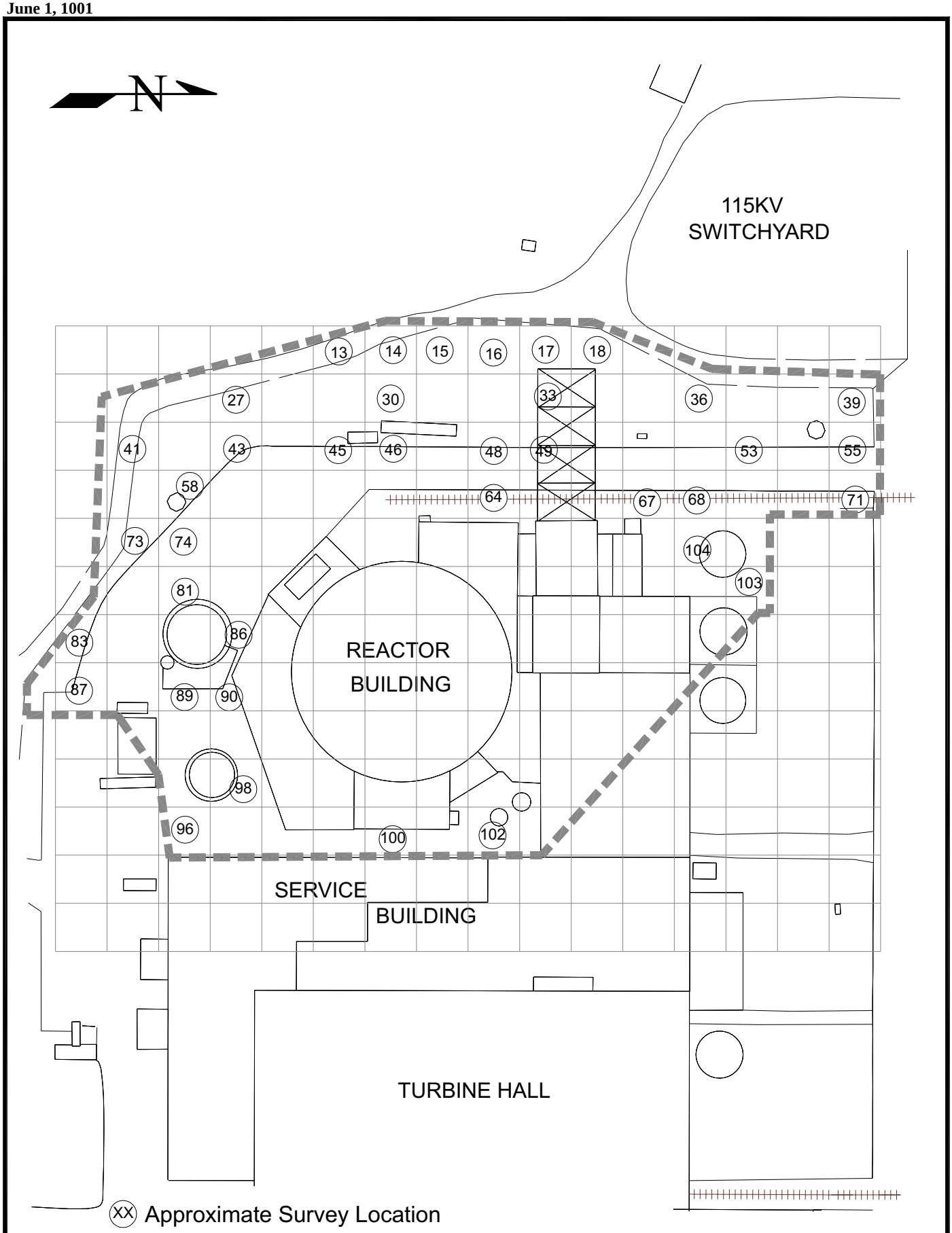
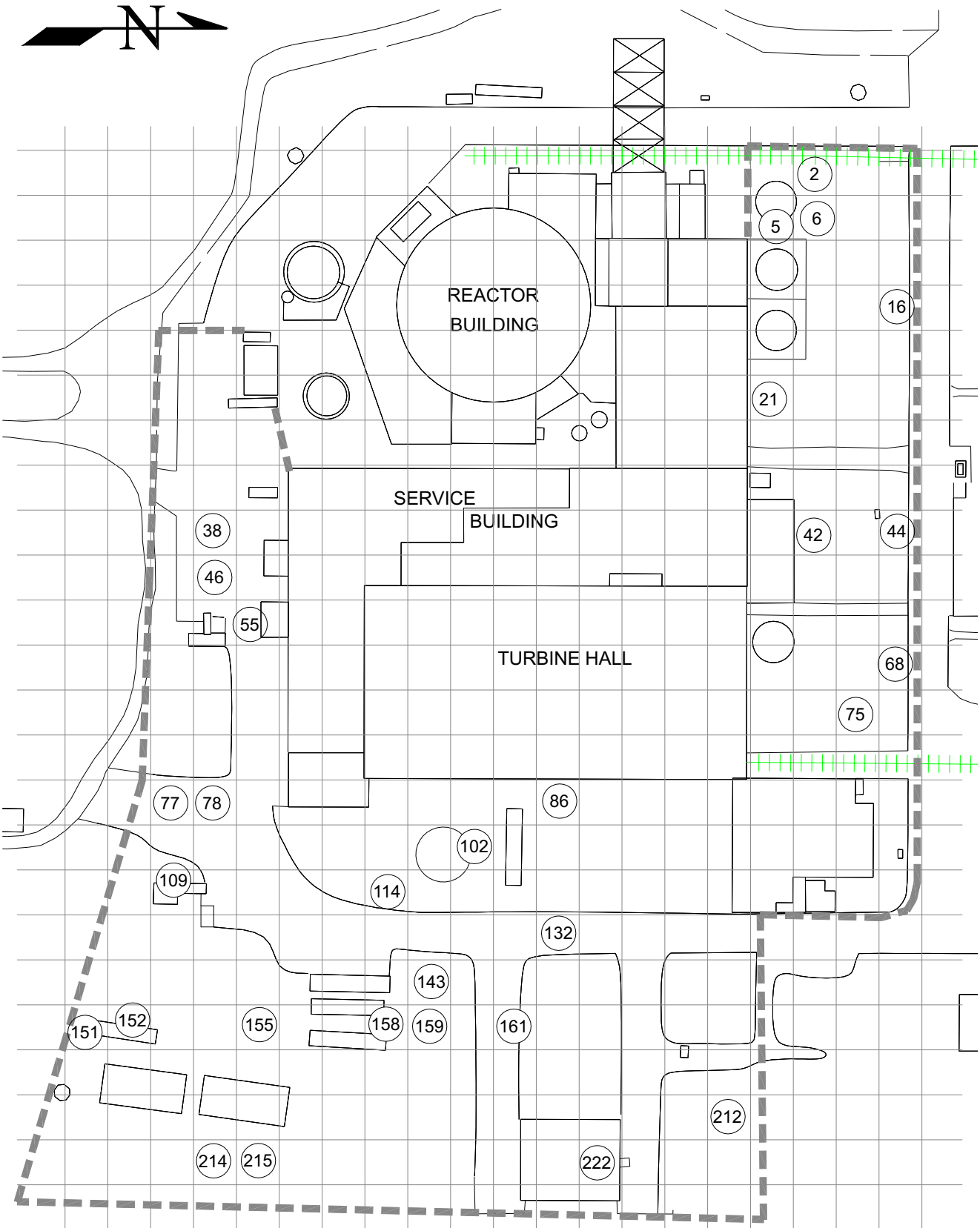
ATTACHMENT 2E

Site and Survey Area Maps

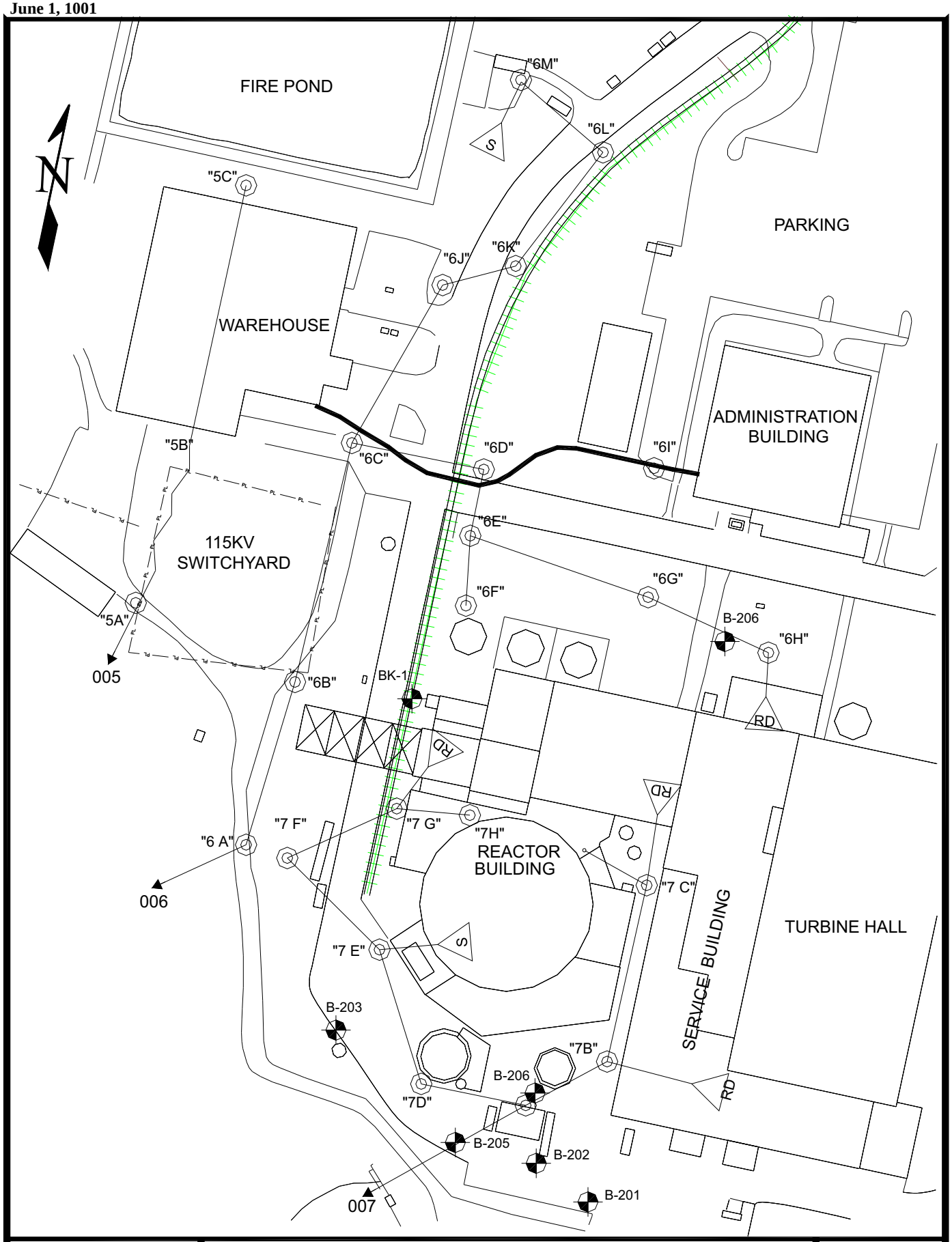


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization West Side Yard Survey Package R0100	Figure 2-3

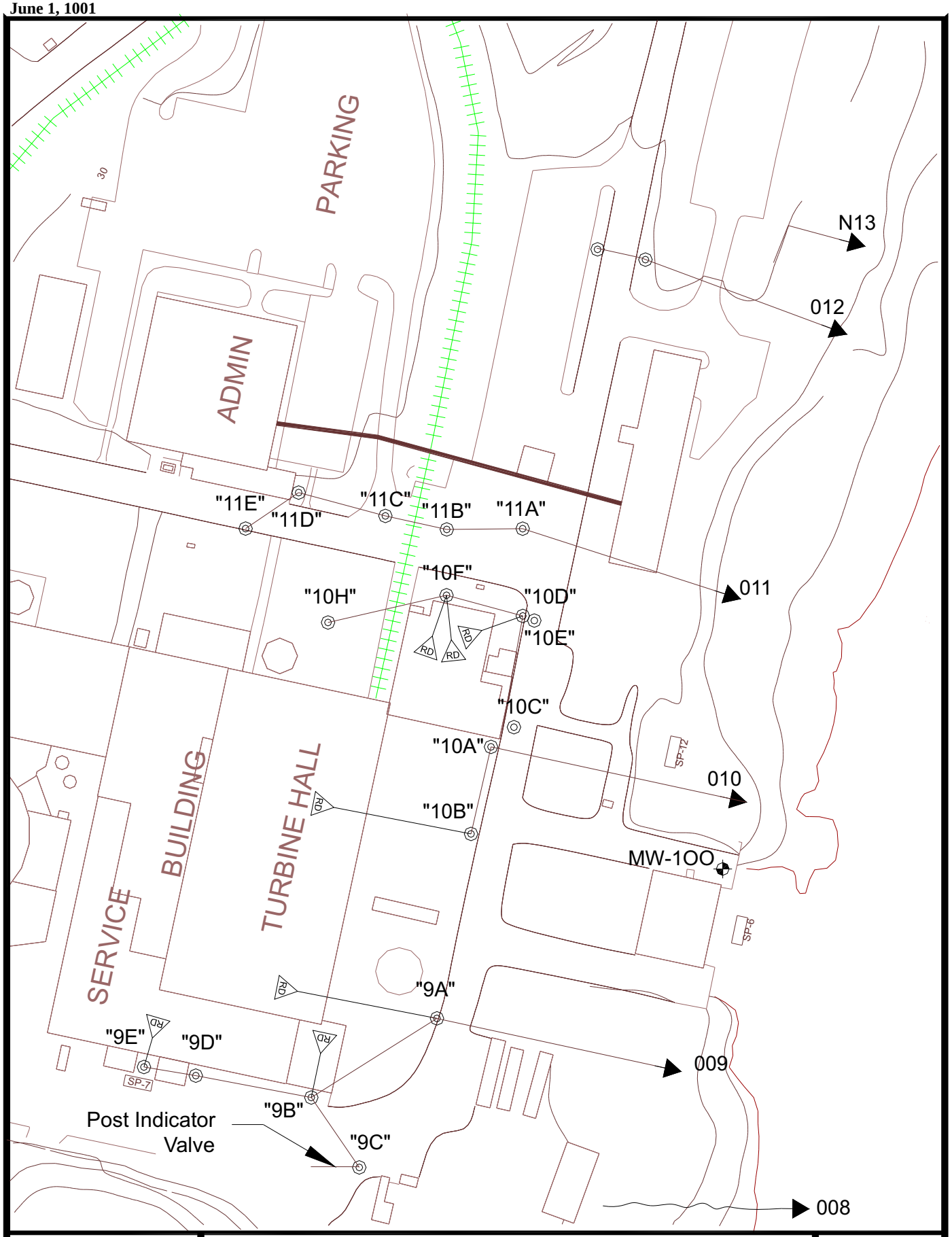


214 Approximate Survey Location

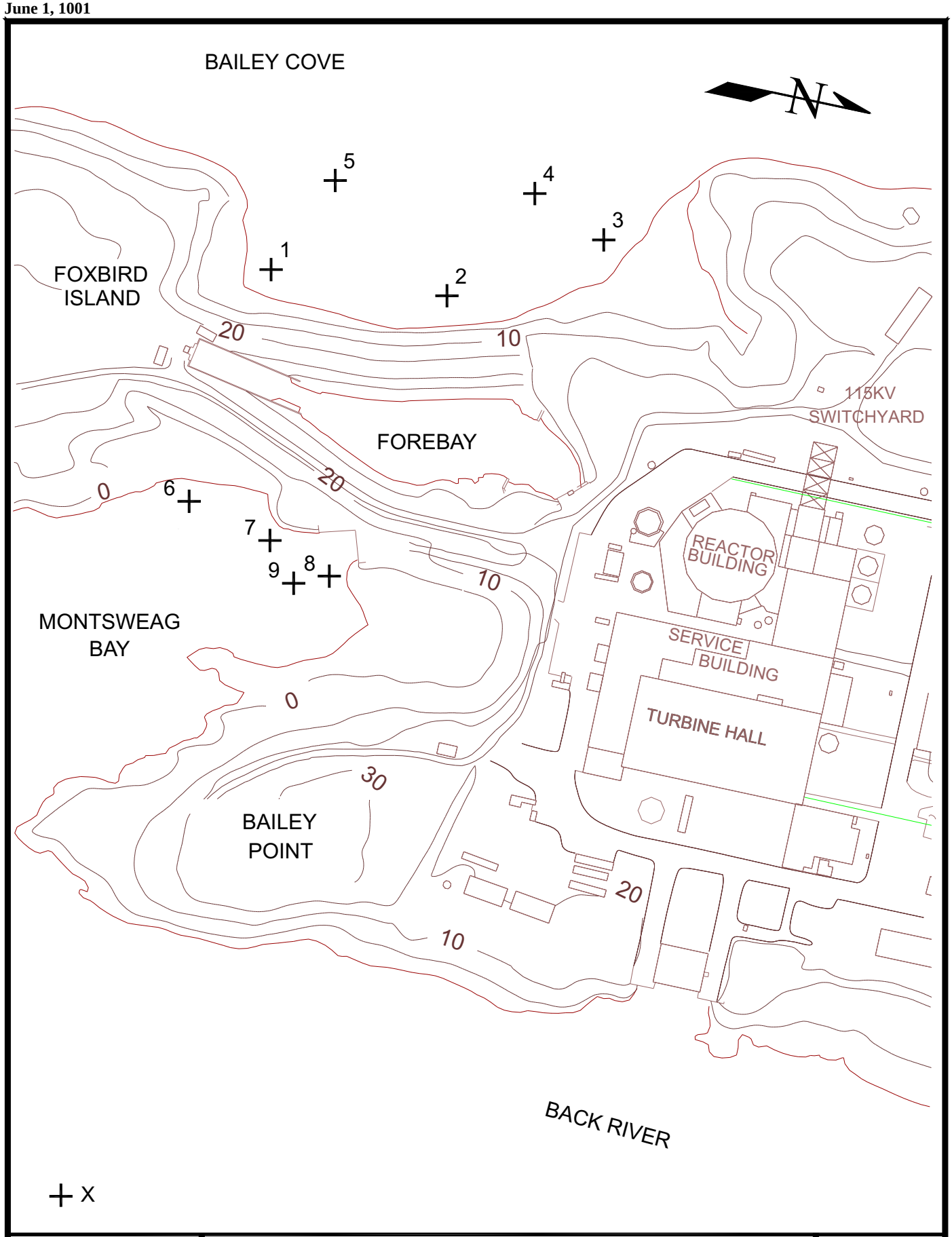
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization East Side Yard Survey Package R0200	Figure 2-4



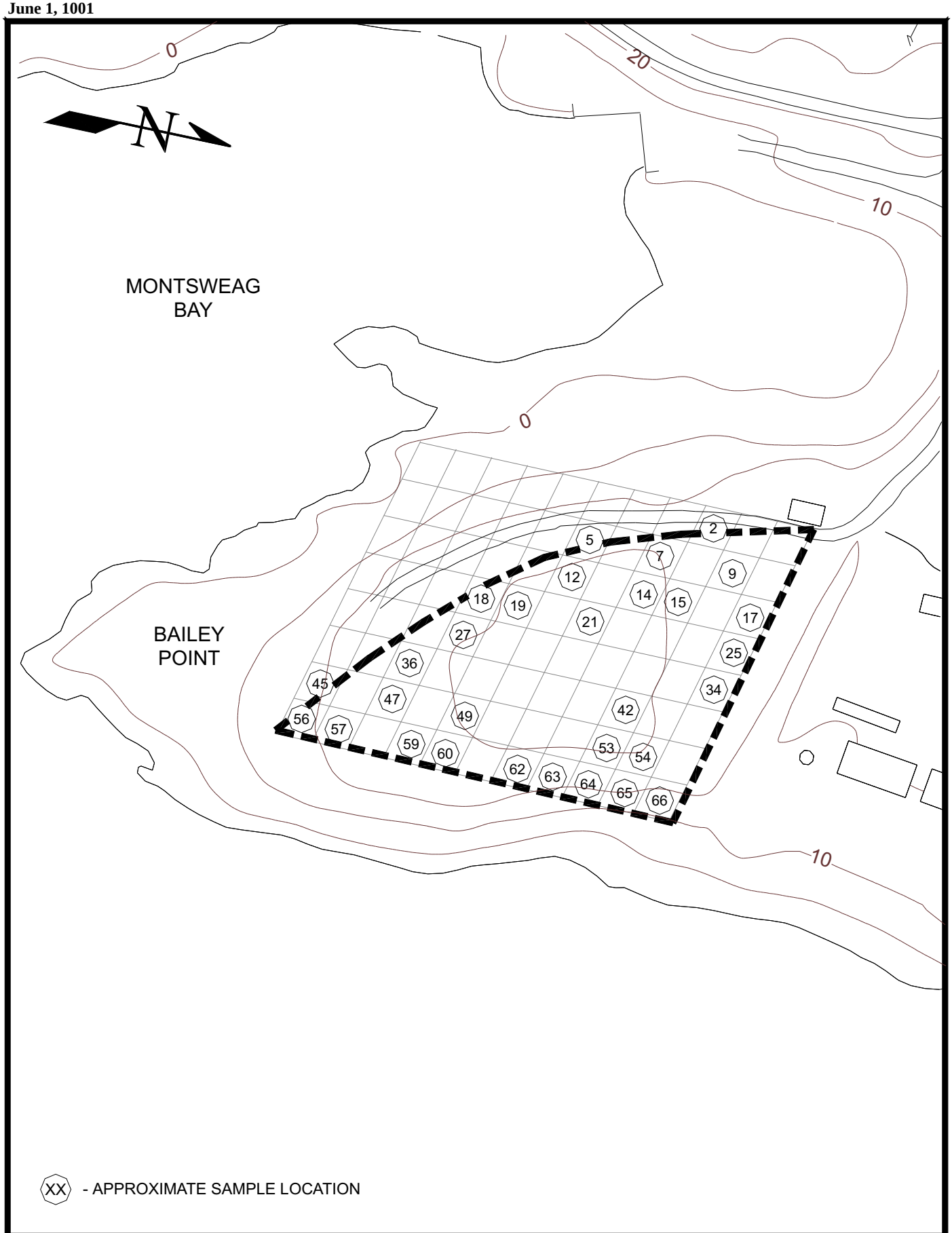
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof and Yard Drains #005, 006, 007; Survey Package R0300-1	Figure 2-5



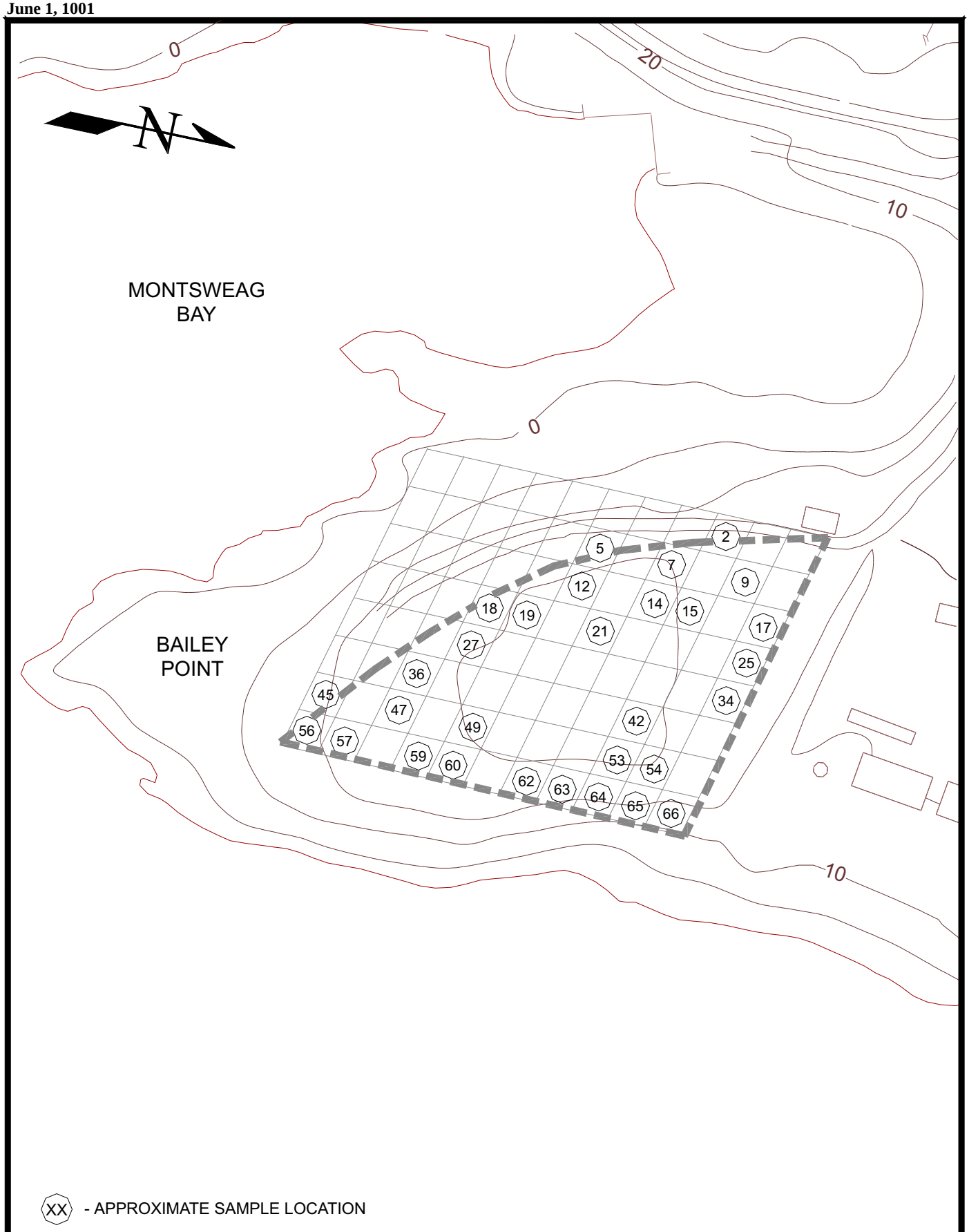
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof and Yard Drains #008, 009, 010, 011, 012, N12; Survey Package R0300-1	Figure 2-6



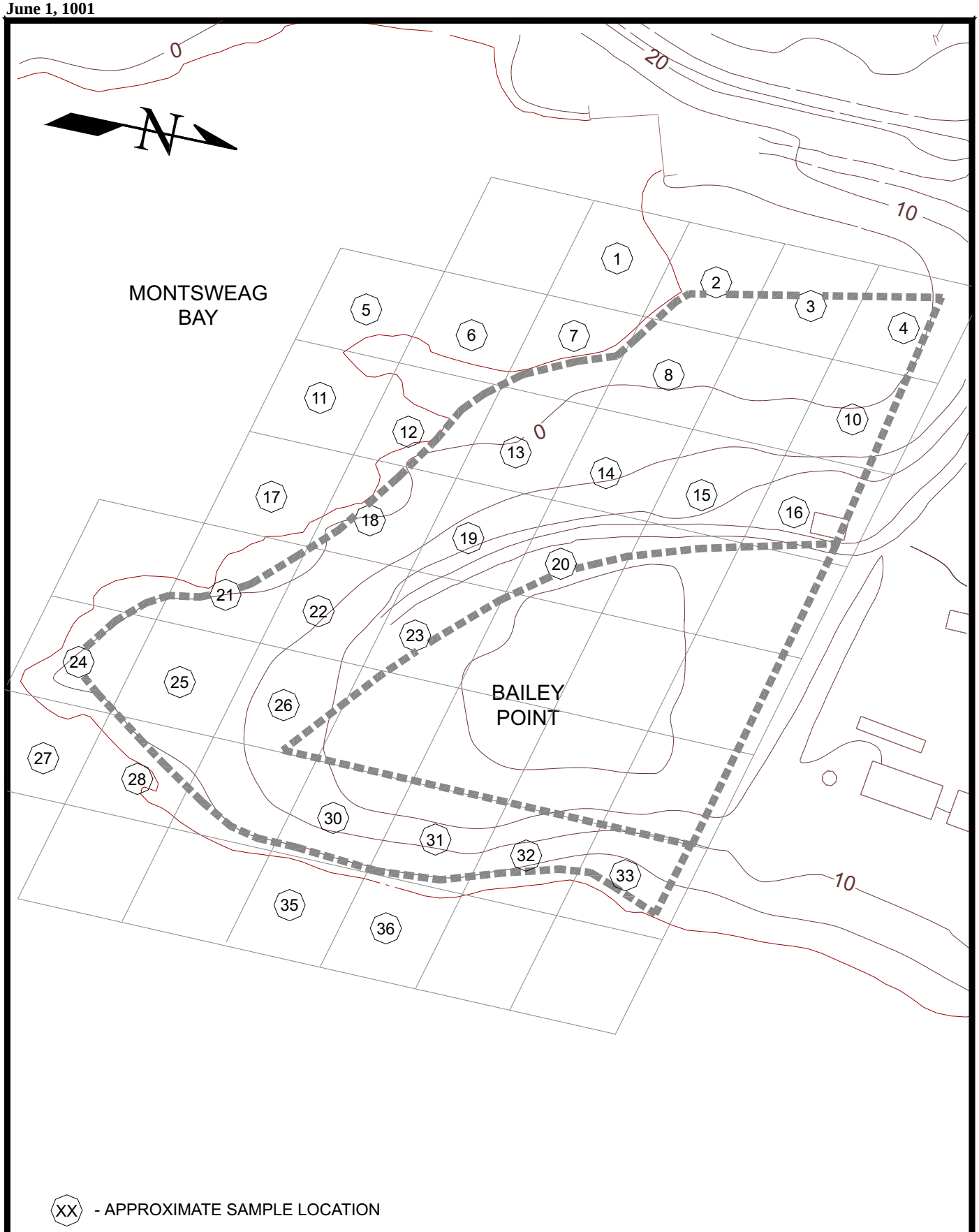
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Forebay Shorelines Survey Package R0400-1A	Figure 2-7



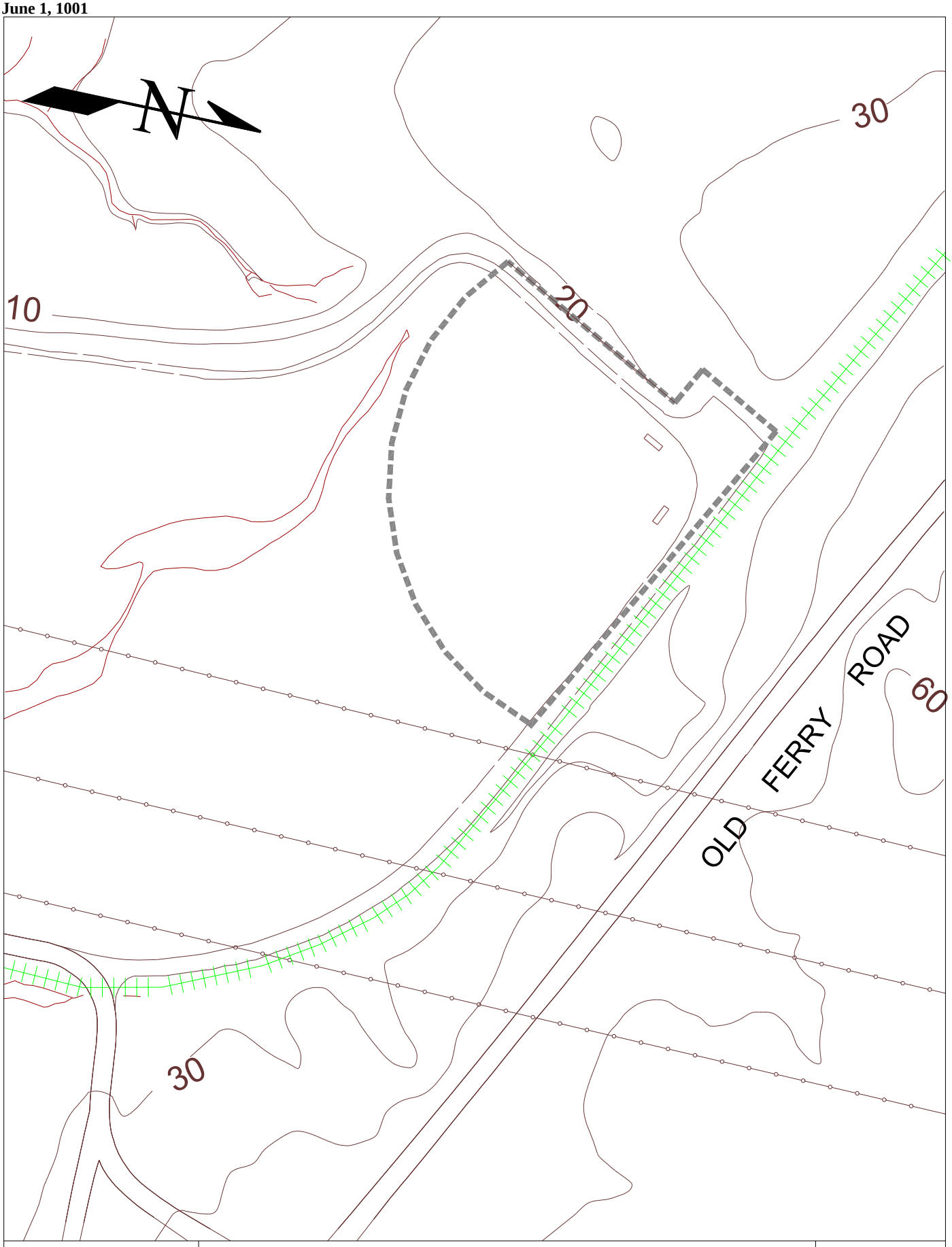
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey Point Survey Package R0500-2	Figure 2-8



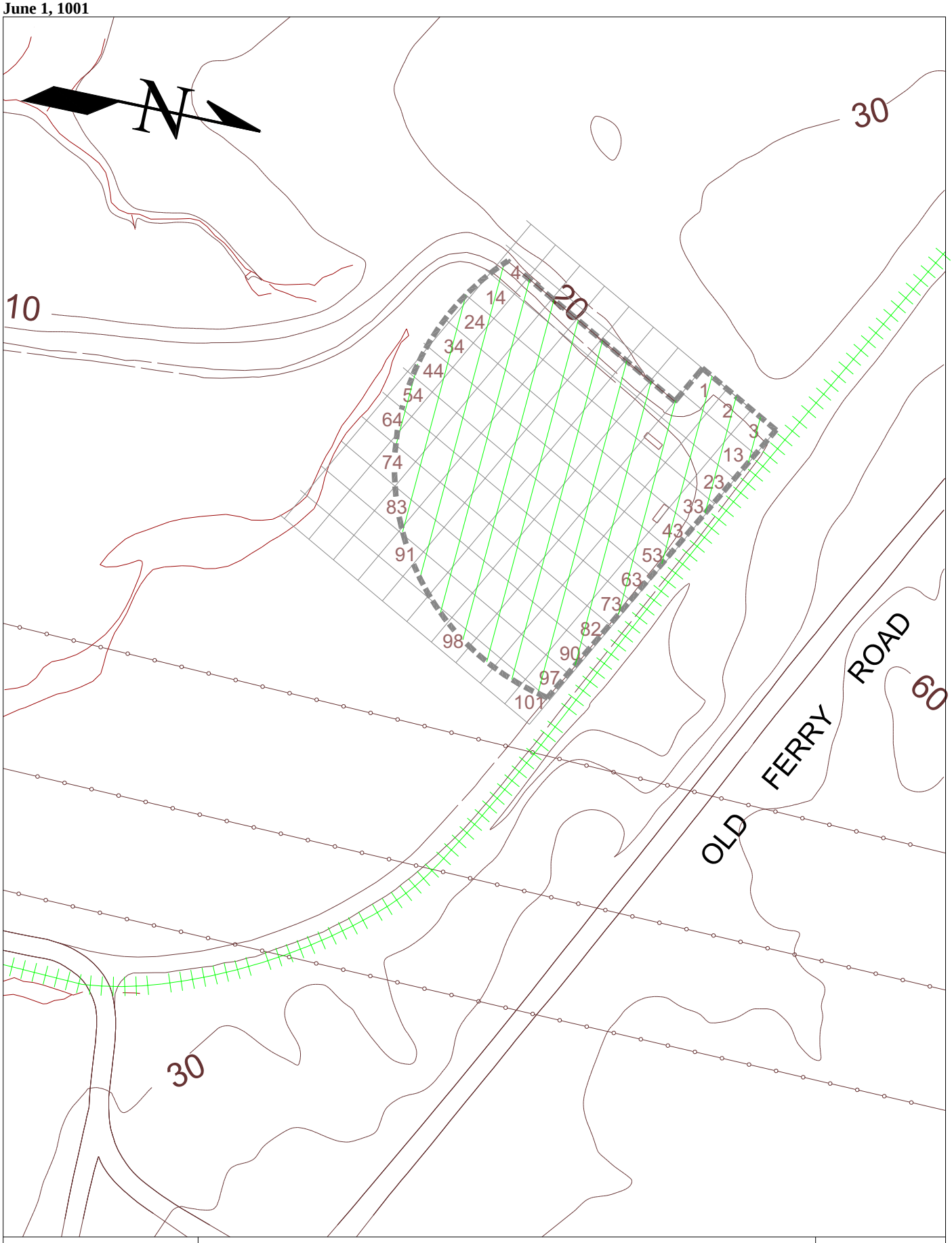
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey Point Survey Package R0500-2	Figure 2-9



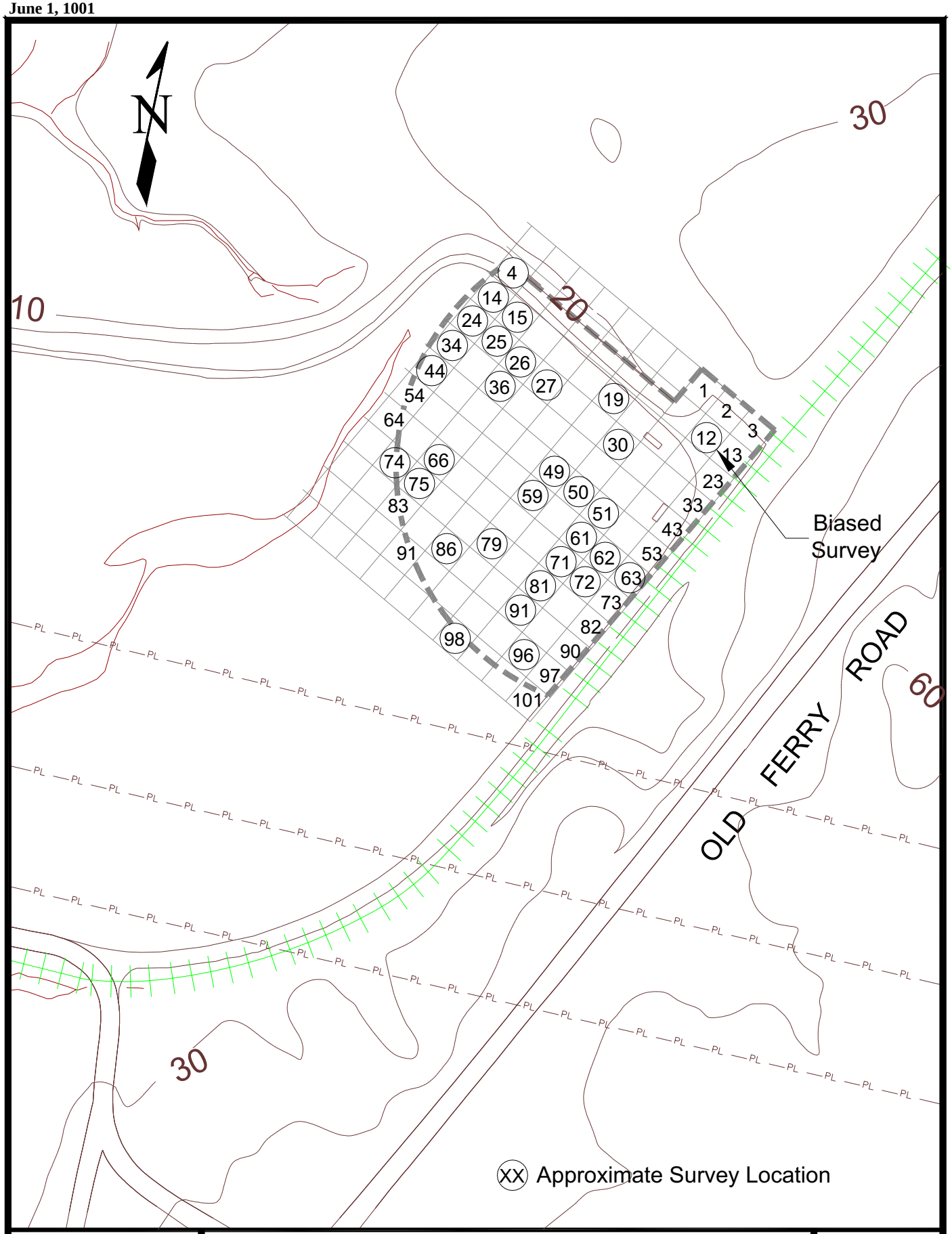
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey Point Survey Package R0500-4	Figure 2-10



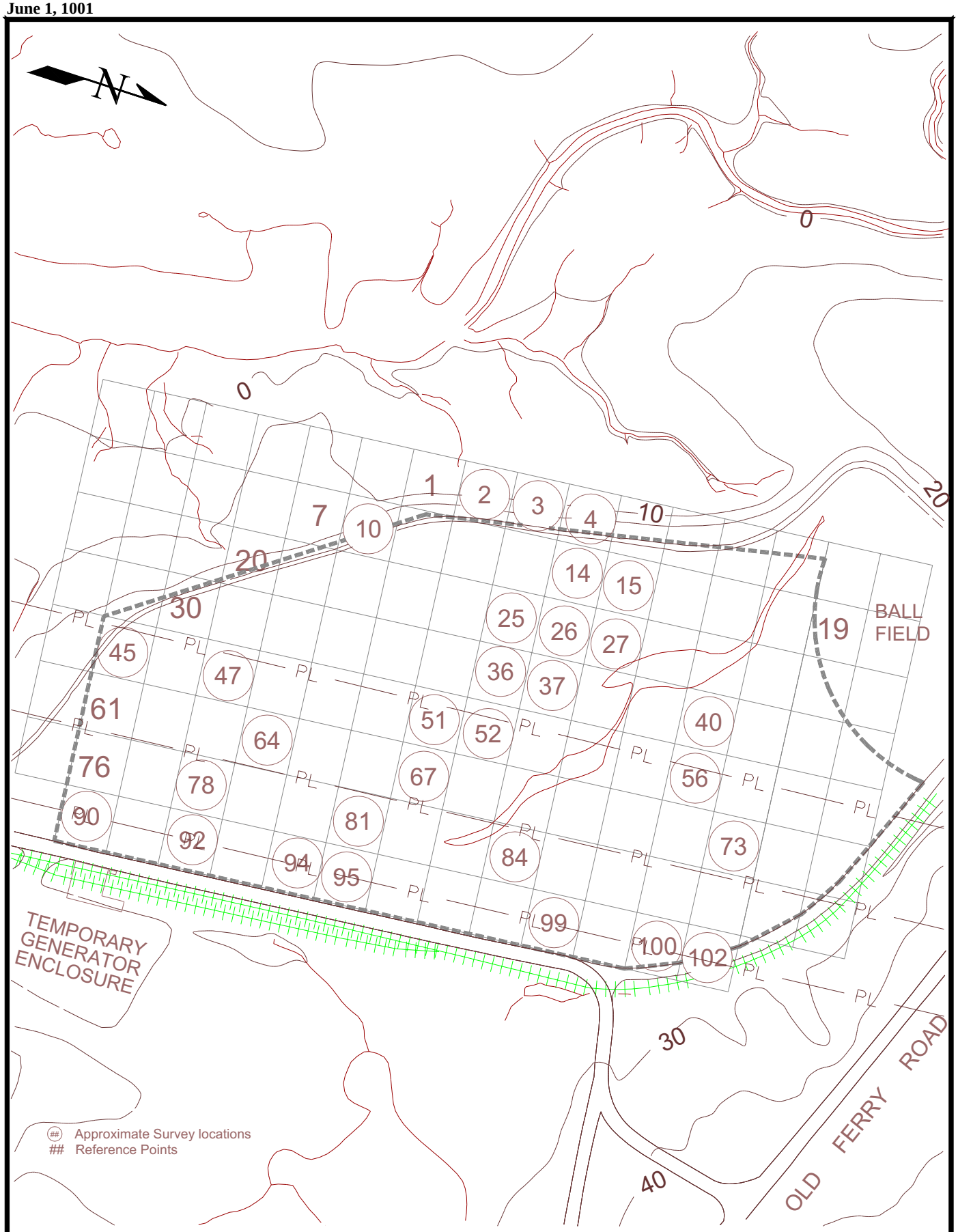
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Ball Field Survey Package R0600-1	Figure 2-11



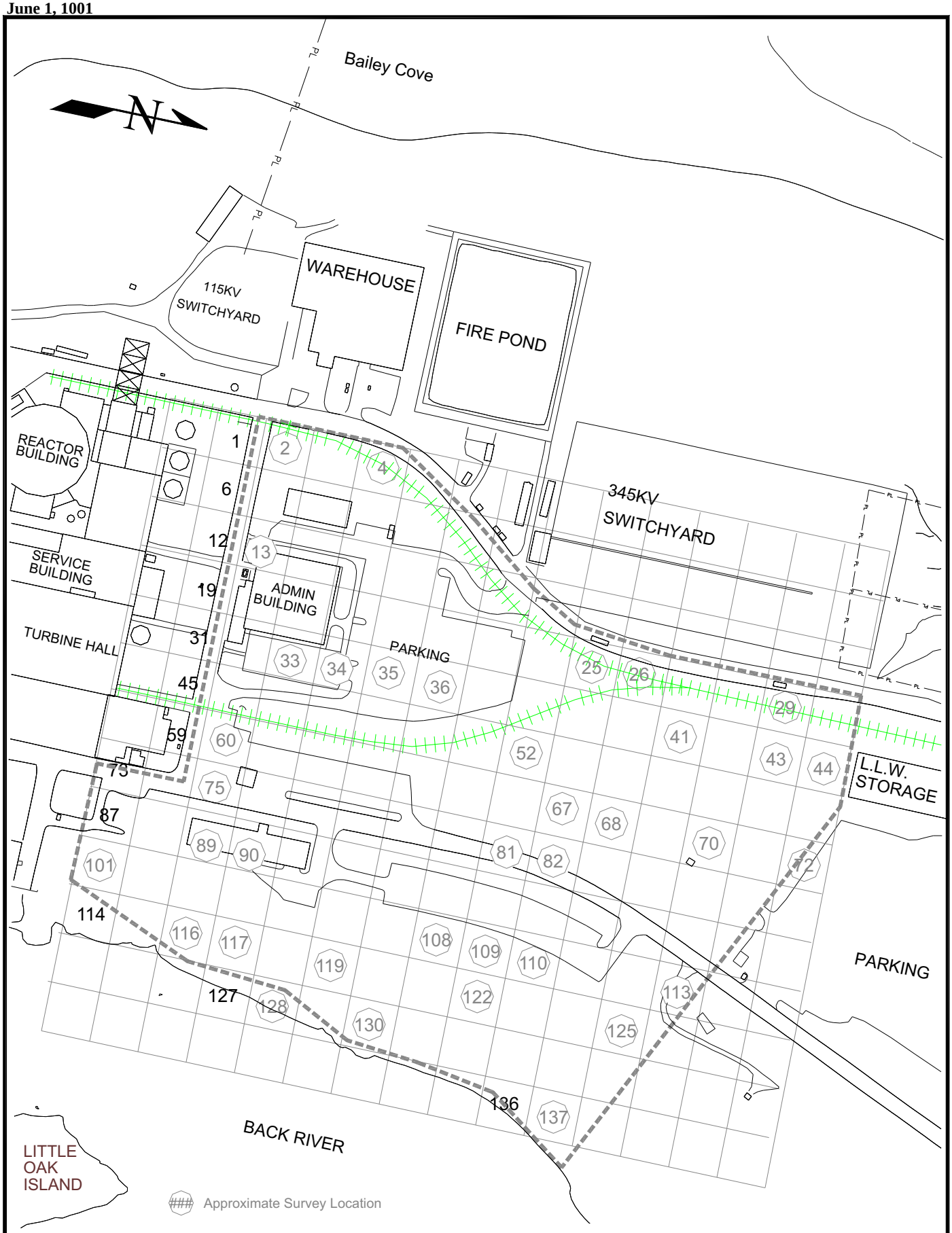
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Ball Field Survey Package R0600-2	Figure 2-12



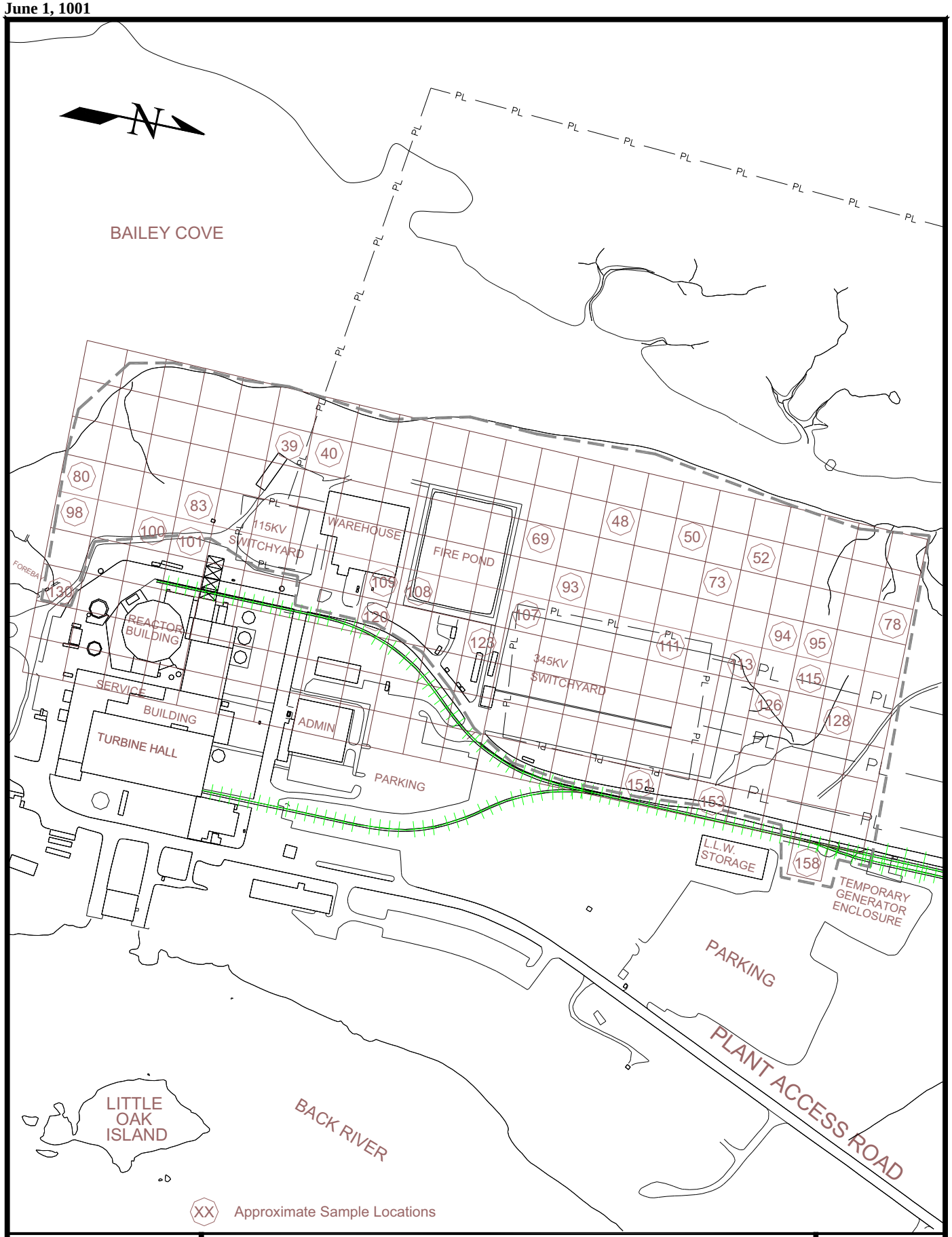
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Ball Field Survey Package R0600-2	Figure 2-13



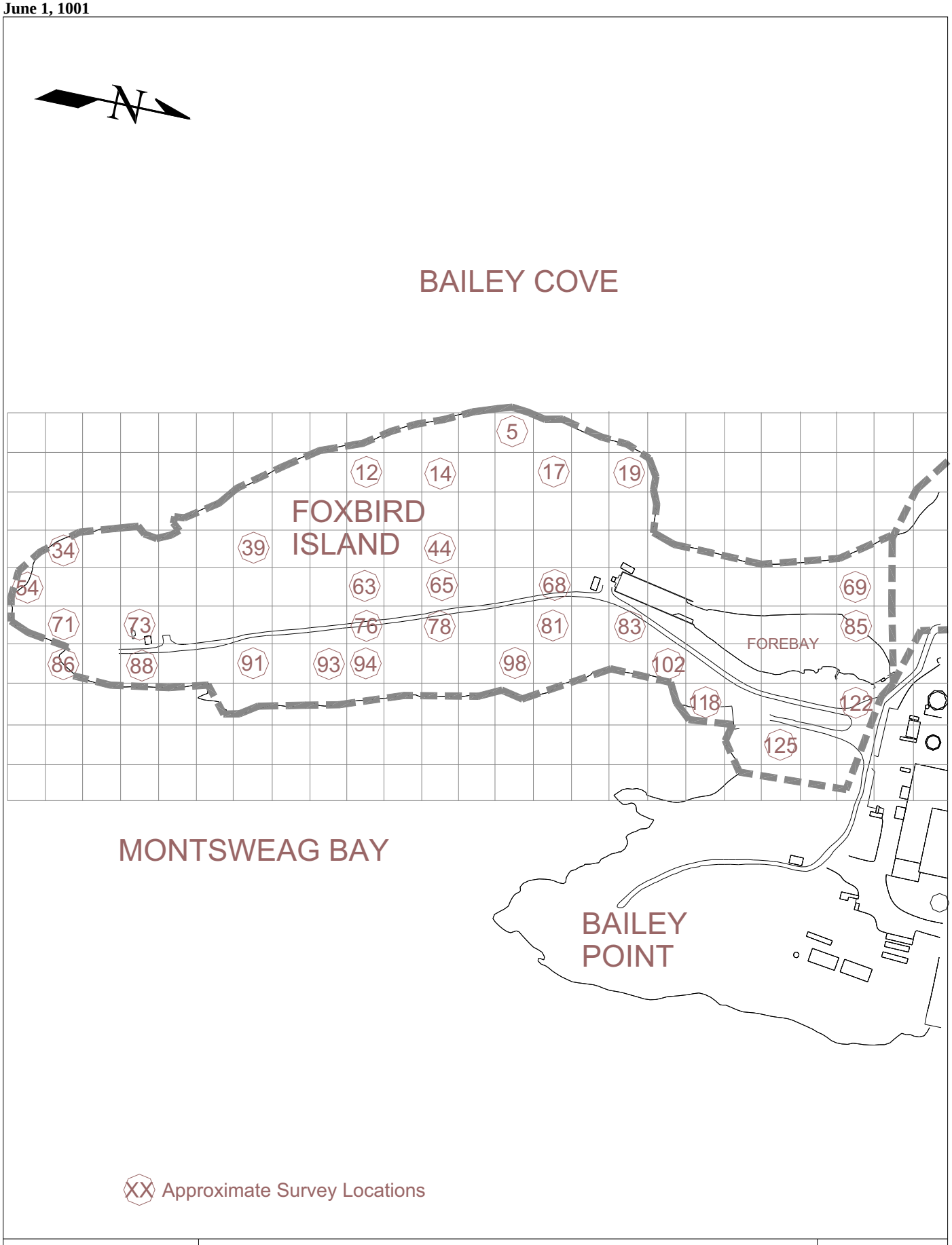
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Construction Debris Landfill Survey Package R0700-2	Figure 2-14



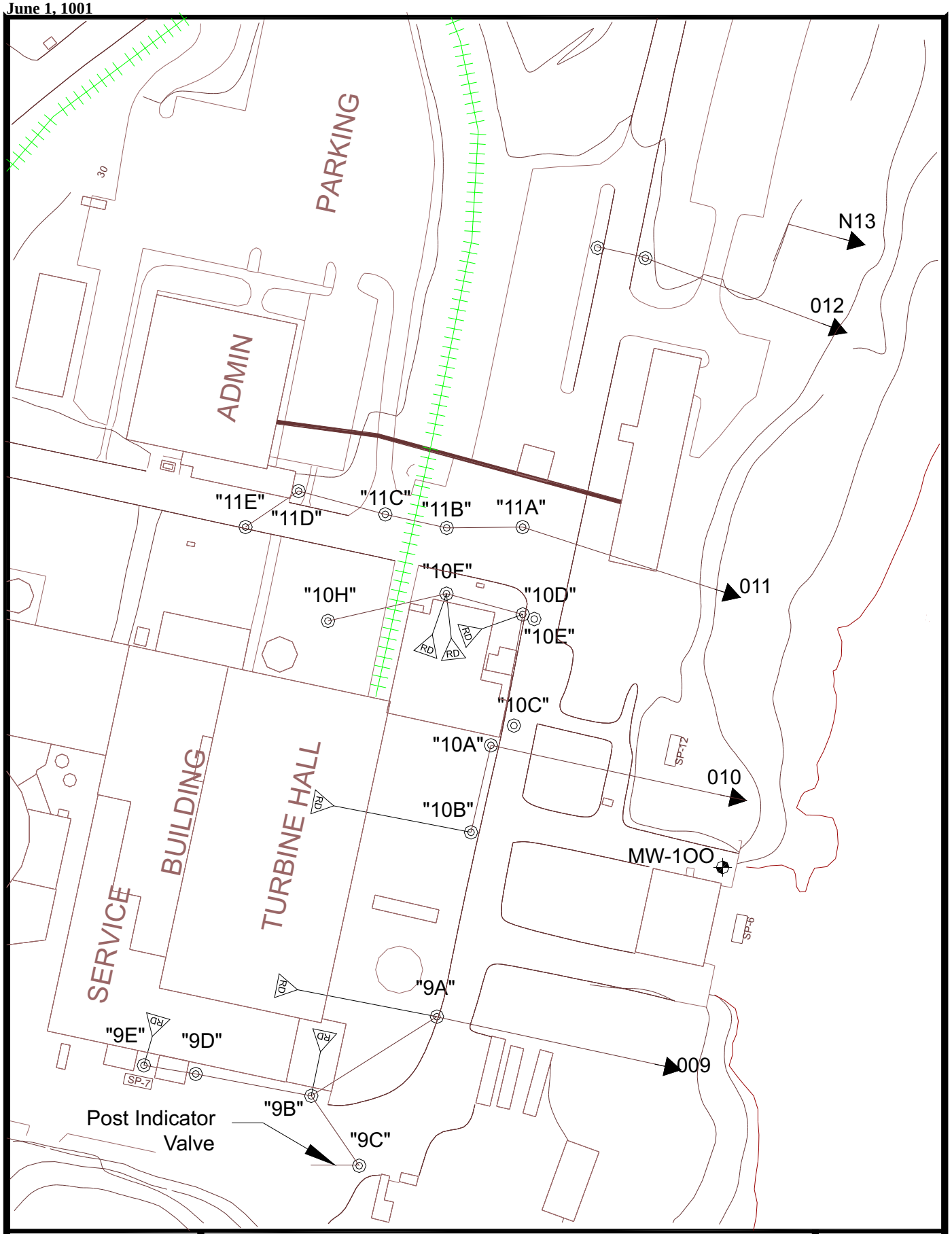
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Admin. and Parking Areas Survey Package R0800-2	Figure 2-15



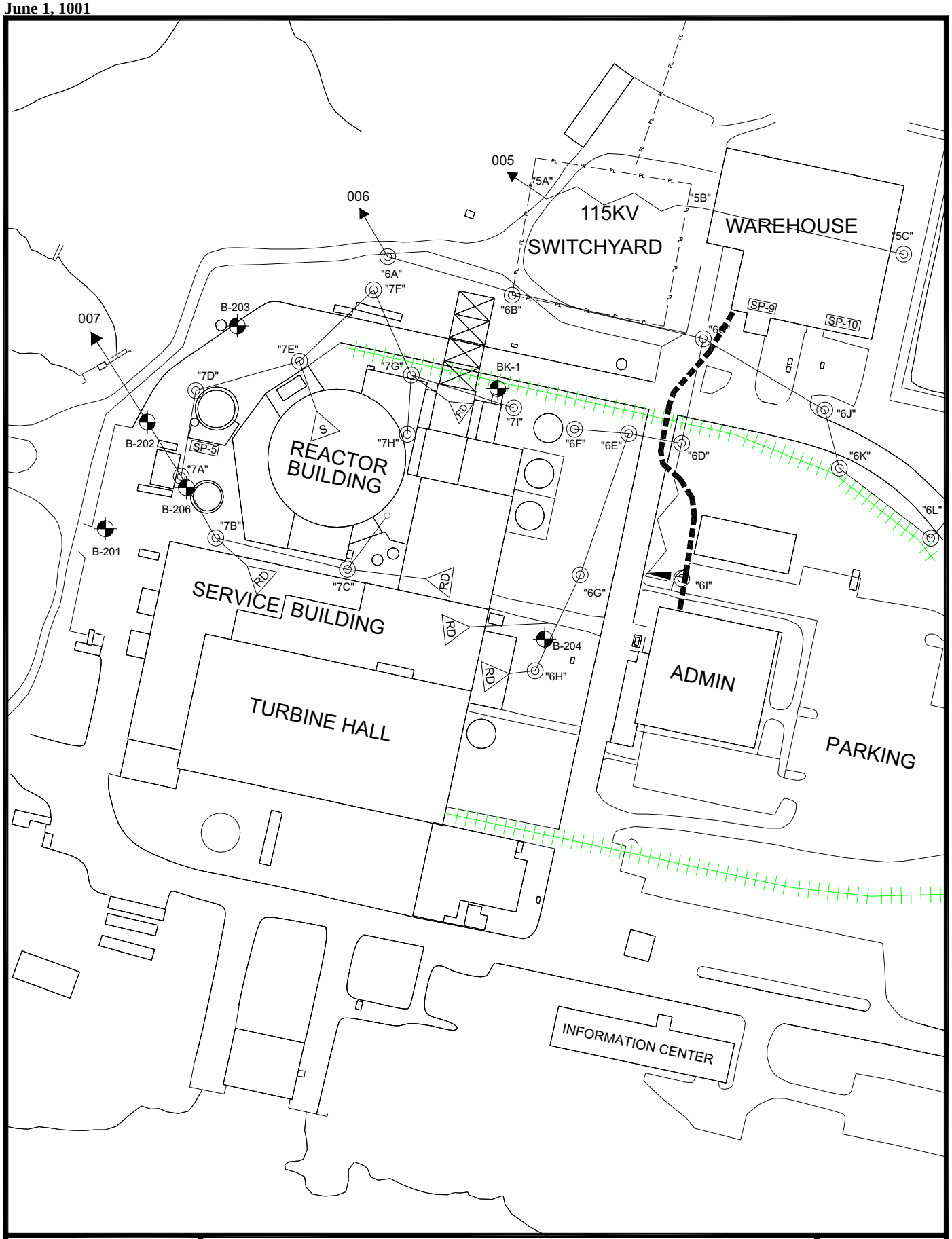
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Balance of Plant Areas Survey Package R0900	Figure 2-16



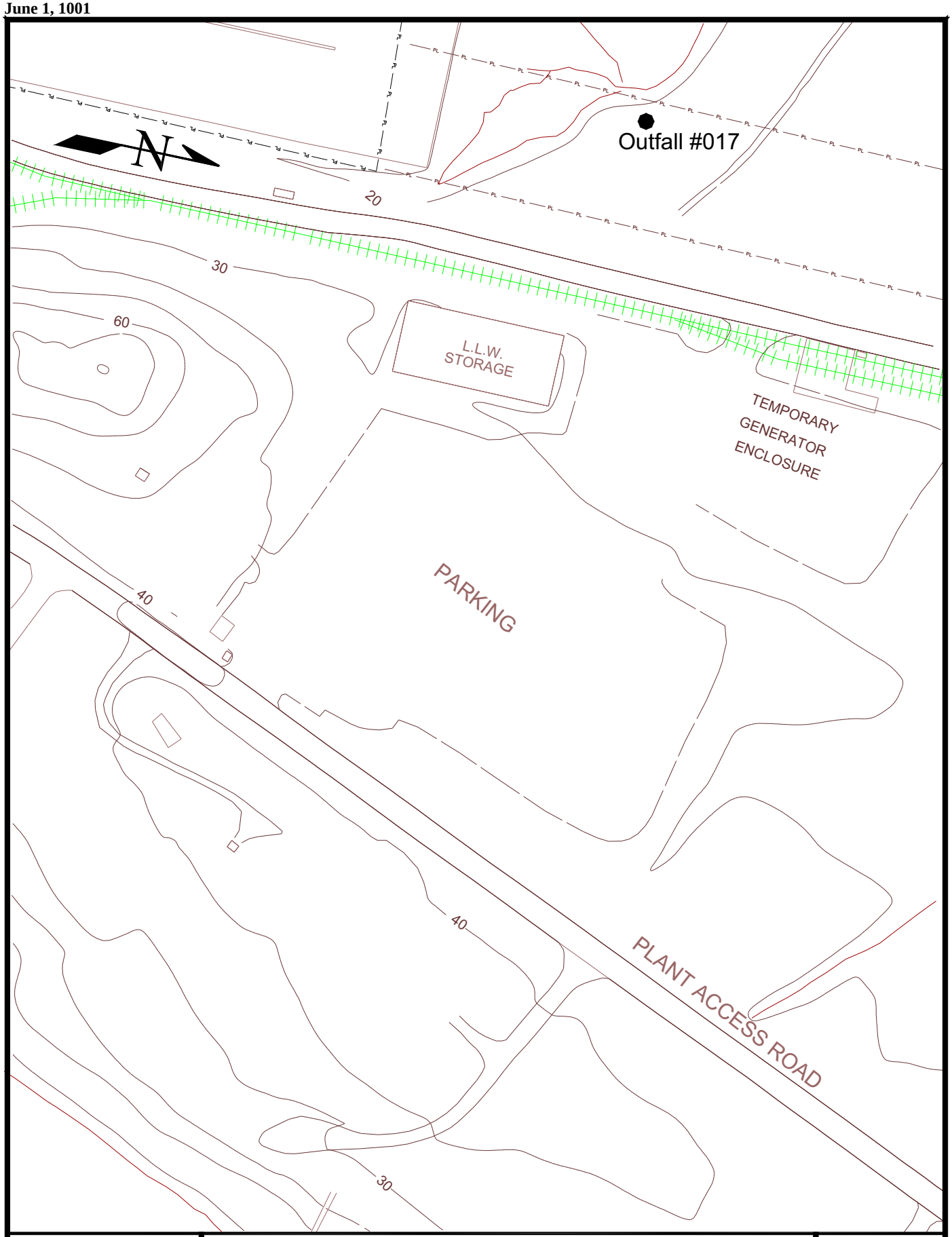
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Foxbird Island Survey Package R1000	Figure 2-17



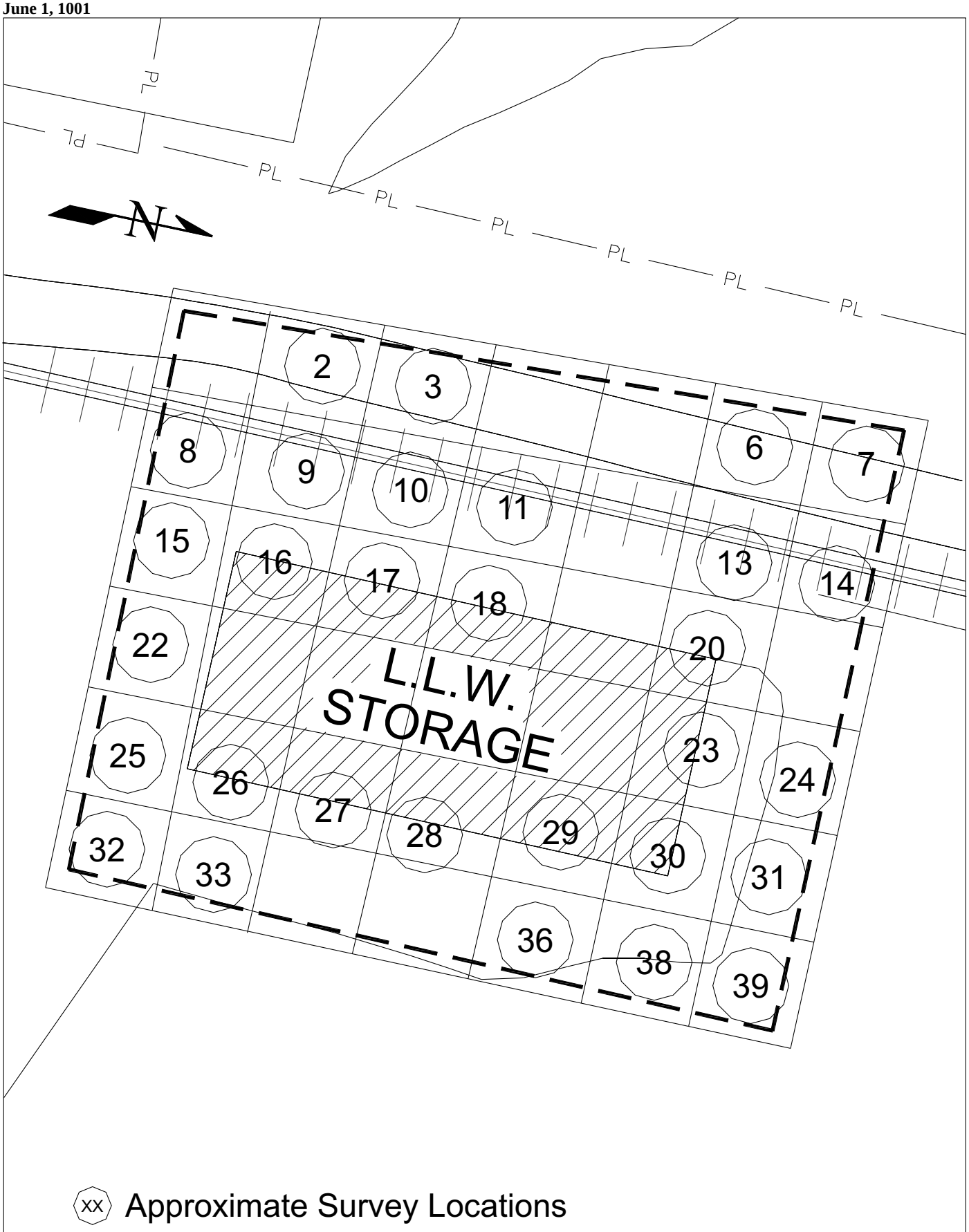
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof and Yard Drains #005, 009-12; Survey Package R1100-1	Figure 2-18



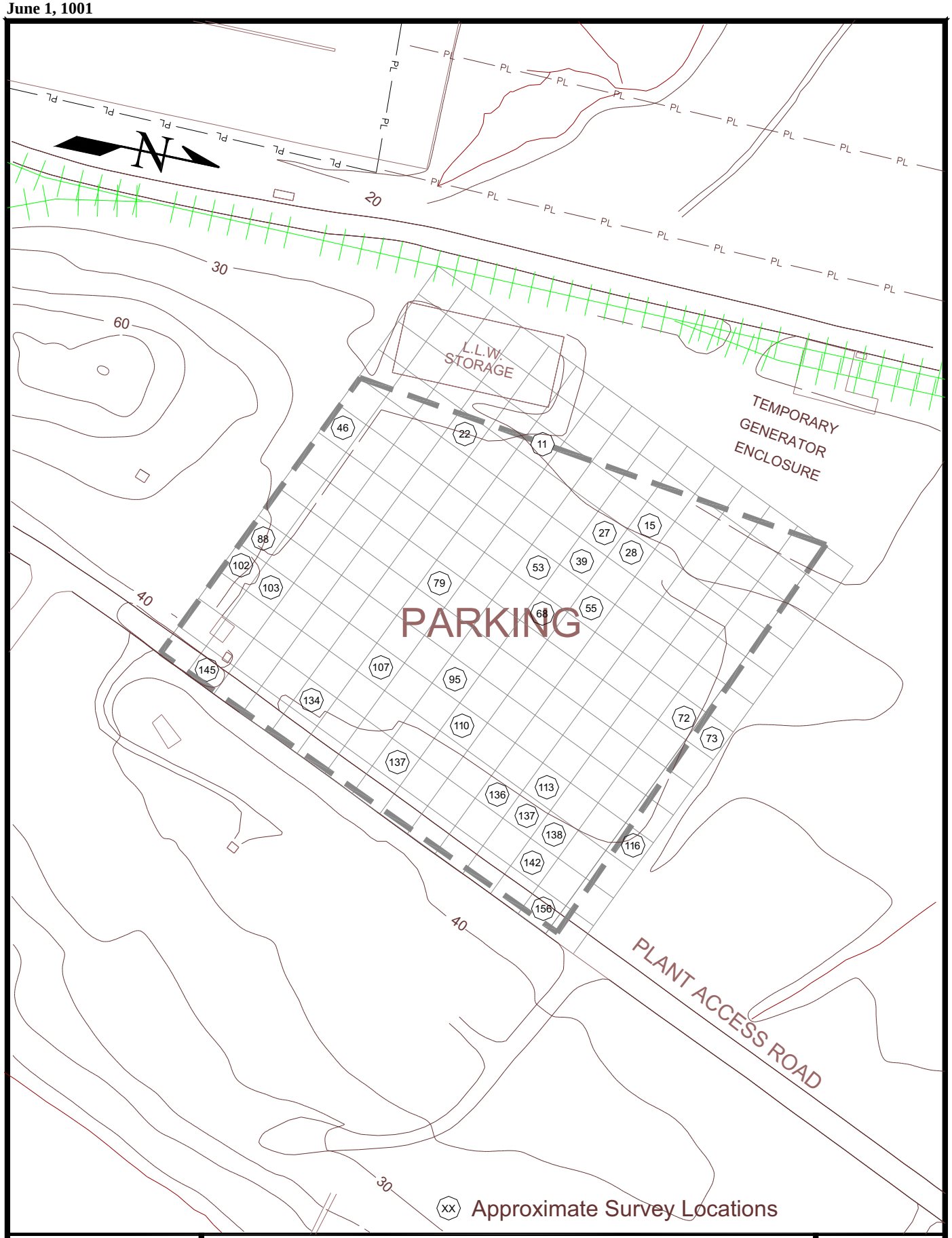
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof and Yard Drains #005, 006, and 007 Survey Package R1100-1	Figure 2-19



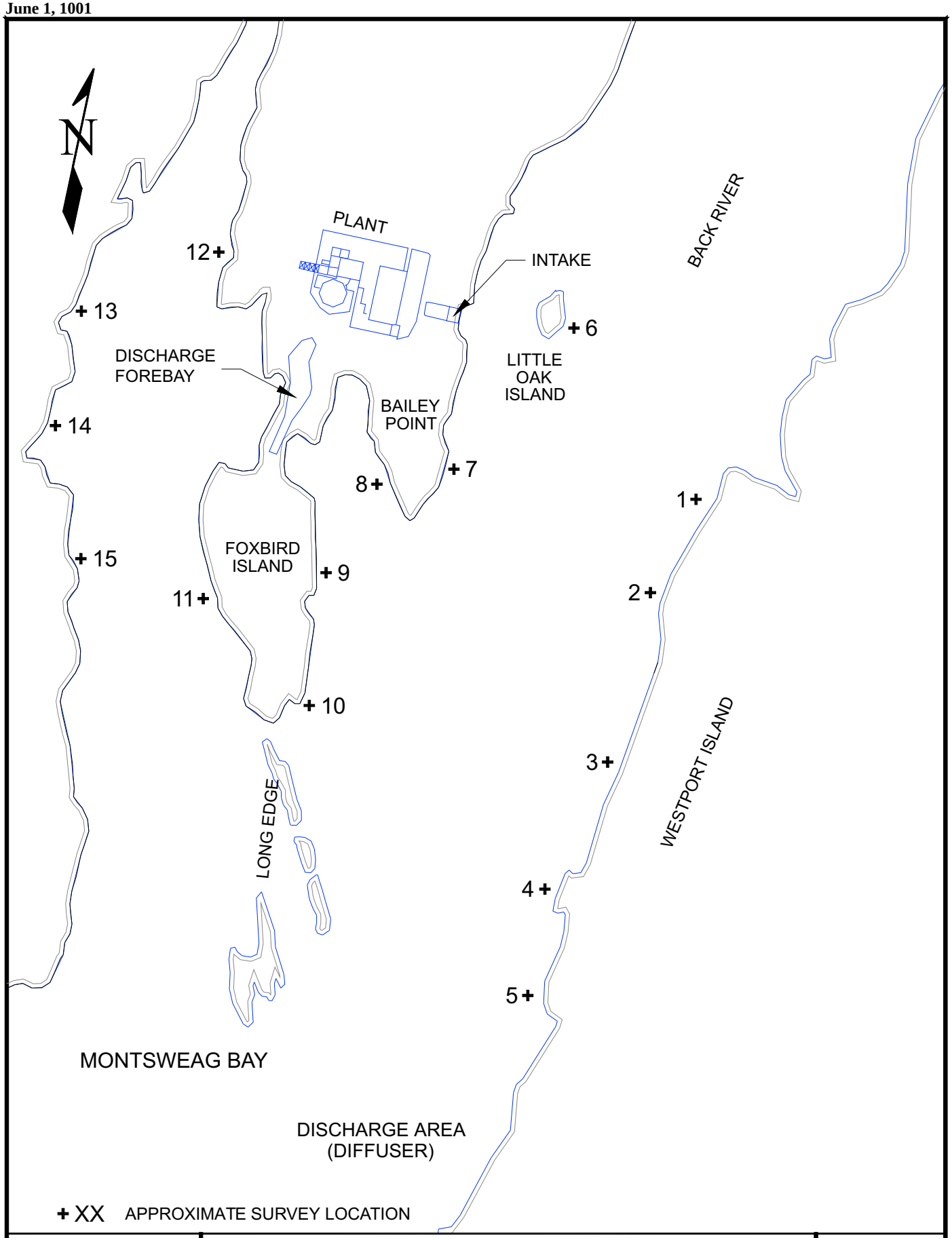
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof and Yard Drains #017 Survey Package R1100-1	Figure 2-20



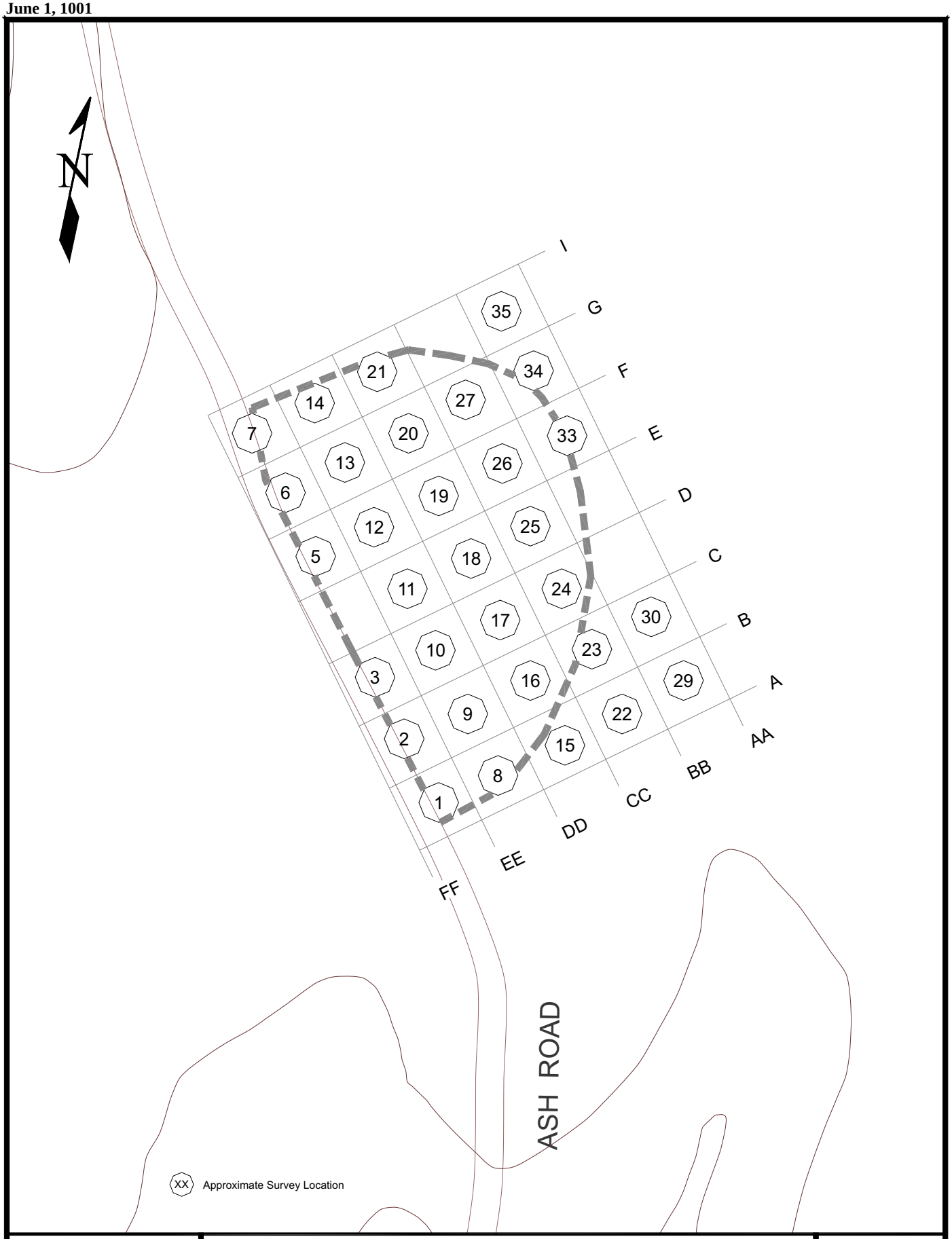
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Low Level Radioactive Waste (LLRW) Storage Yard Survey Package R1200-2	Figure 2-21



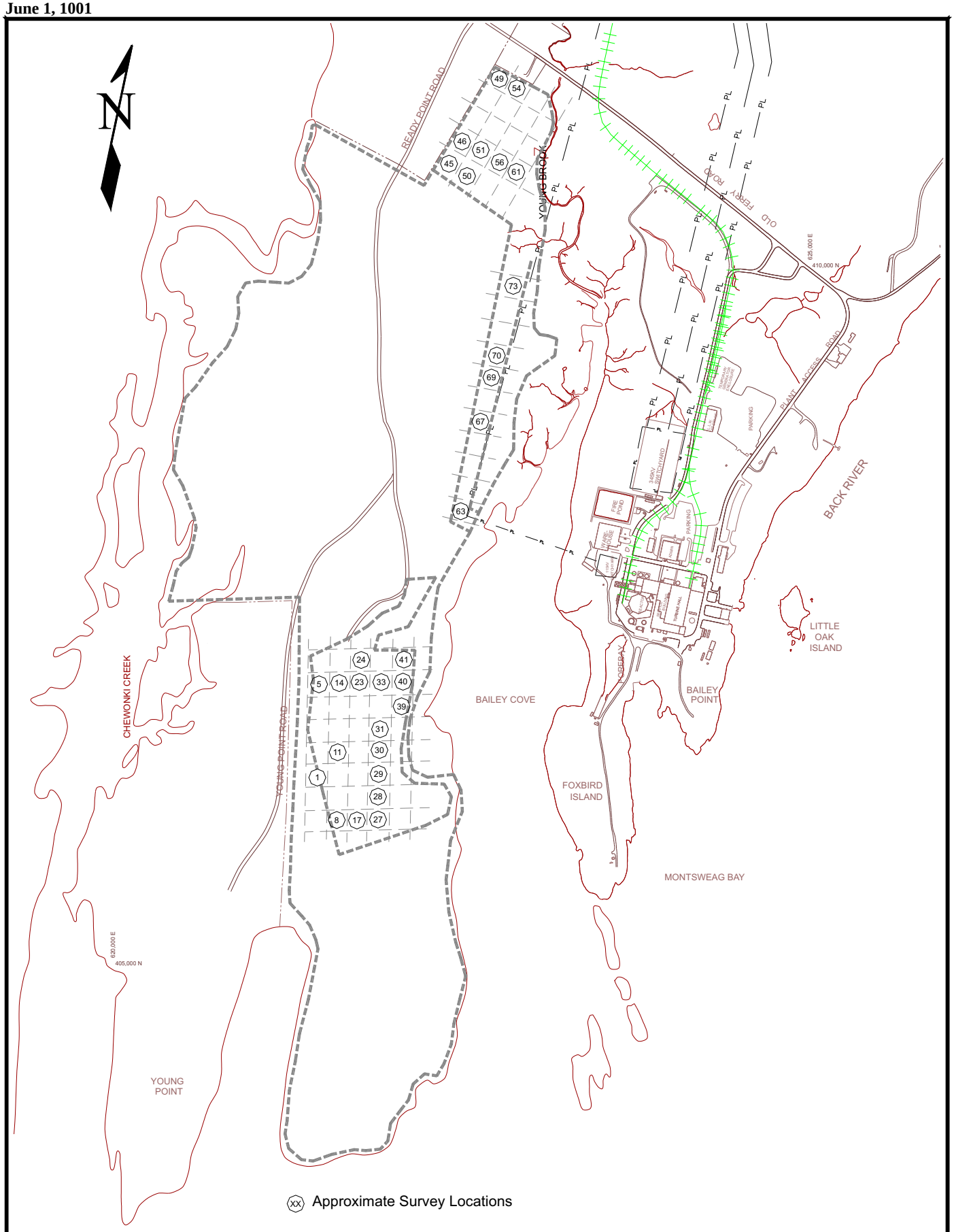
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Dry Cask Storage Area Survey Package R1300-2	Figure 2-22



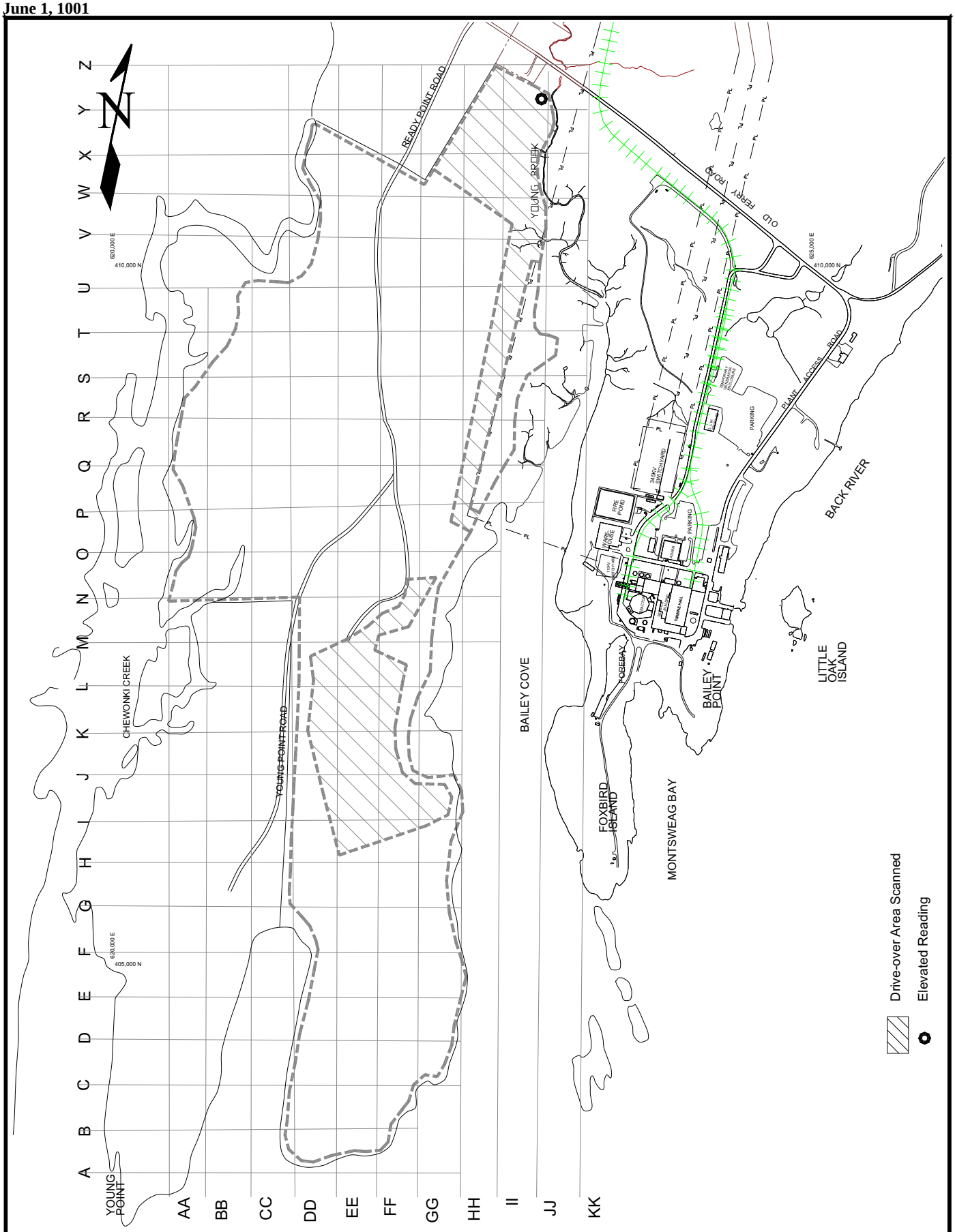
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Westport, Montsweag Bay, Bailey Point and Cove, and Plant Area Shorelines Survey Package R1400-1	Figure 2-23



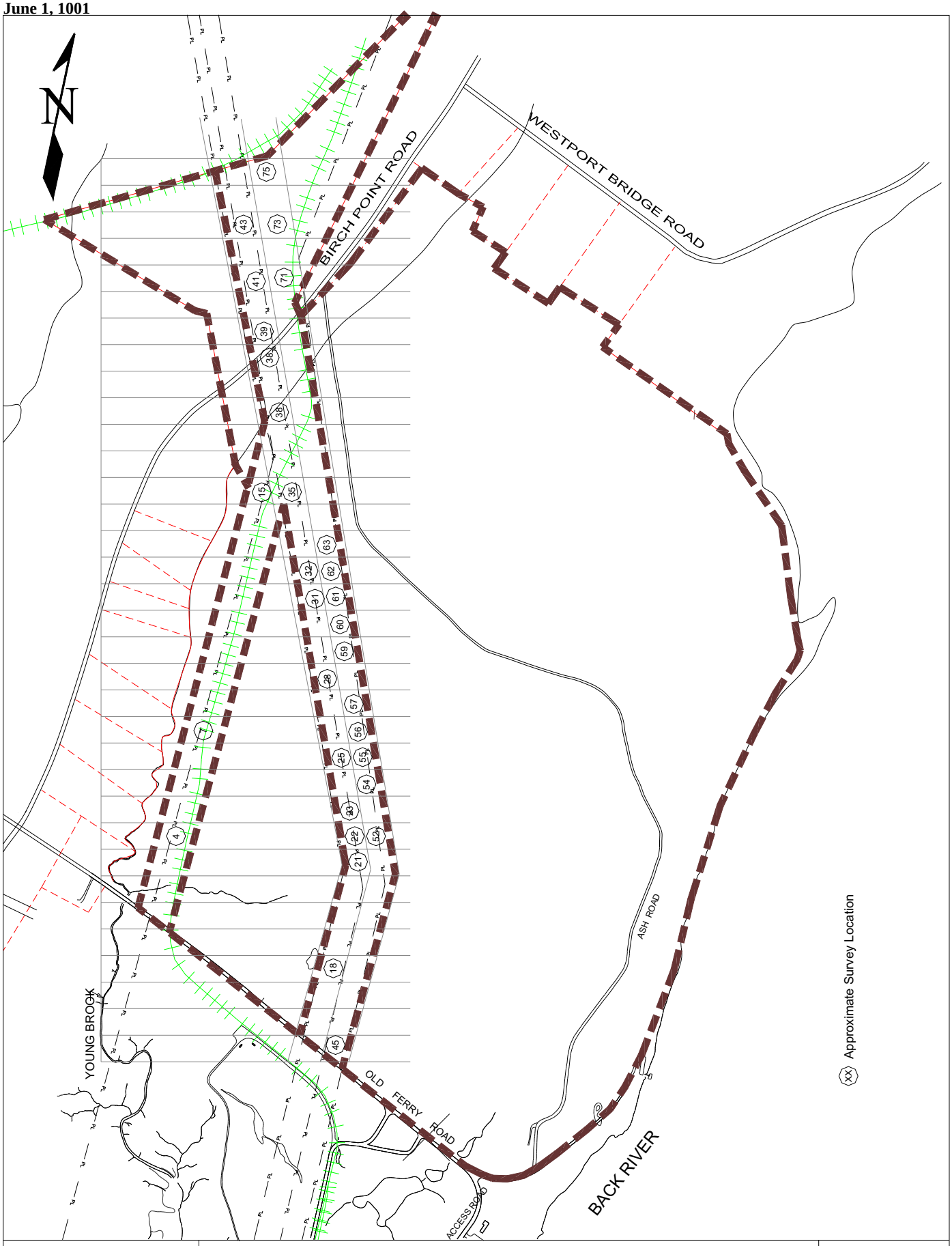
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Ash Road Rubble Piles Survey Package R1500-2	Figure 2-24



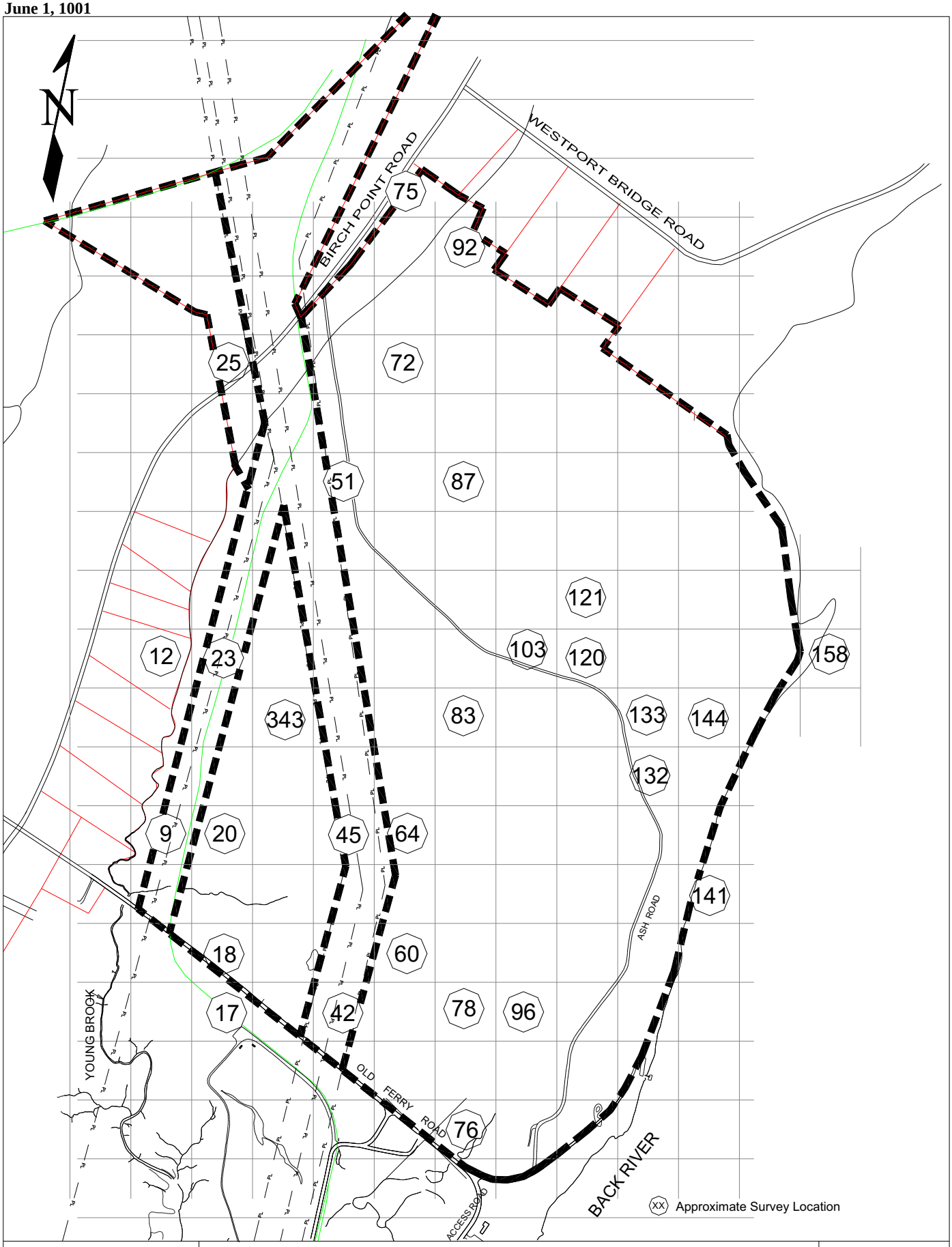
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Owner Controlled Area Survey Package R1600-4	Figure 2-25



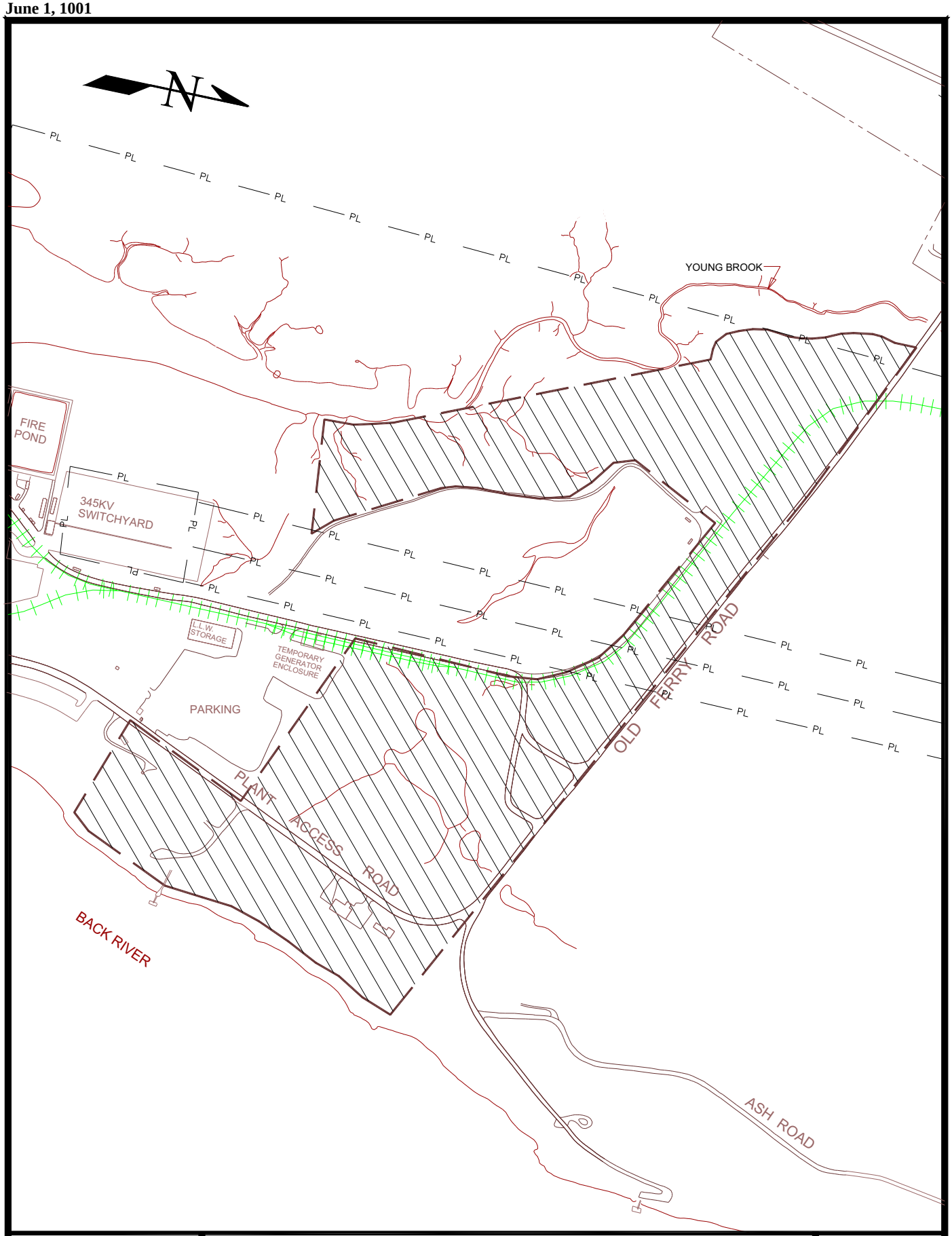
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Owner Controlled Area Survey Package R1600-4	Figure 2-26



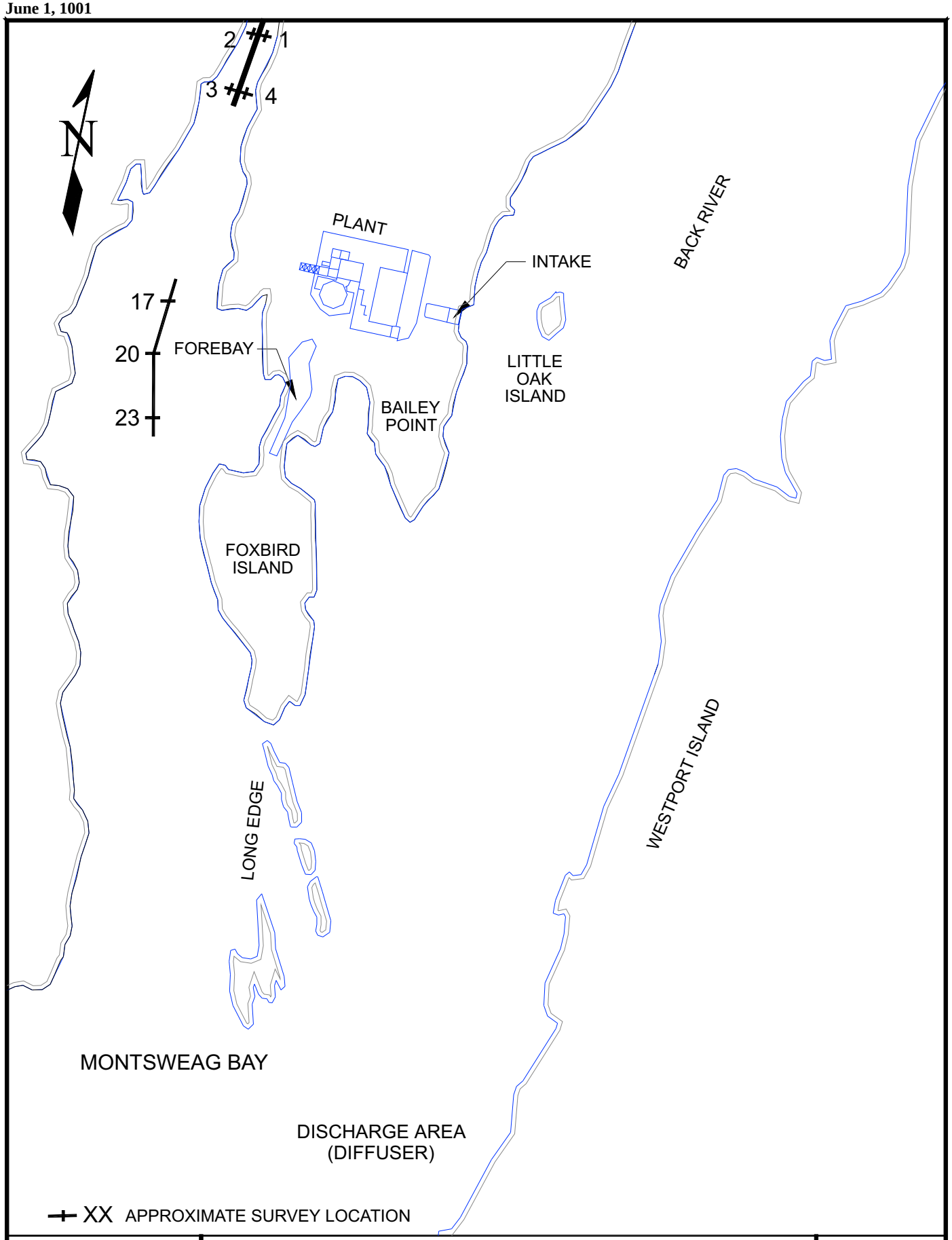
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Owner Controlled Area North of Old Ferry RD Survey Package R1700-1	Figure 2-27



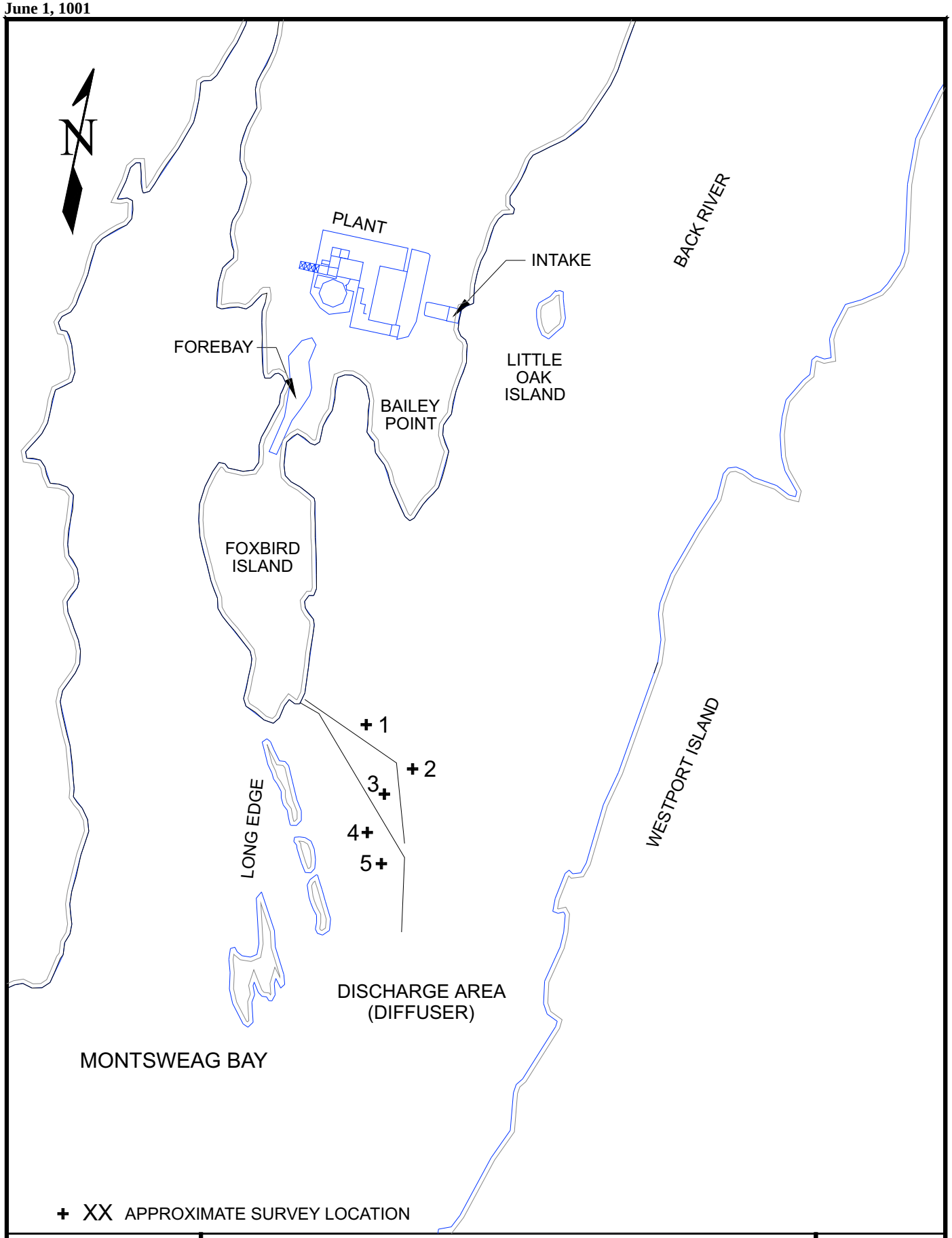
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Owner Controlled Area North of Old Ferry RD Survey Package R1700-4	Figure 2-28



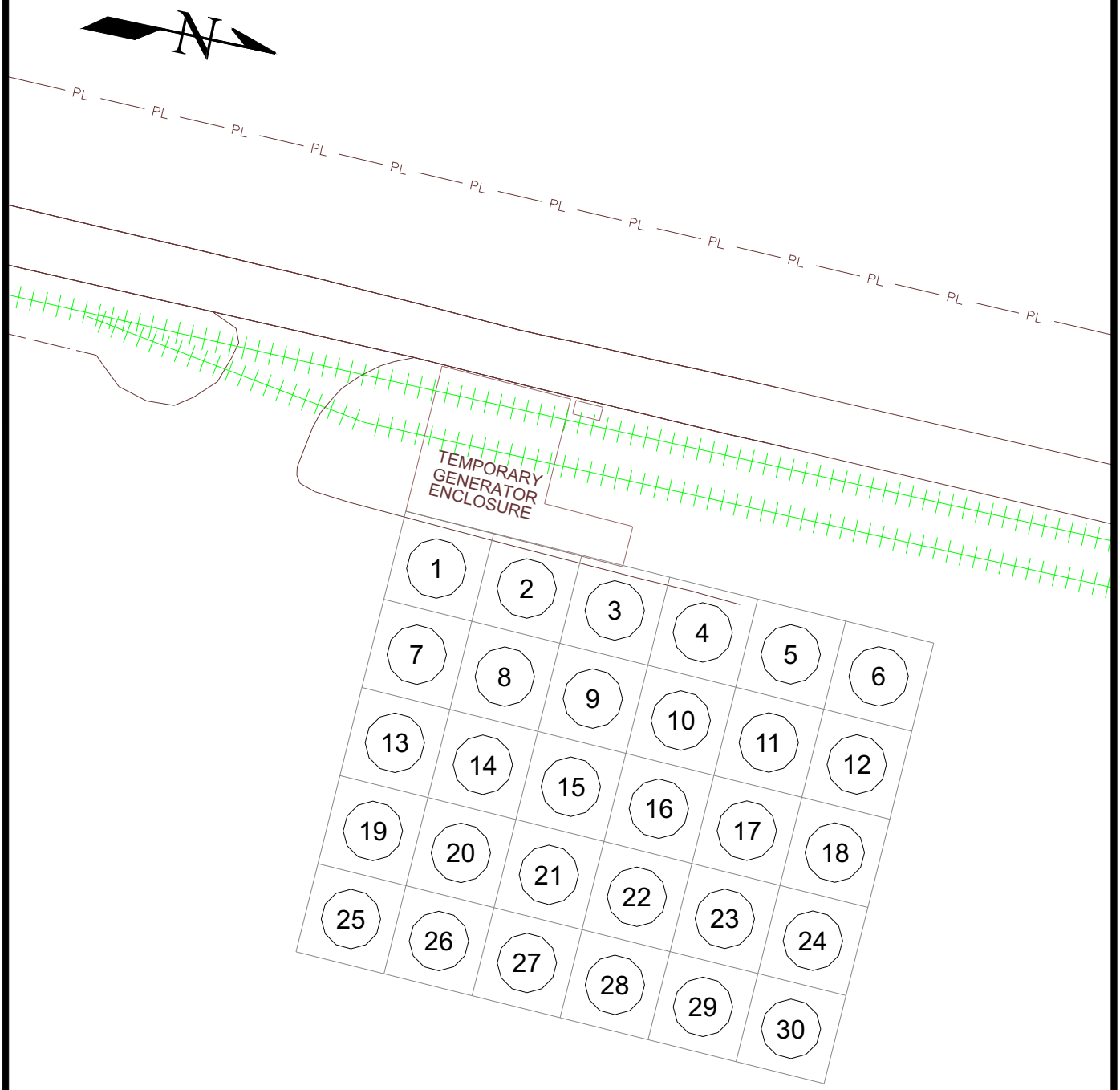
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey House Area Survey Package R1800-1	Figure 2-29



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey Cove Survey Package R1900	Figure 2-30

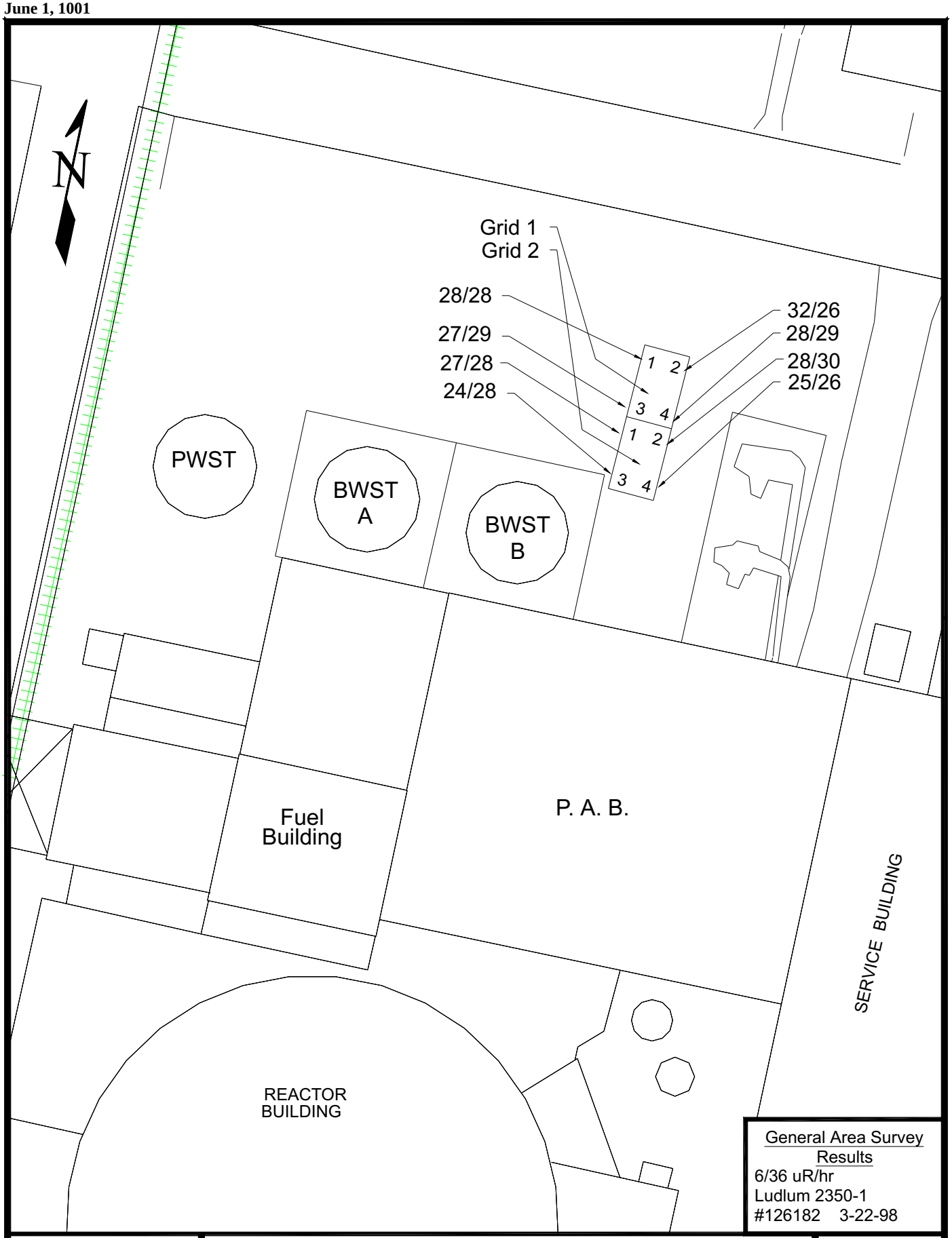


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Diffusers Survey Package R2000	Figure 2-31

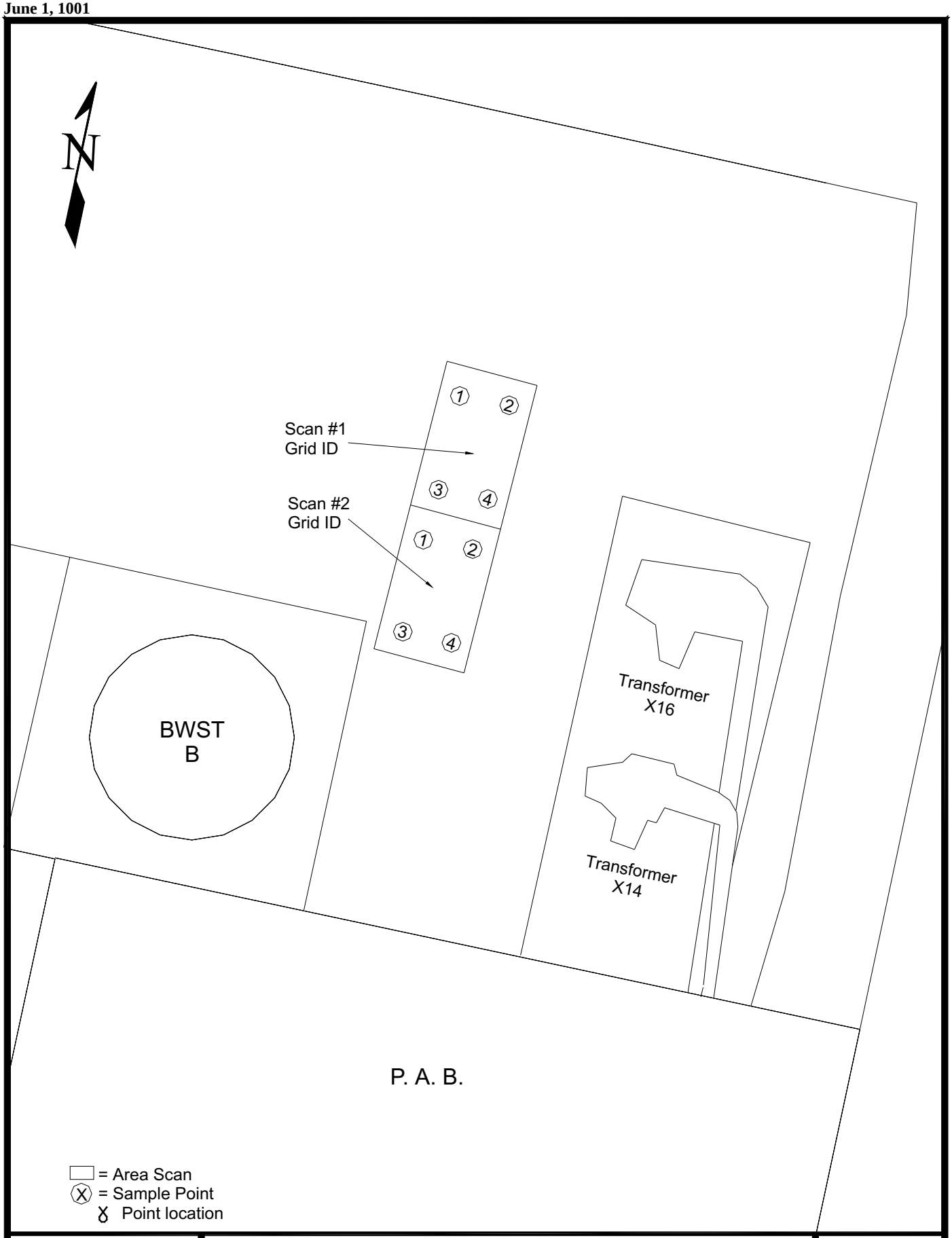


XXX Approximate location of sample and survey point

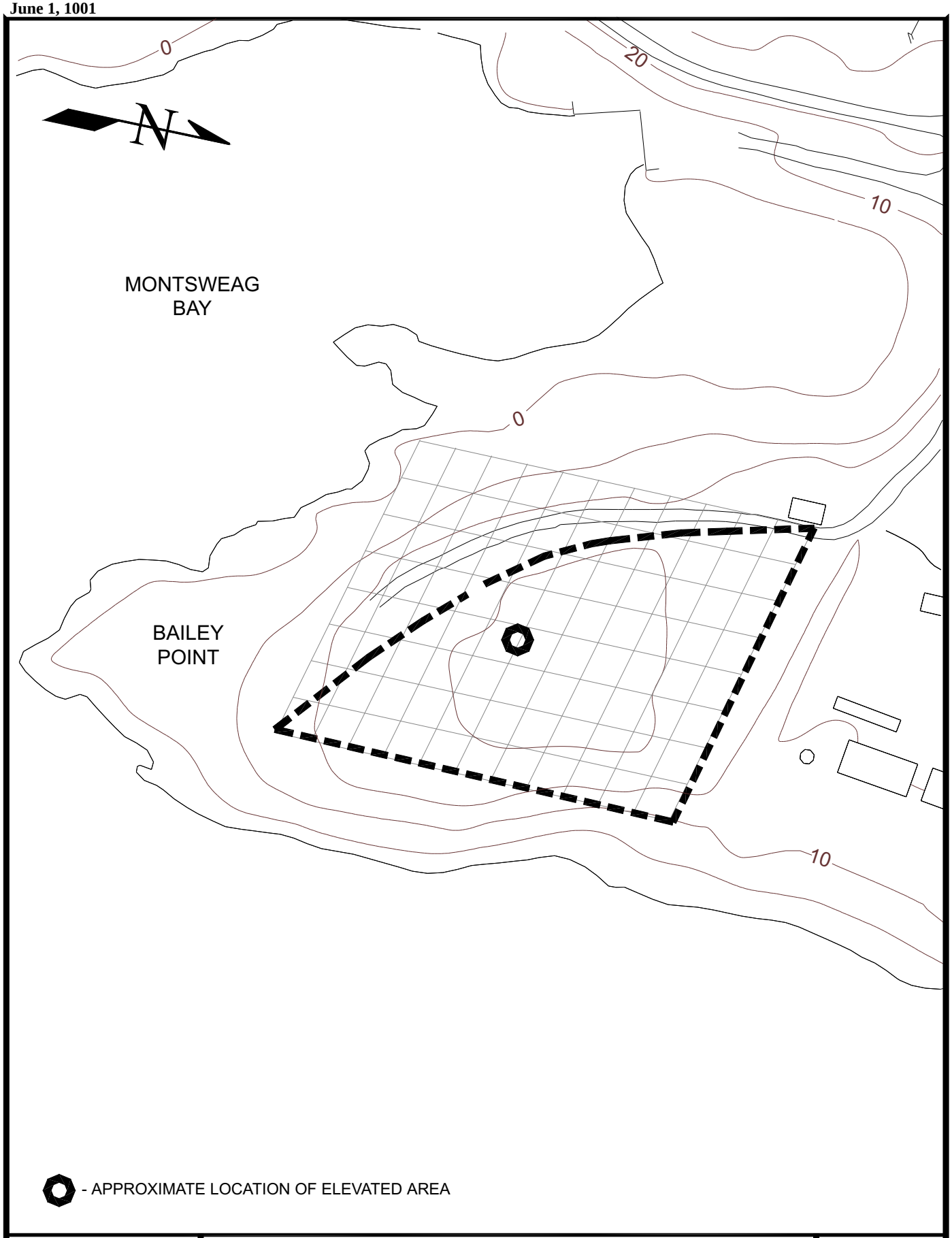
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Maintenance Yard (Stockyard) Survey Package R2100	Figure 2-32



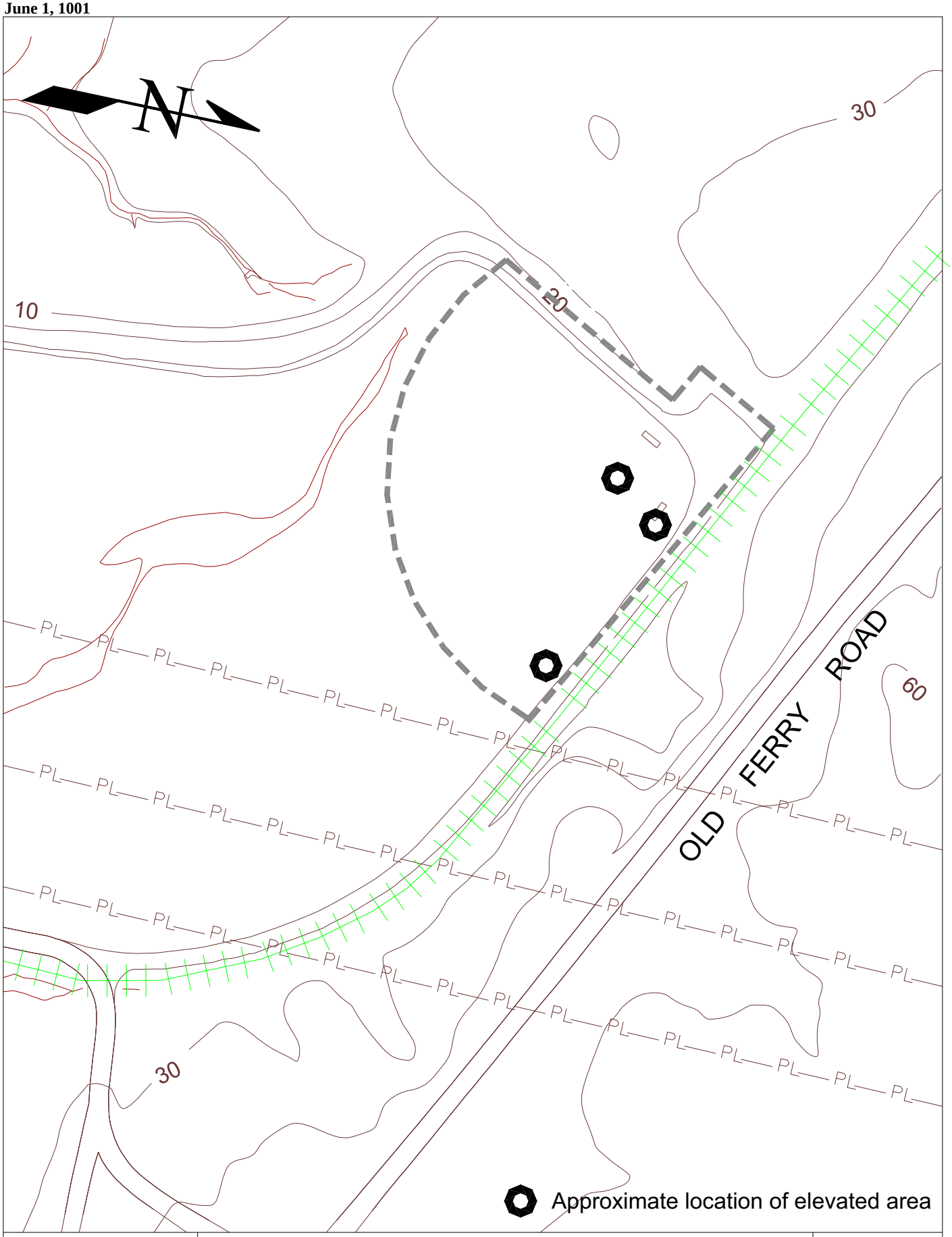
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof SFPI Substation Slab Survey Package R2300-1	Figure 2-33



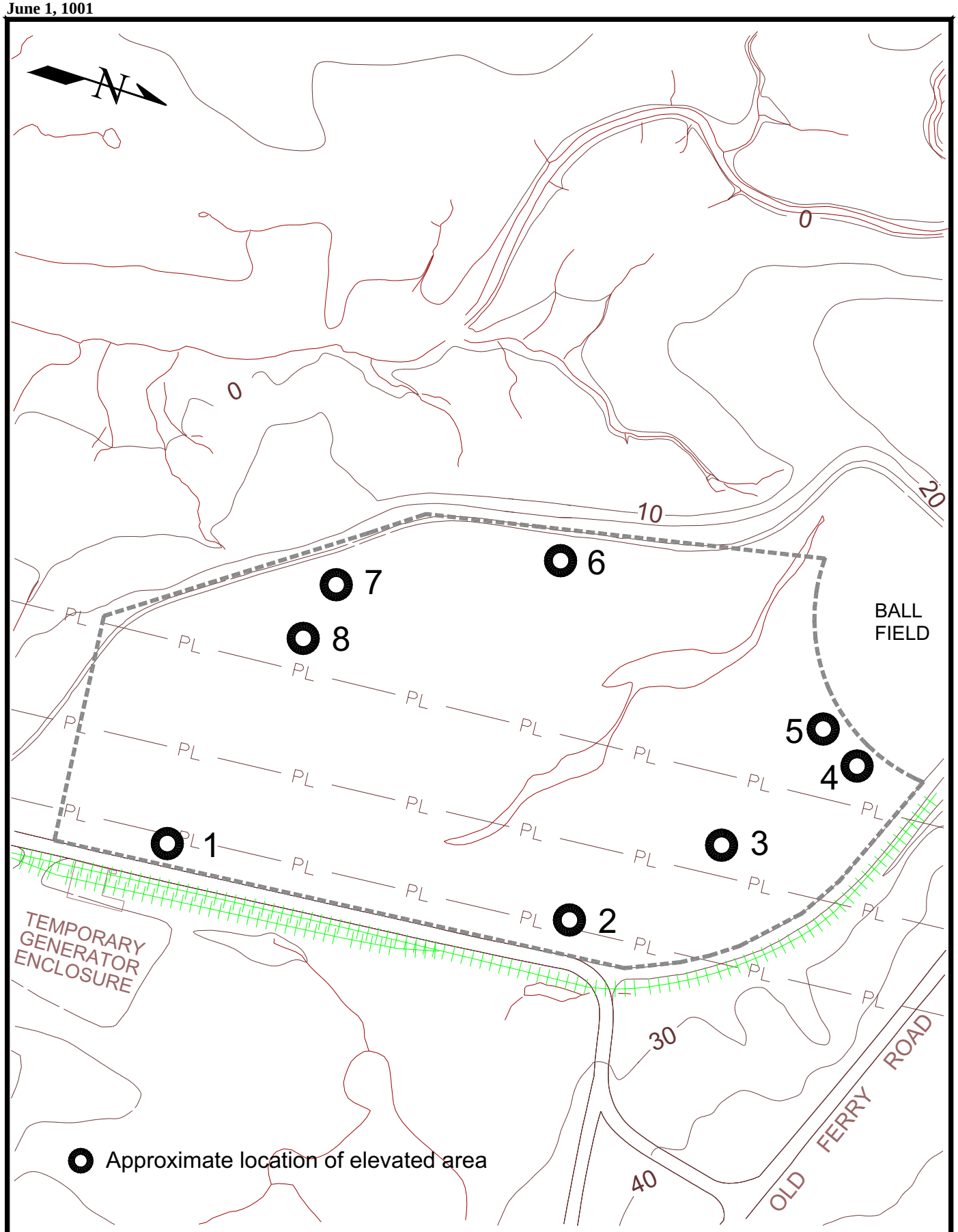
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Roof SFPI Substation Slab Survey Package R2300-2	Figure 2-34



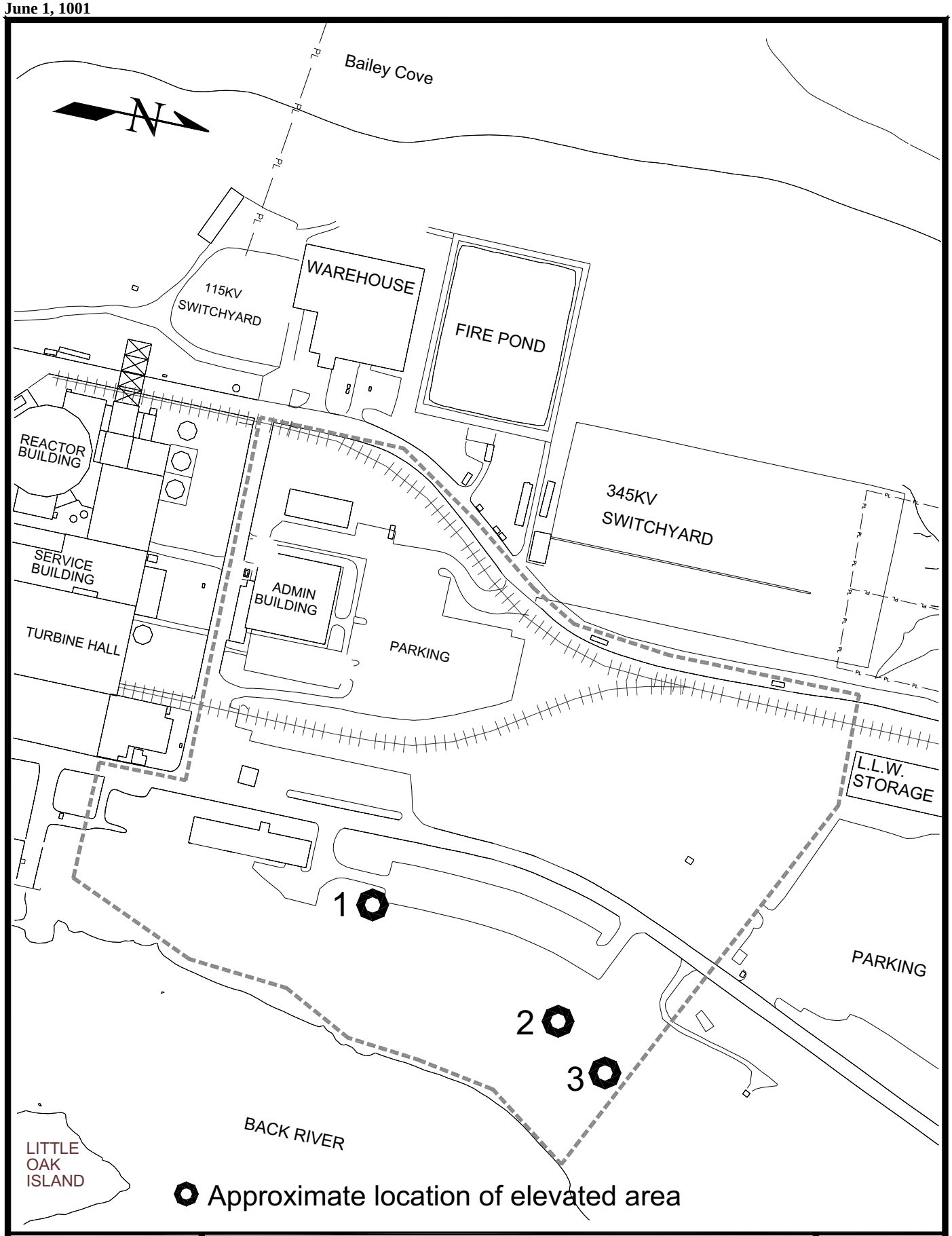
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Elevated Areas Survey Package R2500-1	Figure 2-35



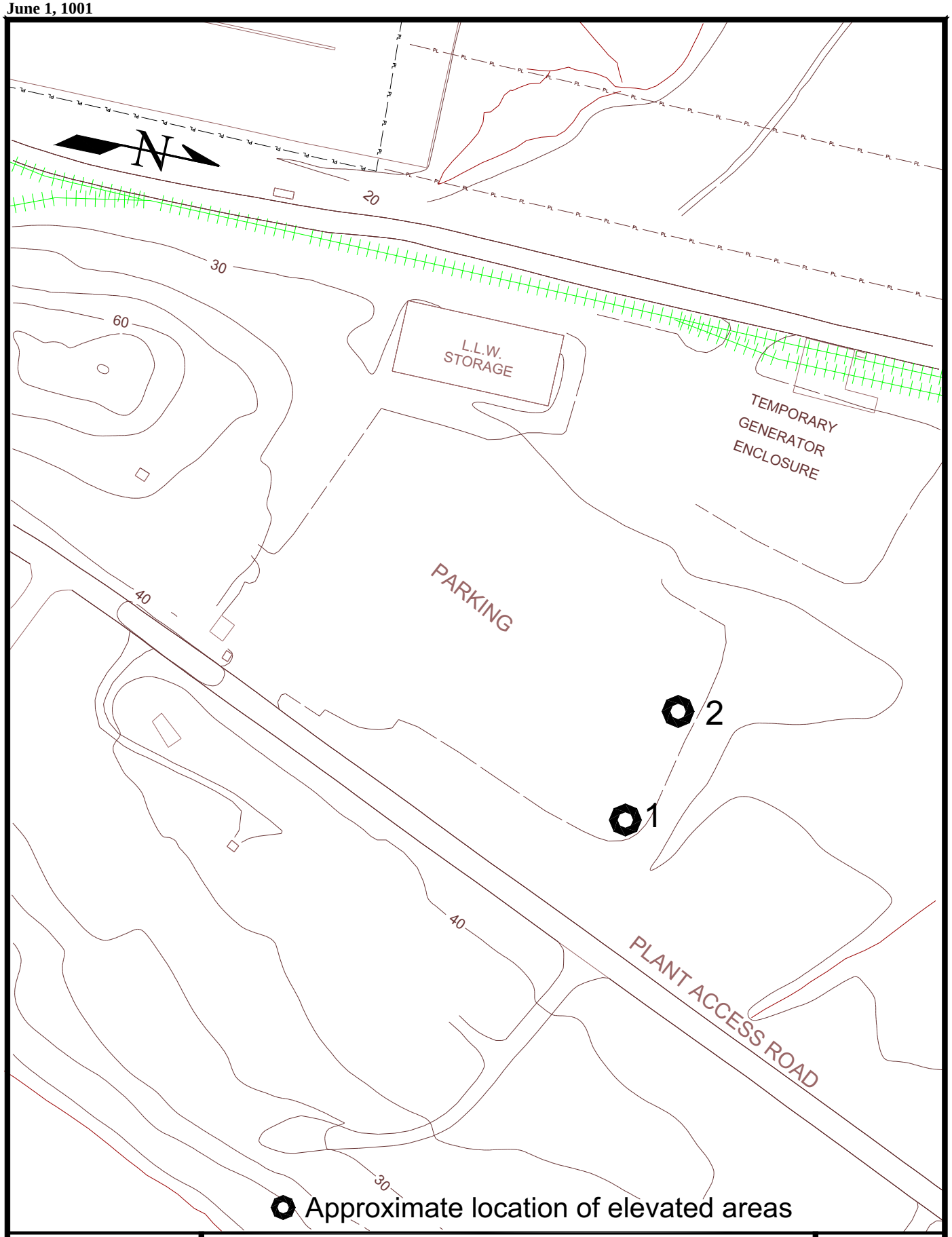
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Area Survey Package R2500-2	Figure 2-36



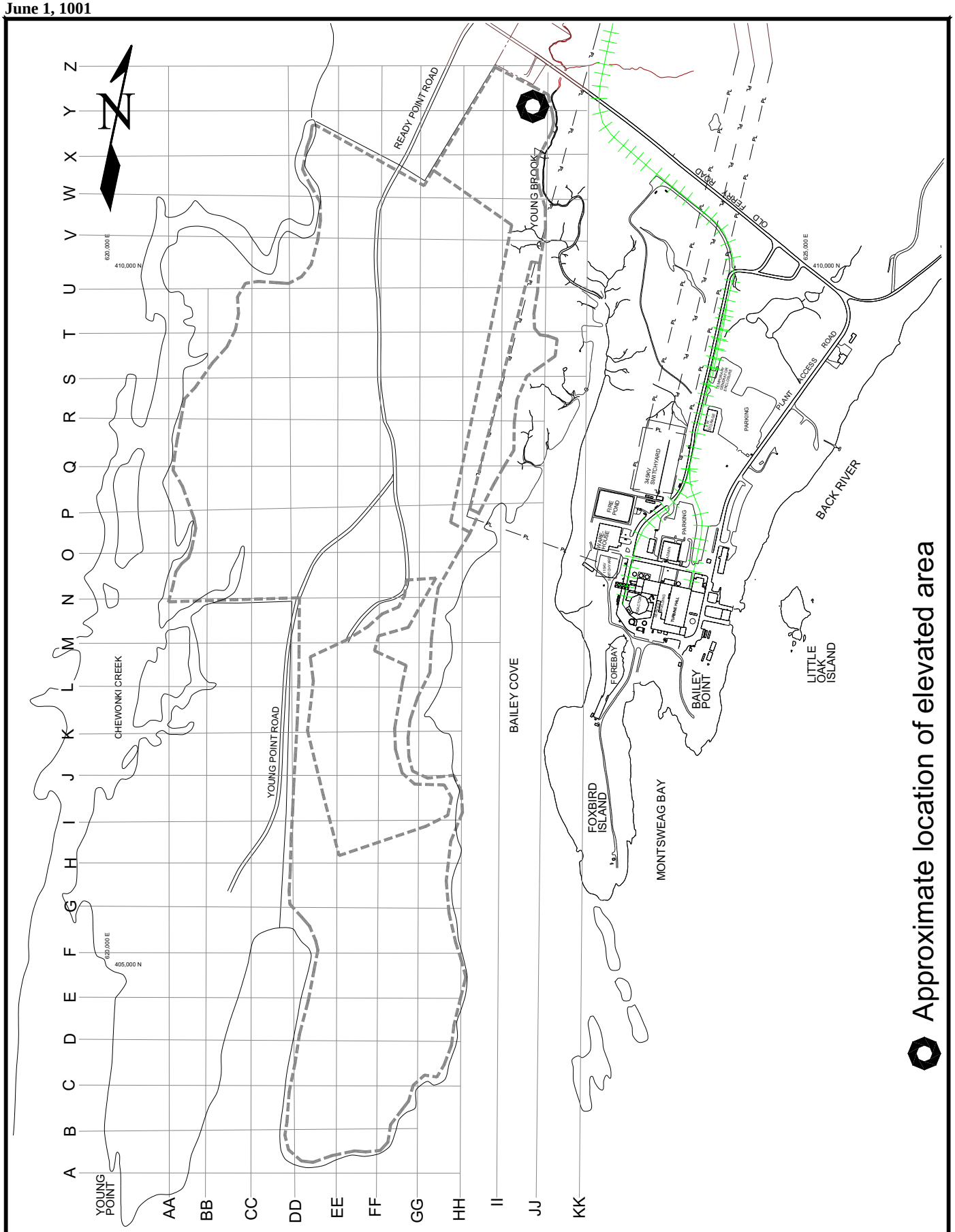
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Elevated Areas Survey Package R2500-3	Figure 2-37



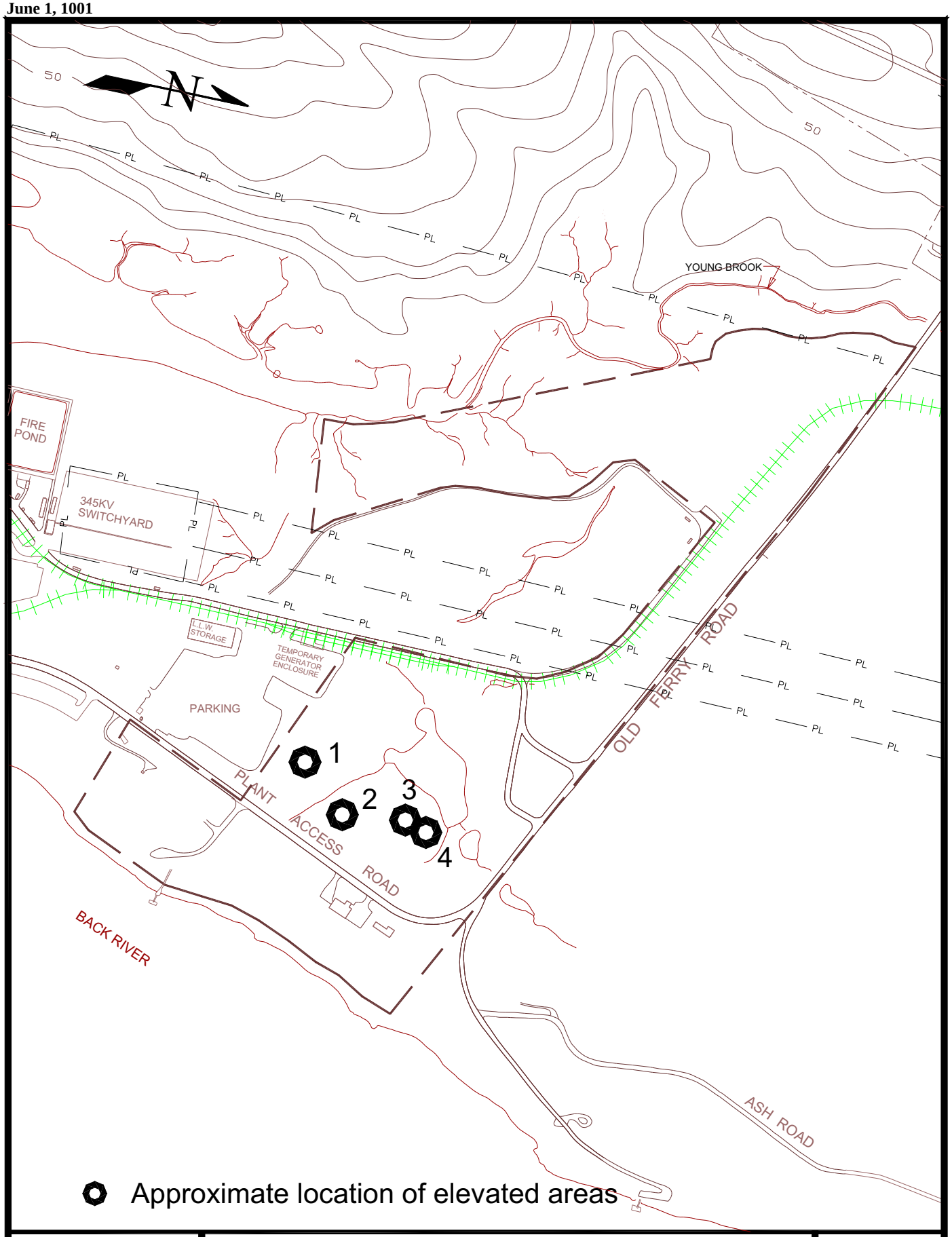
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Areas Survey Package R2500-4	Figure 2-38



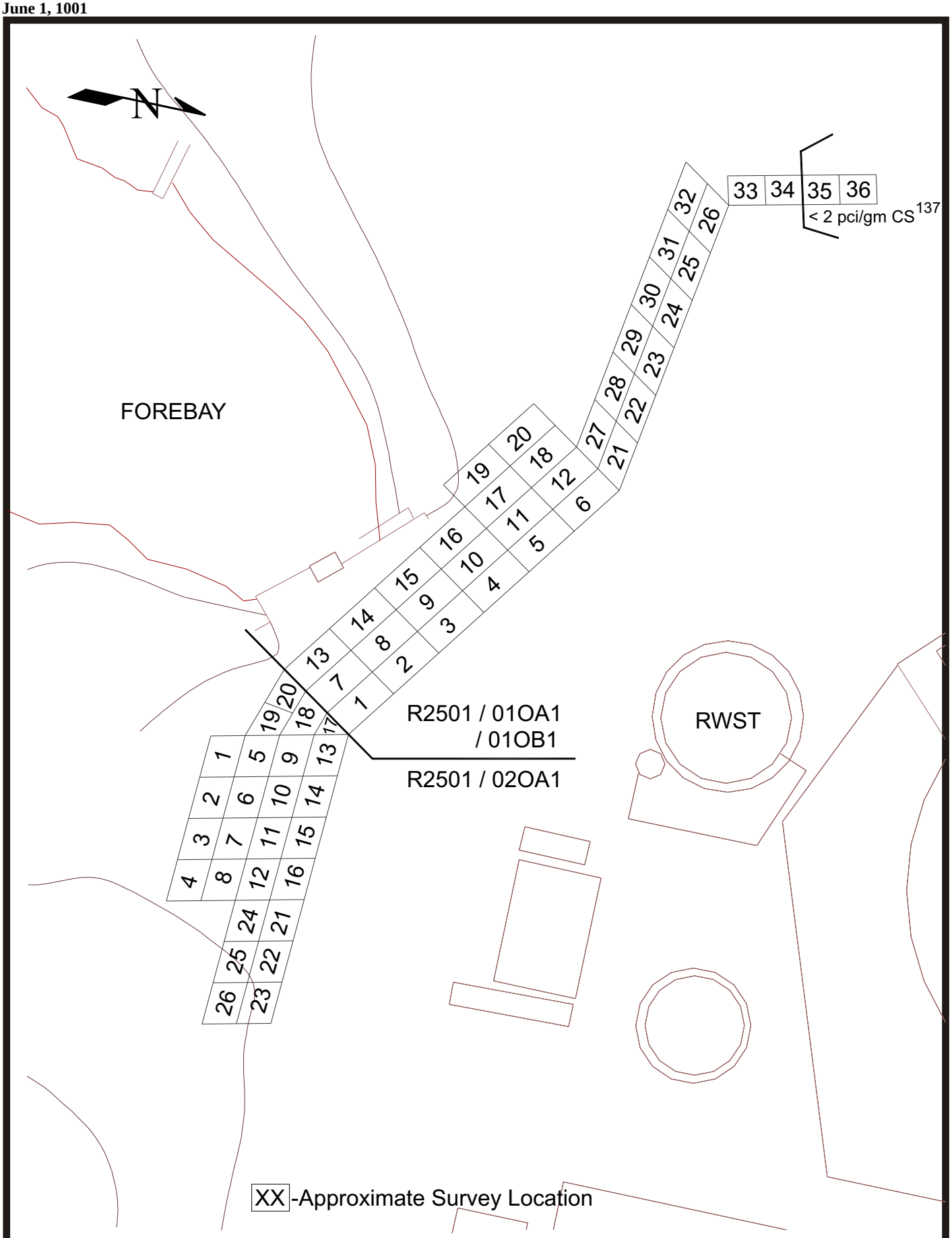
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Elevated Areas Survey Package R2500-6	Figure 2-39



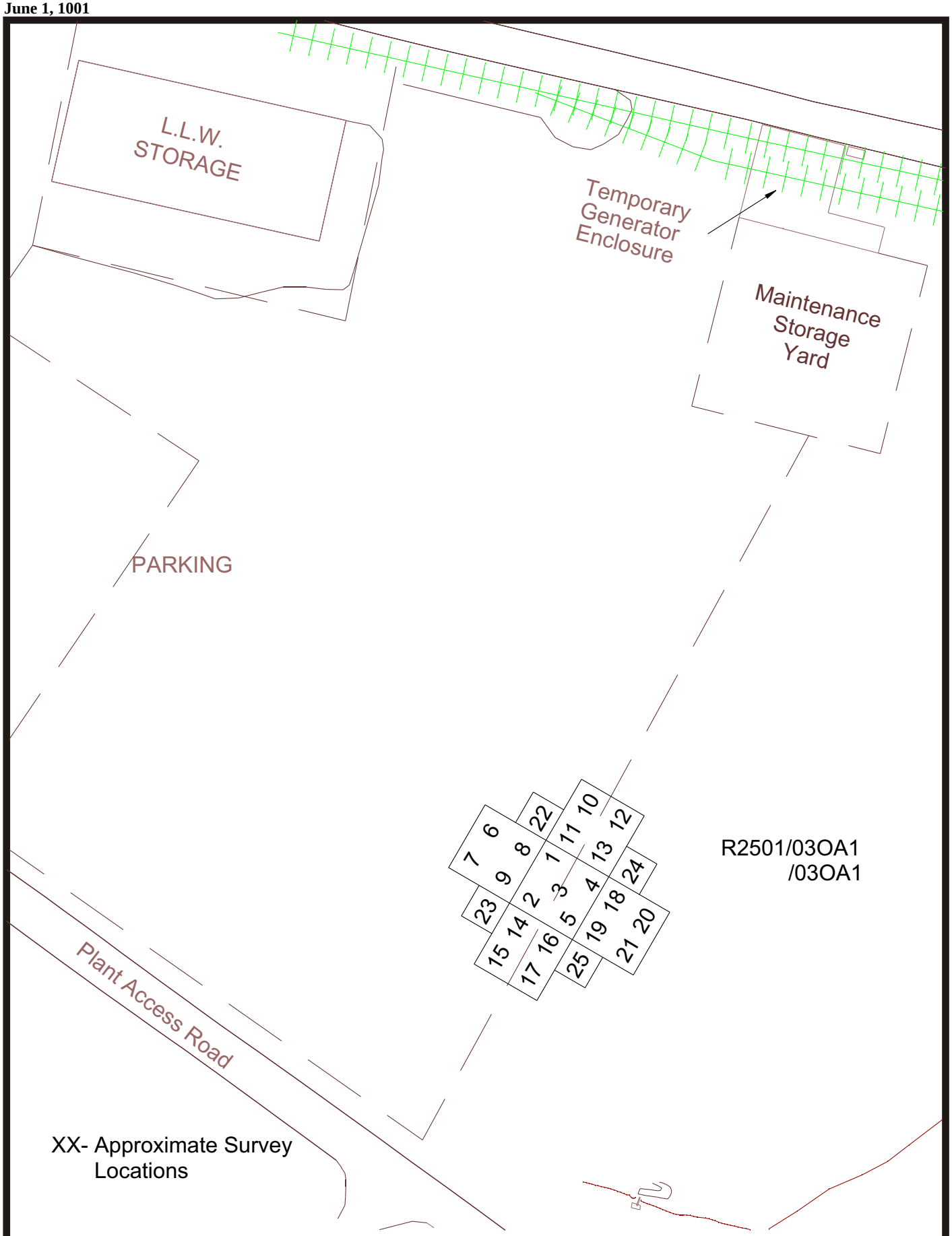
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Elevated Areas Survey Package R2500-7	Figure 2-40



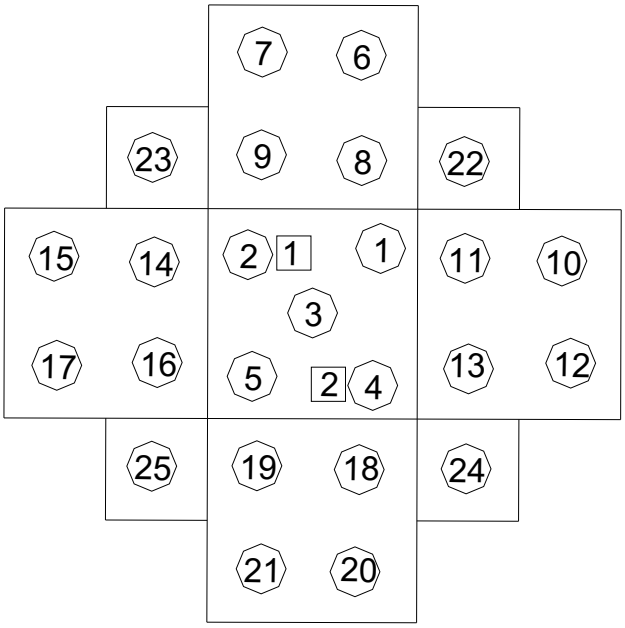
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Drive Over Elevated Areas Survey Package R2500-8	Figure 2-41



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Forebay Area Survey Package R2501	Figure 2-42



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Dry Cask Storage Area Survey Package R2501	Figure 2-43

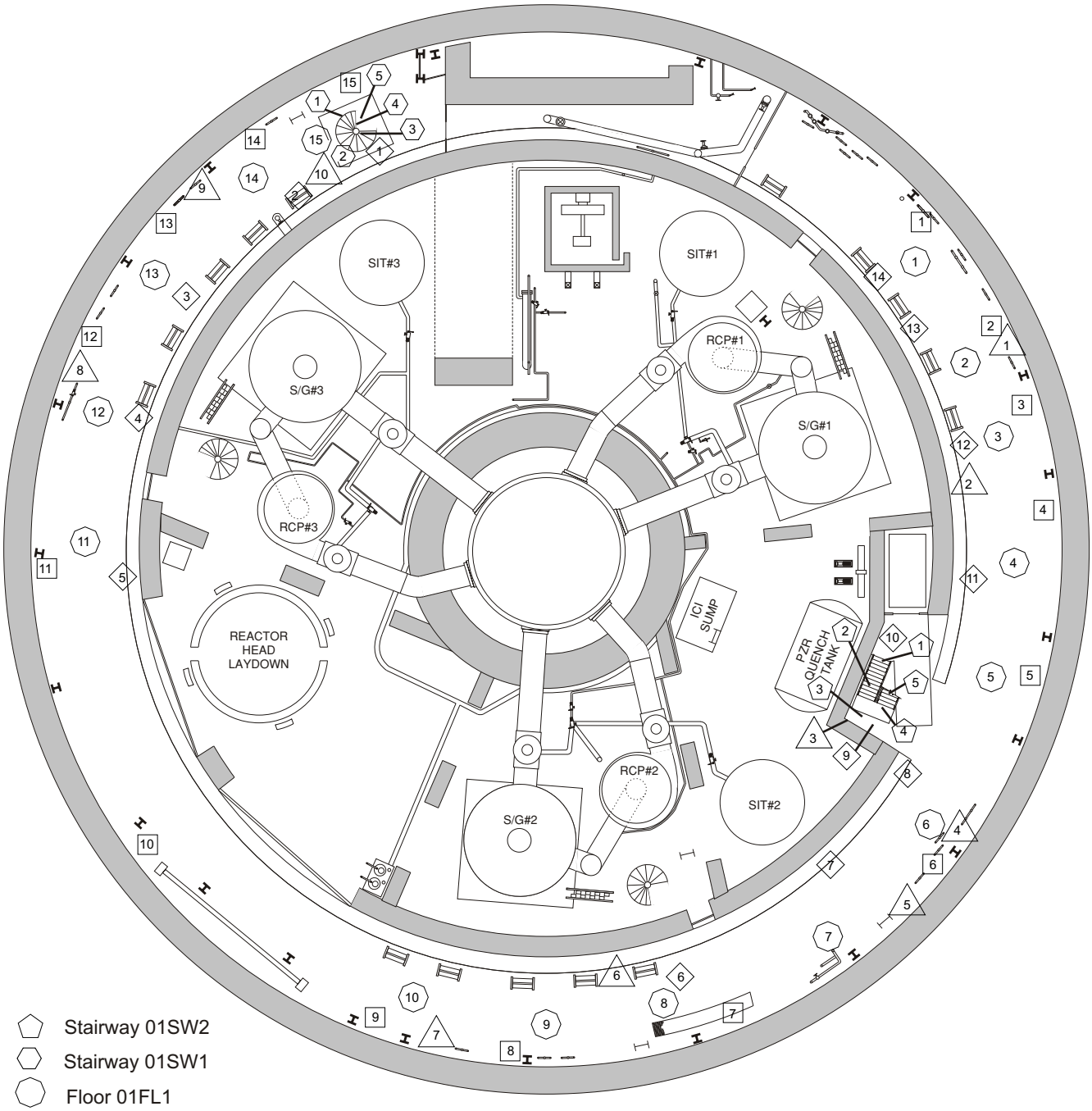


Dry Cask Storage Area

(X) 0 - 6" Soil Sample Location (Approximate)

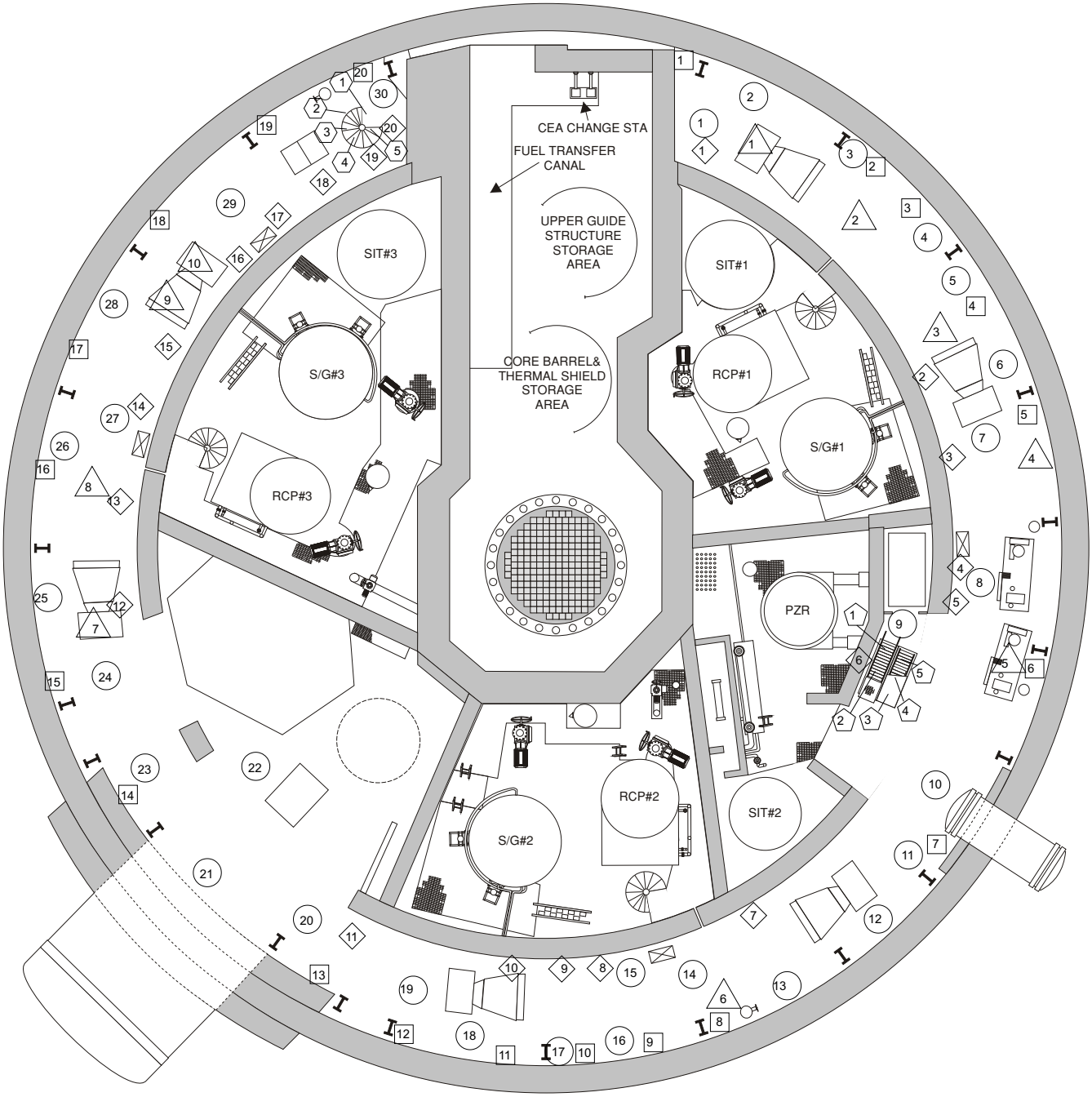
[X] 6 - 12" Soil Sample Location (Approximate)

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Follow-up Sampling At Elevated Soil Sample Locations Survey Package	Figure 2-44



Stairway 01SW2
Stairway 01SW1
Floor 01FL1
Walls 01WS2
Walls 01WS1
Equipment 01EQ1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Containment Building -2ft Elevation Survey Package A0100	Figure 2-45



XX NW Stair well 01SW2

XX SW Stairwell 01SW1

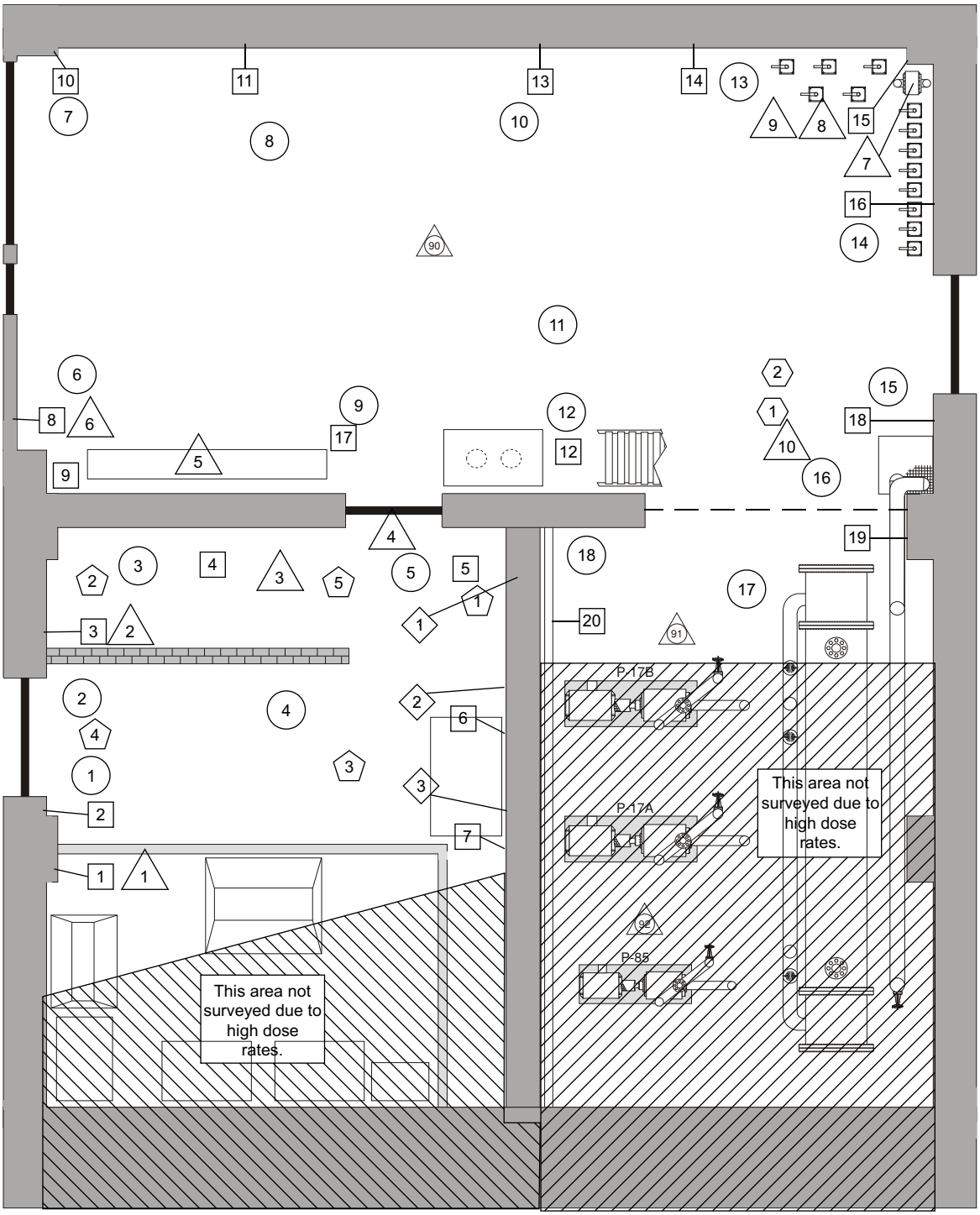
XX Equipment 01EQ1

XX Outer Walls 01WS1

XX Inner Walls 01WS2

XX Floors 01FL1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization 20 ft Elevation Survey Package A0200	Figure 2-46



XX Stair well

XX Floor Drains

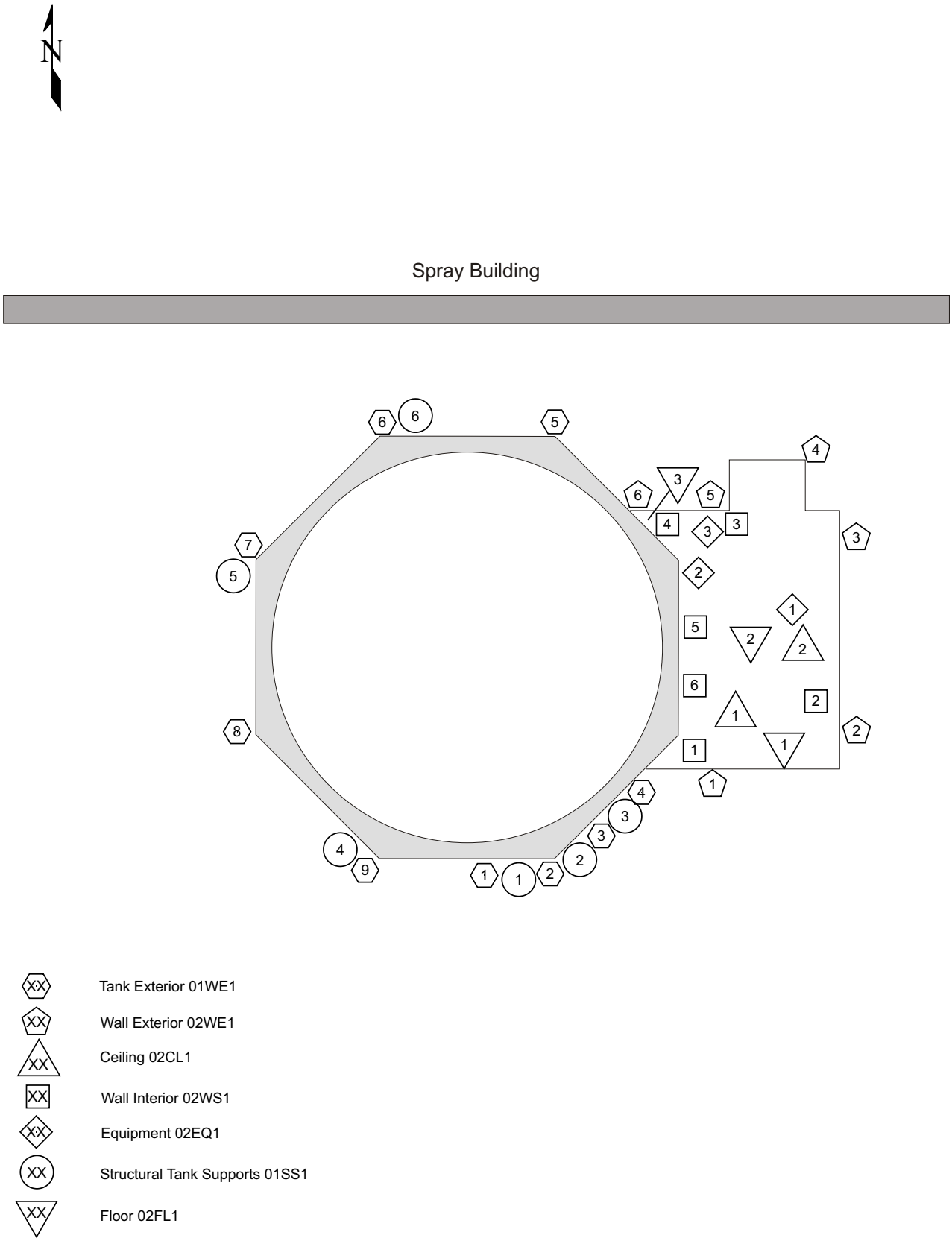
XX Equipment 01EQ1

XX Walls

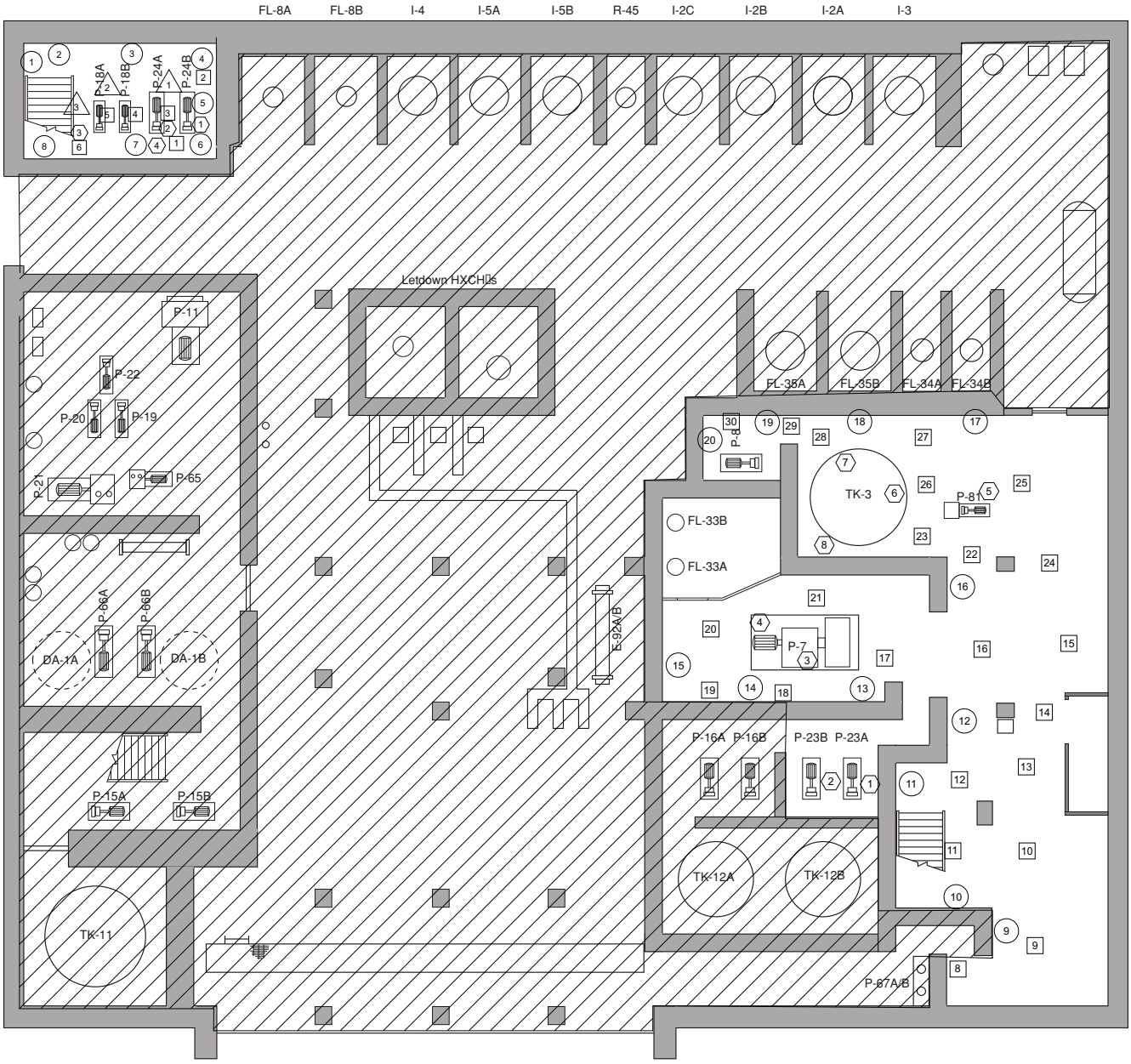
XX Floor Drain

XX Floors

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Fuel Building 21 ft Elevation Survey Package A0400	Figure 2-47

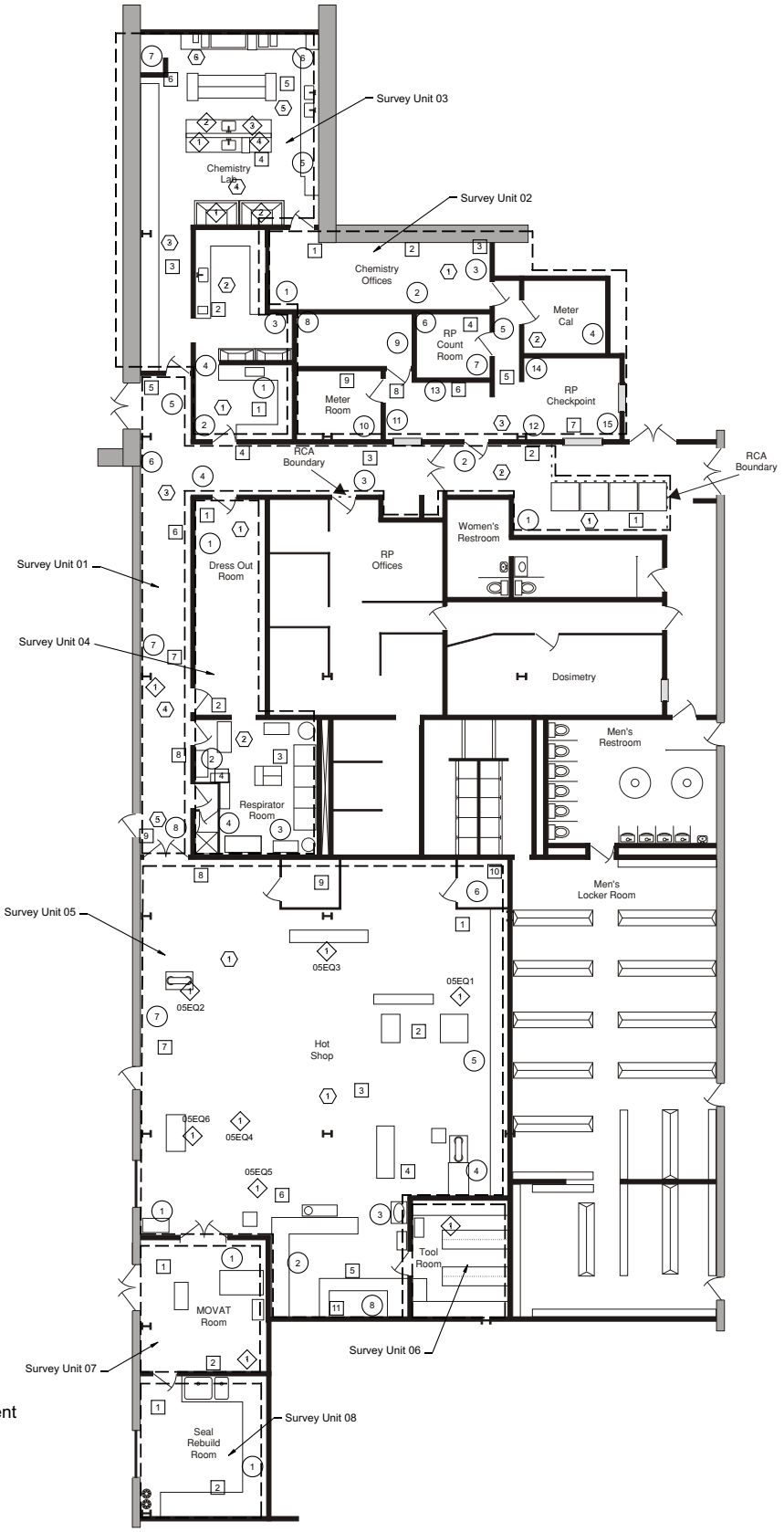


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Demineralized Water Storage Tank (DWST) Survey Package A0500	Figure 2-48



Equipment
Ceiling
Floors
Walls

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Primary Auxiliary Building 11 ft Survey Package A0600	Figure 2-49



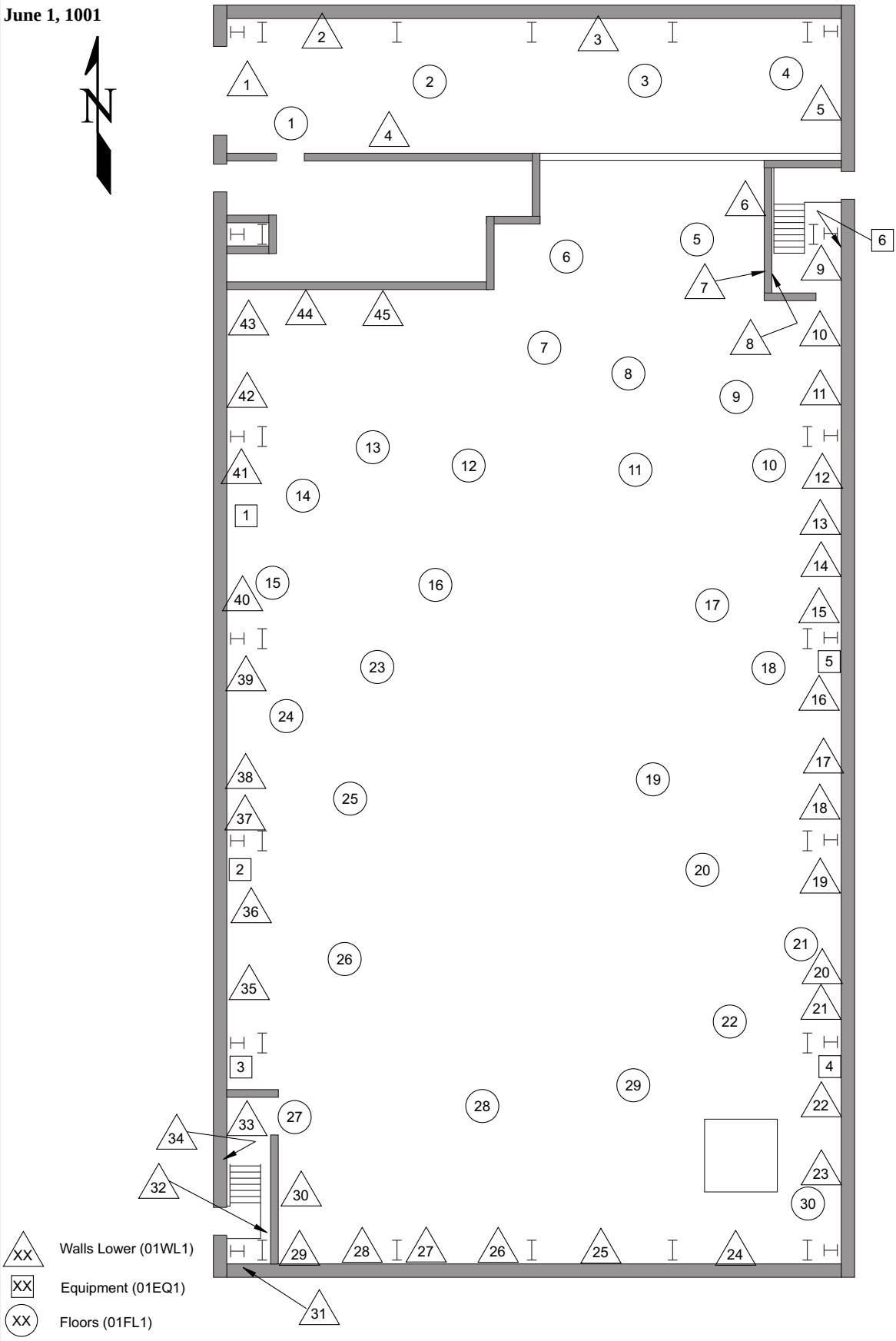
XX Equipment

XX Ceiling

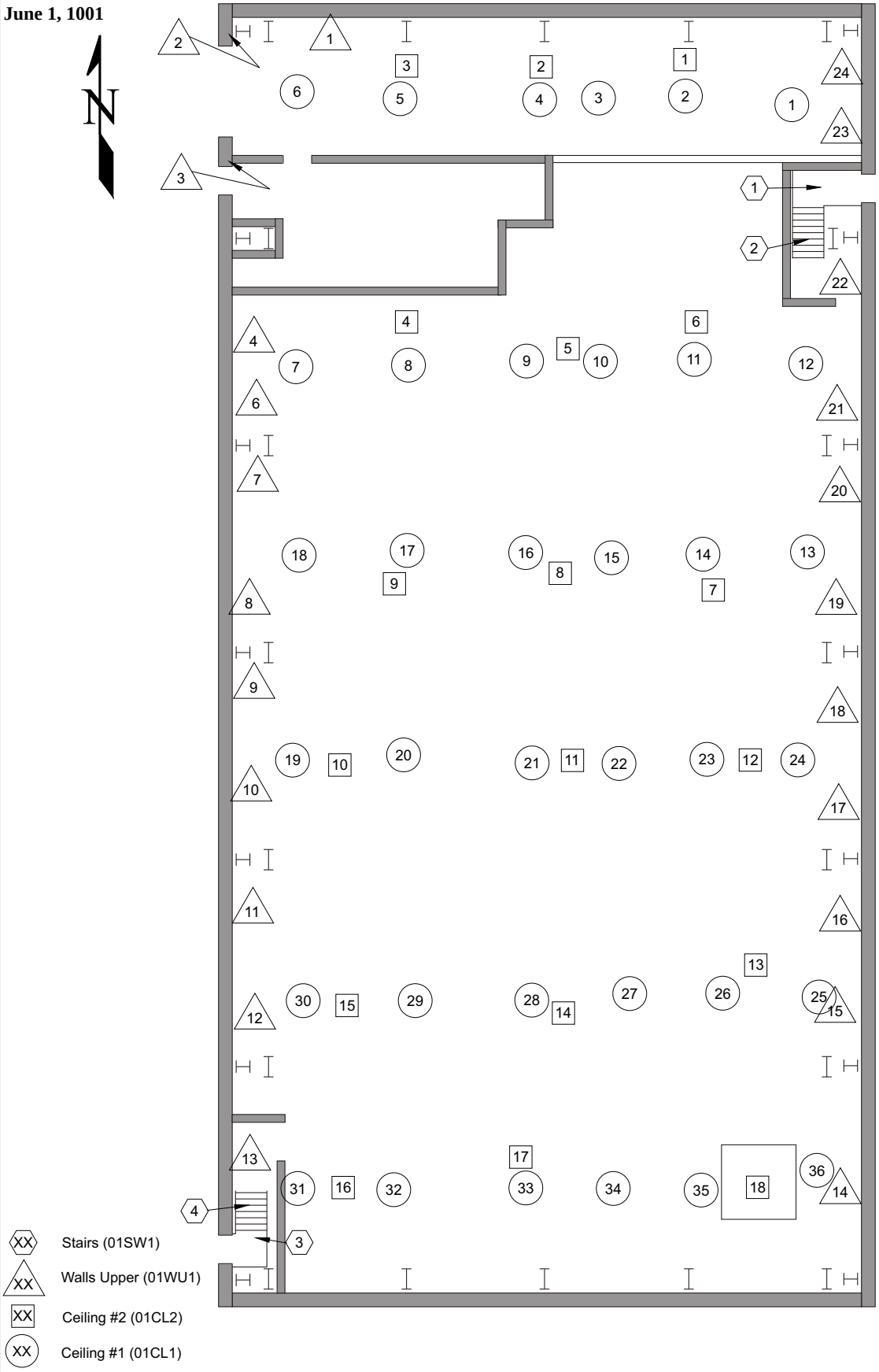
XX Floors

XX Walls

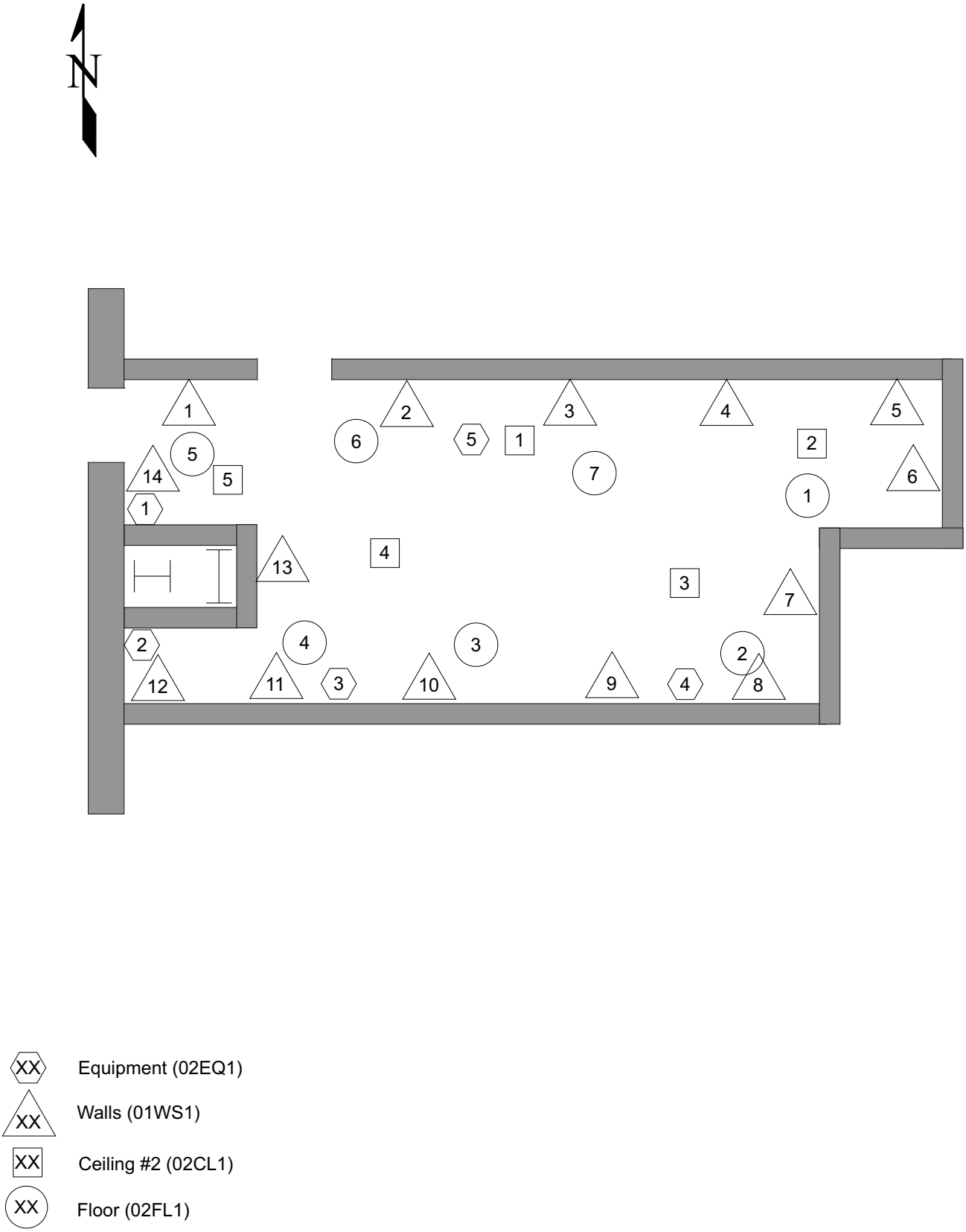
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Service Building Hot Side 21 ft Survey Package A0900	Figure 2-50



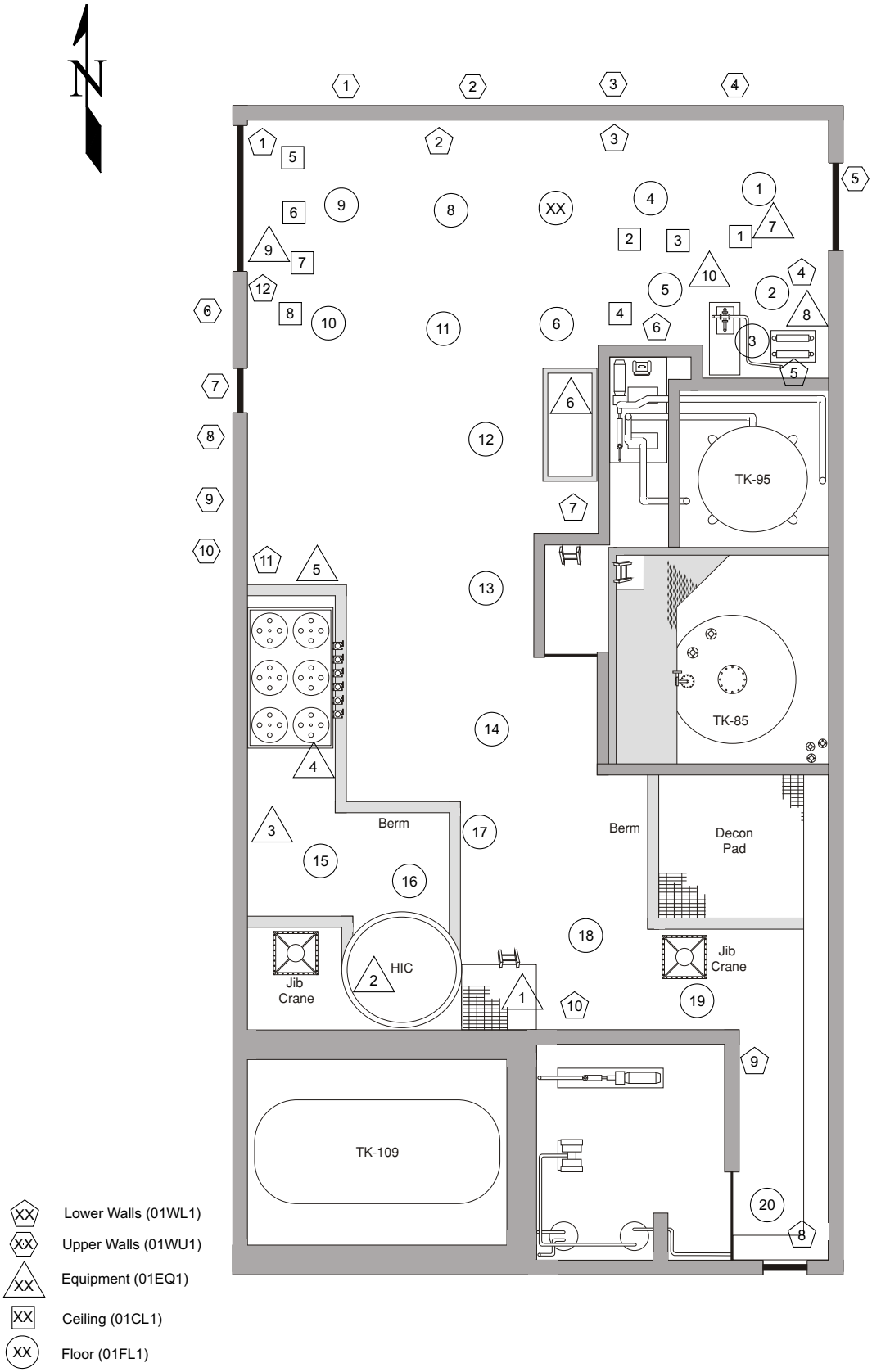
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Low Level Waste Storage Building 21 ft Survey Package A1100	Figure 2-51



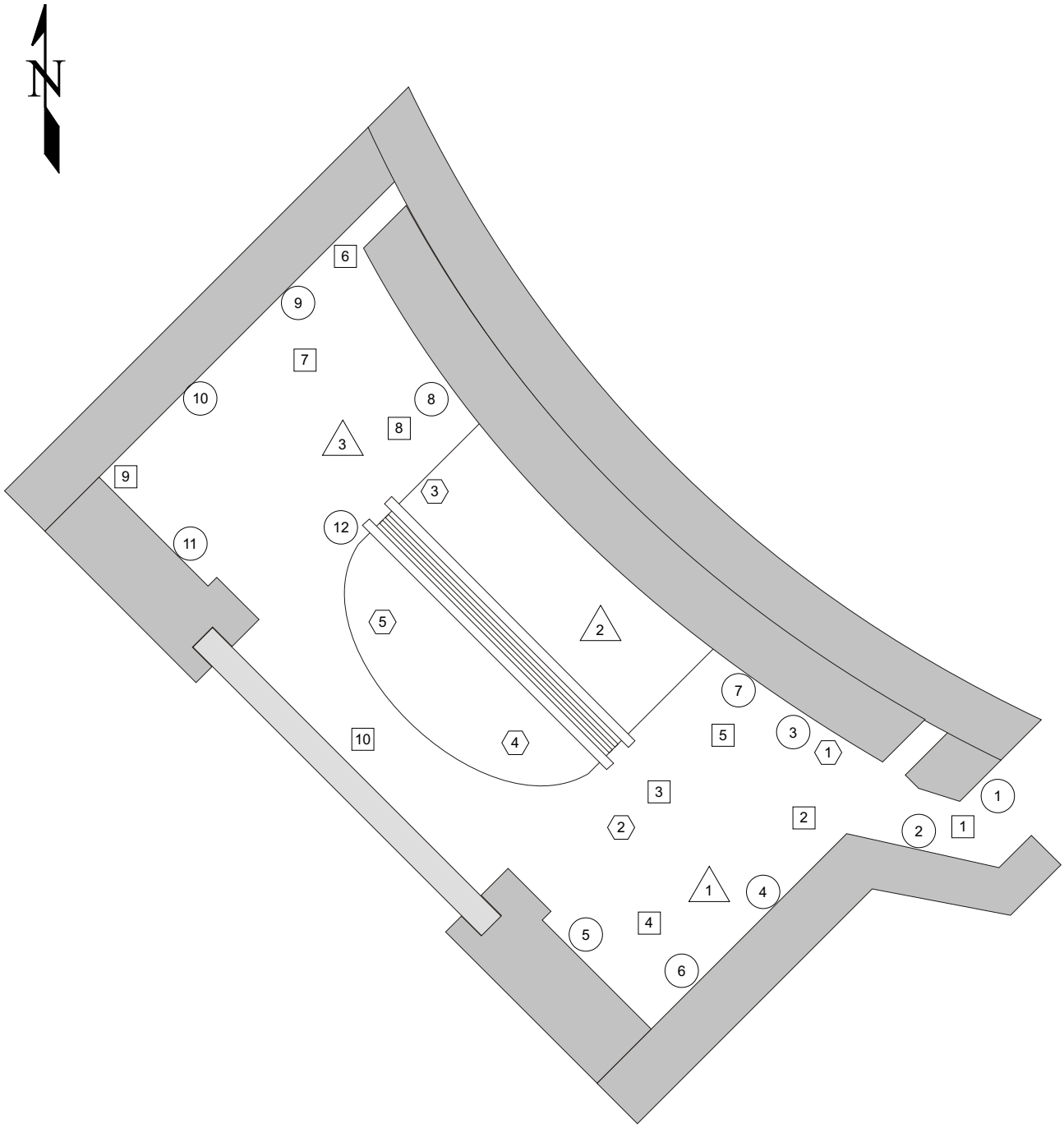
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Low Level Waste Storage Building 21 ft Survey Package A1100	Figure 2-52



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Low Level Waste Storage Building 21 ft Office Survey Package A1100	Figure 2-53



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization RCA Storage Building Survey Package A1200	Figure 2-54



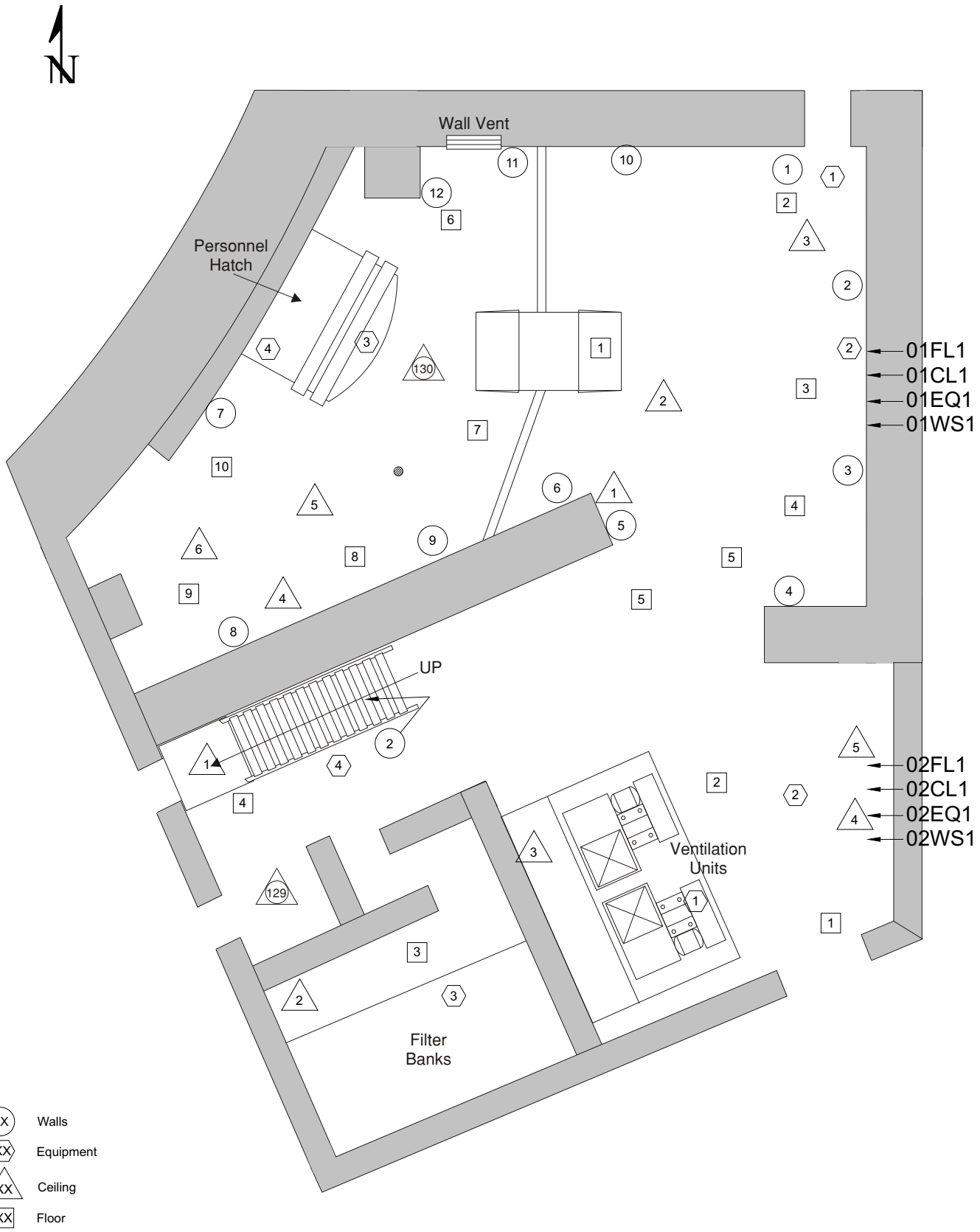
XX Walls (01WS1)

XX Equipment (01EQ1)

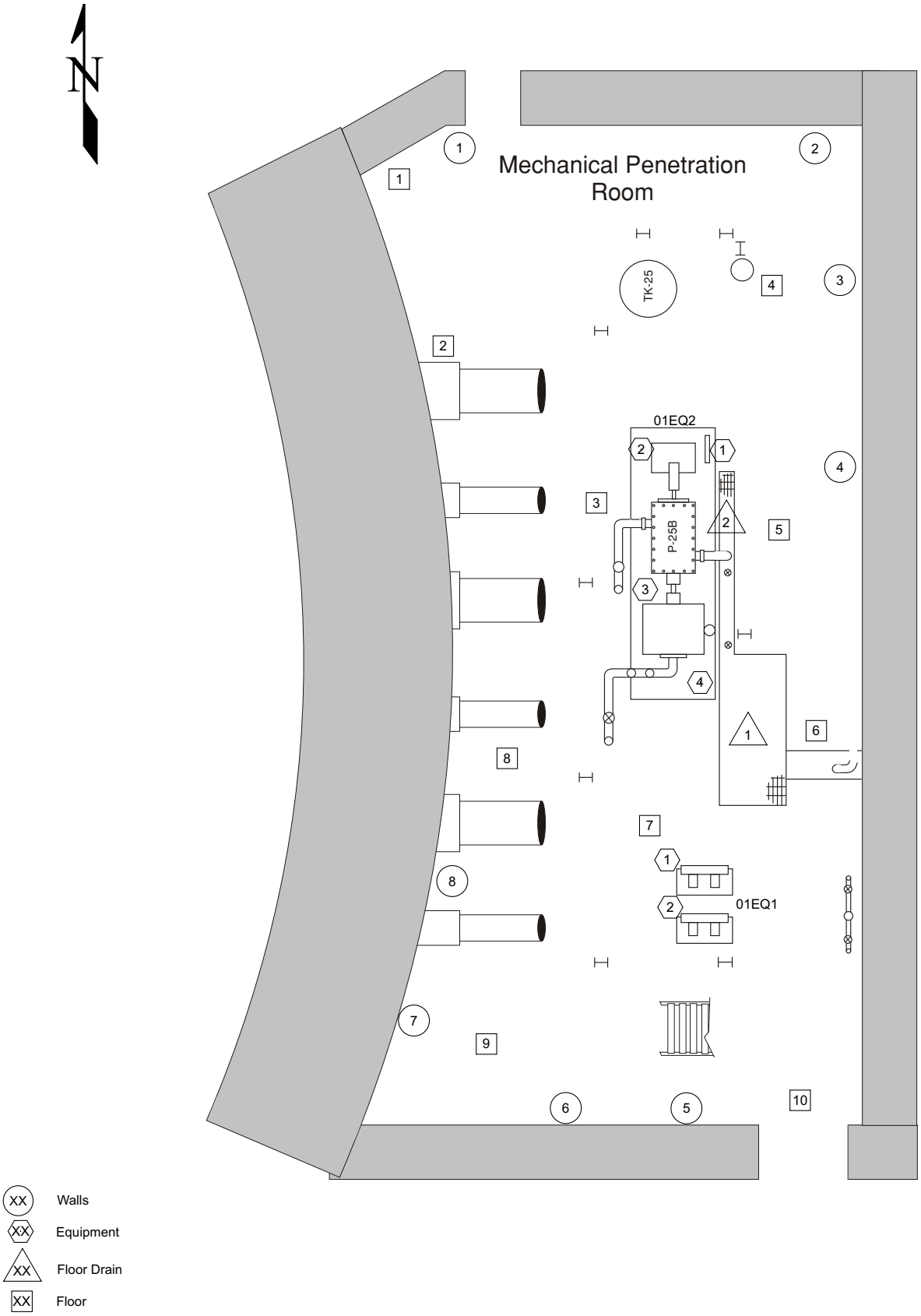
XX Ceiling (01CL1)

XX Floor (01FL1)

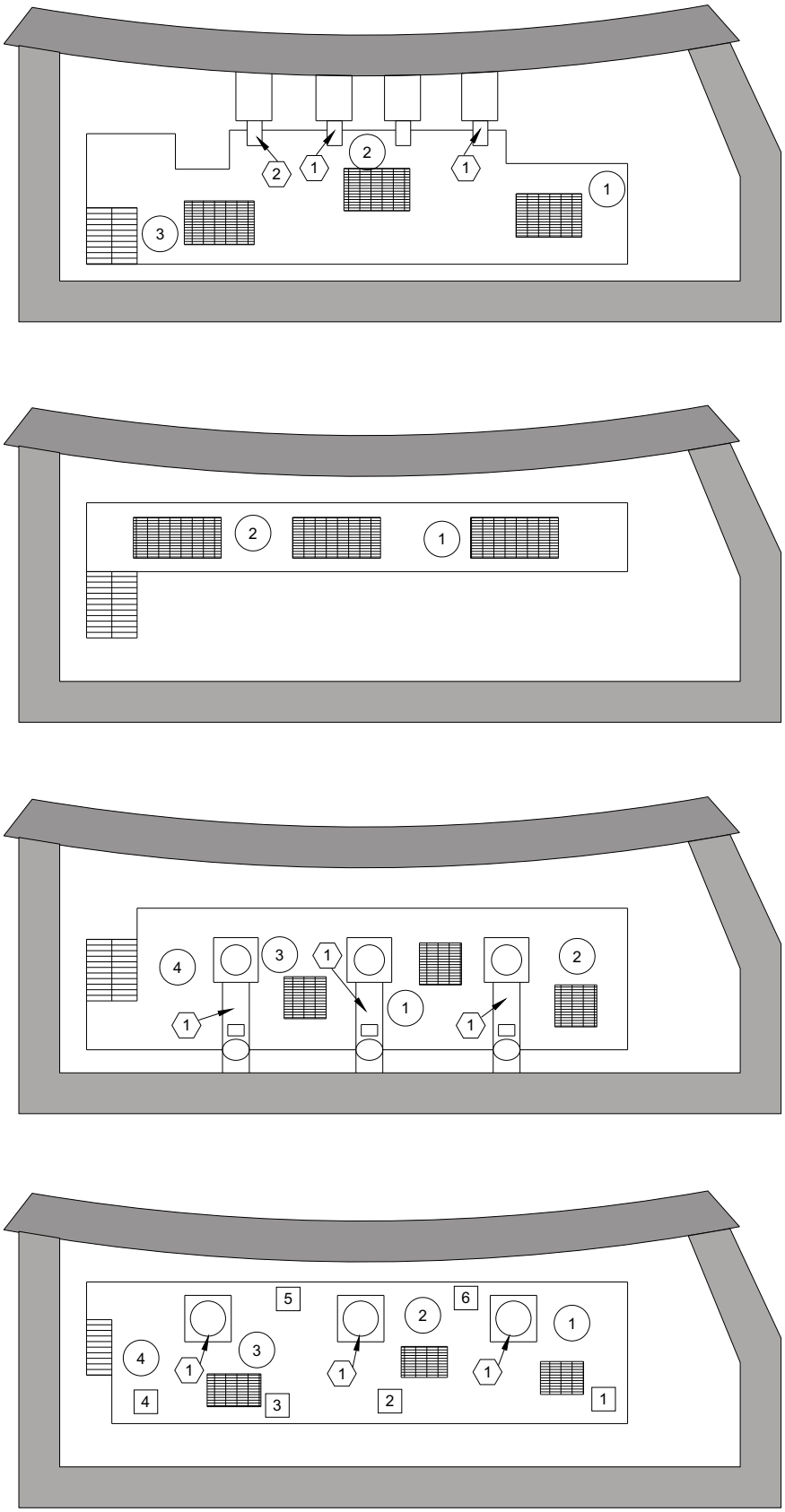
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Equipment Hatch Area 21ft Survey Package A1300	Figure 2-55



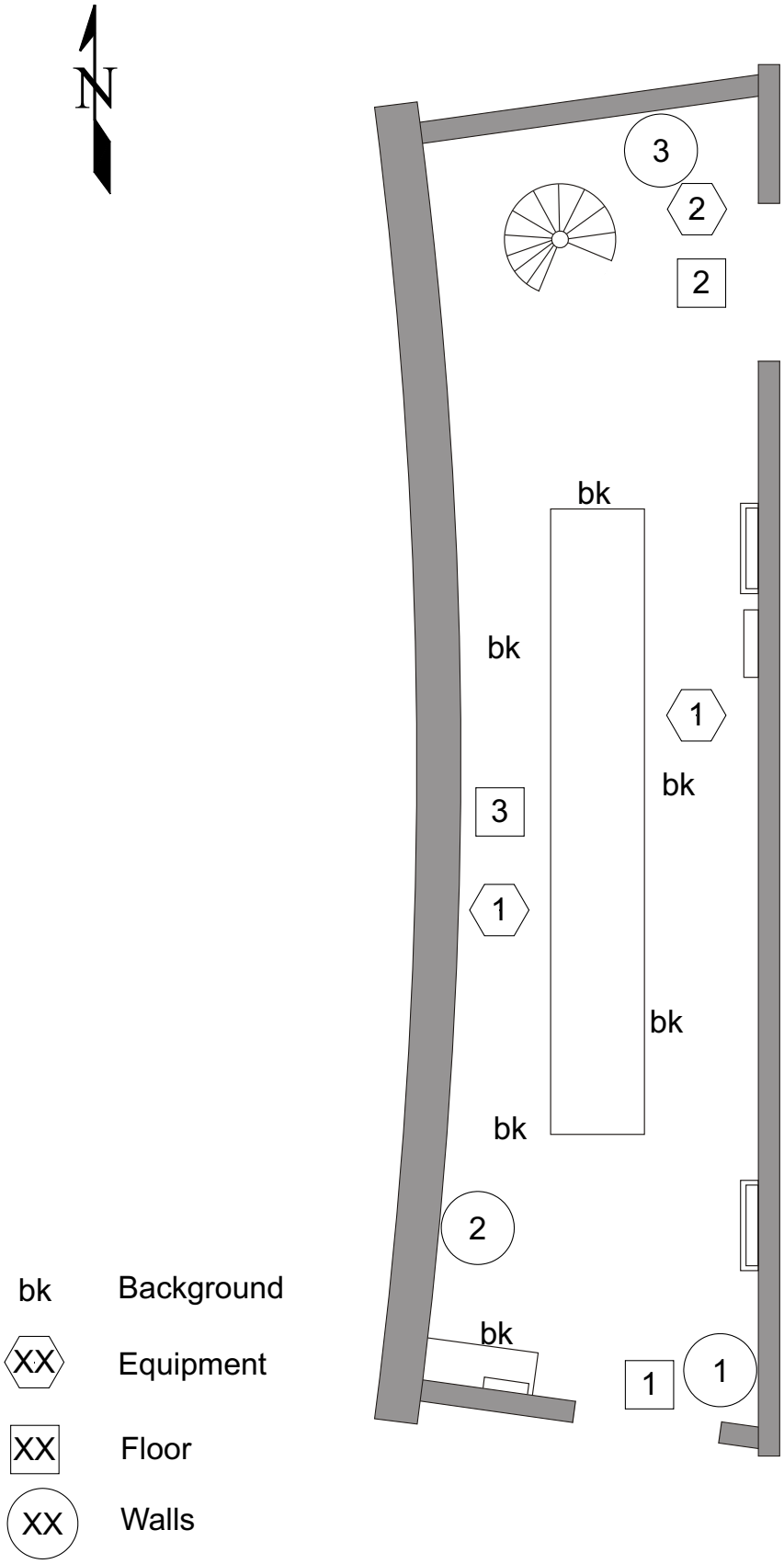
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Personnel Hatch Area 21ft Survey Package A1400	Figure 2-56



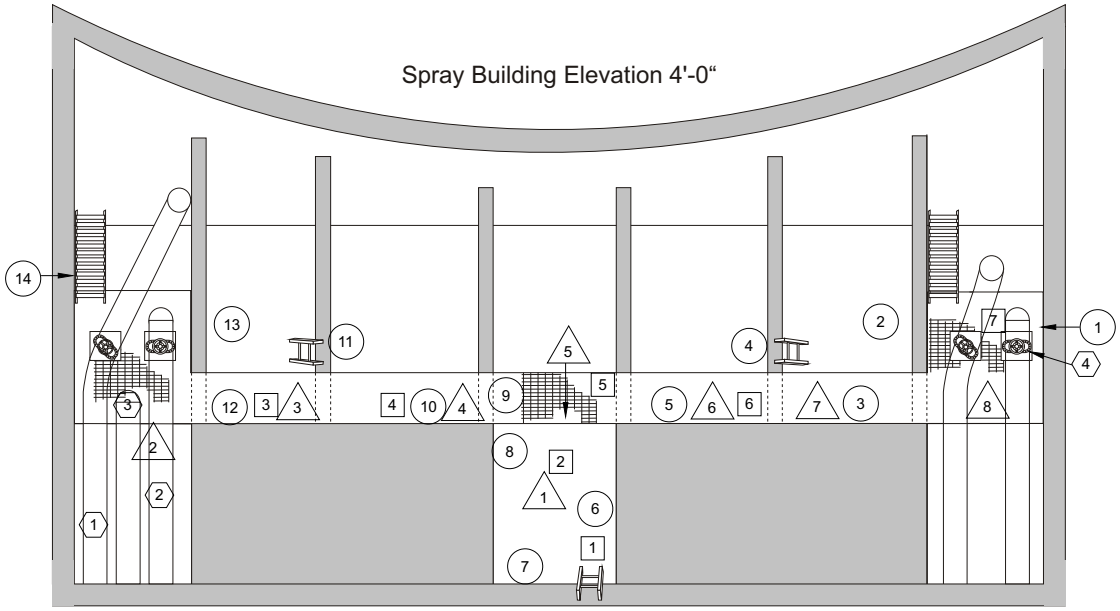
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Mechanical Penetration Room 21 ft Survey Package A1500	Figure 2-57

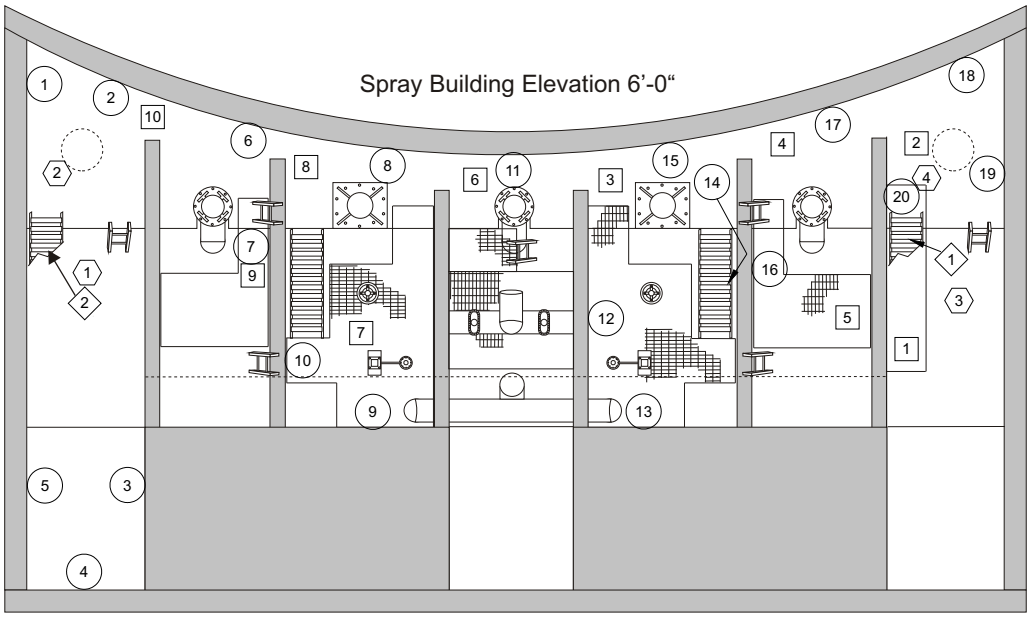


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Mechanical Penetration Room Elevations 2, 3, 4, and 5 Survey Package A1500	Figure 2-58



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Electrical Penetration Room Bottom Level Survey Package A1600	Figure 2-59





XX Walls

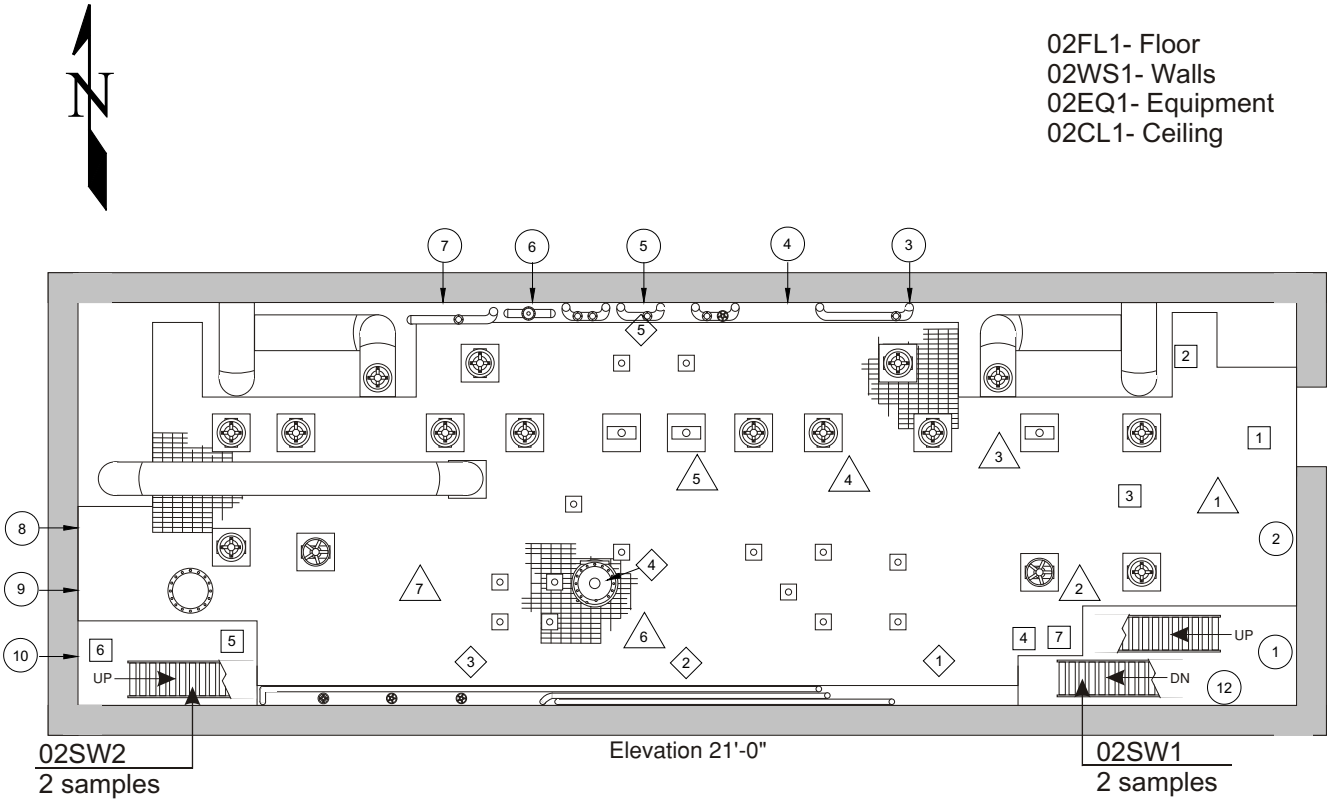
XX Equipment

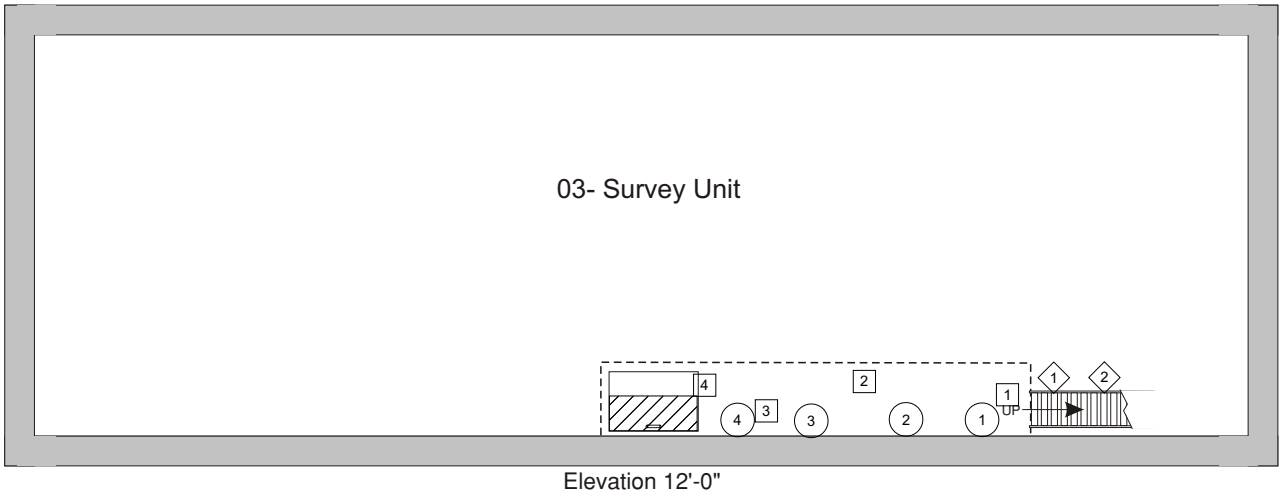
XX Ceiling

XX Floor

XX Stairs

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Containment Spray Building 4 ft and 6 ft Elevations Survey Package A1700	Figure 2-60





XX Walls 03WS1

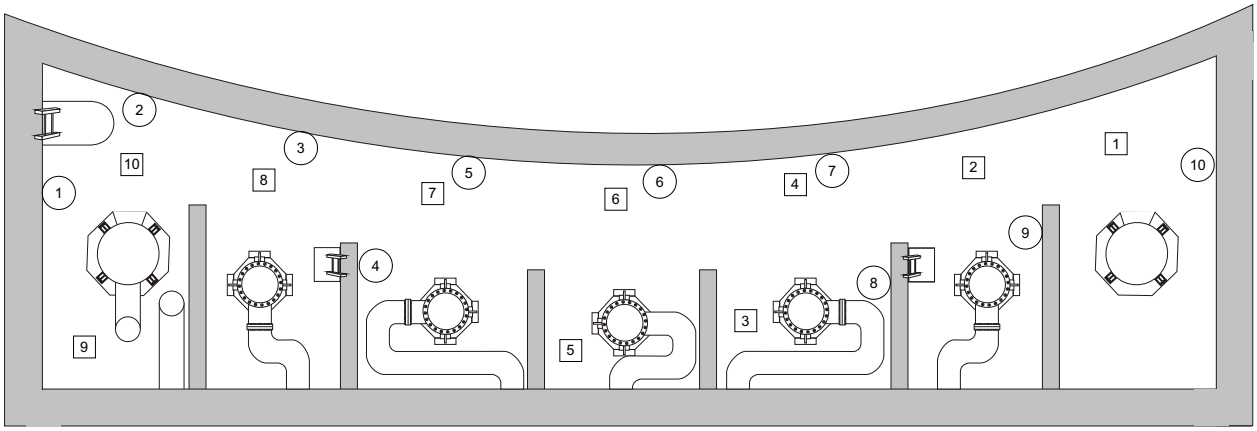
XX Ceiling 03CL1

XX Floor 03FL1

XX Stairs 03SW1

Floor Opening

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Containment Spray Building 12 ft and 21 ft Elevations Survey Package A1700	Figure 2-61

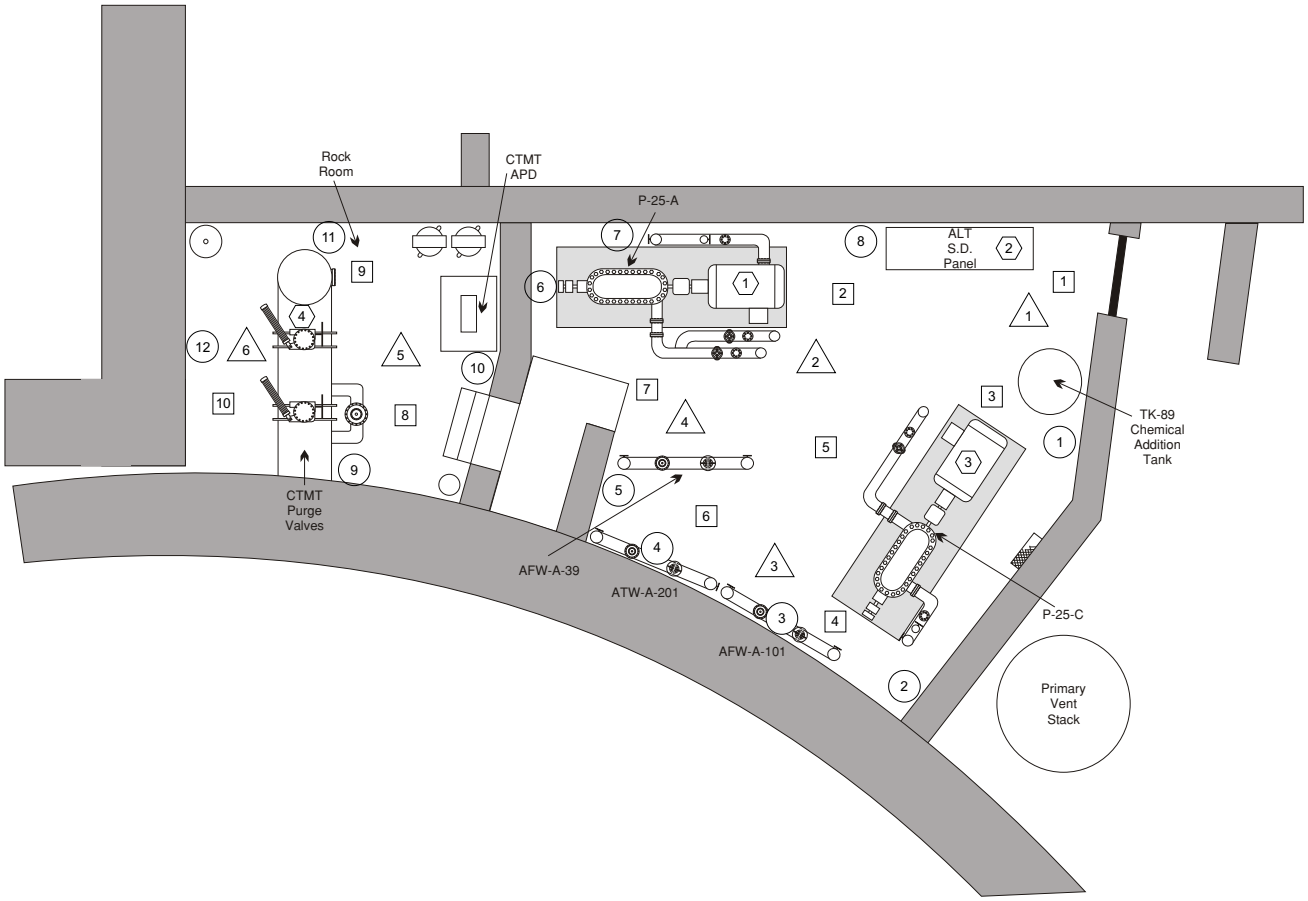


Spray Building 14'-0" (Motors)

XX Walls

XX Floor

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Containment Spray Building 14 ft Elevation Survey Package A1700	Figure 2-62



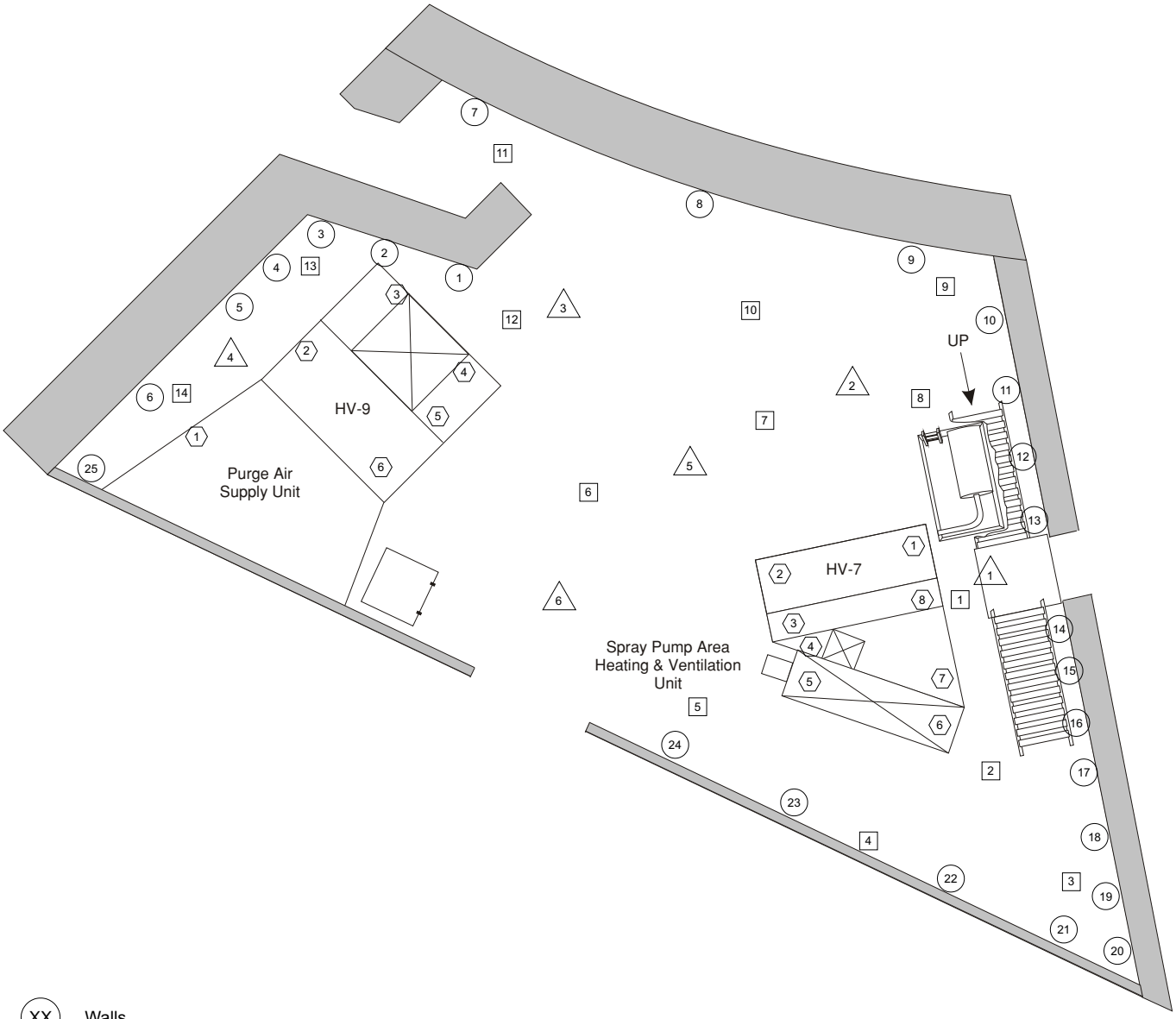
XX Walls 01WS1

XX Floor 01Fl1

XX Equipment 01EQ1

XX Ceiling 01CL1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Auxiliary Feed Pump Room 21 ft Survey Package A1800	Figure 2-63



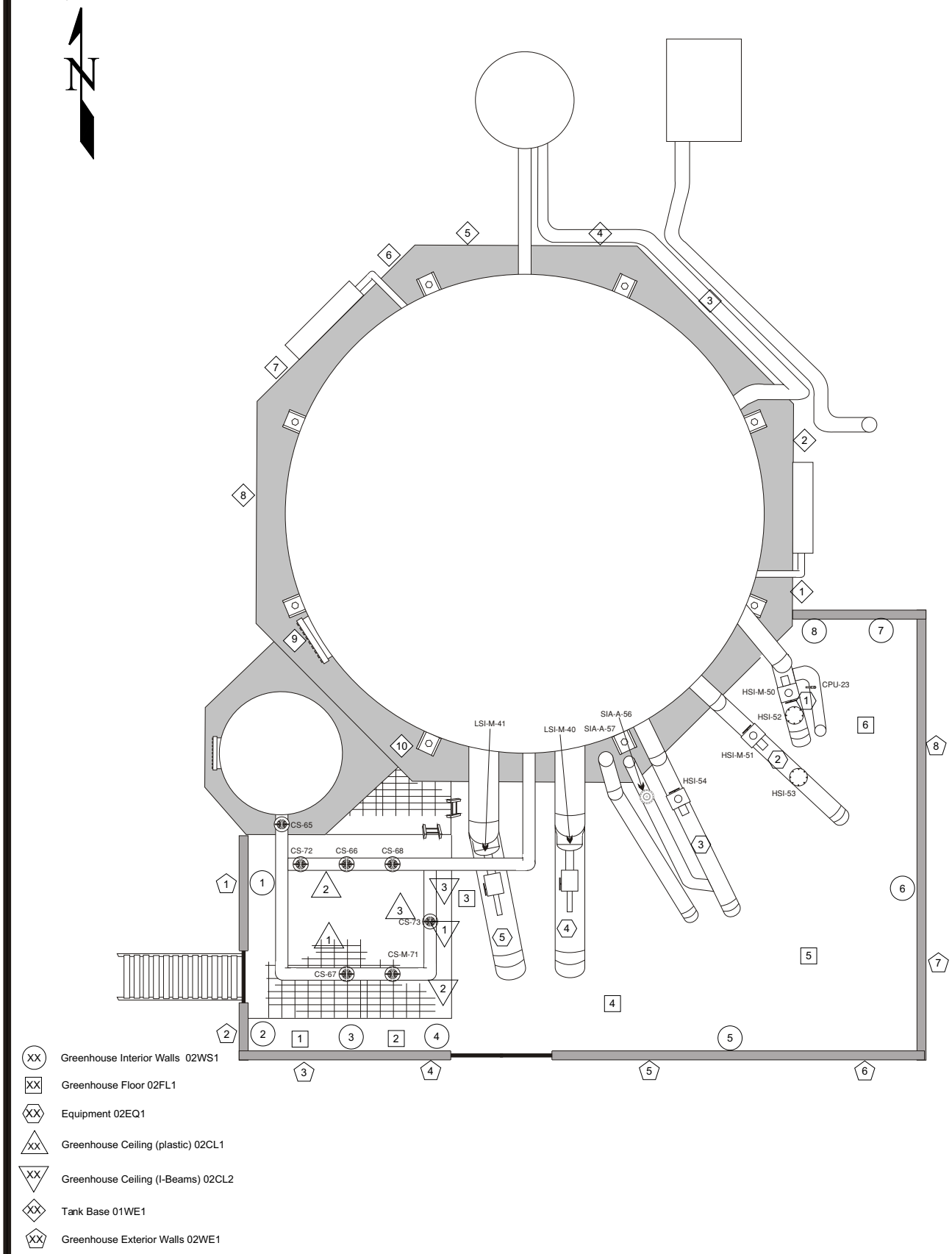
XX Walls

XX Floor

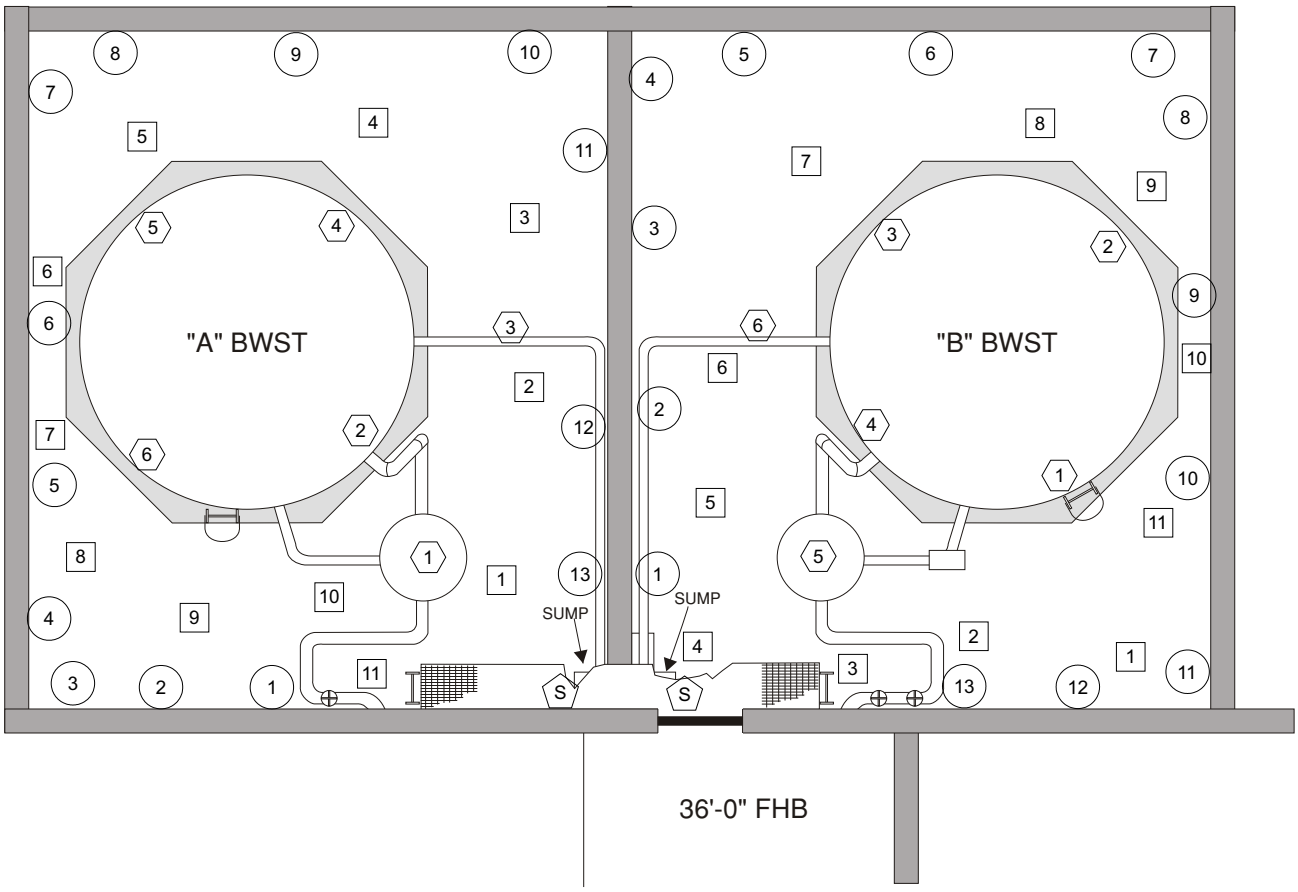
XX Equipment

XX Ceiling

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Equipment Access Area 21 ft Survey Package A1900	Figure 2-64



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Reactor Water Storage Tank Survey Package A2100	Figure 2-65



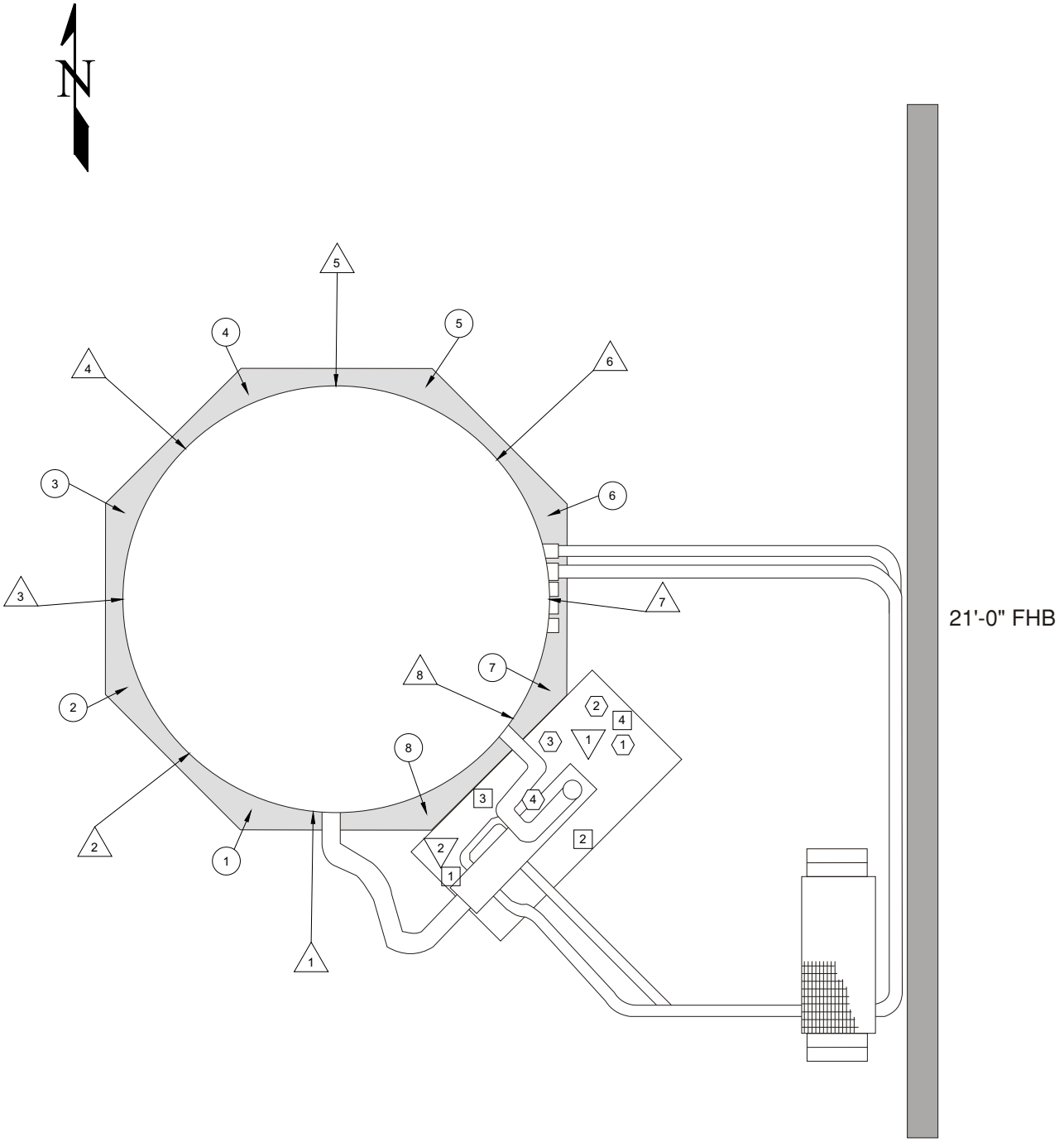
XX Wall

XX Floor

XX Equipment

XX Sump

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Borated Water Storage Tanks Survey Package A2200	Figure 2-66



XX Tank Base 01SS1

XX Shed Wall Inside 02WS1

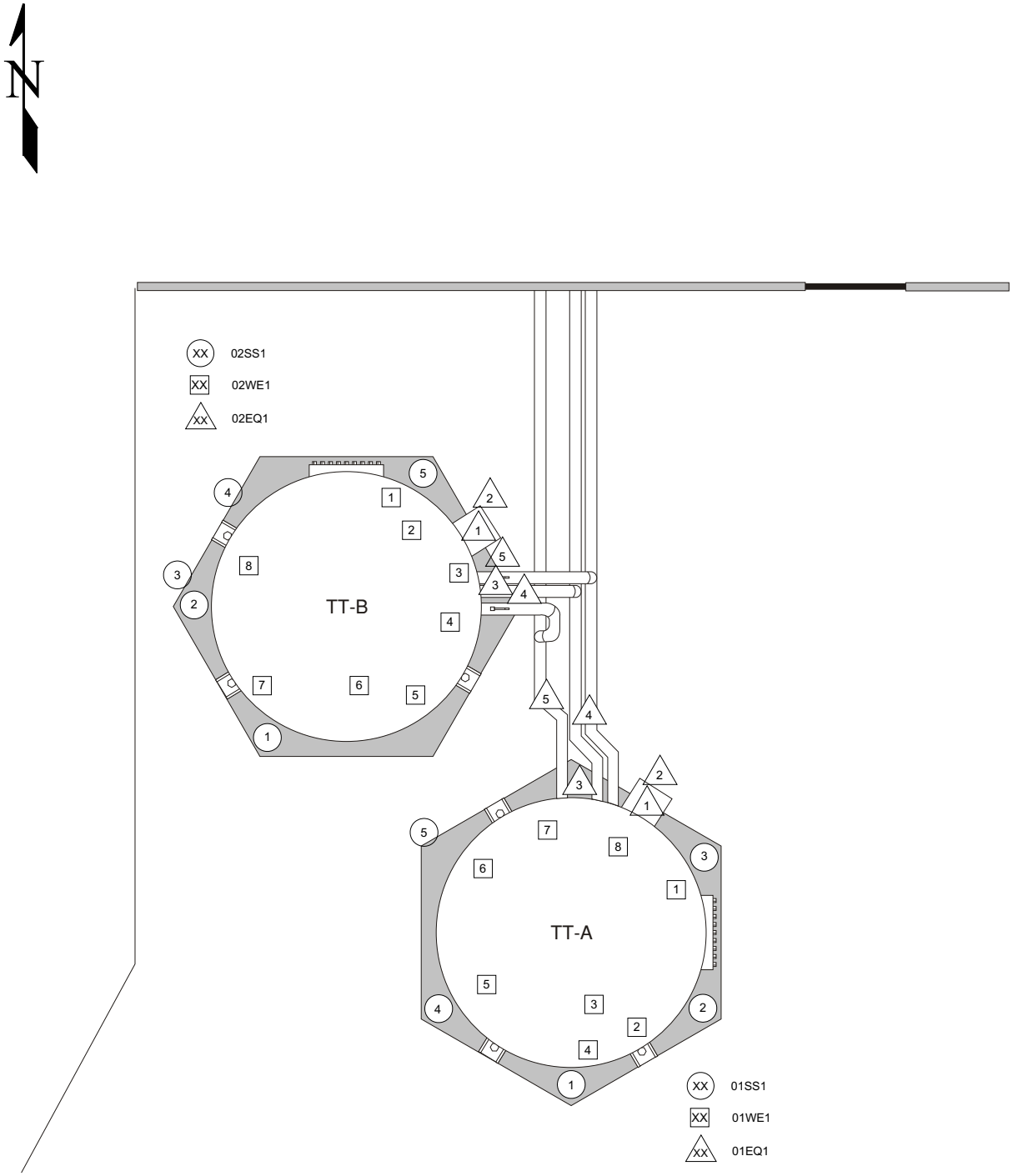
XX Equipment 02EQ1

XX Tank Outside 01WE1

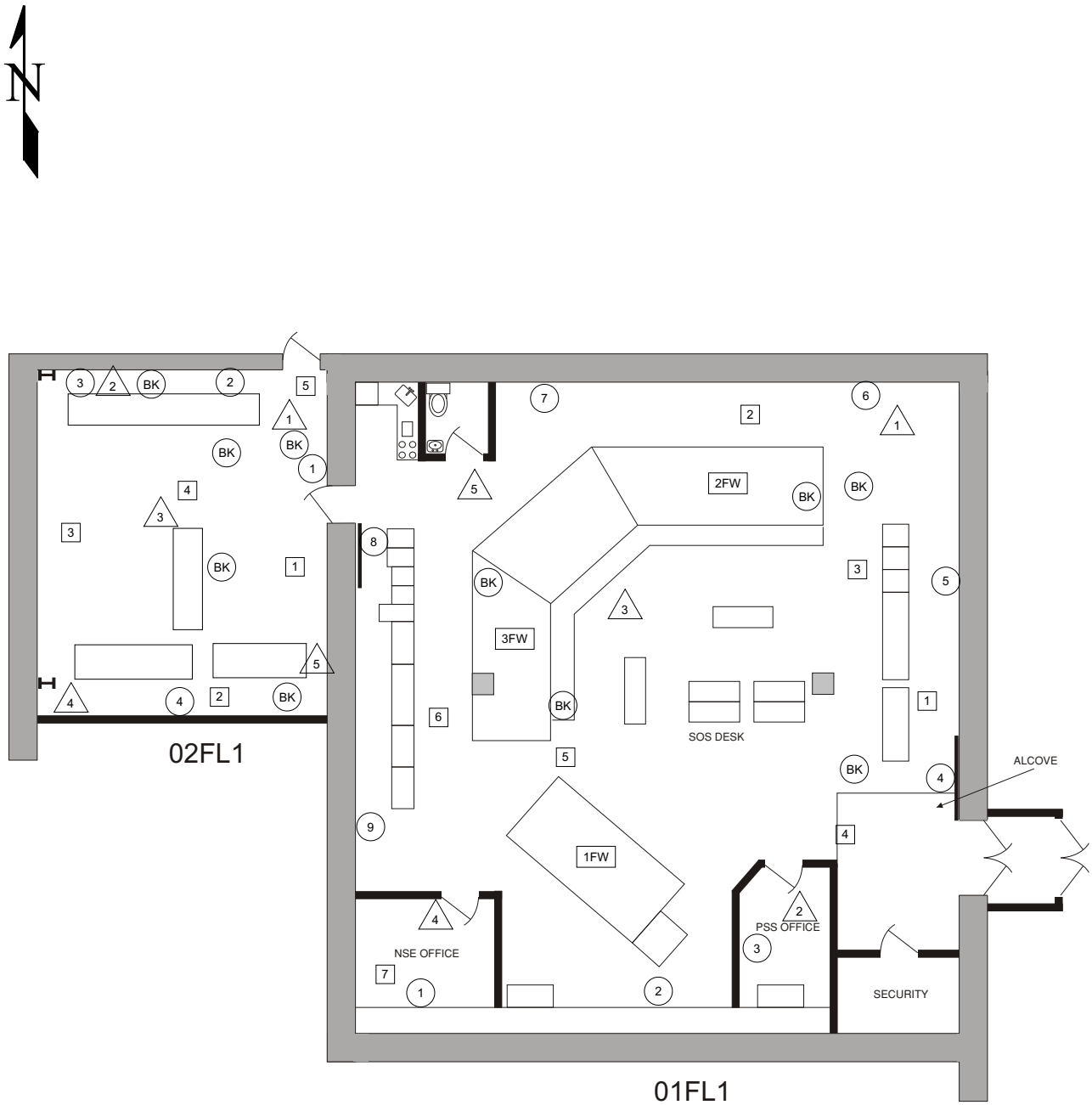
XX Shed Ceiling 02CL1

Note: 2 points also taken on shed roof, not shown 02RF1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Primary Storage Tank Area Survey Package A2300	Figure 2-67



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Test Tanks 21 ft Survey Package A2400	Figure 2-68



XX Walls

XX Floor

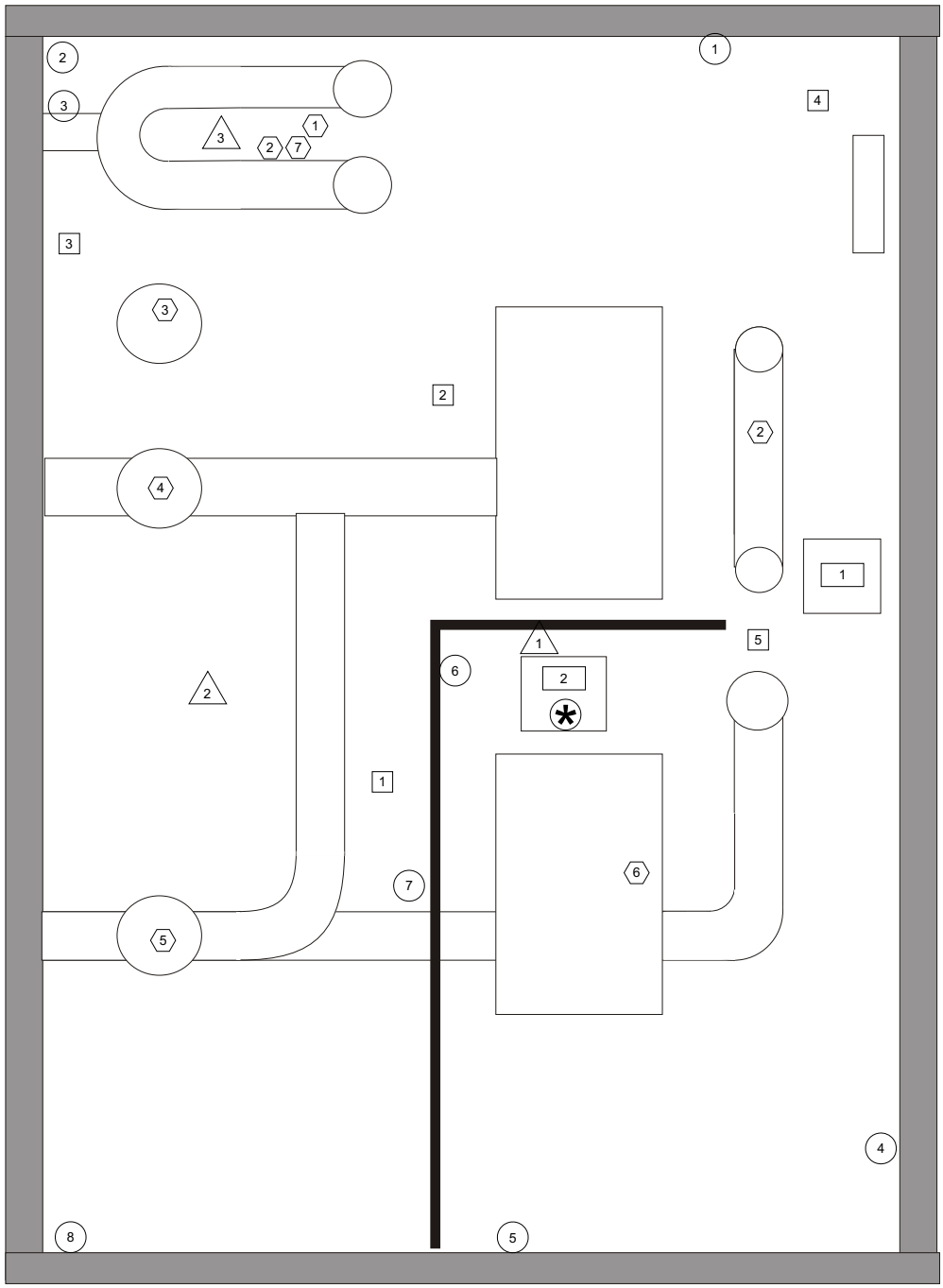
XX Ceiling

XX Equipment

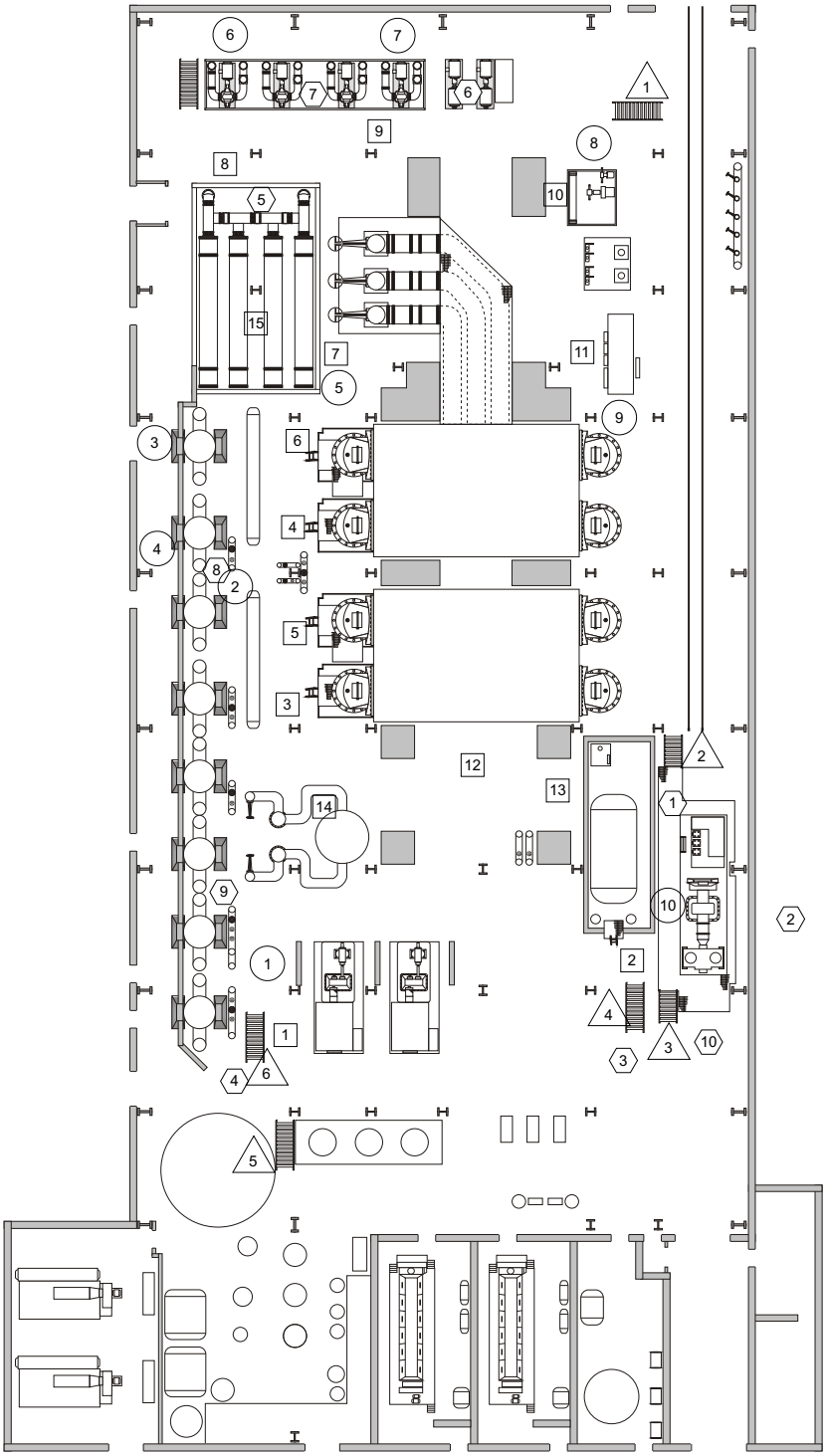
BK Background

XFW Cable Tunnel 03FW1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Control Room & Computer Room Survey Package B0200	Figure 2-69



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Fire Pump House Survey Package B0400	Figure 2-70



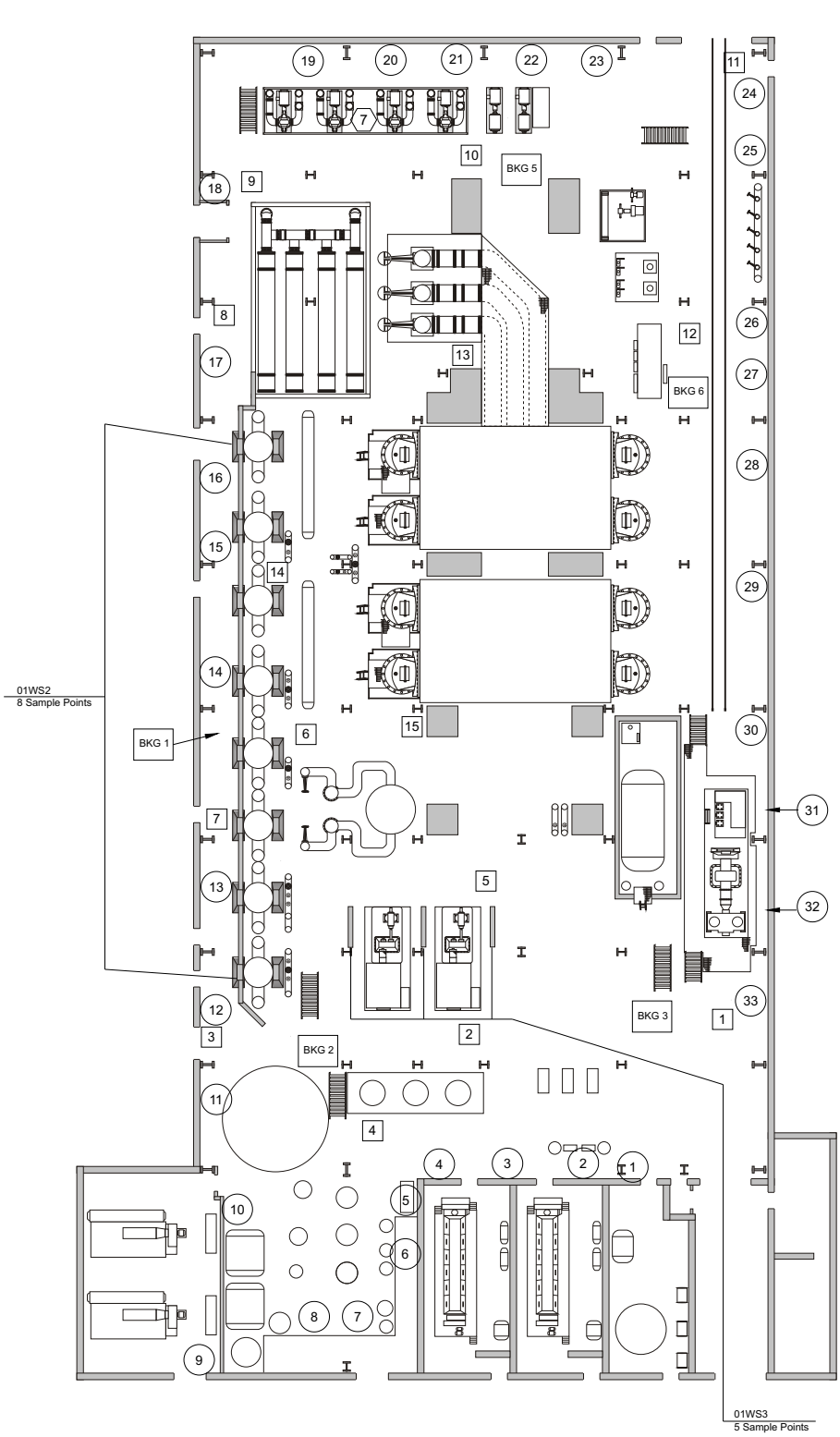
XX Cable Trays 01CL1

XX Ceiling 01EQ1

XX Stairways 01WS1, 01WS2, ... 01WS6

XX Horizontal Supports 01CL2

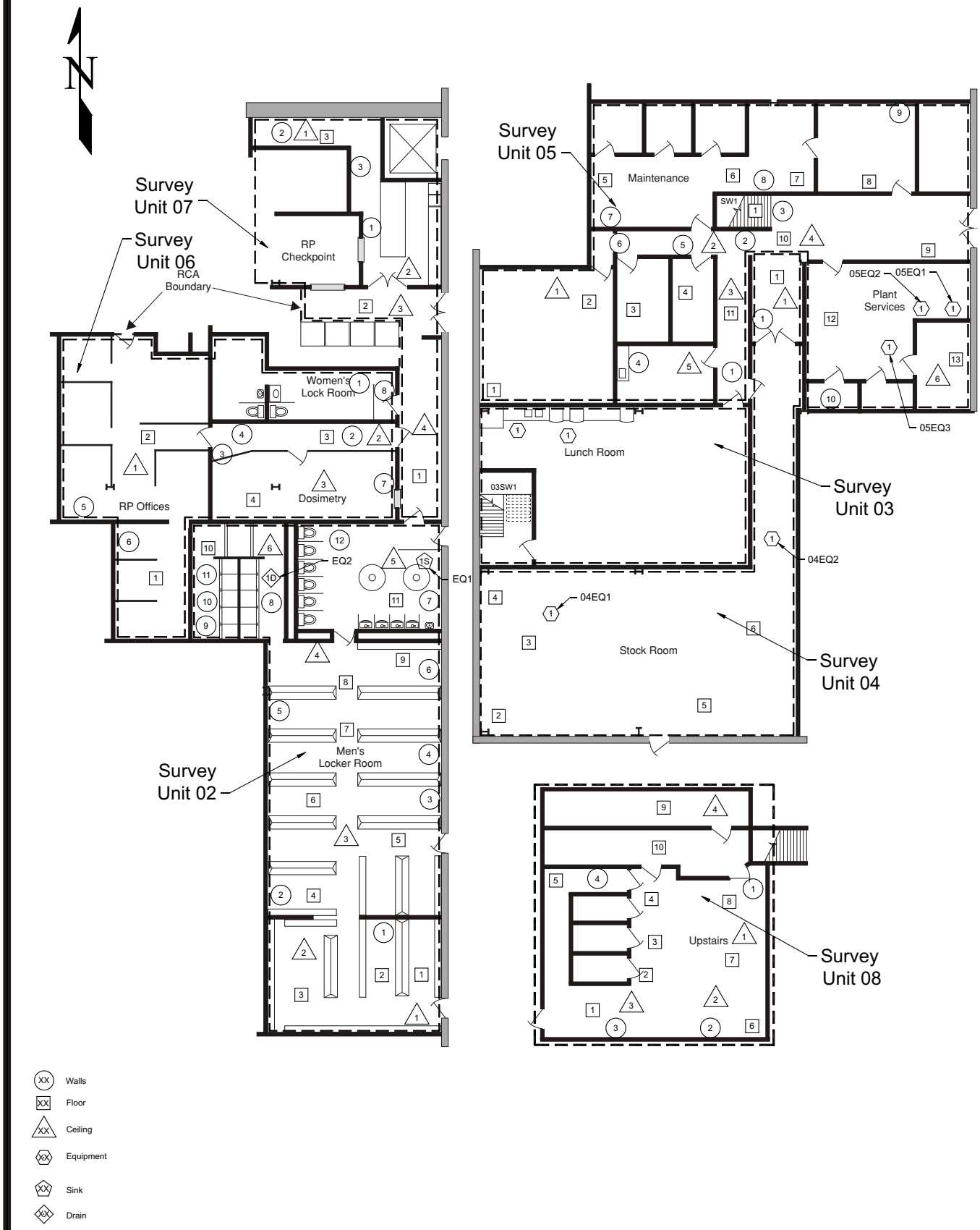
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Turbine Building 21 ft Survey Package B0500	Figure 2-71



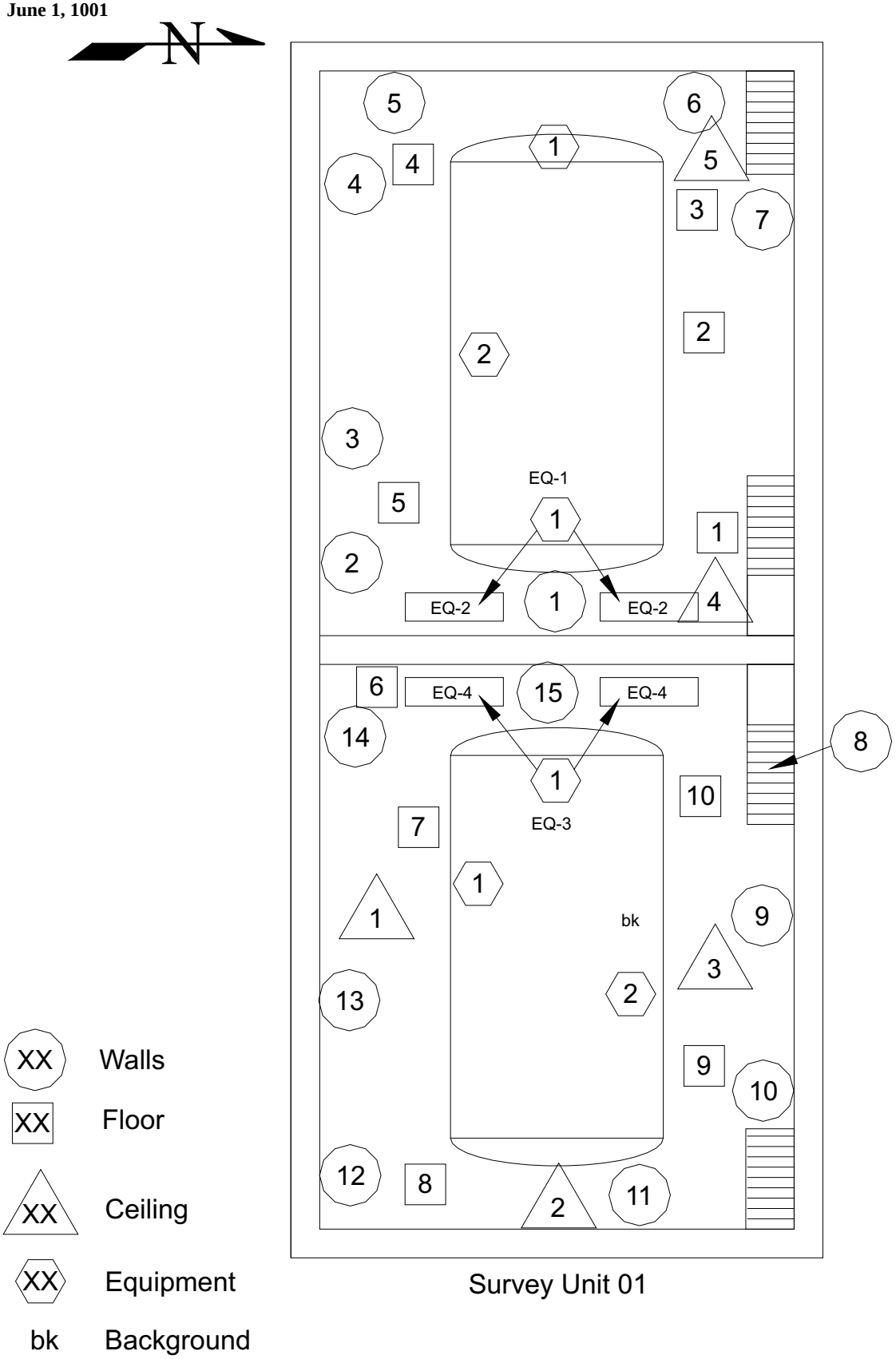
XX Walls

XX Floor

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Turbine Building 21 ft Survey Package B0500	Figure 2-72



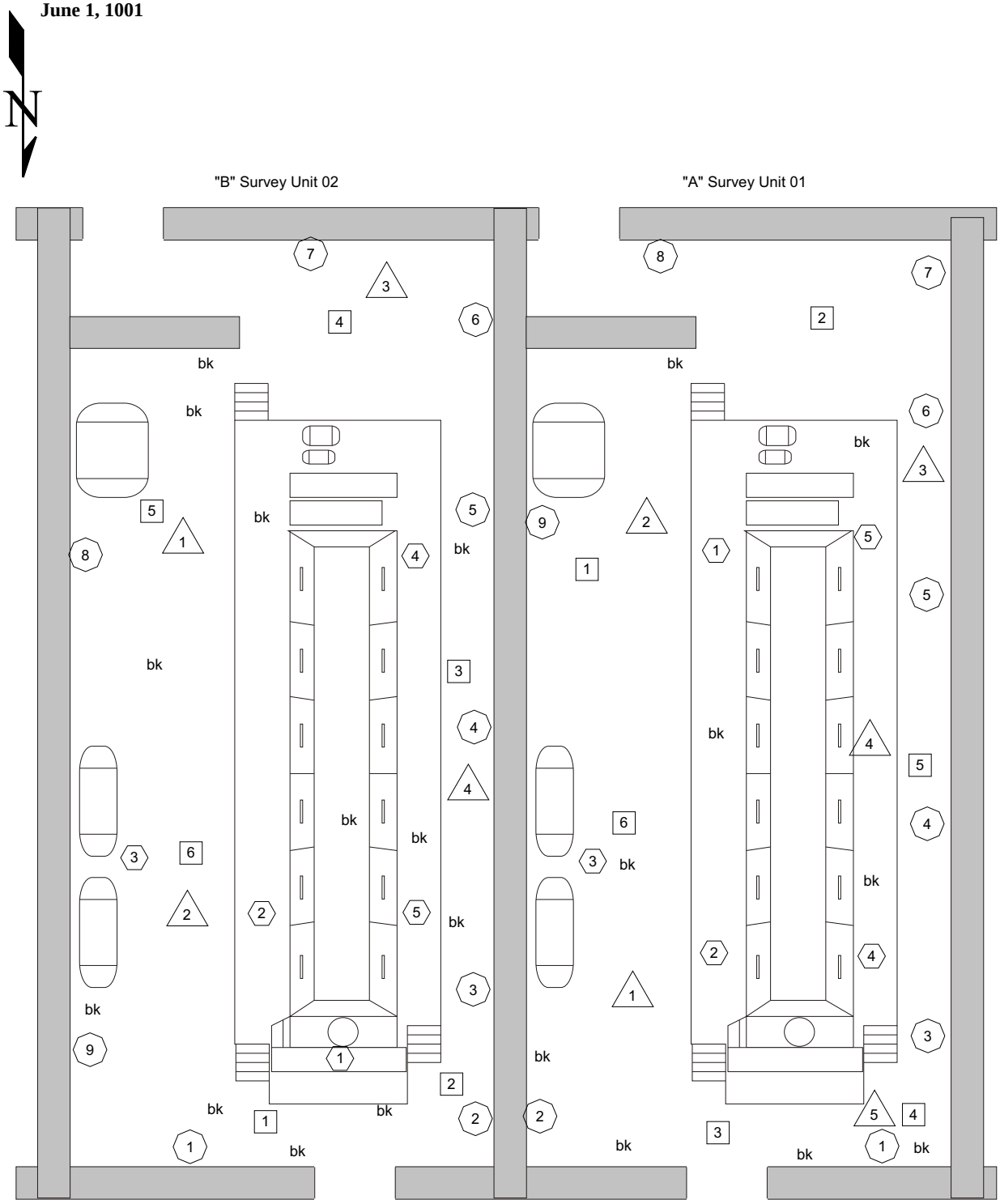
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Service building Cold Side 21 ft Survey Package B0700	Figure 2-73



Survey Unit 01

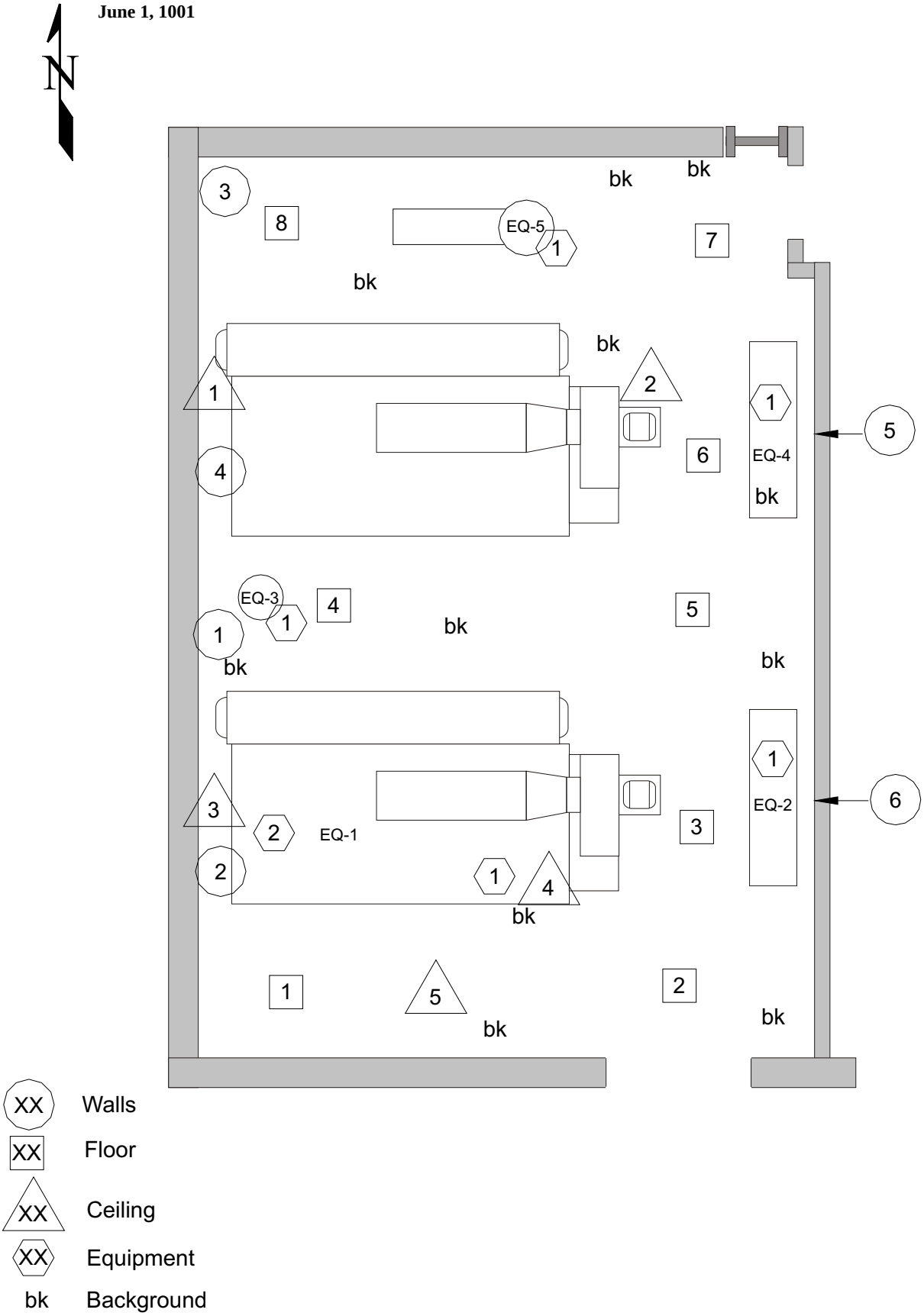
Site Characterization Fuel Oil Storage Building
Survey Package B0800

Figure 2-74

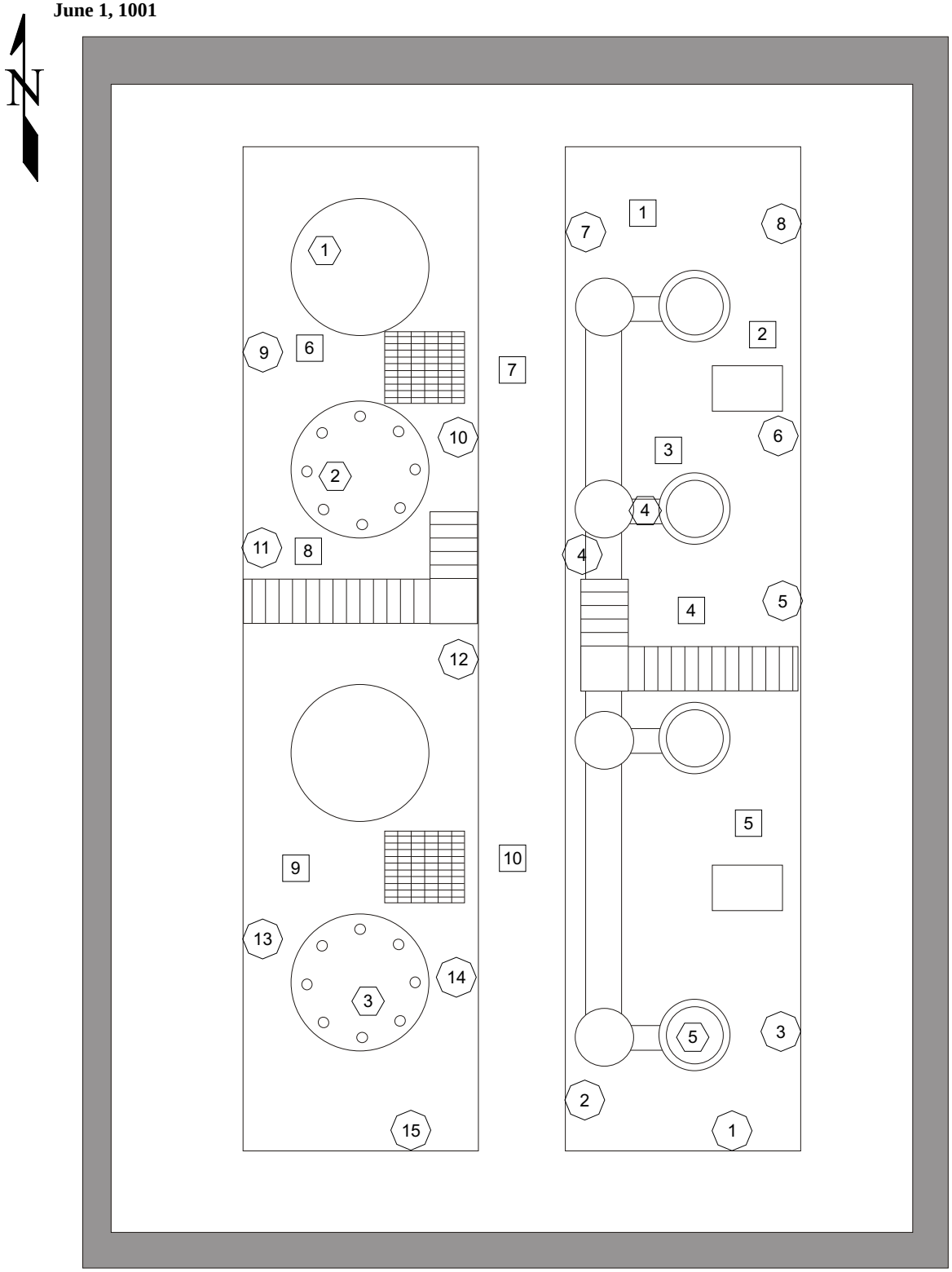


XX Walls
XX Floor
XX Ceiling
XX Equipment
bk Background

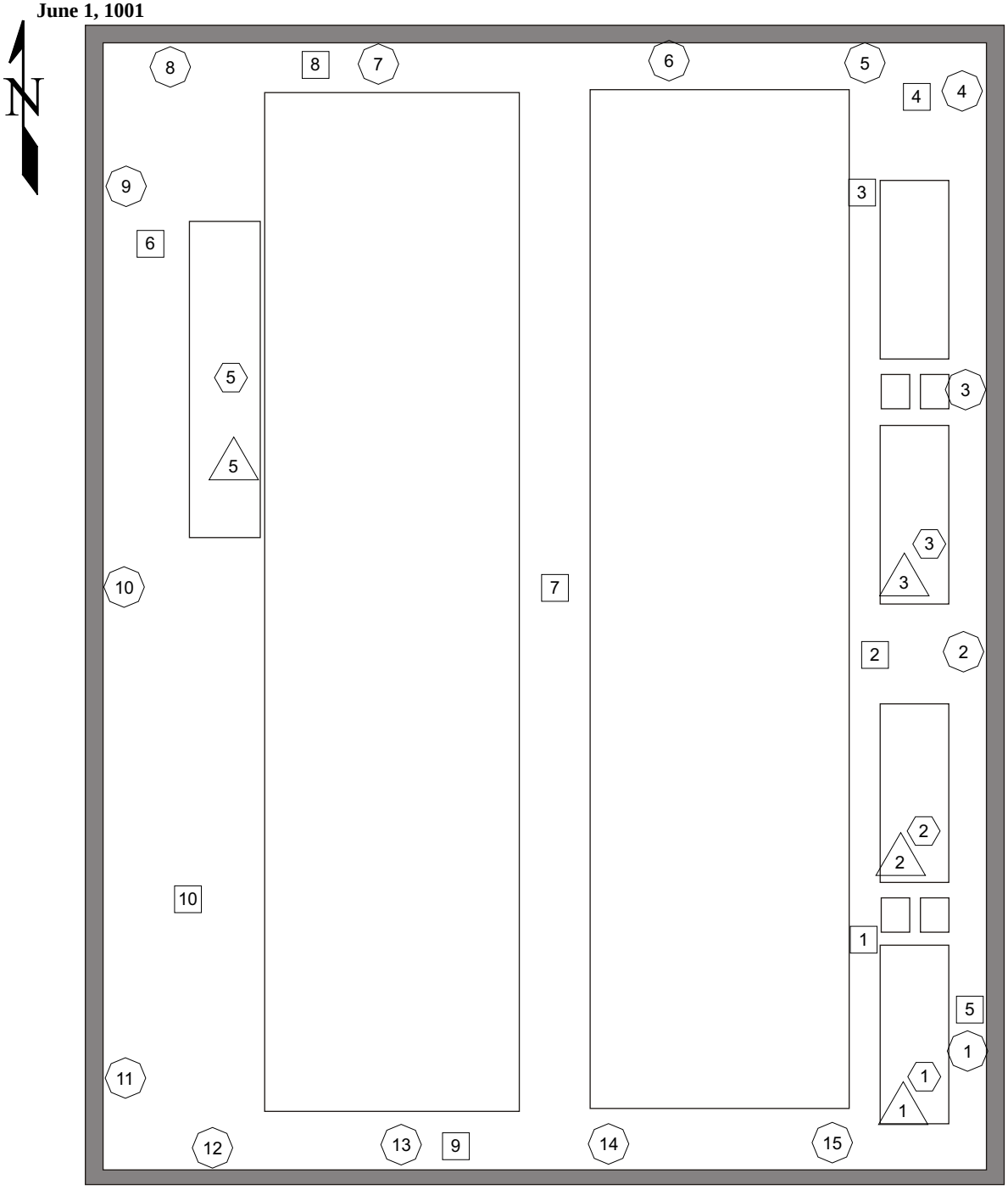
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Diesel Generators Survey Package B0900	Figure 2-75



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Auxiliary Boiler Room Survey Package B1000	Figure 2-76



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Recirc Water Pump House Lower Elevation Survey Package B1100	Figure 2-77



XX Walls 02WS1

XX Floor 02FL1

XX Equipment 02EQ1

XX Ceiling 02CL1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Recirc Water Pump House Upper Elevation Survey Package B1100	Figure 2-78

XX Walls 01WS1

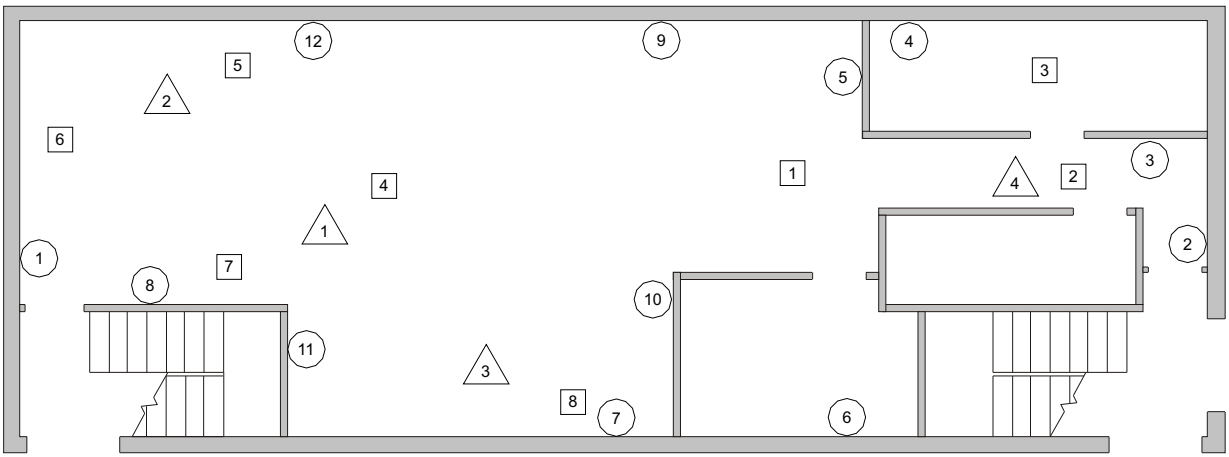
XX Floor 01FL1

XX Equipment 01EQ1, Q2, Q3

XX Ceiling 01CL1

bk Background

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Administration Building Front office Survey Package B1100	Figure 2-79



First Floor / I & C Shop

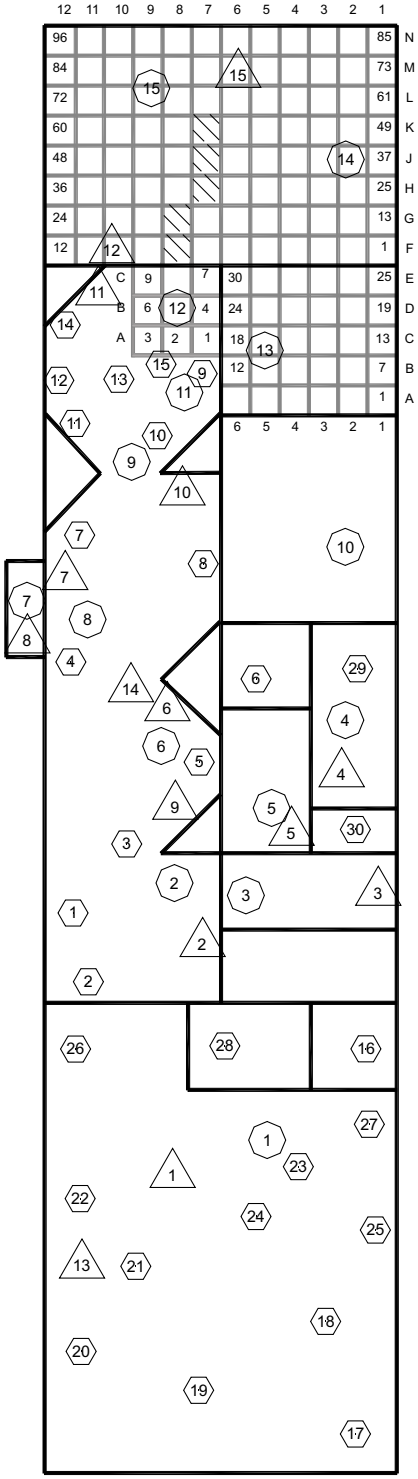
XX Walls 01WS1, 02WS1, 03WS1

XX Floor 01FL1, 02FL1, 03FL1

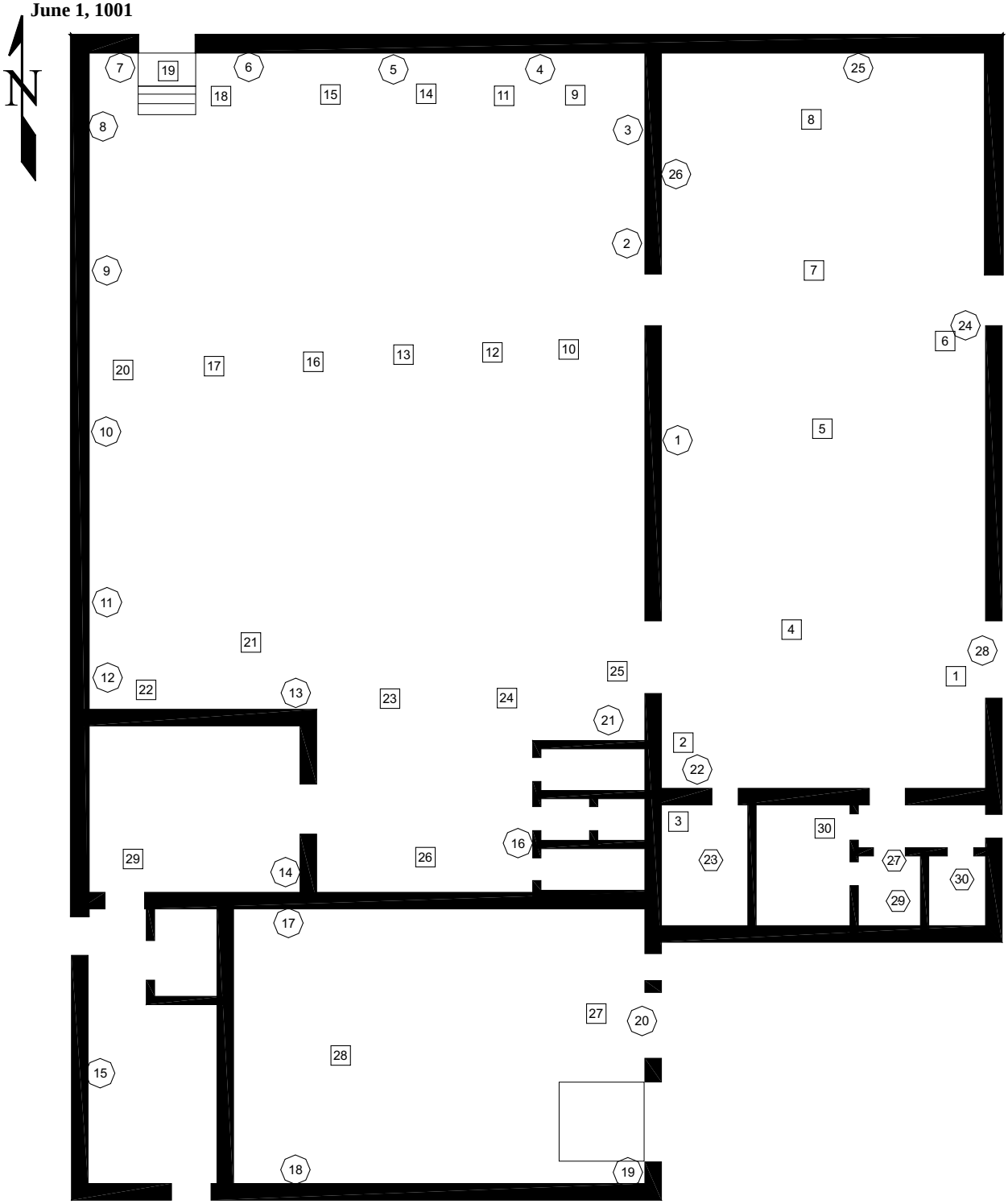
XX Equipment

XX Ceiling 01CL1, 02CL1, 03CL1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization New Office Building (WART Bldg.) Survey Package B1300	Figure 2-80



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Visitor and Information Center Survey Package B1400	Figure 2-81

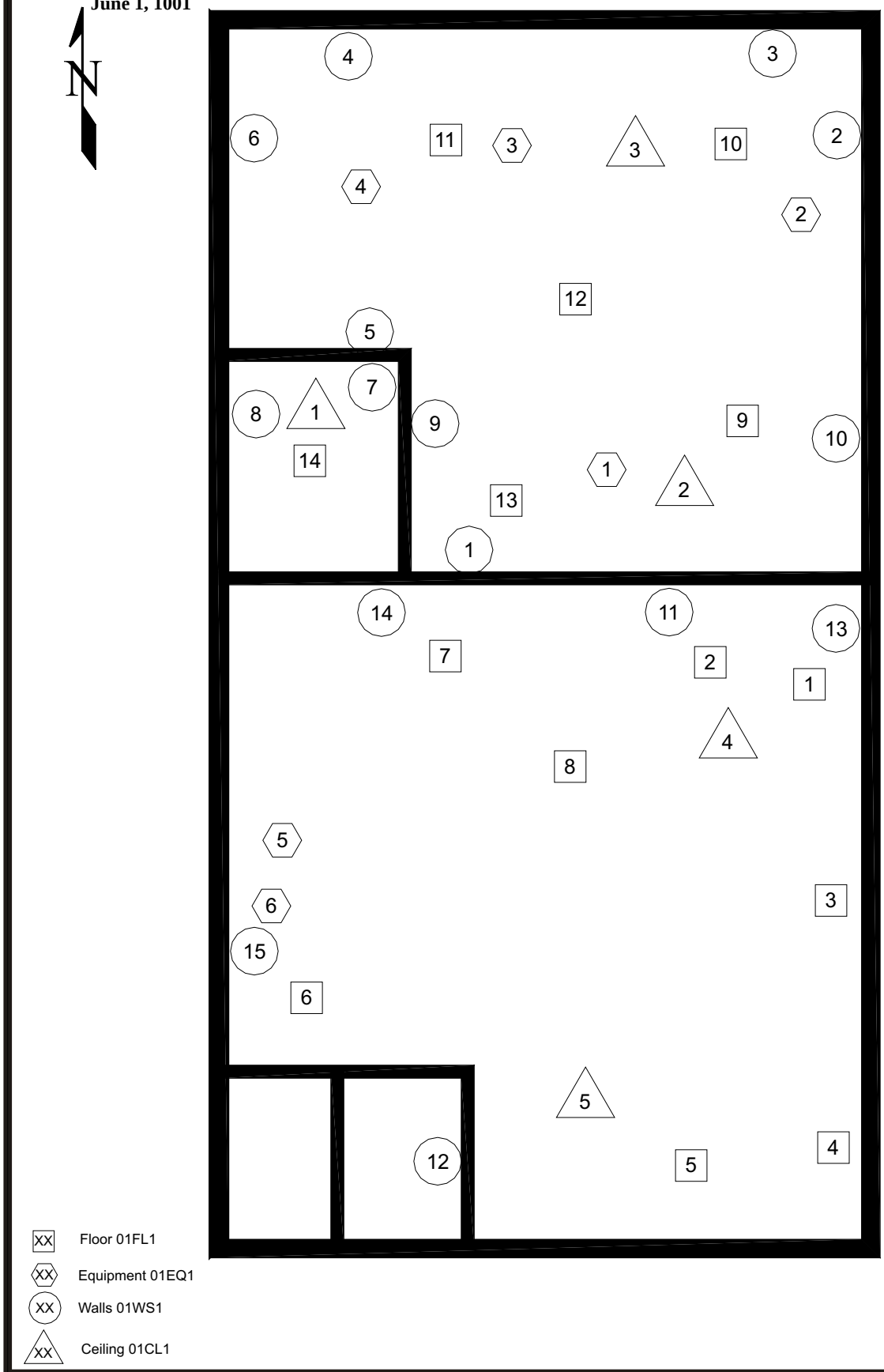


XX Floor 01FL1

XX Ceiling 02WC1

XX Walls 02WC1

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Warehouse 2 Survey Package B1500	Figure 2-82

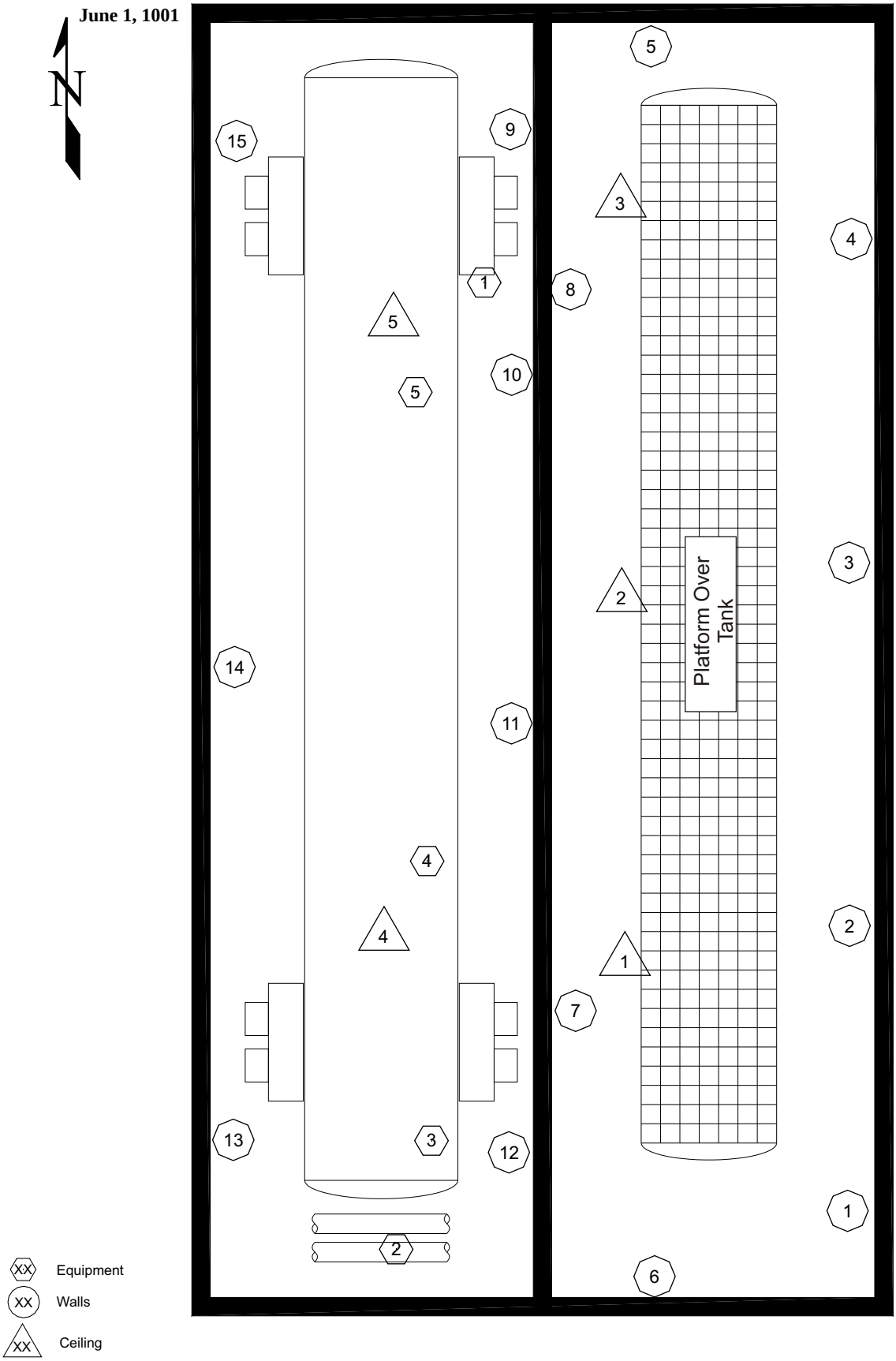


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN

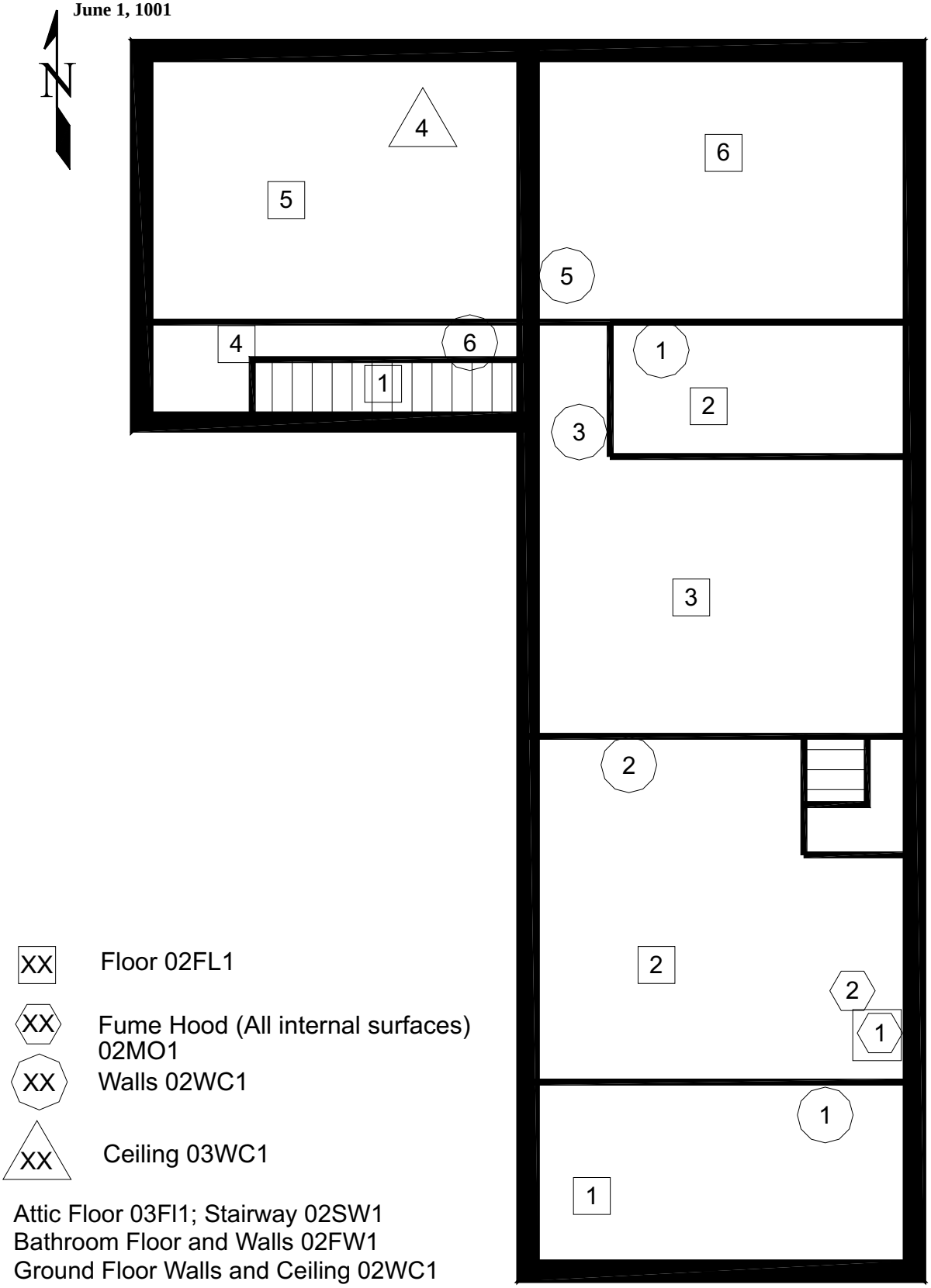
Site Characterization Training Annex
Survey Package B1600

Figure 2-83

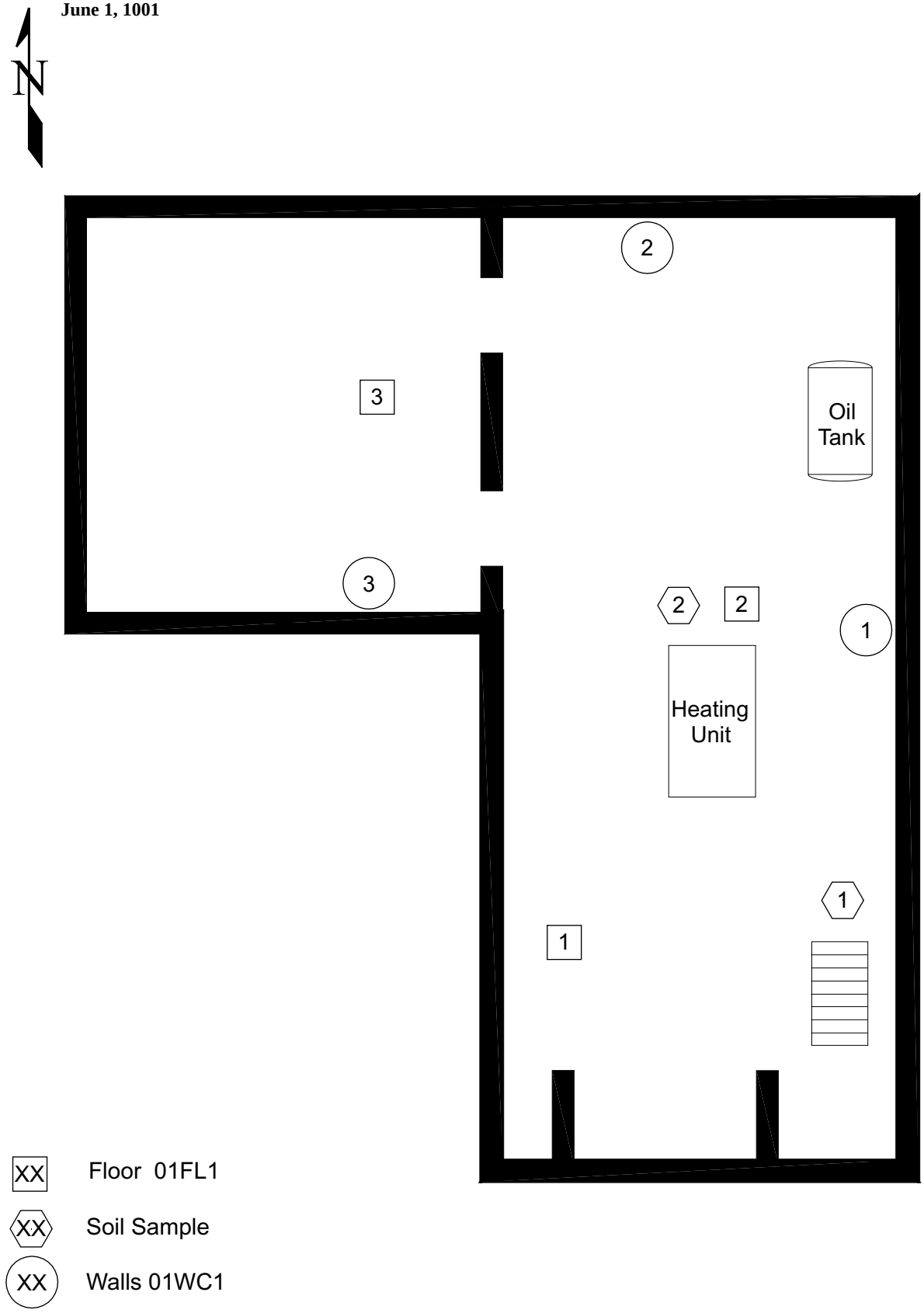
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Staff Building 1st Floor (22ft) Survey Package B1700	Figure 2-84



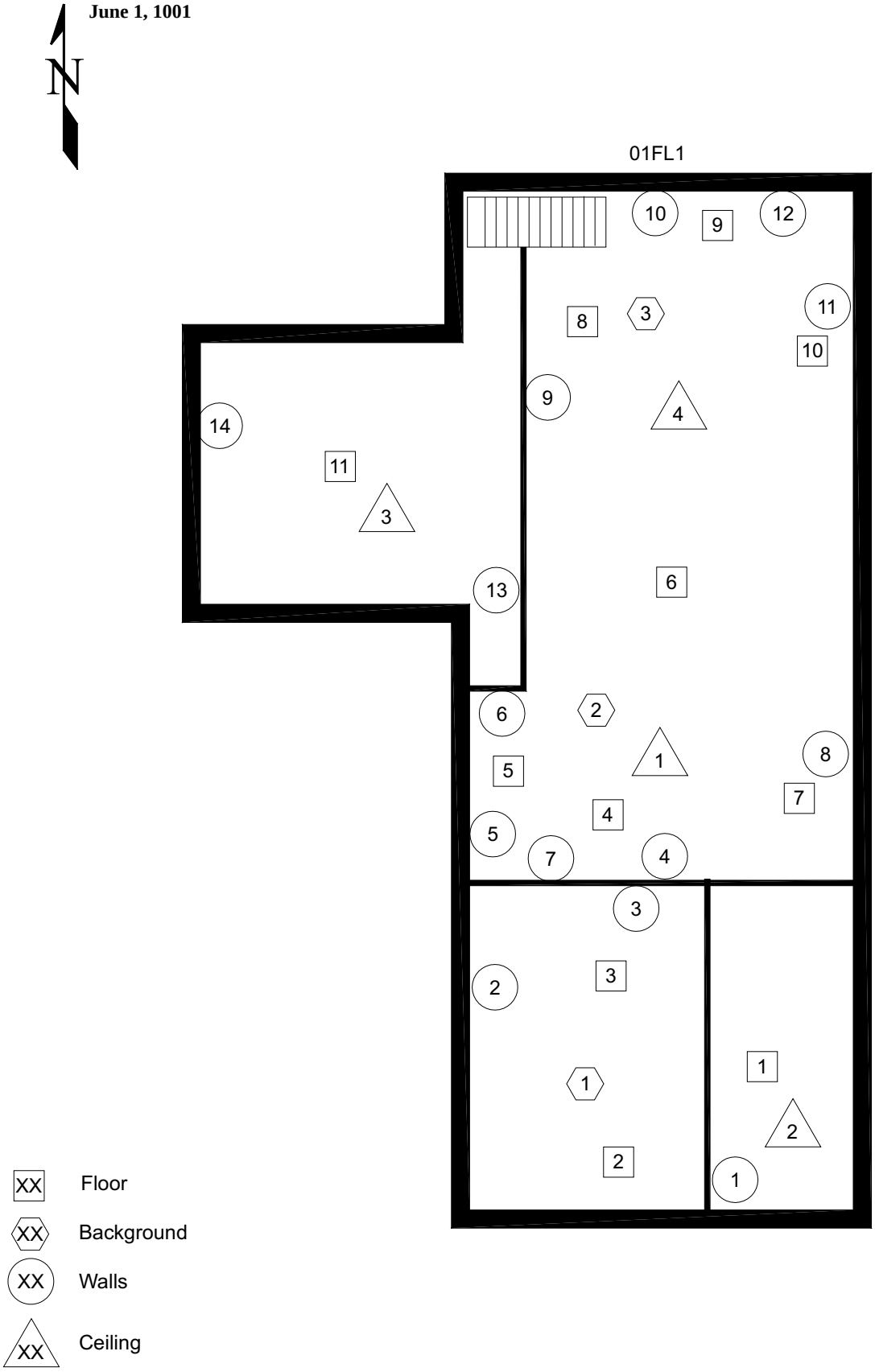
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Spare Generator Building Survey Package B1800	Figure 2-85



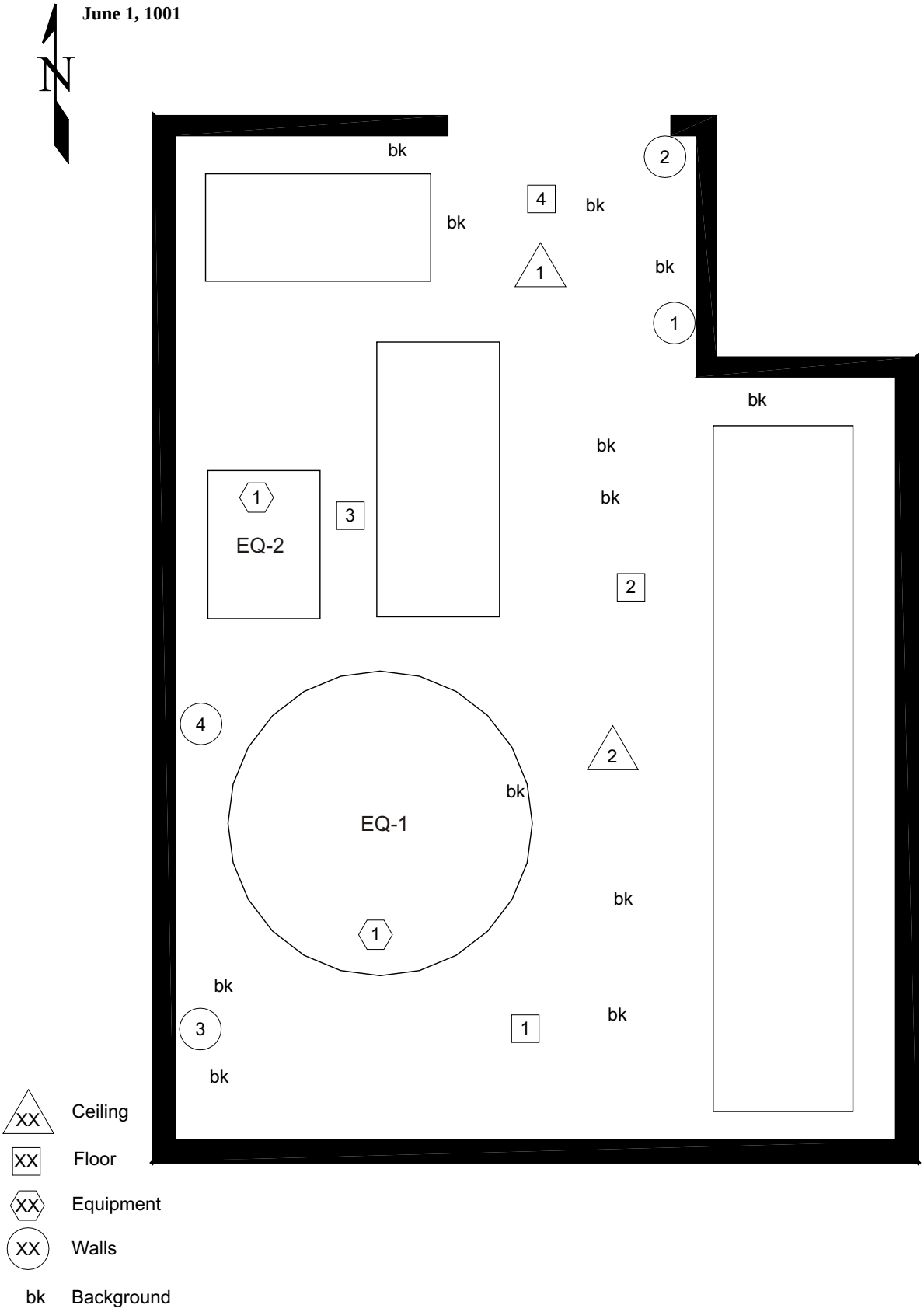
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Environmental Services Building Survey Package B1900	Figure 2-86



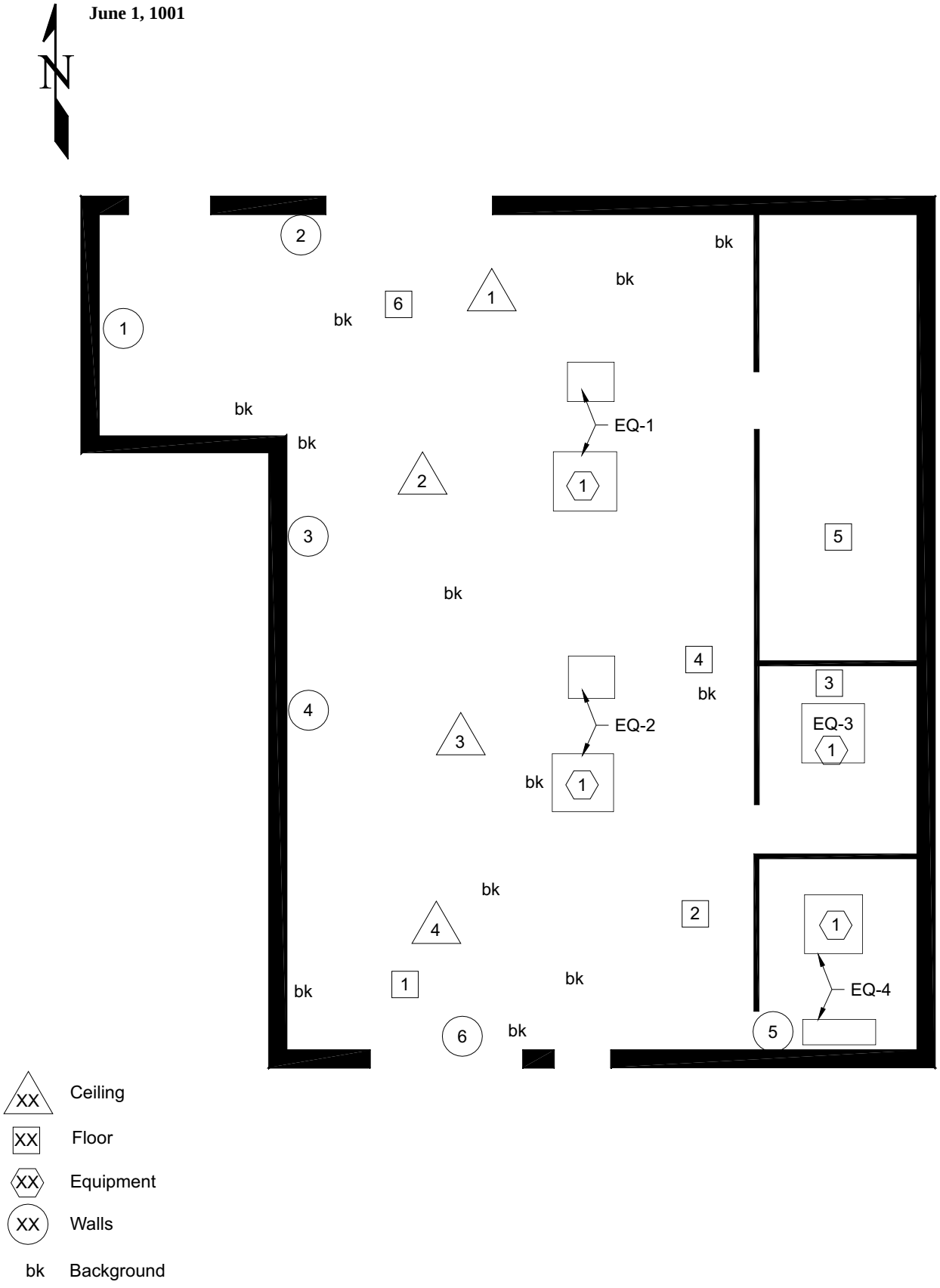
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Environmental Services Building Basement Survey Package B1900	Figure 2-87



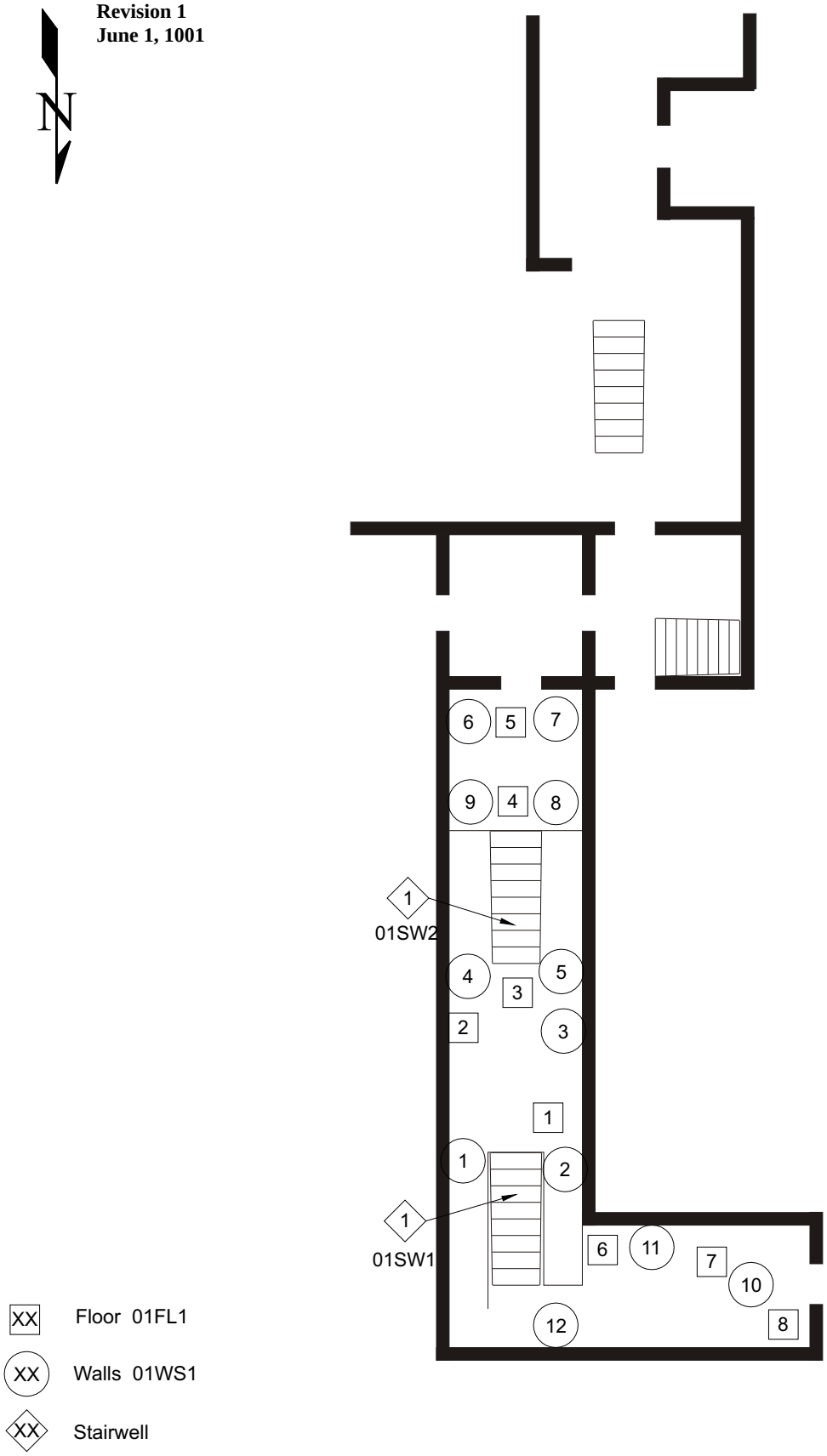
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Bailey Barn Survey Package B2000	Figure 2-88



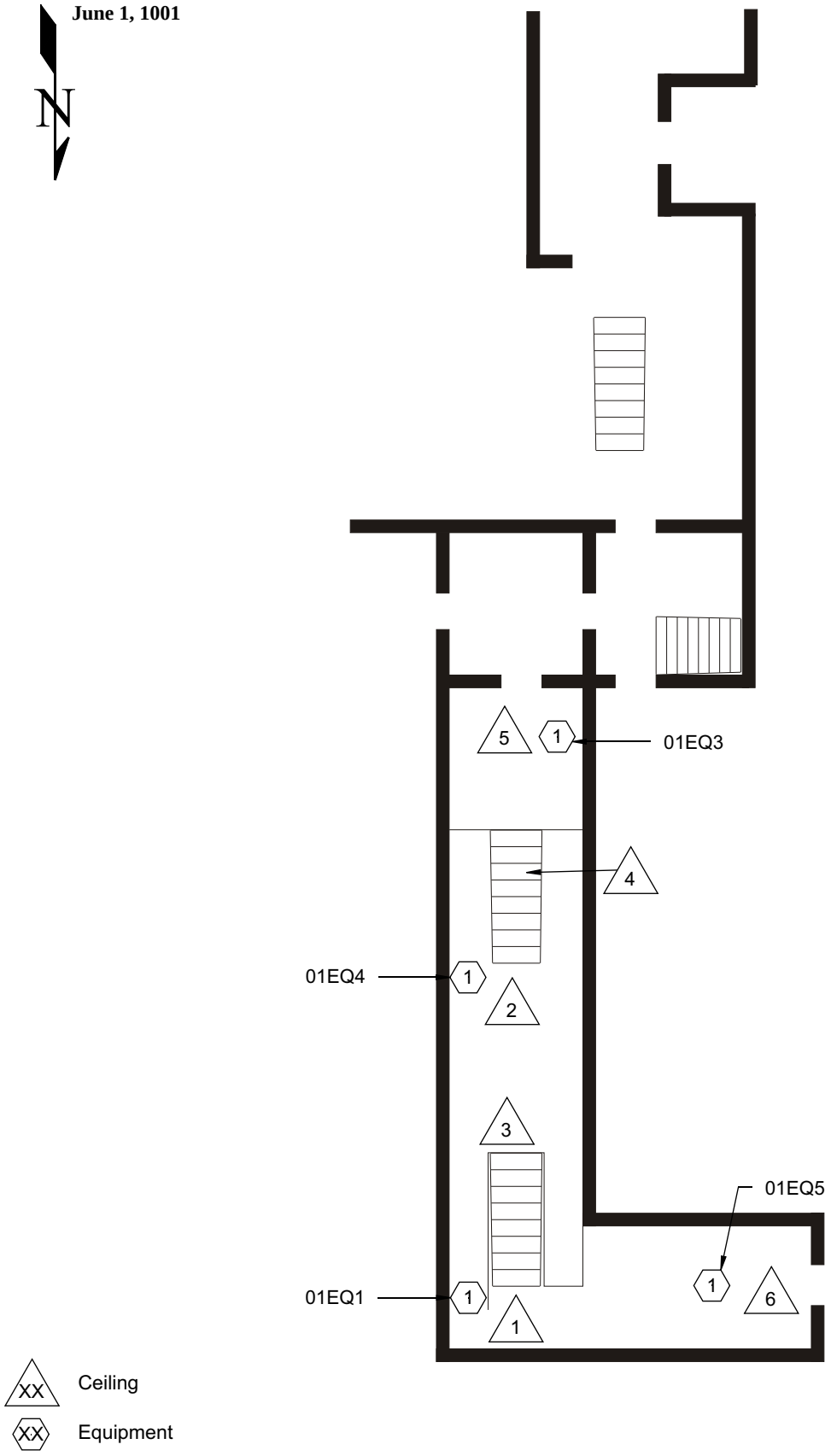
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Lube Oil Storage Room 21 ft Survey Package B2100	Figure 2-89



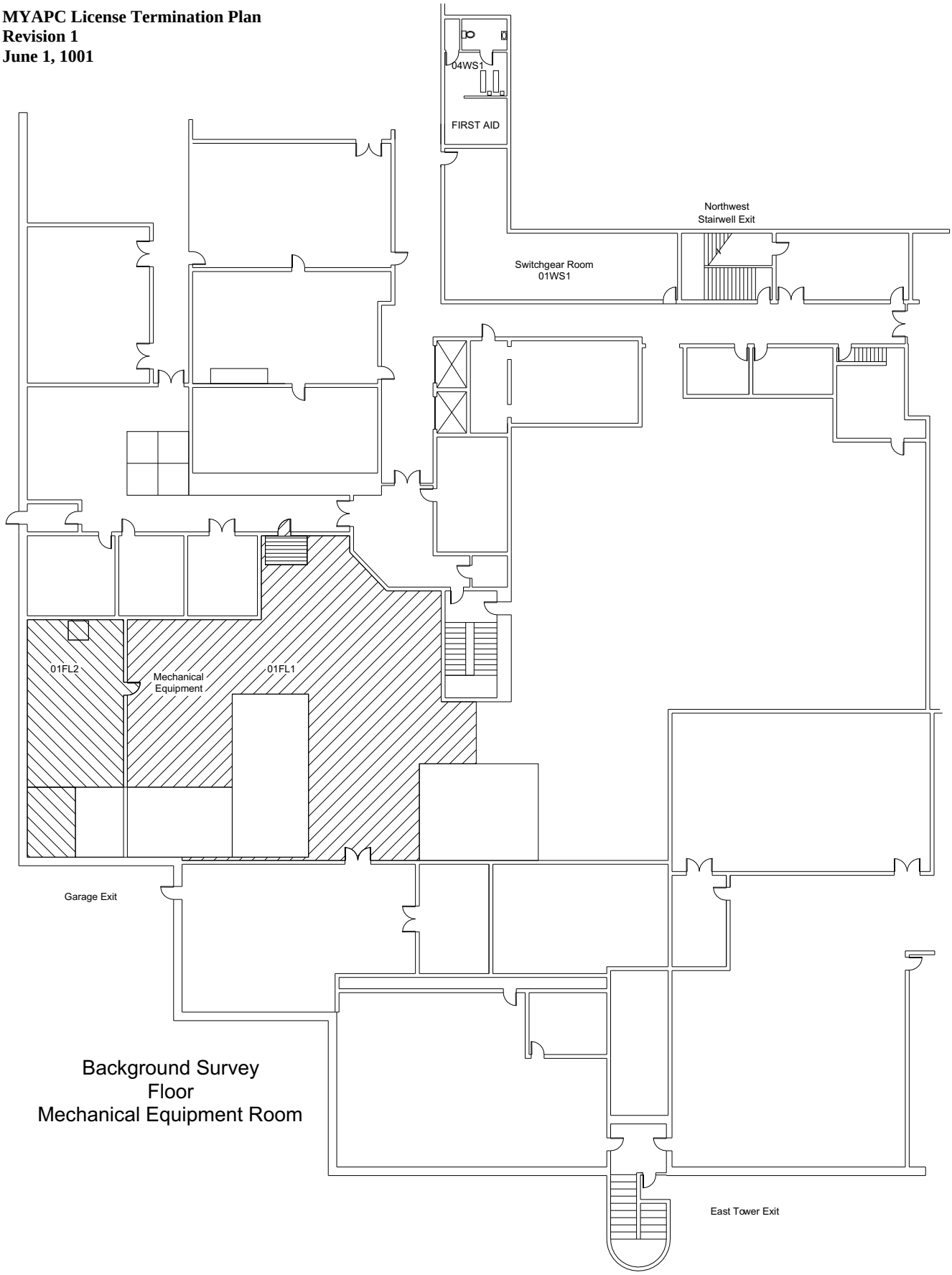
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Cold Machine Shop Turbine Building 21 ft Survey Package B2200	Figure 2-90



MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Staff building Tunnel Survey Package B2400	Figure 2-91

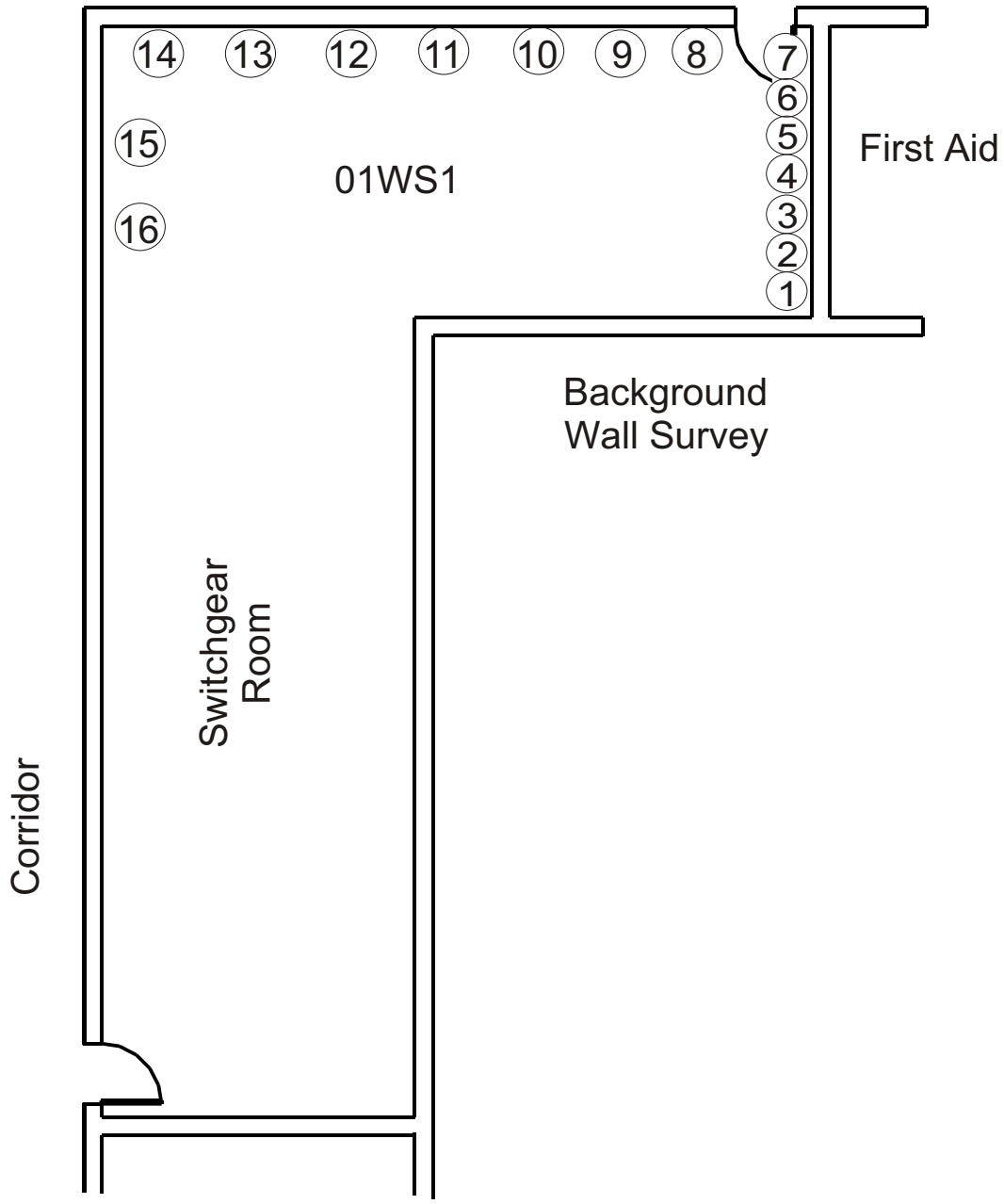


MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization Staff building Tunnel Survey Package B2400	Figure 2-92



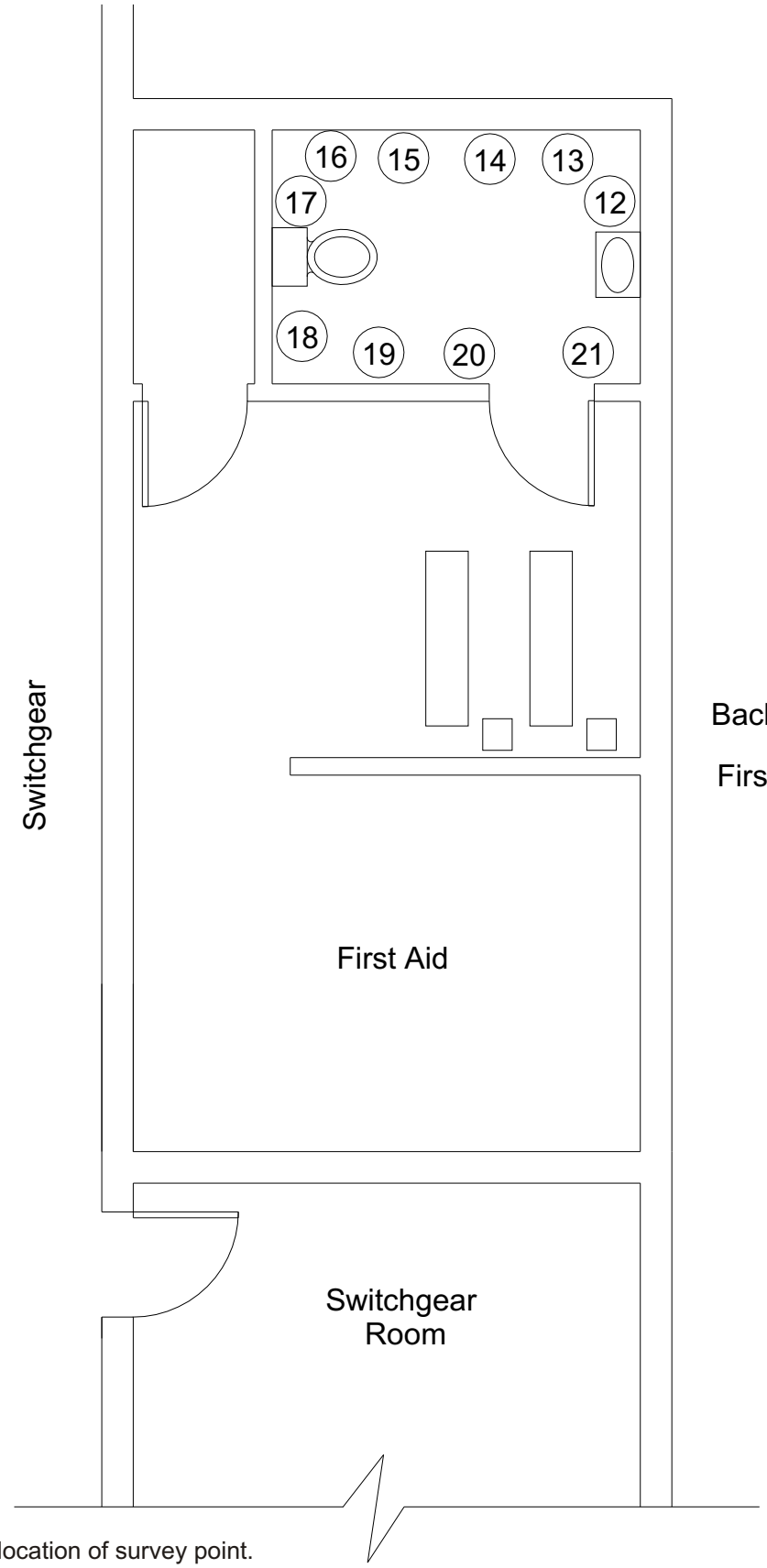
Background Survey
Floor
Mechanical Equipment Room

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-93



(XX) Approximate location of survey point.

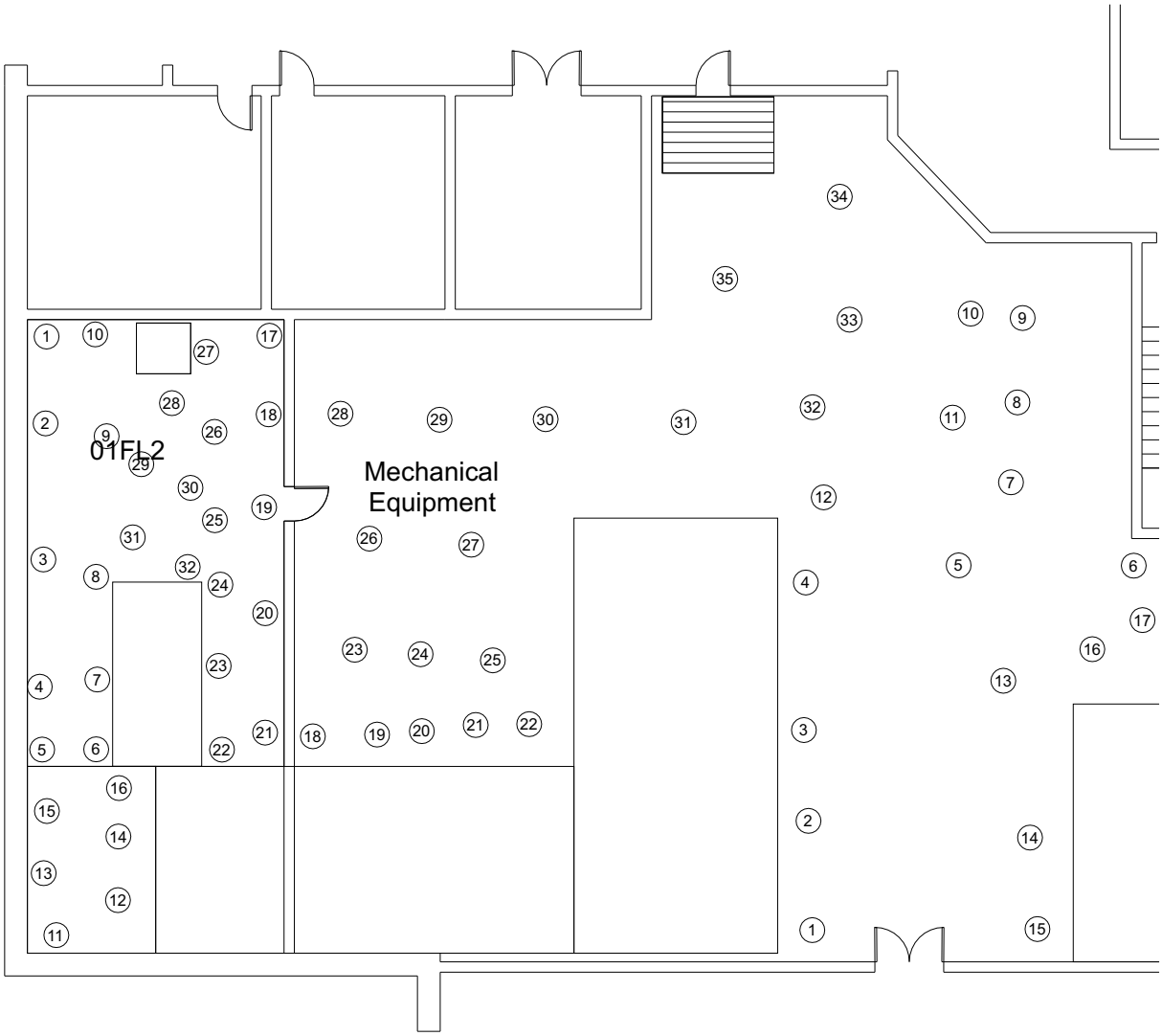
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP building Augusta Survey Package B9800	Figure 2-94



Background Survey
Tile Walls
First Aid/Bathroom
04WS1

XX Approximate location of survey point.

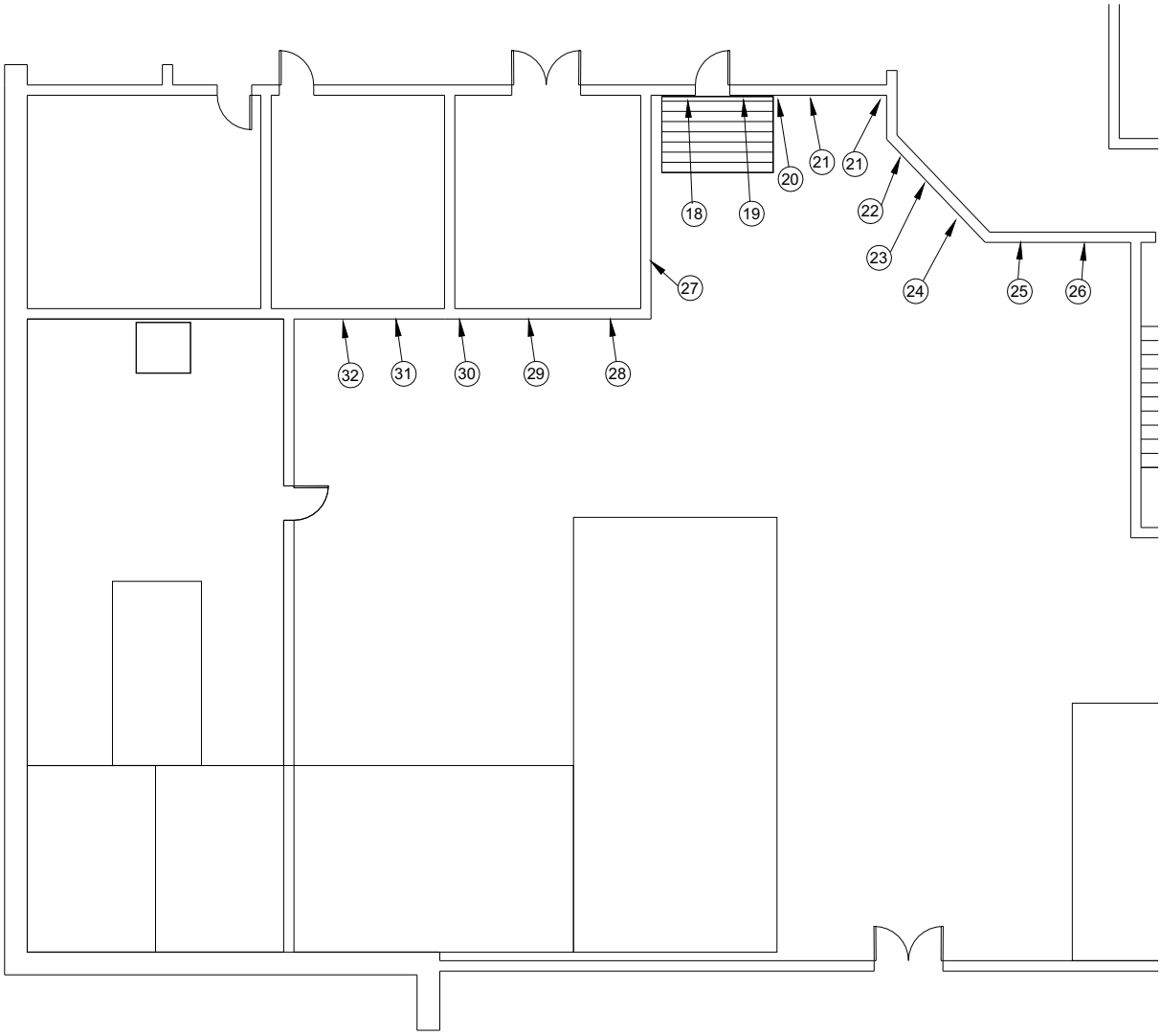
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-95



Floor- Garage Exit
Background Survey

(XX) Approximate location of survey point.

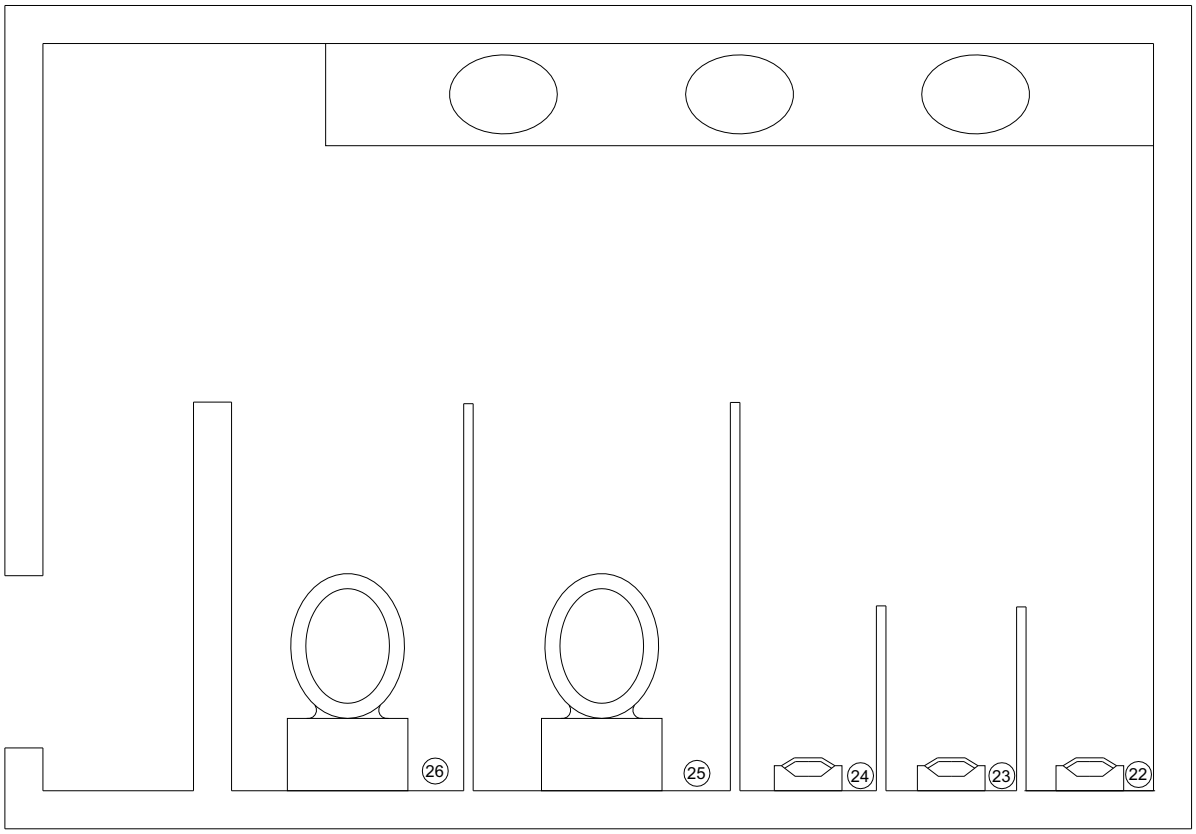
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-96



Mechanical Equipment Room
Background Survey

(XX) Approximate location of survey point.

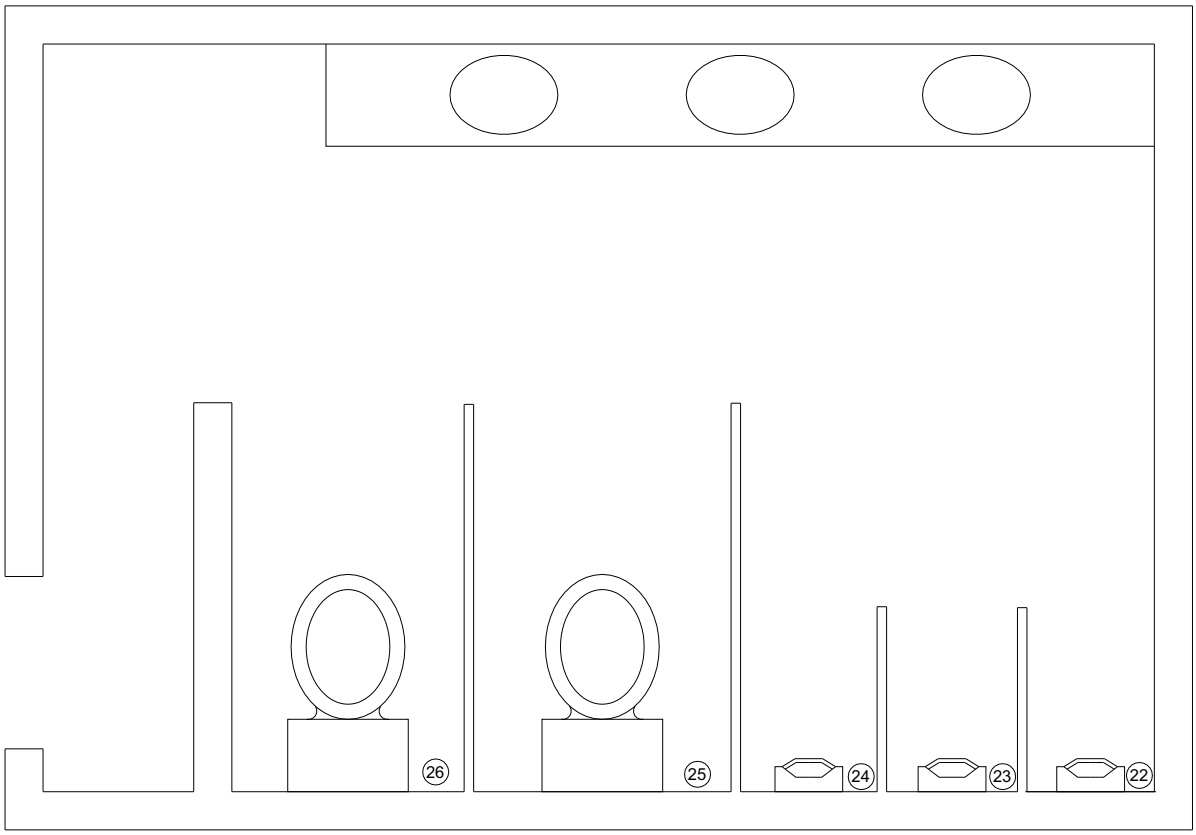
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-97



2nd Floor Men's Bathroom
Tile Wall
Background Survey
04WS1

(XX) Approximate location of survey point.

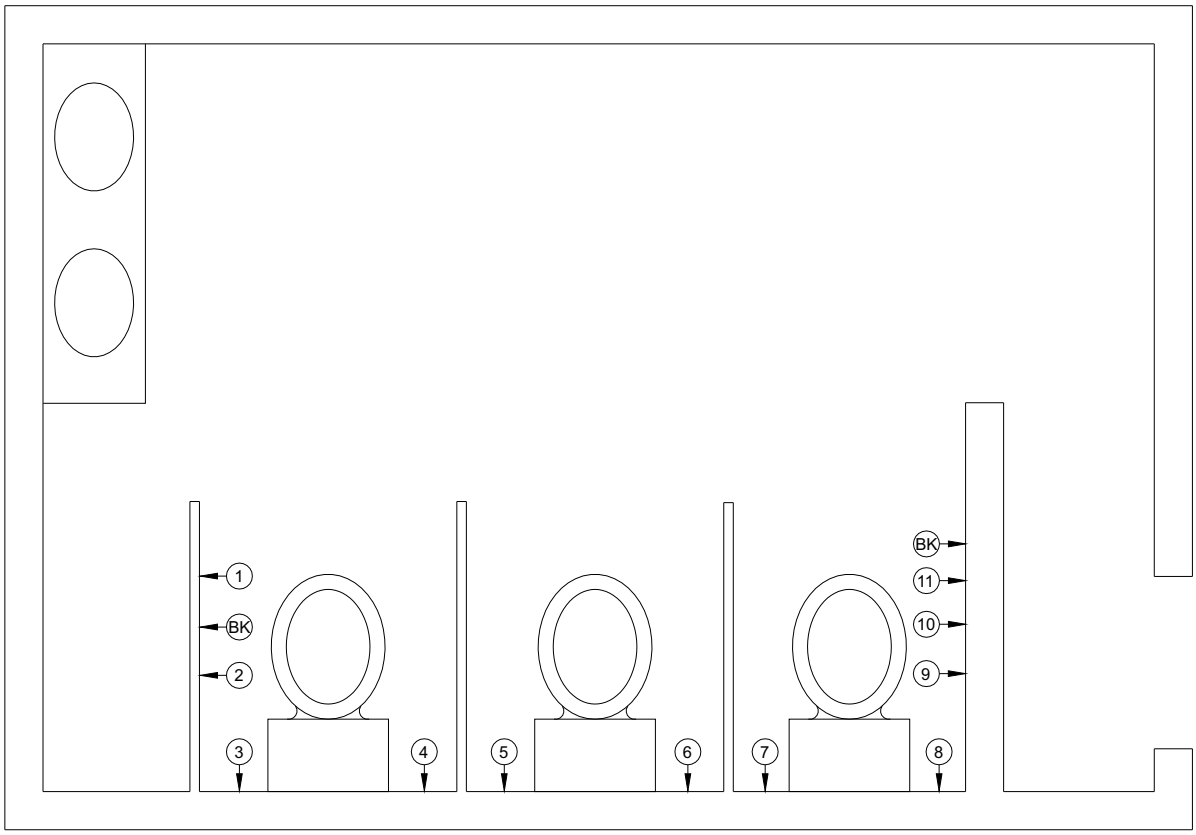
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-98



2nd Floor Men's Bathroom
Tile Wall
Background Survey
04WS1

(XX) Approximate location of survey point.

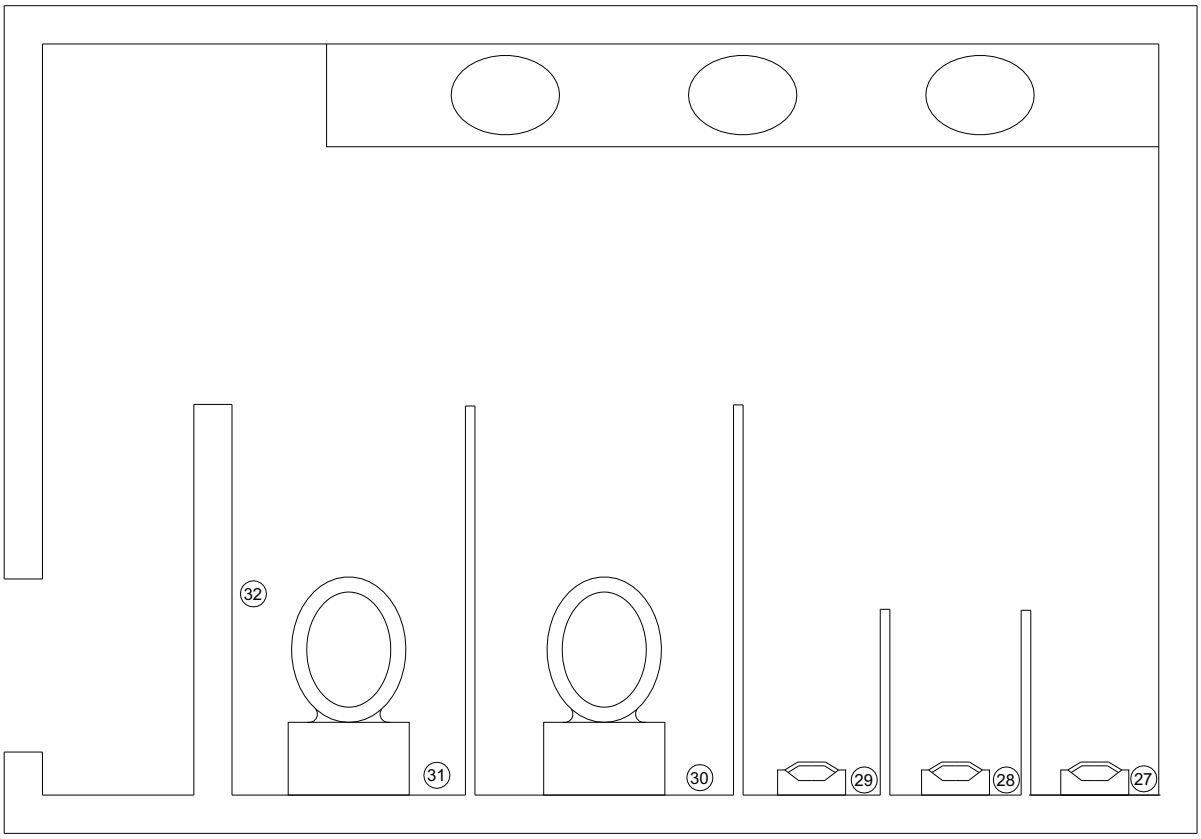
MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-99



3rd Floor Women's Bathroom
Tile Wall
Background Survey

(XX) Approximate location of survey point.

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-100



4th Floor Men's Bathroom
Tile Wall
Background Survey
04WS1

(XX) Approximate location of survey point.

MAINE YANKEE ATOMIC POWER CO. LICENSE TERMINATION PLAN	Site Characterization CMP Building Augusta Survey Package B9800	Figure 2-101

Attachment 2F

Analysis of Concrete Sample Variance

Concrete Core Data Variance Analysis

Introduction

A series of concrete core samples were collected and analyzed as described in EC 011-01(MY) to determine the radionuclide mixture for contaminated materials to use in dose assessment. The analytical results were reviewed to ensure that the concrete core samples were representative and to determine if the cores comprise a single population. This review was performed on the basis of dose. The affect of MDA values on the projected dose was also evaluated and used to justify removing the non-detect nuclides from the mixture.

Nuclide Data

EC 020-00(MY) established the nuclide fractions for the seven concrete core samples that comprised the original set of core samples reviewed. To determine nuclide fractions, the analytical results for the seven GTS cores could have been evaluated in either of two ways: 1) the average of the individual nuclide activities, or 2) the average of the individual nuclide fractions. Using the "average of the fractions" method reduces the bias caused by variability in the radionuclide concentrations found in the seven cores and was therefore used in the analysis. The nuclide fractions were decayed to 1/1/2004 (Attachment 2F-2). The data were then normalized to unity and the normalized values were used to calculate the "average of the fractions" for each of the 30 nuclides in the nuclide suite (EC 007-00(MY)).

A second set of concrete core data consisted of two Containment Outer Annulus (O/A) trench samples that were collected and analyzed to investigate a previous trench sample, which had a questionable nuclide composition. The radionuclide mixture of the two O/A trench samples were evaluated individually and then combined with the original 7 cores using the same "average of the fractions" method.

The third set of data reviewed was a set of 43 cores that were analyzed by gamma spectroscopy only. This provided a larger data set for Co-60 and Cs-137, which together comprise the majority of the projected dose.

Evaluation of Non-Detect Nuclides

The analysis of the concrete core mixture included the 30 nuclides in the nuclide suite. Many of the nuclides were reported as less than MDA. This was expected since these nuclides have a low probability of being present. Two approaches were considered for evaluating MDA results; 1) include the MDA values as representing actual concentrations, and 2) remove the non-detected nuclides from the mixture. Removing the nuclides was considered more appropriate and representative of actual site conditions because the non-detected nuclides are believed to be present at negligible concentrations or at concentrations well below the reported MDA value.

However, it cannot be ruled out with 100% certainty that the non-detected radionuclides are present at activities approaching the MDA values. Therefore, an analysis was performed, based on relative dose, to review the affect of leaving the MDA's in the mixture versus removing the MDA's.

To perform this analysis, the normalized nuclide fractions were treated as activity, converted to equivalent dose and compared on a relative basis. The dose rates for the full nuclide suite were calculated first, including the MDA's. The MDA's were then removed and the remaining nuclides evaluated.

Relative Dose Calculation

There are three materials evaluated in the dose assessment that are assumed to be contaminated with the nuclide mixture represented by the concrete cores; i.e., buried pipe/conduit, embedded pipe, and basement surfaces. Each of these materials has a different dose model. The concrete core mixture was evaluated using the basement surface model since it contains the majority of the contamination inventory and results in the highest dose. The relative dose was calculated assuming that each nuclide contributes to the dose according to its nuclide fraction in the mixture. This was acceptable since the fractions ensure that the proper relative fraction between the cores is maintained. The nuclide fractions were converted to an annual dose using the spreadsheet for contaminated basement concrete. Relative dose was then used to compare the data sets with and without the MDA values.

Error Propagation

The variation between the samples was examined by determining the standard deviations of the mean dose for each core and for the nuclide fractions. The error of the mean dose was determined to evaluate variability within the sample population. The upper and lower 2 sigma bounds were determined for the mean doses.

The standard deviation of the mean dose was calculated as follows for both the individual cores and each nuclide fractions:

$$\sqrt{\frac{n\Sigma x^2 - (\Sigma x)^2}{n(n-1)}}$$

then,

$$\frac{\text{Standard Deviation}}{\sqrt{n}}$$

gives the standard deviation of the mean.

The nuclide fraction data required an additional error propagation to account for the variability in

each nuclide fraction. This was accomplished by squaring the standard deviation of the mean for each nuclide and summing over all nuclides. The propagated error was calculated as:

$$\sqrt{\Sigma\left(\frac{std.\ dev.}{\sqrt{n}}\right)^2}$$

The variation between the nuclide fractions' dose and the individual core dose was examined by reviewing the upper and lower 2 sigma confidence intervals to ensure the error bars overlap, which qualitatively indicates that the two data sets (i.e.; nuclide fractions' and individual core) do not produce significantly different doses.

Data Evaluation

As shown in Attachment 2F-3, the relative dose for the seven cores was determined in three ways 1) with MDA's present, 2) with MDA's removed but transuranic nuclides (TRU's) present, and 3) with TRUs and MDAs removed. The impact of the MDAs has been discussed previously. The TRUs were considered based on their presence in the O/A trench samples.

Attachment 2F-3 shows that the mean dose for the nuclide fraction increases as the MDAs and TRUs are removed. This is due to the increased effect of the primary dose contributing nuclides: Cs-137 and Co-60. In addition, as the dose for the mixture increases, the dose per dpm gross beta also increases. This shows that removing the MDAs and TRUs provides a conservative measure of dose.

The TRUs were only seen in the two O/A trench samples. The O/A trench has a different operational history of radionuclide contact than the floor surfaces in general (water had been drained directly to the trench during machining of cobalt-containing thermal shield pins). The trench samples also had very low Cs-137 to Co-60 ratios, which may indicate recent contamination (the trench had standing water in it at the time of sample collection.) The relative dose from the O/A trench nuclide mixture was about two times the relative dose from the seven-core nuclide mixture. The O/A trench dose fell outside the 2 standard deviation (2 sigma) error bars for the seven core mean dose (Attachments 2F-3, 2F-4). These factors led to the conclusion that the O/A trench samples were outliers and represented a distinct population.

Finally, the mean dose for the 43 cores taken throughout the contaminated buildings, and analyzed by gamma spectroscopy only, were examined relative to the seven core dose. The mean doses for the 43 cores were slightly higher (2.56E-5 mrem) than the seven-core mean dose of 1.90E-5 mrem. The Cs-137 to Co-60 ratios were similar to the seven cores (Attachment 2F-1) and the 43-core mean dose was within the 2 sigma bounds of the seven core mean value as shown graphically in Attachment 2F-4. This supports the contention that the core data and the nuclide fractions are representative of site contaminated concrete.

The data sets for the 43 and 7 core sample populations were evaluated to determine if they were similar by comparing the ratio of Co-60 to Cs-137 in each sample group. The nuclide fraction data decayed to the year 2004 were used to derive the Co-60 to Cs-137 ratios. Only the positive results for the original 43 cores were used, resulting in a population of 36 cores. A parametric method for comparing two data sets is the two-sample *t*-test. The two-sample *t*-test tests the null hypothesis that the means for the two data sets are equal (or equivalently that their difference is zero). The two-sample *t*-test assumes that the data collected are samples from populations with normal distributions. Although the ratios from the data sets are positively skewed, the two-sample t-test is somewhat robust with respect to departures from the normality assumption. It is less robust with respect to the presence of extreme outliers.

A non-parametric method for comparing two data sets is the Wilcoxon Rank Sum (WRS) Test. The WRS tests the null hypothesis that the "centers" of the two data sets are equal. The only assumptions underlying this non-parametric test involve independence of the data. Results from the *t*-test and WRS test are presented in Table 1. The tests were run with and without sample 01FL01 (PAB Pipe Trench) from the seven-core data set because the ratio of Co-60 to Cs-137 in this sample is 1.90 and appears to be significantly higher than the remaining six cores.

Table 1: Results of Tests for Differences Between Seven-Core and 36-Core Data Sets

Test	**Two-Sample t-test**		**WRS Test**	
Results	**Test Statistic**	***p*-value**	**Test Statistic**	***p*-value**
All Data	-1.069	**0.3248**	153	**0.3827**
01FL01 Removed	-0.342	**0.7424**	117	**0.7596**

The results of both the parametric and non-parametric hypothesis tests show that significant differences do not exist between the two sets of ratio data. For both tests, the evidence that no statistical difference exists is more compelling when sample 01FL01 is removed, nonetheless the same conclusion is reached with the sample included. Note also that the results for the parametric and non-parametric tests are similar, perhaps underscoring the robustness of *t*-tests to departures from normality. The results of the tests support the use of the 36 cores to supplement the seven-core data set in the conclusion that the seven cores are a reasonable representation of the general area nuclide mixture.

The 01FL01 core sample may indicate a unique area (and the need for an area specific DCGL as previously identified and assigned to the O/A trench samples) or the effects of biased sampling of elevated areas. Additional core samples from the PAB pipe tunnel are being analyzed. The results of these samples will be used to support the database and determine the need for assigning an area specific DCGL to the PAB Pipe Trench. The nuclide fractions associated with the seven cores will continue to be used pending additional data examinations.

Results

The relative dose was determined using a nuclide mixture that included MDAs as well as using only positively detected nuclides. The mean doses were shown to agree as demonstrated by the overlap of the two sigma error bars and provide reasonable assurance that eliminating the non-detected nuclides does not result in a significant under estimation of dose. Evaluating the individual cores to see which, if any, fall outside the two-sigma range of the average dose value indicated that the O/A trench core data represents a different nuclide mixture and should be treated as a separate mixture.

Comparing the dose determined by the average of the fractions to that determined for individual cores provided support for the use of the average of the fractions as the method for determining the nuclide mixture. Also, a comparison of the seven-core and 36-core data sets provided a larger sample size to support the assumption that the seven-core data set is representative.

The nuclide mixtures for contaminated concrete and the O/A trench is provided in Tables 2-7 and 2-8.

Co-60 to Cs-137 Ratio Data

36 Core Set		7 Core Set	
Location	Co-60/Cs-137 ratio	Location	Co-60/Cs-137 ratio
1-1A	3.53E-02	01FL1	1.90E+00
1-2A	2.87E-01	01FL3	5.42E-03
1-3A	7.24E-01	01FL4	3.81E-01
1-4A	5.65E-03	01FL6	3.24E-02
2-1A	3.22E-01	01FL8	6.80E-02
2-2A	1.03E-01	02FL2	6.38E-03
4-1A	5.35E-02	02FL5	3.92E-01
4-2A	1.34E-02		
4-3A	5.39E-02		
4-4A	2.77E-01		
4-5A	1.40E-01		
5-1A	6.87E-02		
5-2A	5.05E-03		
5-3A	5.86E-02		
5-4A	1.34E-01		
5-5A	3.25E-02		
5-7A	3.72E-01		
6-1A	1.27E-01		
6-2A	0.00E+00		
6-3A	0.00E+00		
6-4A	9.38E-02		
7-1A	8.26E-02		
8-1A	1.43E-02		
8-2A	2.68E-02		
8-3A	3.79E-02		
8-4A	2.12E-02		
9-1A	3.57E-02		
9-2A	3.90E-01		
9-3A	0.00E+00		
9-4A	6.26E-01		
10-1A	0.00E+00		
10-2A	1.31E-03		
10-3A	8.00E-02		
10-4A	8.26E-02		
11-1A	0.00E+00		
11-2A	0.00E+00		

Attachment 2F-2

Core Nuclide Fractions

EC-011091(MY)
Initial Activity and Nuclide Fractions
(Decay Corrected to 2004)

EC-020 activity and nuclide fractions (also see concrete032601.xls) Pm-147 included

Core Data 4/18/01 0850 hrs

			01FL1			01FL31			01FL41			01FL61			01FL81			02FL21	
	Kocher		2004			2004			2004			2004			2004			2004	
Nuclide	Half Life (y)		pCi	nf		pCi	nf		pCi	nf		pCi	nf		pCi	nf		pCi	nf
H-3	**1.23E+01**		**3.13E+01**	**3.81E-04**		**3.92E+00**	**4.32E-04**	0	**5.20E+00**	**9.46E-04**		**1.48E+01**	**9.53E-04**		**1.75E+01**	**2.90E-03**		**2.09E+01**	**3.81E-03**
C-14	5.73E+03	<	2.70E-01	3.28E-06	<	6.70E-01	7.38E-05	<	6.60E-01	1.20E-04	<	5.20E-01	3.34E-05	<	4.70E-01	7.78E-05	<	6.50E-01	1.18E-04
Mn-54	**8.56E-01**	<	**1.03E+01**	**1.25E-04**	<	**7.97E-01**	**8.78E-05**	<	**6.33E-01**	**1.15E-04**	<	**1.52E+00**	**9.77E-05**	<	**5.87E-01**	**9.72E-05**	<	**9.61E-01**	**1.75E-04**
Fe-55	**2.70E+00**		**2.21E+02**	**2.69E-03**		**2.83E+00**	**3.12E-04**		**1.61E+01**	**2.93E-03**		**4.13E+01**	**2.65E-03**		**1.15E+01**	**1.90E-03**	<	**2.52E+00**	**4.59E-04**
Co-57	**7.42E-01**		**2.14E+00**	**2.60E-05**	<	**5.37E-01**	**5.92E-05**	<	**4.06E-01**	**7.39E-05**	<	**7.86E-01**	**5.05E-05**	<	**3.01E-01**	**4.98E-05**	<	**5.37E-01**	**9.78E-05**
Co-58	1.94E-01	<	3.53E-05	4.29E-10	<	2.14E-06	2.36E-10	<	1.83E-06	3.33E-10	<	4.09E-06	2.63E-10	<	1.76E-06	2.91E-10	<	2.64E-06	4.81E-10
Ni-59	7.50E+04	<	4.80E+03	5.83E-02	<	2.90E+03	3.19E-01	<	1.30E+03	2.37E-01	<	1.20E+03	7.71E-02	<	1.20E+03	1.99E-01	<	6.70E+02	1.22E-01
Co-60	**5.27E+00**		**1.20E+04**	**1.46E-01**		**2.53E+01**	**2.79E-03**		**1.34E+02**	**2.44E-02**		**3.87E+02**	**2.49E-02**		**2.46E+02**	**4.07E-02**		**2.91E+01**	**5.30E-03**
Ni-63	**1.00E+02**		**5.78E+04**	**7.03E-01**		**1.31E+03**	**1.44E-01**		**3.58E+03**	**6.52E-01**		**1.71E+03**	**1.10E-01**		**8.50E+02**	**1.41E-01**		**7.54E+01**	**1.37E-02**
Zn-65	6.69E-01	<	9.80E+00	1.19E-04	<	8.17E-01	9.00E-05	<	8.99E-01	1.64E-04	<	1.23E+00	7.90E-05	<	6.78E-01	1.12E-04	<	6.94E-01	1.26E-04
Sr-90	**2.86E+01**		**1.03E+01**	**1.26E-04**	<	**7.51E+00**	**8.27E-04**		**2.33E+00**	**4.24E-04**		**1.83E+01**	**1.18E-03**	<	**2.14E+00**	**3.54E-04**	<	**1.88E+00**	**3.42E-04**
Nb-94	2.03E+04	<	4.70E+02	5.71E-03	<	2.40E+01	2.64E-03	<	3.90E+01	7.09E-03	<	5.60E+01	3.60E-03	<	2.60E+01	4.31E-03	<	2.30E+01	4.19E-03
Tc-99	2.13E+05	<	4.60E-01	5.59E-06	<	9.40E-01	1.04E-04	<	1.30E+00	2.37E-04	<	7.30E-01	4.69E-05	<	7.00E-01	1.16E-04	<	1.20E+00	2.19E-04
Ru-106	1.01E+00	<	1.32E+02	1.60E-03	<	2.19E+01	2.41E-03	<	1.32E+01	2.40E-03	<	3.02E+01	1.94E-03	<	1.20E+01	1.99E-03	<	1.57E+01	2.86E-03
Ag-110m	6.84E-01	<	7.49E+00	9.10E-05	<	4.38E-01	4.82E-05	<	5.02E-01	9.13E-05	<	7.58E-01	4.87E-05	<	4.20E-01	6.96E-05	<	3.29E-01	5.99E-05
Sb-125	**2.77E+00**	<	**2.79E+02**	**3.39E-03**	<	**7.20E+01**	**7.93E-03**	<	**3.13E+01**	**5.70E-03**	<	**1.13E+02**	**7.26E-03**	<	**3.76E+01**	**6.23E-03**	<	**6.57E+01**	**1.20E-02**
I-129	1.57E+07	<	3.00E-02	3.65E-07	<	3.18E-03	3.50E-07	<	2.40E-04	4.37E-08	<	8.13E-03	5.22E-07	<	2.47E-03	4.09E-07	<	4.40E-02	8.01E-06
Cs-134	**2.06E+00**		**1.33E+02**	**1.62E-03**	<	**7.78E+00**	**8.57E-04**	<	**8.62E+00**	**1.57E-03**		**2.61E+01**	**1.68E-03**		**7.46E+00**	**1.24E-03**		**7.35E+00**	**1.34E-03**
Cs-137	**3.02E+01**		**6.32E+03**	**7.68E-02**		**4.67E+03**	**5.14E-01**	<	**3.52E+02**	**6.40E-02**		**1.19E+04**	**7.67E-01**		**3.62E+03**	**5.99E-01**		**4.56E+03**	**8.31E-01**
Pm-147	2.62E+00		**3.94E-01**	4.79E-06		1.71E+00	1.88E-04	<	**1.12E-01**	2.04E-05	<	**3.94E-01**	2.53E-05	<	**1.25E-01**	2.07E-05	<	**4.27E-01**	7.78E-05
Ce-144	7.78E-01	<	2.41E+01	2.93E-04	<	5.45E+00	6.00E-04	<	3.69E+00	6.71E-04	<	7.70E+00	4.95E-04	<	3.05E+00	5.05E-04	<	5.61E+00	1.02E-03
Eu-154	8.80E+00	<	3.75E-01	4.56E-06	<	1.62E+00	1.78E-04	<	1.06E-01	1.93E-05	<	3.75E-01	2.41E-05	<	1.19E-01	1.97E-05	<	4.06E-01	7.39E-05
Eu-155	4.96E+00	<	1.38E-01	1.68E-06	<	5.98E-01	6.59E-05	<	3.91E-02	7.11E-06	<	1.38E-01	8.87E-06	<	4.37E-02	7.24E-06	<	1.49E-01	2.71E-05
Pu-238	**8.78E+01**	<	**9.83E-02**	**1.19E-06**	<	**9.64E-02**	**1.06E-05**	<	**7.62E-02**	**1.39E-05**	<	**9.93E-02**	**6.38E-06**	<	**7.23E-02**	**1.20E-05**	<	**5.11E-02**	**9.31E-06**
Pu-239	**2.41E+04**	<	**3.35E-02**	**4.07E-07**	<	**3.30E-02**	**3.64E-06**	<	**2.38E-02**	**4.33E-06**	<	**3.95E-02**	**2.54E-06**	<	**3.45E-02**	**5.71E-06**	<	**2.25E-02**	**4.10E-06**
Pu-240	**6.57E+03**	<	**3.35E-02**	**4.07E-07**	<	**3.30E-02**	**3.64E-06**	<	**2.38E-02**	**4.33E-06**	<	**3.95E-02**	**2.54E-06**	<	**3.45E-02**	**5.71E-06**	<	**2.25E-02**	**4.10E-06**
Pu-241	**1.44E+01**	<	**4.80E+00**	**5.83E-05**	<	**2.08E+01**	**2.29E-03**	<	**1.36E+00**	**2.48E-04**	<	**4.80E+00**	**3.08E-04**	<	**1.52E+00**	**2.52E-04**	<	**5.20E+00**	**9.47E-04**
Am-241	**4.32E+02**	<	**1.39E-01**	**1.69E-06**	<	**2.18E-01**	**2.41E-05**	<	**3.77E-02**	**6.86E-06**	<	**1.29E-01**	**8.29E-06**	<	**4.22E-02**	**6.99E-06**	<	**1.09E-01**	**1.99E-05**
Cm-242	4.47E-01	<	4.56E-05	5.54E-10	<	7.02E-05	7.73E-09	<	3.44E-05	6.26E-09	<	4.63E-05	2.97E-09	<	5.90E-05	9.77E-09	<	2.84E-05	5.17E-09
Cm-243	**2.85E+01**	<	**2.86E-02**	**3.48E-07**	<	**3.62E-02**	**3.99E-06**	<	**2.10E-02**	**3.82E-06**	<	**2.64E-02**	**1.69E-06**	<	**5.00E-02**	**8.28E-06**	<	**1.83E-02**	**3.34E-06**
Cm-244	**1.81E+01**	<	**2.69E-02**	**3.26E-07**	<	**3.62E-02**	**3.99E-06**	<	**2.10E-02**	**3.82E-06**	<	**2.64E-02**	**1.69E-06**	<	**5.00E-02**	**8.28E-06**	<	**1.83E-02**	**3.33E-06**
			8.23E+04	1.00E+00		9.08E+03	1.00E+00		5.50E+03	1.00E+00		1.56E+04	1.00E+00		6.04E+03	1.00E+00		5.49E+03	1.00E+00

Pm-147 based on: a) ratio of other seven cores to Pu-241 of ~0.224; b) Derived value then decayed to 2004 to yield final nf ratio.

EC-011091(MY)
Initial Activity and Nuclide Fractions
(Decay Corrected to 2004)

		02FL51			CA9900-C002A			CA9900-C001A	
		2004			2004			2004	
Nuclide		pCi	nf		pCi	nf		pCi	nf
H-3		**4.15E+01**	**1.17E-02**	**<**	**1.27E+01**	**9.88E-04**	**<**	**1.43E+01**	**3.13E-03**
C-14	<	8.30E-01	2.34E-04	<	8.10E+01	6.32E-03	<	1.10E+02	2.40E-02
Mn-54	**<**	**4.45E-01**	**1.25E-04**		**1.27E+00**	**9.89E-05**		**1.06E+00**	**2.31E-04**
Fe-55		**5.56E+00**	**1.57E-03**		**7.39E+00**	**5.76E-04**		**2.86E+00**	**6.24E-04**
Co-57	**<**	**4.59E-01**	**1.29E-04**	**<**	**1.44E+00**	**1.12E-04**	**<**	**1.14E+00**	**2.49E-04**
Co-58	<	3.21E-06	9.05E-10	<	2.32E-04	1.81E-08	<	1.75E-04	3.82E-08
Ni-59	<	3.20E+03	9.02E-01	<	9.30E+03	7.26E-01	<	1.50E+03	3.28E-01
Co-60		**3.52E+01**	**9.92E-03**		**1.58E+03**	**1.23E-01**		**1.45E+03**	**3.16E-01**
Ni-63		**8.79E+01**	**2.48E-02**		**1.62E+02**	**1.26E-02**		**1.17E+02**	**2.55E-02**
Zn-65	<	1.23E+00	3.47E-04	<	1.24E+00	9.66E-05	<	9.28E-01	2.03E-04
Sr-90	**<**	**4.20E+00**	**1.18E-03**		**8.87E+00**	**6.92E-04**		**9.97E+00**	**2.18E-03**
Nb-94	<	1.80E+01	5.07E-03	<	7.20E+00	5.62E-04	<	5.50E+00	1.20E-03
Tc-99	<	1.90E+00	5.36E-04	<	6.50E+02	5.07E-02	<	2.90E+02	6.33E-02
Ru-106	<	1.66E+01	4.68E-03	<	8.45E+00	6.60E-04	<	6.56E+00	1.43E-03
Ag-110m	<	4.29E-01	1.21E-04	<	8.04E-01	6.28E-05	<	6.15E-01	1.34E-04
Sb-125	**<**	**2.82E+01**	**7.95E-03**	**<**	**8.94E+00**	**6.98E-04**		**7.96E+00**	**1.74E-03**
I-129	<	6.12E-05	1.73E-08	<	1.10E+01	8.59E-04	<	1.40E+01	3.06E-03
Cs-134	**<**	**5.88E+00**	**1.66E-03**		**3.96E+00**	**3.09E-04**		**5.52E+00**	**1.21E-03**
Cs-137		**8.99E+01**	**2.53E-02**		**9.40E+02**	**7.33E-02**		**1.02E+03**	**2.24E-01**
Pm-147	<	**2.89E-01**	8.15E-05	<	5.09E-07	3.97E-11	<	4.72E-07	1.03E-10
Ce-144	<	4.49E+00	1.27E-03	<	1.57E+00	1.23E-04	<	1.23E+00	2.69E-04
Eu-154	<	2.75E-01	7.75E-05	<	1.26E+01	9.85E-04	<	9.47E+00	2.07E-03
Eu-155	<	1.01E-01	2.85E-05	<	6.57E+00	5.12E-04	<	4.99E+00	1.09E-03
Pu-238	**<**	**7.90E-02**	**2.23E-05**		**1.02E-01**	**7.94E-06**		**1.06E-01**	**2.32E-05**
Pu-239	**<**	**3.00E-02**	**8.46E-06**		**7.28E-02**	**5.69E-06**		**3.90E-02**	**8.52E-06**
Pu-240	**<**	**3.00E-02**	**8.45E-06**		**7.28E-02**	**5.68E-06**		**3.90E-02**	**8.52E-06**
Pu-241	**<**	**3.52E+00**	**9.92E-04**		**4.35E+00**	**3.40E-04**		**4.04E+00**	**8.82E-04**
Am-241	**<**	**9.76E-02**	**2.75E-05**	**<**	**6.37E-03**	**4.97E-07**		**4.65E-02**	**1.02E-05**
Cm-242	<	8.22E-05	2.32E-08	<	1.50E-05	1.17E-09	<	1.50E-05	3.27E-09
Cm-243	**<**	**4.47E-02**	**1.26E-05**	**<**	**6.04E-04**	**4.72E-08**		**3.35E-03**	**7.31E-07**
Cm-244	**<**	**4.48E-02**	**1.26E-05**	**<**	**5.79E-04**	**4.52E-08**		**3.21E-03**	**7.01E-07**
		3.55E+03	1.00E+00		1.28E+04	1.00E+00		4.58E+03	1.00E+00

EC-011-01 Nuclide Fractions Using MDA Decay Corrected to 2004

EC-020 7 cores nuclide fractions (also see concrete032601.xls)
Core Data 4/19/01 0700 hrs

Nuclide	Kocher Half Life (y)	01FL1 2004 nf	01FL31 2004 nf	01FL41 2004 nf	01FL61 2004 nf	01FL81 2004 nf	02FL21 2004 nf	02FL51 2004 nf	7Core Mean	7 core stdev
H-3	1.23E+01	3.81E-04	4.32E-04	9.46E-04	9.53E-04	2.90E-03	3.81E-03	1.17E-02	3.02E-03	4.05E-03
C-14	5.73E+03	3.28E-06	7.38E-05	1.20E-04	3.34E-05	7.78E-05	1.18E-04	2.34E-04	9.43E-05	7.46E-05
Mn-54	8.56E-01	1.25E-04	8.78E-05	1.15E-04	9.77E-05	9.72E-05	1.75E-04	1.25E-04	1.18E-04	2.92E-05
Fe-55	2.70E+00	2.69E-03	3.12E-04	2.93E-03	2.65E-03	1.90E-03	4.59E-04	1.57E-03	1.79E-03	1.07E-03
Co-57	7.42E-01	2.60E-05	5.92E-05	7.39E-05	5.05E-05	4.98E-05	9.78E-05	1.29E-04	6.95E-05	3.45E-05
Co-58	1.94E-01	4.29E-10	2.36E-10	3.33E-10	2.63E-10	2.91E-10	4.81E-10	9.05E-10	4.20E-10	2.32E-10
Ni-59	7.50E+04	5.83E-02	3.19E-01	2.37E-01	7.71E-02	1.99E-01	1.22E-01	9.02E-01	2.73E-01	2.92E-01
Co-60	5.27E+00	1.46E-01	2.79E-03	2.44E-02	2.49E-02	4.07E-02	5.30E-03	9.92E-03	3.63E-02	5.01E-02
Ni-63	1.00E+02	7.03E-01	1.44E-01	6.52E-01	1.10E-01	1.41E-01	1.37E-02	2.48E-02	2.56E-01	2.93E-01
Zn-65	6.69E-01	1.19E-04	9.00E-05	1.64E-04	7.90E-05	1.12E-04	1.26E-04	3.47E-04	1.48E-04	9.17E-05
Sr-90	2.86E+01	1.26E-04	8.27E-04	4.24E-04	1.18E-03	3.54E-04	3.42E-04	1.18E-03	6.34E-04	4.29E-04
Nb-94	2.03E+04	5.71E-03	2.64E-03	7.09E-03	3.60E-03	4.31E-03	4.19E-03	5.07E-03	4.66E-03	1.46E-03
Tc-99	2.13E+05	5.59E-06	1.04E-04	2.37E-04	4.69E-05	1.16E-04	2.19E-04	5.36E-04	1.80E-04	1.78E-04
Ru-106	1.01E+00	1.60E-03	2.41E-03	2.40E-03	1.94E-03	1.99E-03	2.86E-03	4.68E-03	2.55E-03	1.02E-03
Ag-110m	6.84E-01	9.10E-05	4.82E-05	9.13E-05	4.87E-05	6.96E-05	5.99E-05	1.21E-04	7.57E-05	2.68E-05
Sb-125	2.77E+00	3.39E-03	7.93E-03	5.70E-03	7.26E-03	6.23E-03	1.20E-02	7.95E-03	7.20E-03	2.63E-03
I-129	1.57E+07	3.65E-07	3.50E-07	4.37E-08	5.22E-07	4.09E-07	8.01E-06	1.73E-08	1.39E-06	2.93E-06
Cs-134	2.06E+00	1.62E-03	8.57E-04	1.57E-03	1.68E-03	1.24E-03	1.34E-03	1.66E-03	1.42E-03	3.00E-04
Cs-137	3.02E+01	7.68E-02	5.14E-01	6.40E-02	7.67E-01	5.99E-01	8.31E-01	2.53E-02	4.11E-01	3.49E-01
Pm-147	2.62E+00	4.79E-06	1.88E-04	2.04E-05	2.53E-05	2.07E-05	7.78E-05	8.15E-05	5.98E-05	6.41E-05
Ce-144	7.78E-01	2.93E-04	6.00E-04	6.71E-04	4.95E-04	5.05E-04	1.02E-03	1.27E-03	6.93E-04	3.37E-04
Eu-154	8.80E+00	4.56E-06	1.78E-04	1.93E-05	2.41E-05	1.97E-05	7.39E-05	7.75E-05	5.68E-05	6.07E-05
Eu-155	4.96E+00	1.68E-06	6.59E-05	7.11E-06	8.87E-06	7.24E-06	2.71E-05	2.85E-05	2.09E-05	2.24E-05
Pu-238	8.78E+01	1.19E-06	1.06E-05	1.39E-05	6.38E-06	1.20E-05	9.31E-06	2.23E-05	1.08E-05	6.54E-06
Pu-239	2.41E+04	4.07E-07	3.64E-06	4.33E-06	2.54E-06	5.71E-06	4.10E-06	8.46E-06	4.17E-06	2.51E-06
Pu-240	6.57E+03	4.07E-07	3.64E-06	4.33E-06	2.54E-06	5.71E-06	4.10E-06	8.45E-06	4.17E-06	2.51E-06
Pu-241	1.44E+01	5.83E-05	2.29E-03	2.48E-04	3.08E-04	2.52E-04	9.47E-04	9.92E-04	7.28E-04	7.79E-04
Am-241	4.32E+02	1.69E-06	2.41E-05	6.86E-06	8.29E-06	6.99E-06	1.99E-05	2.75E-05	1.36E-05	1.00E-05
Cm-242	4.47E-01	5.54E-10	7.73E-09	6.26E-09	2.97E-09	9.77E-09	5.17E-09	2.32E-08	7.95E-09	7.36E-09
Cm-243	2.85E+01	3.48E-07	3.99E-06	3.82E-06	1.69E-06	8.28E-06	3.34E-06	1.26E-05	4.87E-06	4.20E-06
Cm-244	1.81E+01	3.26E-07	3.99E-06	3.82E-06	1.69E-06	8.28E-06	3.33E-06	1.26E-05	4.87E-06	4.22E-06
		1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.000E+00	

Pm-147 based on: a) ratio of other seven cores to Pu-241 of ~0.224; b) Derived value then decayed to 2004 to yield final nf ratio.

EC-011-01Nuclide Fractions, Adjusted Positive Values, No MDA Except TRU, Sb-125 and Mn-54
Decay corrected to 2004

TRU's, Sb-125 and Mn-54 (nuclide fractions, pre and post normalization)

	01FL1 2004		01FL31 2004		01FL41 2004		01FL61 2004		01FL81 2004		02FL21 2004		02FL51 2004	
Nuclide	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**
H-3	3.81E-04	4.08E-04	4.32E-04	6.41E-04	9.46E-04	1.26E-03	9.53E-04	1.04E-03	2.90E-03	3.65E-03	3.81E-03	4.38E-03	1.17E-02	1.37E-01
Mn-54	1.25E-04	1.34E-04	8.78E-05	1.30E-04	1.15E-04	1.53E-04	9.77E-05	1.07E-04	9.72E-05	1.22E-04	1.75E-04	2.01E-04	1.25E-04	1.47E-03
Fe-55	2.69E-03	2.88E-03	3.12E-04	4.62E-04	2.93E-03	3.89E-03	2.65E-03	2.89E-03	1.90E-03	2.40E-03	4.59E-04	5.28E-04	1.57E-03	1.83E-02
Co-57	2.60E-05	2.78E-05	5.92E-05	8.77E-05	7.39E-05	9.81E-05	5.05E-05	5.51E-05	4.98E-05	6.28E-05	9.78E-05	1.13E-04	1.29E-04	1.51E-03
Co-60	1.46E-01	1.56E-01	2.79E-03	4.13E-03	2.44E-02	3.24E-02	2.49E-02	2.71E-02	4.07E-02	5.13E-02	5.30E-03	6.10E-03	9.92E-03	1.16E-01
Ni-63	7.03E-01	7.53E-01	1.44E-01	2.14E-01	6.52E-01	8.67E-01	1.10E-01	1.20E-01	1.41E-01	1.77E-01	1.37E-02	1.58E-02	2.48E-02	2.90E-01
Sr-90	1.26E-04	1.35E-04	8.27E-04	1.23E-03	4.24E-04	5.63E-04	1.18E-03	1.29E-03	3.54E-04	4.46E-04	3.42E-04	3.94E-04	1.18E-03	1.39E-02
Sb-125	3.39E-03	3.63E-03	7.93E-03	1.18E-02	5.70E-03	7.57E-03	7.26E-03	7.92E-03	6.23E-03	7.84E-03	1.20E-02	1.38E-02	7.95E-03	9.30E-02
Cs-134	1.62E-03	1.73E-03	8.57E-04	1.27E-03	1.57E-03	2.08E-03	1.68E-03	1.83E-03	1.24E-03	1.56E-03	1.34E-03	1.54E-03	1.66E-03	1.94E-02
Cs-137	7.68E-02	8.22E-02	5.14E-01	7.63E-01	6.40E-02	8.51E-02	7.67E-01	8.37E-01	5.99E-01	7.55E-01	8.31E-01	9.56E-01	2.53E-02	2.97E-01
Pu-238	1.19E-06	1.28E-06	1.06E-05	1.58E-05	1.39E-05	1.84E-05	6.38E-06	6.96E-06	1.20E-05	1.51E-05	9.31E-06	1.07E-05	2.23E-05	2.61E-04
Pu-239	4.07E-07	4.36E-07	3.64E-06	5.39E-06	4.33E-06	5.75E-06	2.54E-06	2.77E-06	5.71E-06	7.19E-06	4.10E-06	4.71E-06	8.46E-06	9.90E-05
Pu-240	4.07E-07	4.36E-07	3.64E-06	5.39E-06	4.33E-06	5.75E-06	2.54E-06	2.77E-06	5.71E-06	7.19E-06	4.10E-06	4.71E-06	8.45E-06	9.89E-05
Pu-241	5.83E-05	6.25E-05	2.29E-03	3.40E-03	2.48E-04	3.30E-04	3.08E-04	3.36E-04	2.52E-04	3.18E-04	9.47E-04	1.09E-03	9.92E-04	1.16E-02
Am-241	1.69E-06	1.81E-06	2.41E-05	3.57E-05	6.86E-06	9.11E-06	8.29E-06	9.05E-06	6.99E-06	8.80E-06	1.99E-05	2.29E-05	2.75E-05	3.22E-04
Cm-243	3.48E-07	3.72E-07	3.99E-06	5.92E-06	3.82E-06	5.08E-06	1.69E-06	1.85E-06	8.28E-06	1.04E-05	3.34E-06	3.84E-06	1.26E-05	1.47E-04
Cm-244	3.26E-07	3.49E-07	3.99E-06	5.92E-06	3.82E-06	5.08E-06	1.69E-06	1.85E-06	8.28E-06	1.04E-05	3.33E-06	3.83E-06	1.26E-05	1.48E-04
	9.34E-01	1.00E+00	6.74E-01	1.00E+00	7.53E-01	1.00E+00	9.17E-01	1.00E+00	7.94E-01	1.00E+00	8.69E-01	1.00E+00	8.54E-02	1.00E+00

Core Data 4/19/01 082+O30 hrs adjusted, positives, no mda except for TRU, Sb-125 and Mn-54 (nuclide fractions pre and post normalization)

	01FL1 2004	01FL31 2004	01FL41 2004	01FL61 2004	01FL81 2004	02FL21 2004	02FL51 2004	nf' 7 core	nf' 7 core
Nuclide	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**Mean**	**Stdev**
H-3	4.08E-04	6.41E-04	1.26E-03	1.04E-03	3.65E-03	4.38E-03	1.37E-01	2.12E-02	5.11E-02
Mn-54	1.34E-04	1.30E-04	1.53E-04	1.07E-04	1.22E-04	2.01E-04	1.47E-03	3.31E-04	5.02E-04
Fe-55	2.88E-03	4.62E-04	3.89E-03	2.89E-03	2.40E-03	5.28E-04	1.83E-02	4.49E-03	6.24E-03
Co-57	2.78E-05	8.77E-05	9.81E-05	5.51E-05	6.28E-05	1.13E-04	1.51E-03	2.80E-04	5.45E-04
Co-60	1.56E-01	4.13E-03	3.24E-02	2.71E-02	5.13E-02	6.10E-03	1.16E-01	5.62E-02	5.81E-02
Ni-63	7.53E-01	2.14E-01	8.67E-01	1.20E-01	1.77E-01	1.58E-02	2.90E-01	3.48E-01	3.28E-01
Sr-90	1.35E-04	1.23E-03	5.63E-04	1.29E-03	4.46E-04	3.94E-04	1.39E-02	2.56E-03	5.00E-03
Sb-125	3.63E-03	1.18E-02	7.57E-03	7.92E-03	7.84E-03	1.38E-02	9.30E-02	2.08E-02	3.20E-02
Cs-134	1.73E-03	1.27E-03	2.08E-03	1.83E-03	1.56E-03	1.54E-03	1.94E-02	4.20E-03	6.71E-03
Cs-137	8.22E-02	7.63E-01	8.51E-02	8.37E-01	7.55E-01	9.56E-01	2.97E-01	5.39E-01	3.73E-01
Pu-238	1.28E-06	1.58E-05	1.84E-05	6.96E-06	1.51E-05	1.07E-05	2.61E-04	4.70E-05	9.44E-05
Pu-239	4.36E-07	5.39E-06	5.75E-06	2.77E-06	7.19E-06	4.71E-06	9.90E-05	1.79E-05	3.58E-05
Pu-240	4.36E-07	5.39E-06	5.75E-06	2.77E-06	7.19E-06	4.71E-06	9.89E-05	1.79E-05	3.58E-05
Pu-241	6.25E-05	3.40E-03	3.30E-04	3.36E-04	3.18E-04	1.09E-03	1.16E-02	2.45E-03	4.20E-03
Am-241	1.81E-06	3.57E-05	9.11E-06	9.05E-06	8.80E-06	2.29E-05	3.22E-04	5.85E-05	1.17E-04
Cm-243	3.72E-07	5.92E-06	5.08E-06	1.85E-06	1.04E-05	3.84E-06	1.47E-04	2.50E-05	5.40E-05
Cm-244	3.49E-07	5.92E-06	5.08E-06	1.85E-06	1.04E-05	3.83E-06	1.48E-04	2.50E-05	5.42E-05
	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	

EC-011-01 Nuclide Fractions, Adjusted, Positive Values, No MDA, No TRU
Decay Corrected to 2004

Core Data 4/22/01 1420 hrs adjusted, normalized positives, no mda, no TRU (nuclide fractions pre and post normalization)

	01FL1		01FL31		01FL41		01FL61		01FL81		02FL21		02FL51	
	2004		2004		2004		2004		2004		2004		2004	
Nuclide	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**	**nf**	**nf'**
H-3	3.81E-04	4.09E-04	4.32E-04	6.51E-04	9.46E-04	1.27E-03	9.53E-04	1.05E-03	2.90E-03	3.68E-03	3.81E-03	4.45E-03	1.17E-02	1.53E-01
Fe-55	2.69E-03	2.89E-03	3.12E-04	4.70E-04	2.93E-03	3.92E-03	2.65E-03	2.92E-03	1.90E-03	2.42E-03	4.59E-04	5.36E-04	1.57E-03	2.05E-02
Co-57	2.60E-05	2.80E-05	5.92E-05	8.91E-05	7.39E-05	9.90E-05	5.05E-05	5.56E-05	4.98E-05	6.33E-05	9.78E-05	1.14E-04	1.29E-04	1.70E-03
Co-60	1.46E-01	1.57E-01	2.79E-03	4.20E-03	2.44E-02	3.27E-02	2.49E-02	2.74E-02	4.07E-02	5.17E-02	5.30E-03	6.19E-03	9.92E-03	1.30E-01
Ni-63	7.03E-01	7.55E-01	1.44E-01	2.17E-01	6.52E-01	8.74E-01	1.10E-01	1.21E-01	1.41E-01	1.79E-01	1.37E-02	1.60E-02	2.48E-02	3.25E-01
Sr-90	1.26E-04	1.35E-04	8.27E-04	1.25E-03	4.24E-04	5.68E-04	1.18E-03	1.30E-03	3.54E-04	4.50E-04	3.42E-04	4.00E-04	1.18E-03	1.55E-02
Cs-134	1.62E-03	1.74E-03	8.57E-04	1.29E-03	1.57E-03	2.10E-03	1.68E-03	1.84E-03	1.24E-03	1.57E-03	1.34E-03	1.56E-03	1.66E-03	2.17E-02
Cs-137	7.68E-02	8.26E-02	5.14E-01	7.75E-01	6.40E-02	8.58E-02	7.67E-01	8.44E-01	5.99E-01	7.61E-01	8.31E-01	9.71E-01	2.53E-02	3.32E-01
	9.30E-01	1.00E+00	6.64E-01	1.00E+00	7.47E-01	1.00E+00	9.09E-01	1.00E+00	7.87E-01	1.00E+00	8.56E-01	1.00E+00	7.63E-02	1.00E+00

Core Data 4/22/01 1420 hrs adjusted, normalized positives, no mda, no TRU (normalized nuclide fractions)

	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	nf'	nf'
	2004	2004	2004	2004	2004	2004	2004	7 core	7 core
Nuclide	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**nf'**	**Mean**	**Stdev**
H-3	4.09E-04	6.51E-04	1.27E-03	1.05E-03	3.68E-03	4.45E-03	1.53E-01	**2.36E-02**	5.73E-02
Fe-55	2.89E-03	4.70E-04	3.92E-03	2.92E-03	2.42E-03	5.36E-04	2.05E-02	**4.81E-03**	7.05E-03
Co-57	2.80E-05	8.91E-05	9.90E-05	5.56E-05	6.33E-05	1.14E-04	1.70E-03	**3.06E-04**	6.14E-04
Co-60	1.57E-01	4.20E-03	3.27E-02	2.74E-02	5.17E-02	6.19E-03	1.30E-01	**5.84E-02**	6.08E-02
Ni-63	7.55E-01	2.17E-01	8.74E-01	1.21E-01	1.79E-01	1.60E-02	3.25E-01	**3.55E-01**	3.29E-01
Sr-90	1.35E-04	1.25E-03	5.68E-04	1.30E-03	4.50E-04	4.00E-04	1.55E-02	**2.80E-03**	5.63E-03
Cs-134	1.74E-03	1.29E-03	2.10E-03	1.84E-03	1.57E-03	1.56E-03	2.17E-02	**4.55E-03**	7.58E-03
Cs-137	8.26E-02	7.75E-01	8.58E-02	8.44E-01	7.61E-01	9.71E-01	3.32E-01	**5.50E-01**	3.74E-01
	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	
	2.41E-01	7.82E-01	1.21E-01	8.75E-01	8.15E-01	9.79E-01	5.00E-01	6.16E-01	

Annulus Trench Cores (2)
Without MDA

Annulus Trench Core Data 4/18/01 0850 hrs adjusted, normalized positives, no mda (nuclide fractions)

Nuclide	C002A 2004 nf'	C001A 2004 nf'	2 core mean	2 core stdev
H-3	4.63E-03	5.44E-03	**5.04E-03**	5.73E-04
Mn-54	4.64E-04	4.01E-04	**4.32E-04**	4.42E-05
Fe-55	2.70E-03	1.08E-03	**1.89E-03**	1.14E-03
Co-57	5.27E-04	4.32E-04	**4.80E-04**	6.68E-05
Co-60	5.79E-01	5.49E-01	**5.64E-01**	2.11E-02
Ni-63	5.91E-02	4.42E-02	**5.17E-02**	1.06E-02
Sr-90	3.25E-03	3.78E-03	**3.51E-03**	3.79E-04
Sb-125	3.27E-03	3.02E-03	**3.15E-03**	1.80E-04
Cs-134	1.45E-03	2.10E-03	**1.77E-03**	4.57E-04
Cs-137	3.44E-01	3.89E-01	**3.66E-01**	3.17E-02
Pu-238	3.72E-05	4.04E-05	**3.88E-05**	2.22E-06
Pu-239	2.67E-05	1.48E-05	**2.07E-05**	8.39E-06
Pu-240	2.67E-05	1.48E-05	**2.07E-05**	8.39E-06
Pu-241	1.59E-03	1.53E-03	**1.56E-03**	4.22E-05
Am-241	2.33E-06	1.76E-05	**9.98E-06**	1.08E-05
Cm-243	2.21E-07	1.27E-06	**7.45E-07**	7.41E-07
Cm-244	2.12E-07	1.22E-06	**7.15E-07**	7.11E-07
	1.00E+00	1.00E+00	1.00E+00	

Attachment 2F-3

Core Dose Rates

Core Dose: "36 Core" Data Set

Using all cores
except those with zero entries for Co-60 and Cs-137

Core Location	Co-60 Fxn	Cs-137 Fxn	Annual Dose mrem/y Co-60	Cs-137	Total
1-1A	3.40E-02	9.65E-01	2.04E-06	2.18E-05	2.39E-05
1-2A	2.22E-01	7.74E-01	1.33E-05	1.75E-05	3.08E-05
1-3A	4.18E-01	5.78E-01	2.51E-05	1.31E-05	3.81E-05
1-4A	5.61E-03	9.93E-01	3.36E-07	2.25E-05	2.28E-05
2-1A	2.42E-01	7.51E-01	1.45E-05	1.70E-05	3.15E-05
2-2A	9.18E-02	8.94E-01	5.50E-06	2.02E-05	2.57E-05
4-1A	5.04E-02	9.42E-01	3.02E-06	2.13E-05	2.43E-05
4-2A	1.31E-02	9.83E-01	7.88E-07	2.22E-05	2.30E-05
4-3A	5.09E-02	9.43E-01	3.05E-06	2.13E-05	2.44E-05
4-4A	2.17E-01	7.83E-01	1.30E-05	1.77E-05	3.07E-05
4-5A	1.22E-01	8.74E-01	7.32E-06	1.98E-05	2.71E-05
5-1A	6.42E-02	9.35E-01	3.85E-06	2.12E-05	2.50E-05
5-2A	5.02E-03	9.95E-01	3.01E-07	2.25E-05	2.28E-05
5-3A	5.53E-02	9.45E-01	3.32E-06	2.14E-05	2.47E-05
5-4A	1.18E-01	8.82E-01	7.08E-06	2.00E-05	2.70E-05
5-5A	3.15E-02	9.69E-01	1.89E-06	2.19E-05	2.38E-05
5-7A	2.71E-01	7.29E-01	1.62E-05	1.65E-05	3.27E-05
6-1A	1.12E-01	8.86E-01	6.72E-06	2.00E-05	2.68E-05
6-2A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
6-3A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
6-4A	8.58E-02	9.14E-01	5.14E-06	2.07E-05	2.26E-05
7-1A	7.63E-02	9.24E-01	4.57E-06	2.09E-05	2.55E-05
8-1A	1.41E-02	9.86E-01	8.48E-07	2.23E-05	2.32E-05
8-2A	2.61E-02	9.74E-01	1.57E-06	2.20E-05	2.36E-05
8-3A	3.65E-02	9.64E-01	2.19E-06	2.18E-05	2.40E-05
8-4A	2.08E-02	9.79E-01	1.25E-06	2.22E-05	2.34E-05
9-1A	3.44E-02	9.66E-01	2.06E-06	2.18E-05	2.39E-05
9-2A	2.80E-01	7.20E-01	1.68E-05	1.63E-05	2.26E-05
9-3A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
9-4A	3.85E-01	6.15E-01	2.31E-05	1.39E-05	3.70E-05
10-1A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
10-2A	1.31E-03	9.99E-01	7.84E-08	2.26E-05	2.27E-05
10-3A	7.41E-02	9.26E-01	4.44E-06	2.09E-05	2.54E-05
10-4A	7.63E-02	9.24E-01	4.57E-06	2.09E-05	2.55E-05
11-1A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
11-2A	0.00E+00	1.00E+00	0.00E+00	2.26E-05	2.26E-05
	3.60E+01	**mean**	5.39E-06	2.06E-05	**2.56E-05**
		stdev	6.66E-06	2.53E-06	**4.01E-06**
			Co-60	**Cs-137**	**Total**

EC-011-01 Dose results For Each Core and Per Nuclide
Using Nuclide Fractions Decayed to 2004

4/22/01

Individual Core Dose (mrem/year) per Nuclide, MDA, adjustments per EC-20, normalized

1440 hrs	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	Core Mean Dose (mrem/y)		
nuclides	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**Mean**	**stdev Mean**	**(stdev Mean)^2**
Sr-90	7.70E-08	5.07E-07	2.60E-07	7.22E-07	2.17E-07	2.10E-07	7.25E-07	3.88E-07	9.92E-08	9.84E-15
Nb-94	9.56E-09	4.43E-09	1.19E-08	6.02E-09	7.21E-09	7.01E-09	8.49E-09	7.80E-09	9.22E-10	8.50E-19
Tc-99	1.80E-09	3.33E-08	7.61E-08	1.51E-08	3.73E-08	7.03E-08	1.72E-07	5.80E-08	2.16E-08	4.66E-16
Ru-106	1.98E-08	2.97E-08	2.96E-08	2.39E-08	2.45E-08	3.52E-08	5.76E-08	3.15E-08	4.75E-09	2.26E-17
Ag-110m	3.14E-10	1.66E-10	3.15E-10	1.68E-10	2.40E-10	2.07E-10	4.17E-10	2.61E-10	3.49E-11	1.22E-21
Sb-125	6.81E-09	1.59E-08	1.14E-08	1.46E-08	1.25E-08	2.40E-08	1.60E-08	1.45E-08	2.00E-09	3.98E-18
I-129	2.37E-09	2.27E-09	2.83E-10	3.39E-09	2.65E-09	5.20E-08	1.12E-10	9.01E-09	7.18E-09	5.15E-17
Cs-134	5.43E-08	2.88E-08	5.27E-08	5.63E-08	4.15E-08	4.50E-08	5.57E-08	4.78E-08	3.81E-09	1.45E-17
Cs-137	1.74E-06	1.16E-05	1.45E-06	1.74E-05	1.36E-05	1.88E-05	5.73E-07	9.30E-06	2.98E-06	8.90E-12
Ce-144	3.04E-10	6.22E-10	6.96E-10	5.13E-10	5.23E-10	1.06E-09	1.31E-09	7.18E-10	1.32E-10	1.74E-20
Pm-147	9.71E-12	3.82E-10	4.13E-11	5.13E-11	4.20E-11	1.58E-10	1.65E-10	1.21E-10	4.91E-11	2.41E-21
Eu-154	3.50E-12	1.37E-10	1.48E-11	1.85E-11	1.52E-11	5.69E-11	5.96E-11	4.37E-11	1.76E-11	3.11E-22
Eu-155	1.65E-13	6.47E-12	6.99E-13	8.71E-13	7.11E-13	2.67E-12	2.80E-12	2.06E-12	8.32E-13	6.92E-25
Pu-238	1.66E-10	1.48E-09	1.93E-09	8.88E-10	1.67E-09	1.30E-09	3.10E-09	1.50E-09	3.44E-10	1.18E-19
Pu-239	6.27E-11	5.60E-10	6.67E-10	3.91E-10	8.80E-10	6.31E-10	1.30E-09	6.42E-10	1.46E-10	2.14E-20
Pu-240	6.26E-11	5.60E-10	6.67E-10	3.91E-10	8.79E-10	6.31E-10	1.30E-09	6.42E-10	1.46E-10	2.14E-20
Pu-241	1.74E-10	6.84E-09	7.40E-10	9.20E-10	7.53E-10	2.83E-09	2.96E-09	2.17E-09	8.79E-10	7.73E-19
Am-241	7.87E-11	1.12E-09	3.20E-10	3.86E-10	3.26E-10	9.26E-10	1.28E-09	6.34E-10	1.76E-10	3.11E-20
Cm-242	3.88E-16	5.42E-15	4.38E-15	2.08E-15	6.84E-15	3.62E-15	1.62E-14	5.57E-15	1.95E-15	3.80E-30
Cm-243	5.32E-12	6.11E-11	5.86E-11	2.59E-11	1.27E-10	5.11E-11	1.93E-10	7.45E-11	2.43E-11	5.91E-22
Cm-244	4.02E-12	4.91E-11	4.71E-11	2.09E-11	1.02E-10	4.11E-11	1.55E-10	5.99E-11	1.96E-11	3.85E-22
Co-60	8.74E-06	1.67E-07	1.46E-06	1.49E-06	2.44E-06	3.18E-07	5.95E-07	2.17E-06	1.14E-06	1.29E-12
Co-58	3.31E-15	1.82E-15	2.57E-15	2.03E-15	2.25E-15	3.71E-15	6.98E-15	3.24E-15	6.75E-16	4.56E-31
Co-57	6.30E-11	1.43E-10	1.79E-10	1.22E-10	1.21E-10	2.37E-10	3.13E-10	1.68E-10	3.16E-11	1.00E-21
Mn-54	2.63E-10	1.85E-10	2.42E-10	2.05E-10	2.04E-10	3.68E-10	2.64E-10	2.47E-10	2.32E-11	5.40E-22
Ni-59	2.45E-08	1.34E-07	9.93E-08	3.24E-08	8.34E-08	5.12E-08	3.79E-07	1.15E-07	4.64E-08	2.15E-15
Fe-55	1.57E-09	1.82E-10	1.71E-09	1.55E-09	1.11E-09	2.68E-10	9.16E-10	1.04E-09	2.36E-10	5.58E-20
H-3	1.28E-08	1.45E-08	3.17E-08	3.19E-08	9.71E-08	1.28E-07	3.92E-07	1.01E-07	5.12E-08	2.63E-15
C-14	5.91E-11	1.33E-09	2.16E-09	6.02E-10	1.40E-09	2.13E-09	4.22E-09	1.70E-09	5.09E-10	2.59E-19
Zn-65	1.26E-09	9.52E-10	1.73E-09	8.36E-10	1.19E-09	1.34E-09	3.67E-09	1.57E-09	3.67E-10	1.34E-19
Ni-63	8.10E-07	1.66E-07	7.52E-07	1.27E-07	1.62E-07	1.58E-08	2.86E-08	2.95E-07	1.28E-07	1.63E-14
								Mean	**Stdev sum**	**∑stdev Mean^2**
dose sum	1.15E-05	1.28E-05	4.25E-06	1.99E-05	1.67E-05	1.98E-05	3.02E-06	1.26E-05	4.49E-06	1.02E-11

Standard Error in the Means for core individual nuclide results	3.20E-06

Individual Core (7) Propagation of Error	
core means	1.26E-05
core stdev	6.881E-06
core stdev/sqrt(7)	2.601E-06
95% C.L.	1.349E-05
ucl	2.60E-05
lcl	-9.30E-07

EC-011-01 Dose Results For Each Core and Per Nuclide
No MDA Except TRU, Sb-125 and Mn-54
(Using Nuclide Fractions Decayed to 2004)

Individual Core Dose (mrem/y) positive nuclide, no MDA, adjustments per EC-020, normalized

	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	Core Mean Dose (mrem/y)		
Nuclide	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**mean**	**stdev mean**	**(stdev mean)^2**
Sr-90	8.24E-08	7.52E-07	3.45E-07	7.87E-07	2.73E-07	2.41E-07	8.49E-06	1.57E-06	1.16E-06	1.34E-12
Sb-125	7.29E-09	2.36E-08	1.52E-08	1.59E-08	1.57E-08	2.76E-08	1.87E-07	4.17E-08	2.43E-08	5.90E-16
Cs-134	5.81E-08	4.27E-08	7.00E-08	6.15E-08	5.23E-08	5.17E-08	6.52E-07	1.41E-07	8.52E-08	7.25E-15
Cs-137	1.86E-06	1.73E-05	1.93E-06	1.89E-05	1.71E-05	2.16E-05	6.71E-06	1.22E-05	3.19E-06	1.02E-11
Pu-238	1.78E-10	2.19E-09	2.56E-09	9.69E-10	2.10E-09	1.49E-09	3.63E-08	6.54E-09	4.97E-09	2.47E-17
Pu-239	6.71E-11	8.30E-10	8.86E-10	4.26E-10	1.11E-09	7.26E-10	1.52E-08	2.75E-09	2.08E-09	4.35E-18
Pu-240	6.71E-11	8.30E-10	8.86E-10	4.26E-10	1.11E-09	7.25E-10	1.52E-08	2.75E-09	2.08E-09	4.34E-18
Pu-241	1.86E-10	1.01E-08	9.84E-10	1.00E-09	9.49E-10	3.25E-09	3.47E-08	7.31E-09	4.74E-09	2.25E-17
Am-241	8.42E-11	1.66E-09	4.25E-10	4.21E-10	4.10E-10	1.07E-09	1.50E-08	2.72E-09	2.06E-09	4.23E-18
Cm-243	5.70E-12	9.06E-11	7.78E-11	2.83E-11	1.60E-10	5.88E-11	2.26E-09	3.82E-10	3.13E-10	9.78E-20
Cm-244	4.30E-12	7.29E-11	6.25E-11	2.28E-11	1.28E-10	4.72E-11	1.82E-09	3.08E-10	2.52E-10	6.36E-20
Co-60	9.36E-06	2.48E-07	1.94E-06	1.63E-06	3.08E-06	3.65E-07	6.96E-06	3.37E-06	1.32E-06	1.73E-12
Co-57	6.75E-11	2.13E-10	2.38E-10	1.33E-10	1.52E-10	2.73E-10	3.67E-09	6.78E-10	4.99E-10	2.49E-19
Mn-54	2.82E-10	2.74E-10	3.22E-10	2.24E-10	2.58E-10	4.24E-10	3.09E-09	6.96E-10	3.99E-10	1.60E-19
Fe-55	1.68E-09	2.70E-10	2.27E-09	1.69E-09	1.40E-09	3.08E-10	1.07E-08	2.62E-09	1.38E-09	1.90E-18
H-3	1.37E-08	2.15E-08	4.21E-08	3.49E-08	1.22E-07	1.47E-07	4.59E-06	7.10E-07	6.47E-07	4.18E-13
Ni-63	8.67E-07	2.46E-07	9.99E-07	1.39E-07	2.04E-07	1.82E-08	3.34E-07	4.01E-07	1.43E-07	2.04E-14
								Mean	**Stdev sum**	**∑stdev Mean^2**
dose sum	1.23E-05	1.86E-05	5.35E-06	2.16E-05	2.08E-05	2.25E-05	2.81E-05	1.85E-05	6.58E-06	1.37E-11
								Standard Error in the Means for core individual nuclide results		3.70E-06

Individual Core (7) Propagation of Error	
core means	1.85E-05
core stdev	7.47E-06
core stdev/sqrt(7)	2.82E-06
95% C.L.	1.46E-05
ucl	3.31E-05
lcl	3.82E-06

EC-011-01 Dose Results For Each Nuclide and Per Nuclide With No MDA or TRU (Only Positive results) Using Nuclide Fraction Decayed to 2004

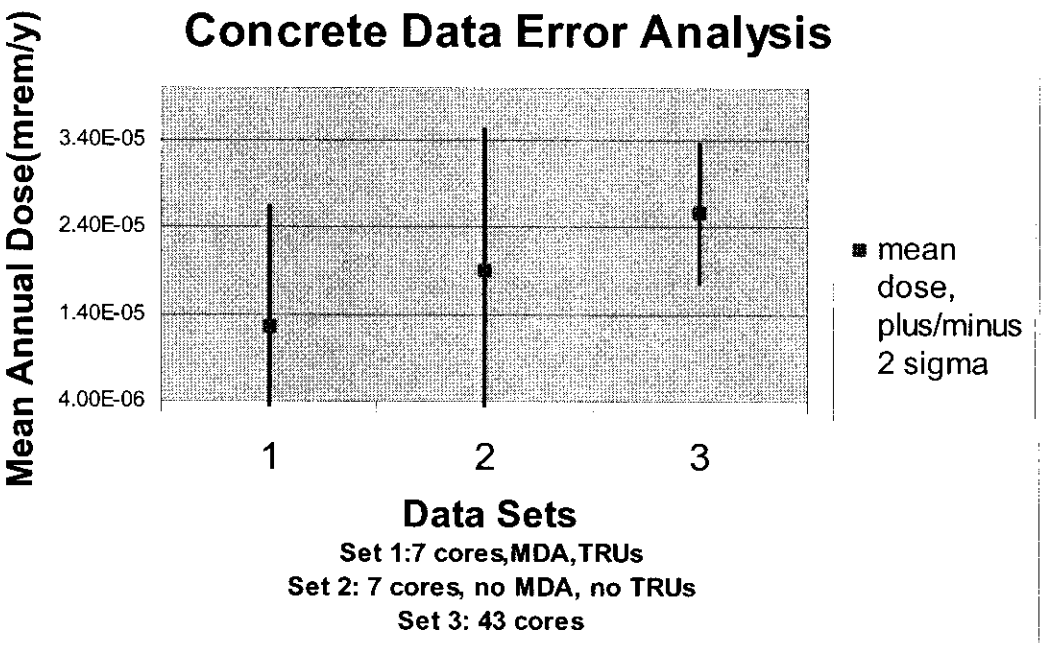
Dose Results per positive nuclide, no MDA, adjustments as per EC-020 No TRU, 04/22/01 1438

	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	Core Mean Dose (mrem/y)		
Nuclide	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**2004**	**mean**	**stdev mean**	**(stdev mean)^2**
Sr-90	8.28E-08	7.63E-07	3.48E-07	7.94E-07	2.76E-07	2.45E-07	9.51E-06	1.72E-06	1.30E-06	1.70E-12
Cs-134	5.84E-08	4.34E-08	7.06E-08	6.20E-08	5.27E-08	5.25E-08	7.30E-07	1.53E-07	9.63E-08	9.27E-15
Cs-137	1.87E-06	1.75E-05	1.94E-06	1.91E-05	1.72E-05	2.20E-05	7.52E-06	1.24E-05	3.20E-06	1.02E-11
Co-60	9.40E-06	2.52E-07	1.96E-06	1.64E-06	3.10E-06	3.71E-07	7.80E-06	3.50E-06	1.38E-06	1.89E-12
Co-57	6.77E-11	2.16E-10	2.40E-10	1.35E-10	1.53E-10	2.77E-10	4.11E-09	7.43E-10	5.62E-10	3.16E-19
Fe-55	1.69E-09	2.74E-10	2.29E-09	1.71E-09	1.41E-09	3.13E-10	1.20E-08	2.81E-09	1.56E-09	2.43E-18
H-3	1.37E-08	2.18E-08	4.25E-08	3.51E-08	1.23E-07	1.49E-07	5.14E-06	7.89E-07	7.25E-07	5.26E-13
Ni-63	8.71E-07	2.50E-07	1.01E-06	1.40E-07	2.06E-07	1.85E-08	3.74E-07	4.10E-07	1.43E-07	2.06E-14
dose sum	1.23E-05	1.89E-05	5.37E-06	2.18E-05	2.10E-05	2.28E-05	3.11E-05	**Mean**	**Stdev sum**	**$\sum$stdev Mean^2**
								1.90E-05	6.85E-06	1.44E-11

Standard Error in the Means for core individual nuclide results	3.79E-06

Individual Core (7) Propagation of Error	
core means	1.90E-05
core stdev	8.19E-06
core stdev/sqrt(7)	3.10E-06
95% C.L.	1.61E-05
ucl	3.51E-05
lcl	2.96E-06

Graph of Annual Dose Rate Error Bands



Attachment 2F-4
EC-011-01 Dose Results for Each Core Including Annulus Trench
With MDA Values (Decay corrected to1/2004)

Dose Results per nuclide with MDA, Pm-147adjustments as per EC-020 and normalized 4/18/01 0940hrs

4/18/01	Individual Core Dose (mrem/year) per Nuclide, MDA, adjustments per EC-20, normalized									Core Mean Dose (mrem/y)		
0940 hrs	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	C002A	C001A			
nuclides	2004	2004	2004	2004	2004	2004	2004	2004	2004	Mean	stdev Mean	(stdev Mean)^2
Sr-90	7.70E-08	5.07E-07	2.60E-07	7.22E-07	2.17E-07	2.10E-07	7.25E-07	4.24E-07	1.33E-06	4.97E-07	1.29E-07	1.67E-14
Nb-94	9.56E-09	4.43E-09	1.19E-08	6.02E-09	7.21E-09	7.01E-09	8.49E-09	9.41E-10	2.01E-09	6.39E-09	1.17E-09	1.37E-18
Tc-99	1.80E-09	3.33E-08	7.61E-08	1.51E-08	3.73E-08	7.03E-08	1.72E-07	1.63E-05	2.04E-05	4.12E-06	2.71E-06	7.34E-12
Ru-106	1.98E-08	2.97E-08	2.96E-08	2.39E-08	2.45E-08	3.52E-08	5.76E-08	8.12E-09	1.76E-08	2.73E-08	4.61E-09	2.13E-17
Ag-110m	3.14E-10	1.66E-10	3.15E-10	1.68E-10	2.40E-10	2.07E-10	4.17E-10	2.17E-10	4.63E-10	2.79E-10	3.56E-11	1.27E-21
Sb-125	6.81E-09	1.59E-08	1.14E-08	1.46E-08	1.25E-08	2.40E-08	1.60E-08	1.40E-09	3.49E-09	1.18E-08	2.34E-09	5.47E-18
I-129	2.37E-09	2.27E-09	2.83E-10	3.39E-09	2.65E-09	5.20E-08	1.12E-10	5.57E-06	1.98E-05	2.83E-06	2.21E-06	4.90E-12
Cs-134	5.43E-08	2.88E-08	5.27E-08	5.63E-08	4.15E-08	4.50E-08	5.57E-08	1.04E-08	4.05E-08	4.28E-08	5.05E-09	2.55E-17
Cs-137	1.74E-06	1.16E-05	1.45E-06	1.74E-05	1.36E-05	1.88E-05	5.73E-07	1.66E-06	5.06E-06	7.98E-06	2.46E-06	6.04E-12
Ce-144	3.04E-10	6.22E-10	6.96E-10	5.13E-10	5.23E-10	1.06E-09	1.31E-09	1.27E-10	2.79E-10	6.04E-10	1.27E-10	1.60E-20
Pm-147	9.71E-12	3.82E-10	4.13E-11	5.13E-11	4.20E-11	1.58E-10	1.65E-10	8.05E-17	2.09E-16	9.44E-11	4.15E-11	1.72E-21
Eu-154	3.50E-12	1.37E-10	1.48E-11	1.85E-11	1.52E-11	5.69E-11	5.96E-11	7.58E-10	1.59E-09	2.95E-10	1.81E-10	3.26E-20
Eu-155	1.65E-13	6.47E-12	6.99E-13	8.71E-13	7.11E-13	2.67E-12	2.80E-12	5.04E-11	1.07E-10	1.91E-11	1.22E-11	1.50E-22
Pu-238	1.66E-10	1.48E-09	1.93E-09	8.88E-10	1.67E-09	1.30E-09	3.10E-09	1.11E-09	3.24E-09	1.65E-09	3.32E-10	1.10E-19
Pu-239	6.27E-11	5.60E-10	6.67E-10	3.91E-10	8.80E-10	6.31E-10	1.30E-09	8.75E-10	1.31E-09	7.42E-10	1.35E-10	1.82E-20
Pu-240	6.26E-11	5.60E-10	6.67E-10	3.91E-10	8.79E-10	6.31E-10	1.30E-09	8.75E-10	1.31E-09	7.42E-10	1.35E-10	1.82E-20
Pu-241	1.74E-10	6.84E-09	7.40E-10	9.20E-10	7.53E-10	2.83E-09	2.96E-09	1.01E-09	2.63E-09	2.10E-09	6.87E-10	4.72E-19
Am-241	7.87E-11	1.12E-09	3.20E-10	3.86E-10	3.26E-10	9.26E-10	1.28E-09	2.32E-11	4.73E-10	5.48E-10	1.51E-10	2.28E-20
Cm-242	3.88E-16	5.42E-15	4.38E-15	2.08E-15	6.84E-15	3.62E-15	1.62E-14	8.19E-16	2.29E-15	4.67E-15	1.61E-15	2.58E-30
Cm-243	5.32E-12	6.11E-11	5.86E-11	2.59E-11	1.27E-10	5.11E-11	1.93E-10	7.22E-13	1.12E-11	5.93E-11	2.11E-11	4.47E-22
Cm-244	4.02E-12	4.91E-11	4.71E-11	2.09E-11	1.02E-10	4.11E-11	1.55E-10	5.57E-13	8.63E-12	4.76E-11	1.71E-11	2.91E-22
Co-60	8.74E-06	1.67E-07	1.46E-06	1.49E-06	2.44E-06	3.18E-07	5.95E-07	7.40E-06	1.89E-05	4.62E-06	2.07E-06	4.29E-12
Co-58	3.31E-15	1.82E-15	2.57E-15	2.03E-15	2.25E-15	3.71E-15	6.98E-15	1.40E-13	2.95E-13	5.08E-14	3.40E-14	1.16E-27
Co-57	6.30E-11	1.43E-10	1.79E-10	1.22E-10	1.21E-10	2.37E-10	3.13E-10	2.72E-10	6.03E-10	2.28E-10	5.39E-11	2.91E-21
Mn-54	2.63E-10	1.85E-10	2.42E-10	2.05E-10	2.04E-10	3.68E-10	2.64E-10	2.08E-10	4.86E-10	2.70E-10	3.26E-11	1.06E-21
Ni-59	2.45E-08	1.34E-07	9.93E-08	3.24E-08	8.34E-08	5.12E-08	3.79E-07	3.05E-07	1.38E-07	1.38E-07	4.11E-08	1.69E-15
Fe-55	1.57E-09	1.82E-10	1.71E-09	1.55E-09	1.11E-09	2.68E-10	9.16E-10	3.37E-10	3.65E-10	8.90E-10	2.07E-10	4.29E-20
H-3	1.28E-08	1.45E-08	3.17E-08	3.19E-08	9.71E-08	1.28E-07	3.92E-07	3.31E-08	1.05E-07	9.40E-08	3.99E-08	1.59E-15
C-14	5.91E-11	1.33E-09	2.16E-09	6.02E-10	1.40E-09	2.13E-09	4.22E-09	1.14E-07	4.33E-07	6.21E-08	4.80E-08	2.30E-15
Zn-65	1.26E-09	9.52E-10	1.73E-09	8.36E-10	1.19E-09	1.34E-09	3.67E-09	1.02E-09	2.14E-09	1.57E-09	2.95E-10	8.71E-20
Ni-63	8.10E-07	1.66E-07	7.52E-07	1.27E-07	1.62E-07	1.58E-08	2.86E-08	1.45E-08	2.93E-08	2.34E-07	1.05E-07	1.11E-14
										Mean	**Stdev sum**	**∑stdev Mean^2**
dose sum	1.15E-05	1.28E-05	4.25E-06	1.99E-05	1.67E-05	1.98E-05	3.02E-06	3.19E-05	6.63E-05	2.07E-05	9.83E-06	2.26E-11
										Standard Error in the Means for core individual nuclide results		4.75E-06

Individual Core Propagation of Error	
core means	2.07E-05
core stdev	1.92E-05
core stdev/sqrt(9)	6.41E-06
95% C.L.	3.77E-05
ucl	5.83E-05
lcl	-1.70E-05

Attachment 2F-4
EC-011-01 Dose Results for Each Core Including Annulus Trench
Without MDA Values (Decay corrected to1/2004)

Individual Core Dose (mrem/y) positive nuclide, no MDA, adjustments per EC-020, normalized

	01FL1	01FL31	01FL41	01FL61	01FL81	02FL21	02FL51	C002A	C001A	Core Mean Dose (mrem/y)		
Nuclide	2004	2004	2004	2004	2004	2004	2004	2004	2004	mean	stdev mean	(stdev mean)^2
Sr-90	8.24E-08	7.52E-07	3.45E-07	7.87E-07	2.73E-07	2.41E-07	8.49E-06	1.99E-06	2.32E-06	1.70E-06	8.89E-07	7.90E-13
Sb-125	7.29E-09	2.36E-08	1.52E-08	1.59E-08	1.57E-08	2.76E-08	1.87E-07	6.57E-09	6.06E-09	3.39E-08	1.93E-08	3.72E-16
Cs-134	5.81E-08	4.27E-08	7.00E-08	6.15E-08	5.23E-08	5.17E-08	6.52E-07	4.87E-08	7.04E-08	1.23E-07	6.62E-08	4.38E-15
Cs-137	1.86E-06	1.73E-05	1.93E-06	1.89E-05	1.71E-05	2.16E-05	6.71E-06	7.78E-06	8.80E-06	1.13E-05	2.50E-06	6.26E-12
Pu-238	1.78E-10	2.19E-09	2.56E-09	9.69E-10	2.10E-09	1.49E-09	3.63E-08	5.18E-09	5.62E-09	6.29E-09	3.80E-09	1.44E-17
Pu-239	6.71E-11	8.30E-10	8.86E-10	4.26E-10	1.11E-09	7.26E-10	1.52E-08	4.11E-09	2.28E-09	2.85E-09	1.60E-09	2.56E-18
Pu-240	6.71E-11	8.30E-10	8.86E-10	4.26E-10	1.11E-09	7.25E-10	1.52E-08	4.10E-09	2.28E-09	2.85E-09	1.60E-09	2.56E-18
Pu-241	1.86E-10	1.01E-08	9.84E-10	1.00E-09	9.49E-10	3.25E-09	3.47E-08	4.75E-09	4.58E-09	6.72E-09	3.64E-09	1.33E-17
Am-241	8.42E-11	1.66E-09	4.25E-10	4.21E-10	4.10E-10	1.07E-09	1.50E-08	1.09E-10	8.21E-10	2.22E-09	1.61E-09	2.58E-18
Cm-243	5.70E-12	9.06E-11	7.78E-11	2.83E-11	1.60E-10	5.88E-11	2.26E-09	3.38E-12	1.94E-11	3.00E-10	2.45E-10	6.00E-20
Cm-244	4.30E-12	7.29E-11	6.25E-11	2.28E-11	1.28E-10	4.72E-11	1.82E-09	2.61E-12	1.50E-11	2.42E-10	1.98E-10	3.90E-20
Co-60	9.36E-06	2.48E-07	1.94E-06	1.63E-06	3.08E-06	3.65E-07	6.96E-06	3.47E-05	3.29E-05	1.01E-05	4.59E-06	2.10E-11
Co-57	6.75E-11	2.13E-10	2.38E-10	1.33E-10	1.52E-10	2.73E-10	3.67E-09	1.28E-09	1.05E-09	7.85E-10	3.88E-10	1.51E-19
Mn-54	2.82E-10	2.74E-10	3.22E-10	2.24E-10	2.58E-10	4.24E-10	3.09E-09	9.75E-10	8.44E-10	7.43E-10	3.07E-10	9.42E-20
Fe-55	1.68E-09	2.70E-10	2.27E-09	1.69E-09	1.40E-09	3.08E-10	1.07E-08	1.58E-09	6.34E-10	2.28E-09	1.08E-09	1.16E-18
H-3	1.37E-08	2.15E-08	4.21E-08	3.49E-08	1.22E-07	1.47E-07	4.59E-06	1.55E-07	1.82E-07	5.90E-07	5.00E-07	2.50E-13
Ni-63	8.67E-07	2.46E-07	9.99E-07	1.39E-07	2.04E-07	1.82E-08	3.34E-07	6.82E-08	5.10E-08	3.25E-07	1.20E-07	1.44E-14
										Mean	Stdev sum	∑stdev Mean^2
dose sum	1.23E-05	1.86E-05	5.35E-06	2.16E-05	2.08E-05	2.25E-05	2.81E-05	4.48E-05	4.44E-05	2.43E-05	8.70E-06	2.84E-11
										Standard Error in the Means for core individual nuclide results		5.33E-06

Individual Core Propagation of Error	
core means	2.43E-05
core stdev	1.32E-05
core stdev/sqrt(9)	4.40E-06
95% C.L.	2.59E-05
ucl	5.01E-05
lcl	-1.62E-06