Solid Sampling Protocol

The following protocol will be used for collecting solid samples for MCAS El Toro in accordance with this amendment:

- Standard Solid Samples: Solid material will be collected from the designated grid locations specified on the applicable sampling map shown in Figures A-O-1 through A-O-10. Samples shall be collected using the procedure specified in Section A-2.4.2.

- Sample Size: The excavation depth for a surface solid sample is limited to 15 centimeters (6 inches); see MARSSIM, Section 3.6.3.1. The solid samples collected in accordance with this Amendment will contain a minimum volume of 500 cubic centimeters (cc) and weight of approximately 500 grams (g) of solid material (amount of material required by analytical laboratories to perform radioisotopic analyses of solid sample). The sample collection process will ensure that the volume of a sample is large enough to provide sufficient material to achieve the desired detection limits. Under conditions where larger volumes of sample media are required, the sample weight may be several (approximately 3 to 4) kilograms; see MARSSIM, Section 7.5. All particles/pieces making up the sample should be less than one inch in the maximum dimension.

- Numbers of Samples: The number of samples to be collected in each SU was determined, using the criteria in MARSSIM, Section 8.4, for "contaminant present" in the background. Based on the results of surveys and sampling performed to date, each of the sites being sampled are classified as MARSSIM Class 3, except for IRP Site 8 (DRMO Yard 1 - inside the fence), which has been reclassified, based on survey and sampling results, as MARSSIM Class 2. The sample areas of each outdoor SU are within the MARSSIM Table 1, Suggested Survey Unit Area requirements for the assigned classifications.

  Equation 1 was used to calculate the relative shift.

Equation 1

$$\text{Relative Shift}_{(\text{Solid Samples})} = \frac{\Delta}{\sigma} = \frac{DCGL_W - LBGR}{\sigma}$$

where,
$DCGL_W$ = Derived Concentration Guideline Level (WRS Test); 1 pCi/g
LBGR = Lower Boundary of Gray Region (established at ½ $DCGL_W$); 0.5 pCi/g
σ = Standard deviation (sample data) in pCi/g

The calculated relative shift for the outdoor sites at MCAS El Toro was determined, and using MARSSIM, Table 5.3, and decision error levels of 5 percent, the minimum number of samples required to be collected in each SU was determined (see Table 5).

- Sample Locations: To determine the sample coordinates, the number of random/systematic samples was used to calculate the spacing between each sample point (see MARSSIM, equation 5-5), using Equation 2.

Equation 2

$$L = \sqrt{A/0.866n}$$

where,
L = Length (between sample points)
A = Area of SU
n = number of samples

Utilizing the calculated spacing (L) between samples, grid maps (Figures A-O-1 through A-O-10) have been prepared showing the coordinates for each outdoor sample to be collected. The random/systematic sample grids are numbered 1, 2, 3, etc. and the judgmental sample grids will be numbered J-1, J-2, J-3, etc.

A-2.4.2 Solid Sampling Procedure

The sampling procedure involves locating, collecting, handling and controlling, and shipment of the sample. The following steps shall be taken:

1. Locating the Sample Points: Locate the sample coordinates (see NOTE) in accordance with Section A-2.4.1 and mark the location, using flags or other appropriate markers.

NOTE: For IRP Site 3 only, prior to collecting surface samples, a scan radiation survey will be conducted in the newly identified landfill area located immediately east of the Augua Chinon Wash, adjacent to the Irvine Boulevard fence (see Figure A-O-1 for area location). The survey shall be performed in accordance with the 2001 Survey Plan, Sections 5.4, 5.5, and 7.5.1.1.

2. Collecting Surface Samples: Personnel collecting samples will wear protective gloves during the sample collection operations. Solid samples (approximately 500 cc minimum and 500 g) will be collected using only hand tools. Prior to each sample collection, a one-minute stationary gamma reading will be recorded at each sample point using a Ludlum 2221 scaler/ratemeter with a model 44-10 probe (or equivalent). As discussed in Section A-2.4.1, the sample excavation depth shall normally not exceed 6 inches. Upon completion of removal, the

collected sample and bottom of the sample excavation will be surveyed by recording a one-minute stationary gamma reading.

3. Collecting Subsurface Samples: When a sampling depth of 6 inches is reached and an elevated radiation reading (greater than DCGL) is present, the sample depth may be increased to a maximum of 12 inches total, with the concurrence of the WESTON onsite senior radiological supervisor. This subsurface sample shall be treated separately from the surface sample. Both the collected media and the bottom of the excavation shall be checked for radiation levels (see NOTE). Upon completion of sample removal, the collected sample and bottom of the sample excavation will be surveyed by recording a one-minute stationary gamma reading. Sampling personnel shall stop sampling at 12 inches maximum depth and report sampling results (approximate sample volume and weight, excavation area and depth and current radiation levels) to the WESTON program manager.

   NOTE: Samples Containing Discrete Anomalies - If, during the above solid sampling process, a discrete radioactive anomaly (e.g., gage, dial, etc.) is found, the item shall be separated from the sample, packaged and controlled in the same manner as a solid sample. A solid sample of the media surrounding the discrete radioactive item will be collected from the excavation following the guidance in Step 2 above.

4. Handling and Controlling the Sample: After sample collection, all samples will be contained, stored, labeled, handled and controlled in accordance with the instructions provided below. Depending on measured radiation levels, solid samples may require special handling (see Step 5).

   Processing of samples at the work site will include the following:
   a. Solid samples will be either double bagged in plastic bags and sealed, or collected in containers provided by the analyzing laboratory and sealed.
   b. Sample labeling, transfer and custody paperwork will be in accordance with Appendix B, ISOLAB-5 (typical container sealing methods and transfer and custody process).

5. Handling and Controlling Elevated Reading Samples: In the event that radioactive samples are determined to read 2 mR/h or greater on contact, the following additional actions shall be taken:
   - Personnel handling the sample will wear, at a minimum, rubber gloves and radiation dosimetry.
   - The sample will be double bagged in plastic bags and sealed.
   - Transfer and Custody paperwork in accordance with ISOLAB-5 (see Appendix B) will be prepared. Appropriate marking will be affixed to the bagged sample.
   - The sample will be stored in a lockable storage area agreed upon with the Caretaker Site Office (CSO) at El Toro. The storage area will be posted with appropriate warning signage.

- Access to the storage area will be limited to CSO and Weston radiological survey personnel.
- Transporting of radioactive samples on site will be performed by qualified radiological personnel. Radioactive items requiring off site shipment will comply with applicable Department of Transportation (DOT) regulations.

Off-site transportation and final disposition of radioactive samples will be performed under the direction of the Navy Radiological Affairs Support Office (RASO).

6. Shipment of Samples: Samples will be transferred to an approved, (licensed) laboratory in accordance with appropriate DOT regulations. Transfer and Custody paperwork in accordance with ISOLAB-5 or certified laboratory procedures will be included with the shipment to ensure proper control of each sample.

A-3 INDOOR SWIPE SAMPLING STRATEGY

A-3.1 Swipe Sampling Criteria

The surface swipe sampling criteria used for this Sampling Amendment is based on guidance contained in the MARSSIM and AEC (NRC) Regulatory Guide 1.86 (See Table 3). For each of the SU buildings listed in Table 4, a corresponding reference area building, also listed in Table 4, will be swipe sampled. Quantities and locations of random and judgmental swipe samples have been determined using the applicable subsections in MARSSIM, Section 5. The detailed random/judgmental swipe sampling procedures, including sampling criteria, numbers of samples to be collected and sample locations are provided in Section A.3.4. The numbers of swipe samples to be collected in each SU is indicated in Table 6. Maps showing the grid location of each sample point at the indoor sites are provided in Figures A-I-1 through A-I-11.

A-3.2 Swipe Sampling Objectives and Limits

The objective is to collect sufficient swipe samples, based on MARSSIM guidelines, to permit a final evaluation of the status of the indoor SUs. These swipe samples will be analyzed for levels of alpha and beta surface contamination. The results of the swipe samples will be compared to the removable surface contamination limits from AEC Regulatory Guide 1.86 (***AEC REGUIDE 1.86***).

Table 3 lists the surface contamination limits from Regulatory Guide 1.86 for the radionuclides of concern.

Table 3
Swipe Samples Removable Surface Contamination Levels-
AEC Reguide 1.86

Radionuclide	Removable ($dpm/100\ cm^2$)
Ra-226 (alpha)	20
Sr-90 (beta)	200

A-3.3 Swipe Sampling Background (Reference Area) Location Determination

The swipe sampling background reference areas are located in buildings known not to be impacted, constructed of similar materials at approximately the same time as the buildings of concern. Reference areas were selected during the preparation for the 2001 surveys and were known to be non-impacted. Reference areas will be swipe sampled prior to the conduct of the sampling per this amendment to provide

representative building backgrounds. Each location that is swipe sampled will also be surveyed for alpha and beta contamination at the time that the swipe is collected. The indoor swipe sample reference areas, number of swipe samples, and the reference area grid map figures are listed in Table 4.

Table 4
Swipe Sample Background Reference Areas

BG No.	Indoor Sites (SUs) to be Swipe Sampled (See Table 6)	Reference Areas to be Sampled	Number of swipe samples to be collected in each Reference Area and Figure numbers
1	Building 319	**Building 317**	**15 random and 15 judgmental – Figure A-R-1**
2	Building 360		
3	Building 295, 296 and 297	**Building 298**	**15 random and 15 judgmental – Figure A-R-2**
4	Building 242	**Building 22**	**10 random and 10 judgmental – Figure A-R-3**
5	Building 243		
6	Building 244		
7	Building 1789	**Building 1719**	**10 random and 10 judgmental – Figure A-R-4**
8	Building 1803 (also known as 832)	**Building 746 (concrete)**	**10 random and 10 judgmental – Figure A-R-5**
9	Building 787	**Building 83 (tile)**	**10 random and 10 judgmental – Figure A-R-6**

A-3.4 Swipe Sampling Process

A-3.4.1 Swipe Sampling Protocol

The following protocol will be used for collecting swipe samples from building surfaces in accordance with the details specified below:

- Swipe Sample Area: Each swipe sample collected in accordance with this Amendment will cover an area approximately 100 square centimeters (cm^2). Use of experienced radiological personnel will ensure that loose particles are transferred from the sample surface to the dry swipe(s).

- Investigative Swipe Sample Radiation Levels: During the direct surveys, if the alpha or beta levels exceed the "Removable Surface Activity" level specified in Table 3, additional direct survey readings and additional swipe samples shall be collected in order to fully characterize the radiation levels at the location in question.

- Numbers of Swipe Samples: The number of swipe samples to be collected in each SU was determined, using the criteria in MARSSIM, Section 8.4 for Contaminant Present in the background. Based on the results of surveys and swipe sampling performed to date, the buildings being sampled are each classified as MARSSIM Class 3. The sample areas of each indoor SU are within the MARSSIM Table 1, Suggested Survey Unit Area requirements for the assigned classifications.

  Equation 3 was used to calculate the relative shift.

  Equation 3

  $$\text{Relative Shift}_{(\text{Swipe Samples})} = \Delta/\sigma = \frac{(DCGL_W - LBGR)}{\sigma}$$

  where,
  $DCGL_W$ (Alpha) = 20 dpm/100cm^2 and Beta = 200 dpm/100cm^2
  LBGR (Alpha) = 10 dpm/100cm^2 and Beta = 100 dpm/100cm^2
  σ = Standard deviation (swipe sample data); Alpha = 0.74 dpm/100cm^2 and Beta = 10.4 dpm/100cm^2

  The relative shift for the indoor sites at MCAS El Toro for both alpha and beta radiation was calculated to be greater than 4. Using MARSSIM, Table 5.3, and decision error levels of 5 percent, the minimum number of swipe samples to be collected in each SU is n = 9. For additional conservatism, 10 or more swipe samples will be collected in each SU.

- Swipe Sample Locations: The spacing between each sample point is calculated (see MARSSIM, equation 5-5), using Equation 2. Utilizing the calculated spacing (L) between samples, grid maps (Figures A-I-1 through A-I-11) are provided showing the coordinates for locating the swipe sample to be collected. The random/systematic sample grids are numbered 1, 2, 3, etc. and the judgmental sample points are numbered J-1, J-2, J-3, etc.

A-3.4.2 Swipe Sampling Procedure

The swipe sampling procedure involves locating, collecting, handling and counting the swipe samples. The following steps shall be taken:

1. Locating the Swipe Sample Points: Locate the sample coordinates in accordance with Section A-3.4.1 and mark the location, using chalk or other appropriate marker.

2. Collecting Surface Swipe Samples: Personnel collecting samples will wear protective gloves during the sample collection operations. Dry swipe samples, taken over an area of approximately 100 cm^2, will be collected by hand. Prior to

each swipe sample collection, a 5-minute stationary alpha and beta reading will be recorded at each sample point using a Ludlum 2224-1 scaler/ratemeter with a model 43-89 probe (or equivalent).

3. Handling and Controlling the Swipe Sample: After collection, all samples will be contained, stored, labeled, and handled in accordance with the instructions provided the following instructions:

   a. Swipe sample labeling and controls are in accordance with Appendix B.
   b. After labeling, swipe samples will be bagged in sealable plastic bags and stored in preparation for counting.

4. Counting of Swipe Samples: The swipe samples will either be counted by an independent laboratory or by WESTON using a calibrated Ludlum 43-10-1 windowless alpha-beta swipe counter in conjunction with a Ludlum Model 2224 - 1 scaler/ratemeter instrument (or equivalent). Swipe sample analyses will check for gross alpha and beta activity. Data will be reported in units of disintegrations per minute per 100 square centimeters (dpm/100 cm^2). Appendix C provides a detailed description of the Ludlum Model 43-10-1 alpha-beta swipe counter.

A-4. Conduct of Sampling and Surveys

A-4.1 Outdoor Sites

A-4.1.1 No Further Solid Samples Required – Based on the previous surveys and solid sampling conducted at the following sites, and/or future use of each site, it has been determined that further radiological solid sampling in accordance with this amendment will not be performed:

- Two landfills, IRP Sites 2 and 17/APHO-44 were radiologically released for restricted use in August 2003. These sites were determined to be radiologically releasable for restricted use and installation of a 4-foot thick clean soil cap. This was based on evaluation of 1,507,241 survey readings and 31 solid samples collected over a 22.7-acre landfill surface at IRP Site 2 and 466,810 survey readings and 57 solid samples collected over a 7.4-acre landfill surface at IRP Site 17/APHO 44.
- IRP Site 1 (EOD Range) – A total of 10 solid samples were required at IRP Site 1, and 26 solid samples were previously collected and analyzed. One sample was determined to contain Ra-226 concentration greater than 1 pCi/g above background; however, the results of all statistical and modeling tests for the site are satisfactory, and additional sampling is not required. This site will be subject to a Fed-to-Fed transfer.
- NBC Complex/APHO 38 – A total of 10 solid samples were required at the NBC complex, and 11 solid samples were previously collected and analyzed. None of the solid samples contained Ra-226 greater than 1 pCi/g above background.

A-4.1.2 Solid Samples Required – There are currently 10 SUs, which were previously surveyed, requiring additional solid sampling as discussed in Section A-1.2 above. Based on MARSSIM, the minimum number of solid samples required in each SU was calculated using Equation 1. Table 5 lists the outdoor SUs, from which additional solid samples will be collected and the numbers of samples to be collected.

- IRP Site 3 - Original Landfill; including high-density scan survey
- IRP Site 5/APHO 46 - Perimeter Road Landfill
- IRP Site 8 - DRMO Yard 1 (Outside Fence)
- IRP Site 12 - Former Industrial Waste Treatment Plant
- IRP Site 25 (partial) - Bee Canyon Wash (outfall)
- AOC 264 - DRMO Yard 3
- Anomaly Area 3
- Aircraft Parts Storage Yard
- Former Site of Radium Plaque Adaptometer Building
- IRP Site 8 - DRMO Yard 1 (Inside Fence – Asphalt Area Only)

Table 5
Outdoor SUs Requiring Solid Sample Collection

SU Description	SU Classi-fication	Approx. Area of SU (sq. meters)	Number of Samples Previously Collected	Minimum No. of Random Samples Required	Minimum No. of Judgmental Samples Required
IRP Site 3, Original Landfill	3	53,000	22	**5**	**4***
IRP Site 5/APHO 46, Perimeter Road Landfill	3	28,300	5	**5**	**0**
IRP Site 8 – DRMO Yard 1 (Inside Fence – Asphalt Area Only)	2	8,900	1	**15**	**0**
IRP Site 8 – DRMO Yard 1 (Outside Fence)	3	14,600	4	**11**	**0**
IRP Site 12 – Former Industrial Waste Treatment Plant	3	19,400	15	**6**	**1****
IRP Site 25 (partial) – Bee Canyon Wash (outfall)	3	10	0	**21**	**0**
AOC 264 – DRMO Yard 3	3	10,500	0	**21**	**0**
Anomaly Area 3	3	38,400	1	**20**	**0**
Aircraft Parts Storage Yard	3	1,600	2	**19**	**1*****
Former Site of Radium Plaque Adaptometer Building	3	800	0	**21**	**0**
Totals		**175,510**	**50**	**144**	**6**

*One judgmental sample located at original (2001) sample point #12
**One judgmental sample located at original (2001) sample point #14
***One judgmental sample located at original (2001) sample point #1

Reference Area Samples – Prior to commencing solid sampling in the SUs, collect the reference area samples using the process described in Section A-2.4 and the information contained in Table 2. Record the "before" and "after" gamma radiation levels for each reference area sample location in Appendix D.

SU Sample Collection – Collect solid samples in accordance with the sampling procedure specified in Section A-2.4.2. Numbers of samples and location will be determined using Table 5 as shown on the Figures specified. In instances where the Figures provide more grid points than the Table 5 numbers of samples, the lead radiological engineer on-site shall designate the grids from which the samples will be

collected. A sample location that is not accessible due to interferences, shall be relocated by the on-site lead engineer to an accessible location as close to the grid location as practical. The relocated point shall be plotted on the sample grid map for future reference. Record the "before" and "after" gamma radiation levels for each sample location in Appendix D.

- IRP Site 3, Original Landfill – Collect 9 total samples (see NOTE) from the locations shown in Figure A-O-1

NOTE: Prior to collecting solid samples at IRP Site 3, perform a high-density survey of the ground surface on the newly identified area of the landfill located east of the Augua Chinon Wash near Irvine Blvd. This area is approximately ¼ acre in size and is shown on Figure A-O-1.

- IRP Site 5/APHO 46, Perimeter Road Landfill – Collect 5 total samples from the locations shown in Figure A-O-2
- IRP Site 8 – DRMO Yard 1 (Outside Fence) – Collect 11 total samples from the locations shown in Figure A-O-3
- IRP Site 12 – Former Industrial Waste Treatment Plant – Collect 7 total samples from the locations shown in Figure A-O-4
- IRP Site 25 (partial) – Bee Canyon Wash (outfall) – Collect 21 total samples from the locations shown in Figure A-O-5
- AOC 264 – DRMO Yard 3 – Collect 21 total samples from the locations shown in Figure A-O-6
- Anomaly Area 3 – Collect 20 total samples from locations shown in Figure A-O-7
- Aircraft Parts Storage Yard – Collect 20 total samples from the locations shown in Figure A-O-8
- Former Site of Radium Plaque Adaptometer Building – Collect 21 total samples from the locations shown in Figure A-O-9
- IRP Site 8 – DRMO Yard 1 (Inside Fence – Asphalt Area Only) – Collect 15 total samples from the locations shown in Figure A-O-10

A-4.2 Indoor Sites

A-4.2.1 Swipe Samples Required -
There are currently 11 buildings, which were previously surveyed, and require additional swipe samples as discussed in Section A-1.2 above. Based on MARSSIM, the minimum number of swipe samples required for each site was calculated using Equation 3. In order to provide further conservatism in the collection of samples and evaluation of data, the number of swipe samples collected from Class 3 areas less than 25,000 sq ft (2,230 sq meters) has been increased to 10 minimum and for areas larger than 25,000 sq ft the number of swipe samples has been increased to 15 minimum. Table 6 lists the indoor SUs, from which additional swipe samples will be collected. Table 7 lists indoor grids on the mezzanine of Building 296 from which follow-up investigative swipe samples will be collected.

- Building 319
- Building 360
- Building 295
- Building 242
- Building 243
- Building 244
- Building 1789
- Building 1803 (Also known as 832)
- Building 787
- Building 296
- Building 297

Table 6
Indoor SUs Requiring Swipe Sample Collection

Indoor SUs to be Swipe Sampled	SU Class	Approx. Area of Each SU	No. of Swipes to be Collected	
		(sq. meters)	Random	Judgmental
Building 319	3	5,760	**15**	**15**
Building 360	3	10,470	**15**	**15**
Building 295	3	2,460	**15**	**15**
Building 242	3	595	**10**	**10**
Building 243	3	195	**10**	**10**
Building 244	3	620	**10**	**10**
Building 1789	3	5	**10**	**10**
Building 1803 (also known as 832)	3	230	**10**	**10**
Building 787	3	165	**10**	**10**
Building 296 (radium rm. & paint rm.)	1	42	**N/A**	**5***
Building 296 (washrms & instr. shop)	2	924	**N/A**	**32***
Building 296 (stairwells)	3	45	**N/A**	**5***
Building 296 – main floor	3	11,750	**56**	**56**
Building 297 – main floor	3	11,750	**56**	**56**
Totals		**45,011**	**217**	**259**

* These judgmental swipe samples collected in Building 296 are for the purpose of investigating direct alpha/beta readings previously recorded in the grid locations shown in Table 7.

Table 7
Building 296 Direct Beta Reading Levels Greater Than 200 dpm/100 cm2

Figure (See July 2002 Release Report)	Location	Grid No.	Net Beta (dpm/100 cm^2)
8	Former Radium Room 6-206, Walls	N2B	217
		WCB	210
		ECT	207
9	Former Conventional Paint Room, Walls	EDB	228
12	Former Toilet Room No. 4, Walls	ECT	221
13	Former Women's Restroom 6-204, Walls	N2B	366
		WAB	276
		S3B	297
		EAB	314
		ECB	393
14A	Former Women's Washroom 6-200, Walls	N2B	245
		N4B	352
		N6B	386
		WDB	407
		S3B	231
		EAB	283
		ECT	334
14B	Former Women's Washroom 6-201, Walls	N2B	293
		WAB	421
		WCB	278
		S1B	362
		EAB	279
		ECT	369
14C	Former Women's Washroom 6-202, Walls	N2B	262
14D	Former Women's Washroom 6-203, Walls	WBB	345
		S5B	345
		EAB	366
14D	Former Women's Washroom 6-203, Floor	4D	207
16A	Former Instrument Shop, Walls	EET	238
16B	Former Instrument Shop, Floor	15A	207
16C	Former Instrument Shop, Floor	5G	317
16E	Former Instrument Shop, Walls	ENT	259
16G	Former Instrument Shop, Walls	S2T	252
		ETT	348
16I	Former Instrument Shop, Walls	EUT	424
		EVT	334
		EUB	424
21	Upper Stair, Left Side, Horizontal	H8	203
	Upper Stair, Middle, Horizontal	H12	228
	Floor - Middle Landing, Furthest from Step	N/A	272
	Floor - Right Landing Side, Middle to Step	N/A	224
	Floor - Right Landing Side, Furthest from Step	N/A	231

Reference Area Swipe Samples – Prior to commencing swipe sampling in the SUs, complete collection of the reference area swipe samples/surveys using the process described in Section A-3.4 and information in Table 4 and the figures specified. A swipe sample location that is not accessible due to interferences, shall be relocated by the on-site lead engineer to an accessible location as close to the grid location as practical. The relocated point shall be plotted on the swipe sample grid map for future reference. Record the alpha/beta direct reading radiation levels for each reference area swipe sample location in Appendix E.

- Bldg 317 – Collect 30 swipe samples (15 from locations shown in Figure A-R-1 and 15 judgmental)
- Bldg 298 – Collect 30 swipe samples (15 from locations shown in Figure A-R-2 and 15 judgmental)
- Bldg 22 – Collect 20 swipe samples (10 from locations shown in Figure A-R-3 and 10 judgmental)
- Bldg 1719 – Collect 20 swipe samples (10 from locations shown in Figure A-R-4 and 10 judgmental)
- Bldg 746 (concrete) – Collect 20 swipe samples (10 from locations shown in Figure A-R-5 and 10 judgmental)
- Bldg 83 (vinyl tile) – Collect 20 swipe samples (10 from locations shown in Figure A-R-6 and 10 judgmental)

SU Swipe Sample Collection – Collect swipe samples in accordance with the sampling procedure specified in Section A-3.4.2. Numbers of samples and location will be determined using Table 6 and the figures specified below. A swipe sample location that is not accessible due to interferences, shall be relocated by the on-site lead engineer to an accessible location as close to the grid location as practical. The relocated point shall be plotted on the swipe sample grid map for future reference. Record the alpha/beta direct reading radiation levels for each swipe sample location in Appendix E.

- Bldg 319 - Collect 30 swipe samples (15 from locations shown in Figure A-I-1 and 15 judgmental)
- Bldg 360 - Collect 30 swipe samples (15 from locations shown in Figure A-I-2 and 15 judgmental)
- Bldg 295 - Collect 30 swipe samples (15 from locations shown in Figure A-I-3 and 15 judgmental)

- Bldg 242 - Collect 20 swipe samples (10 from locations shown in Figure A-I-4 and 10 judgmental)
- Bldg 243 - Collect 20 swipe samples (10 from locations shown in Figure A-I-5 and 10 judgmental)
- Bldg 244 - Collect 20 swipe samples (10 from locations shown in Figure A-I-6 and 10 judgmental)
- Bldg 1789 - Collect 20 swipe samples (10 from locations shown in Figure A-I-7 and 10 judgmental)
- Bldg 1803 - Collect 20 swipe samples (10 from locations shown in Figure A-I-8 and 10 judgmental)
- Bldg 787 - Collect 20 swipe samples (10 from locations shown in Figure A-I-9 and 10 judgmental)
- Bldg 296 – Collect 154 swipe samples (56 from locations shown in Figure A-I-11, 56 judgmental and 42 from the grids listed in Table 7)
- Bldg 297 – Collect 112 swipe samples (56 from locations shown in Figure A-I-12 and 56 judgmental)

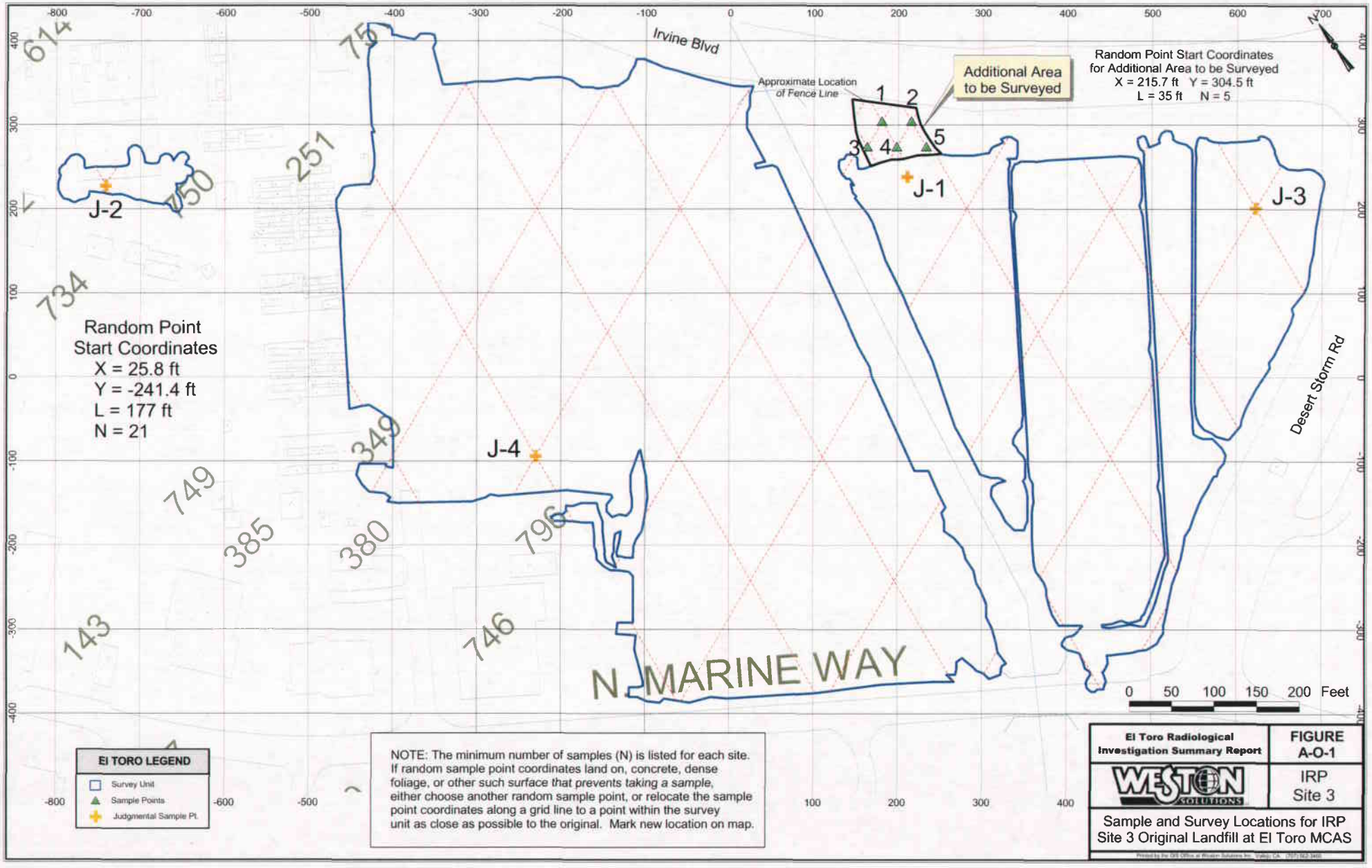
Sampling Amendment to

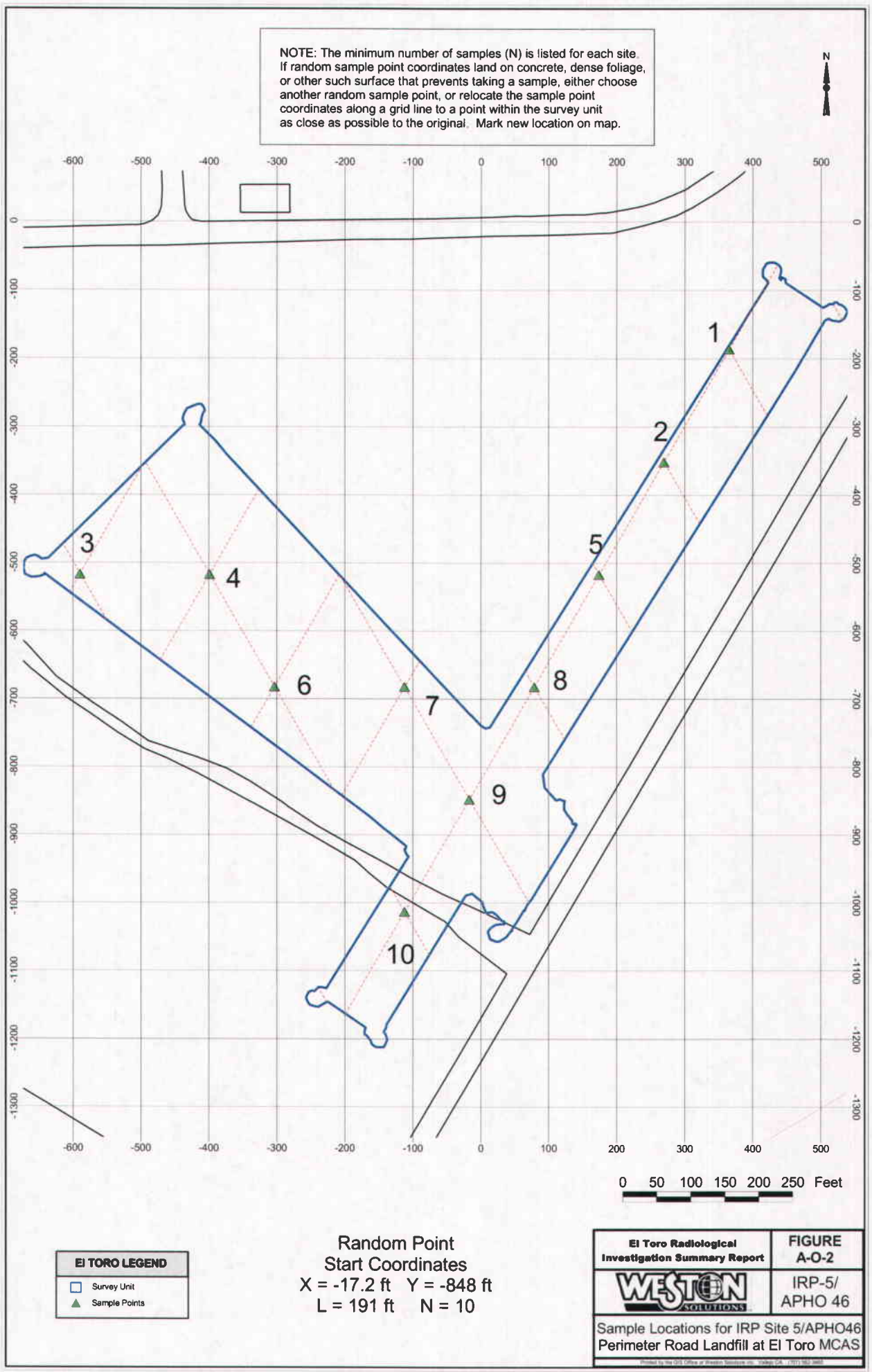
Marine Corps Air Station El Toro

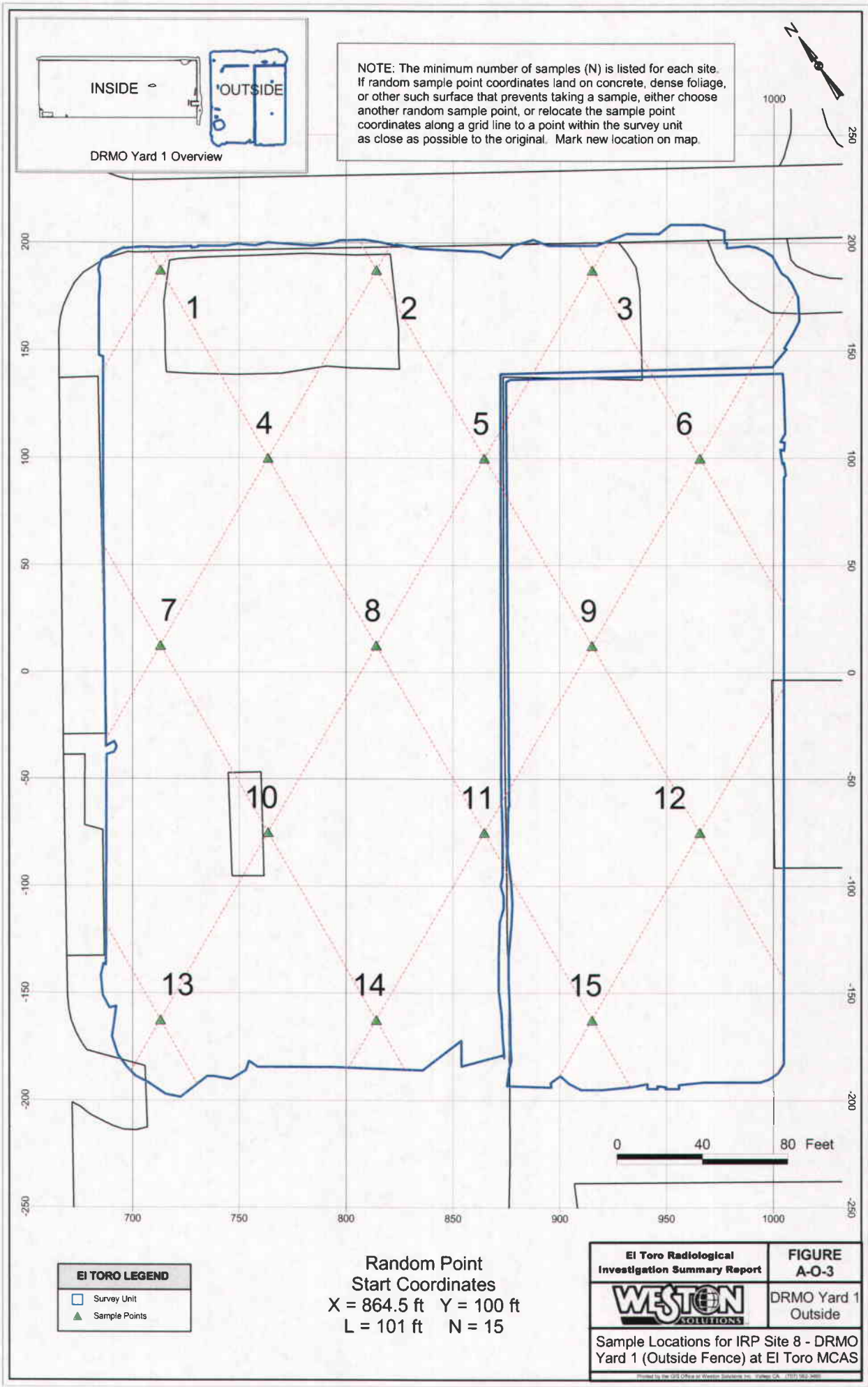
Radiological Survey Plan

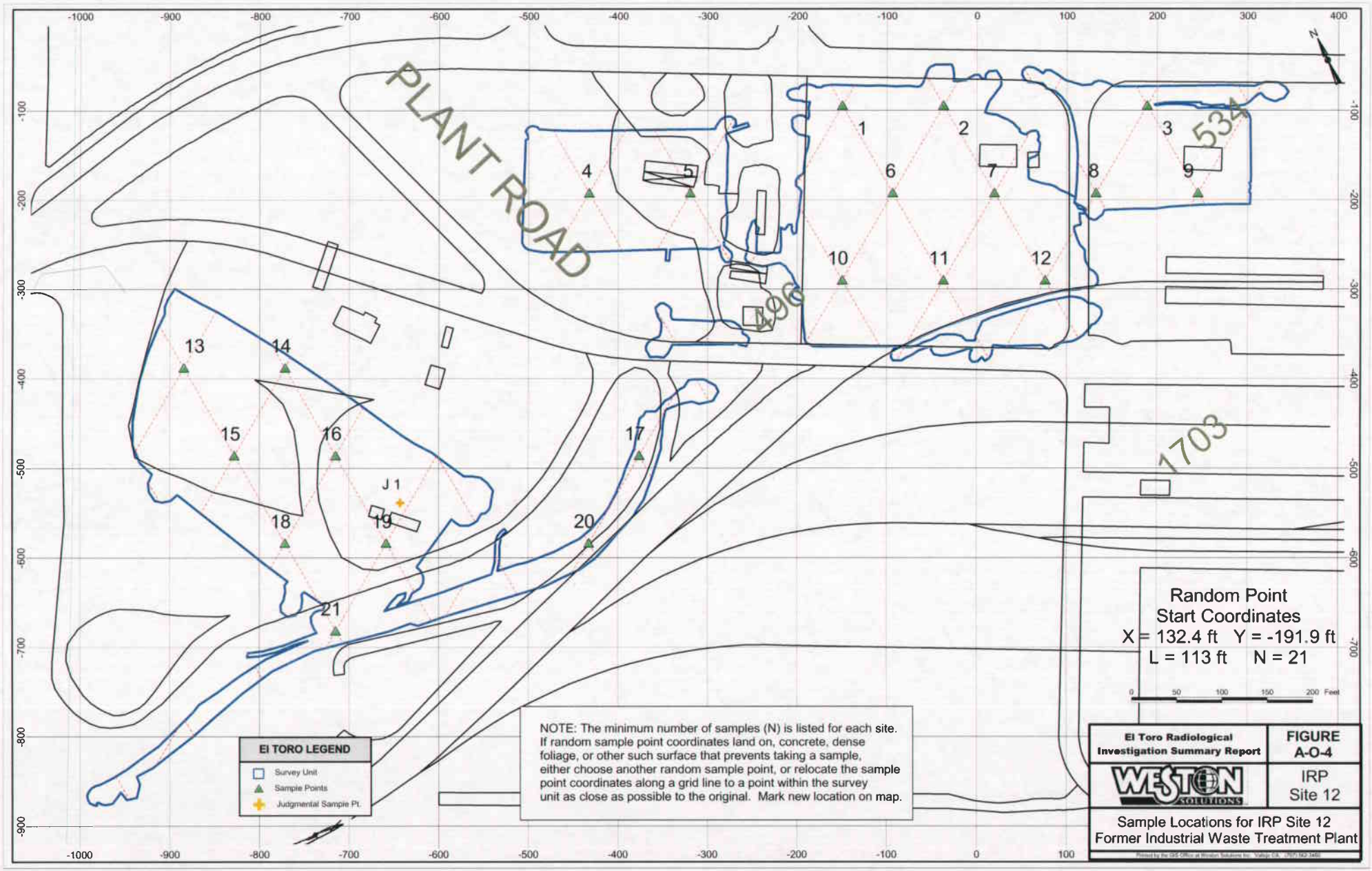
Figures

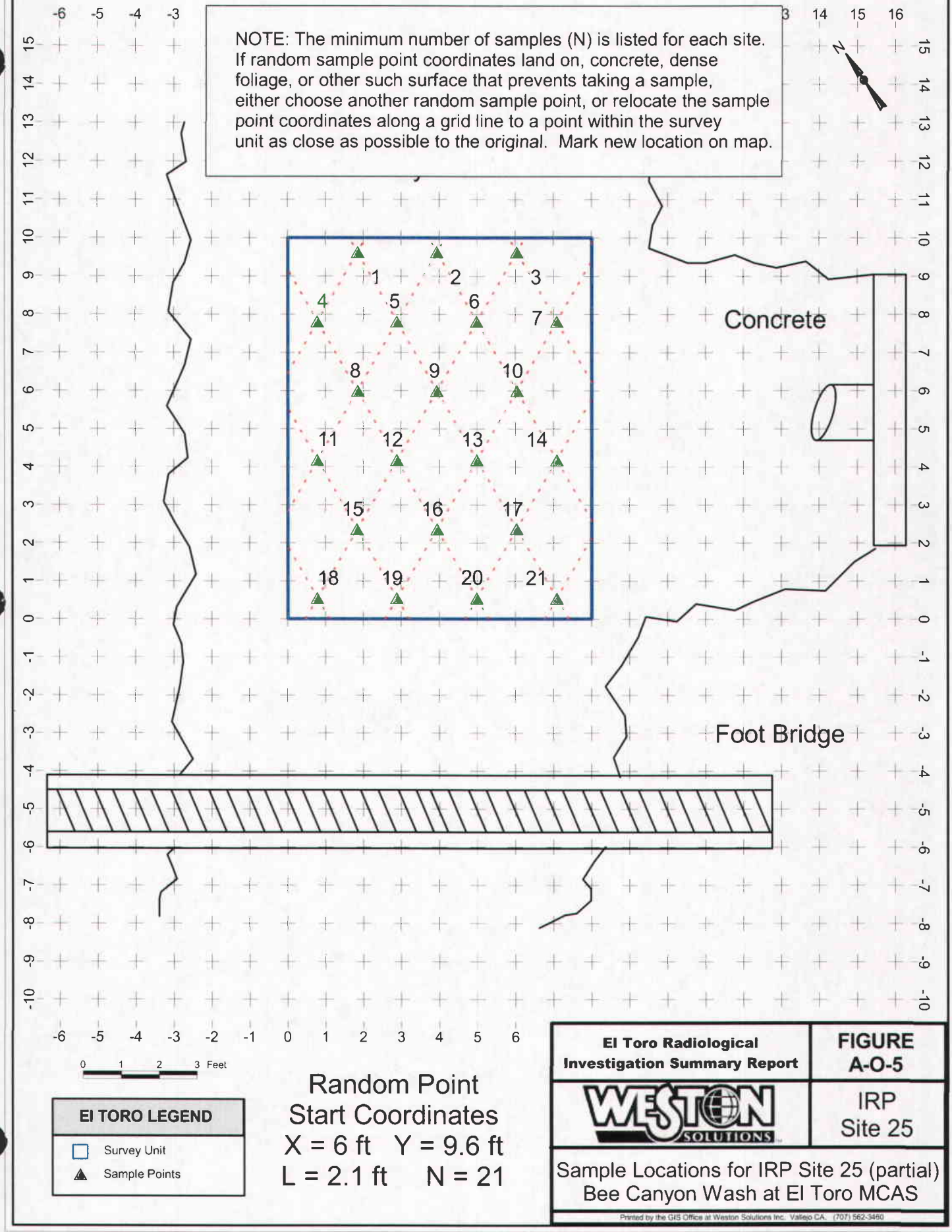
Outdoor Solid Sample Maps

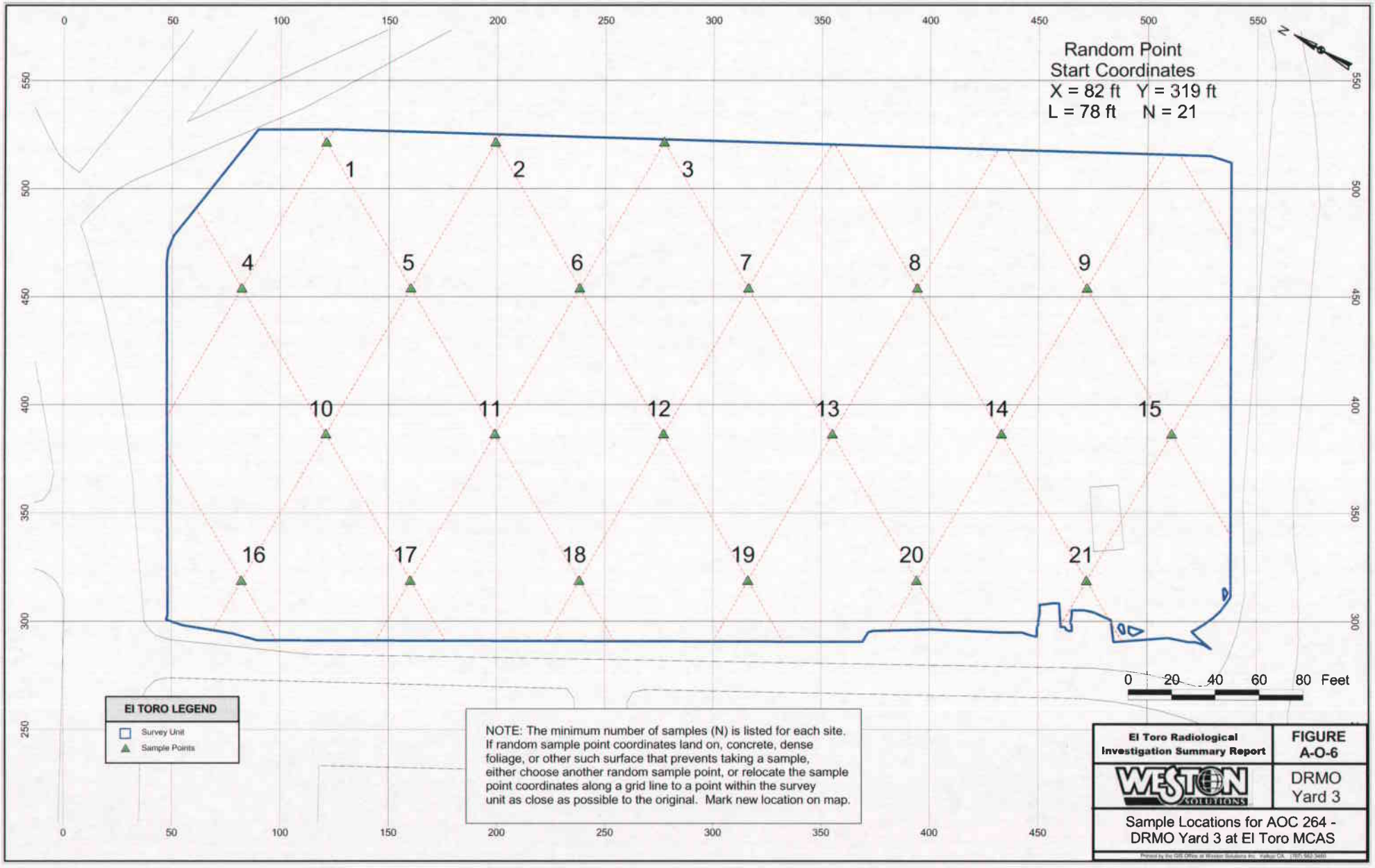

Irvine Blvd
Approximate Location of Fence Line
Additional Area to be Surveyed
Random Point Start Coordinates for Additional Area to be Surveyed
X = 215.7 ft Y = 304.5 ft
L = 35 ft N = 5
1
2
3
4
5
J-1
J-2
J-3
J-4
Random Point Start Coordinates
X = 25.8 ft
Y = -241.4 ft
L = 177 ft
N = 21
Desert Storm Rd
N. MARINE WAY
0 50 100 150 200 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Judgmental Sample Pt.
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
EI Toro Radiological Investigation Summary Report
FIGURE A-O-1
WESTON SOLUTIONS
IRP Site 3
Sample and Survey Locations for IRP Site 3 Original Landfill at EI Toro MCAS

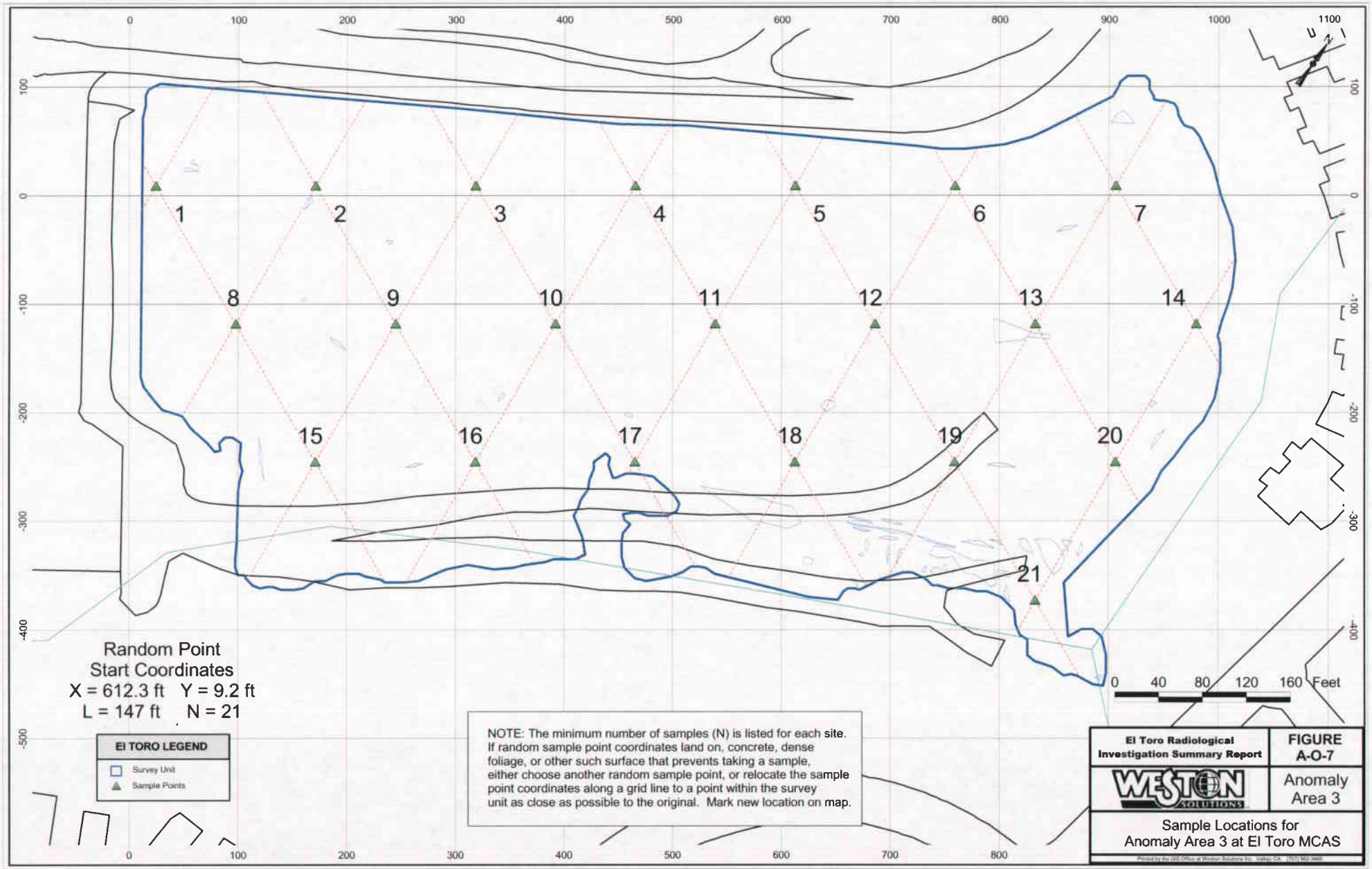

NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
N
1
2
3
4
5
6
7
8
9
10
0 50 100 150 200 250 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Random Point
Start Coordinates
X = -17.2 ft Y = -848 ft
L = 191 ft N = 10
EI Toro Radiological Investigation Summary Report
FIGURE A-O-2
WESTON SOLUTIONS
IRP-5/ APHO 46
Sample Locations for IRP Site 5/APHO46
Perimeter Road Landfill at EI Toro MCAS

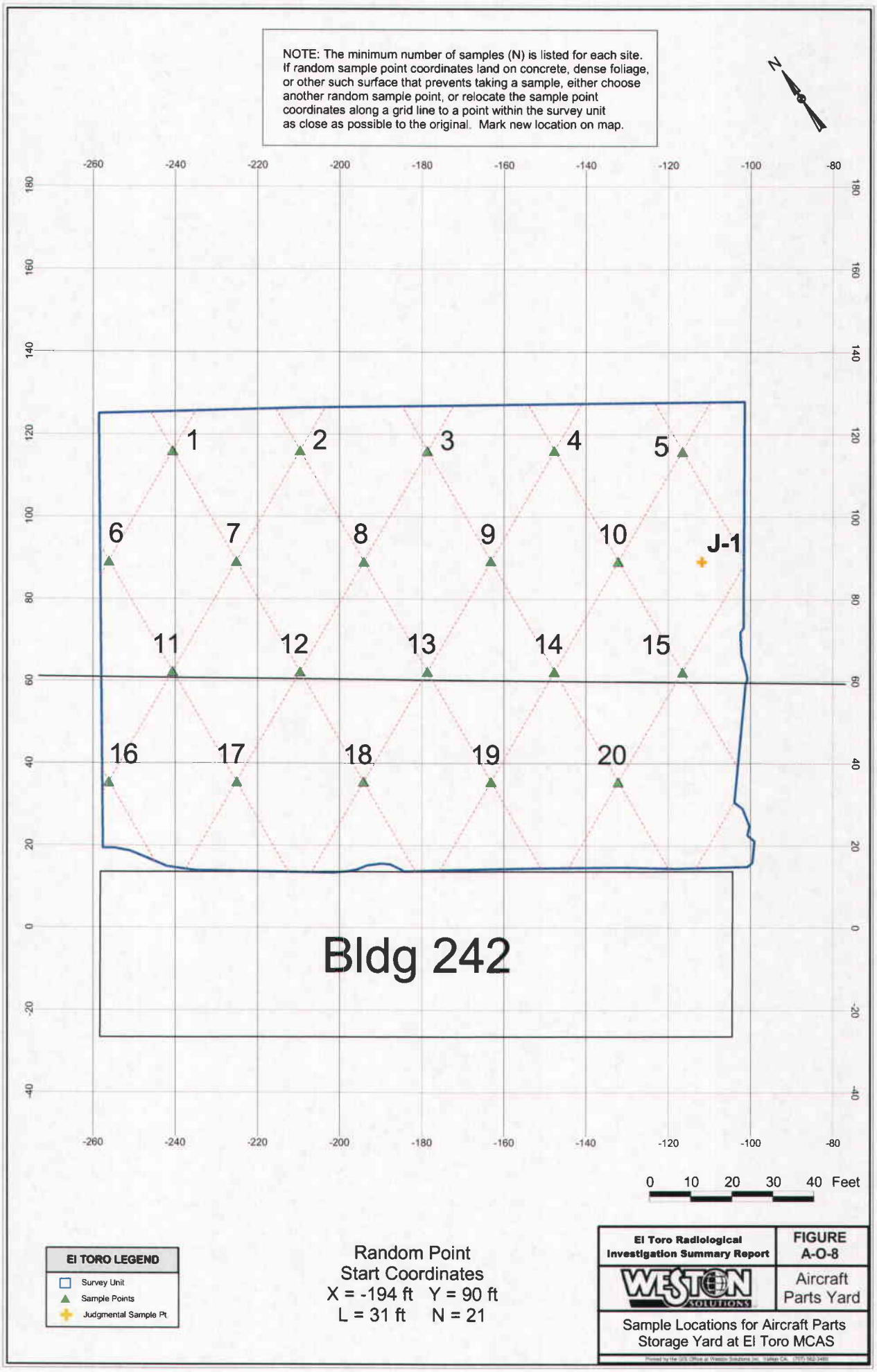

INSIDE
OUTSIDE
DRMO Yard 1 Overview
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
N
1000
250
200
150
100
50
0
-50
-100
-150
-200
-250
700
750
800
850
900
950
1000
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
0
40
80 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Random Point
Start Coordinates
X = 864.5 ft Y = 100 ft
L = 101 ft N = 15
EI Toro Radiological Investigation Summary Report
FIGURE A-O-3
WESTON SOLUTIONS
DRMO Yard 1 Outside
Sample Locations for IRP Site 8 - DRMO Yard 1 (Outside Fence) at EI Toro MCAS

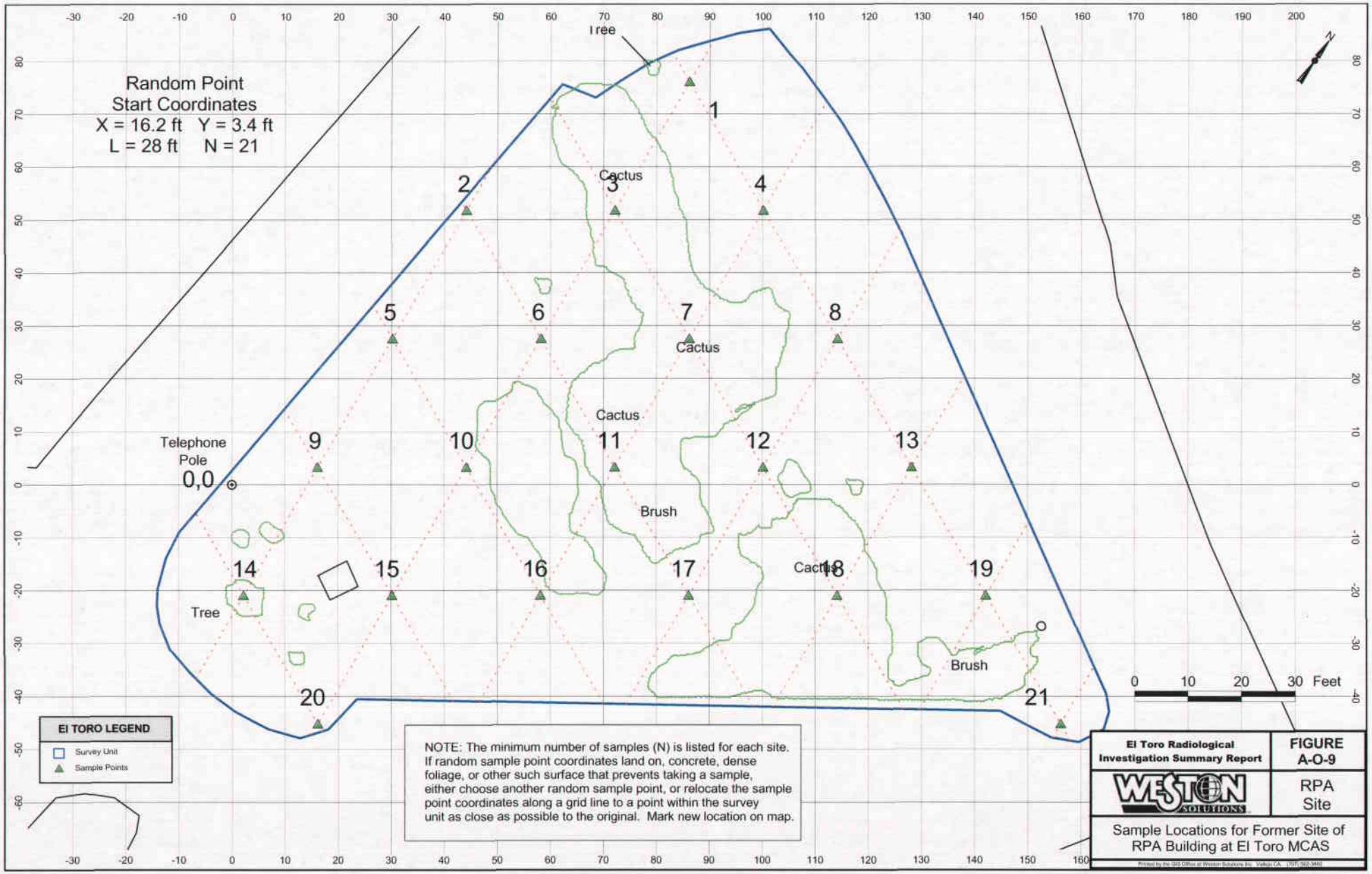

PLANT ROAD
534
496
1703
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
J 1
Random Point
Start Coordinates
X = 132.4 ft Y = -191.9 ft
L = 113 ft N = 21
0 50 100 150 200 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Judgmental Sample Pt.
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
El Toro Radiological Investigation Summary Report
FIGURE A-O-4
WESTON SOLUTIONS
IRP Site 12
Sample Locations for IRP Site 12
Former Industrial Waste Treatment Plant

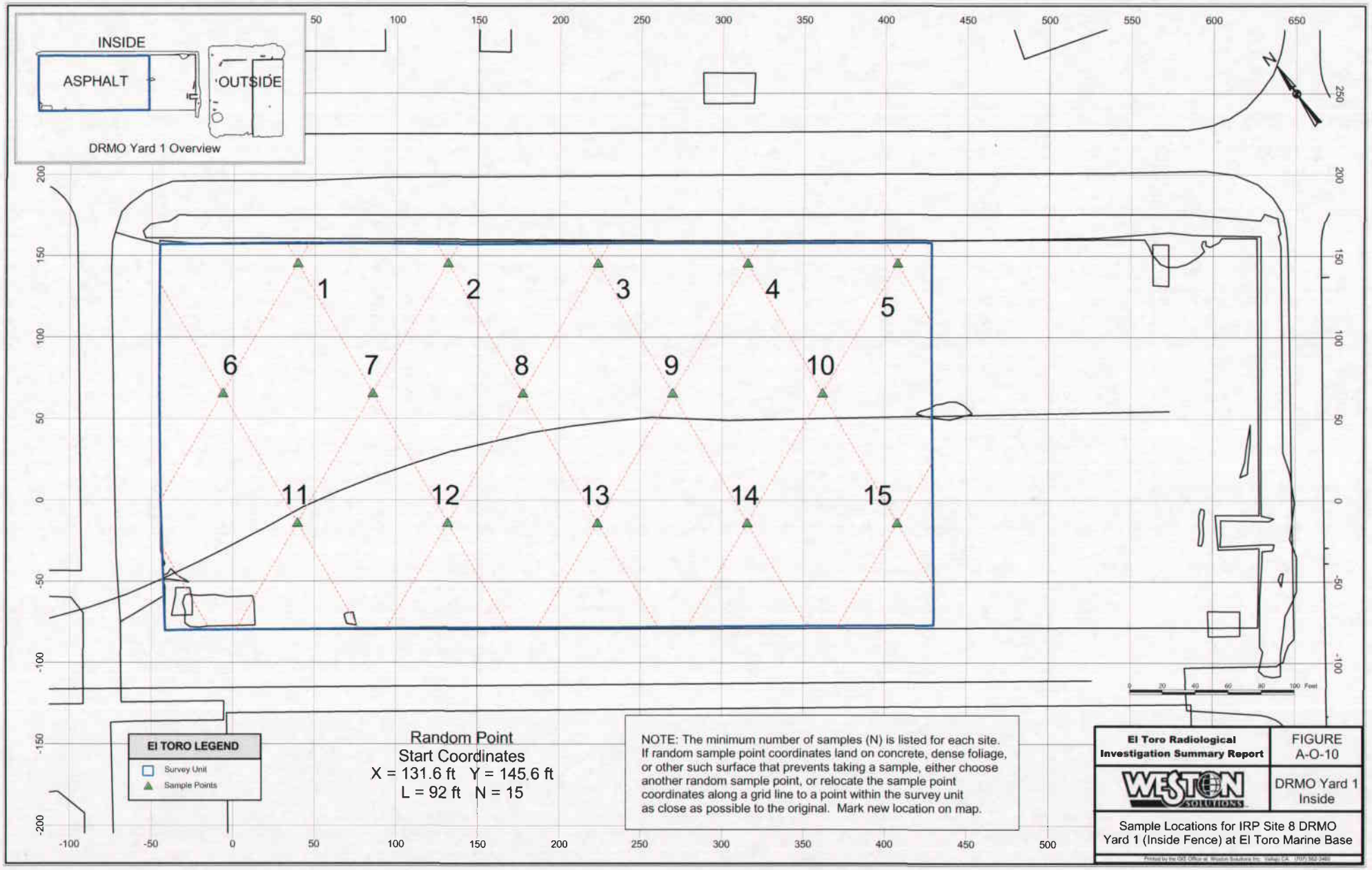

NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
N
Concrete
Foot Bridge
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
0 1 2 3 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Random Point
Start Coordinates
X = 6 ft Y = 9.6 ft
L = 2.1 ft N = 21
El Toro Radiological Investigation Summary Report
FIGURE A-O-5
WESTON SOLUTIONS
IRP Site 25
Sample Locations for IRP Site 25 (partial)
Bee Canyon Wash at El Toro MCAS
Printed by the GIS Office at Weston Solutions Inc. Vallejo CA. (707) 562-3460


Random Point
Start Coordinates
X = 82 ft Y = 319 ft
L = 78 ft N = 21
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
0 20 40 60 80 Feet
EI TORO LEGEND
Survey Unit
Sample Points
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
El Toro Radiological Investigation Summary Report
FIGURE A-O-6
WESTON SOLUTIONS
DRMO Yard 3
Sample Locations for AOC 264 - DRMO Yard 3 at El Toro MCAS

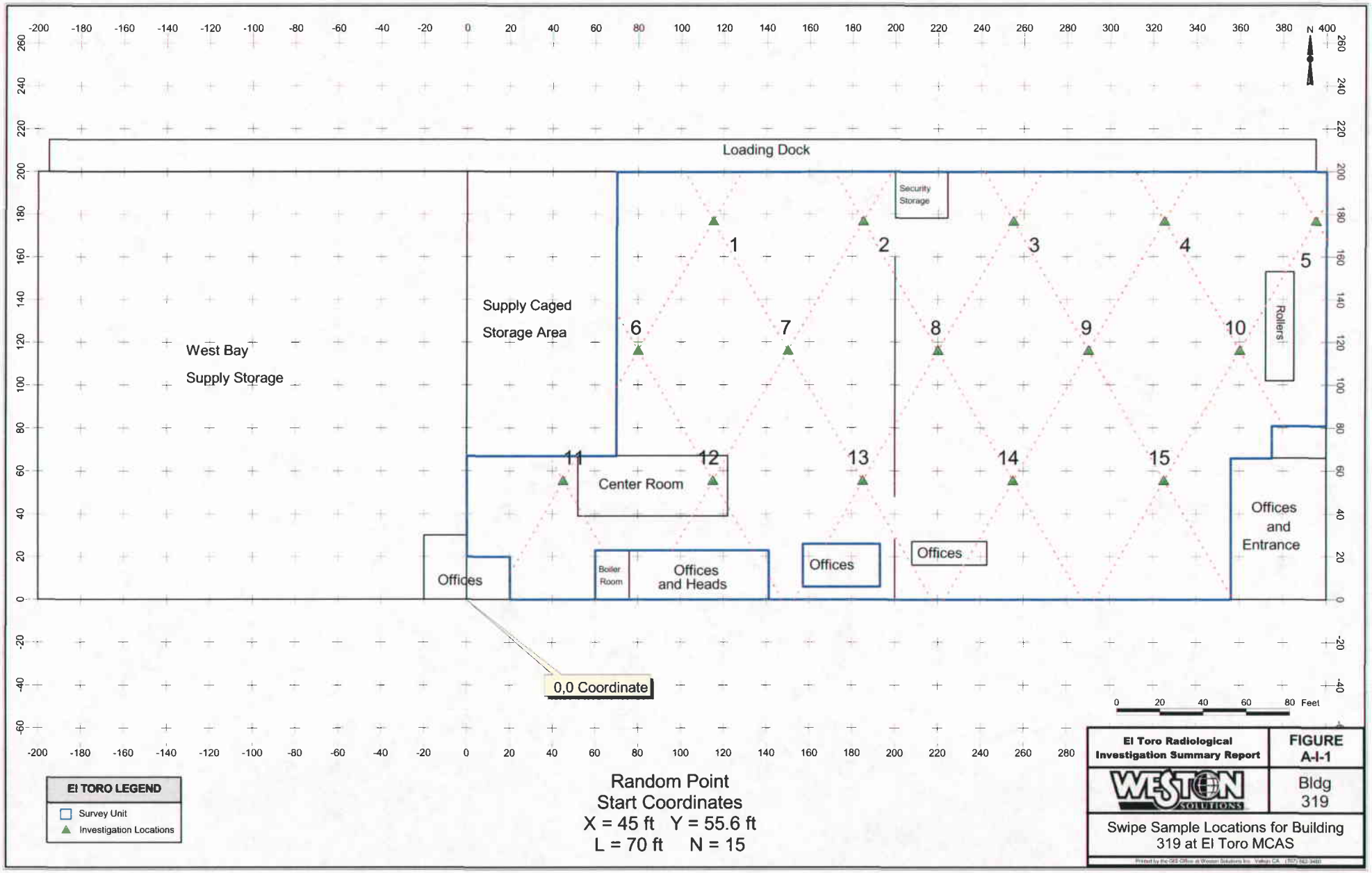

0
100
200
300
400
500
600
700
800
900
1000
1100
100
0
-100
-200
-300
-400
-500
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Random Point
Start Coordinates
X = 612.3 ft Y = 9.2 ft
L = 147 ft N = 21
EI TORO LEGEND
Survey Unit
Sample Points
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
0 40 80 120 160 Feet
El Toro Radiological Investigation Summary Report
FIGURE A-O-7
WESTON SOLUTIONS
Anomaly Area 3
Sample Locations for Anomaly Area 3 at El Toro MCAS

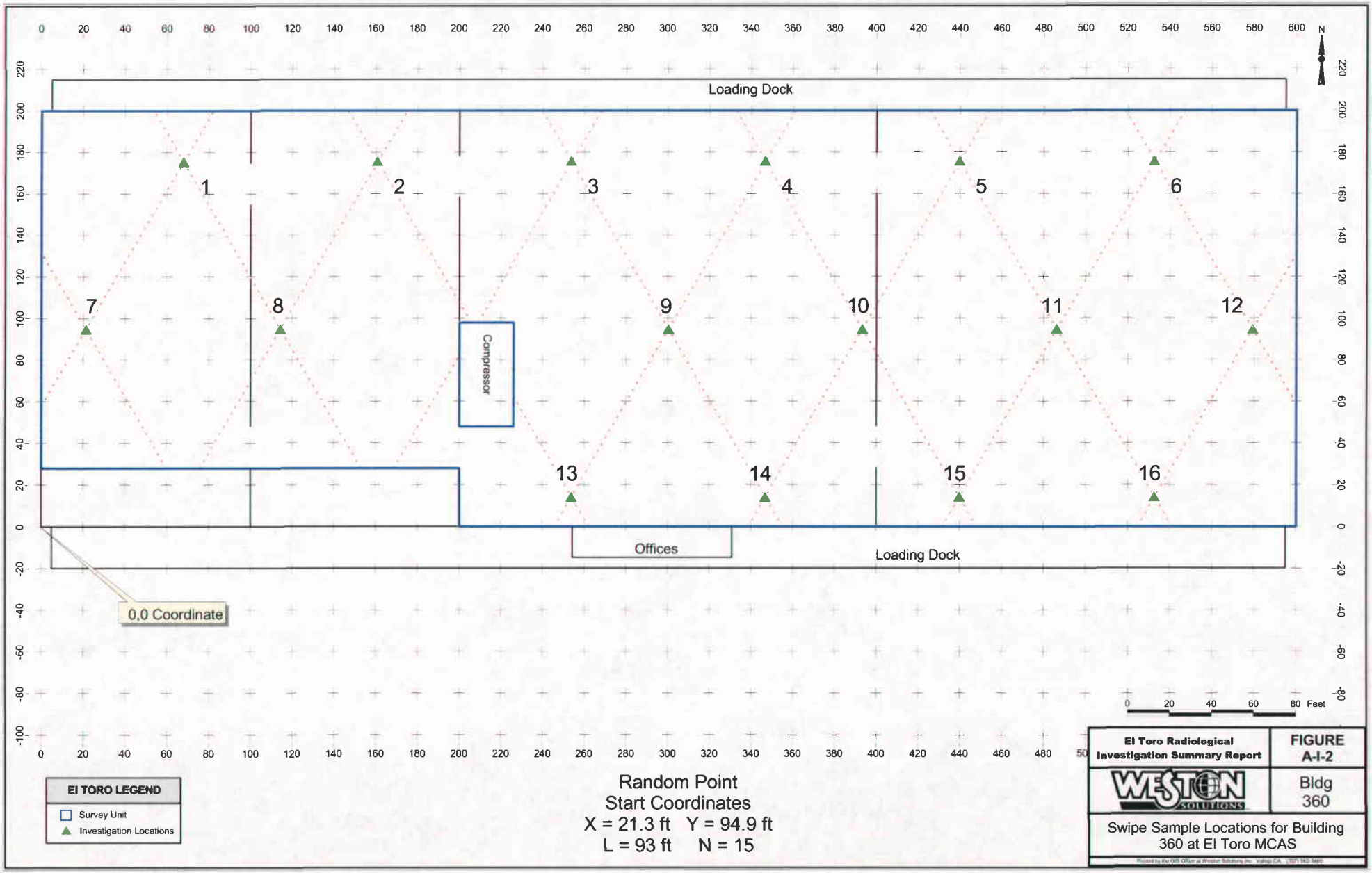

NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
N
-260 -240 -220 -200 -180 -160 -140 -120 -100 -80
180 160 140 120 100 80 60 40 20 0 -20 -40
1 2 3 4 5
6 7 8 9 10
J-1
11 12 13 14 15
16 17 18 19 20
Bldg 242
0 10 20 30 40 Feet
EI TORO LEGEND
Survey Unit
Sample Points
Judgmental Sample Pt
Random Point
Start Coordinates
X = -194 ft Y = 90 ft
L = 31 ft N = 21
El Toro Radiological Investigation Summary Report
FIGURE A-O-8
WESTON SOLUTIONS
Aircraft Parts Yard
Sample Locations for Aircraft Parts Storage Yard at El Toro MCAS

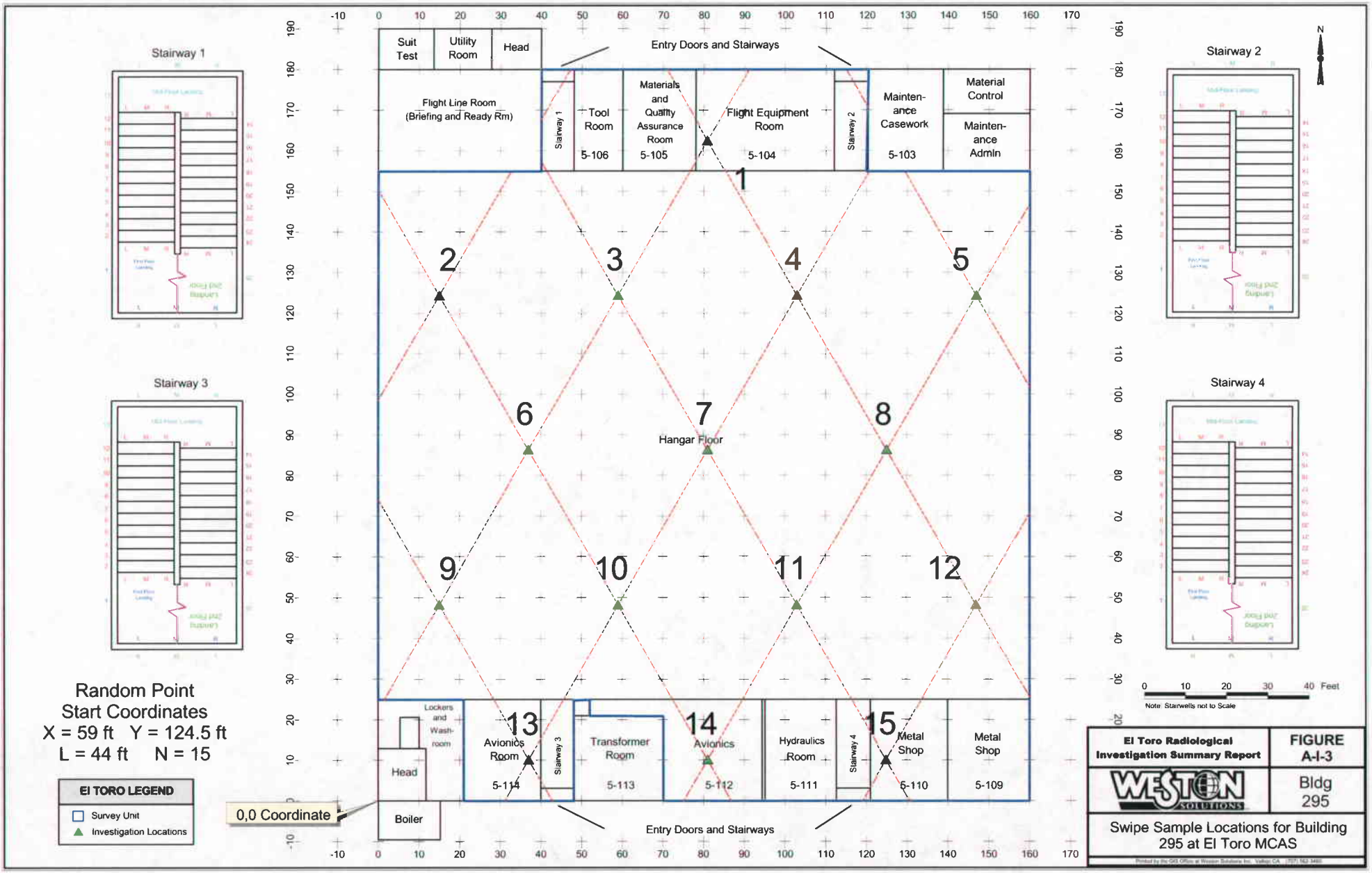

Random Point
Start Coordinates
X = 16.2 ft Y = 3.4 ft
L = 28 ft N = 21
Tree
Cactus
Cactus
Cactus
Cactus
Brush
Brush
Tree
Telephone
Pole
0,0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
N
0 10 20 30 Feet
EI TORO LEGEND
Survey Unit
Sample Points
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on, concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
El Toro Radiological Investigation Summary Report
FIGURE A-O-9
WESTON SOLUTIONS
RPA Site
Sample Locations for Former Site of RPA Building at El Toro MCAS

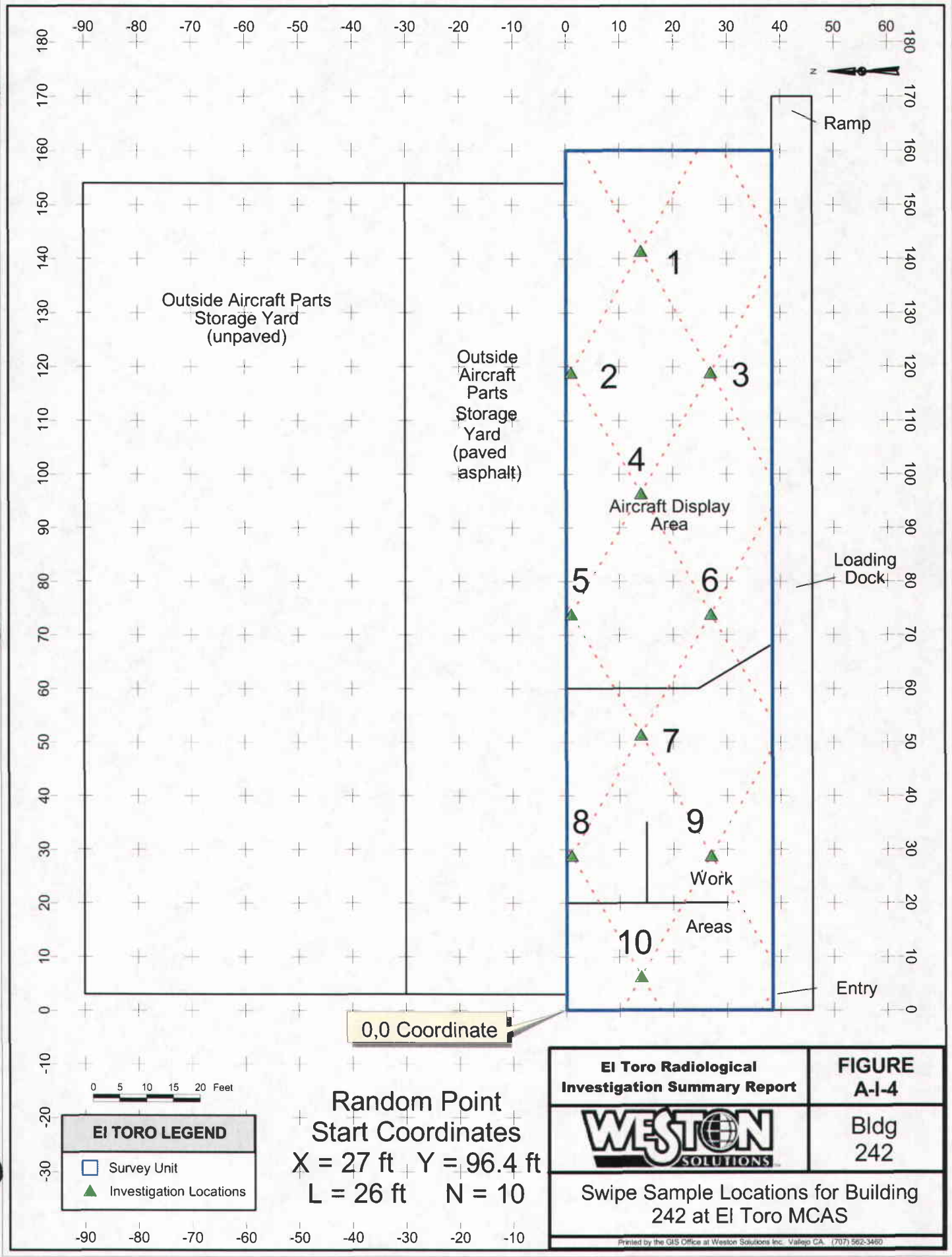

INSIDE
ASPHALT
OUTSIDE
DRMO Yard 1 Overview
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
EI TORO LEGEND
Survey Unit
Sample Points
Random Point
Start Coordinates
X = 131.6 ft Y = 145.6 ft
L = 92 ft N = 15
NOTE: The minimum number of samples (N) is listed for each site. If random sample point coordinates land on concrete, dense foliage, or other such surface that prevents taking a sample, either choose another random sample point, or relocate the sample point coordinates along a grid line to a point within the survey unit as close as possible to the original. Mark new location on map.
El Toro Radiological Investigation Summary Report
FIGURE A-O-10
WESTON SOLUTIONS
DRMO Yard 1 Inside
Sample Locations for IRP Site 8 DRMO Yard 1 (Inside Fence) at El Toro Marine Base

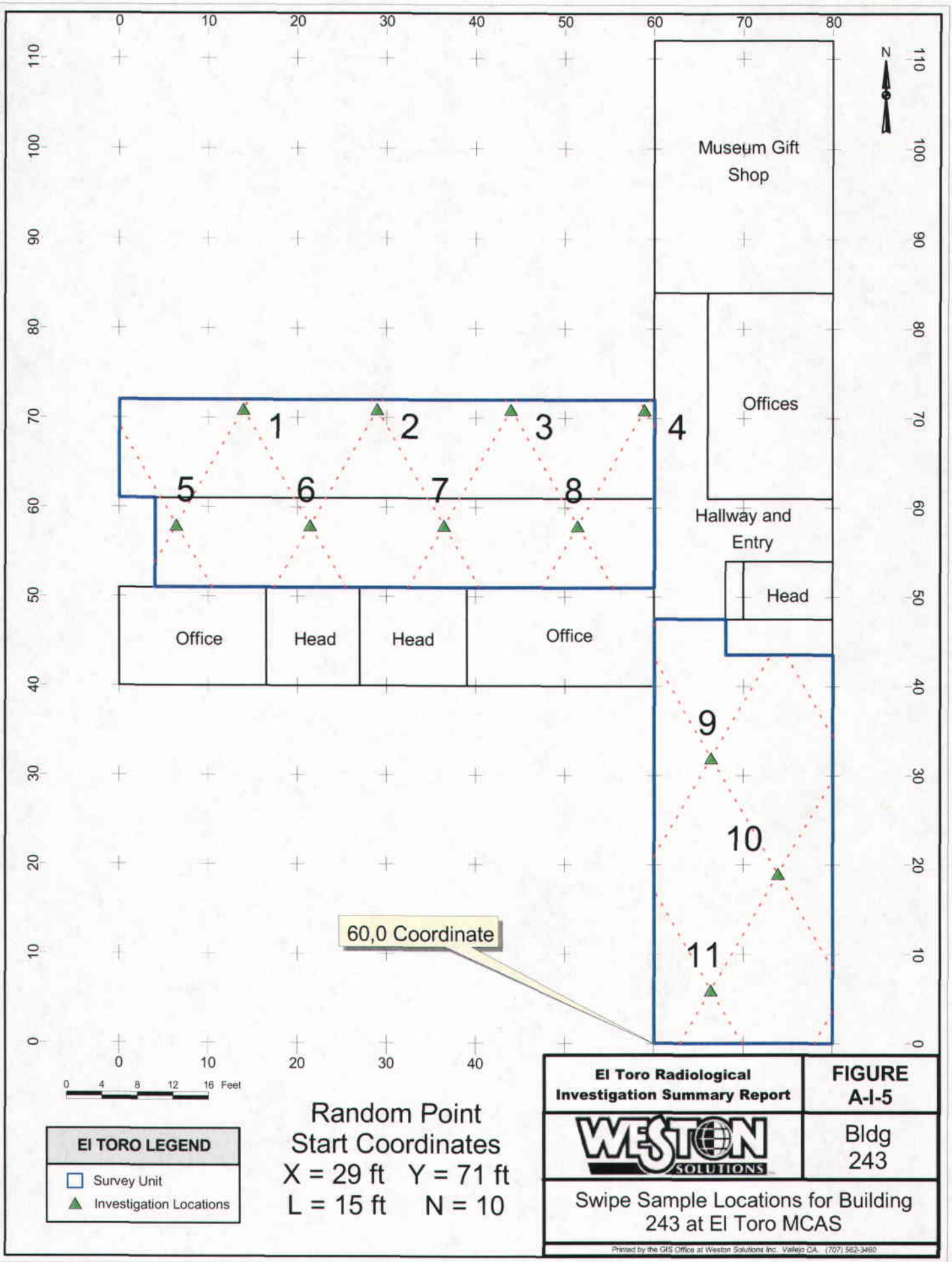
Indoor Swipe Sample Maps Survey Units

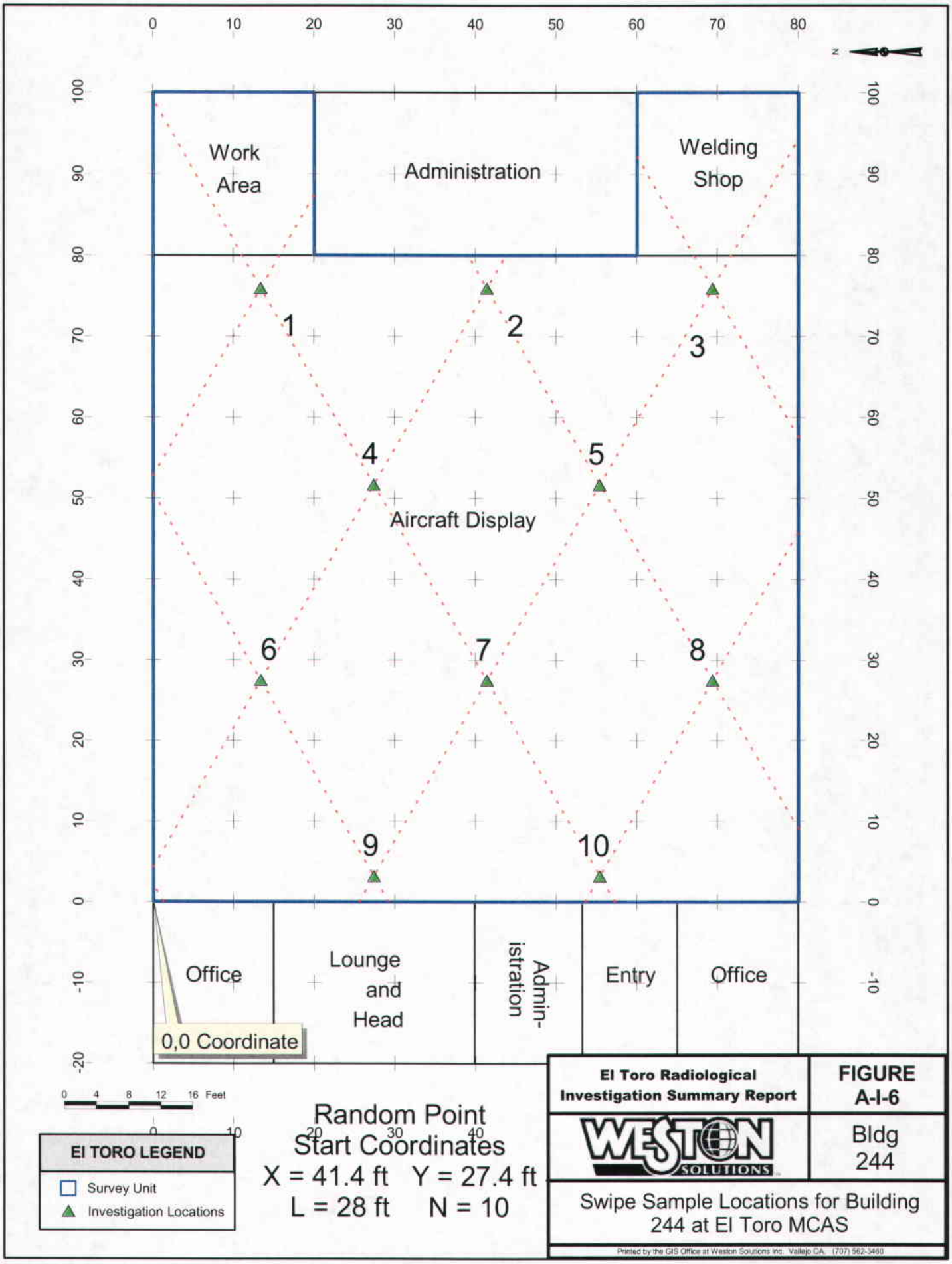

Loading Dock
Security Storage
Supply Caged Storage Area
West Bay Supply Storage
Rollers
Center Room
Offices
Boiler Room
Offices and Heads
Offices
Offices
Offices and Entrance
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
0,0 Coordinate
N
0 20 40 60 80 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 45 ft Y = 55.6 ft
L = 70 ft N = 15
El Toro Radiological Investigation Summary Report
FIGURE A-I-1
WESTON SOLUTIONS
Bldg 319
Swipe Sample Locations for Building 319 at El Toro MCAS

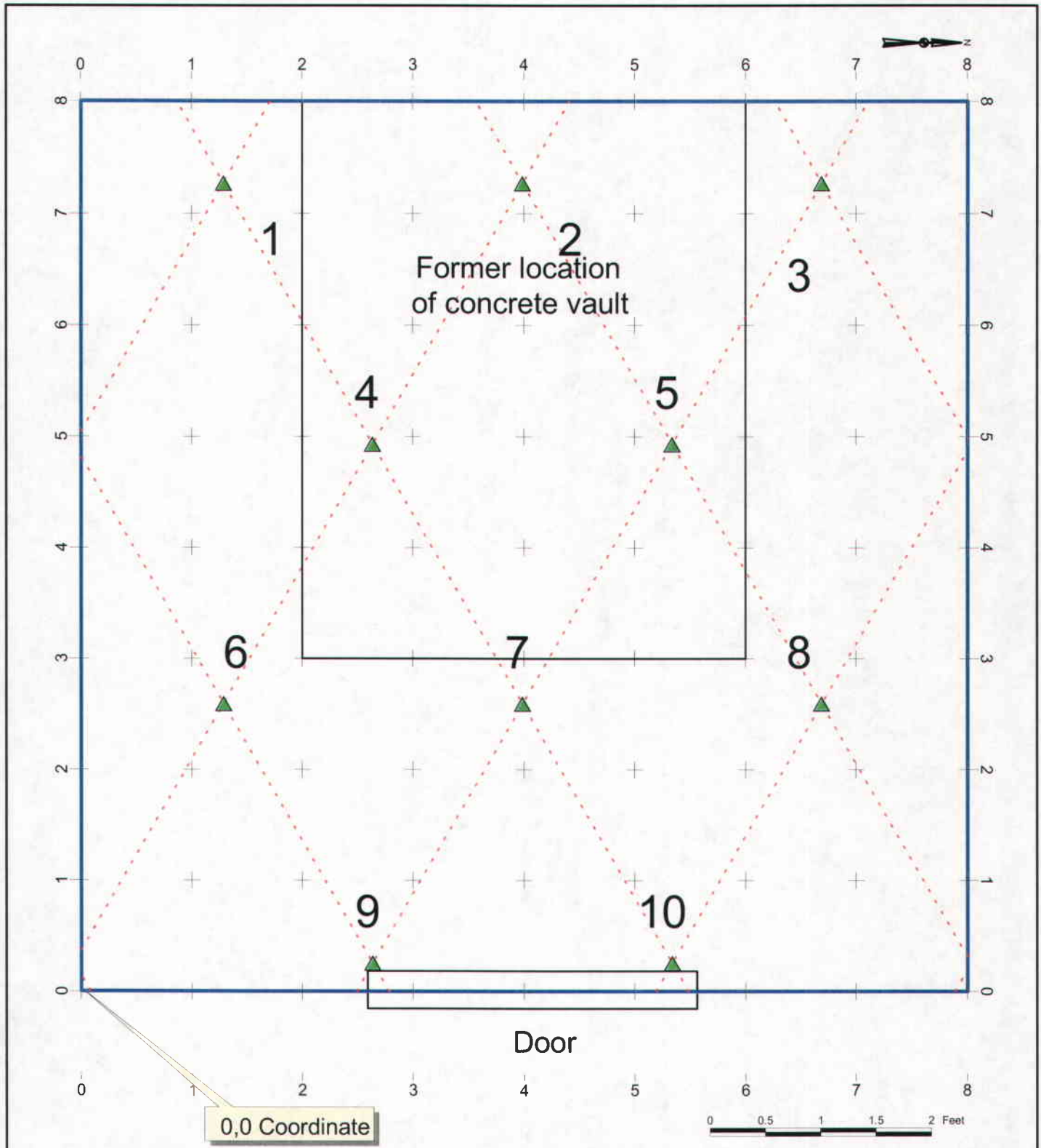

Loading Dock
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Compressor
Offices
Loading Dock
0,0 Coordinate
N
0 20 40 60 80 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 21.3 ft Y = 94.9 ft
L = 93 ft N = 15
EI Toro Radiological Investigation Summary Report
FIGURE A-I-2
WESTON SOLUTIONS
Bldg 360
Swipe Sample Locations for Building 360 at EI Toro MCAS


Stairway 1
Stairway 2
Stairway 3
Stairway 4
Suit Test
Utility Room
Head
Entry Doors and Stairways
Flight Line Room (Briefing and Ready Rm)
Stairway 1
Tool Room 5-106
Materials and Quality Assurance Room 5-105
Flight Equipment Room 5-104
Stairway 2
Maintenance Casework 5-103
Material Control
Maintenance Admin
1
2
3
4
5
6
7
8
Hangar Floor
9
10
11
12
Lockers and Wash-room
Head
Boiler
13
Avionics Room 5-114
Stairway 3
Transformer Room 5-113
14
Avionics 5-112
Hydraulics Room 5-111
Stairway 4
15
Metal Shop 5-110
Metal Shop 5-109
Entry Doors and Stairways
N
0 10 20 30 40 Feet
Note: Stairwells not to Scale
Random Point Start Coordinates
X = 59 ft Y = 124.5 ft
L = 44 ft N = 15
EI TORO LEGEND
Survey Unit
Investigation Locations
0,0 Coordinate
EI Toro Radiological Investigation Summary Report
FIGURE A-I-3
WESTON SOLUTIONS
Bldg 295
Swipe Sample Locations for Building 295 at EI Toro MCAS


Outside Aircraft Parts Storage Yard (unpaved)
Outside Aircraft Parts Storage Yard (paved asphalt)
Aircraft Display Area
Work Areas
Ramp
Loading Dock
Entry
0,0 Coordinate
1
2
3
4
5
6
7
8
9
10
N
0 5 10 15 20 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point Start Coordinates
X = 27 ft Y = 96.4 ft
L = 26 ft N = 10
El Toro Radiological Investigation Summary Report
FIGURE A-I-4
WESTON SOLUTIONS
Bldg 242
Swipe Sample Locations for Building 242 at El Toro MCAS
Printed by the GIS Office at Weston Solutions Inc. Vallejo CA. (707) 562-3460


Museum Gift Shop
Offices
Hallway and Entry
Head
Office
Head
Head
Office
1
2
3
4
5
6
7
8
9
10
11
60,0 Coordinate
N
0 4 8 12 16 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point Start Coordinates
X = 29 ft Y = 71 ft
L = 15 ft N = 10
El Toro Radiological Investigation Summary Report
FIGURE A-I-5
WESTON SOLUTIONS
Bldg 243
Swipe Sample Locations for Building 243 at El Toro MCAS
Printed by the GIS Office at Weston Solutions Inc., Vallejo CA. (707) 562-3460


0
10
20
30
40
50
60
70
80
N
100
90
80
70
60
50
40
30
20
10
0
-10
-20
Work Area
Administration
Welding Shop
1
2
3
4
5
Aircraft Display
6
7
8
9
10
Office
Lounge and Head
Admin-istration
Entry
Office
0,0 Coordinate
0 4 8 12 16 Feet
0 10 20 30 40
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 41.4 ft Y = 27.4 ft
L = 28 ft N = 10
El Toro Radiological Investigation Summary Report
FIGURE A-I-6
WESTON SOLUTIONS
Bldg 244
Swipe Sample Locations for Building 244 at El Toro MCAS
Printed by the GIS Office at Weston Solutions Inc. Vallejo CA. (707) 562-3460



EI TORO LEGEND

- Survey Unit
- Investigation Locations

Random Point
Start Coordinates
X = 4 ft Y = 7.3 ft
L = 2.7 ft N = 10

El Toro Radiological Investigation Summary Report	FIGURE A-I-7
WESTON SOLUTIONS	Bldg 1789
Swipe Sample Locations for Building 1789 at El Toro MCAS	

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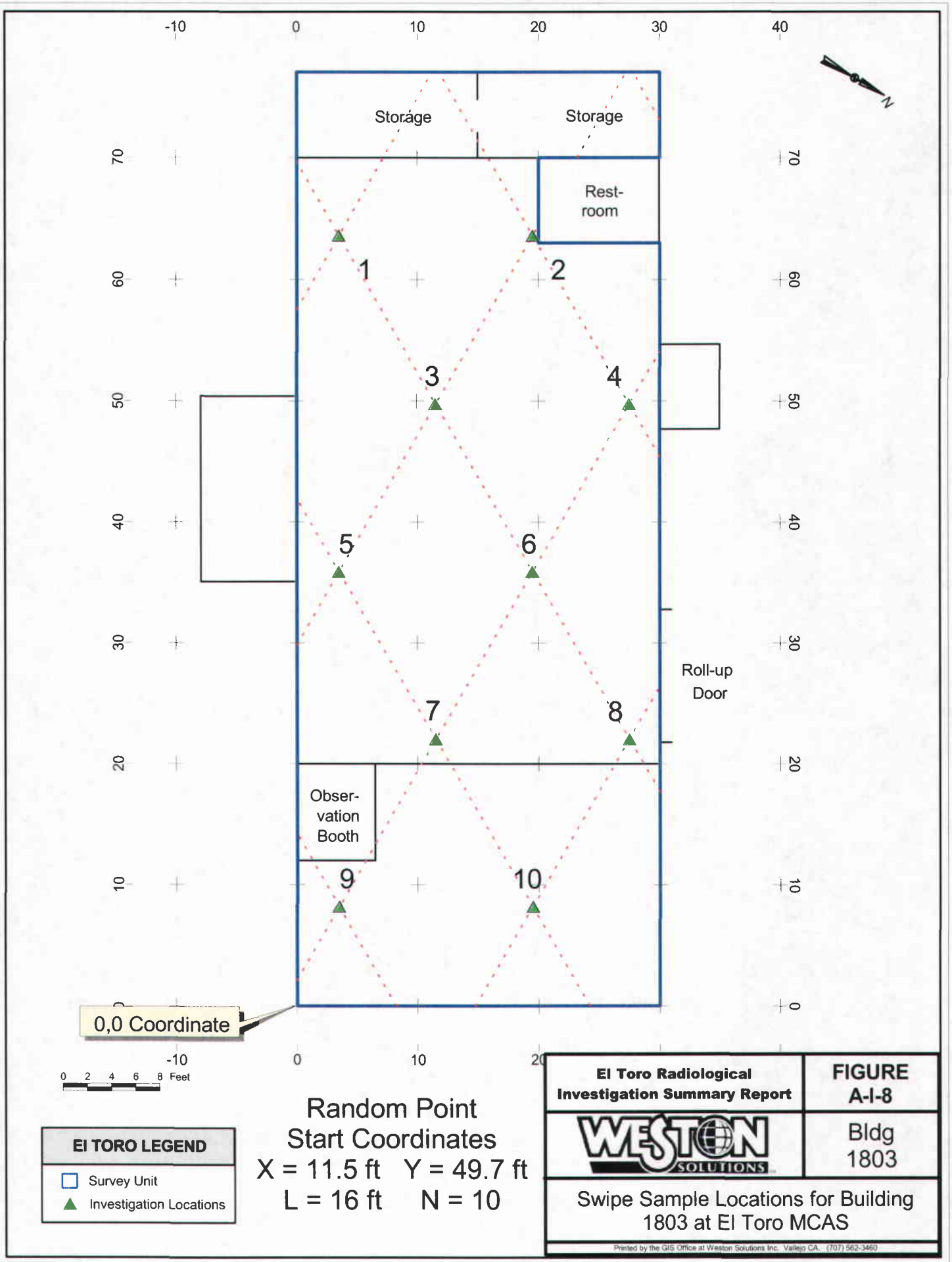


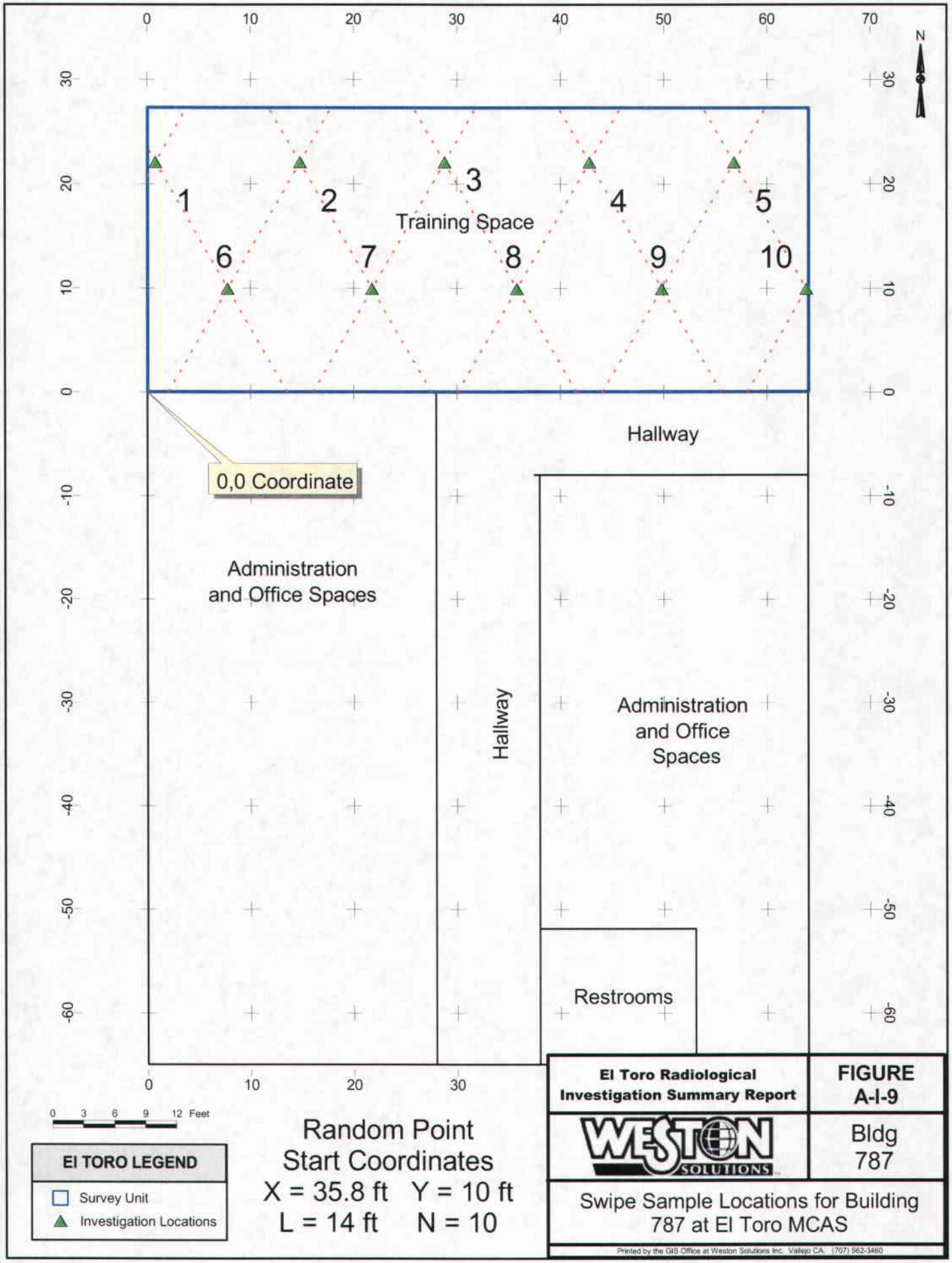
EI TORO LEGEND

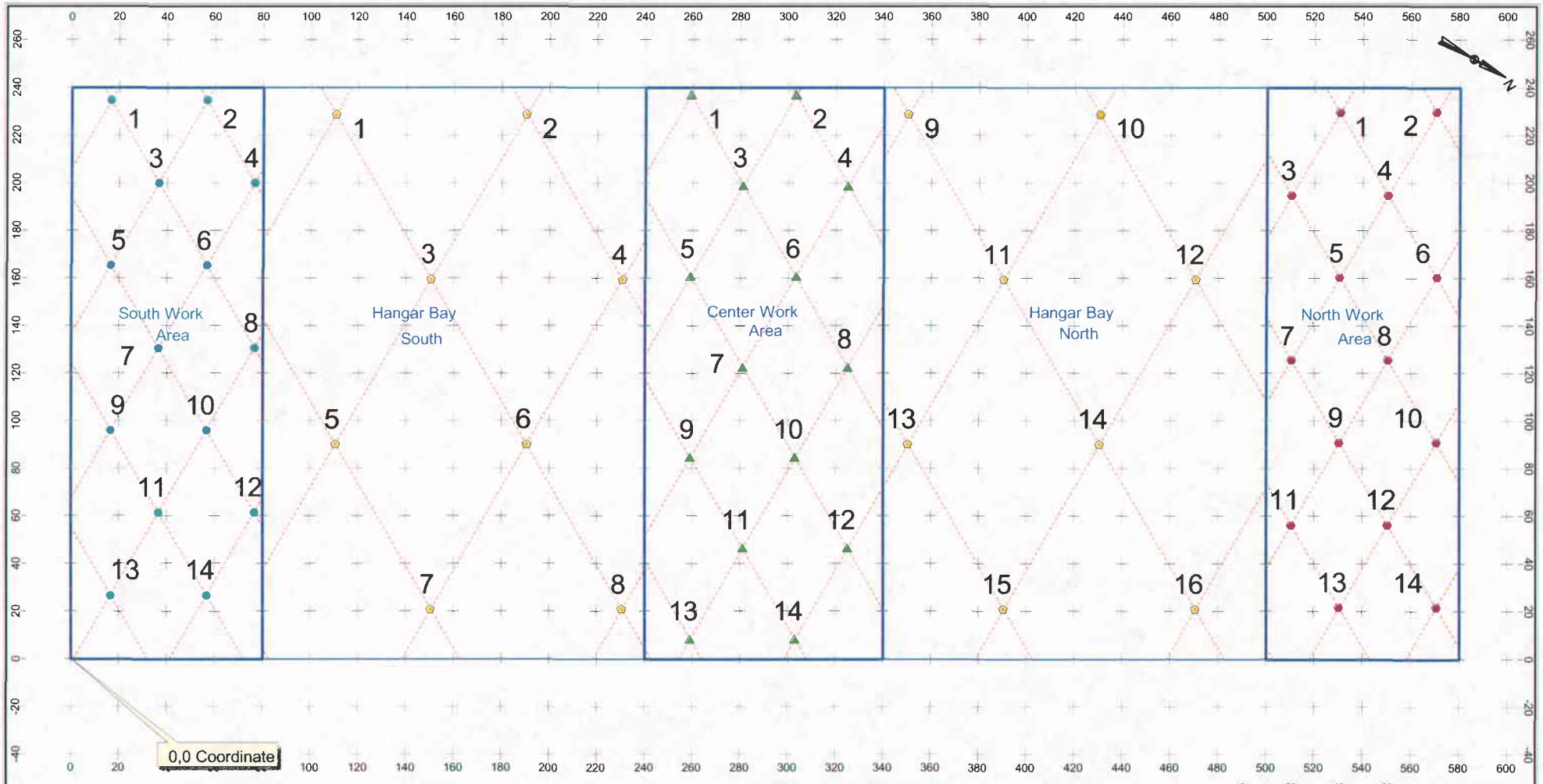
- Survey Unit
- Investigation Locations

Random Point
Start Coordinates
X = 11.5 ft Y = 49.7 ft
L = 16 ft N = 10

El Toro Radiological Investigation Summary Report	**FIGURE A-I-8**
WESTON SOLUTIONS	Bldg 1803
Swipe Sample Locations for Building 1803 at El Toro MCAS	

Printed by the GIS Office at Weston Solutions Inc. Vallejo CA. (707) 562-3460


0
10
20
30
40
50
60
70
N
1
2
3
4
5
6
7
8
9
10
Training Space
0,0 Coordinate
Hallway
Administration
and Office Spaces
Hallway
Administration
and Office
Spaces
Restrooms
0 3 6 9 12 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 35.8 ft Y = 10 ft
L = 14 ft N = 10
El Toro Radiological
Investigation Summary Report
FIGURE
A-I-9
WESTON SOLUTIONS
Bldg
787
Swipe Sample Locations for Building
787 at El Toro MCAS
Printed by the GIS Office at Weston Solutions Inc. Vallejo CA. (707) 562-3460



EI TORO LEDGEND

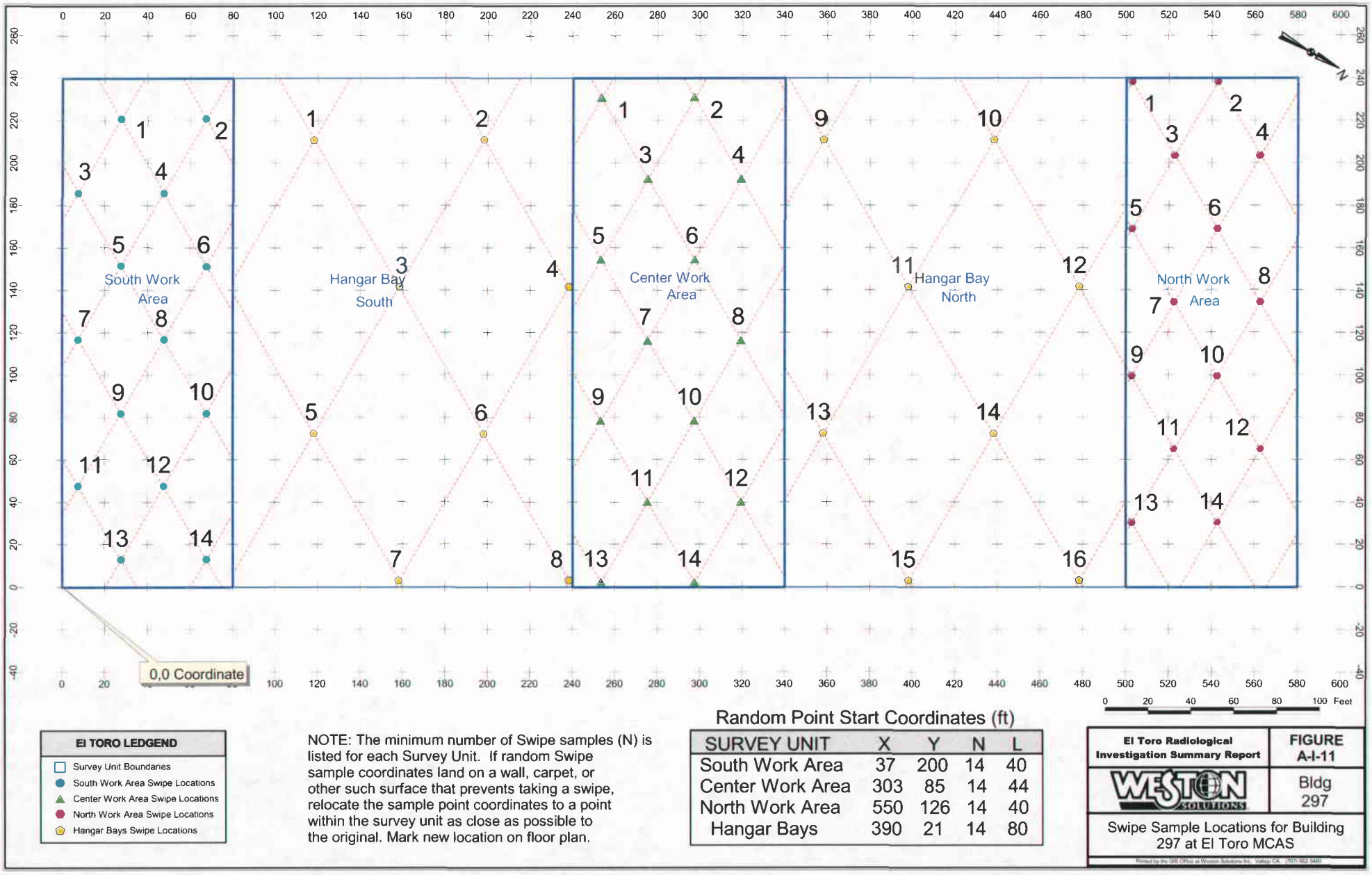
- Survey Unit Boundaries
- South Work Area Swipe Locations
- Center Work Area Swipe Locations
- North Work Area Swipe Locations
- Hangar Bays Swipe Locations

NOTE: The minimum number of Swipe samples (N) is listed for each Survey Unit. If random Swipe sample coordinates land on a wall, carpet, or other such surface that prevents taking a swipe, relocate the sample point coordinates to a point within the survey unit as close as possible to the original. Mark new location on floor plan.

Random Point Start Coordinates (ft)

SURVEY UNIT	X	Y	N	L
South Work Area	37	200	14	40
Center Work Area	303	85	14	44
North Work Area	550	126	14	40
Hangar Bays	390	21	14	80

El Toro Radiological Investigation Summary Report	FIGURE A-I-10
WESTON SOLUTIONS	Bldg 296
Swipe Sample Locations for Building 296 at El Toro MCAS	



EI TORO LEDGEND

- Survey Unit Boundaries
- South Work Area Swipe Locations
- Center Work Area Swipe Locations
- North Work Area Swipe Locations
- Hangar Bays Swipe Locations

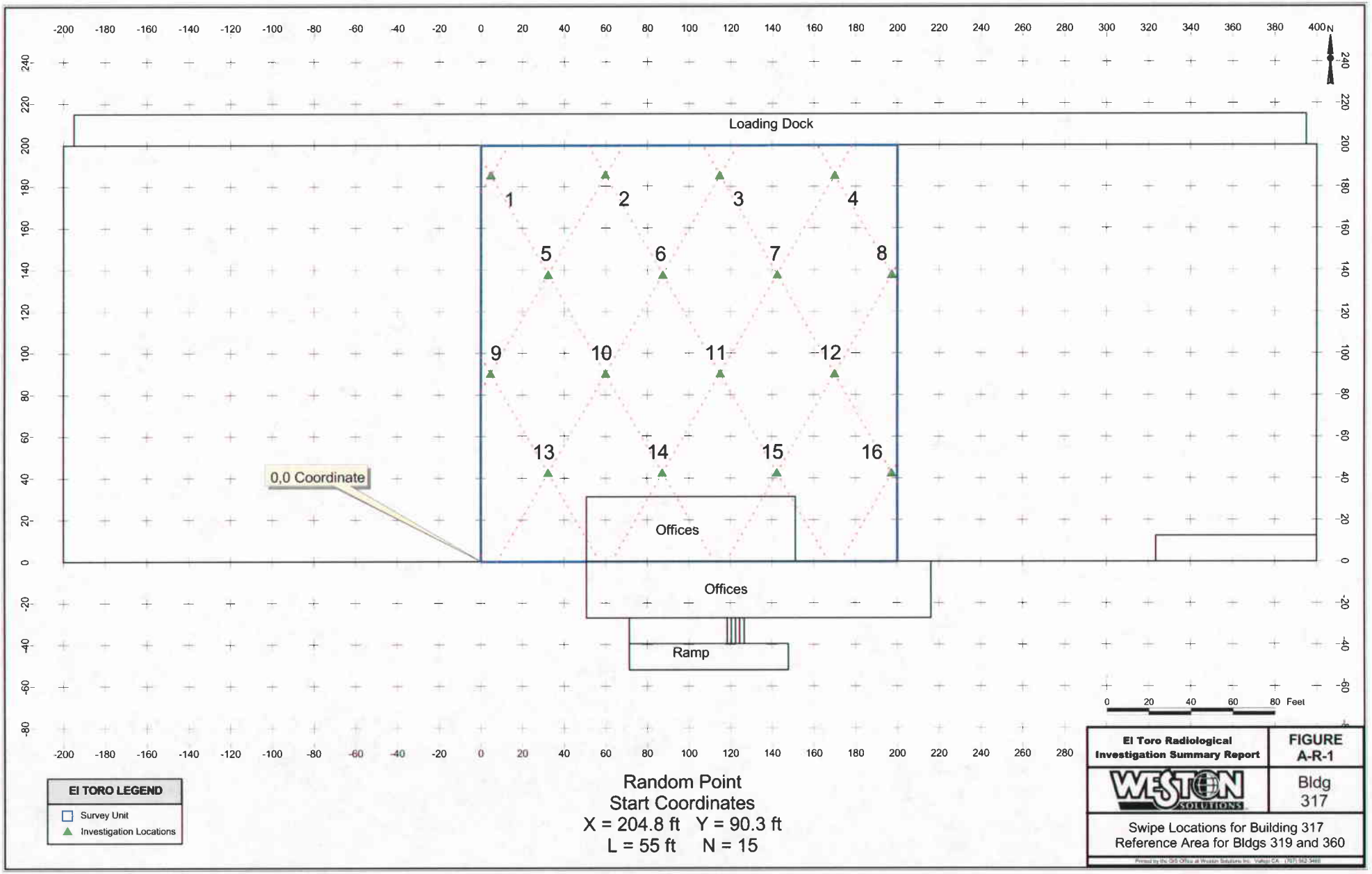
NOTE: The minimum number of Swipe samples (N) is listed for each Survey Unit. If random Swipe sample coordinates land on a wall, carpet, or other such surface that prevents taking a swipe, relocate the sample point coordinates to a point within the survey unit as close as possible to the original. Mark new location on floor plan.

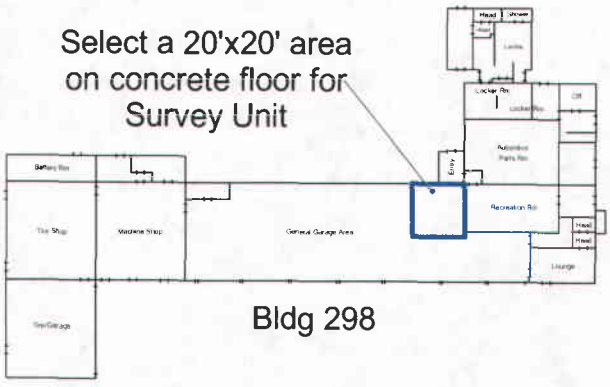
Random Point Start Coordinates (ft)

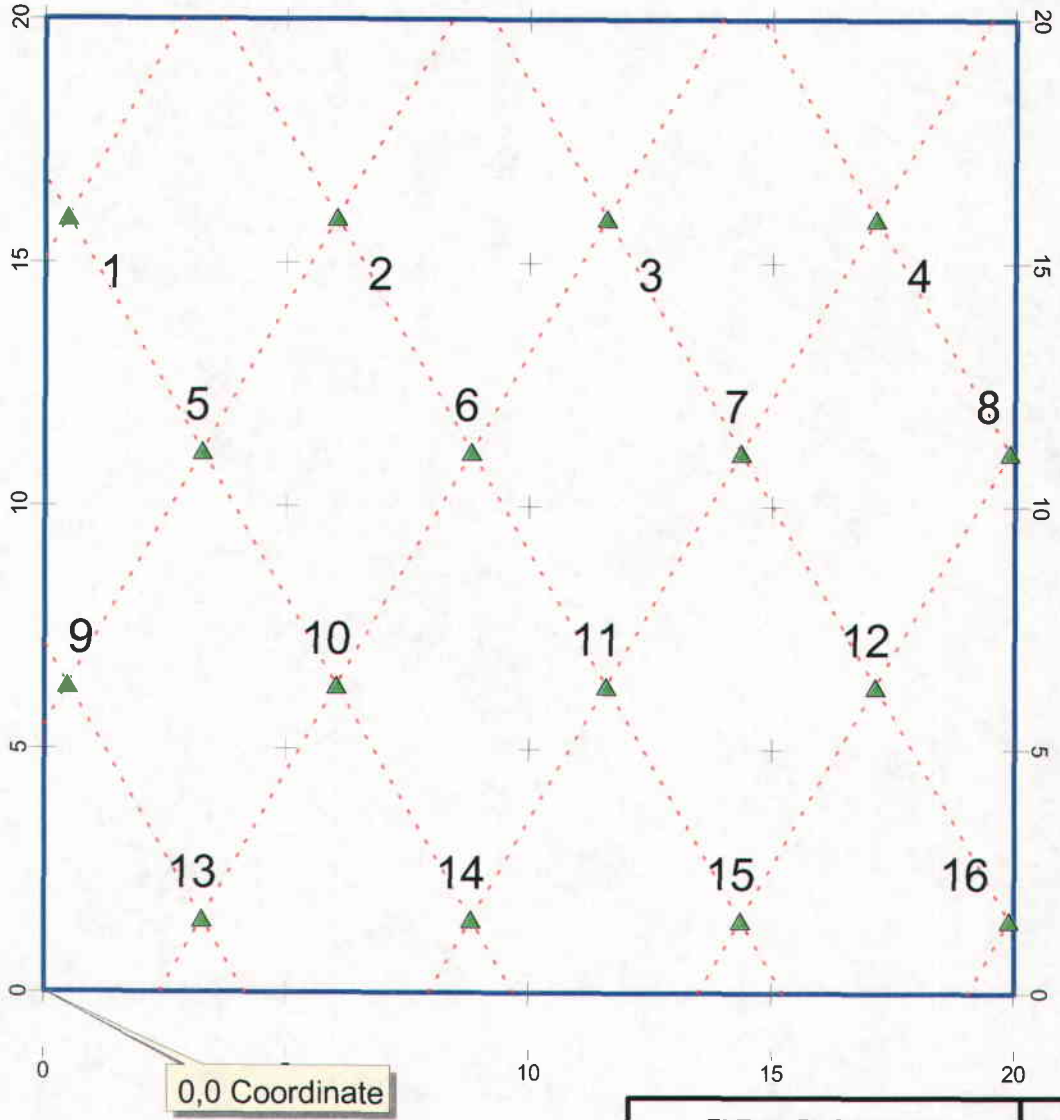
SURVEY UNIT	X	Y	N	L
South Work Area	37	200	14	40
Center Work Area	303	85	14	44
North Work Area	550	126	14	40
Hangar Bays	390	21	14	80

EI Toro Radiological Investigation Summary Report	FIGURE A-I-11
WESTON SOLUTIONS	Bldg 297
Swipe Sample Locations for Building 297 at El Toro MCAS	

Indoor Swipe Sample Maps Reference Areas


Loading Dock
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
0,0 Coordinate
Offices
Offices
Ramp
N
0 20 40 60 80 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 204.8 ft Y = 90.3 ft
L = 55 ft N = 15
El Toro Radiological Investigation Summary Report
FIGURE A-R-1
WESTON SOLUTIONS
Bldg 317
Swipe Locations for Building 317
Reference Area for Bldgs 319 and 360





0 1 2 3 4 Feet

EI TORO LEGEND

- Survey Unit
- Investigation Locations

Random Point
Start Coordinates
X = 20 ft Y = 1.5 ft
L = 5.5 ft N = 15

El Toro Radiological Investigation Summary Report	FIGURE A-R-2
WESTON SOLUTIONS	Bldg 298
Swipe Locations for Building 298 Reference Area for Bldg 295	

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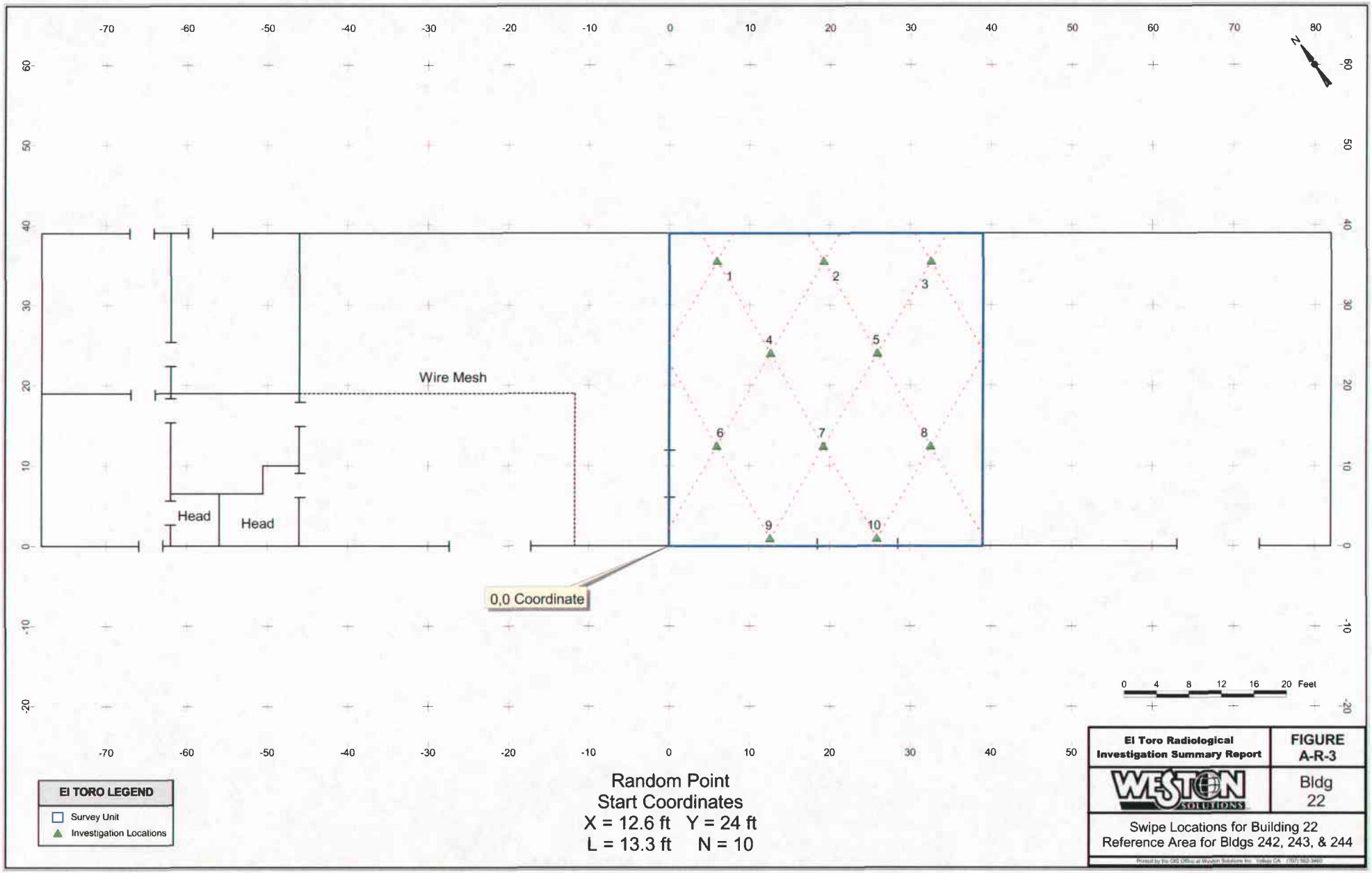
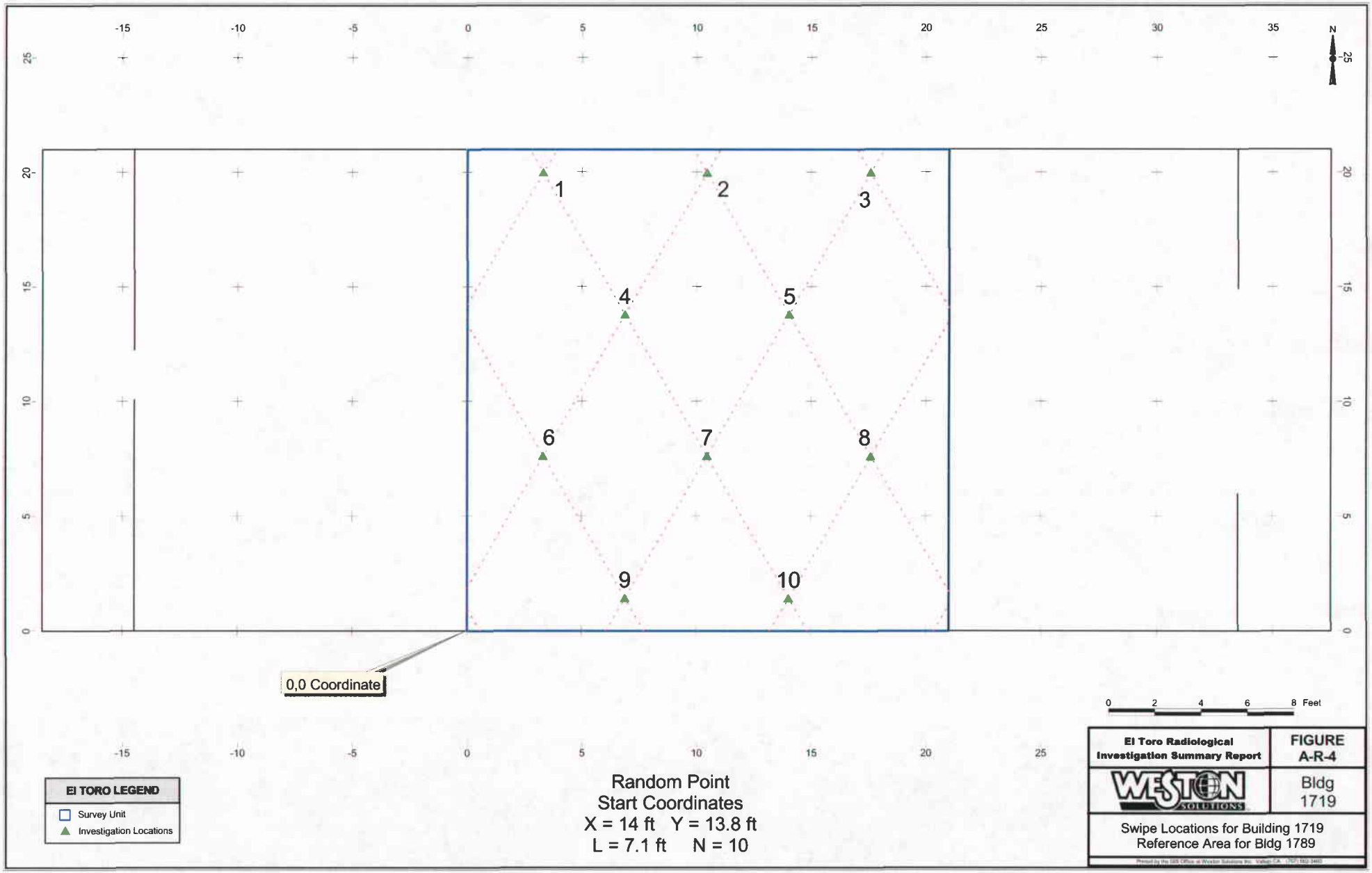
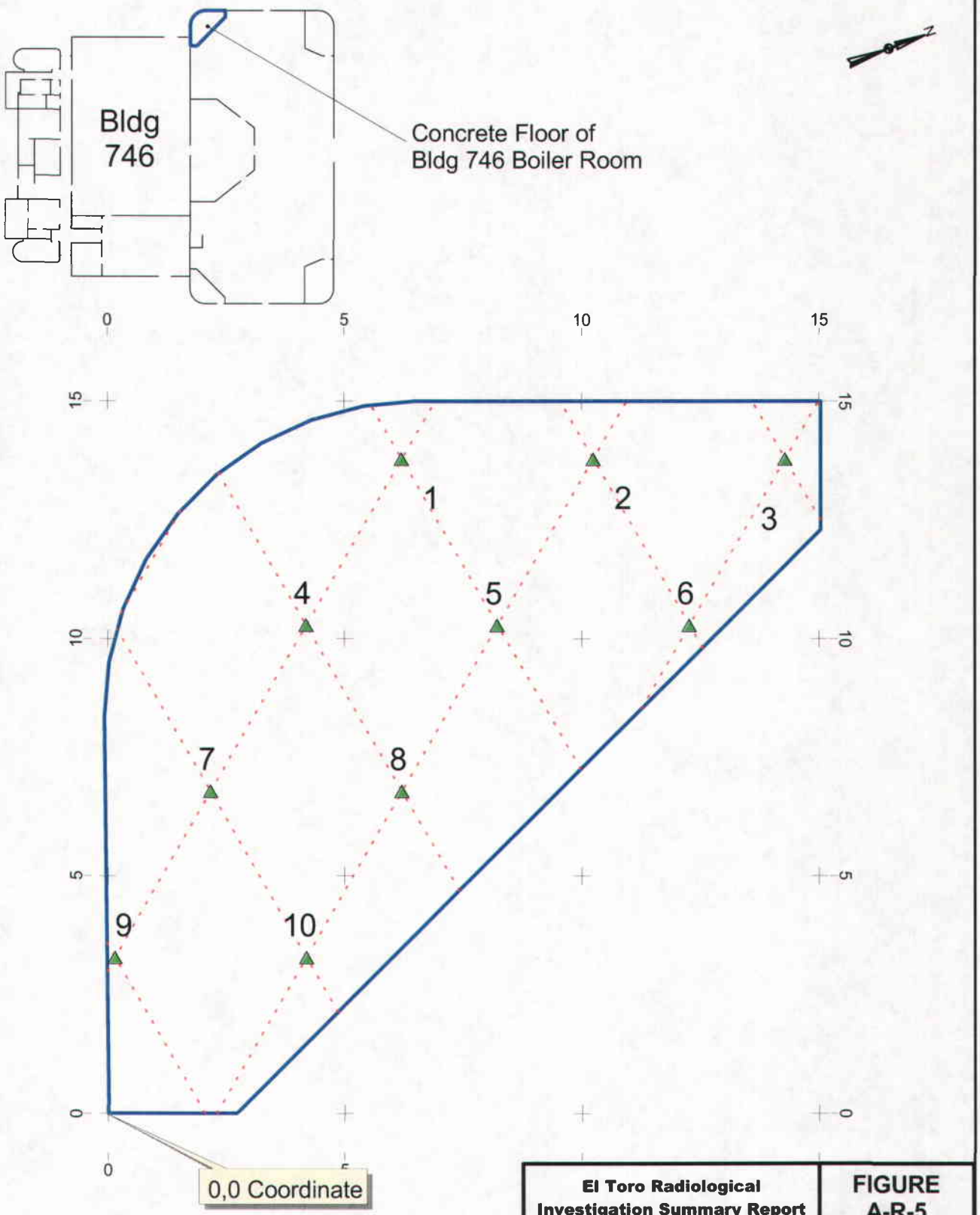

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80
60 50 40 30 20 10 0 -10 -20
N
Wire Mesh
Head
Head
1
2
3
4
5
6
7
8
9
10
0,0 Coordinate
0 4 8 12 16 20 Feet
EI TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 12.6 ft Y = 24 ft
L = 13.3 ft N = 10
El Toro Radiological Investigation Summary Report
FIGURE A-R-3
WESTON SOLUTIONS
Bldg 22
Swipe Locations for Building 22
Reference Area for Bldgs 242, 243, & 244


-15
-10
-5
0
5
10
15
20
25
30
35
N
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
10
0,0 Coordinate
0 2 4 6 8 Feet
El TORO LEGEND
Survey Unit
Investigation Locations
Random Point
Start Coordinates
X = 14 ft Y = 13.8 ft
L = 7.1 ft N = 10
El Toro Radiological Investigation Summary Report
FIGURE A-R-4
WESTON SOLUTIONS
Bldg 1719
Swipe Locations for Building 1719
Reference Area for Bldg 1789



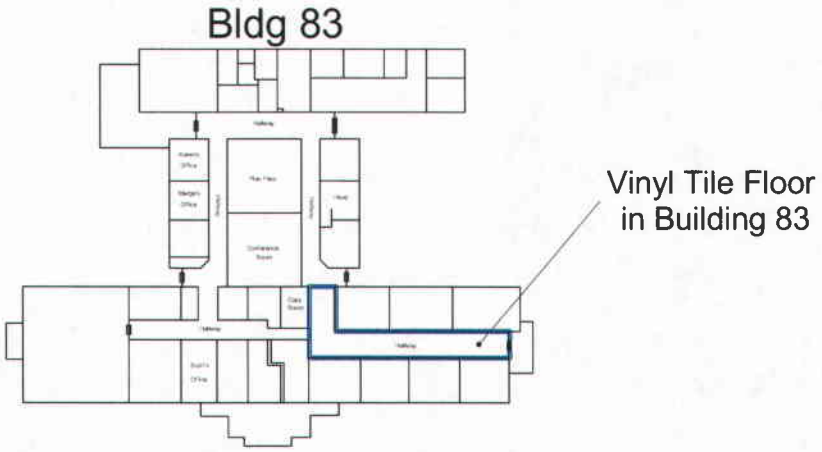
EI TORO LEGEND

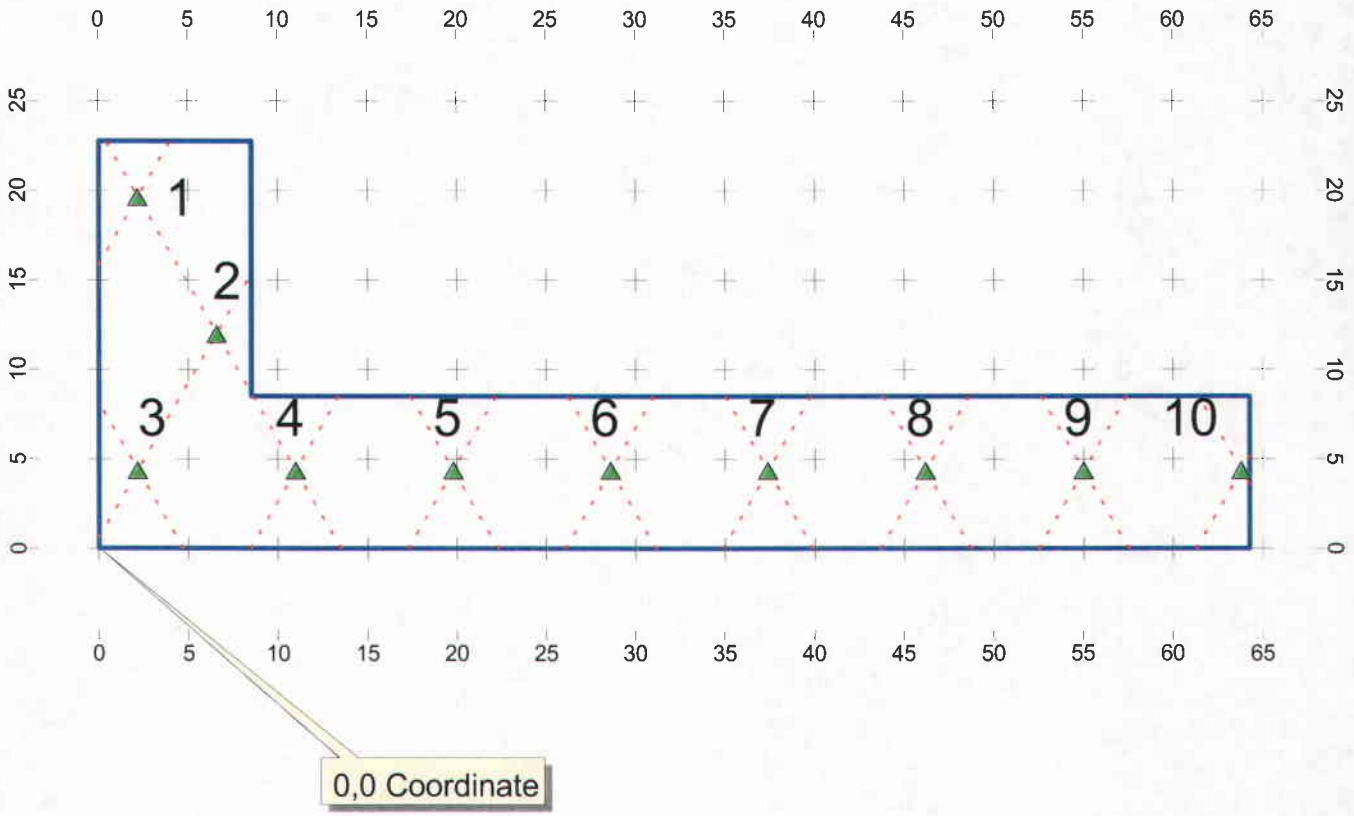
- Survey Unit
- Investigation Locations

Random Point
Start Coordinates
X = 4.2 ft Y = 10.3 ft
L = 4 ft N = 10

EI Toro Radiological Investigation Summary Report	FIGURE A-R-5
WESTON SOLUTIONS	Bldg 746
Swipe Locations for Building 746 (concrete) Reference Area for Bldg 1803	

Printed by the GIS Office at Weston Solutions Inc., Vallejo CA. (707) 562-3460





0 2 4 6 8 10 Feet

EI TORO LEGEND

- Survey Unit
- Investigation Locations

Random Point
Start Coordinates
X = 11 ft Y = 4.4 ft
L = 8.8 ft N = 10

EI Toro Radiological Investigation Summary Report	**FIGURE A-R-6**
WESTON SOLUTIONS	Bldg 83
Swipe Locations for Building 83 (tile) Reference Area for Bldg 787	

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Sampling Amendment to

Marine Corps Air Station El Toro

Radiological Survey Plan

Appendices

Appendix A

Site Specific
Health and Safety Plan

RADIOLOGICAL SURVEY PLAN AMENDMENT

SITE SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)

AT

MARINE CORPS AIR STATION (MCAS) EL TORO
IRVINE, CALIFORNIA

CONTRACT NO. N68711-01-D-6010 - DO 0002 (MOD #3)

Prepared by: Weston Solutions, Inc.
Vallejo Site Office
P.O. Box 2135
Vallejo, California 94592-0135

December 2003

SITE SPECIFIC HEALTH AND SAFETY PLAN
FOR THE RADIOLOGICAL SURVEY PLAN AMENDMENT
MCAS EL TORO

Review and Approval:

By their specific signature, the undersigned certify that this Health and Safety Plan is approved for utilization. Expiration for this SSHASP is 6 months from the approval date.

REVIEWED BY:

Terry Epperson — Date 12/4/03

Radiological Project Manager, Terry Epperson

Bruce Christensen, P.E. — Date 12/4/03

Radiological Project Engineer: Bruce Christensen

Cirilo Lacson — Date 12/4/03

Vallejo Site Office Health & Safety Officer: Cirilo Lacson

Cirilo Lacson for — Date 12/4/03

WESTON Division Safety Manager: Mike Stuart

REVISION LISTING

Rev.	Description	Approval	Date

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REFERENCES

1. Weston Safety Officer's Field Manual
2. Weston CRR Group Health & Safety Program Implementation Plan
3. Weston Construction Health and Safety Guidance Document
4. Weston Injury and Illness Prevention Program
5. Weston VCA Incident Response Procedures
6. US Army Corps of Engineers – EM 385-1-1, Safety and Health Requirements
7. OSHA – 29 CFR 1910, Occupational Safety and Health Standards
   a. 29 CFR 1910.38 – Emergency Action Plan
   b. 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response

1. INTRODUCTION

1.1 PURPOSE / OBJECTIVES

The purpose of this document is to establish standard safety and health procedures for use by Weston Solutions, Inc. (WESTON®) personnel in performance of their work. This document is subject to change based on review and the implementation of additional tasks. Specific hazards control methodologies have been evaluated and selected in an effort to minimize the potential of accident or injury.

All project activities shall be performed in accordance with this document and other documents that are referenced/attached. This SSHASP includes by reference, the WESTON Safety Officer's Field Manual and the WESTON Construction Safety Guidance Document. The initial site briefing will include References 1 and 3.

The purpose of this Site Specific Safety and Health Plan is to supplement the Weston Health and Safety Program documents and is subject to change based on periodic review and the implementation of higher authority directives.

The levels of personal protection and the procedures specified in this SSHASP are based on the best information available from reference documents and current site data. Therefore, these recommendations represent the minimum health and safety requirements to be observed by all personnel engaged in this project. Unforeseeable site conditions or changes in Scope of Work (SOW) may warrant a reassessment of protection levels and controls stated.

1.2 SITE BACKGROUND

Former Marine Corps Air Station (MCAS) El Toro is located in near the City of Irvine in Orange County, California. During the period between 1943 until it's recent closure in 1999, the base provided operational and maintenance facilities for fixed and rotary wing Marine aircraft. Several sites on the base are suspected to contain discarded radiological material that historically was used in aircraft for its luminescent properties. Because of potential hazards associated with performing radiological survey work at the Station, issuance of a Health and Safety Plan is required before the radiological survey of the site can be safely accomplished.

2. PROJECT ORGANIZATION

All personnel entering the site are subject to the requirements of this SSHASP. Work shall not be performed in a manner that conflicts with the intent of, or the inherent safety health or environmental precautions expressed in this plan. After due warnings, personnel violating safety procedures will be dismissed from the site. Personnel responsibilities are summarized in Table 1.

Table 1 – PERSONNEL RESPONSIBILITIES

POSITION	ASSIGNED PERSONNEL
Radiological Project Manager	Terry Epperson (707) 562-3235
Radiological Project Engineer	Bruce Christensen (707) 562-3460
Weston VCA Health and Safety Officer	Cirilo Lacson (707) 562-6534
Weston Regional Health and Safety Officer	Mike Stuart (505) 837-6566
Certified Industrial Hygienist (CIH)	George Crawford (610) 701-7406
Project Certified Health Physicist	Mark Miller (505) 284-2107
Site Health and Safety Officer (SHSO)	Andy Rutkovskis (925) 948-2604
Designated First Aid Providers	Minimum of two required at job site
Weston Vallejo Site Office Manager	Cris Jespersen (925) 948-2662
Senior Radiological Manager (SRM)	Andy Rutkovskis (510) 508-9022 - cell
Radiological Surveyor/Sampler	Charlie Bouffard (925) 948-2605
Navy CSO Officer in Charge	Ron Johnson (619) 572-1403
Navy CSO Engineer	Scott Kehe (949) 726-2506 Cell: (619) 778-7464
Navy Biologist	John Lovio (619) 532-1166

2.1 PROJECT MANAGER

The Radiological Project Manager, Terry Epperson, has overall responsibility for the project and will coordinate with the Project Engineer, Senior Supervisor, Certified Industrial Hygienist, and the Site Safety Officer to ensure that the clearance goals are completed in a manner consistent with the SSHASP.

2.2 PROJECT CERTIFIED INDUSTRIAL HYGIENIST (CIH)

The CIH for this project is George M. Crawford, CIH. Mr. Crawford is certified in the comprehensive practice of industrial hygiene (CIH) by the American Board of Industrial Hygiene (ABIH). He has over 20 years of industrial hygiene and safety experience. The CIH will have the following responsibilities:

- Ensure that the SSHASP complies with all federal, state, and local health and safety requirements
- Evaluate and authorize any changes to the SSHASP
- Implementation and oversight of the Health and Safety Program.

- Assist in acting as liaison with government officials regarding health and safety related site matters.

2.3 WESTERN DIVISION HEALTH AND SAFETY MANAGER

The WESTON Western Division Health and Safety Manager is responsible for the final review and approval of the SSHASP.

2.4 SENIOR RADIOLOGICAL MANAGER (SRM) - SITE HEALTH AND SAFETY OFFICER (SHSO)

The SRM-SHSO, Andy Rutkovskis, reports to the PM and is responsible for supervising field implementation of the project. He provides direct supervision of field staff and, also functions as the Site Safety Officer, in ensuring that all personnel adhere to the requirements of the SSHASP. He is responsible for ensuring that personnel have the proper Personnel Protective Equipment (PPE) by completing the "PPE Used" format (page HASP-A2) at the initiation of the project. The SHSO shall have the authority to upgrade or downgrade levels of protection at any time in response to field conditions. He will hold a site safety meeting each day before the start of work and complete the Blue Card (Section 5.2) and "Safety Meeting Sign-off Sheet" (page HASP-A1). In addition, he has the following responsibilities:

- STOP WORK authority for health and safety reasons.
- Implementation and enforcement of the SSHASP.
- Training of employees in site-specific hazards and completing the Documentation of Training Form.
- Specify proper levels of Personal Protective Equipment (PPE) according to the specifications of this SSHASP.
- Develop additional health and safety procedures, as required.
- Investigate accidents/incidents and "near misses" and notify Weston-VCA within 24 hours by using a Notification of Incident or Near Incident (NOI).
- Conduct visitor orientation.
- Conduct weekly safety audits and complete required documentation.
- Coordinate with CIH concerning monitoring, PPE and other safety issues.
- Conduct monitoring as specified in this SSHASP.
- Ensure field implementation of the WESTON Safety Program.

2.5 PERSONNEL ASSIGNED TO THE PROJECT

All WESTON site personnel are responsible for the following:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees and being alert to potentially harmful situations.
- Performing only those tasks that they believe they can do safely and have been trained to do.
- Notifying the SHSO of any special medical conditions (i.e., allergies, contact lenses, and diabetes), which may impact their ability to perform site work or require assistance from others.
- Notify the SHSO of any prescription and/or non-prescription medication, which the worker may be taking that, might cause drowsiness, anxiety or other unfavorable side affects.
- Preventing spillage and splashing of materials to the greatest extent possible.
- Practicing good housekeeping by keeping the work area neat, clean, and orderly.
- Immediately reporting all injuries to the SHSO and Site Manager.
- Complying with the SSHASP and all health and safety recommendations and precautions, properly using all PPE as directed.

3. SCOPE OF WORK

Survey and sampling areas at the facility are located outdoors and indoors as shown on map in the Amendment. Minimal surface clearing may be required within defined outdoors areas of Station. The clearing will include the removal of materials (foliage and debris) that would interfere with the ground surveys/sampling being performed. Similar surface clearing (mainly furniture) will also be performed inside of buildings. This will enable the use of hand held and/or mechanized radiological survey equipment.

4. EMERGENCY RESPONSE AND CONTINGENCY PLANS

This section describes actions that will be taken by WESTON site personnel in the event of an emergency and is in compliance with the requirements of OSHA, specifically 29 CFR 1910.38 and 29 CFR 1910.120. The administrative procedures provided in reference 5 shall be followed for all incidents.

4.1 PRE-EMERGENCY PLANNING

Planning and training is essential in order to handle emergencies properly and effectively. Site personnel must be knowledgeable of their roles and responsibilities and act within their abilities and training. WESTON prohibits its employees from responding to emergency situations that would require them to be exposed to hazards beyond their degree of training. Prior to site activities (and whenever site conditions change), the Site Health and Safety Officer (SHSO) or project staff will communicate with outside response agencies (e.g., fire, police, ambulance, and medical) to coordinate response efforts.

4.2 ROLES AND RESPONSIBILITIES

The Senior Radiological Manager (SRM) will be the primary Emergency Response Coordinator (ERC). The SRM/Site Health and Safety Officer (SHSO) will contact the appropriate personnel or authorities as determined by the type and nature of incident. A complete list of emergency contacts is contained in Table 2.

TABLE 2 - SUMMARY OF EMERGENCY CONTACTS

FIRE or EXPLOSION	Orange County Emerg. Dispatch, 911 or (714) 726-3917 Sheriff, Sgt. Bensinger (714) 569-2046 or (949) 770-6011
PERSONAL INJURY or EXPOSURE	Irvine Medical Center – (949) 753-2000 or Saddleback Family & Urgent Care – (949) 770-1023
WESTON EMERGENCY CONTACTS	Terry Epperson, Weston Radiological Project Manager, (707) 562-3235, Cell (707) 290-7205
	Larry Maggini, UXO Safety Officer, (707) 562-3310
	George Crawford, CIH (610) 701-7406
	Cris Jespersen, Office Manager (925) 948-2662
	ClinNet Solutions Healthcare - 24-Hr. (Weston) Nat'l Medical Emergency Service (800) 318-0429
	Cirilo Lacson, Weston Vallejo Health and Safety Office, (707) 562-6534 or (707) 529-3963
OTHER EMERGENCY RESOURCES	U.S. Coast Guard Emerg. Resp. Team, (415) 399-3547
	Agency for Toxic Substances and Disease Registry (ATSDR), (404) 498-0004
	CHEMTREC, (800) 424-9300
	CDC Emergency Duty Officer (770) 488-7100
	Navy BEC, Andy Piszkin (619) 532-0784
	Navy Officer in Charge, Ron Johnson (619) 572-1403
	Navy CSO Engineer, Scott Kehe (949) 726-2506 Cell - (619) 779-7464
	NAVFACENGCOM SWDiv RPM, Content Arnold (619) 532-0790; Gordon Brown (619) 532-0791
	Navy Biologist, John Lovio (619) 532-1166

ERC responsibilities during emergency situations are as follows:

- Evaluate emergency situation and special needs.
- Direct all emergency efforts, including evacuation of personnel.
- Notify and interact with emergency response agencies.
- Oversee medical and decontamination procedures.
- Serve as the point of contact for local fire department(s) and/or hazardous material team(s).

4.3 COMMUNICATIONS

Emergency communications will be voice, audible alarm or cellular radio. Emergency telephone numbers will be kept immediately available (radio and/or hardhat stickers). Personnel will be instructed to immediately contact the SRM if an emergency situation arises.

A backup emergency notification system will also be used during all site activities (e.g., air horns located at each work location). In the case of an emergency the signal for personnel to evacuate the area will be a series of long blasts. The assembly/gathering point for individual work locations will be provided during the daily safety briefing. After a head count has been taken, further evacuation may be required based on wind direction and weather conditions. Workers may not return to designated work areas until directed by the SRM. Each type of communication will be tested to insure that site personnel can identify the signals above background noise, as well as to verify system effectiveness.

In the event of an emergency requiring outside assistance, the SRM (or designated alternates) will request outside help using a cellular telephone.

4.4 FIRE PREVENTION

The following rules developed from EM 385-1-1, OSHA, and WESTON Field Procedures will be enforced to prevent fires:

- Smoking will be prohibited at, or in the vicinity of, operations which may present a fire hazard; "No Smoking or Open-Flame" markings will be conspicuously posted.
- Flammable/combustible liquids will be stored in a designated area posted as a "No Smoking" or "No Open Flame" area with a 4A:20BC rated fire extinguisher located 25 to75 feet away.
- When used on-site, flammable and/or combustible liquids must be handled only in approved, properly labeled metal safety cans equipped with flash arrestors and self-closing lids.
- Transfer of flammable liquids from one metal container to another will be done only when the containers are electrically interconnected (bonded).

- The motors of all equipment being fueled will be shut off during fueling operations.
- When necessary for use on-site, flammable/combustible liquids stored in metal drums will be equipped with self-closing safety faucets, vent bung fittings, and drip pans. Such containers will be stored outside buildings in an area approved by the SHSO and will be properly grounded.

4.5 EMERGENCY EQUIPMENT

Fire extinguishers will be provided in the following locations:

- All equipment (backhoes, front loaders, etc.) will be equipped with a fire extinguisher rated 2A:10BC or higher.
- All vehicles used to transport fuel will be equipped with a minimum of one extinguisher rated 2A:20BC or higher.
- Temporary offices will be equipped with a fire extinguisher rated 2A:10BC or higher.
- At least one portable fire extinguisher of 4A:20BC units will be located at work site.

First aid kits, including a "Body Fluids Barrier Kit" shall be provided (size, specific content, and number of kits) sufficient to accommodate the maximum number of people (including visitors) on the work site at any given time. An emergency eyewash station (or equivalent) will be available at the site. Emergency equipment will be located in clearly marked and readily accessible locations. Adequate water and other supplies necessary to cleanse and decontaminate burns or other wounds will be available near the first aid kits. All site workers/visitors will be instructed in the locations of emergency equipment.

4.6 EMERGENCY PROCEDURES

General guidelines for rescue/response include the following:

- Assessment: Assess the type and extent of the emergency, then determine and verify existing and potential hazards to site personnel and the off-site population. Determine, based on the type and extent of the emergency, the following:
  - Whether and how to respond.
  - The extent of any injuries and/or damage.
  - The need for evacuation of site personnel and off-site population.
  - The resources needed for evacuation and response.
- Evacuate:
  - Move site personnel to a safe distance upwind of the incident.
  - Monitor the incident for significant changes. The hazards may diminish, permitting personnel to re-enter the site, or hazards may increase and require public evacuation.

- Survey casualties:
  - Locate all victims and assess their condition.
  - Determine resources needed for stabilization and transport.
- Request aid: Contact the required off-site/on-site personnel or agencies (such as the ambulance, fire department, police, etc). Ensure that previous communications and understanding or response actions to be conducted by the off-site resources have been accomplished. In certain cases (e.g., confined space rescue) the off-site responder(s) must be brought to the site before work is initiated so that an evaluation of and training on the confined spaces is accomplished.
- Allocate resources: Allocate appropriately qualified on-site personnel and equipment to the rescue and initiate incident response operations.
- Remove or assist victims from the area, using appropriate equipment and procedures.
- Control measures, including containment: Assist in bringing the hazardous situation under complete or temporary controls and use measures to prevent any escalation of the emergency.
- Decontaminate: Use established procedures to decontaminate personnel in the decontamination area if appropriate. If the emergency makes this area unsafe, establish a new decontamination area at an appropriate distance. Decontaminate victims before or after stabilization as their medical condition indicates. Decontamination may be delayed if the injuries suffered by the victim pose an immediate threat to the victim's life or health. Instead, the victim should be placed on a tarp, sheet of plastic or non-absorbent backboard to allow handling of victim without the threat of contaminating support personnel until the victim is stabilized.
- Stabilize: Administer any medical procedures that are necessary before the victim can be moved. Stabilize or permanently remediate the hazardous condition. Address the cause of the emergency and anything that was damaged or endangered by the emergency (e.g., drums, and tanks).
- Transport: No one will be transported without being decontaminated or protected from contaminating others. Measures will be taken to minimize chemical contamination of the transport vehicle, ambulance, and hospital personnel.
- Casualty Logging: Record the names(s) of the victim(s), the time, the destination, and their condition upon transport.
- Casualty tracking: Record the disposition, condition, and location of the casualties.
- Media Reporting: The Navy EFDSW Public Affairs Officer will be the media contact person for the project.

4.7 INJURY OR ILLNESS

In the event of injury or illness, site personnel will take the following action:

- Evaluate the scene for safe entry
- Notify SRM and Site Health and Safety Officer
- Assess the type and extent of injury
- Provide first aid to injured, taking universal precautions for blood borne pathogens
- Decontaminate the injured personnel, if necessary
- If injury or illness is not potentially life-threatening, transport to local medical facility if required
- If injury or illness is potentially life-threatening, notify emergency medical services for assistance
- Notify VCA Safety Officer and Program Manager

4.8 EXTRICATION

In the event a person becomes trapped and requires extrication site personnel will take the following action:

- Notify SRM and Site Health and Safety Officer
- Evaluate the scene for safe entry
- Contact the Fire Department
- Provide first aid as necessary
- Notify VCA Safety Officer and Program Manager

4.9 CHEMICAL EXPOSURE

In the event of chemical exposure site personnel will take the following action:

- Evaluate the scene for safe entry
- Notify SRM and Site Health and Safety Officer
- Provide assistance with emergency shower, eyewash, or other initial First Aid, as required
- Decontaminate exposed personnel
- Notify emergency medical services of need for transportation as necessary.
- Notify VCA Safety Officer, ClinNet Solutions Healthcare, and Program Manager

4.10 SMALL FIRE

A small fire is defined as a fire that can be extinguished with a 4A:20BC type fire extinguisher or incipient stage fires, which can safely be extinguished with material readily at hand. In the event of a small fire, site personnel will take the following actions:

- Evacuate all unnecessary personal from the area, if possible, to an upwind location
- Notify SRM and Site Health and Safety Officer
- If fire cannot be readily extinguished or controlled, evacuate the premises to an upwind location.
- If fire can be readily extinguished or controlled, attempt to extinguish fire using portable fire extinguishers or by smothering from an upwind location
- Request emergency response assistance as appropriate
- Notify the VCA Safety Officer and Program Manager

4.11 LARGE FIRE

In the event of a large fire, or a small fire, which cannot be extinguished, the following actions will be taken:

- Sound alarm.
- Evacuate all unnecessary personnel from area, if possible, to an upwind location.
- Notify local fire department; request other emergency response services (police, ambulance, and hospital) as needed. Phone 911 or (714) 726-3917.

Notify VCA Safety Officer, Program Manager, and other appropriate personnel or agencies.

4.12 EXPLOSION

In the event of an explosion, all nonessential personnel will evacuate the site. Required support equipment, services, and personnel will be requested. Response will follow steps identified under the appropriate section for the type(s) of casualties involved. Notification action as indicated in the Large Fires section will be followed (Call 911 or (714) 726-3917).

4.13 SMALL SPILL

In the event of a small spill, appropriate actions will be taken to prevent the spill from reaching groundwater, surface water or drains.

Actions include:

- Verification of spilled material, volume and hazards.
- Determine appropriate response procedures including PPE (see MSDS).

- Assess quantity and size of the spill to determine the level of response to contain and clean it up.
- Confine or contain spill with booms, pads, or berm.
- Neutralize spill with appropriate agents (if safe/possible).
- Notify VCA Safety Officer and SRM.
- WESTON will collect spilled material including absorbent material and place in appropriate containers. All hazardous material shall be disposed of in accordance with all applicable hazardous waste regulations and client requirements.

WESTON will keep all records related to the spill of hazardous waste for a period of at least three years after the spill has been cleaned up or such longer period of time as required in any unresolved enforcement action.

Note: MSDSs for materials onsite with potential to spill (e.g., gasoline, diesel, acids, solvents) will be available at the site. Procedures and requirements for spill response will follow criteria outlined in the MSDS.

4.14 LARGE SPILL

A volume equal to or greater than State or Federal reportable quantity and/or those beyond the capabilities and resources of on-site personnel defines large spills. Appropriate remedial actions will be conducted according to State and Federal Regulations.

General procedures are as follows:

- Verification of spilled material, volume and hazards.
- As safe to do so, confine the spill to the smallest area possible using booms, pads, berms or any other effective material.
- Assess type and extent of damages and injuries to personnel; take appropriate first aid steps if necessary.
- Notify VCA Safety Officer and SRM.
- In the event the additional emergency clean-up assistance is needed, WESTON will request assistance from off-site response contractors.
- WESTON will collect all hazardous waste including contaminated booms and absorbent material. All hazardous clean-up residues shall be disposed of as hazardous waste in accordance with all applicable hazardous waste regulations.
- All emergency equipment will be decontaminated prior to being put back into service. Expendable or damaged supplies will be immediately replaced.

WESTON will keep all records related to the spill of hazardous waste for a period of at least three years after the spill has been cleaned up or such longer period of time as required in any unresolved enforcement action.

In the event of a spill or a release requiring agency reporting, the Program Manager will notify the client and appropriate regulatory agencies.

4.15 HOSPITAL AND EVACUATION ROUTE

Figure 1 illustrates the route from work sites located north of Irvine Boulevard to the designated critical care medical facility, Irvine Medical Center, located in Irvine, California at 16400 Sand Canyon Avenue (phone 949-753-2000).

The route begins in the Northeast (remote sector) of the Station at the Magazine Road or Puzan Way access gate and proceeds to the hospital as follows:

- 1/2 miles south on Magazine Road or 1/4 mile south on Puzan Way to Irvine Blvd
- Right onto Irvine Blvd and proceed approximately 2.9 miles to Sand Canyon Ave
- Left onto Sand Canyon Ave and proceed for 3.3 miles to Hospital Street
- Turn left at Hospital St from Sand Canyon Ave; follow signs to emergency room or to Irvine Medical Center main entrance at 16400 Sand Canyon Ave

Note: The route from work sites located south of Irvine Blvd. starts at the Trabuco Road Main gate and proceeds approximately 1/4 mile to Sand Canyon Ave. Turn left onto Sand Canyon and proceed on Sand Canyon as indicated in the 3rd and 4th bullets above.

Figure 2 illustrates the route from the work sites located north of Irvine Boulevard to the occupational injury medical facility, Saddleback Family & Urgent Care, located in Lake Forest, California at 22855 Lake Forest Drive (phone 949-770-1023).

The route begins in the Northeast (remote sector) of the Station at the Magazine Road or Puzan Way access gate and proceeds to the hospital as follows:

- 1/2 miles south on Magazine Road or 1/4 miles south on Puzan Way to Irvine Blvd
- Left onto Irvine Blvd (left turn from Magazine Road onto Irvine Boulevard is not possible, turn right on Irvine Blvd, make a U-turn at the Desert Storm gate - next intersection) and proceed approximately 2.4 miles to Lake Forest Drive
- Right onto Lake Forest Drive and proceed for 2 miles to Saddleback Family & Urgent Care at 22855 Lake Forest Drive

Note: The route from work sites located south of Irvine Blvd. starts at the Trabuco Road Main gate and proceeds approximately 1/4 mile to Sand Canyon Ave. Turn left on Sand Canyon and proceed on Sand Canyon approximately 1/2 mile to Interstate 5, head south (left) on I-5 to Lake Forest Drive. Turn left on Lake Forest Drive and proceed to the Saddleback Family and Urgent Care, located in Lake Forest at 22855 Lake Forest Drive.

The local medical facility will be notified of the planned site activities and potential medical needs prior to the start of work at the site.

5. TRAINING PLAN

5.1 GENERAL

All personnel assigned to the project site will have received the required training. In accordance with 29 CFR 1910.120 and other OSHA/USACE regulations, applicable required training for all site workers shall be in accordance with the following:

- *Basic OSHA Training* - 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 3 days field experience under the direct supervision of a trained experienced supervisor (the SHSO must have an additional 8 hours of specialized safety supervisory training). All workers must have an annual refresher (8 hours) if initial training is over 1 year old.
- *First Aid and CPR Training* - At least two employees per site will be certified in First-Aid, Blood Borne Pathogens and CPR by the American Red Cross or equivalent
- *Site-Specific Safety and Health Training* - Site-specific health and safety (Type I) training will be conducted prior to field activities. The training will stress emergency response procedures and will cover the chemical and physical hazards of the site and site operations.
- *Trenching and Excavation Competent Person(s)*-**Not Applicable to this Amendment.** A qualified excavation competent person shall be assigned with responsibilities to include the daily inspection of all site excavations to ensure they meet safety requirements.
- *Explosives Safety Training* – **Not Applicable to this Amendment.** All persons designated to accomplish UXO tasks are graduates of the Naval EOD School with extensive field experience in the location and handling of unexploded ordnance.
- *Bloodborne Pathogen (BBP) Training* - Persons designated as first aid providers will receive training in controlling exposures to Bloodborne Pathogens (BBP). This training will consist of the following:
    - Review of the BBP standards.
    - Requirements of the Exposure Control Plan.
    - Description of the risks of exposure and how BBP are transmitted.
    - Management and Employee responsibilities.
    - Methods of protection against exposure and procedures for decontamination.
    - Post-exposure procedures.
    - Labeling and color-coding of infectious waste.

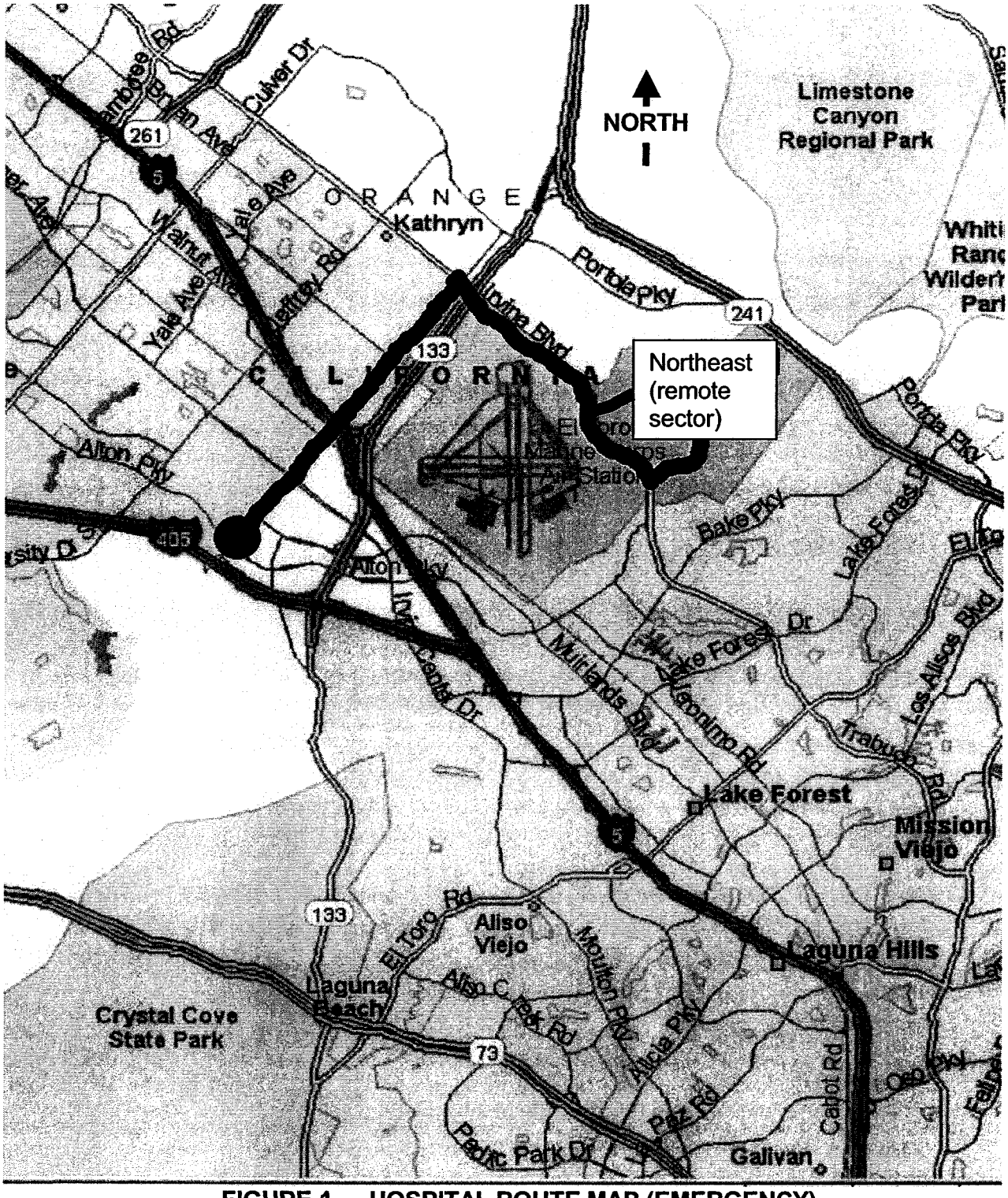


FIGURE 1. HOSPITAL ROUTE MAP (EMERGENCY)

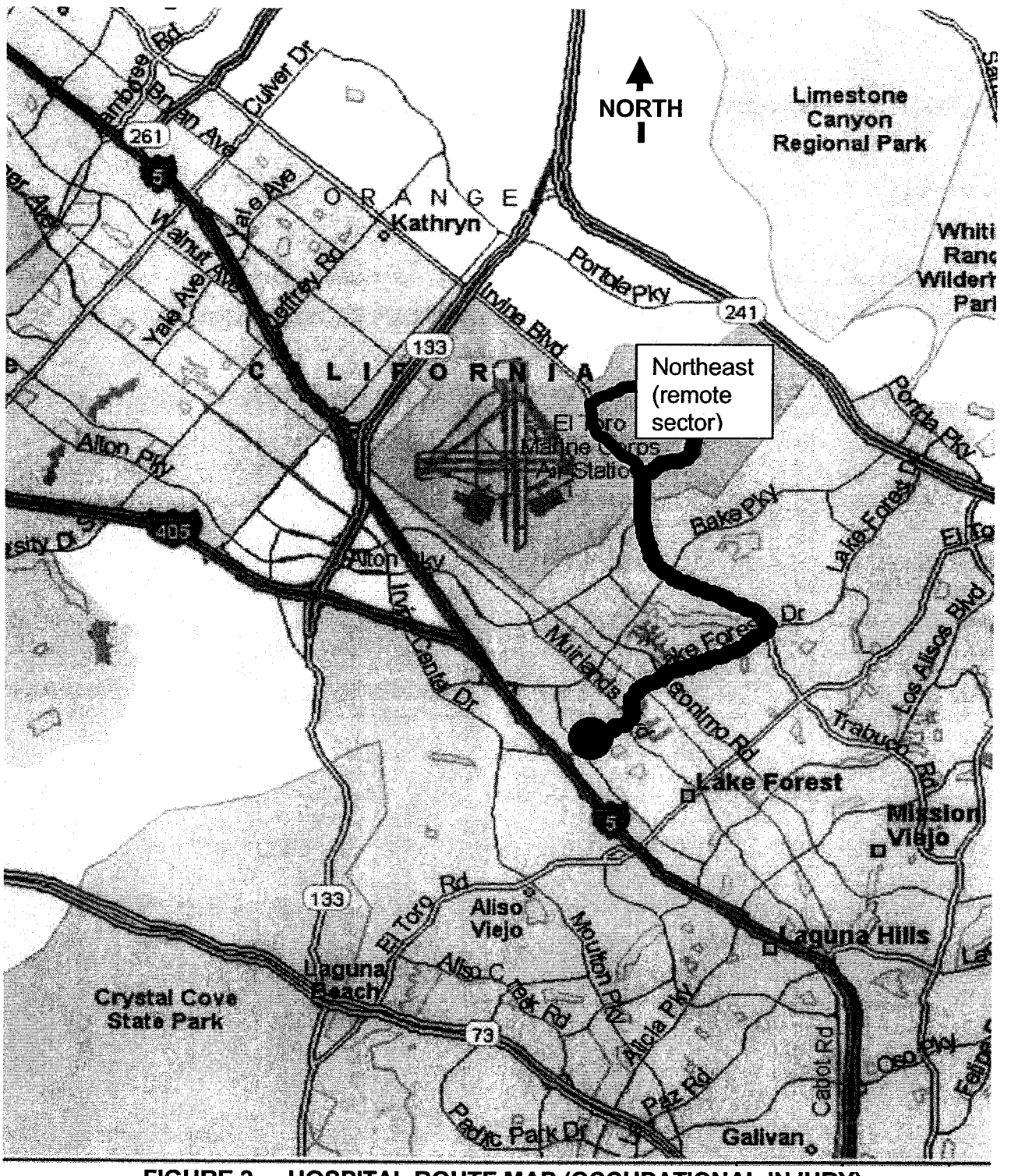


FIGURE 2. HOSPITAL ROUTE MAP (OCCUPATIONAL INJURY)

- *Hearing Conservation* - All site personnel exposed to noise levels exceeding 85 dBA 8-hour time-weighted average (TWA) will be provided with training which addresses the following topics:
    - Physical and psychological effects of high noise exposure.
    - Noise exposure limits.
    - Elements of the Hearing Conservation Program.
    - Selection, use and limitations of hearing protection devices.
- *Respiratory Protection Training* - In accordance with 29 CFR 1910.134, all site personnel required to use respiratory protection devices will have received equipment specific training. This training covers the use, limitations, inspection, maintenance and cleaning of respiratory protection devices required for use under the conditions of this SSHASP. Site-specific briefing/training will reinforce knowledge as necessary. WESTON's Respiratory Protection Program can be found within the Safety Officer's Field Manual.
- *Personal Protective Equipment* - In accordance with OSHA 29 CFR 1910, Subpart I (Personal Protective Equipment) all personal protective equipment will be provided, used and maintained in a sanitary and reliable condition. All personal protective equipment (PPE) will be of construction, design, and material to provide employees protection against known or anticipated hazards. PPE will be selected which properly and appropriately fits the employee. WESTON employees have been provided with training in accordance with the standard. Any concerns regarding the use of appropriate PPE will be brought the attention of the SHSO, who is directed to contact the VCA Safety Officer for assistance in evaluation of PPE as necessary. WESTON's PPE Program can be found within the Safety Officer's Field Manual.
- *Radiological Training* - All personnel assigned to this project will have completed basic training in the use of each field instruments and other related equipment (swipes, radiation sources, etc.) specified for surveys during this project. In addition, each person assigned will have performed scan and stationary radiological surveys at another facility within the past year. Each worker shall be knowledgeable of the requirements for wearing of basic anti-contamination clothing (waterproof gloves and shoe covers), shall be qualified to wear a cartridge/filter respirator and shall have been instructed that dosimetry must be worn in the event that general radiation levels of 2 mR/hr or greater are encountered.

5.2 DAILY SAFETY MEETINGS

Each day, prior to commencing work on site, all site workers will be given a safety brief by the SHSO that identifies potential hazards and risks that may be encountered during that day's activities. Additional training in the use of safety equipment, emergency medical procedures, emergency assistance notification procedures, accident prevention and discussion of the work plan will serve to insure that accomplishment of the work project

can be carried out in a safe and effective manner. After the briefing has been completed, workers will complete an individual Job Safety Analysis (Blue) Card demonstrating their awareness of potential site work hazards and associated safety measures.

5.3 VISITORS

Site visitors are defined as persons who are not employed at the project site, who do not routinely enter restricted work areas or, whose presence is of short duration (i.e., 1 to 2 days at one time or per month). Visitors who enter the exclusion zone (EZ) are required to meet the requirements of Sections 5 and 6. Visitors will receive a site specific briefing, complete an entry in the visitor's log, and be escorted by a WESTON representative at all times (the SHSO or his designee). Documentation of Training and Medical Surveillance will be presented to the SHSO prior to entry into the EZ.

5.4 WEEKLY TRAINING

At the start of each work week, a site-specific safety topic will be selected and discussed in detail. All site personnel are required to attend the training and the SHSO will document this training. The training will consist of site-specific hazards and/or appropriate safety-related concerns.

6. MEDICAL SURVEILLANCE

The following sections describe the medical surveillance program requirements for site workers, including health monitoring, documentation and record keeping, and medical support and follow-up.

6.1 MEDICAL TESTING

All personnel involved in on-site activities that result in exposure to contaminant levels exceeding permissible exposure limits must participate in a health monitoring program as required by OSHA 29 CFR 1910.120(f) and Title 8, CCR 5192 (f)(2) and (3). Medical examinations and consultations by a board-certified occupational medical physician will be provided prior to assignment, at termination, and under certain conditions of reassignment. In order to comply with the requirements of 29 CFR 1910 (specifically, 29 CFR 1910.120) WESTON has designated Dr. Elayne F. Theriault of ClinNet Solutions Healthcare, Inc. (CHI) to oversee the site-specific medical surveillance and OHP. Dr. Theriault is a board-certified physician in internal and occupational medicine.

After laboratory tests have been completed, the examining physician will prepare a documented written opinion that will be documented in the Weston Medical Qualification database in accordance with 29 CFR 1910.120(f)(7). A letter will be issued to the employee and to the employee's organization containing the following information:

- The physician's opinion as to whether or not the employee has any medical conditions that would place the employee at an increased risk of health impairment

from work in explosive handling operations, hazardous waste operations, or during an emergency response.

- Recommended limitations, if any, upon the employee's assigned work. Special emphasis is placed on fitness for duty, including the ability to wear any required PPE under conditions expected on-site.
- A statement that the employee has been informed by the physician of the medical examination results and of any medical conditions that require further examination or treatment.
- A respirator medical clearance.

The medical examination and consultations will also be available to employees at more frequent intervals if the examining physician determines that an increased frequency of examination is medically necessary. Any worker receiving a potentially harmful level of exposure to hazardous chemical/biological material or exhibiting signs or symptoms of possible exposure will undergo a supplemental examination. The physician will certify in writing that the employee is fit to return to work. If necessary, activity restrictions will also be specified in writing. Additional tests will be conducted if contaminants/potential exposures so dictate and will be determined by the examining physician.

6.2 DOCUMENTATION/RECORDKEEPING REQUIREMENTS

Weston and ClinNet Solutions will maintain medical surveillance records in compliance with 29 OSHA CFR 1910.120(f) for Weston Vallejo Site Office employees performing hazardous waste site activities. Copies of medical clearances for all site workers will be maintained at the site. Site visitors will be required to provide records in compliance with OSHA 29 CFR 1910.120(f) before entering the site.

The Project Manager will be responsible for recording and reporting near-misses, accidents, illnesses, and injuries involving employees in accordance with 29 CFR 1910/1926 (OSHA) and Weston corporate requirements. A Weston Notice of Incident and an EFA Contractor Significant Incident Report (CSR-1) will be completed by the Site Safety Officer. A copy of this completed report will be added to Weston employee medical surveillance records in the event of a reportable accident, illness, or injury.

6.3 MEDICAL SUPPORT AND FOLLOW-UP REQUIREMENTS

Weston employees and contractor personnel will be required to seek medical attention and physical testing in the event of injury or possible unprotected exposure above established exposure limits. Follow-up testing may be required within 24 to 48 hours of the incident, depending on the type of injury or exposure. The type of testing performed to monitor exposure effects will be based on the circumstances involved and will be determined by a certified occupational medicine physician.

7. FIELD ACTIVITIES

Planned field work has been broken down into the following tasks:

Task/Subtask	Activity
1	Mobilization/Site Preparation/Demobilization
2	Establishment of Boundaries/Site Surveying
3	Survey/Sampling Location and Marking
4	Surface Sampling

Task 1: Mobilization / Site Preparation/Demobilization

Mobilization/Site Preparation includes (the following are examples): Transporting personnel, equipment, and supplies to the site. Site preparation will include installation of material staging areas, assembly of required support equipment, and situating site facilities. In addition, areas to be surveyed will be inspected to ensure that they are accessible and free of items that would interfere with the survey. This includes checking to ensure foliage and debris are cleared from outdoors sites and furniture and other portable items are removed from indoor sites. Mobilization/demobilization will be performed in Level D PPE, which will consist of as a minimum; work clothes and safety shoes.

Task 2: Establishment of Boundaries/Site Surveying

Radiological surveying involves the establishment of boundaries at the outdoor and indoor survey sites. Grids will be established in accordance with the basic survey plan for hand surveys. Grid layout and hand surveys will be performed in Level D PPE, which will consist of as a minimum; work clothes and safety shoes. High-density surveys, if performed, will be performed without grids and the operator of survey vehicle will wear Level D PPE, which will consist of, as a minimum, work clothes, safety shoes and hard hats.

NOTE: The federally threatened coastal California gnatcatcher has recently been identified on this site. The Navy is currently working with the US Fish and Wildlife Service (USFWS) to mitigate any threat to the gnatcatcher. Based upon the opinion of SWDIV biologist, the radiological survey will have a low potential to affect the gnatcatcher. In order to avoid adversely affecting the gnatcatcher, the following steps to prevent and minimize impact will be implemented by SWDIV.

- A protocol gnatcatcher survey on the site, with an appropriate buffer area, is in progress. Location of active nests is being emphasized in this survey.
- If necessary, all areas of potential gnatcatcher habitat will be delimited, by flagging before any radiological testing is conducted.

- During the gnatcatcher breeding season (February 15 through August 30), a qualified biological monitor, familiar with the ecology of the gnatcatcher and possessing a federal 10(a) permit for this species, will be present during any sampling that could disturb the gnatcatchers on or adjacent to the Site.
- The biological monitor will have the authority to shut down any activities on the Site that have the potential to adversely affect nesting gnatcatchers. Such activities will be postponed if they are found to occur within 300 feet of an active nest and will not resume until young have fledged and are sufficiently mobile to readily follow their parents.
- If applicable, a report of monitoring activities and results will be prepared and submitted to the USFWS.

The SWDIV biologist is John Lovio (619) 532-1166 and the Earth Tech point of contact is Crispin Wanyoike (562) 951-2057.

Task 3: Survey/Sampling Location and Marking

Survey/sampling points determined at each Survey Unit (SU) will be located and marked by the surveyor(s).

Task 4: Surface Sampling

Removal of surface samples will involve removal of a maximum depth of 6 inches of material. Removal of surface samples will be performed in Level D PPE, which will consist of, as a minimum; safety shoes and gloves.

8. HAZARD IDENTIFICATION AND RISK ASSESSMENT

8.1 PRELIMINARY EVALUATION

The site comes under the provisions of 29 CFR 1910.120. Prior to work or specific tasks/activities, a preliminary evaluation of the site's characteristics will be performed by qualified personnel. This preliminary evaluation includes the completion of Hazard Analysis Tables, which identify hazardous conditions, and enables the selection of appropriate employee protection methods and PPE. Evaluation of work site characteristics and hazards is an ongoing process and will continue throughout the duration of the project.

8.2 CHEMICAL HAZARD IDENTIFICATION

All known or potential physical and chemical hazards that may pose a threat to the health and safety of site workers must be identified to ensure workers are adequately protected. Emphasis is placed on identifying conditions that may cause death or serious harm. All site workers must be vigilant in identifying work place hazards and bringing them to the attention of supervision. Chemical hazards can present exposure hazards via inhalation, ingestion, absorption or contact with contaminants present in liquids, soil or air. There are no known chemical contaminants documented to exist at the site. Material Safety Data Sheets (MSDSs) for common ordnance related contaminants and for chemicals supporting site work will be maintained at the site.

Based on site historical data there are no chemical hazards in the locations being surveyed by this plan. Typical radiological contaminants found at military bases are listed in Table 3.

Table 3 - Site Contaminants

CHEMICAL	Maximum Concentration (mg/kg unless otherwise specified)	Survey Screening levels (dpm/100cm^2)	OSHA PEL	TARGET ORGANS	SYMPTOMS OF EXPOSURE
METALS					
Not Applicable to this work					
POTENTIAL RADIONUCLIDES*			TEDE (NRC)		
Radium-226**	unknown	100	25 mrem/yr (see Note)	Gastrointestinal system, bone marrow, testes, ovary, eye lens	Normally none – High doses can cause skin reddening and/or nausea
Strontium-90**	unknown	1000	25 mrem/yr (see Note)	Gastrointestinal system, bone marrow, testes, ovary, eye lens	Normally none – High doses can cause skin reddening and/or nausea

* Although not a contaminant, ultraviolet radiation is a concern when outdoors. Precautions are contained in Table 4.

** Confirmed human carcinogen

PEL OSHA Permissible Exposure Limits

TEDE Total Effective Dose Equivalent

NOTE: USEPA cancer risk range is 10^{-4} to 10^{-6}.

8.3 PHYSICAL HAZARD IDENTIFICATION

Physical hazards which may be encountered during field activities include: unexploded ordinance, cold stress; heat stress; flammable materials; hazards related to equipment handling; uneven/unstable surfaces; excessive noise; heavy equipment operation and decontamination. The SRM shall be responsible for thoroughly evaluating field operations with respect to potential physical hazards to personnel. These potential hazards and the specific procedures to be followed to help prevent or reduce exposure shall be reviewed and documented during the daily Safety Briefing.

8.4 BIOLOGICAL HAZARD IDENTIFICATION

Biological hazards which may be encountered in the field includes: poisonous plants, wild and/or rabid animals, snakes, ticks, and insects. The degree of hazard can range from annoyance to death from bites or anaphylactic shock. In addition, the presence of rodent excreta presents the potential for Hantavirus and Arenovirus. Actions to be taken to control such hazards are discussed in Table 4. Recognition and avoidance are critical in maintaining a safe worksite.

8.5 HAZARD COMMUNICATION

In order to comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200 (HCS), the following shall apply to all commercial products containing hazardous substances, which are brought on-site:

- Copies of the Weston Hazard Communication Program will be made available to site personnel.
- Material Safety Data Sheets (MSDSs) will be maintained for each product containing a hazardous substance, which is used on-site, and which meets the regulatory requirements of the HCS.
- All containers not supplied with adequate hazard labeling shall have a hazard communication label affixed to the container that communicates the health and physical hazards associated with working with the material.
- Employees working with hazardous substances shall be trained in accordance with the requirements of 29 CFR 1910.1200.
- An inventory of all hazardous substances used on-site will be maintained.
- Personnel affected by hazardous substances use shall be informed of the hazards and of the location of appropriate MSDS.

Employees required to perform hazardous non-routine tasks will be given information by the SHSO about any hazardous chemicals involved. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps being taken to reduce the hazards (including but not limited to: ventilation, respirators, presence of another employee, and emergency procedures).

The SHSO is responsible for ensuring that all employees are aware of the following program elements. A health and safety briefing that includes the information will be provided at the time of initial assignment for employees to the work site or whenever a new hazard is introduced into the work area.

- California Radiation Control Regulations (CCR, Title 17, Section 30255) - A copy of the NOTICE TO EMPLOYEES shall be available at the work site.
- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, non-routine tasks to be performed (if any).

9. ACTIVITY HAZARD ANALYSIS

The activity hazard analysis is an ongoing process from the initiation of the SSHASP preparation through the implementation and completion of the project. The activity hazard analyses included in this section are developed for each task associated with the project. WESTON Field Operating Procedures (FLDs) are contained in the WESTON Safety Officer's Field Manual (SOFM), which will be maintained onsite.

Inspection requirements are identified in FLDs referenced in the Activity Hazard Analysis tables in this Section and in Section 16 (Site Field Log Books). Health and safety equipment to be used, such as monitoring instruments and PPE, is specified in Sections 10 and 12 of this SSHASP.

In addition to the physical hazards outlined in the Activity Hazard Analysis table, special physical hazards that have the potential to affect worker and public safety are addressed below.

Heavy Equipment Operation – **Not Applicable to this Amendment**

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent person and certified to be in safe operating condition. The SRM will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests, in accordance with an appropriate vehicle check list, will be made at the beginning of each shift to determine that the brakes and operating systems are in proper working condition for use. Any machinery or equipment found to be unsafe will be dead-lined and its use prohibited until unsafe conditions have been corrected. Only designated personnel holding required licenses will operate machinery and mechanized equipment. Equipment deficiencies that affect its safe operation will be corrected before continued use. Refer to Subsection 2.4.22, Heavy Equipment Operation - FLD 22, of the WESTON Safety Officer Field Manual for proper heavy equipment operation.

Working Near Water

WESTON personnel are not expected to perform work over or adjacent to water where a drowning hazard would exist. However, should conditions dictate and work adjacent to water becomes necessary, this SSHASP will be modified to meet the requirements of EM 385-1-1, Section 5 (05.I and 05.J). WESTON's Standard Operating Procedures (SOPs) for working over or near water can be found in Field Operating Procedure 19 of the Safety Officer Field Manual.

Unknown Compressed Gases, and Reactive Materials

In the event that any of the above are found at the site, an addendum will be made to this SSHASP before any removal/disposal is attempted.

Clearing and Grubbing

Vegetation removal will be completed prior to WESTON mobilization in accordance with directions from SWDivision and USFWS.

For information, WESTON removal procedures are located in Section 35 of Reference 4 and Clearing, Grubbing, & Logging Operations FLD47. Site operations should be limited to the removal of light brush and grass.

Excavations

Surface samples will be limited to a maximum depth of 6 inches.

For information, excavation operations will be in compliance with OSHA, 29 CFR 1926 Subpart P, EM 385-1-1 Section 25, and Excavating/Trenching FLD28 requirements. No operations requiring the entry of personnel into excavations more than 4 feet deep are planned (no confined space permitting required).

Soils Handling

All excavations will be accomplished using hand tools only. Handling will be in accordance with WESTON's SOP for transfer and control of radioactive samples.

TABLE 4 - ACTIVITY HAZARD ANALYSIS

Task Definitions:

1. Mobilization/Site Preparation/Demobilization
2. Establishment of Boundaries/Site Surveying
3. Survey/Sampling Location and Marking
4. Surface Sampling

Task	Hazards	Hazard Control
3,4	*Chemical Hazards*—Chemical contaminants do not exist at the site (none have been documented at this time).	Avoid areas with unusual smell, appearance, texture, etc. Background field surveys will be conducted and action levels established if contamination is suspected and cannot be avoided in the course of site work.
1,2,3,4	*Physical Hazards*—Slip, trips, falls, tools, terrain or vegetation; uneven walking surfaces. Weather hazards, such as rain, lightning; and poor visibility.	The work area shall be visually inspected. Slip, trip, and fall hazards shall be either removed or marked and barricaded. Sufficient illumination shall be maintained. Site personnel shall conduct walkover in groups of two as a minimum. Site personnel shall refer to and follow WESTON FLD 02-Inclement weather and 39-Illumination. Also, see FLD 11 and 12.
1,2,3,4	Housekeeping	Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized and ice, snow and mud will be cleared from steps to reduce slip hazards. See FLD12
1,2,3,4	Strains and sprains from manually lifting and moving.	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others. See FLD 10.
1,2,3,4	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire-extinguishers will be placed within 50 ft of the fuel storage area, in construction

Task	Hazards	Hazard Control
		equipment, and strategically in the construction area.
1,2,3,4	Hands or fingers caught between objects; abrasions and lacerations.	Personnel shall be made aware of the hazard and asked to coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions shall be taken to avoid contact. Personnel shall wear work gloves and avoid placing hands between objects.
1,3,4	Electric Hazards	Generators will be grounded unless self-grounded. GFCIs will be used as necessary. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10' from overhead electric lines. Qualified electricians will make electrical Installations. A lockout/tagout program consistent with FLD42 will be used for equipment maintenance.
1,4	Moving mechanical parts from heavy equipment operations.	Personnel shall be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLD 22.
1,4	Hand tools, manual and power.	Tools shall be inspected prior to use. Damaged tools will be tagged out of service until a qualified person can perform repair. Use tools properly and for their intended purpose. A ground fault circuit interrupter (GFCI) will protect all power circuits used for hand tools. See FLD 38.
1,3,4	Grubbing and vegetation removal. Chain saws, weed whackers and chippers.	Qualified persons will operate chain saws, weed whackers and chippers. Chain saw operators will wear face shields, gloves, hearing protection, hard hat, safety boots and chaps. Chippers will be inspected before use (operators must have documented formal training) and all guards will be in place per EM 385-1-1. Persons cutting trees will be appropriately trained and experienced. Personal protective equipment and formal training will be in accordance with FLD47.

Task	Hazards	Hazard Control
1,2,3,4	Traffic	Work areas will be clearly barricaded and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working near roadways or directing traffic will wear high visibility vests. See FLD 20.
1,2,3,4	Inclement weather, Heat/Cold stress	Workers shall be briefed and cognizant of heat and cold stress symptoms. Fluids will be available to workers. See FLD 05 and 06. Work rest periods will be established according to ACGIH and NIOSH guidelines.
1,3,4	Striking and being struck by operating equipment, loads, falling objects, and pinch points.	Workers shall stay out of the swing area of all equipment and from under loads. No personnel shall ride on the equipment unless seats are provided. See FLD 20, 22A, 23, and 24. Workers exposed to traffic hazards will wear traffic/reflector vests. Vehicles will be checked during maintenance and cribbed if wheels need to be changed.
1,2,3,4	*Biological*—Poisonous plants, insects, snakes. The presence of rodent excreta presents the potential for Hantavirus and Arenovirus.	Review recognition of poisonous plants, insects, or snakes typical of this area. Small patches of poison oak exist at Landfills 2 and 17. If tools are used in poison oak, decon before removal from the area. Use appropriate measures as required. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43 and FLD 44. Apply a water/bleach solution (3 tbs to 1 gallon of water) for dust abatement. Wait one hour before cleaning up while using HEPA/P-100 respirators in addition to other appropriate PPE.
1,2,3,4	*Radiation*— Ionizing radiation may exist on-site.	Radium 226 and other radioisotopes may exist on this site. If radiation levels greater than 2 mrem/hour are encountered, appropriate dosimetry will be worn by workers in the area. If controlled nuclear sources are used, they will be properly licensed and will be operated by qualified technicians.

Task	Hazards	Hazard Control
4	Excavation	Personnel shall remain away from the edges of the excavation and equipment. Due to the shallow depth of the excavation, shoring practices are not needed. Excavation equipment and stockpiles will not be placed closer than 2 feet from any excavation edge. Compliance with 29 CFR Subpart D, EM 385-1-1 Section 25 and FLD 28 will be maintained.
3,4	Explosion-Encountering potential live ordnance/related materials and the handling of demolition materials	All personnel involved with explosive operations will be properly trained and certified. UXO oversight is required for operations involving the location, recovery, and disposal of explosive ordnance and related materials.
1,2,3,4	Air Emission - Dust creating activities	During any operations in which dust is created, site personnel will, to the maximum extent possible, stand upwind of the operation and, when feasible, dampen the area with water (spray bottle). Particular emphasis should be placed on this requirement, when solid samples (which may contain radioactivity) are being collected.
1,2,3,4	Ultraviolet Radiation - Hazardous effects: skin cancer, potential sunburn/sun poisoning	Use wide brim hats and protective clothing. Avoid direct exposure to sun for long periods of time. Wear sun screen with a sun protection factor (SPF) appropriate for skin type. Sun screens shall be used only in accordance with manufacturer's recommendations.

10. AIR MONITORING

Due to very low levels of contaminants identified at the site, and the fact that the non-intrusive survey operations will not disturb these contaminants, it is not anticipated that exposures above their respective action levels and PELs will be experienced. Should site conditions change to indicate the presence of contaminants, this document will be amended to reflect new information and appropriate monitoring will be conducted during specified site activities to evaluate potential physical and chemical hazards. Evaluation of these hazards will assist in determining: the effectiveness of control measures; requirements for upgrading or downgrading PPE; and the effectiveness of work zones and safe work practices. Additional monitoring for physical hazards (e.g., noise, radiation, etc.) may be necessary based upon site conditions.

11. SITE CONTROL

The following sections describe the site control measures required to ensure site security, prevent public health impacts and exposures, and (should chemical contaminants be identified) to prevent the uncontrolled spread of contamination.

11.1 SITE CONTROL ZONES

The following sections describe the exclusion zone, contamination reduction zone (CRZ), and the support zone, as well as the procedures to be followed if their establishment becomes necessary.

Actual placement of the zones is dependent on specific site conditions and will be determined by the Site Safety Officer.

11.2 EXCLUSION ZONE

A defined exclusion zone will be established at the site, when necessary. The perimeter of the exclusion zone will be defined by barricade tape or traffic cones to restrict access and will extend for a minimum of 50 feet from active work areas. Visitors will be permitted to enter the exclusion zone only with the authorization of the Project Manager. Work tasks that require establishment of an exclusion zone around one or more work areas include the following:

- Removal of surface samples.

11.3 CONTAMINATION REDUCTION (DECONTAMINATION) ZONE

The Contamination Reduction Zone (CRZ) is a transition zone between the exclusion zone and the support zone. A decontamination line will be established in a Contamination Reduction Corridor (CRC) within the CRZ. The CRZ decontamination area will contain facilities to decontaminate personnel and portable equipment. A separate area for decontamination of heavy equipment will be established at the edge of

the CRZ. Equipment decontamination procedures are described in Section 13.3. Visitors will be permitted to enter the CRZ only when authorized by the Project Manager.

11.4 SUPPORT ZONE

The support zone will be situated in a clear area outside the CRZ, where the chance of encountering hazardous material or conditions is minimal. Visitors will be permitted to enter the support zone provided no operations are in progress and they wear the appropriate PPE as determined by the SHSO.

11.5 SECURITY

Areas considered unsafe will be maintained secure throughout the operation utilizing existing boundary fences to the maximum. Entry points will be secured and clearly posted to indicate site hazards and to provide Weston points of contact for additional information. Access into the work site will be strictly controlled and limited to authorized personnel.

No unauthorized access is permitted within the perimeter boundaries.

11.6 SITE MAP

The site maps contained in the basic survey plan show the suspected areas of potential contamination and the locations of site perimeter boundary. The maps also show topographic features such as buildings, access roads, wetlands, bodies of water, etc.

11.7 ENTRY PROCEDURES

An administration area may be established outside the survey site. Parking facilities will be available near the survey area. All persons entering the site must proceed with permission of the SRM. Entry to the site will be restricted to those persons having a valid reason to be on the site.

11.8 COMMUNICATIONS

Both internal and external communications systems will be established during site work. Internal communications used between field team members and the SRM and SHSO may consist of verbal communications only or may be supplemented by flags, radio devices, hand signals, or other methods as required. The internal communications system must be understood by all team members and tested to determine its effectiveness.

An external communication system will be necessary to call for off-site emergency assistance and to conduct essential administrative business. When a telephone is not readily available, an alternative method such as a cellular phone or radio communications will be utilized. Every team member will be informed of the location of the nearest

telephone and be instructed in the use of other communications devices, such as fire alarm boxes, located near the worksite. All emergency contact numbers shall be posted in a conspicuous place.

12. PPE SELECTION

All personnel performing operations on-site shall be required to use the appropriate level of protection as specified in this document. The provisions for use of level D, Modified D, C, and B as required for the hazards associated with a given task, operation, or expected contaminant level.

Level D PPE

Level D PPE will be worn during mobilization, site preparation, site reconnaissance, hand surveying, during site high density surveying when driving the survey vehicle, sampling and demobilization and will consist of:

- Work clothes, e.g. coveralls (cotton);
- Safety shoes (ANSI approved) and hard hats, where necessary;
- Gloves (during sampling);
- Chemical Resistant Overboots and Gloves shall be worn when activities are performed in contaminated areas.

Modified Level D PPE

Not Applicable at MCAS El Toro.

Level C PPE

Although Level C PPE is not anticipated for this project, it is included here for completeness should it's use become necessary. In addition to the Level D PPE, Level C PPE consists of:

- Chemical resistant coveralls - Tyvek if dry matrix, Saranex or equivalent if wet matrix and during container movement (labpacking)
- Chemical resistant overboots or chemical boot covers
- Gloves -nitrile or latex inner; and nitrile outer
- Half face or Full face APR with HEPA OV/AG cartridge (NIOSH/MSHA approved - MSA GME, P100 or equivalent). Organic Vapor Cartridges must have an End of Service Life indicator or a Cartridge Change Schedule calculated by the Site Safety Officer or Health and Safety coordinator (maximum use before change is 8 hours.)

Level A/B PPE

- Level A/B PPE is not anticipated for this project.

13. DECONTAMINATION

Reducing the potential spread of contamination is the responsibility of each individual worker. Engineering controls to reduce airborne particulates will also be used where possible to minimize the contamination of personnel and equipment working on the site. Another method of reducing contamination is to use a delineated arrangement of hotline, exclusion zone, contamination reduction zone, and support zone. The following procedures for personnel and equipment decontamination will be utilized where deemed appropriate based on existing site conditions.

13.1 EMERGENCY DECONTAMINATION

Should a site worker in the EZ be injured or appear to exhibit signs of chemical exposure, emergency decontamination will be performed. Supplies for the emergency decontamination will be placed in the CRZ prior to site activities, and shall include:

- Eyewash solution
- First Aid/Blood Borne Pathogen kit
- Plastic sheeting or disposable rescue blanket

These materials will be required in addition to the general decontamination equipment required for standard decontamination activities.

13.2 PERSONNEL DECONTAMINATION PROCEDURES

The SRM or SHSO will designate personnel to assist in the donning and doffing of personal protective equipment (PPE) as they proceed in and out of the CRZ. Decontamination is accomplished to ensure the materials that personnel and equipment may have contacted in the exclusion zone are removed in the contamination reduction zone before passing into the support zone. Personnel will be wearing the appropriate level of protection based on the hazard identification and evaluation (level D, modified level D, or level C for this project). Persons performing decontamination duties will wear, as a minimum, the same level of protection as those persons being decontaminated.

MODIFIED LEVEL D

The following sequence of events will be the procedure for modified Level D personnel decontamination:

- Any site equipment will be deposited in a segregated area prior to entering the contamination reduction zone.
- At the perimeter of the exclusion zone, splash protection (if worn) will be damp-wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Over boots or over-the-sock boots will be scrubbed with a detergent-water solution. The boots will be removed and placed on a rack to dry.

- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent if grossly contaminated.
- Outer gloves will be cleaned and removed, and depending on condition, will be discarded (if damaged or uncleanable).
- Splash gear will be removed, cleaned, and hung to dry (if worn).
- Personnel will wash their hands, arms, neck, and face.

At the discretion of the SHSO, and based on site conditions, exposure potential, and tasks performed, dry decontamination procedures may by utilized for disposable PPE to eliminate the generation of unnecessary amounts of decontamination water. At a minimum, facilities for washing the face and hands of personnel will be established.

LEVEL C

The following sequence of events will be the procedure for Level C personnel decontamination:

- Deposit any site used equipment in a segregated area prior to entering the contamination reduction zone.
- At the perimeter of the exclusion zone, rain gear or splash protection (if worn) will be damp-wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Outer boot covers or over-the-sock boots will be scrubbed with a detergent-water solution. The boots will be removed and placed on a rack to dry.
- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent if grossly contaminated.
- Outer gloves will be cleaned and removed, and depending on condition, will be discarded (if damaged or uncleanable).
- Splash gear will be removed, cleaned, and hung to dry (if worn).
- Tyvek or Saranex suits will be discarded.
- Respirators will be removed and prepared for reuse or decontamination.
- Latex inner gloves will be discarded.
- Personnel will wash their hands, arms, neck, and face.

At the discretion of the SHSO, and based on site conditions, exposure potential, and tasks performed, dry decontamination procedures may by utilized for disposable PPE to eliminate the generation of unnecessary amounts of decontamination water.

13.3 EQUIPMENT DECONTAMINATION PROCEDURES

Decontamination will be required for all tools, field monitoring equipment, and heavy equipment used during site activities. The equipment decontamination procedures described in the following sections are based on guidelines appropriate for low-level

contamination. When appropriate, a detergent cleaning solution and water rinses will be used to decontaminate equipment. Wastewater from equipment decontamination activities will be stored until proper disposal methods can be determined based on sample analysis.

HAND TOOLS

Hand tools will be decontaminated after use by brushing with a detergent solution, rinsing with water, and allowing to air dry.

VEHICLES

Vehicles should be freed of loose dirt or stabilized material on tailgates, axles, wheels, etc. based on a visual inspection of all exposed surfaces. Equipment will be decontaminated at an equipment decontamination pad located at the edge of the CRZ. Decontamination will be performed after completion of site activities or whenever removal of the equipment from the exclusion zone is necessary for maintenance, repairs, etc.

Decontamination will be accomplished by applying a detergent solution and rinsing with water using a pressure washer. If equipment still has soil on it after rinsing, a brush will be used to loosen debris and the cleaning operation will be repeated. All removed soil and wastewater from decontamination activities will be collected and stored for proper disposal.

13.4 DISPOSAL PROCEDURES

Disposable clothing and equipment will be double bagged and drummed. The items will be tested for possible residual contamination and will be properly disposed of based on analytical results.

Wash and rinse water will be collected and disposal based on grab sample analytical results.

14. UTILITY SAFETY PROCEDURES (**NOT APPLICABLE TO THIS AMENDMENT**)

This section provides procedures for safely accomplishing work around overhead and underground utilities.

14.1 UNDERGROUND UTILITIES (**NOT APPLICABLE TO THIS AMENDMENT**)

This section provides the procedures for the safe location, identification, and exposure of underground utilities during excavation and trenching activities. Underground utility safety procedures apply to all excavation operations (including but not limited to: general excavation operations, asphalt removal, sampling operations, and the use of hand tools).

14.1.1 DEFINITIONS

Excavation — Any cut cavity, trench, or depression in the earth created by the removal of soil.

Utility Excavation Area of Concern — The anticipated excavation area perimeter plus five (5) feet in all directions.

Equipment Operator — Individual trained, qualified, and currently licensed by WESTON to operate equipment to be used. Has been briefed by the project supervisor and has walked the job site to sight utility markings. Does not perform excavation without spotter in place at the point of excavation.

Spotter — Individual briefed by the SHSO and stationed at the point of excavation to maintain visual contact at the point of excavation to identify any unidentified utilities or obstacles in the path of excavation.

14.1.2 GENERAL REQUIREMENTS

1. The Project Engineer in consultation with the SRM shall determine the need for excavation work.
2. The work plan shall indicate the location and extent of the excavation work to be performed. Final concurrence to the extent of the excavation will be made by the Project Engineer and the SRM when the excavation area is being delineated for the Regional Notification Center (i.e., Underground Service Alert (USA)).
3. The estimated location of utility installations (in particular, those that may not fall under the responsibility of the USA organization) that reasonably may be expected to be encountered during the excavation work, shall be determined prior to opening the excavation.
4. USA (and any other known owners of underground utilities who are not members of USA) shall be advised of the proposed work at least two (2) working days prior to the start of any digging or excavation work. The location request number, provided by the Notification Center, shall be annotated in the site logs.
5. The established utility excavation area of concern will be delineated with white paint on paved surfaces or with flags or stakes on unpaved surfaces.
6. The Project Engineer and the SRM will review available utility location information to verify the USA identification of all anticipated utilities. Any discrepancies will be communicated to the utility/installation owners and resolved prior to opening the excavation.
7. The Project Engineer and the SRM will investigate the possibilities of deenergizing/depressurizing all active utilities prior to opening the excavation. The Program Manager's concurrence is required, in writing, prior to initiating an excavation near energized/pressurized lines.
8. The SHSO will verify the following for all excavation work:

a. A site specific pre-excavation briefing has occurred and is documented in the Site Safety Log. This briefing will be performed onsite with the operator and the spotter and involve the physical observation of all utility markings.

b. The Equipment Operator's license has been verified and is in the operator's possession.

c. A utility sketch and a utilities evaluation sheet (see pages A5 and A6) have been documented in the Site Safety Log.

d. The SRM, equipment operator, and spotter have sighted the anticipated area of excavation, sighted the utility markings both on the ground and in the utilities sketch, and have discussed the planned operation.

e. The Team Leader will be present at the excavation site until all utilities have been located and exposed.

f. The SRM will ensure that the spotter is present at all times during the use of powered excavation equipment.

9. Utilities within five (5) feet of the excavation area will be exposed every 100 feet (or as necessary) using hand tools or other "safe and acceptable means" to determine the exact location of the utility.

10. When utilities are not located within two (2) feet of their marked location, the utility owner will be notified, and the location resolved before powered equipment is used for excavation.

11. Once utilities have been precisely located, the use of power equipment is authorized up to a minimum clearance of two (2) feet from the utilities. DO NOT use powered equipment within two (2) feet (horizontally and vertically) of active utilities. Excavation within two (2) feet must be removed by the use of hand tools or other "safe and acceptable means" (i.e., vacuum excavator).

14.1.3 REGIONAL NOTIFICATION CENTER

Underground Service Alert (USA) is the Regional Notification Center for California and Nevada (California Government Code 4216). The telephone number for notification is (800) 227-2600. Hours of operation are 0600 hours to 1700 hours, Monday through Friday, except Holidays. Notification of the Regional Notification Center is a mandatory prerequisite for all excavation work.

14.2 OVERHEAD UTILITIES (**NOT APPLICABLE TO THIS AMENDMENT**)

This section applies to all work near overhead utilities involving the use of equipment or machinery capable of reaching (in any operating mode) within the minimum safety clearance distance of an energized utility line. "*Energized*" high voltage lines are defined as those lines with a potential of 600 volts or more that have not been verified to be de-energized by the owner/operator and are not visibly grounded. For additional information, refer to WESTON FLDs-34 (Utilities) and 35 (Electrical Safety).

Every effort shall be made to have the utility owner/operator of the affected power line de-energize the line prior to initiating any nearby work. Where the power line cannot be de-energized (and visibly grounded) by the owner/operator, the following precautions shall be followed.

1. When work is required near overhead high-voltage lines, suitable barrier tape or other personnel and equipment constraints will be used to mark-off and bar approach to the area of danger. Personnel shall not be permitted to cross into the area of danger until safeguards against accidental contact with energized power lines have been implemented.
2. A "spotter" shall be present to monitor the clearances and give timely warning to personnel.
3. The passing of tools, personnel or equipment over energized power lines shall be prohibited.
4. The minimum clearance requirements of Table 5 shall be strictly followed.

Table 5 - Clearance Requirements from Energized Overhead Conductors

Normal Voltage			Minimum Clearance (feet)
600	to	50,000	10
50,001	to	75,000	11
75,001	to	125,000	13
125,001	to	175,000	15
175,001	to	250,000	17
250,001	to	370,000	21
370,001	to	550,000	27
550,001	to	1,000,000	42

5. Any overhead power line shall be considered energized unless and until notified by the owner/operator that the line has been de-energized AND is visibly grounded.
6. A durable warning sign shall be posted in each piece of heavy equipment (in plain view of the operator) and readable at a distance of 12 feet: "Unlawful to operate this equipment within 10 feet of high-voltage lines of 50,000 volts or less...For minimum clearances of high-voltage lines in excess of 50,000 volts, see California Code of Regulations, Title 8, Article 37, "High-Voltage Electrical Safety Orders."

15. GENERAL SITE SAFETY PROCEDURES

15.1 GENERAL

The following sections contain general site safety information. WESTON Field Operating Procedures, contained in the Site Health and Safety Officer's Manual maintained on-site, will also be followed. Hazards due to normal site activities can be reduced by using common sense and following safe practices. The following practices are expressly forbidden:

- Running and horseplay.
- Smoking, eating, drinking, applying cosmetics, or chewing gum or tobacco within any potentially contaminated area.
- Ignition of flammable materials at the site. Equipment will be bonded, grounded, and explosion resistant, as appropriate.
- Performance of tasks in the restricted area individually (i.e. working alone).

Personnel must keep the following guidelines in mind when conducting field activities:

- Hazard assessment is a continuous process; personnel must be aware of their surroundings and constantly aware of the chemical and physical hazards that are or may potentially be present.
- The number of personnel in the SZ or EZ will be the minimum number necessary to perform work tasks in a safe and efficient manner. The use of the Buddy System is mandatory for EZ work.
- Team members will be familiar with the physical characteristics of each site including wind direction, site access, and the location of communication devices and safety equipment.
- The location of overhead power lines and underground utilities must be established prior to conducting excavation or drilling activities.

15.2 PHYSICAL HAZARDS

15.2.1 HEAVY EQUIPMENT OPERATION

Heavy equipment will be operated under the following conditions according to EM 385-1-1, OSHA, and WESTON Field Operating Procedures.

- The operation of heavy equipment will be limited to authorized personnel specifically trained for this task.
- The operator will use the safety devices provided with the equipment, including seat belts. Backup warning indicators and horns will be operable at all times or a trained spotter will direct equipment operations.
- While heavy equipment is in operation, all personnel not directly required in the area will keep a safe distance from the equipment.
- Personnel will avoid moving into the path of operating equipment and areas blinded from the operator's vision will be avoided.
- Additional riders will not be allowed on equipment unless it is specifically designed for that purpose, i.e., there is an additional seat with a seat belt.
- The operator will document inspection of heavy equipment daily prior to operation.

15.2.2 MECHANICAL EQUIPMENT OPERATION

Operation of mechanical equipment presents another potential source for physical hazards and includes the following requirements, in addition to EM 385-1-1, OSHA, and WESTON Field Operating Procedures:

- Operation will be conducted by authorized personnel familiar with the machine, its operation, and safety provisions.
- Mechanical equipment will be inspected prior to use.
- Any equipment found to be defective in any manner will be removed from service and repaired prior to use.

- Hands, feet, etc., will be kept away from all moving parts.
- Maintenance and/or adjustments to machinery will be not conducted while in operation. Power will be disconnected prior to maintenance activities.
- An adequate operating area will be provided, allowing sufficient clearance and access for operation.
- Good housekeeping practices will be followed.

15.2.3 MATERIAL LIFTING

Many types of objects are handled in normal day to day operations. Care should be taken in lifting and handling heavy or bulky items because they are the cause of many back injuries. The following fundamentals address the proper lifting of materials to avoid back injuries:

- The size, shape and weight of the object to be lifted must be considered. A worker shall not lift more than one person can handle comfortably.
- A firm grip on the object is essential; gloves shall be used if necessary, to protect the hands.
- The hands and object shall be free of oil, grease and water, which might prevent a firm grip, and the fingers shall be kept away from any points that cause them to be pinched or crushed, especially when setting the object down.
- The item shall be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces and pinch points.
- The feet shall be place far enough apart for good balance and stability. The footing surface should be firm.
- The worker shall get as close to the load as possible. The legs shall be bent at the knees.
- The back shall be kept as straight as possible.
- To lift the object, the legs are straightened from their bending position.
- A worker shall never carry a load that cannot be seen over or around.
- When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees, back straight, and the object lowered.

In addition, relevant WESTON Field Operating Procedures shall be followed. When two or more workers are required to handle an object, coordination is essential to ensure that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, shall face the direction in which the object is being carried.

15.2.4 ELECTRICAL HAZARDS

Electrical wiring and apparatus safety procedures will be conducted in accordance with OSHA, EM 385-1-1, and WESTON Field Operating Procedures.

The requirements include, but are not limited to:

- All electrical wiring and equipment will be of a type listed by Underwriters Laboratories (UL) or Factory Mutual Engineering Corp. (FM) for the specific application.
- All installations will comply with the National Electrical Safety Code (NESC) or the NEC regulations.
- All work will be accomplished by personnel familiar with and qualified for the class of work to be performed.
- Live parts of wiring or equipment will be guarded to protect all individuals or objects from harm.
- Electric wire or flexible cord passing through work areas will be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, or pinching.
- Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment will be marked to indicate the maximum operating voltage.
- Patched, oil-soaked, worn, or frayed electric cords or cables will not be used.
- Extension cords or cables will not be fastened with staples, hung from nails, or suspended by wire.
- All electrical circuits will be grounded in accordance with the NEC.
- Portable and semi-portable electrical tools and equipment will be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Semi-portable equipment, floodlights, and work lights will be grounded. The protective ground of such equipment should be maintained during moving unless supply circuits are de-energized.
- Tools protected by an approved system of double insulation or its equivalent, need to be grounded. Double insulated tools will be distinctly marked and listed by UL or FM.
- Ground fault circuit interrupters (GFCIs) are required in all circuits used for portable electric tools. The GFCI will be calibrated to trip within the threshold values of 3-7 mA as specified in UL Standard 943. All GFCIs will be UL listed and installed in accordance with the most recent edition of the NEC. The permanent wiring will be electrical circuits grounded in accordance with the NEC. GFCIs may be sensitive to some equipment such as concrete vibrators. In these instances, an assured equipment grounding conductor program is acceptable.
- Flexible cord will be of a type listed by the UL. Flexible cord sets will contain the number of conductors required for the services plus an equipment ground wire. The cords will be hard usage or extra hard usage as specified in the NEC. Approved cords may be identified by the word "outdoor" or letters "WA" on the jacket.

- Bulbs attached to festoon lighting strings and extension cords will be protected by wire guards or equivalent unless deeply recessed in a reflector.
- Temporary wiring will be guarded, buried, or isolated by elevation to prevent accidental contract by workers or equipment.

15.2.5 PRESSURIZED HOSES

Observe the following rules when using hoses:

- Before use, inspect hoses for defects, cuts, loose clamps, improper fittings, etc.
- Never apply air from an air hose to any part of the body or clothing.
- Use only standard fittings for all hoses.
- All quick make up connections must be secured with safety lashing.

15.2.6 EXPLOSIVE ATMOSPHERE AND IGNITION SOURCES

Explosions and fires may arise spontaneously. However, more commonly, they result from site activities, such as moving drums, accidentally mixing incompatible chemicals, or introducing an ignition source (such as a spark from equipment) into an explosive or flammable environment. Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel on-site and members of the general public living or working nearby.

WESTON provides the following to protect against these hazards: monitoring is conducted for explosive atmospheres and flammable vapors using a combustible gas indicator; all potential ignition source are kept away from an explosive or flammable environment; non-sparking, explosion-proof equipment is used; and safe practices are followed when performing any task that might result in the agitation or release of chemicals. Some potential causes of explosions and fires include:

- Chemical reactions that produce explosion, fire or heat.
- Ignition of explosive or flammable chemical gases or vapors.
- Ignition of materials due to oxygen enrichment.
- Agitation of shock or friction-sensitive compounds.
- Sudden release of materials under pressure.

15.2.7 HAND TOOLS

Hand tools will be used according to EM 385-1-1, OSHA, and WESTON Field Operating Procedures. Only tools that are in good condition shall be used. Improper and defective tools contribute to accidents. The following safe practices shall be observed when using hand tools:

- Use tools in the manner for which they were designed.
- Be sure of footing before using any tool.
- Do not use tools that have split handles, mushroom heads, worn jaws, or other defects.

- Do not use makeshift tools or other improper tools.
- Use spark proof tools where there are explosive vapors, gases, or residue.

15.2.8 SANITATION

Applicable sanitation requirements are contained in EM 385-1-1, OSHA, and WESTON Field Procedures and include the following:

- Field office/break trailers will be equipped with power and water. At a minimum, washing facilities will be set up using handi-wipes or a suitable equivalent.
- Appropriate numbers of Port-a-Jons will be obtained. The units will be serviced as necessary.
- All work areas, to include the office/break trailer, will have trash receptacles. Areas will be kept free of trash and any equipment not being used will be removed and stored in the office/break trailer.

15.2.9 ILLUMINATION

Most work will be conducted during daylight hours. If field activities will be conducted from dusk until dawn, appropriate lighting will be supplied to allow illumination according to EM 385-1-1, OSHA, and WESTON Field Procedures.

15.2.10 HEAT STRESS

One of the most common types of stress that can affect field personnel is heat stress. Heat stress may be one of the most serious hazards to workers at waste sites due to the PPE required. Engineering controls should be considered as the first measure to be taken to reduce hazards rather than the donning of PPE.

Heat Stress Causes and Preventative Measures

Heat stress associated with hazardous waste operations is usually a result of protective clothing decreasing natural body ventilation and therefore cooling; however, it may occur at any time work is being performed at elevated temperatures. If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses that hazardous waste site workers encounter, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress. Site workers will adhere to the following procedures:

- Suggest workers drink 16 ounces of water prior to the start of work in the morning and during lunch. Provide water and disposable cups. Urge workers to drink 1-2 gallons per day. Provide a cool, preferably air-conditioned area for rest/breaks. Discourage the use of alcohol and discourage the intake of coffee during working hours. Monitor for signs of heat stress. If an individual has high blood pressure, he/she must be monitored more often and take precautions (i.e., drink more water).

- Acclimate workers to site work conditions by slowly increasing work-loads, i.e., do not begin site work activities with extremely demanding activities instead gradually work up to the more physically demanding tasks.
- Consider providing cooling devices to aid natural body ventilation. These devices add weight, however, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- Install showers and/or hose-down facilities to reduce body temperature and cool protective clothing.
- Ensure that adequate shelter is available to protect personnel against heat, as well as rain, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up the command post in a shady area protected from the wind.
- Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Individuals who notice skin problems should immediately consult medical personnel.

Specific symptoms, causes, preventive measures and first aid procedures for; heat stroke, heat exhaustion, heat cramps and heat rash are outlined in WESTON's Field OP (FLD05) Heat Stress Prevention and Monitoring.

Heat Stress Monitoring and Work Cycle Management

For field activities that are part of on-going site work activities in hot weather, the measurement of heart rate may be used to monitor the body's physiological response to heat and to manage the work cycle. Heart rate should be measured by the radical pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute for most individuals. The maximum rate is based on an individual's base rate. Base rates vary across the population. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats/minute.

Additional monitoring procedures, as outlined in FLd05 may be instituted as necessary.

15.2.11 COLD STRESS

Persons working in temperatures at or below freezing may be frostbitten. Experiencing extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body, which have high surface area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill describes the chilling effect of moving air in combination

with low temperature. For instance, 10 degrees Fahrenheit and a wind speed of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Frostbite includes local injuries resulting from cold. There are several degrees of damage.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature but can occur in milder temperatures when the victim becomes wet, typically from water immersion. Its symptoms are usually exhibited in various stages ranging from; shivering, apathy, listlessness, sleepiness, unconsciousness, glassy stare, slow pulse, slow respiratory rate and death.

Specific symptoms, causes, preventive measures and first aid procedures for cold-stress related injuries can be found in WESTON's Field OP (FLD06) Cold Stress.

15.3 BIOLOGICAL HAZARDS

15.3.1 TICK BITES

The Center for Disease Control (CDC) has noted the increase of Lyme Disease and Rocky Mountain Spotted Fever (RMSF), which are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma up to about one quarter inch and are sometimes difficult to see. The tick season extends from spring through summer Lyme disease has occurred in almost all states and is caused by ticks, which have become infected with a type of spirochete bacteria. Standard field gear (work boots, socks and light-colored coveralls) provide good protection against tick bites, particularly if the joints are taped. The following precautions should be taken when working in areas that might be infested with ticks:

- When in the field, check yourself often for ticks, particularly on your lower legs and areas covered with hair. Look for "a freckle that moves".
- Spray outer clothing, particularly your pant legs, crotch, boots, and socks, BUT NOT YOUR SKIN, with an insect repellent that contains permethrin or permanone.
- Follow manufacture's instructions if using an insect repellant on the skin. For sampling activities be aware of potential cross contamination of samples.
- When walking in wooded areas, avoid contract with bushes, tall grass, or brush as much as possible.
- If you suspect that a tick is present, remove it with tweezers only, and not with matches or a lit cigarette. Grasp the tick near the head with the tweezers and pull gently. Do not use nail polish or any other type of chemical. Be sure and remove all parts of the tick's body. Once removed, disinfect the area with alcohol or a similar antiseptic. Keep the tick in a plastic bag and report the incident to the SHSO.

- Look for signs of the onset of Lyme disease, such as a rash that looks like a bulls eye or an expanding red circle surrounding a light area, frequently with a small welt in the center. This rash can appear from several days to several weeks after the tick bite.
- Also look for signs of the onset of RMSF, an inflammation which is visible in the form of a rash comprised of many red spots under the skin, which appears 3 to 10 days after the tick bite. The rash frequently occurs on the ankles and wrists.
- The first symptoms of either disease are flu like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

If any of the signs and symptoms noted above appear, contact the SHSO. Consult with a physician for an examination and possible treatment.

15.3.2 SNAKES

If bitten by a snake, remain calm and keep the affected area below the level of the heart and walk, do not run, to the nearest aid station for assistance. The SHSO will immediately transport the victim to the closest medical facility for treatment or send for appropriate medical assistance, whichever is faster.

THE USE OF SNAKE BITE KITS IS NOT AUTHORIZED. If at all possible, the snake should be identified to assure prompt medical treatment by the physician.

15.3.3 POISONOUS PLANTS

Site personnel will need to be alert to the presence of poisonous plants. The most common type of poisonous plant on site is poison oak, which has been found at Landfills 2 and 17. Skin contact with poison can cause skin sensitization resulting in reddening, swelling and itching of the affected areas. Skin exposure can result from either direct contact with the plant or contact with clothing/equipment previously exposed to the plant.

Site personnel will receive training in the recognition of poison oak and methods for preventing exposure during the site specific safety briefing.

15.3.4 ANIMAL OR INSECT BITES

Animal bites or stings are usually nuisances (localized swelling, itching, and minor pain) that can be handled by first-aid treatment. The bites of certain snakes, lizards, spiders, and scorpions contain sufficient poison to warrant medical attention. In addition, there are several species of caterpillars that contain stinging hairs which may cause a rash on contact or respiratory distress if the hairs are inhaled.

There are diseases that can be transmitted by insect and animal bites (e.g., Rocky Mountain spotted fever, Lyme disease [tick], rabies [mainly dogs, skunks, raccoons, and foxes], malaria, and equine encephalitis [mosquitoes]). The greatest hazard and most-common cause of fatalities from animal bites, particularly bees, wasps, and spiders, is from a sensitivity reaction. Shocks due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous systems, which also can result in death.

Employee having a history of allergic reactions to bites will be required to have their prescribed treatment with them and notify first aid personnel where it is located. All stings or bites will be taken seriously. Anyone stung or bitten will be required to stop work while that person is observed for signs of severe swelling, shortness of breath, nausea, or shock. If there is any doubt, medical attention will be obtained.

All wild animals are to be avoided, particularly wild animals that are unusually passive or aggressive. Any such animals will be reported to appropriate site personnel. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm-blooded animal could be infected. If an individual is bitten by an animal suspected of rabies infection, an attempt will be made to keep the animal under surveillance until appropriate assistance is called to take care of the animal. The animal should then be tested. A dead animal suspected of infection should also be preserved and tested. Health departments are often sources of testing or obtaining information about where testing can be done. The bite area should be washed with soap and water and disinfected with 70% alcohol as quickly as possible, followed by treatment by a doctor or emergency room. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Hence, prompt medical attention and determining whether the animal that has bitten you is infected are very important. Rabies is not curable once symptoms or signs appear.

15.4 CONFINED SPACE OPERATIONS

A confined space is potentially any space which meets the following characteristics:

- Is large enough and so configured that an employee can enter and perform assigned work.
- Has limited or restricted means of entry or exit.
- Is not designed for continuous human occupancy.

A permit space additionally has the following characteristics:

- Contains or could potentially contain a hazardous atmosphere.
- Contains a material that could potentially engulf the entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated.
- Contains any other recognized serious safety or health hazard.

No confined space operations are planned for this project. WESTON's Confined Space Program, can be found in the Site Safety Officer's Manual maintained on-site.

15.5 EXCAVATION OPERATIONS **(NOT APPLICABLE TO THIS SSHASP)**

In accordance with OSHA requirements, all excavation activities will be in compliance with 29 CFR 1926 Subpart P and USACE EM 385-1-1, Section 25. Specific requirements include routine inspections by qualified competent personnel to verify safe work conditions,

location of utilities, and appropriate worker knowledge of safe work practices. Section 14 contains detailed buried utility and excavation safety requirements.

16. SITE FIELD LOG BOOKS

A Major Permanent Job Record

- If completed in the recorder's handwriting, this document can be entered into a court of law without the person present.
- Entries should be legible and made in permanent ink.
- Errors shall be crossed out and initialed. Do not use white out or correction tape.
- Site Field Log Books shall be bound with sequentially numbered pages.
- Complete and maintain Site Field Log Books in accordance with survey plan instructions.
- Turn completed Site Field Log Books into the SRM or Project Engineer for storage as a permanent record of daily activities.

What to Record

- Survey Unit(s) being worked on a daily basis
- Location and type of elevated level area (by grid and survey unit for the site)
- Total samples taken (by grid and survey unit)
- Purchases - the Site Field Log Book can be used to substantiate a billing claim.
- Status - the Site Field Log Book becomes a record of the project status on any particular date.
- Production progress or major events should be recorded.

Examples of Normal Events to Record

- Name, assignment and hours of crew members.
- Names and affiliation of any visitors.
- Summary of daily activities.
- Instructions from Project Manager, Project Engineer, SRM or SHSO.
- Samples or tests performed (i.e., air monitoring) record equipment serial numbers and results.
- Decontamination activities, vehicles or equipment removed from the site.
- Problems include discussion and resolution.
- Deviations from the work plan or other governing document (i.e., PPE changes) include authorization.
- Sample shipments: destination, weights, containers, hailers, manifests, etc.

- Confined Space Permits, record permit and test results.
- Documentation of required inspections: daily briefing or daily equipment inspections.
- Documentation of all required safety training for special equipment used on site.

Examples of Unusual Events to Record

- Material deliveries.
- Growth or changes in work scope.
- Delays – anything effecting schedules or cost.
- Weather – rain, wind, storms, etc.
- Obstructions, conflicts, or disruptions.
- Accidents and near misses.
- Inspections – local and agency.
- Unusual work problems with discussions and solutions.
- Unexcused absences or tardiness.
- Visitors to the site - any observation noted.

FIGURE 3 - BATTERY CHARGING PROCEDURE

Inter-Office Memorandum
Vallejo Office

TO: **All MCAS El Toro WESTON Employees** *SER:* **00-11-02**

FROM: **G. Rodgers - Safety Officer** *DATE:* **11 December 2003**

SUBJECT: **WESTON VCA Battery Charging Procedures**

References: (a) Title 8 CCR 5185. Changing and Charging Storage Batteries.

Enclosure 1. - Title 8 CCR 5185. Changing and Charging Storage Batteries

In addition to adhering to the Cal OSHA (minimum) requirements specified for this operation, Weston VCA has determined that the following PPE shall be used and maintained by all employees when charging wet cell storage batteries:

PPE

- Employees shall wear safety glasses with face shields when placing batteries on and off the charger.
- An eyewash station shall be located within 25 feet of the battery charging location.

KEY ELEMENTS TO CAL OSHA REGULATIONS

- Only designated trained persons shall change or charge batteries.
- Battery charging shall be performed only in areas designated by the employer.
- Smoking and other ignition sources are prohibited in charging areas.
- Filler - vent caps shall be in place when batteries are being moved.

- Parking brakes on mobile equipment shall be applied before batteries are charged or changed.
- When a jumper battery is connected to a battery in a vehicle, the ground lead shall connect to ground away from the vehicle's battery. Ignition, lights and accessories on the vehicle shall be turned off before connections are made. The battery compartment cover(s) shall be open to dissipate heat.
- Batteries shall be free of corrosion buildup and cap vent holes shall be open.
- The area shall be adequately ventilated to prevent concentrations of flammable gases exceeding 20 percent of the lower explosive limit, and to prevent harmful concentration of mist from the electrolyte.
- Facilities for flushing the eyes, with water shall be provided wherever electrolyte is handled, except that this requirement does not apply when employees are only checking battery electrolyte levels or adding water.
- Battery handling equipment which could contact battery terminals or cell connectors shall be insulated or otherwise protected.
- Metallic objects shall not be placed on uncovered batteries.
- When batteries are being charged, the vent caps shall be in place.
- Chargers shall be turned off when leads are being connected or disconnected.
- Installed batteries shall be secured to avoid physical or electrical contact with compartment walls or components.

The below listed personnel have been trained and are authorized to change and charge storage batteries.

By my signature below, I acknowledge that I have read and understand the contents of this memo and the referenced document, and I agree to perform my duties accordingly.

Name	Signature	Date
Bruce Christensen		
Andy Rutkovskis		
Cirilo Lacson		
Charles Bouffard		

Citation = California Regulations|Title 8|Division 1|

Chapter 4|Subchapter 7|Group 16|Article 109

Date_published = 1985-07-08

Subject = Health & Safety|hazardous substance|safety|compliance|battery|emergency|training|ventilation|spill|materials handling|prohibition|equipment|

Title = 5185 Changing and Charging Storage Batteries

(a) Battery charging installations shall be located in areas designated for that purpose. Employees assigned to work with storage batteries shall be instructed in emergency procedures such as dealing with accidental acid spills.

(b) The area shall be adequately ventilated to prevent concentrations of flammable gases exceeding 20 percent of the lower explosive limit, and to prevent harmful concentration of mist from the electrolyte.

(c) Where corrosive liquids are regularly or frequently handled in open containers or drawn from reservoirs or pipelines, adequate means shall be provided to neutralize or dispose of spills and overflows promptly and safely.

(d) Carboy tilter, siphon, hand-operated bulb or hand-operated pump shall be provided and used for dispensing electrolyte or acid.

(e) Facilities shall be provided for protecting charging apparatus from damage by mobile equipment.

(f) Appropriate mechanical lifting and material handling devices or equipment shall be provided for handling batteries.

(g) Smoking shall be prohibited in the charging area.

(h) Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas. When racks are used for support of batteries, they shall be made of materials nonconductive to spark generation or coated or covered to achieve this objective. Tools and other metallic objects shall be kept away from the top of uncovered batteries. Chargers shall be turned off when leads are being connected or disconnected.

(i) Electrolyte (acid or base, and distilled water) for battery cells shall be mixed in a well ventilated room. Acid or base shall be poured gradually into the water while stirring. Water shall never be poured into concentrated (greater than 75 percent) acid solutions.

(j) Mobile equipment shall be properly positioned and brake applied before attempting charge batteries.

(k) When charging batteries, the vent caps shall be kept firmly in place to avoid electrolyte spray. Care shall be taken to assure that vent caps are functioning. The battery compartment cover(s) shall be open to dissipate heat.

(l) Facilities for quick drenching or flushing of the eyes and body shall be provided unless the storage of batteries are:

(1) equipped with explosion resistant or flame arrestor type vents; or

(2) located in a compartment or other location such as to preclude employee exposure.

EXCEPTION: Automotive servicing facilities and parts stores where:

1. A suitable neutralizing agent is available.

2. An adequate supply of clean water is readily available.

3. The transfer system is essentially a closed system and does not involve handling acid in open containers.

(m) When taking specific gravity readings, the open end of the hydrometer shall be covered with an acid resistant material while moving it from battery to battery to avoid splashing or throwing the electrolyte.

(n) Electrolyte shall only be placed in suitable containers and shall not be stirred with metal objects.

(o) When a jumper battery is connected to a battery in a vehicle, the ground lead shall connect to ground away from the vehicle's battery. Ignition, lights and accessories on the vehicle shall be turned off before connections are made.

(p) Vent caps shall be in place when batteries are being moved.

EXCEPTIONS: Portable equipment battery systems: Batteries and battery charging equipment of less than 100 watt hours are exempt.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY:

1. New section filed 2-13-75; effective thirtieth day thereafter (Register 75, No. 7).

2. Repealer of subsections (i) and (n) and new subsections (i), (n), (o), (p), and (q) filed 11-12-75; effective thirtieth day thereafter (Register 75, No. 46).

3. Amendment of subsections (k) and (1) filed 10-5-77; effective thirtieth day thereafter (Register 77, No. 41).

4. Renumbering of Section 5214 to Section 5185 filed 5-3-78 as procedural and organizational; effective upon filing (Register 78, No. 18).

5. Amendment of subsection (h) and new subsections (r) and (s) filed 12-12-84; effective thirtieth day thereafter (Register 84, No. 50).

6. Amendment filed 7-8-85; effective thirtieth day thereafter (Register 85, No. 28).

Safety Meeting Sign-Off Sheet

(To be completed each day/shift prior to beginning work)

The Task Safety Analysis Card has been reviewed and completed for all recognized hazards.

_____ _____

Site Supervisor / Site Safety Officer Signature* Date

*The Site Supervisor / Safety Officer certifies by signature that a comprehensive Site Hazard Assessment was performed on this date and the PPE requirements and the communication of all hazard information was performed. This process will be repeated at subsequent Safety Meetings and as site conditions change by revising the card.

Underground and overhead utilities	Yes_____	No_____
Hospital Route:	Yes_____	No_____
Poison Control Center:	Yes_____	No_____
Water faucet locations:	Yes_____	No_____
Fire hydrant locations:	Yes_____	No_____

Attendees:

Team Members:

Name (Print)	Signature	Date

Visitors:

Name (Print): _____ Affiliation: _____

Signature: _____ Date: _____

Name (Print): _____ Affiliation: _____

Signature: _____ Date: _____

Name (Print): _____ Affiliation: _____

Signature: _____ Date: _____

Personal Protective Equipment Used

Note: This form is to be completed at initiation of the project. Or; when a change in work conditions requires a change in PPE. This form is to be attached to Safety Meeting Sign off Sheet.

Work Description:_____

Level C PPE may include, but is not committed or limited to, the following as appropriate:

Respirator: Check appropriate

[ ] Half Mask	[ ] PAPR	[ ] HEPA(P100)	[ ] Other_____
[ ] Full Face	[ ] Negative Pres.	[ ] Organic Vapor	(describe)
[ ] Hood	[ ] Supplied Air	[ ] Acid Gas	

If air-purifying respirators are designated for VOC's - cartridge change out shall be as follows:

[ ] Every 8 hrs for unidentified VOC's @ < 5 ppm–expressed as benzene, detected with PID.

[ ] Every 4 hrs for unidentified VOC's @ < 10 ppm-expressed as benzene, detected with PID.

[ ] Hooded chemical-resistant clothing (disposable chemical-resistant overalls).
[ ] Coveralls (Tyvek).
[ ] Gloves, outer, chemical-resistant (Latex).
[ ] Gloves, inner, chemical-resistant.
[ ] Boots, outer, chemical-resistant steel toe and shank.
[ ] Boot-covers, outer, chemical-resistant (disposable).
[ ] Hard hat (under suit).
[ ] Escape mask.
[ ] Face shield with safety glasses
[ ] Safety glasses

Level D PPE may include, but is not committed or limited to, the following as appropriate:

[ ] Coveralls_____ (Tyvek, Saranex.
[ ] Gloves _____(Latex, Nitrile, Butyl, Niton.
[ ] Boots/shoes, chemical-resistant, steel toe and shank.
[ ] Boots, outer, chemical-resistant (disposable).
[ ] Hard hat.
[ ] Escape mask.
[ ] Face shield with safety glasses
[ ] Chemical splash goggles with face shield

Additional equipment required for each level of protection is as follows - (Check or write in)

	Level C	Level D
Hearing Protection Single = S / Double =D		
Meta-tarsal Guards		
Full body harness		
Other (list appropriate)		

Site Safety Officer:_____

Signature Date

Supervisor Verification of Worker Training

The Site Foreman acknowledges by signature that the participating worker(s) have the required training and skills to operate the equipment required for the task(s) assigned, including all appropriate personnel protective equipment and that certification of training is current with assigned task date(s). If more than one supervisor oversees the completion of this work document each shall sign for the dates he/she was in responsible charge.

Verification of Worker Training Signoff Sheet

Worker Assigned	Dates Assigned	Supervisor
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______
Name: ______ Empl. No.: ______ Date: ______	Beginning: __/__/__ Ending: __/__/__	Name: ______ Empl. No.: ______ Date: ______

Site Specific Health and Safety Plan
MCAS El Toro - Radiological Survey
Contract No. N68711-01-D-6010; DO 0002

INSTRUCTIONS: This form is to be completed by each person prior to beginning work. The supervisor is responsible for providing training on all appropriate sections of referenced documents, which shall be maintained at the work site.

Work Order No.: _____

Project: _____

Location: _____

By my signature below, I acknowledge that I have read and understand the contents of the Site-Specific Health & Safety Plan, the Health and Safety Plan, the Emergency Response and Contingency Plan, in addition to all relevant sections of all referenced documents; and I agree to perform my duties accordingly.

Name		Signature Date

cc: WESTON Project Engineer, Weston Vallejo Site Office

UTILITIES SITE SAFETY FORM

Site: _____

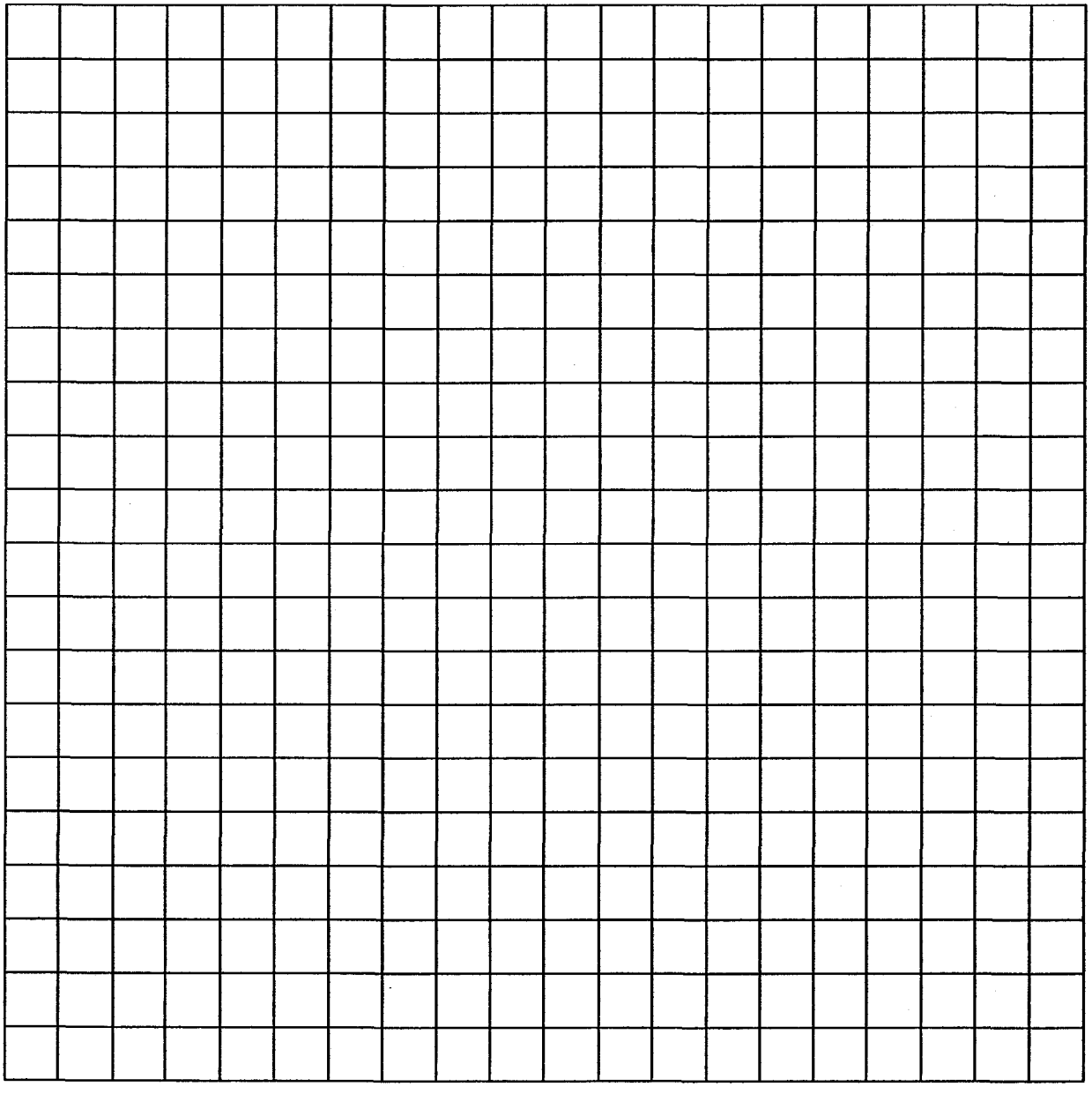
UTILITY	HAZARD TO WORK	VULNERABLE TO DAMAGE	POLLUTION HAZARD	LOCATION	DATE	SIGNATURE
Fiber Optic Local Area Network (LAN) Conduit	No	Yes	No			
Firefighting High-Pressure Mains	Yes	Yes	No			
Fresh Water Piping	Yes	Yes	No			
Fuel Oil Distribution Piping (inactive)	Yes	Yes	Yes			
High-Pressure Compressed-Air Piping*	Yes	Yes	No			
High-Voltage Above-Ground Electric Power*	Yes	Yes	No			
High-Voltage Underground Electric Power	Yes	Yes	No			
Industrial Wastewater Treatment Sewer Piping	Yes	Yes	Yes			
Natural Gas Piping*	Yes	Yes	No			
Saltwater Piping	Yes	Yes	No			
Sanitary Sewer Piping	Yes	Yes	Yes			
Steam Condensate Piping*	Yes	Yes	Yes			
Steam (hot) Piping*	Yes	Yes	Yes			
Storm Water Sewer Piping	No	Yes	No			
Telephone Lines	No	Yes	No			
Wheeler Vacuum System Piping	No	Yes	Yes			
Other:						

The Site Foreman or his designee shall complete this form and a hand-drawn sketch of the utilities USA identifies as present on the site. Include pipe size. (Note: Sketch may be drawn on Sheet 2 or a blank piece of paper).

* Record owner/operator point of contact stipulating that utility cannot be DE-ENERGIZED.
USA Control Number: _____

UNDERGROUND UTILITY LOCATION SKETCH

Company: _____ Point of Contact: _____ Date: _____
Location: _____ Phone: _____
Description: _____ Fax: _____



Appendix B

Standard Operating Procedures

ISOLAB – 5: Preparation, Custody and Analysis of Radiological Samples

ISOLAB – 10: Radiation Detection Instrument General Operation and Performance

Weston Solutions, Inc.

ISOLAB - 05

STANDARD OPERATING PROCEDURE

PREPARATION, CUSTODY, AND ANALYSIS OF RADIOLOGICAL SAMPLES

Date: 10/10/03

List of Effective Pages

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Enclosure 1 (page 1 of 1)	2	0
Enclosure 1 (page 1 of 2)	2	0
Enclosure 2 (page 1 of 1)	2	0
Enclosure 3 (page 1 of 1)	2	0
Enclosure 4 (page 1 of 6)	2	0
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Enclosure 4 (page 5 of 6)	2	0
Enclosure 4 ~~(page 5 of 6)~~ (Page 6 of 6)	2	0

CHANGE SUMMARY

Revision ORIGINAL dated 4/20/98
Revision 1 dated November 2000
Revision 2 dated October 2003

Weston Solutions, Inc. - Mare Island Site Office
P.O. Box 2135
Vallejo, CA 94592-0135

STANDARD OPERATING PROCEDURE
PREPARATION, CUSTODY AND ANALYSIS OF RADIOLOGICAL SAMPLES

PURPOSE

To provide procedures for the transfer and custody of General Radioactive Material (G-RAM) Radiological samples from time of collection until sample placement in long-term storage after analysis. This document is to be used by all sampling, transportation, counting and storage personnel.

SCOPE

This procedure is based on procedure and used by Supervisor of Shipbuilding and Repair, Portsmouth, VA (SSPORTS) since April 1, 1996. This instruction establishes the requirements for preparation, control and analysis of radiological samples taken for G-RAM analysis.

GENERAL INFORMATION

Samples collected must be traceable from the time they are collected through the analysis phase, during the retention period and until they are disposed of properly. To maintain and document sample possession, chain of custody procedures specified in the methods section shall be followed.

Sample Custody - All samples collected are to be maintained under secure conditions. In general, as few people as possible should be part of the chain of custody. A sample is under custody if:
-It is in your possession.
-You secured the sample in an appropriate container in a secure location, awaiting transporting for testing.
-You transferred the sample to authorized person for analysis.
-It is held in a secure area.

Transfer of Custody - Samples are accompanied by a chain of custody form, Enclosure (1) or equivalent. When transferring the possession of samples, the individual relinquishing and the individual receiving will sign, date, and note the time on the record (This may be the same person). This documents the sample custody transfer.

Counting Lab Site Control - In the Counting Lab Site, samples may be handled and moved only by authorized personnel. Anyone else must sign a chain of custody form. The Counting Lab Site shall be maintained as a secure area.

Damaged samples - If a sample container is discovered to be damaged at any stage in the sampling, counting or storage process the individual who discovers the damaged sample shall document the condition.

Sample types - Various types of sample containers are used for G-RAM samples. Where different procedures and requirements are container specific they will be identified in this instruction; when not specified the requirements contained in this instruction apply to all of the sample containers used for G-RAM sampling.

1.0: EQUIPMENT

No special equipment is required to maintain sample custody and control.

2.0: MATERIAL

2.1 FORMS. The forms mentioned in this process instruction are listed below.

2.1.1 CHAIN OF CUSTODY FORM (Enclosure 1)

2.1.2 RADIOLOGICAL SAMPLE TAG (Enclosure 2)

2.1.3 SAMPLE TRACKING SHEET (Enclosure 3)

2.2 CONTAINERS

2.2.1 TYPICAL SAMPLING CONTAINERS AND METHODS OF SEALING CONTAINERS (Enclosure 4)

3.0: TRAINING

3.1 GENERAL TRAINING. All personnel performing work under the scope of this instruction shall be trained in its use.

3.1.1 At a minimum, the training shall include handling of radioactive materials and information contained in this procedure.

4.0: QUALITY ASSURANCE

4.1 SURVEILLANCE.

4.1.1 Surveillance inspections regarding the procedures of this instruction shall be performed

4.2 AUDITS.

4.2.1 Audits for conformance to this instruction shall be conducted periodically.

4.2.2 Radiological supervisor shall conduct investigations to determine causes of deficient conditions and nonconformance to required procedures. Corrective actions shall then be taken to prevent recurrence.

5.0: METHOD

5.1 Prepare binder, folder, or file for each applicable Work Plan (WP): for the site, the Counting Laboratory Site/storage area. The files will be divided into alphanumeric sections based on the WP survey units (building, site, etc.) numbers.

5.2 Samples shall be obtained in accordance with the applicable WP. The sample shall be dry (if material is damp, it shall be set aside to dry) prior to sealing and shipping. The person sealing the sample container shall use black, 1-inch tape to seal the sample containers, except for Zip-Loc containers. Samples will be taped in accordance with Enclosure (4). Samples that are collected in Radon cans shall be placed in a zip-loc bag and shall have the label attached over the top of the bag.

5.2.1 If sediment samples are required, collect at least two samples, obtaining the maximum amount of sediment into each container. Allow samples to settle for 24 hours and carefully pour off excess liquid. During this in-process sampling period, the samples may be moved and stored in another area to accomplish the settling, removal of liquids, and transfer of sediment into a single container. This is considered part of the sampling process and therefore chain-of-custody procedures are not required at this time. Each container should have a preliminary label affixed to it for identification purposes. Use the label, Enclosure (2) or equivalent, and mark it as "PRELIMINARY". The preliminary label may be broken without voiding the sample. The containers should be stored in a secured area. Combine sediment into one full container for analysis. Repeat the settling, pouring off of excess liquid, and addition of sediment steps at least once more to attain sufficient sample material. After an additional 24-hour wait, the sample is ready for counting and should be sealed, taped, labeled and handled per the chain of custody requirements of this instruction. The excess liquid and sediment may be discarded.

5.3 When the sample is obtained, fill out the applicable portions of the chain of custody form, Enclosure (1) or equivalent. Fill out the label , Enclosure (2) or equivalent, and affix it to the sample container/packaging. If the sample is being drawn from the same grid as a previously drawn sample (i.e., repeat sample), ensure the grid identification number on the label is noted as such.

5.4 Sign the chain of custody form to release the sample to the transporter, who signs the chain of custody form or include the chain of custody form in the shipping container.

5.5 Transport (or ship) the samples and the chain of custody forms to the Counting Lab Site.

5.6 Responsible laboratory personnel sign the chain of custody form as the receiver upon arrival at the Counting Lab Site. For samples analyzed by Weston, the Counting Lab instructions contained in Addendum 1 should be used in addition to the instructions below.

5.7 Laboratory personnel shall enter the chain of custody forms in the Counting Lab records.

5.8 Laboratory personnel are responsible for keeping the samples segregated.

5.9 The assigned counting personnel are responsible to count the sample and fill out the applicable records and sample label with counting results.

5.9.1 **Solid samples** will normally be analyzed for the following:

Gamma Spectroscopy – Using EPA Method 901.1
Gross Alpha-Beta – Using EPA Method 900.0

If results of gross beta analysis indicate elevated beta levels, the following analysis may also be performed:

Total Strontium (Sr-89/90) – Using EPA Method 905.0

5.9.2 **Swipe samples** are contained in zip-loc bags and will normally be analyzed for alpha and beta particles. The assigned counting personnel, wearing gloves, will carefully remove the swipe from the bag for analysis. Swipe sample analysis will be performed using EPA Method 900.0. When sample analysis is complete, the zip-loc bag shall be resealed, with signature of individual that performed the analysis and the date of the analysis.

5.9.3 For solid samples, if the sample analysis results are greater than or equal to the concentration levels defined in the radiological survey procedure, the assigned counting personnel shall contact Weston radiological supervisor and treat the sample as radioactive material. When the sample is shipped

to a radiological storage facility it shall be in accordance with applicable radioactive transportation requirements. The chain of custody form shall also be used as described in steps 5.12, 5.13 and 5.14 below.

5.9.4 For swipe samples, if the sample is greater than the criteria specified in the applicable Weston Survey Plan, the assigned counting personnel shall notify the appropriate radiological supervisor. When the sample is shipped the chain of custody form shall be used.

5.10 Laboratory personnel are responsible to return samples to a controlled area after being counted prior to shipping to a suitable storage or disposal area.

5.11 Weston Solutions, Inc. complete final review of sample results sheets for the samples prior to shipping samples from the Counting Lab Site.

5.12 Counting laboratory personnel transport samples when they are ready for shipping from the counting site to the storage or disposal area located remotely from the counting site.

5.13 Counting laboratory personnel sign the chain of custody form to release the sample to transporter, who signs the custody form and transports the samples and the chain of custody forms to the storage or disposal area.

5.14 The receiver at the storage area signs the chain of custody form. If the sample is to be disposed of, applicable manifests will be generated. Note that samples will not be disposed of without authority, in writing, from Weston Radiological Group.

5.15 Enter the chain of custody forms in the storage area records. If sample is disposed of, return forms to Weston Radiological Group.

5.16 Receiver is responsible for logging in, and for storing the samples in the storage area such that they may be accessed, if required, for additional analysis.

5.17 When requested to be shipped, the originator will prepare documentation (Receipt for Samples) for sample transfer. This consists of attaching a copy of the completed chain of custody form for each sample requested to be shipped.

5.17.1 The shipper signs the Receipt for Samples form to release the sample to the agency representative who signs the Receipt for Samples form as the receiver.

5.17.2 The shipper annotates the log that the agency has taken possession of the sample.

5.19 The sampling laboratory is responsible for final disposition of samples.

5.20 Once a WP has been completed, as indicated in writing by Weston Radiological Group, the sample tracking sheets for that WP may be disposed of.

5.21 If resampling is required DO NOT USE the same identification as the original sample. Using the same identification can cause loss of the original sample results on the computer. In addition when recalling samples at a later date there would be two samples with the same identification. Obtain concurrence from the Weston Radiological Group as to method of identifying resamples (use "R" or other distinct designator).

Enclosure (1) – Typical Chain of Custody Forms (equivalent forms may be used)

WESTON CHAIN OF CUSTODY FORM		
SAMPLED BY:	SITE ID NO.: LOCATION:	DATE/TIME:
SAMPLE NUMBER	BLDG # OR SURVEY LOCATION	SAMPLE GEOMETRY & MATERIAL
RELEASED BY: DATE/TIME:	ESCORTED BY: DATE/TIME:	RECEIVED BY: DATE/TIME:
RELEASED BY: DATE/TIME:	ESCORTED BY: DATE/TIME:	RECEIVED BY: DATE/TIME:
RELEASED BY: DATE/TIME:	ESCORTED BY: DATE/TIME:	RECEIVED BY: DATE/TIME:
RELEASED BY: DATE/TIME:	ESCORTED BY: DATE/TIME:	RECEIVED BY: DATE/TIME:
COMMENTS: STORAGE LOCATION: _____		

ISOLAB-05
REV. 2

Chain-of-Custody Form (Pace Analytical Laboratories)

Project Number: 12954.002.002.0028	Project Name: MCAS El Toro						Request for Analysis							Chain of Custody Number:
Sampler's *(Signature)*														Page 1 of 1
Field Sample ID	Data	Time	Comp.	Grab	Sample Location	No. of Containers	Gamma Spec. EPA-901.1	Gross Alpha - Beta EPA 900.0	Total Strontium EPA-905.0					Additional Requirements
Reliquished by: *(Signature)*					Date and Time:	Received by: *(Signature)*								Date and Time:
Reliquished by: *(Signature)*					Date and Time:	Received by: *(Signature)*								Date and Time:
Reliquished by: *(Signature)*					Date and Time:	Received by: *(Signature)*								Date and Time:
Comments, special instructions: P.O. No.														For Laboratory Use Only

RADIOLOGICAL SAMPLE TAG

SAMPLE VOID IF SEAL BROKEN

FACILITY_____

GRID IDENTIFICATION NO._____

SAMPLE OBTAINED BY_____
NAME / ID#

SAMPLE DATE/TIME_____ NET WT._____
(gms)

SAMPLE COUNTED DATE/TIME_____

SAMPLE VOID IF SEAL BROKEN

CUSTODY SEAL
Date:_____
Signature:_____

SAMPLE VOID IF SEAL BROKEN

Note: These are examples; actual tags may vary

WESTON SAMPLE TRACKING SHEET

BLDG # or SURVEY SITE and LOCATION (i.e. MCAS El Toro) _____

Sample ID Number	Date Sample Obtained	Sample Geometry	Sample Material	Date Counted	Sample Location	

TYPICAL SAMPLING CONTAINERS AND METHODS OF SEALING CONTAINERS

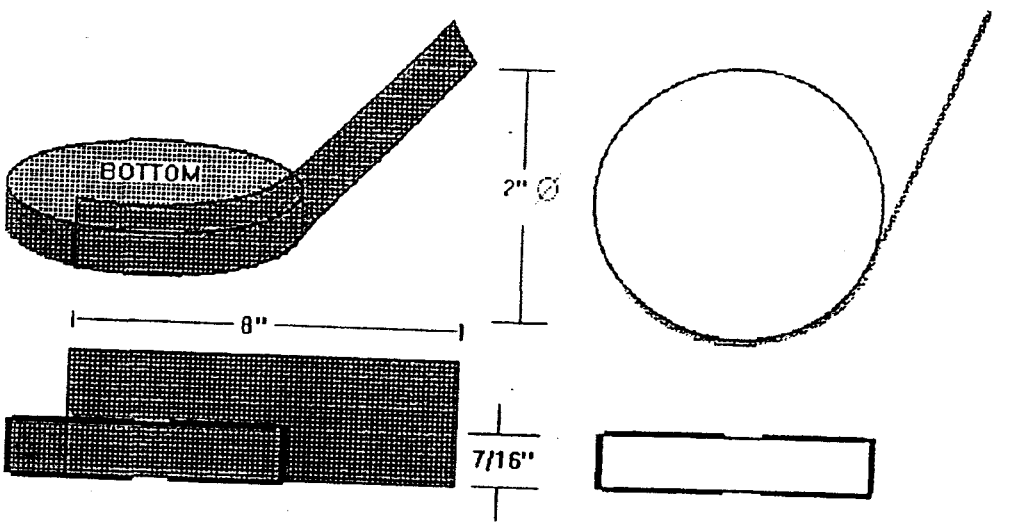
1). GENERAL RADIOLOGICAL SAMPLE CONTAINERS:

a.) Sample containers may be provided by Weston Solutions or by an approved Sampling Laboratory.
b.) Sampling containers shall be constructed of inert, impervious materials such as plastic, polyethylene, etc. and shall be capable of being securely sealed.
c.) Sample identification marking shall normally be affixed to the outside of the container (see Note).
c.) If commercially available containers, such as Zip-Loc bags are used, they shall be heavy-duty construction and the sample shall be double bagged, with sample information marking on the outer bag.
d.) If the container may become damaged during shipping, it will be packaged in suitable packing material to avoid damage.

Note: Dry swipe sample will normally be stored in clear Zip-Loc type plastic baggies. If swipe samples contain an area where sample identification markings may be affixed, and such markings are visible through the storage container, additional markings on the outside of the storage container are not required.

2). SAMPLE OF TAPING SINGLE PETRI DISHES

a.) Use 1" black pipe tape 8 inches long.
b.) Attach tape flush, don't overlap, to top of dish.
c.) Overlap remaining tape on bottom of dish.
d.) The nominal 9.9g size petri may be identified by the glazed area which covers approximately 2/3's of the bottom, or by the tiny nipple point within one or more of the four quadrant notches lying on the outside perimeter of the cover. Alternately, this size petri may be identified by the absence of the small, approximately 1/8" circles lying just within the four quadrant notches lying on the outside perimeter of either top or bottom.
e.) The nominal 7.9g size petri may be identified by the 1/4" width glazed ribbon covering 1/3 of the circumference on the bottom, or by the small, approximately 1/8" circle lying just within the four quadrant notches lying on the outside perimeter of the top or bottom covers.
f.) If any petri is received obviously differing from that described above, obtain Counting Lab concurrence prior to using.
g.) Package the single petri in a consistently sized zip-lock bag such as 6"x6".

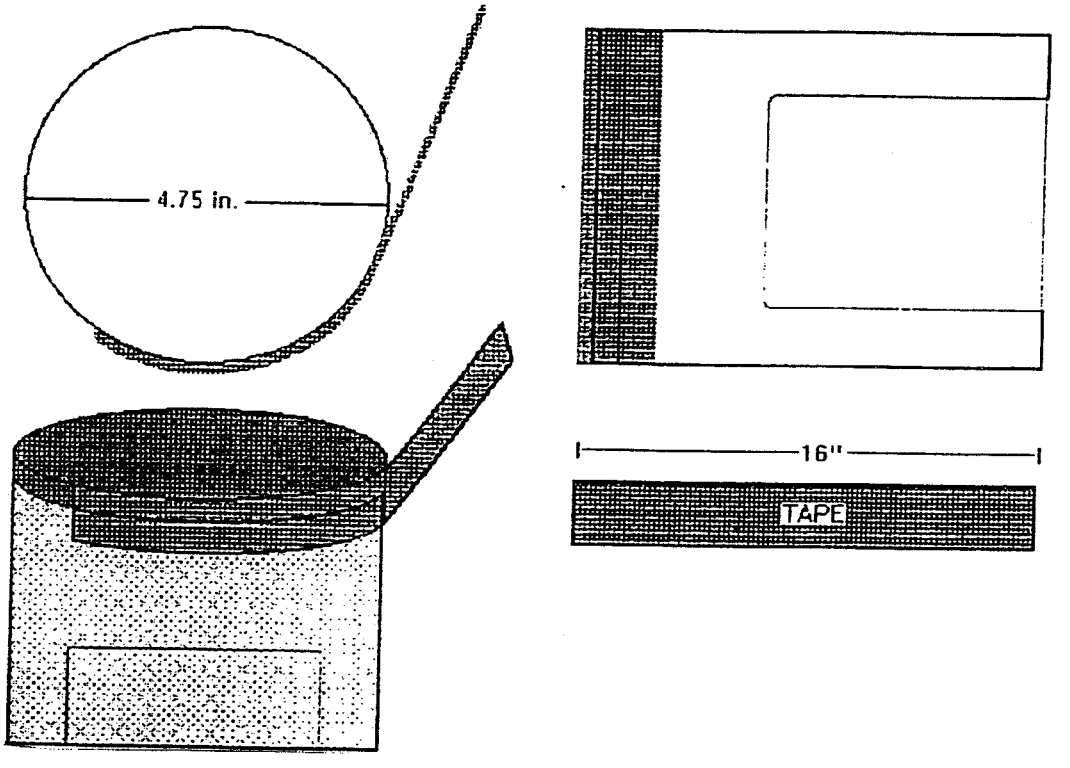


3). SAMPLE OF TAPING A DOUBLE PETRI DISH

a.) Use 1" black pipe tape 8 inches long.
b.) Check to assure both petri dishes are of the same type and weight.
c.) Assemble both dishes bottom to top together. They should fit or key together without slipping.
d.) Attach tape flush with the top cover of one dish, overlapping the bottom of the second dish.
e.) The nominal 9.9g size petri may be identified by the glazed area which covers approximately 2/3's of the bottom area, or by the tiny nipple point within one or more of the four quadrant notches lying on the outside perimeter of the cover. Alternately, this size petri may be identified by the absence of the small, approximately 1/8" circles lying just within the four quadrant notches lying on the outside perimeter of either top or bottom.
f.) The 7.9g size petri may be identified by the 1/4" width glazed ribbon covering 1/3 of the circumference on the bottom, or by the small, approximately 1/8" circle lying just within the four quadrant notches lying on the outside perimeter of the cover.
g.) The 7.55g size petri may be identified by the four 3/32" dia. circles at the top of the dish and by a 1/3 glazed area on the bottom of the dish.
h) If any petri is received obviously differing from that described above, obtain Weston radiological personnel concurrence prior to using.
i.) Package the double petri in a consistently sized zip-lock bag such as 6"x6" or 8"x8" for all samples.

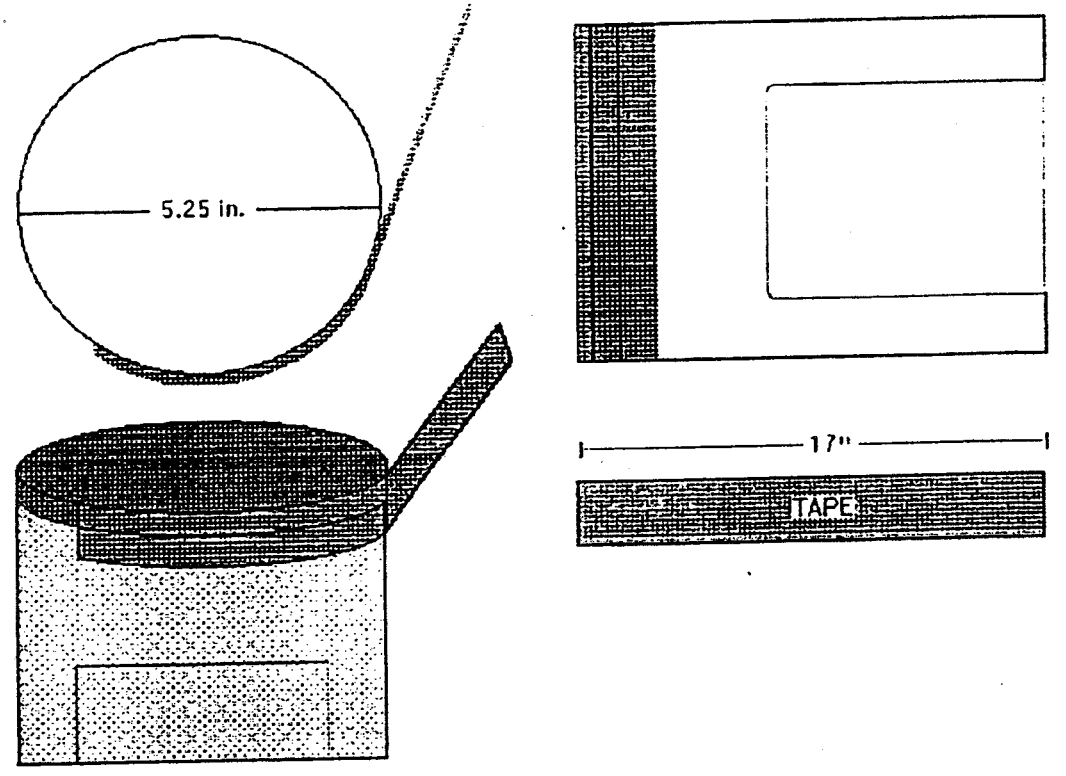
4). SAMPLE OF TAPING A 4-3/4 IN. DIA. MARINELLI BEAKER

a.) Use 1" black pipe tape 16 inches long.
b.) Attach tape flush with the top of the beaker .



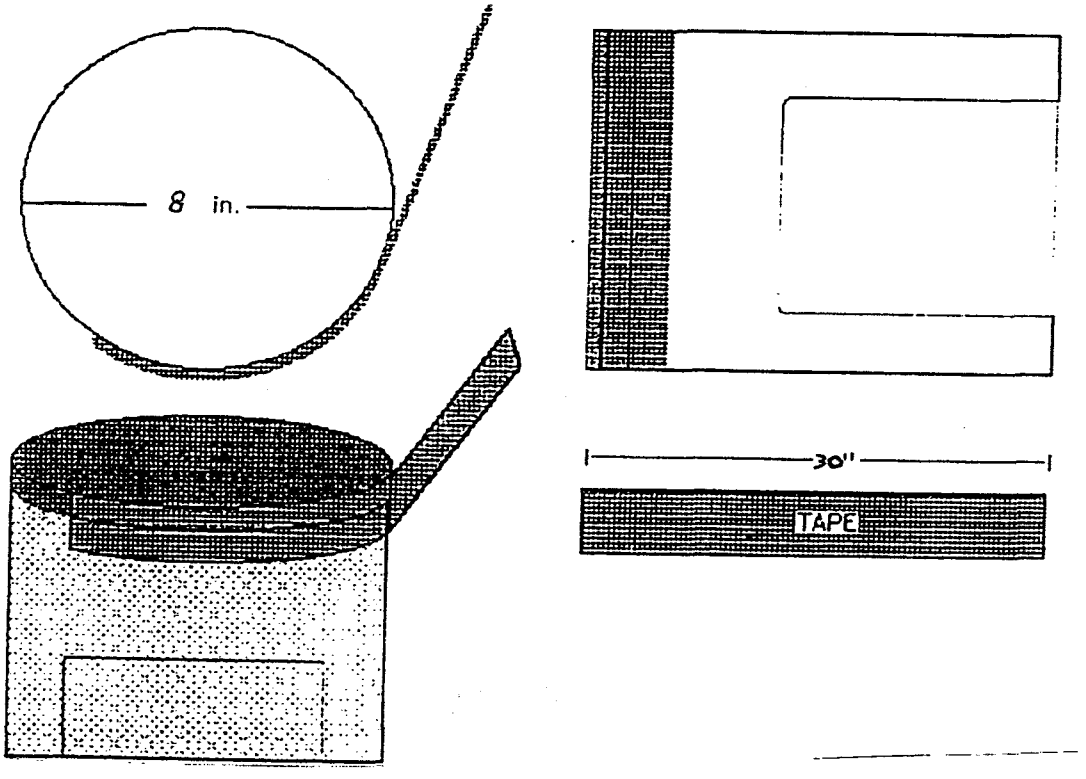
5). SAMPLE OF TAPING A 5-1/ 4 IN. DIA. MARINELLI BEAKER

a.) Use 1" black pipe tape 17 inches long.
b.) Attach tape flush with the top of the beaker.



6). SAMPLE OF TAPING A 8 IN. DIA. MARINELLI BEAKER

a.) Use 1" black pipe tape 30 inches long.
b.) Attach tape flush with the top of the beaker.



ADDENDUM 1 - HANDLING SAMPLES AT THE COUNTING LABORATORY
(For Samples counted by Weston Solutions, Inc.)

PURPOSE: To provide additional instructions on how radiological samples will be handled at the counting laboratory, and how to fill out the sample tracking sheet.

1.0 When a sample arrives at the laboratory, radiological personnel signs the chain of custody form as the receiver.

1.1 For Marinelli beaker and petri dish samples, the custodian shall place the chain of custody form in the appropriate binder/folder for the applicable Work Plan (WP). The chain of custody form should be placed in the binder in numerical order, based on sample grid number, to aid in retrieval of the sheet when the sample is relocated to another area.

1.2 For swipe samples, the radiological personnel shall verify chain of custody form attached or attach the chain of custody form to the swipe sample's zip-loc bag.

2.0 After the custody transfer is complete the laboratory personnel will complete the sample-tracking sheet, Enclosure (3), weigh the sample (if applicable), and enter all the tracking system and other required information in the tracking records.

3.0 The laboratory personnel will then place the sample in the incoming storage area and log that numbered location on to the sample tracking sheet or data base.

4.0 The Weston Solution Radiological Supervisor shall set the priorities for counting the samples.

5.0 Once a sample has been counted and results reviewed, the sample will be returned to the appropriate storage location.

6.0 The sample will be maintained in storage until the WP and all required reports are completed and approved by the cognizant regulatory agencies. All samples will be disposed of following Weston Solution Radiological Group release.

Weston Solutions, Inc.

ISOLAB-10

STANDARD OPERATING PROCEDURE

RADIATION DETECTION INSTRUMENT GENERAL OPERATION AND PERFORMANCE CHECK

Originator: H. Alsworth Date: April 1998

Approval: Ron Leneker - Program Manager Date: 11/13/00

Revised: B. Christensen – Project Engineer Date: 10/29/03

List of Effective Pages

Page	Revision	Change
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6	2	0
7	2	0
8	2	0
9	2	0

Weston Solutions, Inc. - Mare Island Site Office
P.O. Box 2135
Vallejo, Ca. 94592-0135

RADIATION DETECTION INSTRUMENT GENERAL OPERATION AND PERFORMANCE CHECK

1.0 PURPOSE

Radiation can be detected and quantified by measuring the ionizations produced in a detector. Instruments selected for use by Weston Solutions, Inc. are rugged, reliable, and with minimal care are relatively maintenance free. The instruments described in this SOP can produce quantitative data useful for protecting the health and safety of workers and for controlling or avoiding the spread of radioactive contamination. Both portable and fixed radiation detection instruments will be used during any future remediation, removal and inspection projects.

This SOP describes the daily checks of instrumentation performance required to verify that the manufacturer's calibration is valid for the measurements being made. This SOP also tells in general how to use the instrument; details from the manufacturer's instructions peculiar to a specific instrument are not repeated here. The instruments covered by this SOP and the intended use of each instrument are given in Table 1.

2.0 APPLICABILITY

Use of the instruments in Table 1 for quantification of radiation and/or contamination require initial calibration and daily response checks of the adequacy of that calibration. This SOP provides the steps necessary to assess the adequacy of the instrument's calibration: Instrument daily response checks performed using this SOP are not a suitable substitute for calibration.

This SOP should be used in conjunction with the manufacturer's instrument operations manual for operational details.

3.0 TERMS AND DEFINITIONS

Calibration - The process of adjusting instrument settings as necessary to insure that the instrument responds properly to a known source of radioactivity traceable to the National Institute of Standards and Technology (NIST). Vendors shall perform the necessary calibration of their instruments. Instruments shall not be accepted from vendors unless they have been calibrated immediately prior to shipment by the vendor. Certificates of calibration and calibration data shall be included with instrument use records. Instruments should be calibrated across their operating range (energy and intensity) before use.

Daily response check - All portable instruments (except the pocket dosimeter) shall be response checked twice daily (once at the beginning of work and once at the end of the day). If possible, check sources should approximate the energies of potential contaminants at the site. This SOP describes the steps that shall be taken in carrying out these checks. The initial response check should be conducted following the calibration.

Background - The response of the radiation detection instrument when no source is present. Background is caused by ambient radiation from cosmic and terrestrial sources and by stray electrical currents generated in the electronics of the instrumentation.

Table 1. Instruments Covered by this SOP and Their Intended Use

Instrument	Type	Used For
Alpha/Beta Scintillation* (Ludlum Model 43-89 probe with Model 2224-1 scalar/ratemeter or Eberline Model SHP-380 with E600 scalar/ratemeter or equivalent)	Portable	Alpha and Beta surface contamination – stationary only
Geiger-Mueller Pancake* (Ludlum Model 44-9 with Model 12 ratemeter or Eberline Model SHP 360 with E600 scalar/ratemeter or equivalent)	Portable	Beta-gamma – scan and stationary
Pocket Dosimeter (Radiacmeter Model IM-9F/PD with model 910 charger or equivalent)	Portable	Personal monitoring - determines integrated dose from gamma radiation
Gamma Scintillation NaI* (Ludlum Model 44-10 probe (2X2) with Model 18 ratemeter or Model 2221 scalar/ratemeter or Eberline Model SPA-3 or 44-103 probe (3X3) with E600 scalar/ratemeter or Ludlum Model 19 Micro-R meter or equivalent)	Portable	Surface contamination screening gamma emitting radionuclides – scan and stationary

*When using Attachments 1, 2 or 3 for daily response checks, enter the applicable instrument designator.

4.0 EQUIPMENT AND PROCEDURES

Operations Manuals must be on-site for each instrument used. Operation and daily source checks should be performed as stated. If manufacturer's instructions vary from those presented here, discuss with a radiological expert to determine which procedure should be used.

4.1 Portable probe model 43-89 or model SHP-380 (alpha/beta scintillation):

4.1.1 Pre-use Procedures

1. Upon receipt of the instrument, verify it has been calibrated within the last 12 months.

2. Verify the instrument will detect radionuclides of interest (i.e., alpha emitters) and that its calibration range encompasses the expected emission energies of potential contaminants.

3. Expose the meter to the check source you will be using on-site using procedures described in the following source check section. Record the meter's response and establish a range of ±20% of the response. This range is the acceptable range for source checks performed in the field.

4.1.2 Source Check

1. Turn the instrument on; allow for a 5-minute warm up before proceeding.

2. Check the battery and ascertain that it falls within the "test" range. If the response falls outside this range, replace the batteries.

3. Make certain the alpha/beta scintillation detector does not have a light leak by exposing the face of the probe to a light source and noting the instrument response.

4. Determine the instrument background. For the 2224-1 or E600 scalar, use the average of three separate 1-minute counts. For a ratemeter, record the response on the most sensitive setting.

5. Expose the instrument detector to the alpha/beta check source at a distance of less than 1 cm. Note the response for alpha and beta.

6. Confirm the instrument response is within the ±20% range determined in Section 4.1.1. Do not use the instrument unless it falls within this range.

7. Record the results of the response check on Form-1.

4.1.3 Use

1. Hold the face of the detector less than 1 cm above the item being surveyed. If the audible response of the scalar or ratemeter is adjustable, set the response to produce one "click" for each 10 events recorded.

2. Scan the item by looking at the detector and listening to the response. If using the 2224-1, set the timer to "continuous" to scan; set the timer to 1 minute to make a recordable measurement. If using a ratemeter, begin scanning with the most sensitive scale setting; when maximum pitch is heard, note the ratemeter reading.

4.2 Portable probe model 44-9 or model SHP-360 (Geiger-Mueller (G-M) Pancake)

4.2.1 Pre-use Procedures

1. Upon receipt of the instrument, verify it has been calibrated within the last 12 months.

2. Verify the instrument will detect radionuclides of interest (i.e., beta or gamma emitters) and that its calibration range encompasses the expected emission energies of potential contaminants.

3. Expose the meter to the check source you will be using on-site using procedures described in the following source check section. Record the meter's response and establish a range of ±20% of the response. This range is the acceptable range for source checks performed in the field.

4.2.2 Source Check

1. Turn the instrument on; allow for a 5-minute warm up before proceeding.

2. Check the battery and ascertain that it falls within the "test" range. If the response falls outside this range, replace the batteries.

3. Determine the instrument background. For the 2221 scalar, use the average of three separate 1-minute counts. For a ratemeter, record the response on the most sensitive setting.

4. Expose the instrument detector to the beta-gamma response check source at a distance of 1-3 cm. Note the response.

5. Confirm the instrument response is within the ±20% range determined in Section 4.2.1. Do not use the instrument unless it falls within this range.

6. Record the results of the response check on Form - 1.

4.2.3 Use

1. Hold the face of the detector 1- 3 cm above the item being surveyed. If the audible response of the scalar or ratemeter is adjustable, set the response to produce one "click" for each 10 events recorded.

2. Scan the item by looking at the detector and listening to the response. If using the Model 12, set the timer to "continuous" to scan, set the timer to 1-minute to make a recordable measurement. If using a ratemeter, begin scanning with the most sensitive scale setting; when maximum pitch is heard, note the ratemeter reading.

4.3 Portable probe model 44-10, model SPA-3 or model 44-103 probe or model 19 Micro-R meter (Gamma Scintillation - Sodium Iodide [NaI]):

4.3.1 Pre-use Procedures

1. Upon receipt of the instrument, verify it has been calibrated within the last 12 months.

2. Verify the instrument will detect radionuclides of interest (i.e., gamma emitters) and that its calibration range encompasses the expected emission energies of potential contaminants.

3. Expose the meter to the check source you will be using on-site using procedures described in the following source check section. Record the meter's response and establish a range of ±20% of the response. This range is the acceptable range for source checks performed in the field.

4.3.2 Source Check

1. Turn the instrument on; allow for a 5-minute warm up before proceeding.

2. Check the battery and ascertain that it falls within the "test" range. If the response falls outside this range, replace the batteries.

3. Determine the instrument background. For the scalar, use the average of three separate 1-minute counts. For a ratemeter, record the response on the most sensitive setting.

4. Expose the instrument detector to the gamma check source at a distance of 1 cm. Note the response.

5. Confirm the instrument response is within the ±20% range determined in Section 4.3.1. Do not use the instrument unless it was within this range.

6. Record the results of the response check on Form-1.

4.3.3 Use

1. Hold the face of the detector 1-cm above the item being surveyed for surface scans and 0.5 m for general area scans. Scan at a rate of less than 0.5 m/s. If the audible response of the scalar or ratemeter is adjustable, set the response to produce one "click" for each 10 events recorded.

2. Scan the item by looking at the detector and listening to the response. If using the 2221, set the timer to "continuous" to scan, set the timer to 1 minute to make a recordable measurement. If using a ratemeter, begin scanning with the most sensitive scale setting, when maximum pitch is heard, note the ratemeter reading.

4.4 Pocket Dosimeter (Personal Monitor)

1. The pencil dosimeter is not response checked daily. It shall be the responsibility of the individual wearing the dosimeter; however, to periodically check it and record the radiation indicated.

2. The dosimeter shall be "re-zeroed" when it is within 75% of full scale.

3. When reading the dosimeter, ensure that the scale is horizontal and the numbers on the scale are right side up.

5.0 REFERENCES

Instrument operation manuals by Ludlum Measurements, Inc., P.O. Box 810, Sweetwater, TX 79556.

Instrument operation manuals by Eberline Systems, Inc., P.O. Box 2108, Santa Fe, NM 87504-2108.

6.0 ATTACHMENTS - Radiation Detection Instrument Performance/Response Check.

1. Alpha/Beta Probe Background and Source Response Daily Checks
2. Gamma Probe Background and Source Response Daily Checks
3. Alpha/Beta Swipe Counter Background and Source Response Daily Checks

ATTACHMENT 1

Instrument Designator: Date:

Alpha/Beta Probe Background and Source Response Daily Checks

(Alpha/Beta Scintillation)

Instrument:	Ludlum Model 2224-1	**S/N:**	
Probe:	Ludlum Model 43-89	**S/N:**	
Calibration Date:		**Calibration due:**	

Light Check:	(Start)	(End)
Battery Check:	(Start)	(End)

INITIAL Background/Source Check			**FINAL Background/Source Check**		
No.	Alpha cpm	Beta cpm	No.	Alpha cpm	Beta cpm
1 (Initial)			1 (final)		
2((Initial))			2 (final)		
3((Initial))			3 (final)		
Average:			Average:		

Acceptance Criteria: (+/-) 20% of Instrument Pre-use cpm results.

Performance Check Results: SAT( ) UNSAT( )

Signature/Date:	

Source:(List Sources used)

ATTACHMENT 2

Instrument Designator: Date:

Gamma Probe Background and Source Response Daily Checks

(2" x 2" NaI Probes, Gamma Scintillation)

Instrument:		**S/N:**	
Calibration Date:		**Calibration due:**	
Probe:		**S/N:**	
Calibration Date:		**Calibration due:**	
Battery Check:	(Start)	(End)	

INITIAL Background/Source Check			**FINAL Background/Source Check**		
No.	Alpha cpm	Beta cpm	No.	Alpha cpm	Beta cpm
1 (Initial)			1 (final)		
2((Initial))			2 (final)		
3((Initial))			3 (final)		
Average:			Average:		

Acceptance Criteria: (+/-) 20% of Instrument Pre-use cpm results.

Performance Check Results: SAT( ) UNSAT( )

Signature/Date:	

Source:(List Sources used)

ATTACHMENT 3

Instrument Designator: Date:

Alpha/Beta Swipe Counter
Background and Source Response Daily Checks

(Alpha/Beta Scintillation)

Instrument:	Ludlum Model 2224-1	**S/N:**	
Calibration Date:		**Calibration due:**	
Probe:	Ludlum Model 43-10-1	**S/N:**	
Calibration Date:		**Calibration due:**	
Battery Check:	(Start)	(End)	

INITIAL Background/Source Check			**FINAL Background/Source Check**		
No.	Alpha cpm	Beta cpm	No.	Alpha cpm	Beta cpm
1 (Initial)			1 (final)		
2((Initial))			2 (final)		
3((Initial))			3 (final)		
Average:			Average:		

Acceptance Criteria: (+/-) 20% of Instrument Pre-use cpm results.

Performance Check Results: SAT( ) UNSAT( )

Signature/Date:	

Source:(List Sources used)

Appendix C

Ludlum Technical Manual

Swipe Counter Model 43-10-1

LUDLUM MODEL 43-10-1

ALPHA-BETA SAMPLE COUNTER

February 2002

LUDLUM MEASUREMENTS, INC.
501 OAK ST., P.O. BOX 810
SWEETWATER, TX 79556
915/235-5494 FAX: 915/235-4672

TABLE OF CONTENTS

M43-10-1 Alpha/Beta Sample Counter
February 2002

1. GENERAL

The Model 43-10-1 is an Alpha-Beta Sample Counter capable of holding up to a two-inch diameter filter or planchet. The sample drawer, when fully closed, strikes a micro switch to allow high voltage (HV) to be applied to the photomultiplier tube (PMT). The sample drawer is locked in the closed position by rotation of the slide lever mounted on the side of the instrument.

The detector is a 2.5-inch diameter "phoswich" with a 0.010-inch thick plastic scintillator coated with zinc sulfide (ZnS).

ZnS(Ag) is used for alpha radiation detection and the plastic scintillation material is used for detection of beta radiation. The scintillation material is covered by 0.4 mg/cm^2 metalized mylar to reduce light response (excessive background). If simultaneous alpha-beta discrimination is desired, the counting instrument must have separate power supplies or threshold controls for each channel. The Ludlum Model 2929 Scaler, Model 2223, or Model 2224 instruments provide the necessary circuitry for simultaneous alpha-beta discrimination.

2. SPECIFICATIONS

? **PHOTOMULTIPLIER TUBE:** 2" (5.1 cm) diameter, 10 pin dynode structure

? **SCINTILLATOR MATERIAL:** ZnS disc; plastic 0.01" thick

? **SAMPLE SLIDE AND HOLDER:** Sample cavity size is 2.25" diameter x 0.425" deep, with an insert cavity size of 1.125" diameter x 0.125" deep or 2" diameter x 1/8" deep.

? **TYPICAL BACKGROUND:** ?80 cpm beta-gamma, ?3 cpm alpha (in ambient background of 10?R/hr)

? **CHANNEL CROSS TALK:** Alpha in beta channel ?10%; beta in alpha channel ?1%

? **EFFICIENCY (2pi):** 74% for Pu-239, 16% for C-14, 44% for Tc-99.

? **HV SWITCH:** Opening sample slide disables PMT high voltage

? **FINISH:** computer-beige, polyurethane enamel

3. OPERATING PROCEDURES

Connect the M43-10-1 to the scaler counting instrument. The coax cable with "C" connectors carries both the signal and HV.

HV is applied to the PMT when the sample slide is pushed completely in, tripping the microswitch. Rotate the sample slide lever to the locked position, securing sample slide in the "ON" position.

Alpha background count is approximately less than or equal to 3 counts per minute.

Beta background count is approximately 60-100 counts per minute.

To check a radioactive sample, place sample on the appropriate side of the sample

holder for the one or two inch filters. Do not allow the sample to extend above the top of the sample slide.

A background count should be taken after each source count to check for contamination on the sample holder or area within the O-ring.

4. CALIBRATION

CAUTION:
Do not tip sample counter over with sample holder in sample slide. The sample holder will tear the thin metalized mylar window, allowing light to scintillate the ZnS and cause excessive count in the beta channel.

For instruments with separate power supplies (fixed threshold), the alpha channel will operate at a lower voltage than the beta channel.

4.1 Counting Instrument

? Calibrated Scaler Instrument
? HV Range - Nominally 800 ? 200 volts
? Nominal Input Sensitivity:
Alpha Channel = 175 mV
Beta Channel = 4 mV (with upper discriminator set at 50 mV)

4.2 Operating Voltage

1. Connect M43-10-1 to the counting instrument with proper cable.
2. Place a calibrated ^{14}C source in the sample holder. Close and lock the sample drawer.
3. Adjust the counting instrument HV until it receives at least 16% (2 pi) efficiency.
4. Decrease HV by 25 volts.
5. Record the HV.
6. Record the ^{14}C source count and beta crosstalk in the alpha channel.
7. Remove the ^{14}C source and record the background count in the alpha and beta channels.
8. Place a calibrated ^{239}Pu source in the sample holder. Close and lock the sample drawer.
9. Record the ^{239}Pu source count and the alpha crosstalk in the beta channel.
10. Increase the HV by 25 volts.
11. Repeat steps 5-10 until one or more of the following conditions is met (assuming a 10?R/hr background exposure):
(a) beta background exceeds 80 cpm
(b) alpha background exceeds 3 cpm
(c) alpha crosstalk in the beta channel exceeds 10%
(d) beta crosstalk in the alpha channel exceeds 1%.
12. The operating voltage should be selected as a point where:
(a) ^{14}C efficiency (2 pi) ? 16%
(b) ^{239}Pu efficiency (2 pi) ? 74%
(c) alpha crosstalk in beta channel less than or equal to 10%
(d) beta crosstalk in alpha channel less than or equal to 1%

4.3 Efficiency

1. NIST-traceable sources required.
2. Set HV as determined above.

If the source value is listed as a cpm value (2 pi emission rate):

3. Record the source count. Divide the source count by the cpm value of the source. Multiply by 100 for the percent efficiency (2 pi).

If the source value is listed as a dpm value (4 pi):

3. Record source count. Apply the appropriate backscatter correction* to the dpm value of the source. Divide the source count by corrected dpm value of the source (corrected for backscatter), times 100 for 4 pi efficiency.

* Normally there is approximately 1.5% increase in the alpha count due to backscatter of the radioactive material plated on a metal disc. The backscatter from beta sources on metal discs is more prominent and the increase in emission rate may be as high as 40%, depending upon the beta energy. The source manufacturer should provide information as to the amount of backscatter expected, due to the source material plated on the metal discs.

If the source value is listed in microcuries (activity):

3. Convert the microcurie value to a dpm value by multiplying the microcurie value by 2.22×10^6.

4. Calculate the 4 pi efficiency as in the previous steps.

5. TROUBLESHOOTING

5.1 Zero or Very Low Counts

? Large light leak
? PMT malfunction
? Broken wire in tube socket
? Inoperative HV switch on sample counter or broken wire
? Counting instrument malfunction
? Source too far from scintillation material
? Cable malfunction

5.2 No Source Plateau

? Light leak- slide not sealed properly against true base
? Noisy PMT
? Noisy HV switch
? Poor PMT to scintillation- light pipe interface

5.3 Excessive Background Count

? Light leak
? PMT malfunction
? Cable malfunction
? Noisy HV switch
? Instrument contaminated

PARTS LIST

Ref. No.	Description	Part No.

Model 43-10-1 Alpha/Beta Sample Counter

UNIT	Completely Assembled 43-10-1 Detector	47-1305

Assembly View, Drawing 142 x 39

*	PM TUBE ASSY 705	4002-
*	EJ212-2.20 x .010	01-5194
*	TUBE HOLDER/BASE:	2142-002-02
	CONNECTOR CAP	7142-014
*	SAMPLE DRAWER: Model 43-10	7142-001-06
*	O-RING	16-8286
*	ACRYLIC DISC	7142-002-01
2 EA.	SPACER STRIP	7142-002-03
*	ADAPTER PLATE	7142-003-01
*	CASE TOP:	7142-004-03
*	CASE BOTTOM	7142-004-04
*	CAP GASKET	7142-017
*	BASE PLATE	7142-018
*	SHAFT	7142-019
*	LIFTER	7142-020
*	PIN	7142-021
*	O-RING	16-8270
3 EA.	2" X-TAL FOAM PAD	7260-001-05
*	ZnS(Ag) DISC	14-5431
*	METALIZED MYLAR	01-5143
*	FILLER PLATE	7142-001-07
*	BRACKET	7142-004-01
*	CAP	7142-004-02
1 EA.	SWITCH-BZ-2RD-A2	08-6538
1 EA.	KNOB-90 4 2G POINTER	08-6608
1 EA.	RECPT-UG706/U "C" LMI	4478-011
4 EA.	BUMPER PADS	21-9376
2 EA.	SPACERS	18-9043

Ref. No.	Description	Part No.

Switch Filter Board, Drawing 142 X 58

BOARD	Assembled Switch Filter	5412-103
?	**CAPACITORS**	
C1-C2	CAP-0.0056μF, 3kV, C	04-5522
C3	CAP-0.0015μF, 3kV, C	04-5518
?	**RESISTORS**	
R1-R2	RES-1MEG, 1/4W, 5%	10-7028

Voltage Divider Board, Drawing 2 X 359

BOARD	Assembled Voltage Divider	5002-571
?	**CAPACITORS**	
C1	0.01μF, 2kV, C	04-5525
?	**RESISTORS**	
R1-R11	4.75 MEG, 1/8W, 1%	12-7995
R12	10MEG, 1/8W, 1%	12-7996

DRAWINGS AND DIAGRAMS

Model 43-10-1 Assembly View, Drawing 142 x 39

Switch Filter Board, Drawing 142 x 58

Switch Filter Board Layout, Drawing 142 x 59

2" Voltage Divider Board, Drawing 2 x 359

2" Voltage Divider Board Layout, Drawing 2 x 360

Appendix D

Survey Data Sheet

For Solid Samples

(Gamma Radiation)

Survey Data Sheet
MCAS El Toro Solid Sampling (Gamma Radiation)

Location:_____ (Site number), Date: _____

Parcel Description: _____(location/position – If necessary, mark location of parcel on copy of Survey Map)

Survey Instrument Model:_____and Probe Model:_____

Instr. Serial Number: _____Calibration Due Date:_____

Probe Serial Number: _____Calibration Due Date:_____

Survey Type: Grid ☐ **Judgmental** ☐

	Gamma Radiation Level (cpm)				Gamma Radiation Level (cpm)		
Rdg No. [Grid #]	Before Sampling	After Sampling	Sample Reading	**Rdg No.** [Grid #]	Before Sampling	After Sampling	Sample Reading
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			
-				-			

Note: 1. For "Judgmental" sample points (J-1, J-2, etc.), survey/sample location will be indicated on grid survey maps.
2. All readings will be stationary on-contact for one minute.

Name/Signature of Surveyor-Sampler:_____/_____

Name/Signature of Recorder (if different than surveyor):_____/_____

Appendix D
Survey Data Sheet For Solid Samples (Gamma Radiation)

Appendix E

Survey Data Sheet

For Buildings

(Alpha-Beta Radiation)

Survey Data Sheet
MCAS El Toro Buildings (Alpha-Beta Radiation)

Location:_____ (Building number), Date: _____

Parcel Description: _____(Room #/location/position – If necessary, mark location of parcel on copy of Survey Map)

Survey Instrument Model:_____and Probe Model:_____

Instr. Serial Number: _____Calibration Due Date:_____

Probe Serial Number: _____Calibration Due Date:_____

Survey Type: Grid ☐ Judgmental ☐ DCGL: Alpha-100 dpm/100 cm^2
Beta-1,000 dpm/100cm^2

Rdg No. [Grid #]	Alpha Radiation Level (cpfm/100cm^2)	Beta Radiation Level (cpfm/100cm^2)	Rdg No. [Grid #]	Alpha Radiation Level (cpfm/100cm^2)	Beta Radiation Level (cpfm/100cm^2)
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
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__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		
__-__			__-__		

Notes: 1. For "Judgmental" survey points (J-1, J-2, etc.), survey/swipe location will be indicated on grid survey maps.
2. All readings will be recorded during a 5-minute survey preceding collection of dry alpha/beta swipes.

Name/Signature of Surveyor:_____/_____

Name/Signature of Recorder (if different than surveyor):_____/_____

Appendix E
Survey Data Sheet For Buildings (Alpha-Beta Radiation)