

I-30039-0001

DOE/OR/01-2299

**Baseline Condition Report for the
Main Campus – North Parking Lot Study Area
at the Oak Ridge National Laboratory,
Oak Ridge, Tennessee**



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contributed to the preparation of this document and should not
be considered an eligible contractor for its review.



DOE Contract No. DE-AC05-98OR22700
Job No. 23900
RI-06-0012
February 27, 2006

Ms. Susan M. Cange
Office of Assistant Manager for Nuclear Fuel Supply
U. S. Department of Energy
Oak Ridge Operations Office
Post Office Box 2001
Oak Ridge, Tennessee 37831

Dear Ms. Cange:

DE-AC05-98OR22700: Baseline Condition Report for the Lease of a Parcel of Land at the Oak Ridge National Laboratory

The Bechtel Jacobs Company LLC (BJC) is pleased to transmit twelve copies of the Baseline Condition Report for the Main Campus – North Parking Lot Study Area at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (DOE/OR/01-2299). The final document incorporates all Department of Energy (DOE) comments received as of Friday, February 24, 2006.

The document was prepared per DOE's correspondence of January 11, 2006. If you have any questions in regard to this material, require additional copies, or would like an electronic version, please do not hesitate to contact me at (865) 241-9440.

Sincerely,

A handwritten signature in black ink that reads "Lesley T. Cusick". The signature is written in a cursive style.

Lesley T. Cusick
Regulatory Affairs Manager
Reindustrialization Program

Ms. Susan M. Cange
Page 2
RI-06-0012
February 27, 2006

LTC:idd
LTC:RI-ENV-06-002

Enclosure: Baseline Condition Report for the Main Campus – North Parking Lot Study Area at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (DOE/OR/01-2299).

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**Baseline Condition Report for the
Main Campus – North Parking Lot Study Area
at the Oak Ridge National Laboratory,
Oak Ridge, Tennessee**

Date Issued—February 2006

Prepared by
Science Applications International Corporation
Oak Ridge, Tennessee
under subcontract 23900-BA-PR007U
under work release 000500

Prepared for the
U. S. Department of Energy
Office of Nuclear Fuel Supply

BECHTEL JACOBS COMPANY LLC
managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
Paducah Gaseous Diffusion Plant
under contract DE-AC05-98OR22700
for the
U. S. DEPARTMENT OF ENERGY

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This report is intended to be used in its entirety. Excerpts, which are taken out-of-context, run the risk of being misinterpreted and are, therefore, not representative of the findings of this assessment. Opinions and recommendations presented in this report apply only to site conditions and features as they existed at the time of SAIC's site visit, and those inferred from information observed or available at that time, and cannot be applied to conditions and features of which SAIC is unaware and has not had the opportunity to evaluate.

The results of this report are based on record reviews, site reconnaissance, interviews, and data. SAIC has not made, nor has it been asked to make, any independent investigation concerning the accuracy, reliability, or completeness of such information.

All sources of information on which SAIC has relied in making its conclusions are identified in Chap. 8 of this report. Any information, regardless of its source, not listed in Chap. 8 has not been evaluated or relied upon by SAIC in the context of this report.

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ACRONYMS

µg/L	micrograms per liter
AM	Action Memorandum
bgs	below ground surface
BJC	Bechtel Jacobs Company LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COE	U. S. Army Corps of Engineers
cps	counts per second
DOE	U. S. Department of Energy
DWS	Domestic Water Supply
EPA	U. S. Environmental Protection Agency
FFA	Federal Facility Agreement
IROD	Interim Record of Decision
MCL	maximum contaminant level
OREIS	Oak Ridge Environmental Information System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PRG	preliminary remediation goal
ROD	Record of Decision
SVOC	semivolatile organic compound
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
VOC	volatile organic compound

EXECUTIVE SUMMARY

This report documents the baseline environmental condition of the U. S. Department of Energy's (DOE's) Main Campus – North Parking Lot study area at the Oak Ridge National Laboratory (ORNL). DOE is proposing to lease this area to the Community Reuse Organization of East Tennessee (its sublessees, agents, or representatives). This report provides supporting information for the use, by a potential lessee, of government-owned land at ORNL.

The Main Campus – North Parking Lot study area is located in the northwest corner of the main ORNL campus at the intersection of Bethel Valley Road and First Street. It is currently a partially paved, partially graveled 8-acre tract of land used as a parking lot. From the early 1940s to the 1990s, the site was a wooded and grassy area of ORNL.

A review of the property and government records was performed to identify any areas on the property proposed for lease where hazardous substances and/or petroleum products were stored for one year or more, or were known to have been released, or disposed of. The review and inspection were modeled after the requirements of Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Based on information and records available at this time, there is no indication that chemicals exceeding 1000 kg have been stored and/or used at the Main Campus – North Parking Lot study area for one or more years or that there were releases or disposal of hazardous substances.

There are no environmental waste management areas associated with the lease space. However, the lease space is part of an area listed in the CERCLA Federal Facility Agreement. Based on historic data, the Interim Record of Decision (IROD) for this Federal Facility Agreement area (Bethel Valley) assumes no soil remediation in the study area and defers groundwater investigations to the final Bethel Valley Record of Decision (ROD). Final RODs for all media are scheduled for fiscal year 2009 or beyond.

Visual inspections of the lease space revealed no permanent structures or equipment except for three groundwater monitoring wells and associated protective posts. The area is used for employee parking and for temporary staging of construction materials for a nearby building on the ORNL campus.

Because of the historic use of this area as only a parking lot, no additional sampling was conducted. However, historical groundwater data are available for three monitoring wells located in the Main Campus – North Parking Lot lease footprint. These samples have been analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides, polychlorinated biphenyls, and radiological constituents. Although soil samples have not been collected from within the lease footprint, they have been collected from the adjacent space. Additional monitoring wells are also located in the adjacent areas. Details on the adjacent areas can be found in Chaps. 4, 5, and 6 of this report.

The chemical results for the groundwater samples collected from the lease footprint indicate that VOCs are generally absent from groundwater beneath the footprint and are not of concern. Overall, the concentrations of SVOCs were also low (none was above the laboratory's reporting limit) and not repeated over more than one sampling event. Some metals were detected at concentrations greater than either the primary drinking water maximum contaminant level (MCL) or the Tennessee Domestic Water Supply (DWS) criteria. These metals included antimony, arsenic, beryllium, cadmium, chromium, lead, nickel, selenium, and thallium. The metals with the most detected results above MCLs or Tennessee Department of Environmental Compliance DWS criteria were antimony and lead, with five samples each exceeding the criteria. However, sample collection techniques common during the sampling period of record (1990–1995) may have contributed to the elevated results for metals.

A groundwater plume has been identified within approximately 150 ft of the southwestern corner of the lease footprint. This plume contains tritium concentrations of greater than 10,000 picocuries per liter (pCi/L). Concentrations of ⁹⁰Sr in groundwater exceed 10,000 pCi/L approximately 350 ft south of the lease footprint. The plume of ⁹⁰Sr-contaminated groundwater, referred to as the Corehole 8 Plume, has been addressed under CERCLA decision documents, and remedial actions are underway. A narrow limestone bedrock layer has been determined to be the preferential flow pathway for the Corehole 8 Plume. Based on the current understanding of the hydrogeology, this plume is not expected to reach the Main Campus – North Parking Lot study area. The absence of ⁹⁰Sr in groundwater beneath the study area confirms that the Corehole 8 Plume does not extend northward into the study area.

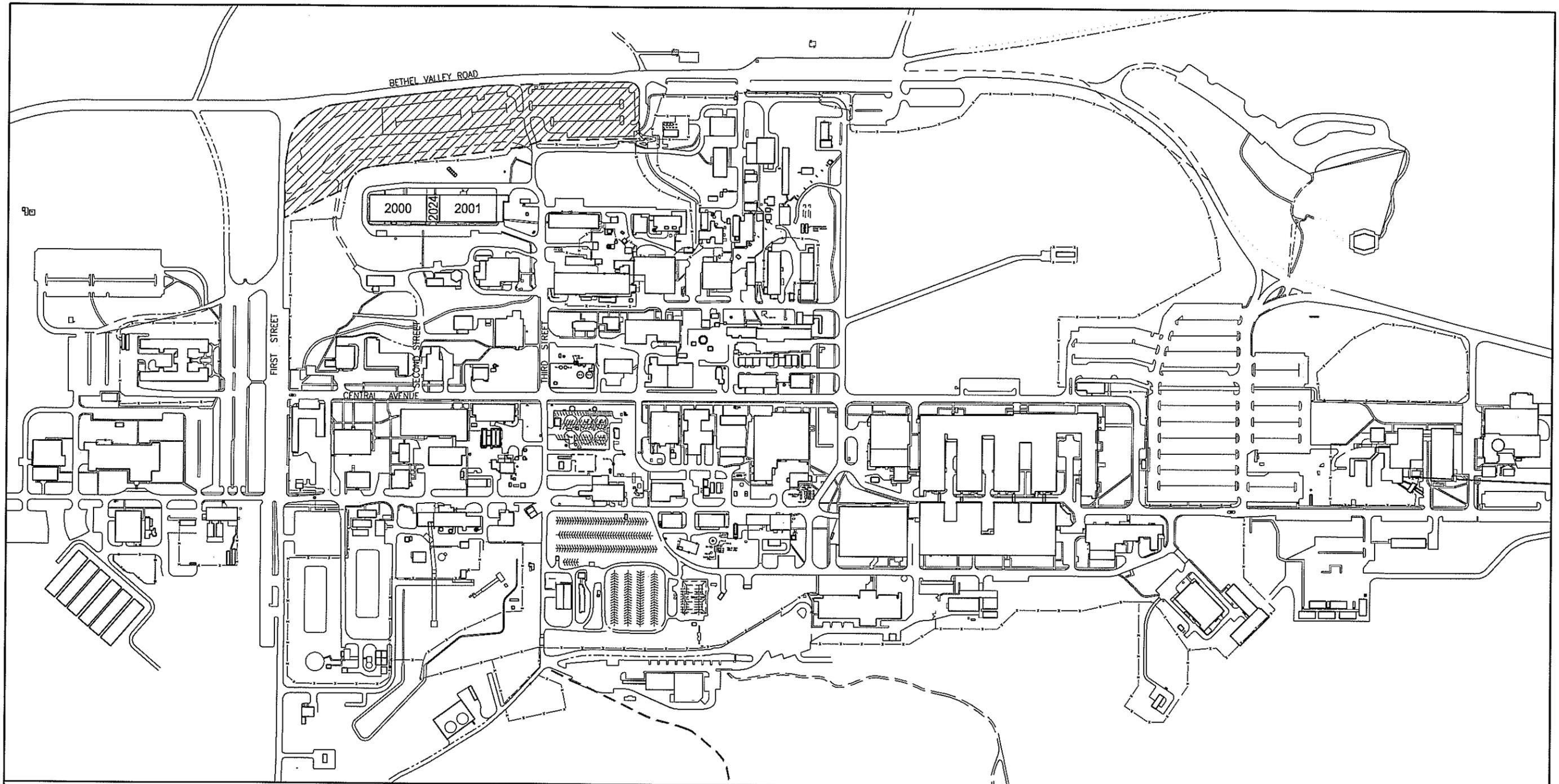
Based upon the results of this evaluation, DOE has determined that the Main Plant – North Parking Lot study area is suitable for lease.

1. PROPERTY IDENTIFICATION

The Main Campus – North Parking Lot study area discussed in this baseline environmental condition report is located at the intersection of Bethel Valley Road and First Street in the northwestern portion of the Oak Ridge National Laboratory (ORNL) on the Oak Ridge Reservation (ORR) in Roane County, Tennessee. Figure 1.1 delineates the footprint of the study area showing the location of the site in relation to the rest of the ORNL main campus. Figures 1.2 through 1.11 are aerial photographs of the area showing the site and surrounding areas from pre-construction of ORNL (1942) to 1998 and a satellite image of current conditions (2004).

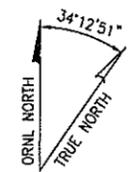
The study area is bounded to the north by Bethel Valley Road, to the west by First Street, to the east by the visitor entrance to the Graphite Reactor, and to the south by Hilltop Circle and Northside Drive. The study area is currently used for parking and temporary tractor trailer storage, and is covered with a combination of gravel, asphalt, and grass. Figure 1.12 shows the study area as well as adjacent areas.

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LEGEND:

BUILDING
ASPHALT ROAD
GRAVEL ROAD
FENCE LINE
LEASE FOOTPRINT

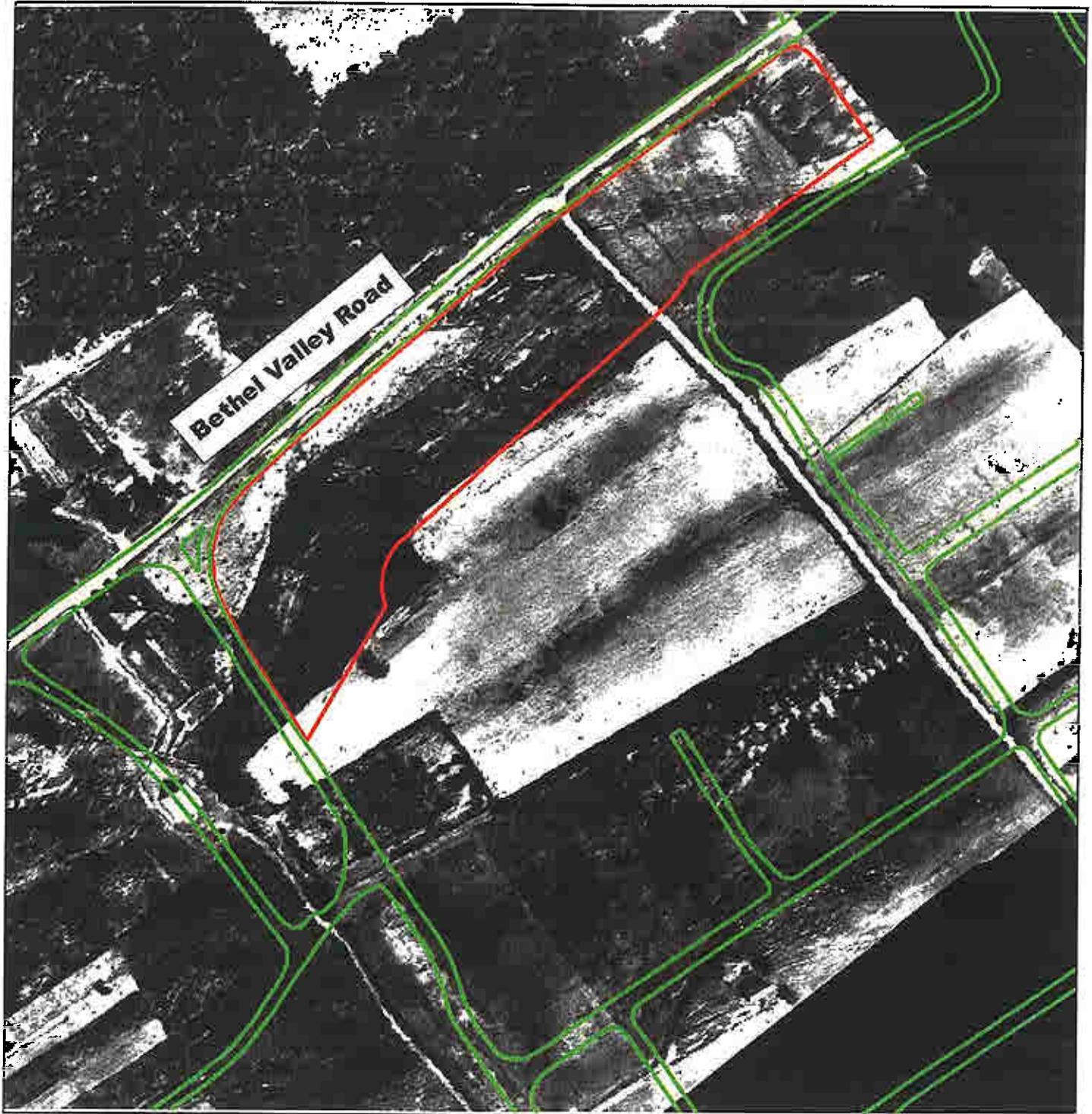


**OAK RIDGE
NATIONAL LABORATORY
OAK RIDGE, TENNESSEE**

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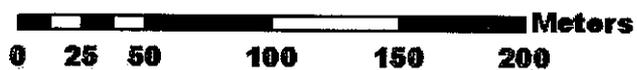
Fig. 1.1. Footprint of the Main Campus - North Parking Lot study area.

Main Campus - North Parking Lot Oak Ridge National Laboratory 1942 Aerial Photograph



Legend

-  **Proposed Lease Footprint**
-  **Present Day Roads**

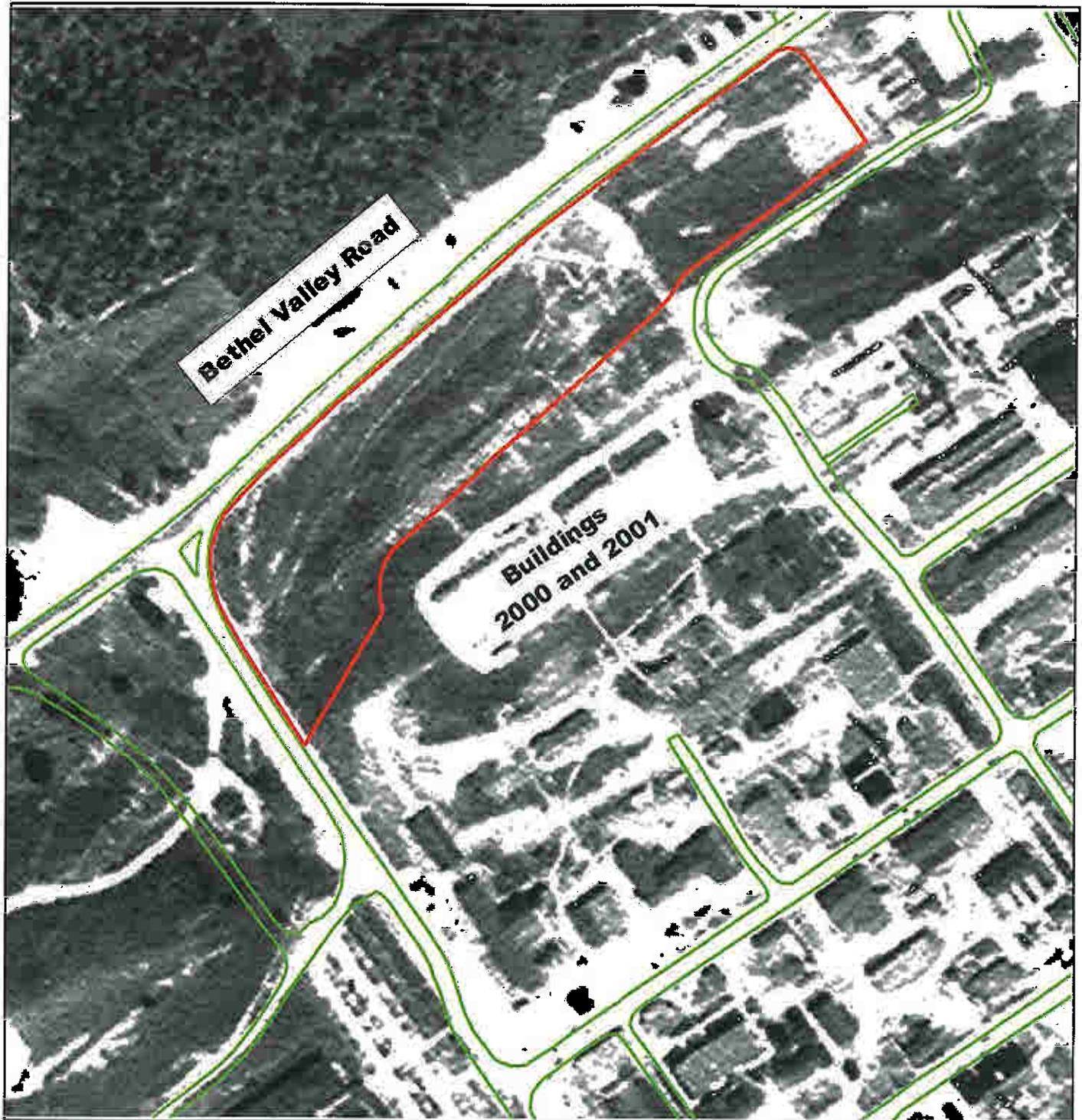
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0 25 50 100 150 200



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Fig. 1.2. Aerial photograph of the Main Campus - North Parking Lot study area (1942).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1952 Aerial Photograph



Legend

- Proposed Lease Footprint
- Present Day Roads

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Fig. 1.3. Aerial photograph of the Main Campus - North Parking Lot study area (1952).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1969 Aerial Photograph

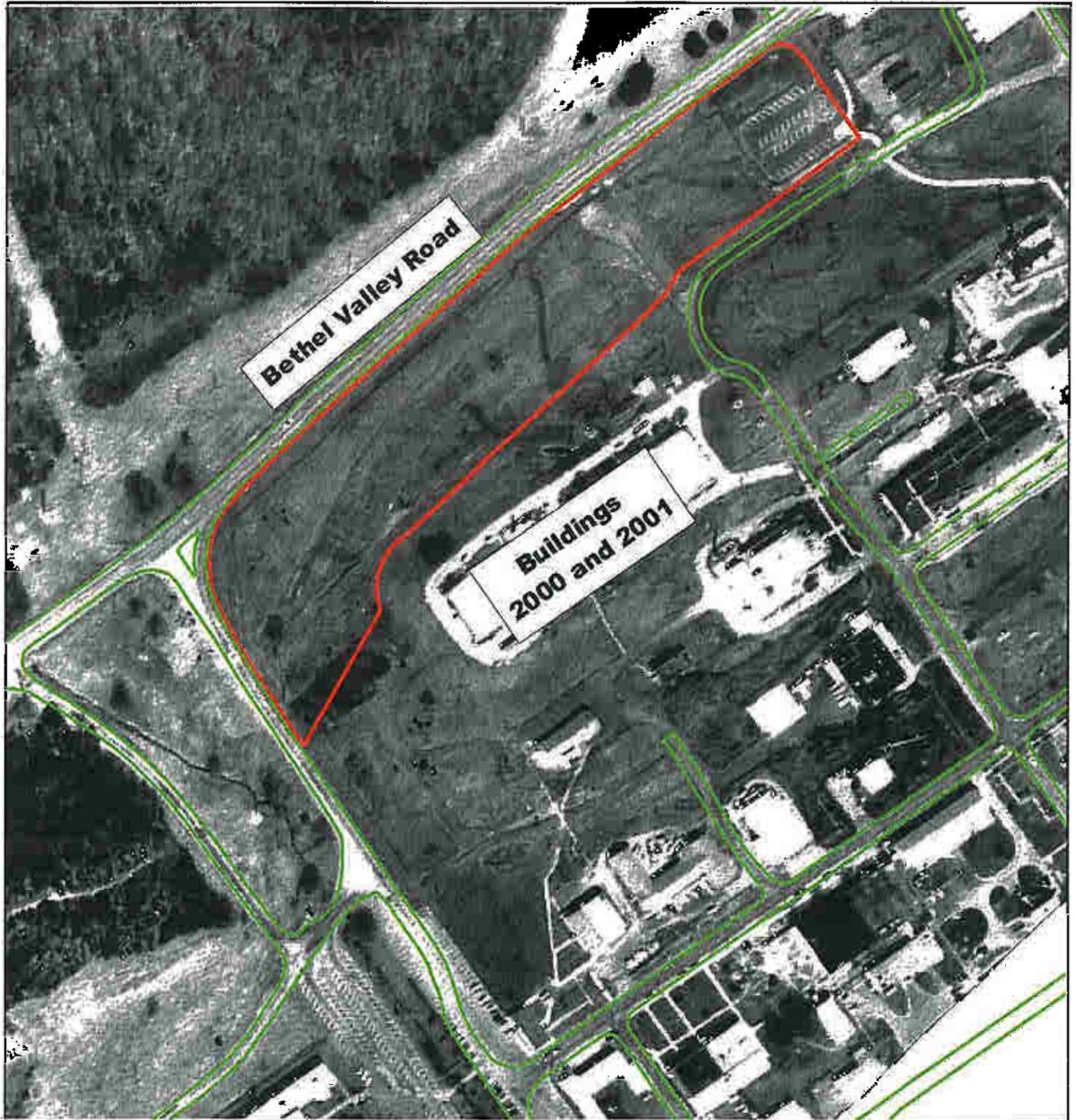


Fig. 1.4. Aerial photograph of the Main Campus - North Parking Lot study area (1969).

Legend

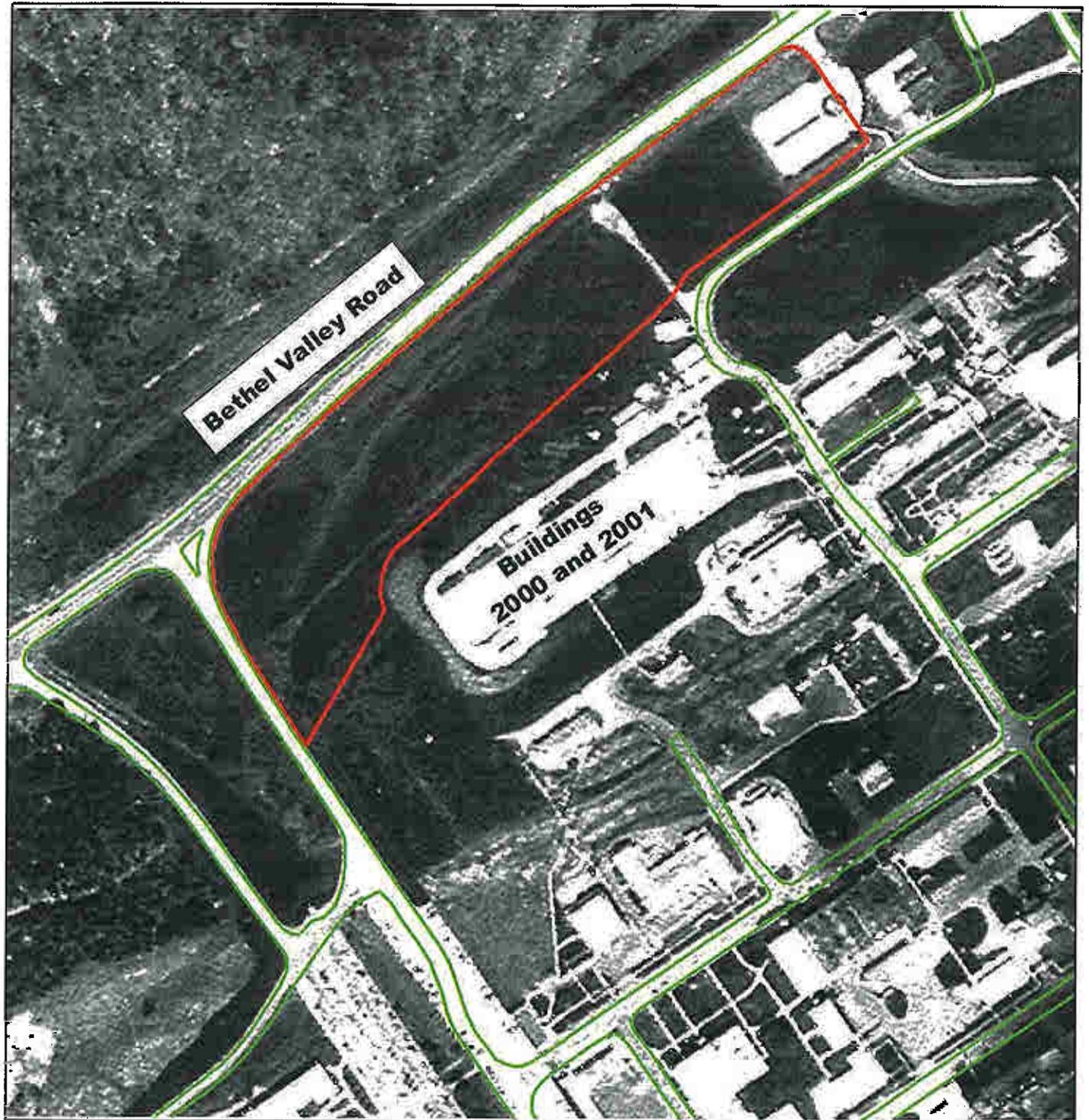
-  **Proposed Lease Footprint**
-  **Present Day Roads**

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Main Campus - North Parking Lot Oak Ridge National Laboratory 1974 Aerial Photograph



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 **Proposed Lease Footprint**

 **Present Day Roads**

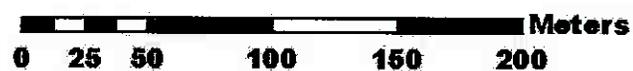
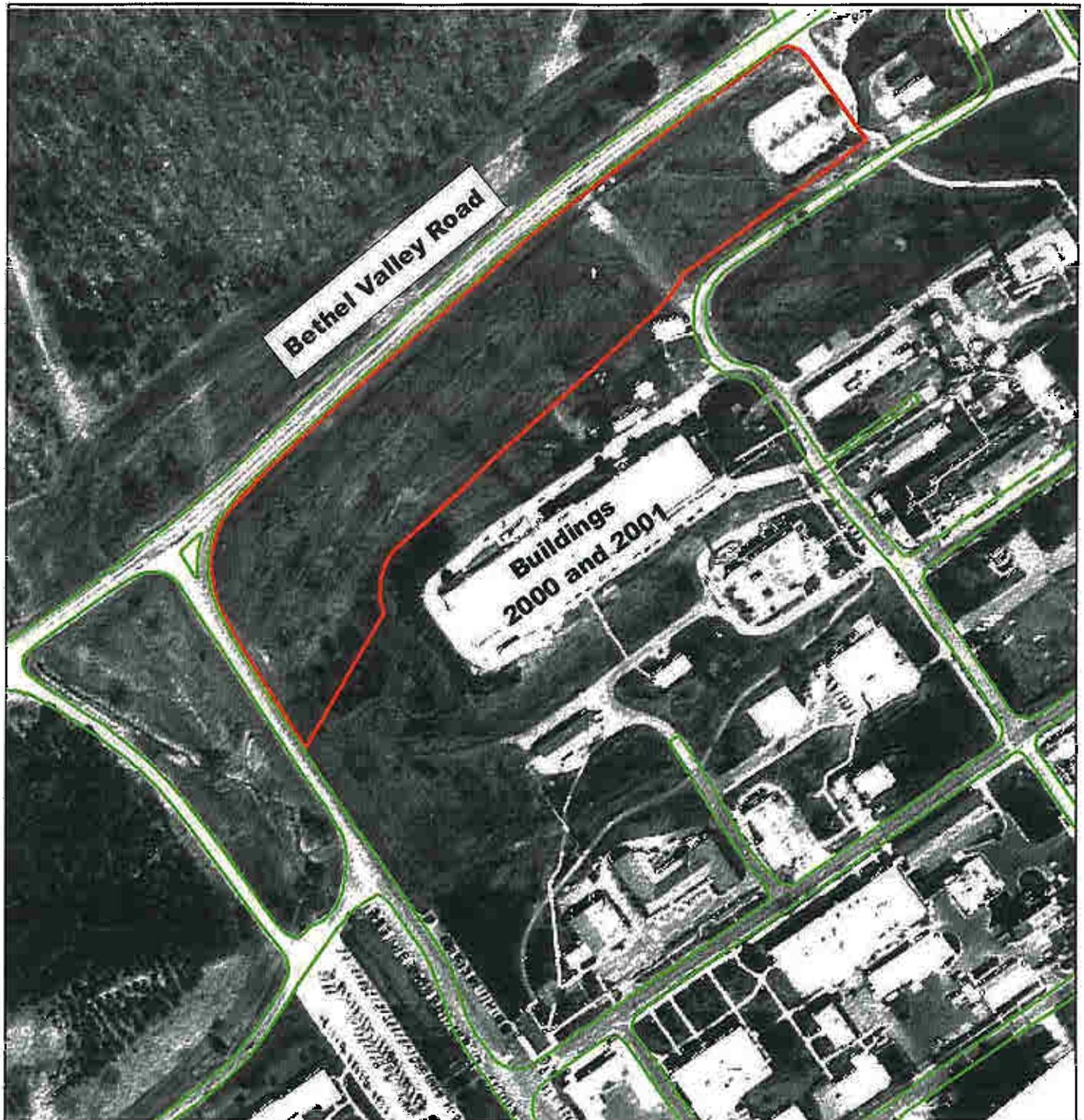
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Fig. 1.5. Aerial photograph of the Main Campus - North Parking Lot study area (1974).



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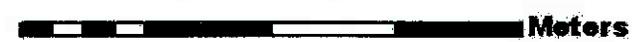
Main Campus - North Parking Lot Oak Ridge National Laboratory 1981 Aerial Photograph



Legend

 **Proposed Lease Footprint**

 **Present Day Roads**

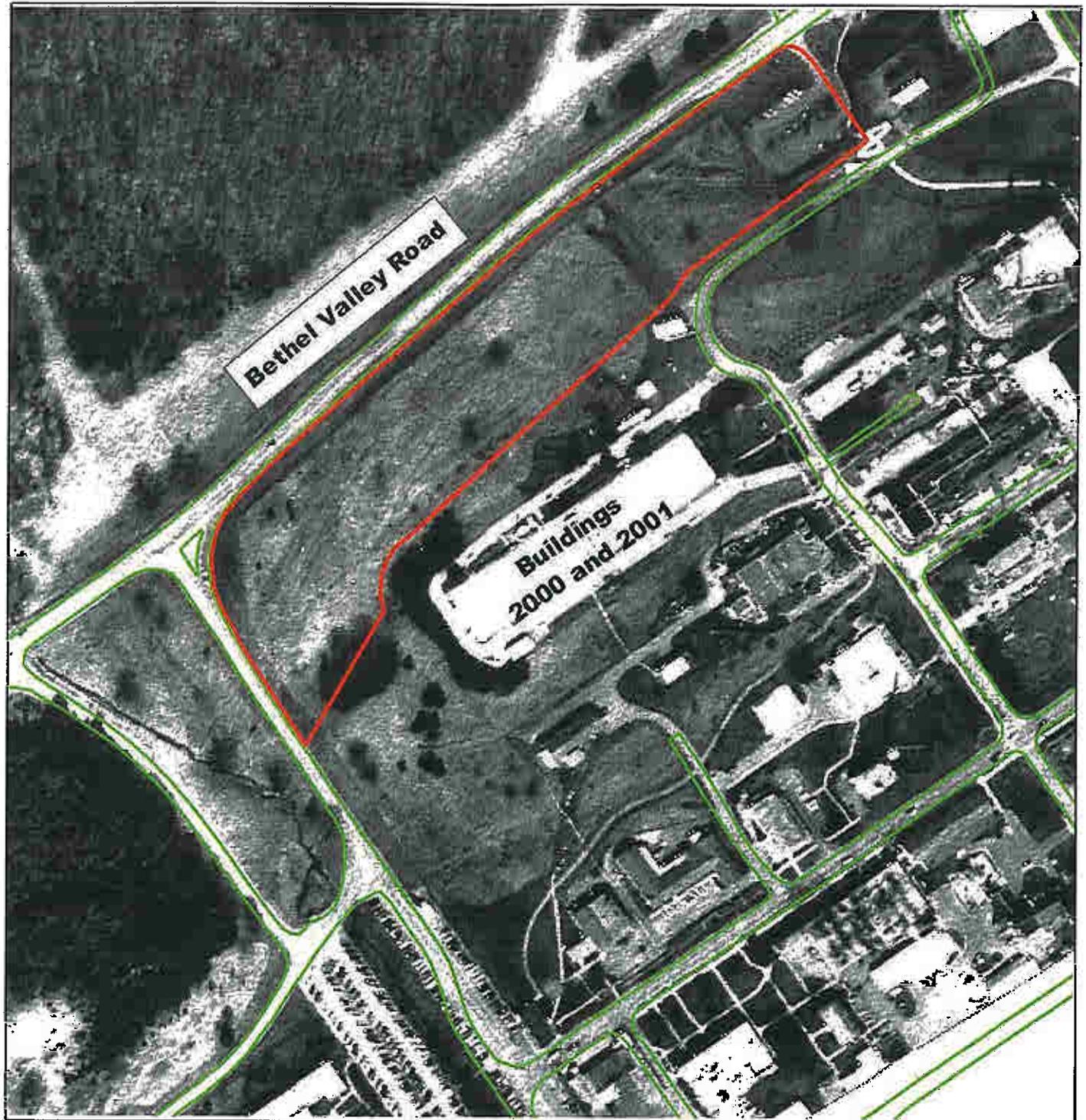
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Fig. 1.6. Aerial photograph of the Main Campus - North Parking Lot study area (1981).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1984 Aerial Photograph



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 **Proposed Lease Footprint**

 **Present Day Roads**

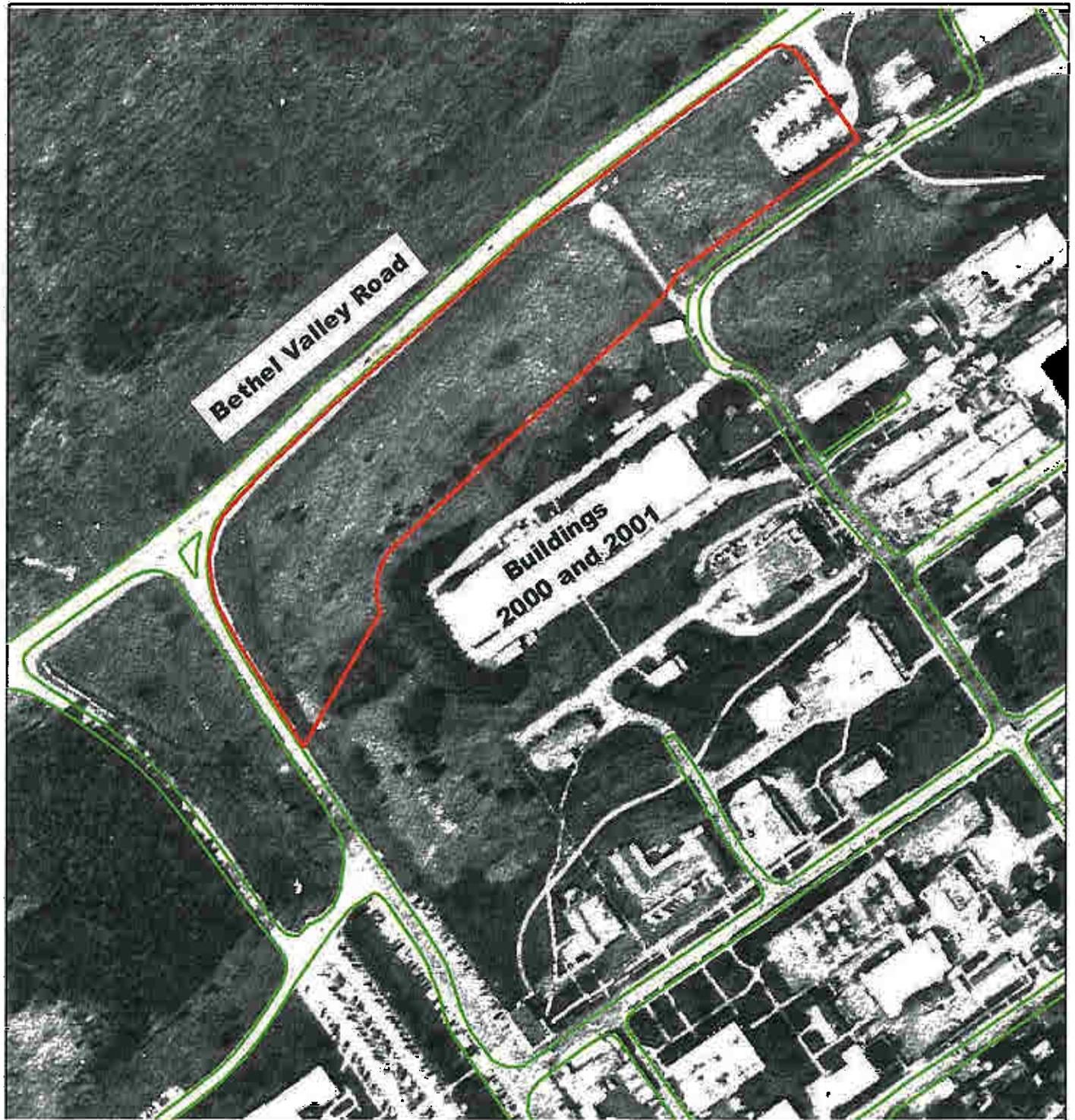
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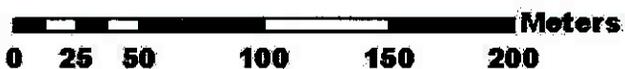
Fig. 1.7. Aerial photograph of the Main Campus - North Parking Lot study area (1984).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1987 Aerial Photograph



Legend

-  **Proposed Lease Footprint**
-  **Present Day Roads**

 **Meters**

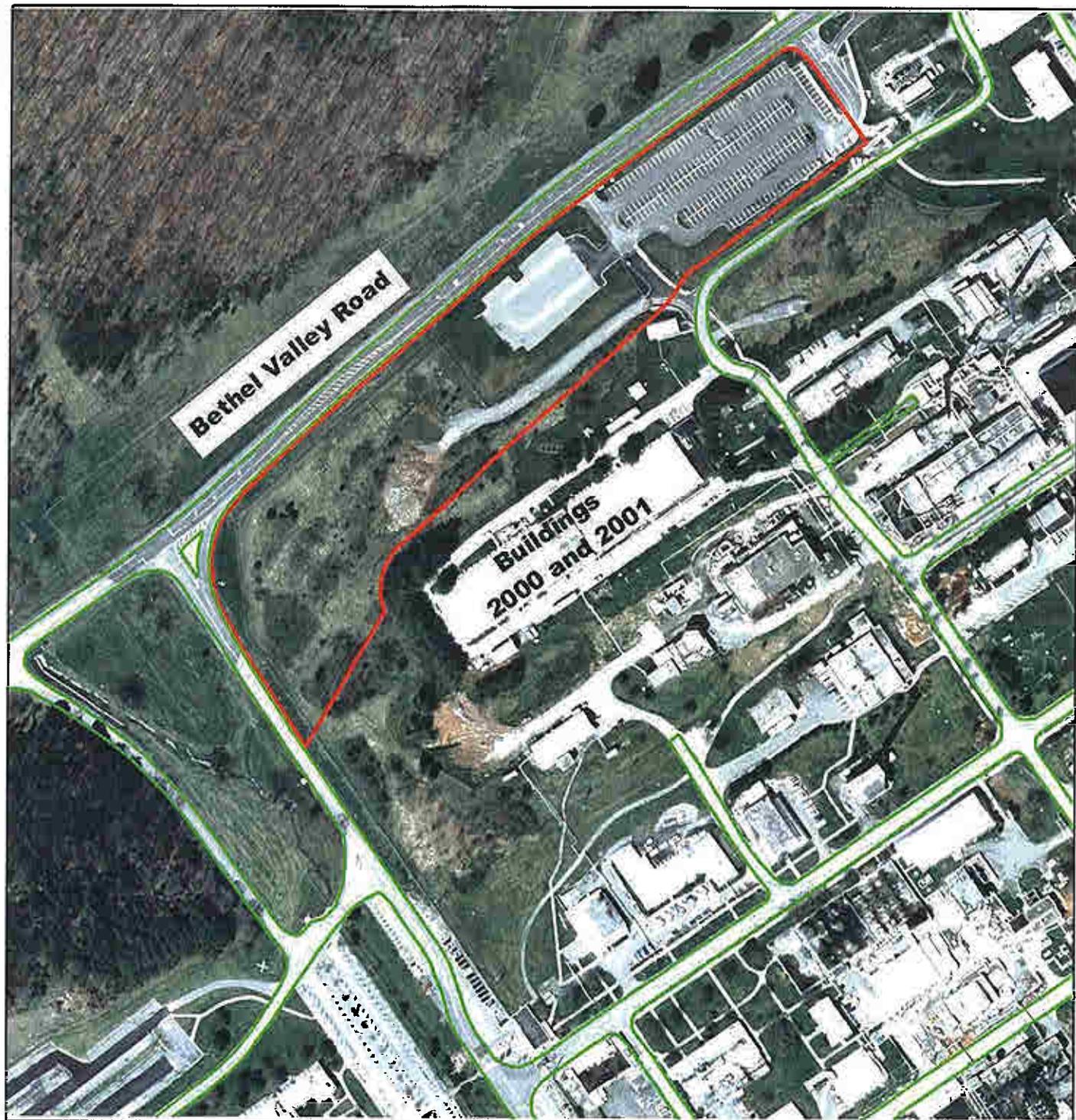
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Fig. 1.8. Aerial photograph of the Main Campus - North Parking Lot study area (1987).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1993 Aerial Photograph



Legend

- Proposed Lease Footprint
- Present Day Roads

0 25 50 100 150 200 Meters



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Fig. 1.9. Aerial photograph of the Main Campus - North Parking Lot study area (1993).

Main Campus - North Parking Lot Oak Ridge National Laboratory 1998 Aerial Photograph



Legend

 **Proposed Lease Footprint**

 **Present Day Roads**

 **Meters**
0 25 50 100 150 200



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Fig. 1.10. Aerial photograph of the Main Campus - North Parking Lot study area (1998).

Main Campus - North Parking Lot Oak Ridge National Laboratory 2004 Satellite Image



Legend

 **Proposed Leased Footprint**

 **Present Day Roads**

 **Meters**
0 25 50 100 150 200



Fig. 1.11. Satellite image of the Main Campus - North Parking Lot study area (2004).

Image provided by Digital Globe,
taken September 29, 2004.

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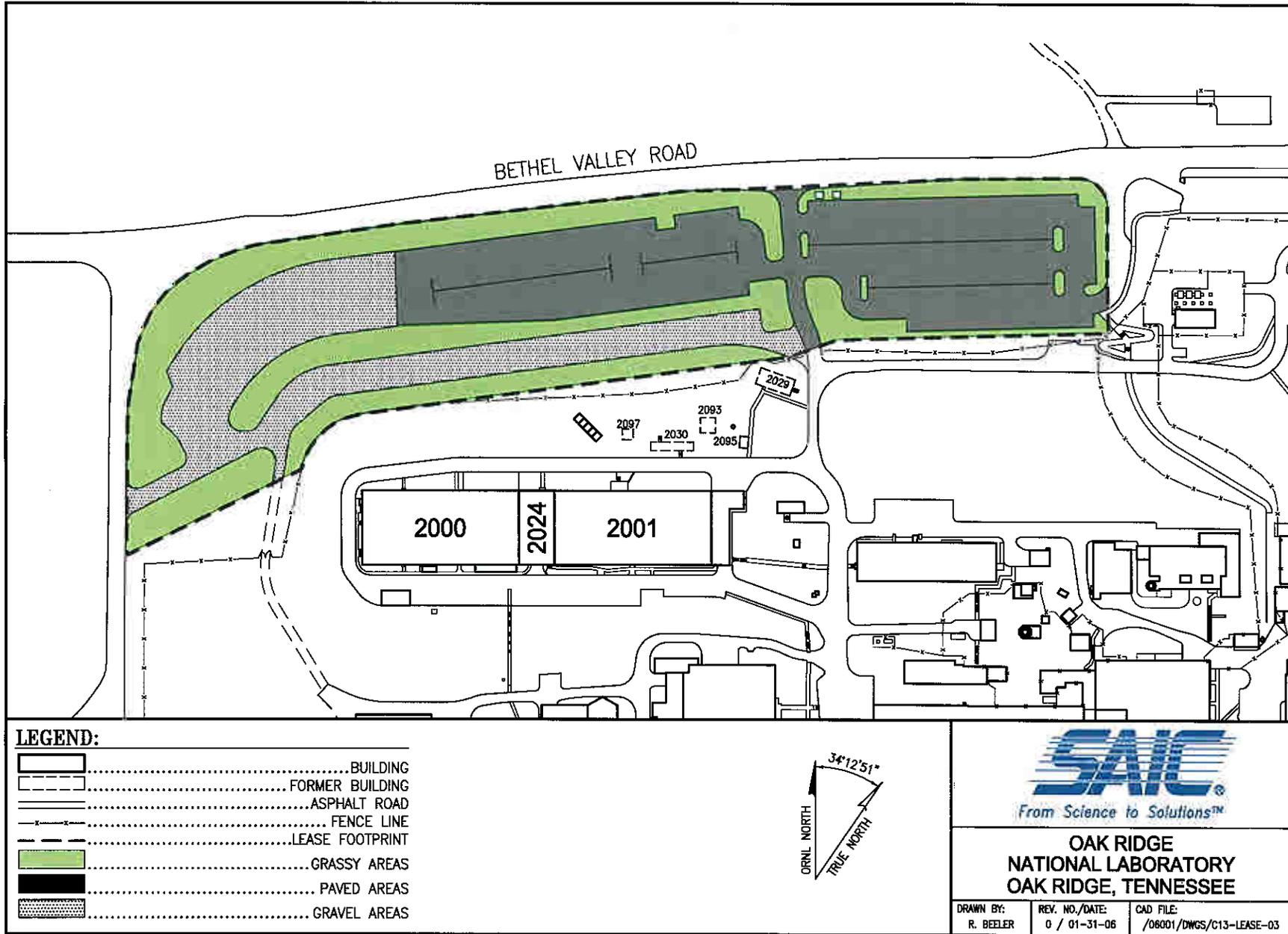


Fig. 1.12. Detail of the Main Campus - North Parking Lot study area.

2. TITLE SEARCH

On February 15, 2006, the State of Tennessee Roane County Recorder's Office was visited, and a review was conducted of the recorded deeds documenting previous ownership of the land tract where the Main Campus – North Parking Lot study area is located. The deeds contained no information or references to other recorded evidence that, prior to U. S. Department of Energy (DOE) ownership, the property was utilized for the storage of hazardous substances and/or petroleum products or their derivatives. Additionally, no information contained in the deeds would indicate that hazardous substances and/or petroleum products or their derivatives were released from or disposed of on the property (BJC 2006a).

3. FEDERAL RECORDS SEARCH

As part of the federal records search, government records, title documents, and historical aerial photographs and satellite images (ORNL 2005a) were searched; inspections of the property and adjacent properties were performed; and interviews with current and former employees were conducted. Based on the reviews, inspections, and interviews documented herein, DOE has determined that there is no evidence to indicate that hazardous substance activity took place on the property during the time the property was owned by the United States. The property proposed for lease has been under the ownership of DOE or its predecessor agencies since 1943.

The lease property was originally part of Tract Nos. A-6 and A-9, which were included as part of a Judgment on the Declaration of Taking No. 1, Civil Action No. 429, Friday, November 20, 1942, in the United States District Court for the Eastern District of Tennessee, "United States of America, Petitioner, vs. 56,200 Acres of Land, More or Less Situated in Roane and Anderson Counties, Tennessee, and Ed C. Browder, et ux., Defendants." Tract A-6 was acquired from J. H. Anderson, et ux. Tract A-9 was acquired from Josiah Monger, et al. Both deeds are filed in book X-5, p. 277, in the Roane County Recorder's Office. Deeds of landowners prior to federal acquisition of the property did not indicate any evidence of past hazardous substance activity (BJC 2006a). Appendix A contains the DOE Realty Office documentation.

4. PAST AND PRESENT ACTIVITIES

4.1 PAST AND PRESENT ACTIVITIES FOR THE REAL PROPERTY PROPOSED FOR LEASE

The Main Campus – North Parking Lot study area was farmland prior to the construction of the ORNL in the early 1940s. Figure 1.2 reveals the land as it appeared in 1942 prior to construction of ORNL. The land, at that time, sloped gently to the north and appears to be pastureland or cropland. No structures such as farmhouses, barns, or other farm buildings are visible.

The aerial photograph taken in 1952 (Fig. 1.3) shows ORNL buildings constructed to the south of the study area, but again the study area itself appears to be just a grassy field with no structures visible with the exception of the first parking area beginning to show up in the extreme eastern portion of the study area. The same is true for the aerial photographs taken in 1969, 1974, 1981, 1984, and 1987 (Figs. 1.4 through 1.8). By 1969, the parking area in the extreme eastern portion of the study area appears to be paved and striped to delineate individual parking spaces.

By 1993 (Fig. 1.9), the parking lot in the eastern part of the study area had been expanded and a road was being built through the study area. Road construction activities are visible in the center of the study area as well as to the southwest of Bldgs. 2000 and 2001. The other parts of the study area not modified by parking lots or road building were becoming more forested.

The 1998 aerial photograph (Fig. 1.10) and the 2004 satellite image (Fig. 1.11) show the study area much as it appears in present day (ORNL 2005a). The initial road built through the study area was connected to the road that circles south of Bldgs. 2000 and 2001, and most of the study area had been expanded into parking lots (some paved, some gravel). Areas not used for parking are grassy and maintained by periodic mowing. Figure 1.12 shows the study area in greater detail with the paved, graveled, and grassy areas delineated.

There are no solid waste management units under the Hazardous and Solid Waste Amendments of 1984 to the Resource Conservation and Recovery Act of 1976 within the study area (SAIC 2006a). A spill report database maintained since 1986 did not reveal any documentation of spills in the area (SAIC 2006b). In addition, interviews with ORNL personnel did not indicate that any spills had occurred in the study area (SAIC 2006a).

The ORR was placed on the National Priorities List on November 21, 1989, and investigations and environmental cleanup activities are continuing in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the National Oil and Hazardous Substances Pollution Contingency Plan, and the Federal Facility Agreement (FFA) [DOE 1992]. The FFA, a tri-party agreement entered into by DOE, U. S. Environmental Protection Agency (EPA) Region 4, and the Tennessee Department of Environment and Conservation (TDEC) in 1992, establishes the schedules and milestones for environmental remediation of the ORR. Part of the study area is listed in Appendix C of the FFA and was included in the Bethel Valley Interim Record of Decision (IROD). Based on historic data, this IROD currently assumes no soil remedial actions in the study area and defers groundwater investigations to the final Bethel Valley Record of Decision (ROD). Final remediation decisions are scheduled for no earlier than fiscal year 2009 (BJC 2006b).

4.2 PAST AND PRESENT ACTIVITIES FOR THE ADJACENT PROPERTY

The areas adjacent to the study area are also located within the bounds of ORNL. The nearest non-DOE property is State Highway 95, located 1 mile west of the study area. There is no indication that activities from this non-DOE area would have contributed any contamination to the area proposed for lease.

Buildings 2000 and 2001 are the closest primary structures to the study area and were some of the first buildings constructed at ORNL, as evidenced by their presence in the 1952 aerial photograph. These buildings have been in use as offices and laboratories from the mid-1940s until 2004 when the last researcher was relocated to a different facility. The buildings are currently slated for demolition.

By 1969, additional smaller structures are located in the area between the study area and Bldgs. 2000 and 2001. These structures are visible in the aerial photographs through 1998 (Fig. 1.10) but had all been removed by 2004 (Fig. 1.11). Figure 1.13 identifies these structures as Bldgs. 2029, 2030, 2093, 2095, and 2097. A 2002 Land and Facilities Plan (ORNL 2002) identifies these structures as follows:

Facility Number	Facility Name	Gross Sq Ft	Year Built
2029	Office Trailer	1173	1974
2030	Office Trailer	720	1976
2093	Environmental Storage Building	420	1953
2095	No information		
2097	Cooling Tower for Building 2001	Not given	Not given

Interviews with ORNL personnel indicated that Bldg. 2095 could have possibly been a turnstile or guard shack related to a former portal into the fenced area of ORNL (SAIC 2006c).

As with the proposed lease space, the soils in the adjacent areas to the south and east of the lease space are listed in Appendix C of the FFA and were included in the Bethel Valley IROD. In addition, tritium- and strontium-contaminated groundwater plumes have been identified well south of Bldgs. 2000 and 2001 and are addressed separately under CERLCA (DOE 2002).

5. RESULTS OF VISUAL AND PHYSICAL INSPECTIONS

5.1 VISUAL AND PHYSICAL INSPECTIONS OF THE PROPERTY PROPOSED FOR LEASE

The Main Campus – North Parking Lot study area is a partially paved and partially graveled parking lot with minor grassy areas maintained by mowing. Most of the parking lot is terraced, with the northernmost lot being lower than the southernmost lot. The easternmost parking lot is one level (not terraced) and ends near the visitors entrance to the Historic Graphite Reactor. The northern boundary is Bethel Valley Road, and the western boundary is First Street. The southern boundary of the site is at the lower break of the wooded hill just to the north of Bldgs. 2000 and 2001. The wooded hill leading up to the Bldgs. 2000/2001 area is not part of the property proposed for lease.

No buildings are present on the lease space. Employees who work in nearby buildings use the area to park cars. In addition, the parking lot is currently used as a staging area to park flat-bed tractor trailers containing concrete panels. The concrete panels are being used to construct a building in another part of the ORNL campus; therefore, this is a temporary use of the study area. There are three groundwater monitoring wells on the boundary of the lease space. Well No. 557 is located in the east central part of the site. Well No. 549 is on the south, and well No. 545 is on the west (see Fig. 6.1).

5.2 VISUAL AND PHYSICAL INSPECTION OF THE ADJACENT PROPERTY

The adjacent areas are owned by DOE and are part of the ORNL Main Campus. Information about each of the adjacent areas is documented in Sect. 4.2.

The closest primary structures to the lease space are Bldgs. 2000 and 2001. These are primarily rounded metal structures (Quonset Huts) that have been painted. Because they contain no workers and are slated for demolition, maintenance of these buildings has been reduced to a minimum. Therefore, weathering has caused paint chips to flake off the buildings, and the paint chips are visible on the ground near the buildings. Because of concern about polychlorinated biphenyls (PCBs) and lead in old paints, the paint chips have been sampled and analyzed by ORNL. The analyses indicated PCB levels above regulatory concern, and the outside surface of the buildings has been labeled according to Toxic Substances Control Act of 1976 regulations by the ORNL Environmental Compliance organization. To ascertain if the paint chips have contaminated the surrounding soils, a Sampling and Analysis Plan was implemented in an area 75 ft from the edge of the buildings. These data are evaluated in Chap. 6 of this report. To prevent the paint chips from entering into surface water, the storm drains in the vicinity of Bldgs. 2000 and 2001 have been lined with a water-permeable barrier to allow water to pass through but to capture any debris. These barriers are cleaned on a periodic basis and the paint chips disposed of through the ORNL Laboratory Waste Services Division.

A smaller concrete structure is located on the hill between the lease space and Bldgs. 2000 and 2001. The outside outline of this structure is visible in the 1969 aerial photograph (Fig. 1.4) and according to interviews was a cooling tower, probably to support processes occurring in Bldgs. 2000 and 2001. In the 1993 aerial photograph (Fig. 1.9), the cooling tower equipment appears to have been dismantled, leaving only the concrete basin as a remnant. The structure is visible in Figs. 1.9, 1.10, and 1.12 as four dark squares aligned and trending in a northwest/southeast direction. Although the structure is not visible on the 2004 satellite image (Fig. 1.11) [possibly hidden by the shadow cast by a tree], the inspection of the adjacent space verified that it was still in existence (ORNL 2005a).

6. RESULTS OF HISTORICAL SAMPLING

6.1 DESCRIPTION AND HISTORY OF THE STUDY AREA

The Main Campus – North Parking Lot study area is located south of Bethel Valley Road in the Central Bethel Valley area of ORNL. The study area is bounded to the north by Bethel Valley Road, to the west by First Street, to the east by the visitor entrance to the Graphite Reactor, and to the south by Hilltop Circle and Northside Drive. The study area is currently used for parking and temporary tractor trailer storage, and is covered with gravel or asphalt and grass. See Fig. 6.1 for the study area footprint.

A ROD for Interim Actions in Bethel Valley (DOE 2002) has been signed that describes the selected remedies for various contaminated areas within the Bethel Valley area of the ORR. The Bethel Valley area was divided into four areas for purposes of reporting the remedial investigation results. The Main Campus – North Parking Lot study area lies within the Central Bethel Valley area, which includes the main plant area of ORNL. The main plant boundary presented in the IROD includes only the eastern portion of the Main Campus – North Parking Lot study area, which also corresponds to the controlled industrial land use boundary presented in the IROD. The western portion of the study area lies outside of the controlled industrial use boundary and is designated in the IROD for unrestricted industrial use. The IROD indicates that sampling may be required in order to determine if cleanup is necessary. However, based on the historic use of the study area, it is unlikely that soil remediation will be required.

6.2 SAMPLING DATA ASSOCIATED WITH THE STUDY AREA

Available data for the Main Campus – North Parking Lot study area include data for three groundwater monitoring wells, which are present within the lease footprint. Given the history of the proposed lease footprint (see Sect. 4.1), soil samples have not been collected in the Main Campus – North Parking Lot study area.

6.3 CHEMICAL SAMPLING ASSOCIATED WITH THE STUDY AREA

This section presents and discusses the results of the available chemical sampling that has been performed in the Main Campus – North Parking Lot study area. Results are compared to either national primary drinking water maximum contaminant levels (MCLs) or Tennessee Department of Environment and Conservation (TDEC) Domestic Water Supply (DWS) criteria.

6.3.1 Historical Results

Historical groundwater data are available for three monitoring wells located in the Main Campus – North Parking Lot lease footprint. The data available for two of the three wells (Nos. 545 and 549) represent groundwater samples collected in the 1990–1991 time period, with additional sampling for selected analytes conducted in the 1994–1995 time period. Data for groundwater samples collected in October 1986 are the only data available for one of the three wells (No. 557). These wells are all completed in bedrock and at relatively shallow depths ranging from 17.5 to 45 ft below ground surface (bgs). Bedrock was encountered at these locations at depths of less than 1.0 ft to 6 ft bgs.

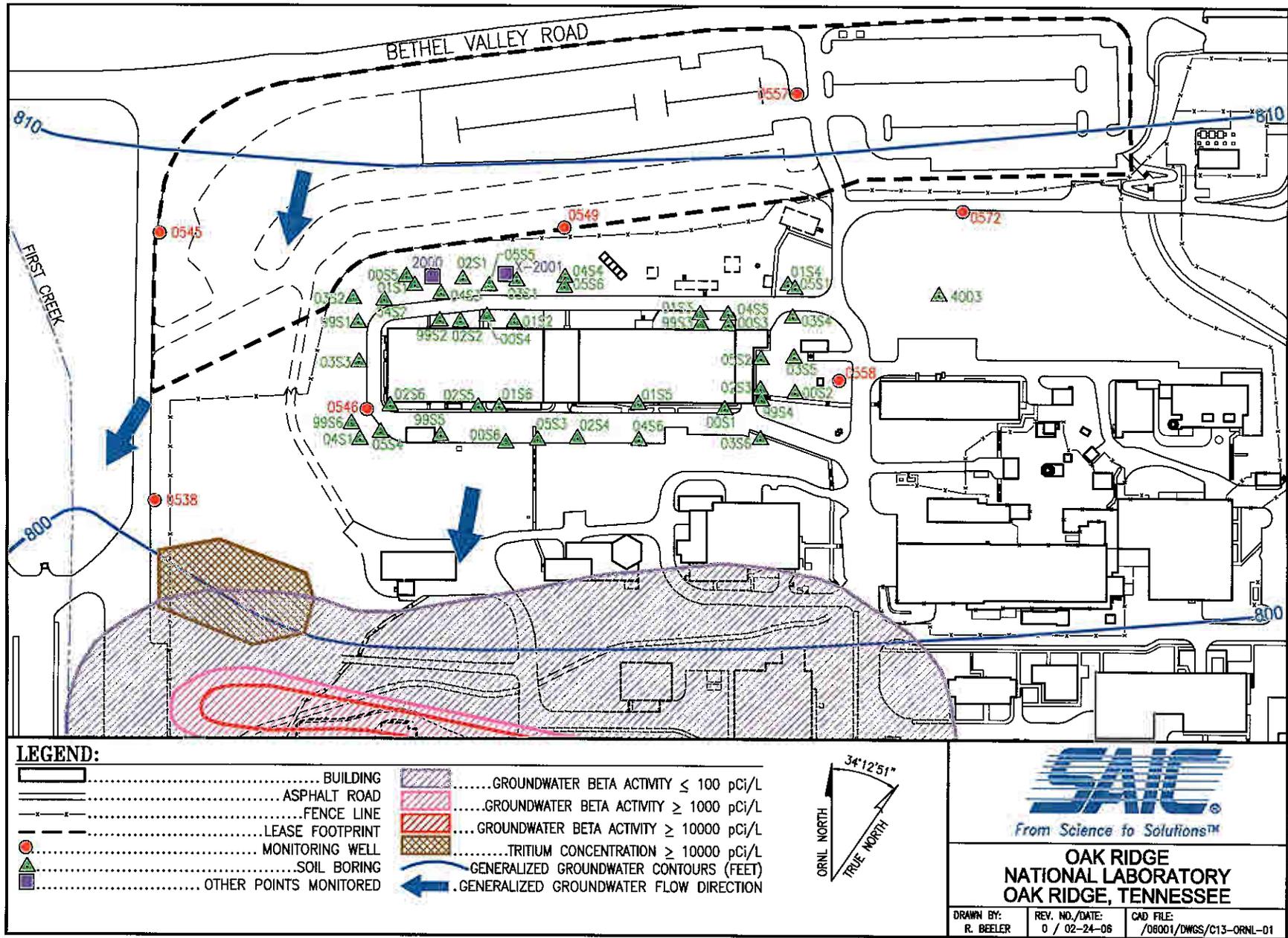


Fig. 6.1. Environmental information for the Main Campus - North Parking Lot study area and adjacent area.

A groundwater plume (contaminated with radiological constituents) has been identified within approximately 150 ft of the southwestern corner of the lease footprint (Fig. 6.1) and is discussed in Sect. 6.5.

The chemical results for the three monitoring wells located within the footprint are summarized in Table 6.1 by analysis type. For each analysis type the following information is listed: the frequency of detection, minimum and maximum detected concentrations, and well numbers where detected. There were detected results for VOCs, SVOCs, and metals.

Table 6.1. Main Campus – North Parking Lot study area groundwater chemical analytical results summary

Analysis type	Frequency detect	Minimum concentration	Maximum concentration	Well number where detected
PCBs (µg/L)	0/42	N/A	N/A	N/A
Pesticides (µg/L)	0/120	N/A	N/A	N/A
VOCs (µg/L)	2/269	2	2	545 and 549
SVOCs (µg/L)	4/392	1	5	545 and 549
Metals (mg/L)	219/373	0.0008	968	545, 549, and 557

N/A =Not applicable.
 PCB = polychlorinated biphenyl.
 SVOC = semivolatile organic compound.
 VOC = volatile organic compound.

6.3.2 Results Analysis

Groundwater samples from all three wells were collected and analyzed for VOCs and metals. Samples from well Nos. 545 and 549 were also analyzed for PCBs and SVOCs.

VOCs

A total of 269 VOC results were reported with only 2 results (0.7%) detected. The VOCs detected in groundwater were carbon tetrachloride [2 micrograms per liter (µg/L)] at well No. 545 and carbon disulfide (2 µg/L) at well No. 549 (Table 6.2). The only sampling data available for well No. 557 were collected in 1986, and conclusions based on the data available in the Oak Ridge Environmental Information System (OREIS) are inconclusive. (Due to the historical nature of the data, result qualifiers and validation qualifiers are not included in the data set.) Although several VOCs are reported in the data, the indicated results appear to correspond to detection limit concentrations (i.e., all results are reported as either 5 or 10 µg/L); thus, it does not appear that VOCs were detected at this well. Although carbon tetrachloride was detected at well No. 545, this compound was only detected in the September 1990 results and was not detected in two subsequent sampling events in 1991 at this well. Carbon disulfide was only detected in one of four sampling events at well No. 549. Overall, the reported concentrations of the VOCs in groundwater within the lease footprint were very low (below the laboratory’s reporting limit) and were not repeated across sampling events. Therefore, based on the available data, VOCs are not of concern beneath the lease footprint.

Table 6.2. Main Campus – North Parking Lot groundwater study area volatile organic compounds results (µg/L)

Analyte	MCL	Frequency of detects	Minimum detected concentration	Maximum detected concentration	Well number where detected
Carbon tetrachloride	5	1/8	2	2	545
Carbon disulfide	N/A	1/8	2	2	549

MCL = U. S. Environmental Protection Agency primary drinking water maximum contaminant level or Tennessee Department of Environment and Conservation domestic water supply criteria.
N/A = not applicable.

SVOCs

A total of 392 SVOC results were reported with 4 results (1.0%) detected. The concentrations of the SVOC results ranged from 1 µg/L to 5 µg/L. Overall, the concentrations of the SVOC results were low (none was above the laboratory's reporting limit). Only the detection of di-n-octylphthalate was repeated over more than one sampling event at well No. 549, but it was not detected in all three sampling events of record at this well.

Table 6.3. Main Campus – North Parking Lot study area groundwater semivolatile organic compounds results (µg/kg)

Analyte	MCL	Frequency of detect	Minimum Detected concentration	Maximum detected concentration	Well number where detected
Bis(2-ethylhexyl)phthalate	6	2/6	3	5	545 and 549
Di-n-octylphthalate	N/A	2/6	1	2	549

MCL = U. S. Environmental Protection Agency primary drinking water maximum contaminant level or Tennessee Department of Environment and Conservation domestic water supply criteria.
N/A = not applicable.

Metals

A total of 373 metal results were reported with 219 results (59%) detected. The concentrations of the metal results ranged from 0.0008 mg/L for cadmium to 968 mg/L for calcium. The metals results for groundwater are summarized in Table 6.4. Twenty-nine metals results (8%) were detected at concentrations greater than either the MCL or the TDEC DWS criteria. These metals included antimony, arsenic, beryllium, cadmium, chromium, lead, nickel, selenium, and thallium. The metals with the most detected results above MCLs or TDEC DWS criteria were antimony and lead with five samples each exceeding the criteria. The largest number of exceedances of criteria for metals was reported for well No. 549 on the north side of the property. Antimony, beryllium, cadmium, chromium, lead, nickel, and thallium all exceeded MCLs or DWS criteria over multiple sampling events at this well. However, only cadmium, lead, and thallium exceeded MCLs or DWS criteria at well No. 549 in the most recent sampling event (March 1995). Lead was the only metal detected above the DWS criteria over multiple sampling events at well No. 545 on the west. As with the VOCs data, conclusions about the metals results for well No. 557 on the east central part of the property are uncertain due to the absence of data qualifiers/validation flags in OREIS. Based on the reported results for this well, antimony, arsenic, and selenium may have exceeded their respective MCLs in the 1986 sampling event.

Given the age of the sample collection from these wells, the elevated metals results are not surprising as the sample collection techniques common at that time (e.g., pumping 3 well volumes prior to sample collection) lend themselves to significant disturbance of the sediment in the well and in the surrounding aquifer materials. The suspended particles produced by the aggressive pumping can lead to elevated results for metals in the samples collected.

Table 6.4. Main Campus – North Parking Lot study area groundwater metals results (mg/L)

Analyte	MCL	Frequency of detects	Minimum detected concentration	Maximum detected concentration	Well number where detected
Aluminum	N/A	9/16	0.02	130	545, 549, and 557
Antimony	0.006	5/16	0.0172	0.2	545, 549, and 557
Arsenic	0.01	3/16	0.005	0.282	549 and 557
Barium	2	16/16	0.0295	0.478	545, 549, and 557
Beryllium	0.004	7/16	0.0013	0.0101	545, 549, and 557
Cadmium	0.005	4/16	0.0008	0.0299	545, 549, and 557
Calcium	N/A	16/16	92.4	968	545, 549, and 557
Chromium	0.1	10/16	0.0184	0.282	545, 549, and 557
Cobalt	N/A	9/16	0.01	0.0852	545, 549, and 557
Copper	1.3	9/16	0.009	0.124	545, 549, and 557
Iron	N/A	14/16	0.0398	152	545, 549, and 557
Lead	0.005	9/15	0.0028	0.0324	545 and 549
Magnesium	N/A	16/16	0.496	104	545, 549, and 557
Manganese	N/A	15/16	0.0016	2.23	545, 549, and 557
Mercury	0.002	0/16	N/A	N/A	N/A
Nickel	0.1	8/16	0.0286	0.233	545, 549, and 557
Potassium	N/A	12/15	0.645	51.6	545 and 549
Selenium	0.05	1/13	0.2	0.2	557
Silver	N/A	4/16	0.0116	0.132	545, 549, and 557
Thallium	0.002	1/15	1.94	1.94	549
Vanadium	N/A	10/16	0.0172	0.232	545, 549, and 557
Zinc	N/A	14/16	0.0104	0.54	545, 549, and 557

MCL = U. S. Environmental Protection Agency primary drinking water maximum contaminant level or Tennessee Department of Environment and Conservation domestic water supply criteria, whichever is lower.

N/A = not applicable.

6.4 RADIOLOGICAL SAMPLING ASSOCIATED WITH THE STUDY AREA

This section presents and discusses the radiological sampling results for the study area.

6.4.1 Radiological Surveys

New radiological surveys of the lease footprint were not performed because the study area has only been used as a parking lot. However, historical man-made gamma radiation aerial survey data from 1992 are available and indicate that levels of gamma radiation in the area of the lease footprint [< 1000 counts per second (cps) to 3200 cps] were much lower than those found in the main campus area of ORNL at that time.

6.4.2 Radiological Sampling

Historical groundwater samples from the three monitoring wells within the lease footprint have been analyzed for radiological constituents. Soil samples from within the lease footprint were not collected.

6.4.2.1 Historical samples

The results for the historical groundwater samples from the three monitoring wells within the lease footprint are summarized in Table 6.5.

As mentioned previously, a plume of groundwater contaminated with radiological constituents exists south of the study area. Although this plume contains tritium and ⁹⁰Sr, only tritium has been detected in monitoring wells located within the study area. Tritium was detected in 11 of 12 samples, with concentrations ranging from 3080 pCi/L to 3710 pCi/L, which is well below the derived MCL of 20,000 pCi/L.¹ Concentrations of ⁹⁹Tc and the uranium isotopes detected in groundwater beneath the study area also do not exceed their respective derived MCLs (900 pCi/L and 20 pCi/L, respectively). Although one result for ²³²Th (alpha decay) from well No. 545 exceeded the MCL for gross alpha activity of 15 pCi/L, the corresponding error limit for this analysis was also elevated, and the result may or may not exceed the MCL for gross alpha activity.

Table 6.5. Radiological groundwater sampling summary (pCi/L)

Analyte	Frequency of detects	Minimum detected concentration	Maximum detected concentration	Well number where detected
³ H	11/12	3080	3710	545, 549, and 557
⁶⁰ Co	0/1	N/A	N/A	N/A
⁹⁰ Sr	0/5	N/A	N/A	N/A
⁹⁹ Tc	2/2	5	550	549
¹³⁷ Cs	0/12	N/A	N/A	N/A
²²⁸ Th	3/7	1.39	2.43	545 and 249
²³⁰ Th	1/7	7.35	7.35	549
²³² Th	3/8	0.18	27.3	545 and 549
^{233/234} U	5/8	0.3	6.08	545 and 549
²³⁵ U	0/8	N/A	N/A	N/A
²³⁸ U	2/8	3.94	3.99	549

N/A = not applicable.

Based on the results of groundwater samples for radiological analyses collected from the study area, it does not appear that radiological contamination exists beneath the study area. The absence of ⁹⁰Sr in groundwater beneath the study area indicates that the Corehole 8 Plume does not extend northward into the study area and supports the conceptual model that the Corehole 8 Plume is strata-bound.

¹ This value is not an MCL, but represents a derived concentration that results in the effective dose equivalent of the MCL for gross beta emissions, which is 4 mrem/year.

6.5 ADJACENT AREA SAMPLE RESULTS

The following section presents information from the areas adjacent to the proposed lease space.

One soil sample (No. 4003) has been collected from the adjacent space and analyzed for metals, VOCs, SVOCs, pesticides, PCBs, and radiological constituents. Samples from this location were collected from 2 to 4 ft bgs. Also, surface soil samples have been collected from the area immediately surrounding (< 75 ft) Bldgs. 2000 and 2001 on an annual basis since 1999 and analyzed for PCBs. This annual PCB sampling and monitoring is due to the PCB content of paint on the buildings, which is spalling from the building surfaces. In addition to soil, sediment and water samples are collected from storm water catch basins located in the immediate vicinity of Bldgs. 2000 and 2001. All of these results are presented in an annual report entitled *Analytical Results for PCBs at ORNL's Buildings 2000 and 2001*. This report is submitted to EPA if results exceed established threshold concentrations (ORNL 2005b). Additional monitoring wells are also located in the adjacent areas. In addition, samples of water have been collected from the remnants of a cooling tower basin and air effluent data are available for a former stack, both located in the adjacent space.

Analytical results for the 4003 soil boring indicate that no PCBs or SVOCs were detected in this soil sample. The only VOCs detected were chloroform (0.007 mg/kg) and methylene chloride (0.019 mg/kg), which is a common laboratory contaminant. Both of these concentrations are well below their respective industrial soil preliminary remediation goals (PRGs) [4.7 mg/kg and 210 mg/kg]. As would be expected for soils on the ORR, several metals were detected in the soil sample from the 4003 sample location; however, all of the detected concentrations were well below the corresponding industrial soil PRG and below risk-based remediation concentrations for the industrial areas presented in the Bethel Valley IROD. Several radionuclides were also detected in the soil sample; however, as with the metals, none of the detected radionuclide concentrations exceeded industrial PRGs or the ROD risk-based remediation concentrations.

The 2005 analytical data from the annual monitoring performed at Bldgs. 2000 and 2001 indicate that PCBs are present in catch basin sediment and soils surrounding the buildings. PCB concentrations found in catch basin sediment ranged from 0.21 mg/kg to 6.8 mg/kg (ORNL 2005b). PCBs were not detected in the water samples collected from the basins. PCB concentrations detected in soil samples ranged from 0.012 mg/kg to 0.3 mg/kg (see Table 6.6), which are below the EPA Region 9 PRGs for industrial soil.

Table 6.6. Adjacent area soil sample results for Buildings 2000 and 2001

Sample No.	PCBs 1999 (mg/kg)	PCBs 2000 (mg/kg)	PCBs 2001 (mg/kg)	PCBs 2002 (mg/kg)	PCBs 2003 (mg/kg)	PCBs 2004 (mg/kg)	PCBs 2005 (mg/kg)
S1	0.06 U	0.35	0.049	0.072	0.071 J	0.057	0.053
S2	0.570	0.017 J	0.3	5.3	0.078 U	0.02 J	0.029
S3	0.066 U	0.37	0.079	0.083	0.55	0.096 U	0.012 J
S4	0.067 U	0.65	0.048 U	0.036	0.043 J	0.11 U	0.3
S5	0.062 U	0.02 J	0.45	15	0.079 U	0.15	0.046
S6	0.06 U	0.05 U	3.7	5.5	0.227	0.091 U	0.18

J = estimated concentration.

PCB = polychlorinated biphenyl.

U = not detected at indicated concentration.

Soil samples collected from the vicinity of Bldgs. 2000 and 2001 have been given similar designations over the years; however, the actual sample locations have been randomly selected each year (see Fig. 6.1). Thus, comparison of results from year to year is difficult (DOE 2005). Although PCBs have been detected in soils surrounding Bldgs. 2000 and 2001, the detected concentrations have been lower than the PCB threshold concentrations (40 mg/kg) established for soil at Bldgs. 2000 and 2001. With the exception of one result obtained in 2002 (15 mg/kg at S5), all of the results have also been below the EPA Region 9 PRG for industrial soil at a target risk level of 10^{-5} (7.4 mg/kg). This sample location is on the opposite side (south) of Bldg. 2000 from the study area. Two of the four samples of sediment from the catch basins (3.2 mg/kg and 6.8 mg/kg) exceeded the established threshold concentration for sediment (2 mg/kg) in 2005. These two catch basins are located near the southwestern and southeastern corners of the buildings. Concentrations of PCBs for sediment samples from two catch basins located on the north side of the buildings were an order of magnitude lower (0.21 mg/kg and 0.37 mg/kg).

As mentioned previously, a groundwater plume has been identified within approximately 150 ft of the southwestern corner of the lease footprint. This plume contains tritium concentrations of greater than 10,000 picocuries per liter (pCi/L). Concentrations of ^{90}Sr in groundwater exceed 10,000 pCi/L approximately 350 ft south of the footprint.

The plume of ^{90}Sr -contaminated groundwater, referred to as the Corehole 8 Plume, was addressed in an Action Memorandum (AM) in 1994. The AM authorized installation of a groundwater collection and transmission system, which began in December 1994. A tank in the North Tank Farm has been identified as the source of the Corehole 8 Plume. An additional groundwater interceptor trench was installed in 1998, and in September 1999, an addendum to the AM authorized additional groundwater extraction and treatment actions, which involved pumping contaminated groundwater out of an existing monitoring well south of the plume. A narrow limestone bedrock layer has been determined to be the preferential flow pathway for the Corehole 8 Plume. This is illustrated by the plume geometry indicated in Fig. 6.1. Contaminated groundwater follows strike-controlled fractures and solutional conduits developed within this limestone layer. Thus, based on the anticipated hydrogeologic controls, this plume is not expected to reach the Main Campus – North Parking Lot study area.

Historical groundwater results for monitoring wells located in the adjacent areas are similar to the results obtained from within the footprint. Gross alpha activities occasionally exceeded the MCL of 15 pCi/L and ranged from non-detect to 660 pCi/L in the same well. Strontium-90 was not detected in any of the adjacent area wells, and tritium concentrations ranged from 490 to 2760 pCi/L, well below the derived MCL for tritium (20,000 pCi/L). As with the groundwater samples collected from within the footprint, metal concentrations sporadically exceeded MCLs in the adjacent area wells with arsenic, antimony, beryllium, chromium, cadmium, lead, nickel, and thallium occasionally exceeding their respective MCLs, but these exceedances were generally not repeated in a given well over multiple sampling events. The only VOC detected in more than one well was trichloroethene (TCE), which was detected in two of four sampling events at well No. 538 and in the only sampling event of record at well No. 546. TCE concentrations ranged from an estimated 3 $\mu\text{g/L}$ at well No. 538 to 27 $\mu\text{g/L}$ at well No. 546, which exceeds the MCL of 5 $\mu\text{g/L}$. The only SVOC detected in groundwater samples from the adjacent area was bis(2-ethylhexyl)phthalate at well No. 546 at a concentration of 22 $\mu\text{g/L}$.

Water samples collected from the former cooling tower basin were analyzed for chromium, copper, and zinc. Neither the chromium (0.0047 mg/L) nor the copper (0.092 mg/L) results exceeded their respective MCLs (0.01 mg/L and 1.3 mg/L). Although zinc does not have a primary drinking water MCL, the concentration (0.43 mg/L) did not exceed the nonenforceable secondary drinking water standard (5 mg/L).

7. CONCLUSIONS

Government records, title documents, and historical aerial photographs were searched; inspections of the property and adjacent properties were performed; historical data were evaluated; and interviews with current and former employees were conducted as part of the effort to determine the baseline condition of the Main Campus – North Parking Lot study area (i.e., the proposed lease space). Based on the reviews, inspections, and interviews documented herein, DOE has determined that there is no evidence to indicate that hazardous substance activity took place on the property during the time the property was owned by the U. S. Government, or prior to that time.

Data evaluations also indicate that while contaminated media exist in the adjacent areas to the south, there is no indication of a groundwater contamination plume on the lease space and no reason to suspect contaminated soils from past activities on the lease space.

There are no environmental waste management areas associated with the lease space. However, the lease space is part of a larger area listed in the CERCLA FFA. Based on historic data the Bethel Valley IROD assumes no soil remediation in the lease space and defers groundwater investigations to the final Bethel Valley ROD.

Visual inspections of the lease space revealed no permanent structures or equipment except for three groundwater monitoring wells and associated protective posts. The area is used only for employee parking and for periodic staging of materials for miscellaneous activities.

Historical groundwater data from the lease space were compared to either national primary drinking water MCLs or TDEC DWS criteria. Based on available data, VOCs, SVOCs, and radiological contamination are not of concern in the groundwater beneath the lease footprint. The metals antimony, arsenic, and selenium may exceed MCLs, but the sample collection technique used in the past may have resulted in the elevated metals results.

While groundwater and soils contamination has been detected in the adjacent areas, there is no evidence that contaminant migration has affected, or will affect, the lease space (e.g., the lease space is hydrogeologically upgradient from the groundwater contaminant plumes).

Because of the historic use of this area as only a parking lot and the results of the investigations described above, no additional site-specific sampling and analysis was conducted.

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SAIC 2006c. Email report from J. E. Van Winkle (SAIC) entitled "Meeting on 1/27/06 with Mike Finger about ORNL North Parking Lot Area Lease Space," January 30.

UT-Battelle 2006a. *Proposed Reindustrial Development of North Parking Lot Area, Oak Ridge National Laboratory, Map 1 – Major Environmental Attributes Proximal to Parcel (map)*, Oak Ridge, TN, February 9.

UT-Battelle 2006b. *Proposed Reindustrial Development of North Parking Lot Area, Oak Ridge National Laboratory, Map 2 – Major Environmental Attributes and Boundaries Proximal to Parcel (map)*, February 9.

UT-Battelle 2006c. *Building 2000/2001 Complex Area Composite Map of Sampling locations, Calendar Years 1999–2005*, February 9.

APPENDIX A
REAL ESTATE ACQUISITION LETTER

**PROPOSED LAND LEASE
INNOVATION VALLEY SCIENCE AND TECHNOLOGY PARK
OAK RIDGE RESERVATION, TN**

FILES RESEARCH FOR HAZARDOUS SUBSTANCE ACTIVITY

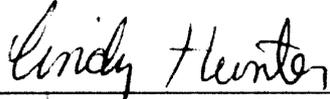
The following statement is provided in support of guidance promulgated under Section 120(h) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA) 42 U.S.C 9620(h) and in support of regulations issued by the Environmental Protection Agency at 40 CFR part 373.

The undersigned has made a complete search of existing and available Department of Energy (DOE) records, documentation, and data within the real estate files relating to the property that is subject to the proposed land lease action for the Innovation Valley Science and Technology Park at the Oak Ridge National Laboratory within the Oak Ridge Reservation, Tennessee. The proposed action would result in a lease to the Community Reuse Organization of East Tennessee. The search conducted was considered reasonable with a good faith effort expended to identify whether any hazardous substances were known to have been released or disposed of on the property. The available real estate records of this office do not reflect any determinable reference that hazardous substance activity as defined by Section 101(14) of CERCLA took place on or in the property during the time the property was owned by the United States of America.

Lands affected by this action are identified as portions of the following original acquisition tracts in which the United States of America acquired title, (having been acquired for the Atomic Energy Commission as a forerunner of the Department of Energy) by Civil Action No. 429 filed in the United States District Court for the Eastern District of Tennessee, Northern Division:

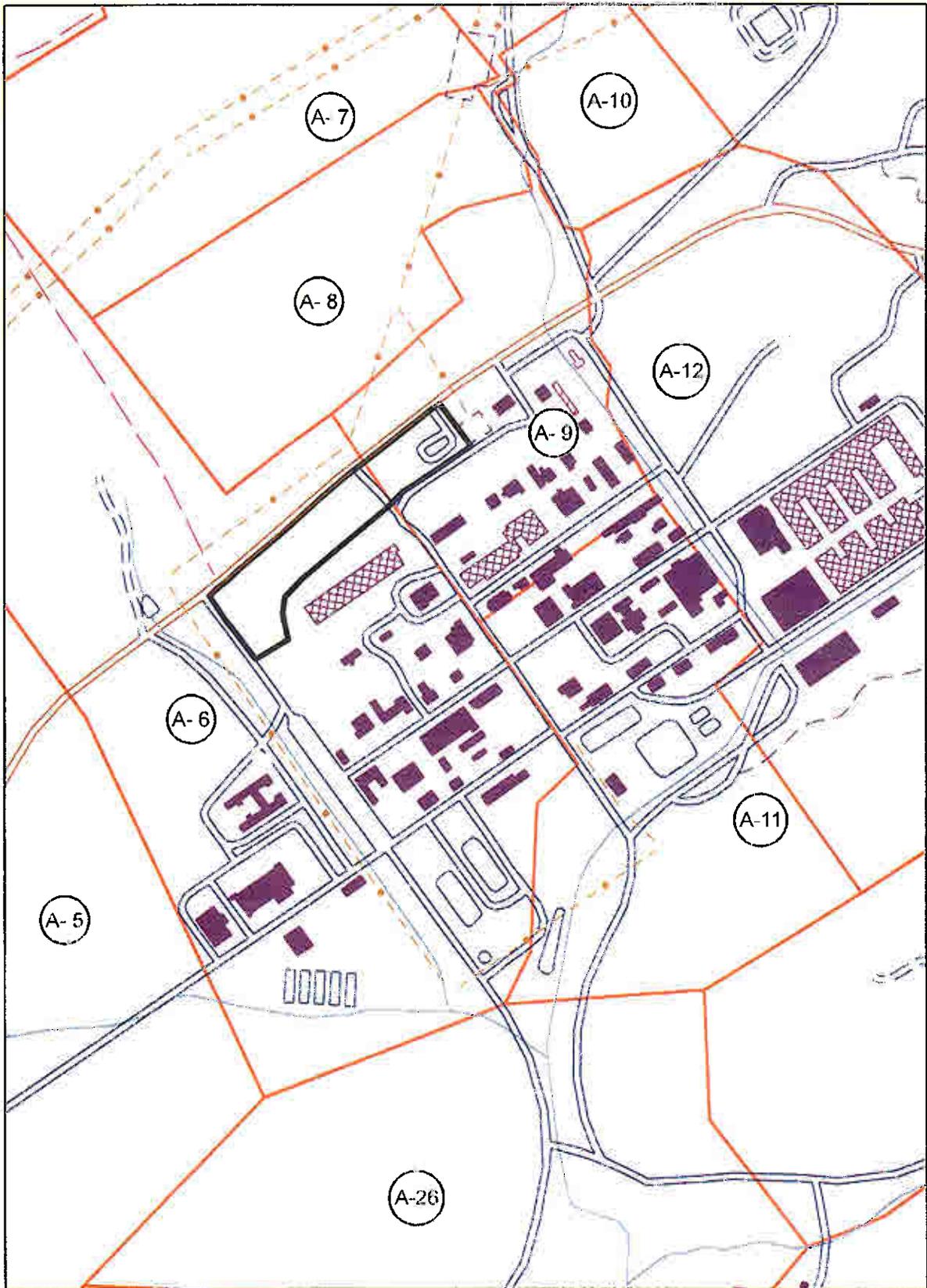
The proposed land is located on a portion of Tract A-6 and Tract A-9. Title to this land was vested in the United States of America by Declaration of Taking No. 1. Judgment on Declaration of Taking was filed for public record on November 20, 1942, in Vol. X-5, page 277 in the Roane County Register's Office, Tennessee.

This record shall be made a part of the CERCLA report currently being prepared.

 2/22/06

Cindy Hunter, Realty Officer
Oak Ridge Office
U. S. Department of Energy

Attachment
Plat Exhibit



Tract A-6: Acquired from J. H. Anderson, et ux. Deed Book \ Page: X-5/277.
 Judgement of Taking: 1. Dated 11/20/42. Civil Action: 429. Approximated Acreage: 218.
 Tract A-9: Acquired from Josiah Monger, et ux. Deed Book \ Page: X-5/277.
 Judgement of Taking: 1. Dated 11/20/42. Civil Action: 429. Approximated Acreage: 59.4.

○ = Acquisition Tract Numbers
 — = Boundary

RECORD COPY DISTRIBUTION

File—EMEF DMC—RC
UT-Battelle—Lab Records