

**APPENDIX C**  
**FLOODPLAIN ASSESSMENT**



**FLOODPLAIN ASSESSMENT  
PROPOSED TITLE TRANSFER OF PARCEL ED-1**



**November 2002**

**U.S. Department of Energy  
Oak Ridge Operations  
Oak Ridge, Tennessee**

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Date Issued—November 2002

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**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION**

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

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## ABBREVIATIONS AND ACRONYMS

<i>CFR</i>	<i>Code of Federal Regulations</i>
CWA	Clean Water Act of 1972
DOE	U.S. Department of Energy
ORO	Oak Ridge Operations Office
ORR	Oak Ridge Reservation
TDEC	Tennessee Department of Environment and Protection
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers

# 1. INTRODUCTION

This floodplain assessment has been prepared in accordance with the *Code of Federal Regulations (CFR)* Title 10 Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements for the purpose of fulfilling the U.S. Department of Energy's (DOE's) responsibilities under Executive Order 11988 "Floodplain Management." Executive Order 11988 encourages measures to preserve and enhance the natural and beneficial functions of floodplains. They also require federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative.

A floodplain, according to 10 *CFR* 1022, means the lowlands adjoining inland and coastal waters and relatively flat areas and floodprone areas of offshore islands including, at a minimum, that area inundated by a 1 percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

Additionally, 10 *CFR* 1022 applies to activities in furtherance of DOE responsibilities for acquiring, managing, and disposing of federal lands and facilities. When property in a floodplain or wetlands is proposed for lease, easement, right-of-way, or disposal (e.g., title transfer) to non-federal public or private parties, DOE shall (1) identify those uses that are restricted under federal, state, or local floodplains or wetlands regulations; (2) attach other appropriate restrictions to uses of the property; or (3) withhold the property from conveyance.

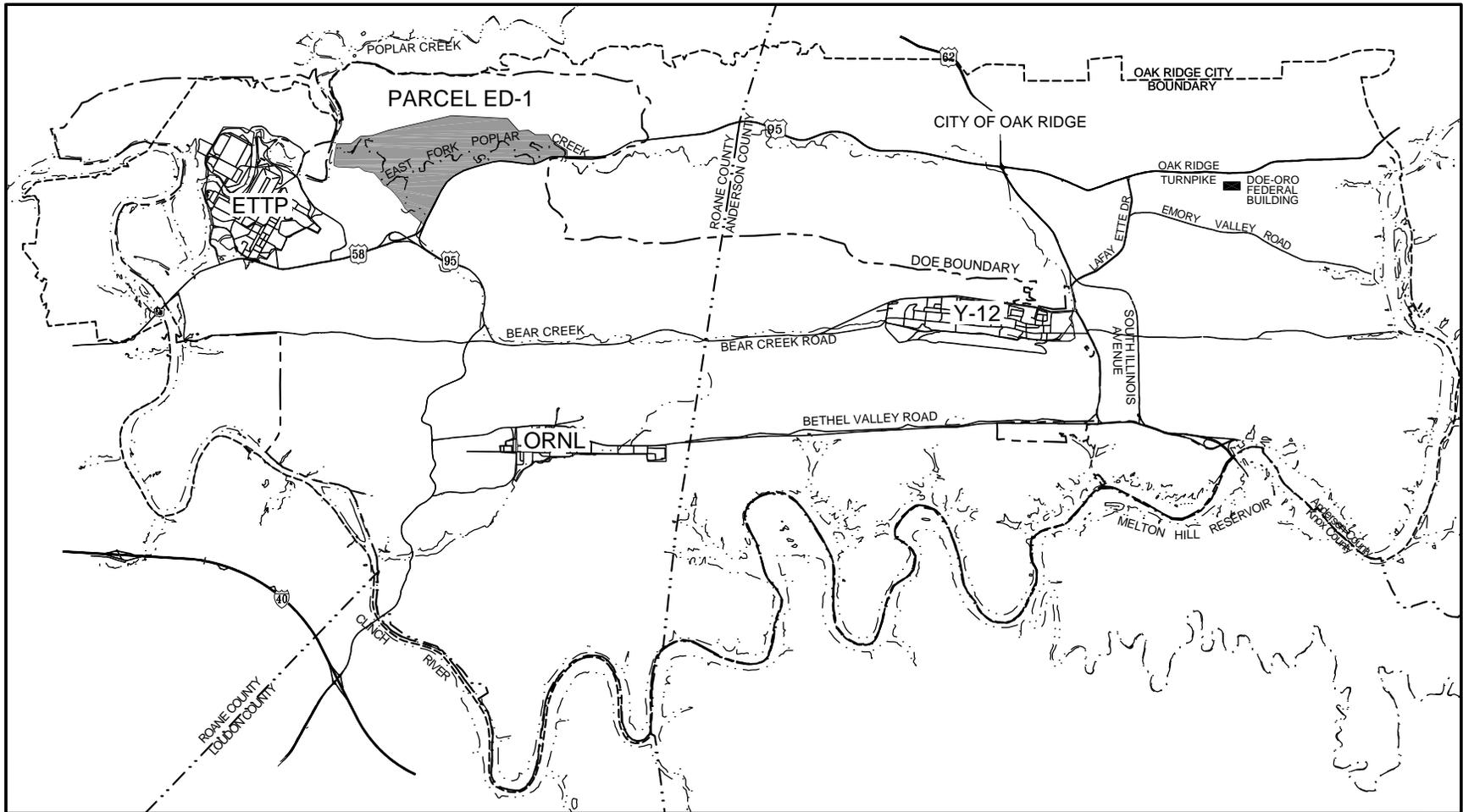
Finally, 10 *CFR* 1022 seeks to provide early and adequate opportunities for public review of plans and proposals involving actions located in a floodplain and/or wetlands.

This floodplain assessment serves to inform the public of proposed activities at the Oak Ridge Reservation (ORR) that have the potential to affect the floodplain on property currently controlled by DOE and to present measures or alternatives to the proposed action that will reduce or mitigate adverse effects. Information is presented on the following topics: project description, floodplain effects, and alternatives. The 100-year flood was chosen as the criterion of evaluation for floodplain effects because no critical actions, as defined in 10 *CFR* 1022 would occur as a result of the proposed action.

## 2. PROJECT DESCRIPTION

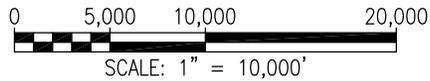
### 2.1 PROPOSED ACTION

This floodplain assessment evaluates the potential floodplain impacts from the proposed title transfer of the developable portion of Parcel ED-1 (also known as the Horizon Center) to Horizon Center LLC, a subsidiary of the Community Reuse Organization of East Tennessee. Parcel ED-1 consists of approximately 957 acres located in the western portion of the ORR, Roane County, Tennessee (Fig.1). DOE is proposing to transfer approximately 426 developable acres of the parcel. The remaining property, which contains the Natural Area including the majority of the floodplain, wetlands, and other sensitive resources, would stay under DOE ownership and control. Horizon Center LLC would continue to monitor and protect this area under a lease agreement. The potential environmental impacts of the proposed action have been considered in an Environmental Assessment Addendum being prepared by DOE (DOE 2002).



**LEGEND:**

- PRIMARY ROAD
- - - - RIVER & STREAM
- PARCEL ED-1
- .....DOE BOUNDARY
- · - · - · - · - · - · OAK RIDGE BOUNDARY



**TRANSFER OF PARCEL ED-1**

DRAWN BY: P. HOLM	REV. NO./DATE: REV. 0 / 4-25-02	CAD FILE: 01014/DWGS/P40-ED1SITE
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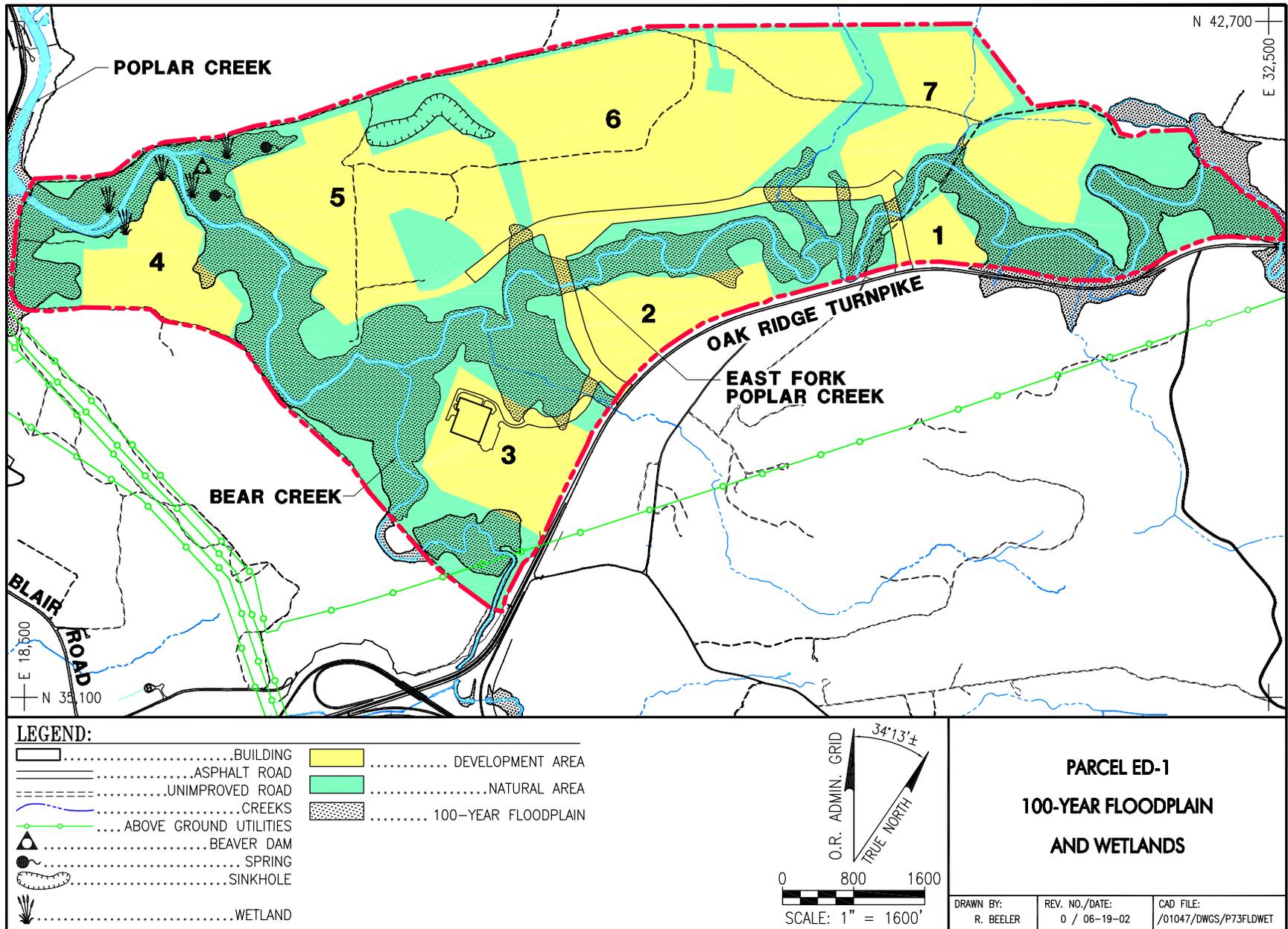
**Fig. 1. Parcel ED-1 Vicinity Map**

CROET has leased Parcel ED-1 since 1998 for development of an industrial/business park. Under the proposed transfer, Horizon Center LLC would continue the development of the parcel as an industrial/business park for research and development, medical technology, manufacturing, distribution, and corporate headquarters/office facilities. The developable portion of the parcel consists of seven major development areas, ranging in size from 11 to 148 acres. The majority of the remaining (non-developable) portion of Parcel ED-1 is located within the 100-year floodplain of East Fork Poplar Creek (EFPC).

## 2.2 PARCEL ED-1 FLOODPLAIN

The 100-year floodplain of EFPC within Parcel ED-1 contains approximately 287 acres (Fig. 2). The floodplain is predominantly forested with bottomland hardwoods or pine plantation. The majority of the pine plantations in the area have been severely impacted as a result of infestation by the southern pine beetle (*Dendroctonus frontalis*). Prior to the initial development of the parcel, the predominant land uses were wildlife management, silviculture, ecosystem research, and environmental monitoring. Limited encroachment into the 100-year floodplain occurred during construction of culverts, utilities, bridges, and roads as part of CROET's initial development of Parcel ED-1. The two bridges across EFPC were designed to span the creek so that no portion was located within the creek or floodway. The remainder of the 100-year floodplain has been protected from development activities.

The Tennessee Valley Authority (TVA) conducted a Flood Insurance Study of EFPC to determine the flood profiles for the Federal Emergency Management Agency (FEMA) (FEMA 1984). FEMA used this information to revise existing Flood Insurance Rate Maps of EFPC (FEMA 1985). TVA and the COE amended this study as part of the remedial action plans for removal and containment of contamination within the EFPC floodplain. This contamination was primarily the result of historical mercury releases from the Y-12 Plant located about 14 miles upstream of Parcel ED-1. The closest removal action to the parcel was located approximately 8 miles upstream. Changes to the floodplain and floodway boundaries also resulted from commercial and residential development in the floodplain upstream of Parcel ED-1 and changes in the amount of water discharged from the Y-12 Plant (TVA 1991; COE 1992a). The portion of the EFPC floodplain within Parcel ED-1 is outside of the limits of the existing City of Oak Ridge Flood Insurance Rate Maps.



**Fig. 2. Location of the 100-year floodplain within Parcel ED-1**

### **3. FLOODPLAIN EFFECTS**

#### **3.1 POTENTIAL EFFECTS ON FLOODPLAIN**

The proposed transfer of title for a portion of Parcel ED-1 would not inherently cause impacts that affect the floodplain on the parcel because the proposed transfer is an administrative action. The potential for, and degree of, adverse impacts would depend upon how Horizon Center LLC continues the development of Parcel ED-1. Activities associated with subsequent development of the parcel could have beneficial effects or adverse effects on the floodplain. Effects could result from activities occurring directly in the floodplain or indirectly from activities that occur in adjacent areas. The consequences of floodplain alteration might last for decades (long-term effects) or be minor enough that the floodplain could recover in a few years (short-term effects).

Any activity that has the potential to affect the floodplain in any way would be subject to regulation by the federal and/or state government. Horizon Center LLC or any of its successors, transferees, or assigns would be required to comply with applicable federal, state, and local laws, rules, or ordinances governing land use in floodplains, wetlands and streams. It would be the responsibility of Horizon Center LLC or the owner to secure the necessary permits and to comply with all the permit requirements, including compensatory mitigation.

##### **3.1.1 Negative Effects**

Negative impacts include any activity that adversely affects the survival, quality, natural, and beneficial values of the floodplain. Negative effects would result from any action that eliminates or interferes with the floodplain at Parcel ED-1 or reduces its ability to perform normal biological, chemical, hydrological, and physical functions. No significant negative impacts to the floodplain at Parcel ED-1 are expected to occur since the majority of the 100-year floodplain of EFPC is located and protected within the Natural Area. Improvement of the existing road and bridges across Bear Creek associated with Development Area 4 and future construction (i.e., parking lot) within Development Area 2 (see Fig. 2) could encroach into the 100-year floodplain but the potential activities should not negatively impact the floodway or affect flooding conditions. The appropriate engineering studies would be completed and permits would be obtained prior to any of these actions. No critical actions, as defined in 10 *CFR* 1022 would occur as a result of the proposed action or no action.

##### **3.1.2 Direct Effects**

Direct effects would result from any activity that occurs directly in a floodplain and affects floodplain characteristics or functions. Direct effects could be negative or adverse if they eliminate, interfere with, or reduce normal floodplain functions. The most extreme example of direct adverse effects to floodplains would involve the placement of fill material into the floodplain during site preparation or construction activities. Placement of fill into the 100-year floodplain for construction within Development Area 2 and potential road and bridge improvements associated with Development Area 4 would have direct effects. However, the amount of fill material should not adversely impact the floodway or affect flooding conditions.

### **3.1.3 Long-Term Effects**

Long-term effects include any activities that influence floodplain functions for several years or decades. Adverse long-term effects would include any activities (e.g., construction of large permanent structures in the floodplain) that impair or damage floodplain functions such that it would take several years or decades for functions to recover to their pre-disturbance level. Adverse long-term effects are of sufficient magnitude and intensity that site resources may not recover without intervention (restoration). Long-term positive effects would include activities that provided permanent protection for the floodplain. No long-term adverse impacts to the 100-year floodplain are expected to result from the proposed action or no action. Minor encroachments that might occur in the 100-year floodplain (see Sect. 3.1.2) would not add enough fill material to the floodplain to create dangerous flooding conditions beyond those that already naturally occur. Long-term positive effects would occur since the majority of the 100-year floodplain would continue to be protected within the Natural Area.

### **3.1.4 Short-Term Effects**

Short-term effects include any activities that have relatively minor impacts on floodplain functions. An example of a short-term negative effect would be the placement of temporary diversion structures (e.g., coffer dam) into the creek or floodplain in order to conduct construction activities. After removal of the temporary structures, the floodplain functions should recover within a short period of time. Short-term disturbances are generally not severe enough to cause permanent impairment of floodplain functions and values. Resources can usually recover in a short period of time without assistance. The duration of the recovery period would depend on the magnitude of disturbance.

## **4. ALTERNATIVES**

### **4.1 THE NO ACTION ALTERNATIVE**

Under the No Action alternative, no portion of Parcel ED-1 would be transferred to Horizon Center LLC and the parcel would remain DOE property. The current lease of the parcel would continue and it is expected that CROET would continue to develop and market the parcel as an industrial/business park. No additional impacts to the 100-year floodplain at Parcel ED-1 would occur beyond those discussed in Sect. 3 and it is expected that the floodplain associated with the Parcel ED-1 would continue to exist and function as it presently does.

### **4.2 MITIGATION**

Any actions that take place in the floodplain at Parcel ED-1 are subject to regulation by USACE, the Tennessee Department of Environment and Conservation (TDEC), Division of Water Pollution Control, and possibly the Tennessee Valley Authority (TVA). USACE regulates activities in floodplains through Sect. 404 of the Clean Water Act of 1972 (CWA). The State of Tennessee also regulates activities in floodplains under Sect. 401 of the CWA and the Tennessee Water Quality Control Act of 1977 (Tennessee Administrative Code 69-3-108). TVA regulates all construction, operation, or maintenance of structures affecting navigation, flood control, or public lands or reservations in the Tennessee River or its tributaries under Section 26a of the TVA Act (U.S. Congress, 1933, as amended).

In general, TDEC has lower thresholds for disturbance to floodplains than USACE. In some cases, USACE may determine that it does not have jurisdiction over activities that would affect floodplains. In these situations, TDEC would serve as the lead regulatory agency. The sequencing for regulatory review by USACE and TDEC and/or TVA requires applicants to make all efforts to avoid adverse impacts to floodplains if possible, minimize adverse impacts, and compensate for adverse impacts after making all practicable effort to avoid and minimize them. Compensatory requirements depend on the quality of the affected floodplain, the type and degree of impact, and the region of the state where the impact would occur. Compensatory mitigation usually includes restoration, enhancement, or preservation and generally must be negotiated with USACE, TVA, and TDEC on a case-by-case basis.

#### **4.2.1 Avoidance**

Avoidance means that DOE would take steps to prevent new owners from engaging in any activity that would have adverse impacts on the 100-year floodplain at Parcel ED-1. DOE will accomplish this by withholding the majority of the floodplain from transfer, prohibiting development in the floodplain except for unavoidable encroachments (e.g., utility crossings, road improvements), and placing restrictions on the future uses of the transferred property. In order for these controls to be effective, the floodplain boundaries will be surveyed and marked in the field prior to the title transfer; appropriate restrictions will be placed in deeds, maps, and plats; appropriate buffer zones will be defined and required to be maintained; and the new property owners will be prohibited from construction activities that have adverse direct or indirect effects on the floodplain unless the appropriate regulatory permits are obtained. To ensure that all administrative controls are implemented and functioning as intended, DOE or Horizon Center LLC or their agents or representatives will conduct periodic inspections or monitoring.

Under the proposed action, all environmental protections in the current lease would be carried forward in transfer documents. This includes protection of the Natural Area from the effects of development on the remainder of Parcel ED-1. With DOE's retention of the Natural Area, direct impacts to the 100-year floodplain would be avoided except for the few small areas of potential encroachment into the 100-year floodplain (see Sect. 3.1.2). Because DOE will retain the Natural Area, the provisions of the MAP would continue. Inspections will be scheduled three times each year: December-January, April-June, and September-October. During construction activities in the developable areas Horizon Center LLC would conduct more frequent inspections of areas being disturbed to ensure that no encroachment of the Natural Area boundary is occurring and that no significant adverse impacts to the sensitive resources occur. These inspections would be in addition to any other inspections that may take place by city or state officials (i.e., codes or other regulatory enforcement).

#### **4.2.2 Minimization**

Minimization means restricting actions that have the potential to adversely affect the floodplain to the absolute minimum required for the project to continue. Minimization could include reducing areas of impact in the floodplain. It could also include implementing best management practices, such as sediment controls that reduce or prevent soil erosion and runoff from adjacent construction sites, and minimum grading requirements that reduce land disturbance on steep slopes adjacent to the floodplain and streams.

#### **4.2.3 Regulatory Permits**

Any proposed activities on Parcel ED-1 that would affect 100-year floodplain would be subject to compliance with all applicable local, state, and federal regulations. Any proposed structure in the floodplain of EFPC (e.g., bridges, culverts, and parking lots) would be subject to a TVA Section 26(a) review. Activities that include discharge of dredged or fill material into the waters of the United States, regardless of whether on private or public property, must obtain a Sect. 404 permit from the USACE and

a Sect. 401 Water Quality Certification from the state prior to taking the action. In cases where TVA lands or waters may be affected, TVA and USACE would determine which agency would be the lead regulatory agency. Federal, state, and local storm water regulations to minimize erosion and sedimentation would also need to be met.

It would be the responsibility of Horizon Center LLC its successors, transferees, or assigns to secure all applicable permits prior to initiating work in the floodplain. Permit conditions would stipulate which activities could occur in or around the floodplain. Regulatory permits would also specify all required mitigative measures, including compensation.

## **5. SUMMARY AND CONCLUSIONS**

The potentially affected 100-year floodplain property lies along EFPC and its tributaries within Parcel ED-1. Under the current lease CROET obtained approvals to encroach upon the 100-year floodplain of EFPC during construction of culverts, bridges, and roads as part of its development of the parcel. These activities were conducted under the appropriate state and federal permits. Upon the title transfer of Parcel ED-1, additional minor encroachments of the floodplain may be necessary for further development of the parcel.

DOE proposes to transfer title to approximately 426 developable acres of Parcel ED-1 to Horizon Center LLC a subsidiary of CROET. CROET has leased Parcel ED-1 since 1998 for development of an industrial/business park. Under the proposed transfer of title, Horizon Center, LLC would continue development of the parcel as an industrial/business park for research and development, medical technology, manufacturing, distribution, and corporate headquarters office facilities. The developable portion of the parcel consists of seven major development areas, ranging in size from 11 to 148 acres. The remaining property, which contains the 100-year floodplain of EFPC is protected as a Natural Area and will not be transferred. The conditions of the transfer documents would ensure continued protection of the Natural Area.

The proposed action is the title transfer of Parcel ED-1 exclusive of the Natural Area that contains most of the floodplain. The Natural Area will stay under DOE ownership and control. For purposes of comparison it was determined that if DOE chose not to transfer Parcel ED-1 (i.e., no action) the current lease with CROET would continue.

Although no adverse direct or indirect impacts are expected except for potential minor encroachments into the 100-year floodplain, all future development activities on Parcel ED-1 that could affect the 100-year floodplain would be subject to regulation by USACE, TDEC, and possibly TVA. Proposed projects would be required to follow normal sequencing during regulatory review to avoid and minimize adverse impacts. Compensatory mitigation should be used as a last resort and would be subject to negotiation between USACE, TDEC, and possibly DOE and TVA.

## **6. REFERENCES**

Adamus, P. R., L. T. Stockwell, E. J. Clarain, Jr., M. E. Morrow, L. P. Rozas, and R. D. Smith 1991. *Wetland Evaluation Technique (WET), Volume I: Literature Review and Evaluation Rationale 1991*, Wetlands Research Program Technical Report WRP-DE-2, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS. 287 pp. plus appendices.

- Brinson, Mark M. 1993 *A Hydrogeomorphic Classification of Wetlands*, Wetlands Research Program Technical Report WRP-DE-4, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS. 79 pp. plus appendices.
- COE (U.S. Army Corps of Engineers) 1992a. *An Identification of the East Fork Poplar Creek Floodplain in Anderson and Roane Counties, Tennessee*. Final Report to the U.S. Department of Energy, December.
- COE 1992b. *An Inventory of Wetlands in the East Fork Poplar Creek Floodplain in Anderson and Roane Counties, Tennessee*. Final Report to the U.S. Department of Energy, December.
- DOE (U.S. Department of Energy) 1994. *East Fork Poplar Creek – Sewer Line Beltway Remedial Investigation Report*, DOE/OR/02-1119&D2&V1, Oak Ridge, Tennessee, January.
- DOE 1996. *Environmental Assessment – Lease of Parcel ED-1 of the Oak Ridge Reservation by the East Tennessee Economic Council*, DOE/EA-1113, Oak Ridge, Tennessee, April.
- DOE 2002. *Draft Environmental Assessment Addendum for the Proposed Transfer of Parcel ED-1 to the Community Reuse Organization of East Tennessee*, DOE/EA-1113-A. Prepared for DOE by Science Applications International Corporation, Oak Ridge, Tennessee, May.
- Environmental Laboratory 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, Department of the Army.
- FEMA (Federal Emergency Management Agency) 1984. *Flood Insurance Study for the City of Oak Ridge, Tennessee, Anderson and Roane Counties*. Community Panel No. 475441. National Flood Insurance Program, November.
- FEMA 1985. *Flood Insurance Rate Maps, City of Oak Ridge, Tennessee, Anderson and Roane Counties*. Community Panel Numbers 475441 0010 D, 475441 0015, 475441 0015 D, and 475441 0030 D, May.
- TVA (Tennessee Valley Authority) 1991. *Flood Analysis for Department of Energy Y-12, ORNL, and K-25 Plants*, December.
- U.S. Congress 1933, as amended.