

DOE/EA-1113-A2

Environmental Assessment Addendum

**Proposed Revitalization of Parcel ED-1
at the Horizon Center,
Oak Ridge, Tennessee**



This document is approved for public
release per review by:

Peter Kortman

5/27/2020

UCOR Classification &
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Date

**LEIDOS, Inc. [formerly part of SCIENCE APPLICATIONS
INTERNATIONAL CORPORATION (SAIC)]**

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

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 *Code of Federal Regulations* [CFR] Parts 1500 to 1508), and the U.S. Department of Energy (DOE) NEPA Implementing Procedures (10 CFR 1021). DOE implementing procedures for NEPA provide an opportunity for public input on DOE decision-making, allow the public to offer inputs on alternative ways for the DOE to accomplish what it is proposing, and solicit comments on the DOE's analysis of environmental effects.

Public commenting allows the DOE to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting digital copies of the Final EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the document.

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Finding of No Significant Impact Proposed Revitalization of Parcel ED-1

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The U.S. Department of Energy (DOE) has completed an Environmental Assessment (EA) Addendum (DOE/EA-1113-A2) for a proposal to increase the allowable land uses in the Horizon Center (Parcel ED-1) and to increase connectivity between Development Areas (DAs). In response to previous requests from developers as well as increased business opportunities for the region, the DOE proposes increasing land uses to include hotels, a recreational vehicle (RV) park, a motorsports park, a vehicle test facility, residential development, and an amphitheater. Additionally, the DOE proposes creating more connectivity between DAs 5, 6, and 7, which would require reducing the restrictions for the Natural Areas (NAs) that separate them. This would allow full development potential of the Horizon Center and create a semi-contiguous, large tract of developable land greater than 300 acres. The purpose of the proposal is to support continued economic development in the region by utilizing Parcel ED-1. Parcel ED-1 (957 acres) was previously parsed into seven major developable areas, ranging in size from 11 to 148 acres, with a total developable acreage of 489 acres. The DOE maintains ownership and control of the remainder of the area (approximately 468 acres), which is referred to as the NA. The developable acreage was leased to Horizon Center LLC in 2003 for development as an industrial/business park for research and development, medical technology, manufacturing, distribution, and corporate office facilities. A FONSI, as well as a Mitigation Action Plan (MAP), was issued in April 2003 indicating that there were no significant impacts associated with those activities provided mitigations were implemented. Since issuance of the previous FONSI and the subsequent lease agreement, the developable acreage of Parcel ED-1 has been underutilized (only two of seven developable areas are currently used) due to a lack of interest from business enterprises.

The proposed development's primary purpose is to finally utilize Parcel ED-1 to its full potential and further economic development in the area. Realigning the developable area and allowable land uses would make the property more attractive to business prospects and provide needed opportunity to help offset economic losses resulting from past DOE downsizing, facility closures, and workforce restructuring, which was the intent of the original lease agreement between DOE and Horizon Center LLC.

Based on the results of analysis reported in the EA Addendum and implementation of continued monitoring and mitigation measures as described in the current MAP and this FONSI, DOE has determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an Environmental Impact Statement (EIS) is not necessary, and DOE is issuing this FONSI. DOE will continue implementation of the MAP for the original leasing activity identified in the 2003 FONSI, which includes monitoring and mitigation activities, as well as associated annual reporting.

PUBLIC AVAILABILITY: The EA Addendum, FONSI, and other relevant documentation may be viewed at <https://doeic.science.energy.gov/default.html>.

FURTHER INFORMATION ON THE NEPA PROCESS: For further information on the NEPA process, contact:

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DESCRIPTION OF PROPOSED ACTION: The DOE proposes to increase the allowable land uses in the Horizon Center (Parcel ED-1) and to modify some of the environmental mitigations implemented under previous NEPA actions. Additionally, the DOE proposes creating more connectivity between DAs 5, 6, and 7 by reducing the restrictions for the NAs that separate them.

ALTERNATIVES: Alternative 1 involves the same activities as described under the proposed action except the NA corridors between DAs 5, 6, and 7 would be removed entirely to provide one contiguous developable parcel. This would involve clearing of approximately 12 acres of NA within DA 5, 23 acres between DAs 5 and 6, and approximately 23 acres between DAs 6 and 7, for a total of approximately 58 acres. Potential development of an additional 58 acres would represent approximately 12% of the total NA of Parcel ED-1. Alternative 1 would allow development of the entire consolidated DAs 5, 6, and 7 parcel (within existing development constraints identified in previous NEPA documentation).

ENVIRONMENTAL IMPACTS: Environmental impacts of the proposed action would essentially be the same as those described previously in the 1996 EA for leasing Parcel ED-1 to the Community Reuse Organization of East Tennessee (CROET) and the subsequent 2003 EA Addendum for title transfer from CROET to Horizon Center LLC. Previous analyses addressed potential direct impacts to resources within developable areas associated with development and operational activities, as well as indirect impacts to resources within the NA. Based on an evaluation of the proposed action against those activities previously approved and analyzed under past NEPA documentation for Parcel ED-1, potential impacts to the following resources have been incorporated by reference and are not specifically addressed in this EA Addendum: Air Quality, Human Health and Safety, Geology and Soils, Cultural Resources, Infrastructure and Support Services, and Waste Management.

Based on substantive differences in this proposed action versus activities addressed previously, analysis in this EA Addendum focuses on the following resources:

Land Use

Overall, potential impacts would remain within the scope of those analyzed under previous NEPA documentation. Allowing mixed use on Parcel ED-1 and/or improving connectivity between DAs 5, 6, and 7 would not result in adverse land use-related impacts. Parcel ED-1 is already zoned for industrial use. Allowing a mixed-use zoning would not result in adverse impacts to surrounding land uses and may prove beneficial from a potential reduction in industrial use over less intrusive types of land uses. A change in zoning for Parcel ED-1 may provide for more development opportunities over the long-term. Under the no action alternative, Parcel ED-1 would continue to be available as an industrial/business park. Maintaining the status quo may continue to limit development interest, as has been the case since 1996.

A segment of the local area greenway temporary easement (approximately 4,627 linear ft, or 5.6%, of the total local area greenway [approximately 81,989 linear ft]) would either be removed or incorporated into site design. The overall impact would be negligible, given availability of other greenway space in the area and compensatory recreational opportunities provided as part of development (e.g., walking and bike trails). In the long-term, development of Parcel ED-1 would eventually provide a benefit to the surrounding recreation network if new development includes additional recreational opportunities, and new construction of public parking would improve access (e.g., park and go) to the trails.

Noise

Overall, the largest potential noise contributor would be the proposed operation of a motorsports park. However, noise levels are not expected to conflict with surrounding land uses. Based on other existing motorsports parks, cars are typically muffled to limit noise between 86 A-weighted decibels (dBA) and 103 dBA at a 50-ft distance from the racetrack. Noise modeling analyses conducted for this EA assumed the same for any proposed motorsports park. Modeling under these noise limitations for three different

types of notional cars under two different scenarios (single events and racing events) shows that while noise levels in the immediate area of the racetrack would be loud, noise levels outside of Parcel ED-1 would decrease at distance, with local topography and land cover contributing to noise attenuation. Persons within Parcel ED-1 would be considered “participants,” would be expected to acknowledge racing activity results in loud noise, and would take necessary precautions. Average background noise levels at nearby residential areas would be expected to be between 45 and 50 dBA. The highest noise level anticipated, based on modeling results, would be under 50 dBA for a 103 dBA noise level restriction 50 ft from the racetrack. While noise from racing events may be noticeable for nearby residential areas, the noise would not be expected to interfere with daily activities. Noise level restrictions and limiting operational hours to daytime would serve to minimize potential annoyance.

Water Resources

Overall, impacts associated with development activities (e.g., ground disturbance) would be within the scope of those identified in previous NEPA documentation. Surface water resources on and near DAs 5, 6, and 7 could be affected by the alteration of local hydrology, soil erosion, runoff, and sedimentation during construction activities, and contaminated stormwater runoff from operations. Prior to construction, an Erosion and Stormwater Management Plan (per guidance from the City of Oak Ridge’s Zoning Ordinance) for the proposed action would be required.

Measures implemented to reduce the degradation of surface water quality from operations would be required and must follow the MAP and the City of Oak Ridge’s Zoning Ordinance. Such measures would include required mitigations already outlined in the 1996 EA, such as: contouring paved areas to direct runoff into man-made catchment basins; preserving and planting new natural vegetation areas to impede stormwater flow and increase infiltration; implementing buffer zones of at least 30 m (100 ft) on each side of streams; and restoration of any stream banks, stream sides, and riparian zones.

There are several sinkholes within Parcel ED-1 that must be considered for avoidance during development planning and design. Stormwater management systems must also consider minimizing directed runoff to sinkhole areas.

Floodplains/Wetlands

Overall, impacts associated with development activities (e.g., bridging or placing culverts in creeks) would be within the scope of those identified in previous NEPA documentation. No impacts to wetlands would occur and no direct impacts to floodplains are anticipated. All construction would comply with applicable federal, state, and local floodplain regulations. Wetland and floodplain delineations would occur prior to construction and Clean Water Act of 1972 (CWA), Sect. 404 permits would be required should wetlands or other waters of the U.S. be identified.

Terrestrial Ecology

Temporary and permanent impacts to vegetation and wildlife habitats would occur from activities associated with development and land clearing. The removal of vegetation such as mixed pine-hardwood forests, second-growth loblolly pine forests, tall fescue, and sensitive beech-maple forests within the NAs would result in permanent habitat loss and could potentially increase fragmentation by reducing habitat connectivity. Sensitive vegetation communities within the proposed action area include beech-maple forest, limestone barrens, and two walnut plantations. Direct impacts to these communities would occur should these areas be disturbed, degradation, or cleared. Where practicable, the proponent would avoid these areas entirely from development to minimize potential adverse impacts to these sensitive communities.

There are no U.S. Fish and Wildlife Service (USFWS) federally listed species or designated critical habitats within the proposed action area. State-listed sensitive species are present within the action area. Additional

species-specific surveys would need to occur prior to land-clearing activities to adequately determine the severity of effects to rare plants (goldenseal and pink ladies-slipper), sharp-shinned hawk (nesting locations), southeastern shrew, and Tennessee dace (aquatic habitats). Under the proposed action, the proponent would continue to coordinate with the various natural resource agencies (including the USFWS, Tennessee Department of Environment and Conservation [TDEC], and the Tennessee Wildlife Resources Agency) that manage the Parcel ED-1 site.

Seasonal development constraints would be required to mitigate potential impacts to migratory birds. Although the NA potentially cleared and developed under Alternative 1 would be larger than under the proposed action (up to 58 acres vs. up to 13 acres, respectively), impacts to water resources, terrestrial ecology, and wetlands/floodplains, and associated mitigation requirements to minimize impacts, would be the same.

MONITORING AND MITIGATION: Monitoring and mitigation associated with development of Parcel ED-1 has been occurring since 1996, with monitoring concluding in 2013 with issuance of the MAP. Continuous monitoring at the site has indicated that development and use of the parcel has had minimal impact to the site, although use has been limited. Mitigations established by the previous NEPA documents (the 1996 and 2003 FONSI) are still applicable and would remain in place with the following adjustments:

Changes to existing Exclusion Area mitigations under the proposed action

Existing Exclusion Area mitigation	Proposed modification
1. a) No disturbance of bottomland hardwood habitat associated with EFPC and its tributaries both in and out of the 100-year floodplain. b) Buffer zones of at least 30 m (100 ft) on each side of streams.	No change.
2. a) Wetland boundary delineations prior to development. Appropriate environmental documentation and permitting for any road, bridge, or other construction proposed in floodplains or wetlands. b) Restoration of any stream banks, stream sides, and riparian zones. c) Use of native plant species for restoration/revegetation.	No change.
3. a) Preservation/protection of upland hardwood habitat and features of special value for wildlife. b) Clearing of other upland hardwoods only during October – April.	3. a) This mitigation is adjusted to apply in full to those areas outside of the corridors between DAs 5, 6, and 7, and would be applied to the extent practicable within the corridors and DA 5. b) No change.
4. a) NA 47 excluded from development. b) Continuity of NAs. c) Easternmost area of ED-1 to remain undeveloped. d) Natural corridor system (minimum of 61 m/200 ft wide) to connect bottomland habitat to upland habitat. e) Methods to maintain corridors across roadways.	4. a) No change. b) This mitigation is adjusted to apply in full to those areas outside of the corridors between DAs 5, 6, and 7. c) No change. d) This mitigation is removed to allow for connectivity between DAs 5, 6, and 7. e) No change.
5. Roads and utility extensions shall not cross NAs 46 and 47.	This mitigation is revised to exclude only NA 47 (DA 4).

Changes to existing Exclusion Area mitigations under the proposed action (cont.)

Existing Exclusion Area mitigation	Proposed modification
6. Land temporarily disturbed will be restored to original contour, soil content, and native vegetation.	No change.
7. Consult with DOE prior to construction for landscape planning and vegetation management.	No change.
8. Maintain continuing dialogue during development to ensure compliance.	No change.

DA = Development Area.
 DOE = U.S. Department of Energy.
 EFPC = East Fork Poplar Creek.
 ft = feet.
 NA = Natural Area.

FLOODPLAIN STATEMENT OF FINDINGS: This is a Floodplain Statement of Findings prepared in accordance with 10 *Code of Federal Regulations (CFR)* Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements. Previous Floodplain Statement of Findings issued under the previous 1996 and 2003 NEPA documents remain applicable, and no new or additional impacts outside the scope of those previously analyzed have been identified in this EA Addendum. Parcel ED-1 contains approximately 287 acres of the 100-year floodplain of East Fork Poplar Creek (EFPC). The portion of the EFPC floodplain within Parcel ED-1 is outside the limits of the existing City of Oak Ridge Flood Insurance Rate Maps. Limited encroachment into the 100-year floodplain, which was covered under a U.S. Army Corps of Engineers (USACE) Nationwide Permit (33 *CFR* 330), has already occurred during past construction activities associated with previous development of Parcel ED-1. Continued development on Parcel ED-1 will conform to all applicable floodplain protection standards including regulation by the USACE, TDEC, and, if required, the Tennessee Valley Authority.

DETERMINATION: Based on the findings of this EA Addendum, after careful consideration of all public and agency comments, and implementation of mitigation requirements described in this FONSI and the MAP (as amended by this FONSI), DOE has determined that the proposed mitigation modification and adjusting of allowable land uses at Parcel ED-1 does not constitute a major federal action that would significantly affect the quality of the human environment within the context of NEPA. Therefore, preparation of an EIS is not required.

Issued at Oak Ridge, Tennessee, this ____ day of Month 2020.

_____, Manager
 U.S. Department of Energy
 Oak Ridge Office of Environmental Management

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Environmental Assessment Addendum

**Proposed Revitalization of Parcel ED-1
at the Heritage Center,
Oak Ridge, Tennessee**

Date Issued—August 2020

Prepared by
Leidos
Oak Ridge, Tennessee
under subcontract BA-16-024689
under work release 0004

Prepared for the
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Oak Ridge, Tennessee

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ACRONYMS

a.m.	<i>ante meridiem</i> (before midday)
AAM	Advanced Acoustic Model
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BMP	best management practice
CEQ	Council on Environmental Quality
<i>CFR</i>	<i>Code of Federal Regulations</i>
CROET	Community Reuse Organization of East Tennessee
CWA	Clean Water Act of 1972
DA	Development Area
dB	decibel
dBA	A-weighted decibel
DOE	U.S. Department of Energy
EA	Environmental Assessment
EFPC	East Fork Poplar Creek
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
F3	Formula 3
FA	Formula Americas
FIA	Federation Internationale de L'Automobile
FONSI	Finding of No Significant Impact
ft	feet
G	Greenbelt District
GT	GT Motorsports
Hz	hertz
IDB	Industrial Development Board
IND2	Industrial District
IPaC	Information for Planning and Consultation
$L_{Aeq,dur}$	A-weighted equivalent continuous sound level
L_{Amax}	maximum A-weighted sound level
$L_{eq,dur}$	decibel average of the sound level over a specified duration
L_{max}	highest sound level measured during a noise event
L_{NN}	sound level exceeded by NN% of the time for a given period
MAP	Mitigation Action Plan
MBTA	Migratory Bird Treaty Act of 1918
NA	Natural Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
p.m.	<i>post meridiem</i> (past midday)
POC	point of contact
POL	petroleum, oil, and lubricant
ROI	region of interest
RPM	revolutions per minute

ACRONYMS (cont.)

RV	recreational vehicle
S4	apparently secure
SCDA	Sports Car Driving Association
SR	State Route
TDEC	Tennessee Department of Environment and Conservation
TPGF	Tennessee Parks and Greenways Foundation
TWRA	Tennessee Wildlife Resources Agency
U.S.	United States
<i>U.S.C.</i>	<i>United States Code</i>
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1. INTRODUCTION

1.1 PURPOSE AND NEED FOR ACTION

The proposed action in this Environmental Assessment (EA) is for the U.S. Department of Energy (DOE) to increase the allowable land uses in the Horizon Center [located approximately 3 miles west of the city of Oak Ridge, Tennessee (Fig. 1.1)] and to create more connectivity between Development Areas (DAs) 5, 6, and 7, which would require reducing the restrictions for the Natural Areas (NAs) that separate them.

The purpose of the proposed action is to enhance the potential for development by providing a single large parcel and expanding allowable land use to provide a greater diversity of development opportunities. In its 20-year history, Horizon Center (Parcel ED-1) has experienced limited development and remains largely vacant. Currently, the Horizon Center is comprised of several, non-contiguous DAs subject to restrictive land use constraints. Several potential prospects have chosen other sites due to current land use constraints, limited electrical capacity, and developable area parcel size. Specifically, many potential developers are looking for larger parcels of 200 or more acres. The three largest development areas (DA 5, DA 6, and DA 7) have the potential to become a single parcel of more than 300 acres if the proposed land use changes are implemented. The proposed action would greatly enhance the potential for development by providing a single large parcel. Additionally, the adjusting allowable land uses would provide a greater diversity of development opportunities.

The proposed action is needed to increase the development potential of the Horizon Center in response to recent development proposals and to further economic growth in the area, as was the intent of the original lease of the property. As a result, in response to feedback received from the Industrial Development Board (IDB) and City of Oak Ridge, DOE is evaluating expanding allowable land uses and reducing some land use constraints.

1.2 BACKGROUND

Detailed background information regarding the history of Parcel ED-1, from original lease of the total 957-acre parcel in 1996 to the Community Reuse Organization of East Tennessee (CROET) and subsequent title transfer to Horizon Center LLC, can be found in Sect. 1.2 of the 2003 EA Addendum (DOE/EA-1113-A); additional detail on activities associated with Parcel ED-1 from 2003 until 2012 can be found in Chapter 2 of the *Implementation of Mitigations Action plan for Parcel ED-1 on the Oak Ridge Reservation, Oak Ridge Tennessee* (DOE/OR/01-2585). In summary, as part of a property leasing action evaluated in an EA in 1996, Parcel ED-1 (957 acres) was parsed into seven major developable areas, ranging in size from 11 to 148 acres, with a total developable acreage of 489 acres. The DOE maintains ownership and control of the remainder of the area (approximately 468 acres), which is referred to as the NA (Fig. 1.2). The lease title for the developable acreage was then transferred to Horizon Center LLC in 2003 for development as an industrial/business park for research and development, medical technology, manufacturing, distribution, and corporate office facilities.

A Finding of No Significant Impact (FONSI), as well as a Mitigation Action Plan (MAP), was issued in April 2003 indicating that there were no significant impacts associated with those activities provided mitigations were implemented. Since issuance of the previous FONSI and the subsequent lease title transfer, the developable acreage of Parcel ED-1 has been underutilized (only two of seven developable areas are currently used) due to a lack of interest from business enterprises. Currently, the DAs associated with Parcel ED-1 are as follows:

- DA 1: 11 Acres/Unoccupied,
- DA 2: 30 Acres/Unoccupied,
- DA 3: 42 Acres/Partially Occupied,
- DA 4: 35 Acres/Transferred to the Tennessee Parks and Greenways Foundation (TPGF),
- DA 5: 90 Acres/Unoccupied,
- DA 6: 148 Acres/Partially Occupied, and
- DA 7: 70 Acres/Unoccupied.

Horizon LLC has maintained the unoccupied areas of the DAs in a semi-improved state (i.e., cleared and controlled vegetation) since title transfer. The proposed expansion of allowable land uses is expected to increase development and utilization of Parcel ED-1; a recent request by IDB provides the best opportunity in 20 years to fully utilize Parcel ED-1 to further economic growth as originally intended.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ADDENDUM

DOE has prepared this EA Addendum to assess the potential consequences (impacts) of the proposed action on the human environment in accordance with the Council on Environmental Quality (CEQ) regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508) implementing the National Environmental Policy Act of 1969 (NEPA) and the DOE NEPA Implementing Procedures (10 *CFR* 1021). If the impacts associated with the proposed action are not identified as significant, as a result of this EA Addendum, DOE may issue a FONSI and proceed with the action. If impacts are identified as potentially significant, an Environmental Impact Statement (EIS) may be prepared.

For this EA Addendum, the proposed action is the proposed development of Parcel ED-1. Because the proposal is to support economic growth in the Oak Ridge, Tennessee, area, the reasonably anticipated use of the land is for economic development. NEPA requires analysis of reasonably foreseeable actions in addition to the proposed action. The impact analysis conducted within the EA is a “bounding analysis” in that it represents a reasonable upper end of operational activity and is intended to determine whether the reasonably foreseeable future use would have significant environmental impacts. Thus, DOE is analyzing the potential environmental impacts associated with proposed development of Parcel ED-1 to determine if the proposal is appropriate for a FONSI or if the preparation of an EIS is warranted.

This EA Addendum (1) describes the existing environment; (2) analyzes potential environmental impacts that could result from the proposed action and alternatives; and (3) identifies and characterizes cumulative impacts that could result from proposed development and use in relation to other ongoing or proposed activities within the surrounding area. Certain aspects of the proposed action have a greater potential for creating adverse environmental impacts than others. For this reason, CEQ regulations (40 *CFR* 1502.1 and 1502.2) recommend a “sliding-scale” approach so that those actions with greater potential effect can be discussed in greater detail in NEPA documents than those that have little potential for impact.

Because a significant amount of environmental documentation is available associated with establishing the affected environment and analyses of potential impacts, these documents and associated information therein are incorporated by reference where appropriate. Documents directly related to the affected environment and analysis of the proposed action are listed in Table 1.1.

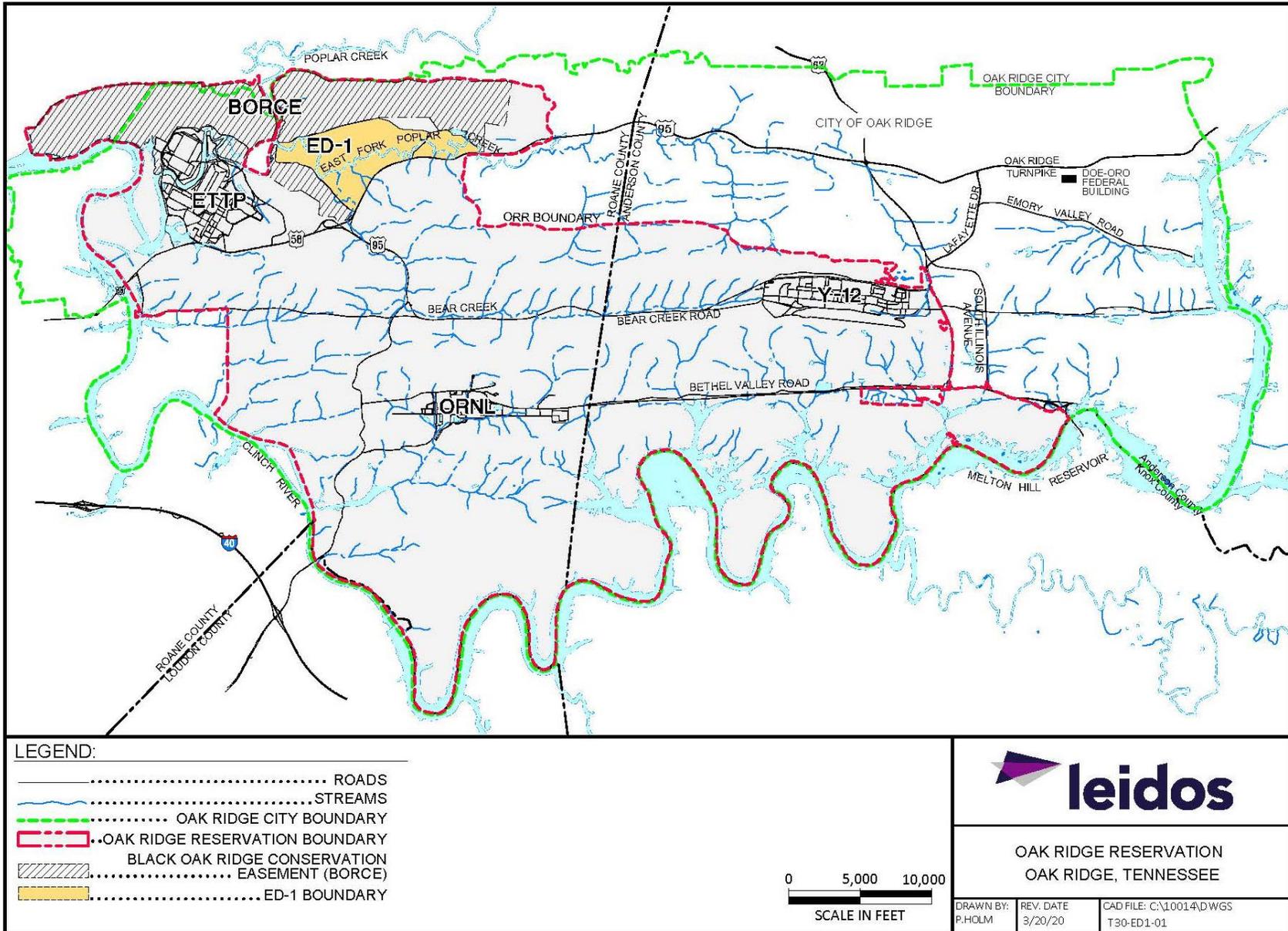


Fig. 1.1. Location of Parcel ED-1.

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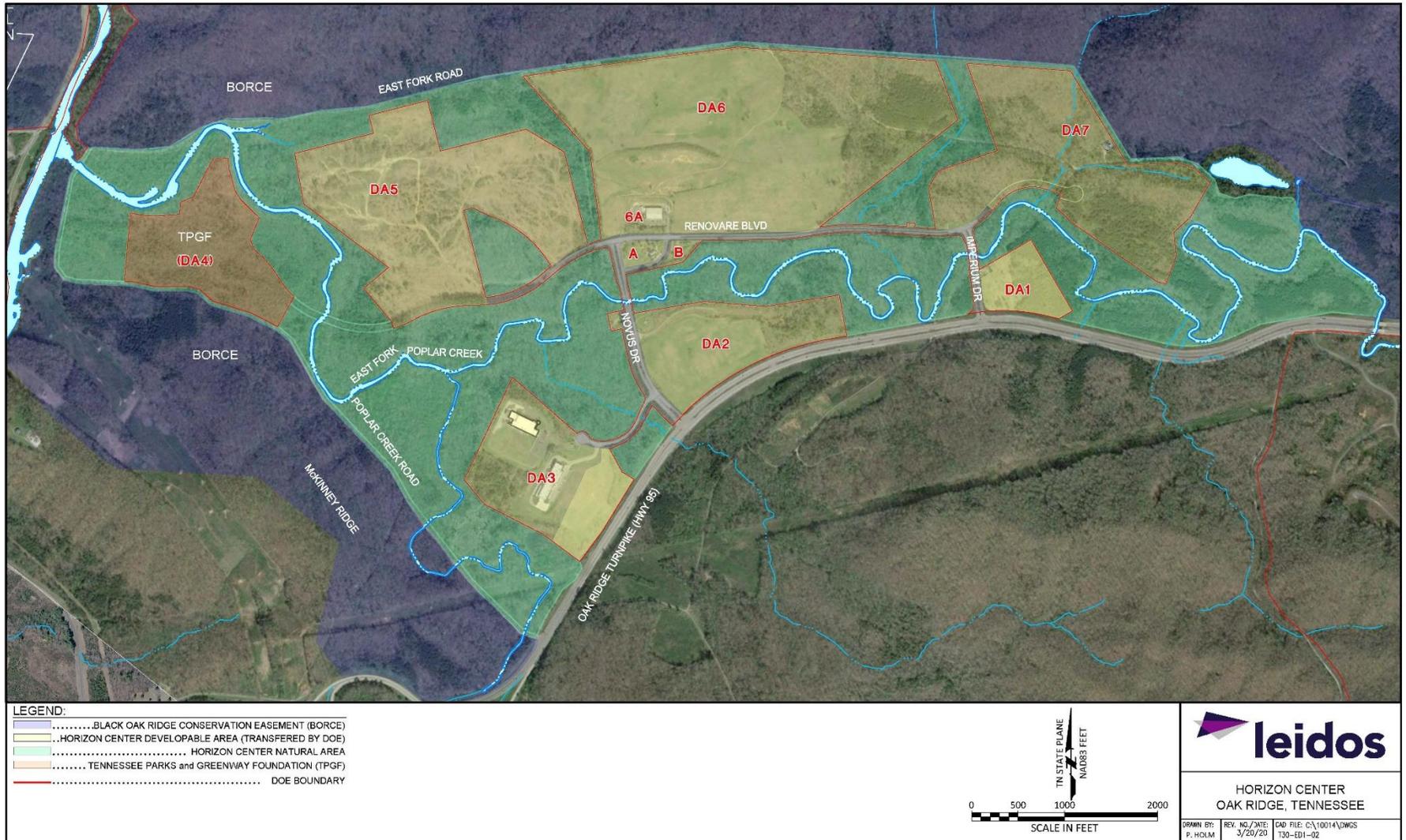


Fig. 1.2. Parcel ED-1 Details.

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Table 1.1. Relevant past environmental documents

Title	Date published	Relevance
<i>Environmental Assessment – Lease of Parcel ED-1 of the Oak Ridge Reservation by the East Tennessee Economic Council (DOE/EA-1113)</i>	April 1996	EA for original Parcel ED-1 lease agreement. Establishes baseline affected environment and provides analysis of activities associated with development as an industrial park within developable areas. Identifies mitigations required for development activities to avoid and/or minimize potential environmental impacts.
<i>Mitigation Action Plan – Lease of Parcel ED-1 of the Oak Ridge Reservation by the East Tennessee Economic Council (MAP), DOE/EA-1113</i>	April 1996	Prescribed measures to be implemented to mitigate potentially significant adverse impacts from industrial development on Parcel ED-1. Specified that mitigation would be accomplished by: (1) excluding areas on Parcel ED-1 from disturbance and development, and (2) conducting surveys and monitoring of industrial DAs prior to disturbance (predevelopment) and during industrial operations (post-development).
<i>Environmental Assessment Addendum for the Proposed Title Transfer of Parcel ED-1 (DOE/EA-1113-A)</i>	April 2003	Addendum to 1996 EA – addresses transfer of lease title to Horizon Center LLC. As a continuation of analysis of activities conducted in the 1996 EA, the Addendum provided updated affected environment information and addressed potential impacts from continued build-out/development of Parcel ED-1.
<i>Mitigation Action Plan for the Protection of the Natural Area on Parcel ED-1</i>	April 2003	The revised 2003 MAP covers the transfer of Parcel ED-1 to CROET and specifies monitoring of birds, benthic invertebrates, and fish to evaluate changes from the predevelopment conditions, potentially associated with development of the site as an industrial park.
<i>Summary Report – Monitoring and Ecological Data (1996 – 2011) for Parcel ED-1 at Horizon Center, Oak Ridge, Tennessee</i>	2013	Provides summaries of the monitoring data for birds, benthic macroinvertebrates, fish, and stream habitat characteristics collected during sampling conducted from 1996 – 2011 at Parcel ED-1. Compare the monitoring data for the bird, benthic macroinvertebrate, and fish data from the pre- versus post-development years at different locations.
<i>Implementation of Mitigation Action Plan for Parcel ED-1 on the Oak Ridge Reservation, Oak Ridge, Tennessee (DOE/OR/01-2585)</i>	May 2013	Assessed the effectiveness of mitigations identified in the 1996 MAP and 2003 MAP; analyzed and summarized ecological data collected during the time frame between 1996 and 2012; determined if mitigation goals were being met based on the ecological data evaluation; reported and evaluated the results of ecological monitoring conducted in 2012; made recommendations regarding the appropriate path forward for stewardship of the NA and the need for future ecological monitoring at Parcel ED-1.

CROET = Community Reuse Organization of East Tennessee.
 DOE = U.S. Department of Energy.
 EA = environmental assessment.
 MAP = Mitigation Action Plan.
 NA = Natural Area.

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2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The DOE proposes to increase the allowable land uses in the Horizon Center and to modify some of the environmental mitigations previously implemented. Specifically, the DOE proposes creating more connectivity between DAs 5, 6, and 7 by reducing the restrictions for the NAs that separate them and adjusting allowable land uses in DAs 1 through 3 and DAs 5 through 7 to provide for more diverse business opportunities. This would allow full development potential of the Horizon Center and create a semi-contiguous large tract of greater than 300 acres. Aspects of the proposed action are shown in Fig. 2.1.

2.1.1 Mitigation Modification

Under the proposed Action, the DOE proposes to increase connectivity between the DAs, which necessitates modification of existing Exclusion Area mitigations, as established by the FONSI signed in 1996 and reaffirmed in the 2003 FONSI, to provide the ability to implement other elements of the proposed action. The following Table 2.1 lists the existing Exclusion Area mitigations and the proposed changes under the proposed action.

Table 2.1. Changes to existing Exclusion Area mitigations under the proposed action

Existing Exclusion Area mitigation	Proposed modification
1. a) No disturbance of bottomland hardwood habitat associated with EFPC and its tributaries both in and out of the 100-year floodplain. b) Buffer zones of at least 30 m (100 ft) on each side of streams.	No change.
2. a) Wetland boundary delineations prior to development. Appropriate environmental documentation and permitting for any road, bridge, or other construction proposed in floodplains or wetlands. b) Restoration of any stream banks, stream sides, and riparian zones. c) Use of native plant species for restoration/revegetation.	No change.
3. a) Preservation/protection of upland hardwood habitat and features of special value for wildlife. b) Clearing of other upland hardwoods only during October – April.	3. a) Yes – This proposed change is reflected in proposed connectivity of DAs 5, 6, and 7 as described in Sect. 2.1.2. b) No change.
4. a) NA 47 excluded from development. b) Continuity of NAs. c) Easternmost area of ED-1 to remain undeveloped. d) Natural corridor system (minimum of 61 m/200 ft wide) to connect bottomland habitat to upland habitat. e) Methods to maintain corridors across roadways.	4. a) No change. b) Yes – This proposed change is reflected in proposed connectivity of DAs 5, 6, and 7 as described in Sect. 2.1.2. c) No change. d) Yes – This proposed change is reflected in proposed connectivity of DAs 5, 6, and 7 as described in Sect. 2.1.2. e) No change.

Table 2.1. Changes to existing Exclusion Area mitigations under proposed action (cont.)

Existing Exclusion Area mitigation		Proposed modification
5.	Roads and utility extensions shall not cross NAs 46 and 47.	Yes – This proposed change is reflected in proposed connectivity of DAs 5, 6, and 7 as described in Sect. 2.1.2.
6.	Land temporarily disturbed will be restored to original contour, soil content, and native vegetation.	No change.
7.	Consult with DOE prior to construction for landscape planning and vegetation management.	No change.
8.	Maintain continuing dialogue during development to ensure compliance.	No change.

DA = Development Area.
 DOE = U.S. Department of Energy.
 EFPC = East Fork Poplar Creek.
 NA = Natural Area.

2.1.2 Development Area Connectivity

In addition to allowing development of the 12-acre natural area within DA 5, the DOE proposes to provide connectivity between DAs 5, 6, and 7 to allow for one semi-contiguous parcel of more than 300 acres through modification of the mitigations as identified in Table 2.1. This would provide more attractive opportunities for business development based on the needs identified through inputs from the Oak Ridge IDB. Specifically, the DOE proposes to provide for limited connectivity among DAs 5, 6, and 7 by fencing off the northern boundaries of the existing NA corridors between these DAs and allowing roadway development between the DAs (Fig. 2.1). The NA within DA 5 and the NA corridors represent approximately 12% of the total NA present on Parcel ED-1 (approximately 58 of 503 acres – the 35 acres of DA 4, which is deeded to the TPGF and prohibits development, is included as NA for purposes of analysis within the context of this document). Roadways would be developed in compliance with the mitigations identified in Table 2.1, to include the requirements for wetland and floodplain delineations, bridges and overpasses where practicable, and habitat restoration for disturbed areas. The extent of ground disturbance of these NA corridors would be limited to the linear area required for roadway development and associated easements, to include fencing to protect both wildlife and drivers from collisions. The remainder of the corridors would remain relatively undisturbed. A standard two-lane roadway with easement is up to approximately 25 ft wide. Were two roadways to cross each corridor, the estimated upper bound of land disturbance, based on the maximum width of each corridor, would be as shown in Table 2.2.

Table 2.2. Estimated NA land disturbance from DA connectivity

Road w/easement width	DA 5 – DA 6 maximum width (i.e., road length in ft)	DA 6 – DA 7 maximum width (i.e., road length in ft)	Square ft of road (acres)	Total estimated acres of NA disturbance	Total ED-1 NA ^a (% disturbance of total)
Road 1 = 25 ft	~1,170		~29,250	~13.32	~503 (~3%)
Road 2 = 25 ft			(~0.67)		
Road 3 = 25 ft	~1,130		~28,250		
Road 4 = 25 ft			(~0.65)		
DA 5 NA			Entire NA (~12)		

^a Includes 35 acres of DA 4, deeded to TPGF; prohibits development – this area is considered NA for purposes of analysis.
 DA = Development Area. ft = feet. NA = Natural Area. TPGF = Tennessee Parks and Greenways Foundation.

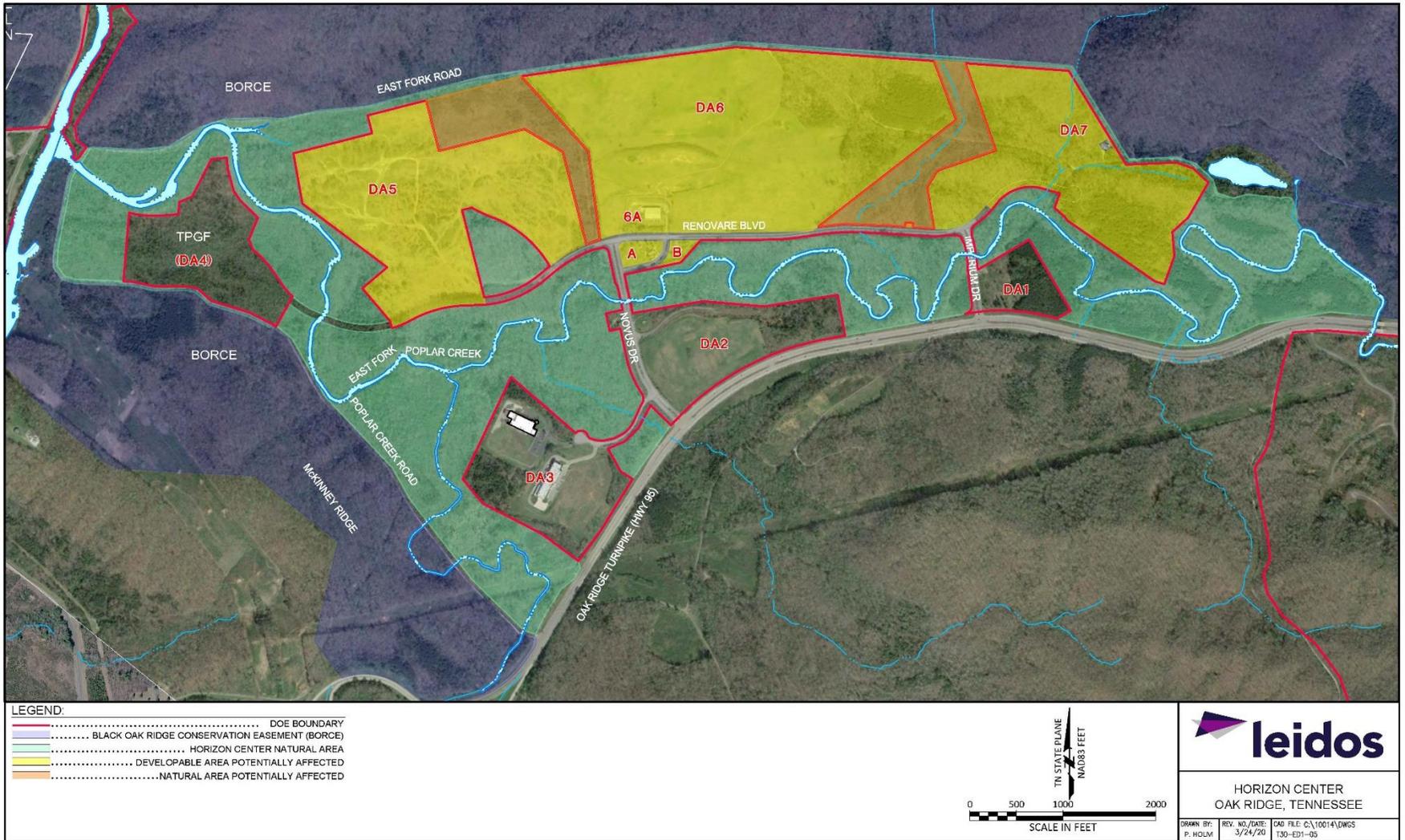


Fig. 2.1. Areas potentially affected under proposed action.

2.1.3 Adjustment of Allowable Land Uses

Currently, the deed restrictions in Horizon Center LLC allows for utilization of Horizon Center as an industrial/business park. In response to previous requests from developers, as well as increased business opportunities for the region, the DOE proposes increasing land uses within all DAs, except DA 4, to include commercial, residential, and recreational activities. These activities may include such items as hotels, a recreational vehicle (RV) park, a motorsports park, a vehicle test facility, residential development, and an amphitheater. These additional land uses are needed to increase the development potential of the Horizon Center in response to recent development proposals.

Proposed development activities are either in proposal/fact finding stages or preliminary planning stages; as such, specific details that would support quantifiable analyses (e.g., facility layouts and diagrams, etc.) are not available at this time. As a result, general assumptions regarding these types of development activities, based on information available regarding available proposals and other similar activities/facilities located elsewhere, have been made to provide a programmatic analysis to determine potential environmental consequences in Chap. 3.

Commercial

Proposed commercial land uses within DAs 1 through 3 and 5 through 7 could include restaurants, shops, and meeting and conference space.

Residential

Residential land uses within DAs 1 through 3 and 5 through 7 could include homes and/or townhomes, as well as overnight lodging (i.e., hotels).

Recreation/Public Facilities

Recreational land uses and public facilities within DAs 1 through 3 and 5 through 7 may include an RV park, go-karting track, paddock club, club house, and public facilities that would include walking trails and outdoor meeting spaces. Other specific components that could be permitted under this land use category may include:

Motorsports Park/Vehicle Test Facility

This activity would potentially involve a motor vehicle test track and research facility on DAs 5, 6, and 7, totaling more than 300 acres. Based on preliminary proposals presented to the Oak Ridge IDB, a road course could potentially be developed that is “suitable for FIA (Federation Internationale de L’Automobile) sanctioned events, such as Formula E, Indy Car, International Motor Sports Association, National Auto Sport Association, and other sanctioning bodies.” Development of a motorsports park would involve roadway and facility development throughout DAs 5, 6, and 7, with potential development of the NA within DA 5 (approximately 12 acres) as shown in Fig. 2.1. While current proposals are in the preliminary planning phase, other motorsports parks of similar scope are located throughout the country and serve as an example of what such a development might entail (Fig. 2.2). The following is a general description of a motorsports park.

Motorsports parks typically encompass several miles of track as well as amenities such as garages/car storage, restaurant/dining, a pro shop, lounges, locker rooms and showers, classrooms, fuel services, car wash and detailing, classrooms, and a service center.



Fig. 2.2. Picture of Monticello Motor Club Speedway in Monticello, New York.

Motorsports parks typically implement operational restrictions on drivers to limit noise from park use. Below are examples of operational restrictions at other locations, which would be assumed to be similar in scope to those implemented at Parcel ED-1 were a motorsports park developed. A notional layout of a racetrack on Parcel ED-1 is provided in Fig. 2.3.

Hours of Operation: Standard hours of operation are 9 a.m. to 5 p.m. Engines may idle prior to 9 a.m. and may be driven to the false grid prior to 9 a.m. “Revving” of engines prior to 9 a.m. or after 5 p.m. is expressly prohibited and violators are subject to immediate removal from the park for the day (Atlanta Motorsports Park 2012).

Sound Restrictions:

- Atlanta Motorsports Park (Atlanta Motorsports Park 2012):
 - Large track – 98 dBA “A” weighted 50 ft from track edge under full throttle, near or at full revolutions per minute (RPM).
 - Autocross/Kart track – 92 dBA “A” weighted 50 ft from track edge under full throttle, near or at full RPM.
- Tracks associated with the Sports Car Driving Association [SCDA] (SCDA 2020):
 - Thompson Speedway – Thompson, Connecticut:
 - Cars muffled to 103 dB.
 - Lime Rock Park – Lakeville, Connecticut:
 - Cars muffled to 86 dB.
 - Palmer Motorsports Park – Ware, Massachusetts:
 - Cars muffled to 95 dB.

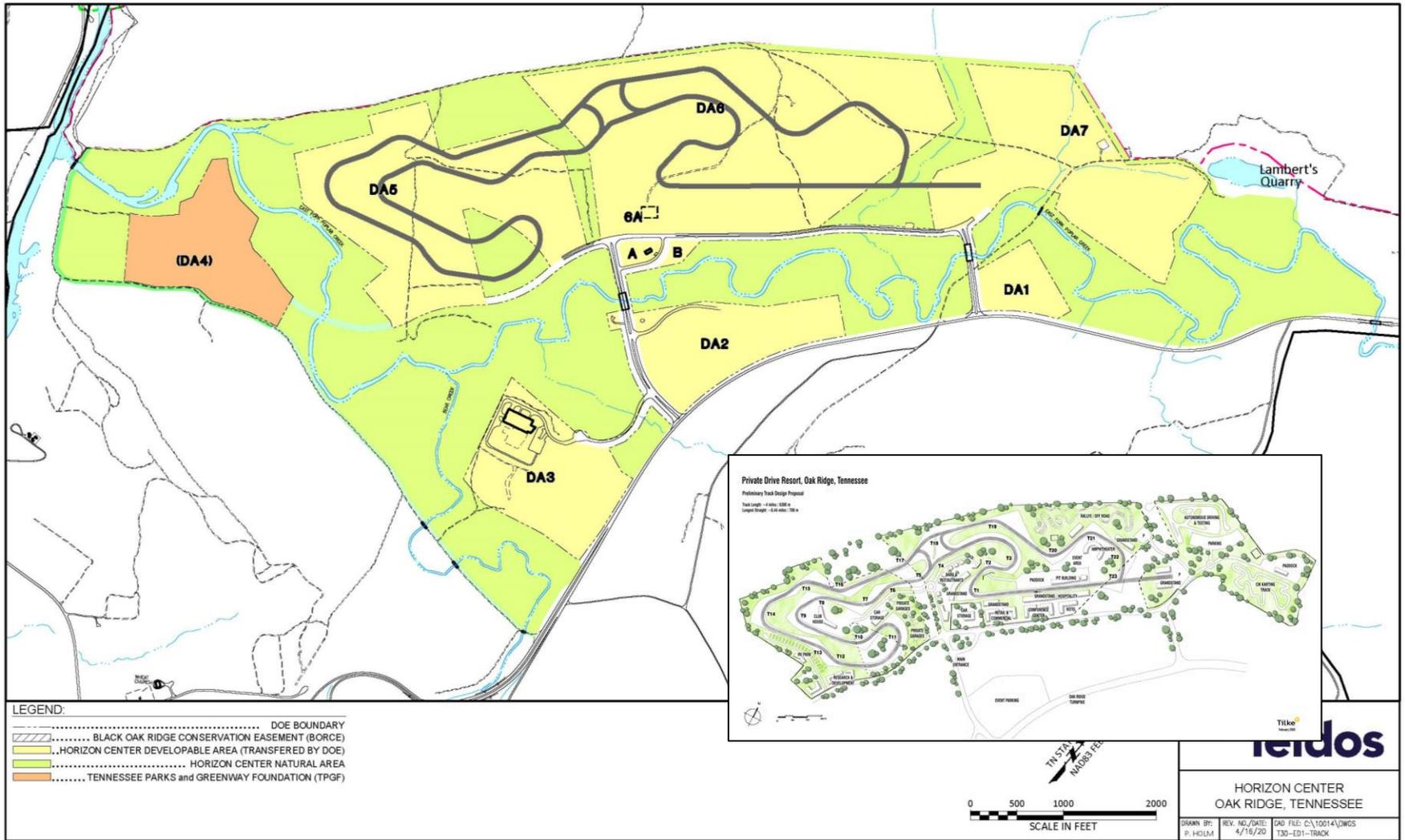


Fig. 2.3. Notional configuration of a potential Motorsports Park racetrack.

Types of Vehicles: The types of cars driven at these types of parks can range from Formula 1-type cars and exotic street cars to high-end go-karts, depending on the desired user experience. Each park has limitations on the type of vehicle that can be utilized and requires that all vehicles be inspected prior to use on the track. For addressing noise impacts, the operational noise restrictions determine the extent of noise produced by the vehicles.

Amphitheater

An amphitheater could be utilized for outdoor concerts/entertainment with a mix of permanent and lawn seating for more than 7,000 people. An example of a similar amphitheater would be the Ascend Amphitheater in Nashville, Tennessee (Fig. 2.4). Operational aspects (e.g., hours of operation, noise limitations, etc.) of an outdoor amphitheater would be dictated by City of Oak Ridge ordinances.

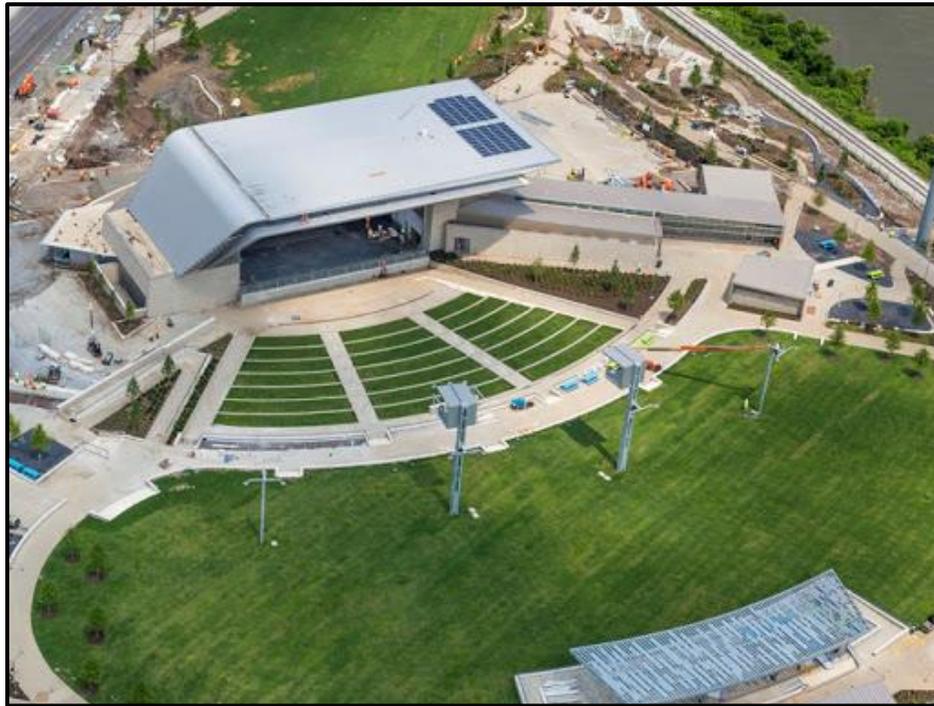


Fig. 2.4. Picture of Ascend Amphitheater in Nashville, Tennessee.

2.2 ALTERNATIVES

Alternative 1 – Alternative 1 involves the same activities as described under the proposed action except the NA corridors between DAs 5, 6, and 7 would be removed entirely to provide one contiguous developable parcel. This would involve clearing of approximately 12 acres of NA within DA 5, 23 acres between DAs 5 and 6, and approximately 23 acres between DAs 6 and 7, for a total of approximately 58 acres. Approximately 503 acres of Parcel ED-1 are considered “Natural Area” within the context of this EA Addendum; the 503 acres include 35 acres of DA 4, which is deeded to the TPGF and prohibits development. Consequently, potential development of 58 acres would represent approximately 12% of the total NA of Parcel ED-1. Alternative 1 would allow development of the entire consolidated DAs 5, 6, and 7 parcel (within the constraints identified in Table 2.1).

2.3 NO ACTION ALTERNATIVE

Under the no action alternative, the proposed mitigation modifications and changes in allowable land use as described under the proposed action would not occur. Parcel ED-1 would continue to be utilized as permitted under the constraints identified under previous NEPA documentation. The no action alternative would not meet the purpose of enhancing the development potential of the Horizon Center by providing a single, large parcel and expanding allowable land use to provide a greater diversity of development opportunities.

2.4 ALTERNATIVES CONSIDERED BUT ELMINATED

As stated previously, the purpose of the proposed action is to enhance the potential for development by providing a single, large parcel and expanding allowable land use to provide a greater diversity of development opportunities. The proposed action is needed to increase the development potential of the Horizon Center in response to recent development proposals and to further economic growth in the area, as was the intent of the original lease of the property.

Given the stated purpose and need, alternatives to the proposed action are limited. In its 20-year history, Horizon Center (Parcel ED-1) has experienced limited development and remains largely vacant due to its segmented nature and restrictive land use constraints. Several potential prospects have chosen other sites due to current land use constraints, limited electrical capacity, and developable area parcel size.

The only other alternative considered was to provide for different allowable land uses for one or two individual parcels. However, this still minimizes the overall attractiveness of the Horizon Center for various types of development, and does not address the issue of a lack of connectivity between parcels or provide for larger DAs. As a result, this alternative was eliminated because it does not fully meet the purpose and need for the proposed action. No other alternatives were considered.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a discussion of the affected environment and potential environmental impacts to the environment associated with implementation of the no action alternative, proposed action, and Alternative 1. Included in this discussion is a description of the analysis approach for this EA Addendum, to include the process for scoping of issues eliminated from detailed analyses and those issues/resource areas carried forward for detailed analysis.

3.1 ANALYSIS APPROACH

NEPA requires focused analysis of the areas and resources potentially affected by an action or alternative. It also provides that a NEPA analysis should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. This EA Addendum focuses on those resources potentially affected by the proposed action as described in Chap. 2.

CEQ regulations for NEPA require a discussion of impacts in proportion to their significance and only enough discussion of other than significant issues to show why more study is not warranted. The analysis in this EA considers the current conditions (i.e., baseline) of the affected environment and compares those to conditions that might occur should the proposed action and alternatives be implemented. Baseline conditions provide a benchmark against which an agency measures the effects of a proposed action. The differences in the conditions between the baseline and the proposed action reflect the magnitude of impacts relative to the various resources analyzed. For the proposed action, establishing a baseline within the affected environment meant consideration of the conditions of each resource within Parcel ED-1 based on the best available information.

To that end, a comparison was conducted between the resource analyses provided in previous NEPA documentation identified in Sect. 1.3 and the proposed action outlined in Chap. 2 to determine the scope of analyses and resources to be assessed in this EA Addendum. Table 3.1 provides a matrix comparing the components of the proposed action, the associated “effectors” (i.e., specific action components that may cause an effect to a particular resource), resources potentially impacted (the “receptor”), and whether the analysis of the effector/receptor relationship falls within the scope of previous analysis.

3.1.1 Resources Analyzed

Based on an evaluation of the proposed action in relation to previous actions analyzed for Parcel ED-1 and the associated DAs and NAs, the following resource areas were carried forward for analysis because proposed action components potentially affecting these resources do not fall within the scope of previous analysis: Noise, Land Use, Terrestrial Ecology, Water Resources, and Floodplains/Wetlands.

3.1.2 Resources not Carried Forward for Detailed Analysis

CEQ regulations [40 *CFR* 1501.7(a)(3)] indicate that the lead agency should identify and eliminate from detailed study the issues that are not relevant or that have been covered by prior environmental review. The discussion of these issues in the NEPA document should be a brief presentation of why the proposed action would not have a significant effect on those resources. The following resource areas have been eliminated from detailed analysis: Soils/Geology; Air Quality; Infrastructure; Socioeconomics/Environmental Justice; Historic and Archaeological Resources; Health and Safety; Hazardous Materials and Waste/Solid Waste Management.

Table 3.1. Proposed action effector/receptor comparison to previous NEPA

Receptor/resource area	Effector	Location	Proposed action within scope of previous analyses	Outcome
Land Use	Natural Area to Industrial Use	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
	Natural Area and/or Industrial Use to Residential, Commercial, and/or Recreational	All DAs NA	No	N/A – to be assessed
Geology and Soils	Land Disturbance	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Noise	Automobile Use (Motorsports Park)	Parcel ED-1	No	N/A – to be assessed
	Amphitheater Use			
Air Quality	Construction/Operations	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Water Resources	Erosion/Stormwater/Consumptive Use	Parcel ED-1	Yes (1996)	FONSI w/MAP
		All DAs	Yes (2003)	
		NA	No	N/A – to be assessed
Floodplains/Wetlands	Land Disturbance/Stormwater	Parcel ED-1	Yes (1996)	FONSI w/MAP
		All DAs	Yes (2003)	
		NA	No	N/A – to be assessed
Terrestrial Ecology	Land Disturbance/Human Presence	Parcel ED-1	Yes (1996)	FONSI w/MAP
		All DAs	Yes (2003)	
		NA	No	N/A – to be assessed
Threatened and Endangered Species	Land Disturbance/Human Presence	Parcel ED-1	Yes (1996)	FONSI w/MAP
		All DAs	Yes (2003)	
Infrastructure	Land Disturbance/Traffic/Consumptive Use	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Socioeconomics/Environmental Justice	Construction/Operations	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Historic and Archaeological Resources	Land Disturbance	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Health and Safety	Construction/Operations	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP
Hazardous Materials & Waste/Solid Waste Management	Construction/Human Presence	Parcel ED-1	Yes (1996/2003)	FONSI w/MAP

DA = Development Area.

FONSI = Finding of No Significant Impact.

MAP = Mitigation Action Plan.

NA = Natural Area.

N/A = Not Applicable.

Geology and Soils: Assessment of impacts to this resource area is based on the amount/area of ground disturbance and the potential for erosion impacts or adverse impacts to soil productivity. Area geology and soils have not changed from baseline conditions presented in the 1996 and 2003 EAs, with development activities having occurred on Parcel ED-1 over the years as described in the 2013 MAP. Regulatory requirements such as compliance with National Pollution Discharge Elimination (NPDES) permitting for land disturbance of more than one acre and associated best management practices (BMPs) for erosion mitigation are still applicable for development activities throughout Parcel ED-1. Additionally, mitigations associated with ground disturbance activities within Parcel ED-1 identified in the previous FONSI are still applicable. Because the affected environment for this resource area and potential impacts associated with development activities (e.g., ground disturbance, erosion, etc.) are within the scope of analysis conducted in previous NEPA documentation, this resource area is not carried forward for more detailed analysis.

Air Quality: Assessment of impacts to air quality are required under the Clean Air Act of 1970. Air quality impacts are assessed by comparing potential air emissions from proposed activities to National Ambient Air Quality Standards (NAAQS) [40 *CFR* part 50] for pollutants considered harmful to public health and the environment. The U.S. Environmental Protection Agency (EPA) has set NAAQS for six principal pollutants, which are called “criteria” air pollutants. The current standards are available at <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. Currently, Roane County is in attainment for all criteria pollutants (EPA 2020). Impacts from development activities would be primarily associated with land disturbance activities. This activity would result in intermittent, short-term impacts to air quality from particulate matter (i.e., dust), and to some extent emissions from equipment use. Effects from these types of emission sources would conclude once development activities cease, and typical dust control BMPs associated with NPDES construction permitting would serve to minimize particulate matter. Potential impacts from vehicle emissions associated with employees of businesses and visitors to the area would be intermittent and would not be associated with quantities that would result in non-attainment of NAAQS. Overall, potential impacts associated with development activities and operations are within the scope of analysis conducted in previous NEPA documentation and this resource area is not carried forward for more detailed analysis.

Infrastructure: Infrastructure includes utility (electricity, potable water, and wastewater; natural gas; etc.) system development and use, as well as transportation infrastructure (roadways) development and use. Impact analysis assesses the potential for degradation or improvement of utility systems, increases or decreases in consumptive use, and whether there would be increased traffic that would negatively affect current transportation systems. Since 1996, there have been significant improvements in Parcel ED-1 infrastructure, as described in the 2013 MAP. Continued development and utilization of infrastructure at Parcel ED-1 under the proposed action and Alternative 1 would be similar in scope to that analyzed in previous NEPA documentation. Design and construction of stormwater systems would be conducted in accordance with state and local requirements for proper management of stormwater. Impacts and associated mitigations/management requirements would be similar to those analyzed previously, with potential benefits associated with minimization of large trucks associated with industrial activities entering/leaving the area. It is also likely that there would be improved traffic management with implementation of traffic control mechanisms such as traffic lights and turn lanes. Consequently, this resource area is not carried forward for more detailed analysis.

Socioeconomics/Environmental Justice: Analysis of socioeconomic impacts assesses potential beneficial or adverse impacts to the social and economic environment surrounding the action area. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, requires evaluation of potential impacts to minority and low-income populations from the proposed action. Overall, potential impacts associated with proposed development activities and operations are within the scope of analysis conducted in previous NEPA documentation. Socioeconomic impacts identified under previous NEPA documentation were beneficial and associated with job creation associated

with development, as well as spending and job creation associated with new businesses entering the park. However, as discussed previously, there have been several opportunities for development at Parcel ED-1 due to the limitations posed by the disconnected nature of the developable areas. Thus, the potential beneficial socioeconomic impacts have not been fully realized. It would be expected that providing connectivity between DAs 5, 6, and 7, as well as changing the allowable land uses within Parcel ED-1, would provide more attractive options for development and use, resulting in beneficial economic impacts. Since the parcel was originally intended for use as an industrial/business park, and there are no adjacent residential land areas, there are no impacts outside Parcel ED-1 that would necessarily negatively affect residential land areas or property values. As discussed in the 1996 and 2003 NEPA documents, there would be no environmental justice impacts associated with industrial development and use of Parcel ED-1; this would hold true as well for a mixed-use land use. This resource area is not carried forward for more detailed analysis.

Historic and Archaeological Resources: The National Historic Preservation Act requires identification and assessment of potential impacts to archaeological resources and historic structures. Surveys have been conducted throughout Parcel ED-1 as part of previous NEPA analyses. There are three known cultural resources at Parcel ED-1: the McKamey-Carmichael cemetery located in DA 6 (Fig. 3.3), which includes a protective 100-ft buffer, and two former grist mill sites (40RE195 and 40RE200) along East Fork Poplar Creek (EFPC). As required under previous NEPA documentation, design and development within DA 6 would be required to avoid the 100-ft buffer placed around the McKamey-Carmichael cemetery, and there is the potential for fencing to be required to ensure the public cannot access the cemetery. Both former grist mill sites are located within the NA outside any DAs, and are not located in any areas likely to be affected by planned construction activities. Because there are no archaeological sites or historic resources that would be affected by development activities, this resource has not been carried forward for further discussion in this addendum. Should previously undiscovered artifacts or cultural resource features be unearthed during ground disturbance activities, work would be stopped in the immediate vicinity of the find and DOE would be notified. At that point, a determination of significance would be made and, if required, consultation with the Tennessee State Historic Preservation Officer would be initiated.

Health and Safety: The assessment of health and safety impacts is typically associated with identifying any components of the proposed action or alternatives that would present unique risks, or increase existing risks, to human health and safety. Occupational Safety and Health Administration (OSHA) requirements would be implemented during construction activities to minimize job-site safety risks. Similarly, operational activities at Parcel ED-1 would be governed by OSHA and state safety requirements. Patrons participating in inherently risky activities such as operating vehicles at high speed on a racetrack would be expected to be notified of the risks by the operator and would be expected to participate at their own risk via waiver or other such participatory agreement. No otherwise unique health and/or safety risks would be anticipated. As a result, this issue is not addressed further in this document.

Hazardous Materials and Waste/Solid Waste Management: Analysis of this issue area identifies the use of hazardous materials, associated hazardous wastes potentially generated, and solid wastes potentially generated. Hazardous material such as petroleum, oils, and lubricants (POLs) would be utilized during both development activities and facility operations. Wastes associated with industrial and mixed-use activities would generally be associated with disposal of POLs (which are not generally considered hazardous wastes in Tennessee), paint-related wastes, and municipal solid wastes. Overall, potential impacts associated with development activities and operations are within the scope of analysis conducted in previous NEPA documentation. The types of materials used and stored, and associated wastes generated, under the proposed action would likely be less hazardous and in less quantity than those associated with industrial activities previously analyzed. While municipal solid wastes might be generated at a higher rate due to more public use, solid wastes would be handled through typical solid waste management processes and the areas

accessed by the public would be policed for litter. Given these factors, this resource area is not carried forward for more detailed analysis.

3.2 NOISE

3.2.1 Affected Environment

Noise Metrics

Noise is unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. In this section, noise is any sound that impacts the resource being considered – a sound environment that is quiet and/or desirable to the sound receptor (i.e., a person or animal hearing the sound). Responses to noise vary widely according to the characteristics of the sound source, the distance between the noise source and the receptor, and the time of day as well as the sensitivity and expectations of the receptor.

Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is a mathematical tool that simplifies the representation of large and small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6.

The frequency (or pitch) of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from acoustic energy. Low-frequency sounds are heard as rumbles or roars, and high-frequency sounds are heard as screeches. The human ear is most sensitive to sounds in the 1,000 to 4,000 Hz range. Sound levels that are “A-weighted” (denoted dBA) have been modified such that sound energy frequencies heard well by the human ear are mathematically emphasized whereas other sounds are de-emphasized. Examples of typical A-weighted sound levels of common sounds are shown in Fig. 3.1.

Noise metrics describe and quantify sound. The following sound metrics are used in this environmental analysis document.

Maximum Sound Level (L_{\max}): The L_{\max} is the highest sound level measured during a noise event. In many situations, noise levels vary over time. In the case of a car drive-by, the noise level varies as the car approaches an observer, it reaches its highest level as the car passes the observer, and then the noise level fades as the car moves farther away from the observer. L_{\max} is a useful metric for judging a noise event’s interference with conversations and other common activities.

Equivalent Continuous Sound Level ($L_{\text{eq,dur}}$): The $L_{\text{eq,dur}}$ is the decibel average of the sound levels over a specified duration. The duration can vary from 1 sec ($L_{\text{eq,1s}}$) to 24 h ($L_{\text{eq,24hr}}$). Hence, $L_{\text{eq,dur}}$ is flexible to describe different durations of sound-generating events. In this document, $L_{\text{eq,dur}}$ is used to describe cumulative sound exposures from competitive racing events. These conceptual events have different durations, so the durations are noted for each event.

Exceedance Sound Level (L_{NN}): The L_{NN} is the sound level exceeded by NN% of the time for a given period. For example, L_{90} represents the sound level exceeded for 90% of the measurement period, and this level is used to indicate the ambient background sound level for a given area.

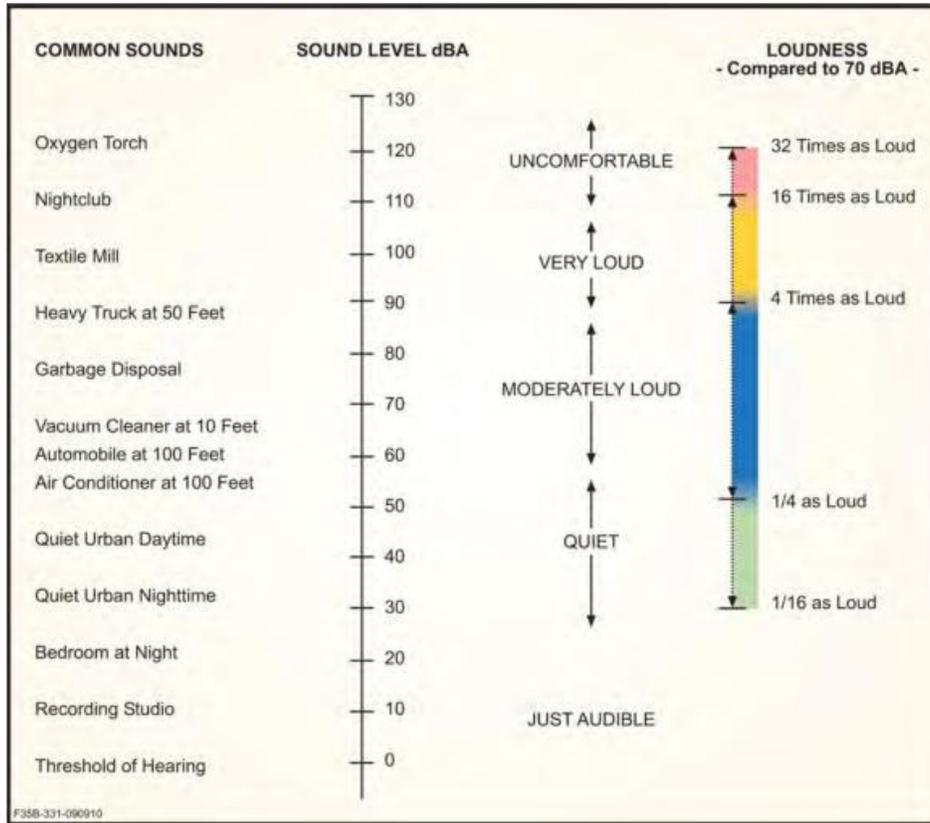


Fig. 3.1. Typical A-weighted levels of common sounds.

Noise Environment

The ambient soundscape of the area surrounding Parcel ED-1 can be represented by the 90% time-exceeded level, L_{90} (Downing and Hobbs 2003; Plotkin 2002; Harris 1998). L_{90} is an acoustic metric that indicates the sound level that is exceeded for 90% of a given period. For example, over a 10-h measurement period, the L_{90} represents the quietest moments that collectively form the quietest 1-h period (although not necessarily of a consecutive duration). Thus, the L_{90} metric describes the background sound level with minimal influence from noise intrusions, such as dogs barking or traffic noise.

The L_{90} metric was calculated in a 2015 Oak Ridge sound monitoring study that was conducted to explore the potential level of community annoyance related to the development of a nearby airport (Ikkelheimer 2015). Of the three measurement sites in this 2015 study, one location is approximately 1.5 miles south of the proposed racetrack location within Parcel ED-1. This site was referred to as Wheat Church in the 2015 study and is alternately known as the George Jones Memorial Baptist Church. The daytime ambient background sound level, per the L_{90} metric, was calculated to be approximately 45 dBA at Wheat Church.

3.2.2 Environmental Consequences

The largest potential contributor to the noise environment under the proposed action would be associated with a proposed motorsports racetrack constructed over DAs 5, 6, and 7. As a result, noise analyses focuses on potential noise generated from activities typically associated with a motorsports racetrack (as described in Sect. 2.1.3). Because a motorsports park is only in the initial proposal phase at this time, no details are

available regarding motorsports park operational parameters. As a result, certain assumptions were made in order to estimate the potential for noise impacts; these assumptions are discussed below and in Appendix C.

It is assumed that the motorsports park would be operated for racing enthusiasts, sanctioned races, and vehicle testing during daylight hours (9 a.m. to 5 p.m.). There is no standard methodology for assessing the level of potential community annoyance from racetrack noise. However, one common approach is to compare the estimated sounds levels and exposures from the racetrack operations to the local ambient soundscape levels. The acoustical modeling evaluated noise emanating from the proposed racetrack by using varied racecar noise limits based on levels 50 ft from the racetrack. The modeled racecar noise limits include L_{Amax} values of 86 dBA, 95 dBA, and 103 dBA.

The Advanced Acoustic Model (AAM) was used to model the noise limits associated with racing activity. AAM utilizes three-dimensional reference sound levels for any vehicle in motion (Bradley et al. 2016). The 2015 Oak Ridge study included soundscape measurements from microphones set to a height of 1.5 m (5 ft) above the ground, to approximate the height of a person’s ear. Likewise, AAM was used to assess community noise exposure with modeled locations set at 1.5 m.

Recordings of two types of racing cars were applied for the reference sounds levels in AAM: Formula 3 (F3) and Porsche Cayman. The spectral data were then adjusted to evaluate each of the three potential racecar noise limits (86 dBA, 95 dBA, and 103 dBA) at a distance of 50 ft from the racetrack. AAM applied this reference acoustic data to the vehicle trajectory, using a constant average speed throughout the proposed racetrack centerline. Vehicle operations can be defined as single events or as events over time. For the AAM analysis, both single-vehicle and event-duration modes were utilized to describe different aspects of the potential received sound levels from the racetrack operations.

The results for a single car on the racetrack were modeled to provide a mapping of the maximum A-weighted sound level (L_{Amax}) around the racetrack. L_{Amax} is the highest level that occurs for a transient sound event such as a vehicle drive-by. Table 3.2 lists the modeled L_{Amax} values at two representative residential locations near the racetrack for the three different racecar noise limits. All of the values are below 50 dBA. For the 86 dBA racecar noise limit, all of the modeled values are below 40 dBA. For the 95 dBA limit, modeled levels are only above 40 dBA at the north site for the GT Motorsports (GT) and SCDA conceptual racecars, and their modeled sound level is 41 dBA. For the 103 dBA limit, the modeled levels are less than 45 dBA at the north site. At the northeast site, the GT and SCDA conceptual racecars generate modeled levels of 49 and 48 dBA, respectively. Figures 3.2 through 3.4 provide contours of the L_{Amax} results for the conceptual 103 dBA racecar noise limit for the F3, GT, and SCDA racecars, respectively. The L_{Amax} results for the 86 and 103 dBA sound limits are provided in Appendix C. The terrain ridgelines to the northwest and southwest reduce the noise propagation in those directions. Additionally, the spectral content of each reference vehicle affects the results: the area exposed to noise from the F3 is smaller due to the F3’s higher frequency content relative to the Porsche.

Table 3.2. Modeled L_{Amax} values for a single car on the racetrack at two representative residential locations

Road Intersection	Westview Lane and Whippoorwill Drive			Mason Lane and Wildwood Drive		
	Single Event Sound Level					
Racecar Noise Limit (dBA)	F-3	GT	SCDA	F-3	GT	SCDA
86	<40	<40	<40	<40	<40	<40
95	<40	<40	<40	<40	41	41
103	<40	43	44	42	49	48

Key: F-3 = Formula 3; GT = GT Motorsports; and SCDA = Sports Car Driving Association.
dBA = A-weighted decibel. L_{Amax} = maximum A-weighted sound level.

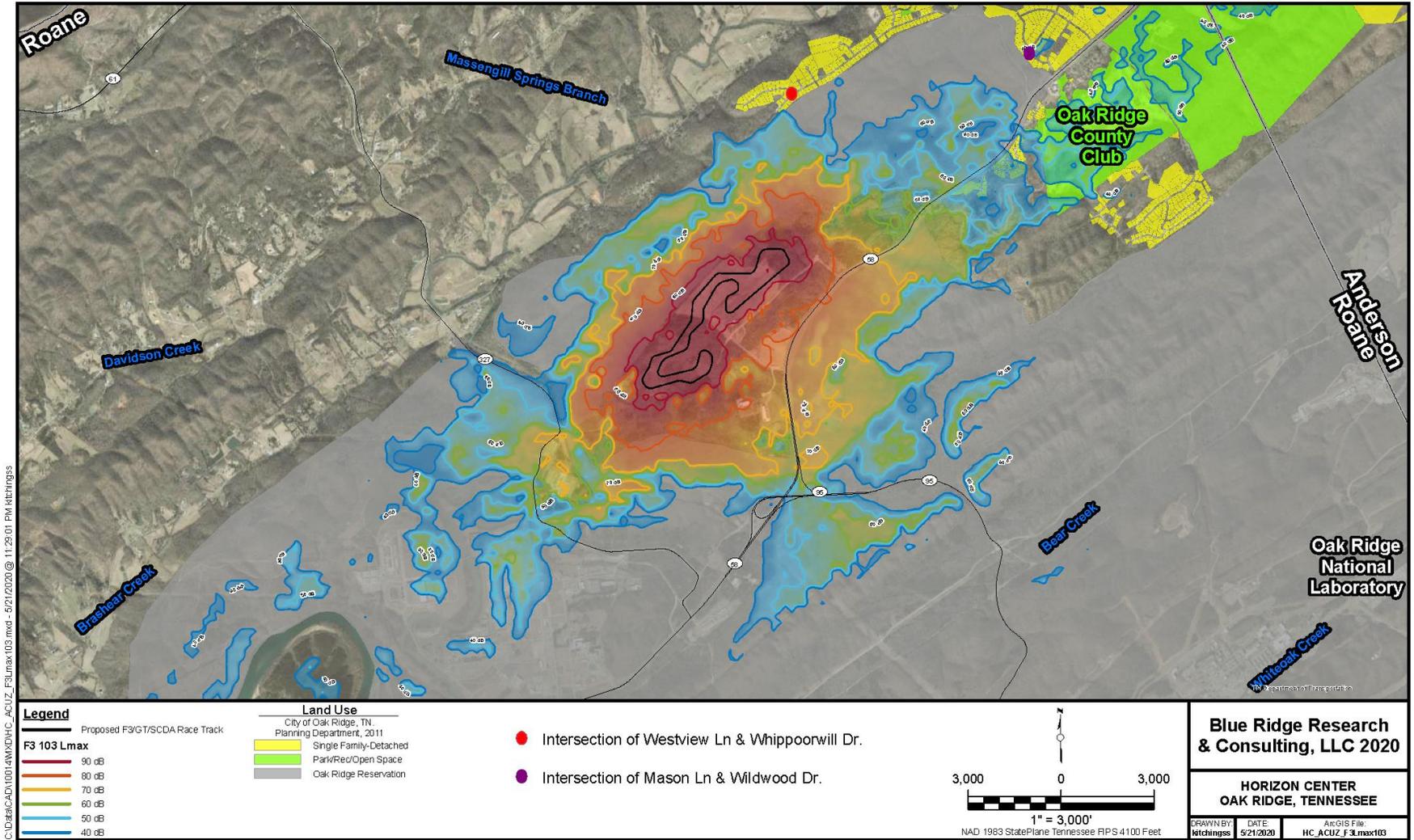


Fig. 3.2. F3 single car L_{Amax} for a 103 dBA racecar noise limit.

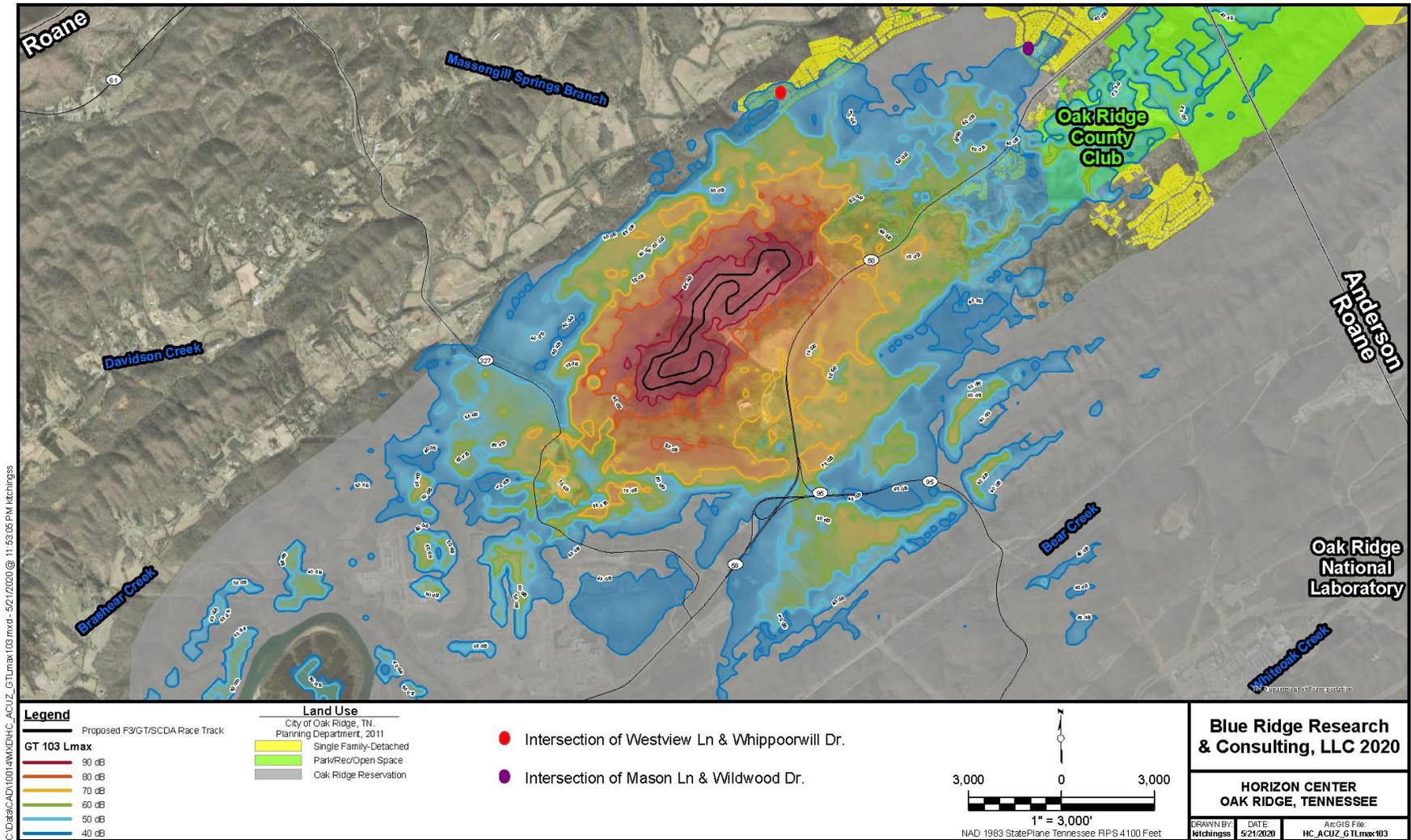


Fig. 3.3. GT (Porsche Cayman) single car L_{Amax} for a 103 dBA racecar noise limit.

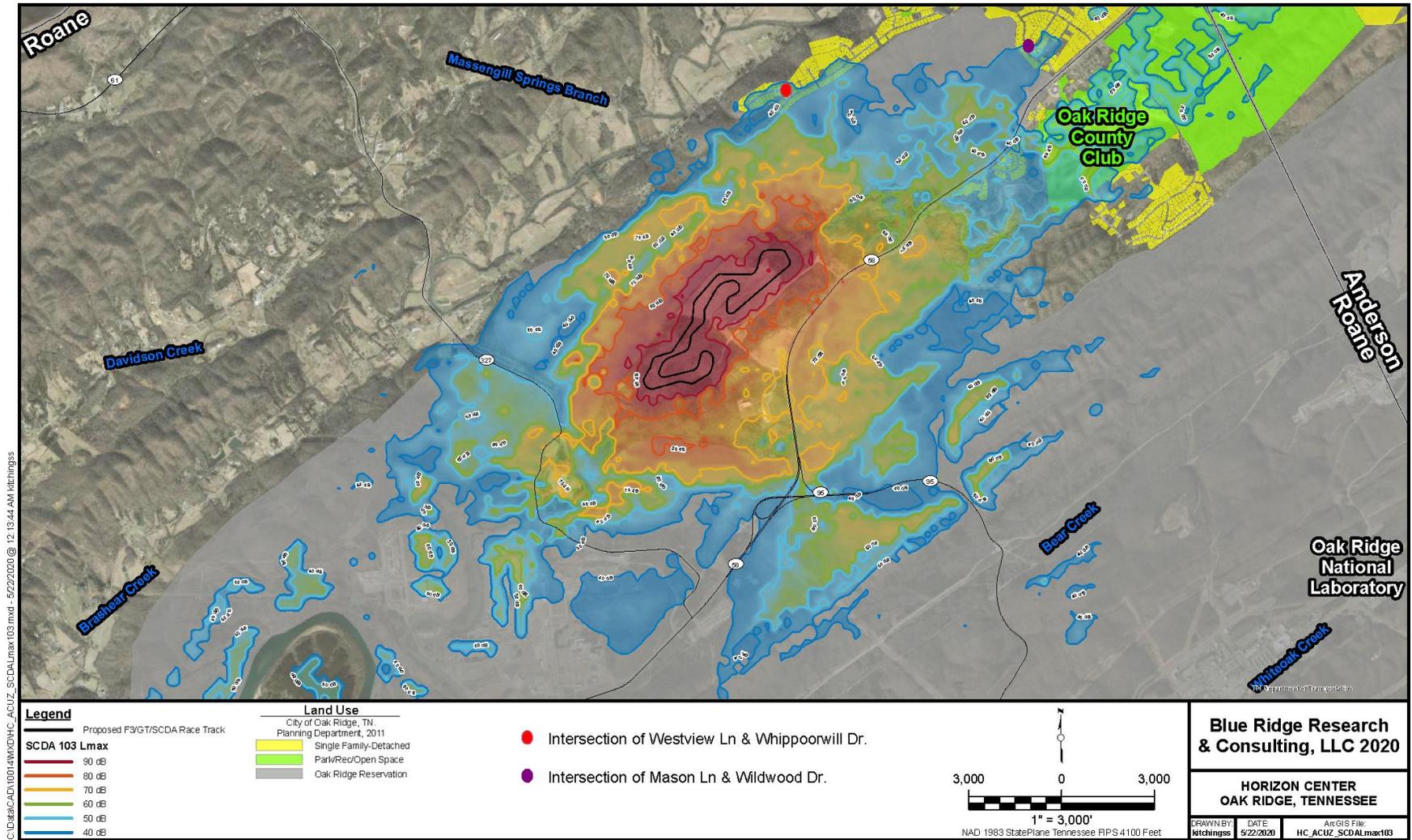


Fig. 3.4. SDCA (Porsche Cayman) single car L_{Amax} for a 103 dBA racecar noise limit.

For racing and driving events occurring over relatively longer periods, the estimated noise exposure levels are calculated for the estimated competitive racing duration of the events. Race weekends will consist of longer periods of activity involved with practice and qualifying, but these periods are expected to be less intense compared to the actual competitive racing. Competitive racing for Formula Americas (FA) events consists of three 35-min races, which provides a total of 1.75 h. GT competitive races consist of two 90-min races, which results in 3 h of racing. SCDA events involve multiple levels of driver experience with only one group on the track at a time. SCDA driving events usually have 8 h of active track driving.

The applicable acoustic metric for evaluating the sound exposure levels over the duration of these events is the A-weighted equivalent continuous sound level ($L_{Aeq,dur}$). $L_{Aeq,dur}$ represents a steady sound level that is equivalent to the total sound energy from fluctuating noise, such as the revving, breaking, and turning associated with racecar driving.

Table 3.3 lists the modeled $L_{Aeq,dur}$ values at two representative residential locations near the racetrack for the three different racecar noise limits. All of the values are below 50 dBA $L_{Aeq,dur}$. For the 86 dBA and 95 dBA racecar noise limits, all of the modeled noise exposures are below 40 dBA $L_{Aeq,dur}$. The FA race exposures for the 103 dBA limit are also less than 40 dBA at both locations. At the north site, GT and SCDA events with the 103 dBA limit result in $L_{Aeq,dur}$ values of 47 dBA and 45 dBA, respectively. At the northeast site, GT and SCDA events with the 103 dBA limit result in $L_{Aeq,dur}$ values of 46 dBA and 44 dBA, respectively.

Figures 3.5, 3.6, and 3.7 provide $L_{Aeq,dur}$ sound exposure results for the 103 dBA racecar noise limit for an FA race, a GT race, and an SCDA event, respectively. The $L_{Aeq,dur}$ results for the 86 and 95 dBA racecar noise limits are provided in Appendix C. The modeled FA racing event generated the smallest noise exposures, due to a combination of vehicle sound emissions, the number of laps completed, and the representative race duration. The GT racing event exposure is slightly greater than the SCDA event primarily based on the shorter race duration.

Table 3.3. Modeled $L_{Aeq,dur}$ values for racing and driving events on the racetrack at two representative residential locations

Road Intersection	Westview Lane and Whippoorwill Drive			Mason Lane and Wildwood Drive		
	Race Event Sound Average Exposure Level ($L_{eq, dur}$)					
Racecar Noise Limit (dBA)	F-3 ($L_{eq, 1.75hr}$)	GT ($L_{eq, 3hr}$)	SCDA ($L_{eq, 8hr}$)	F-3 ($L_{eq, 1.75hr}$)	GT ($L_{eq, 3hr}$)	SCDA ($L_{eq, 8hr}$)
86	<40	<40	<40	<40	<40	<40
95	<40	<40	<40	<40	<40	<40
103	<40	47	45	<40	46	44

Key: FA = Formula Americas; GT = GT Motorsports; and SCDA = Sports Car Driving Association.

dBA = A-weighted decibels.

$L_{eq, dur}$ = average equivalent continuous sound level over a specified duration.

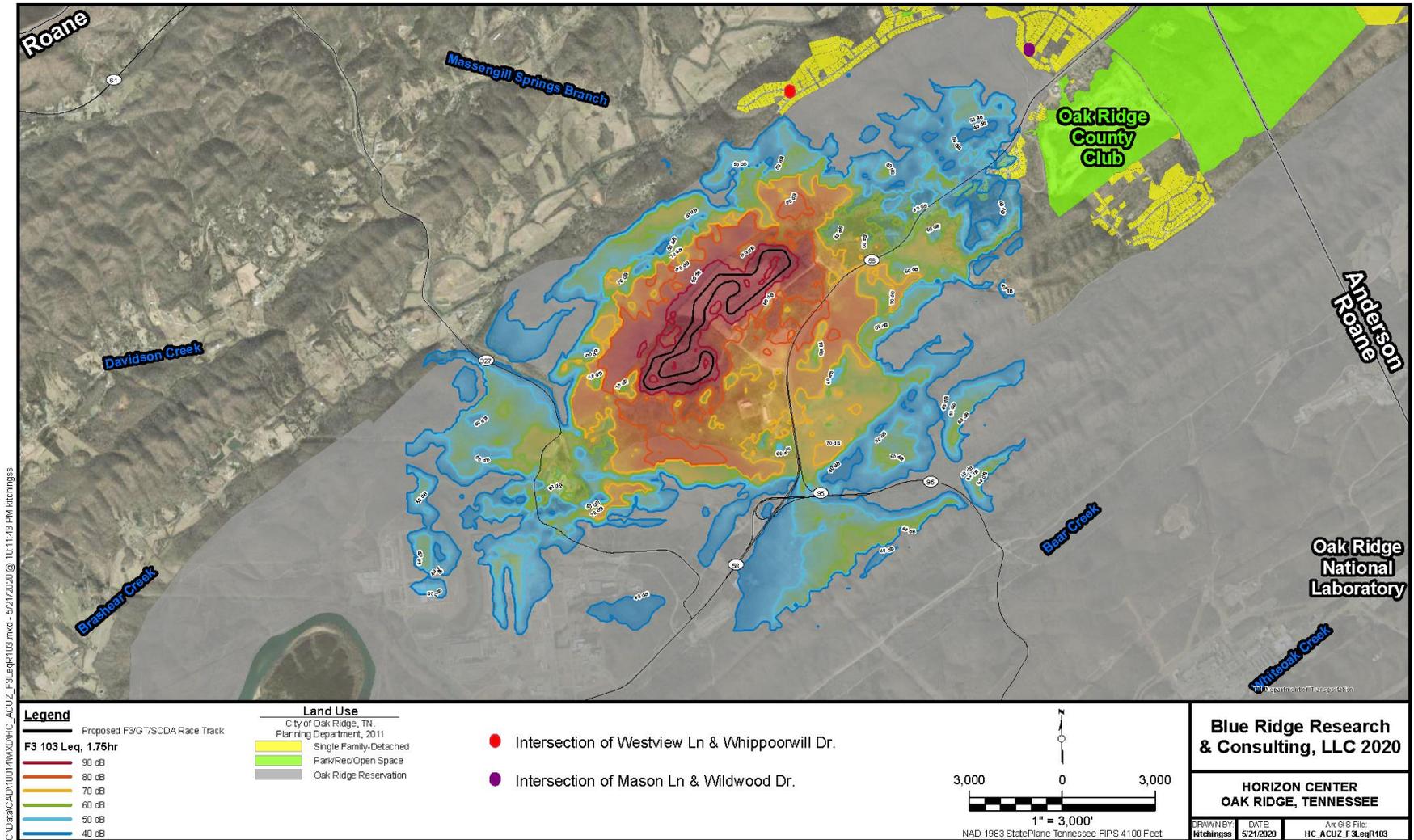


Fig. 3.5. $L_{eqA,1.75hrs}$ for a conceptual FA Race Day with a 103 dBA racecar noise limit.

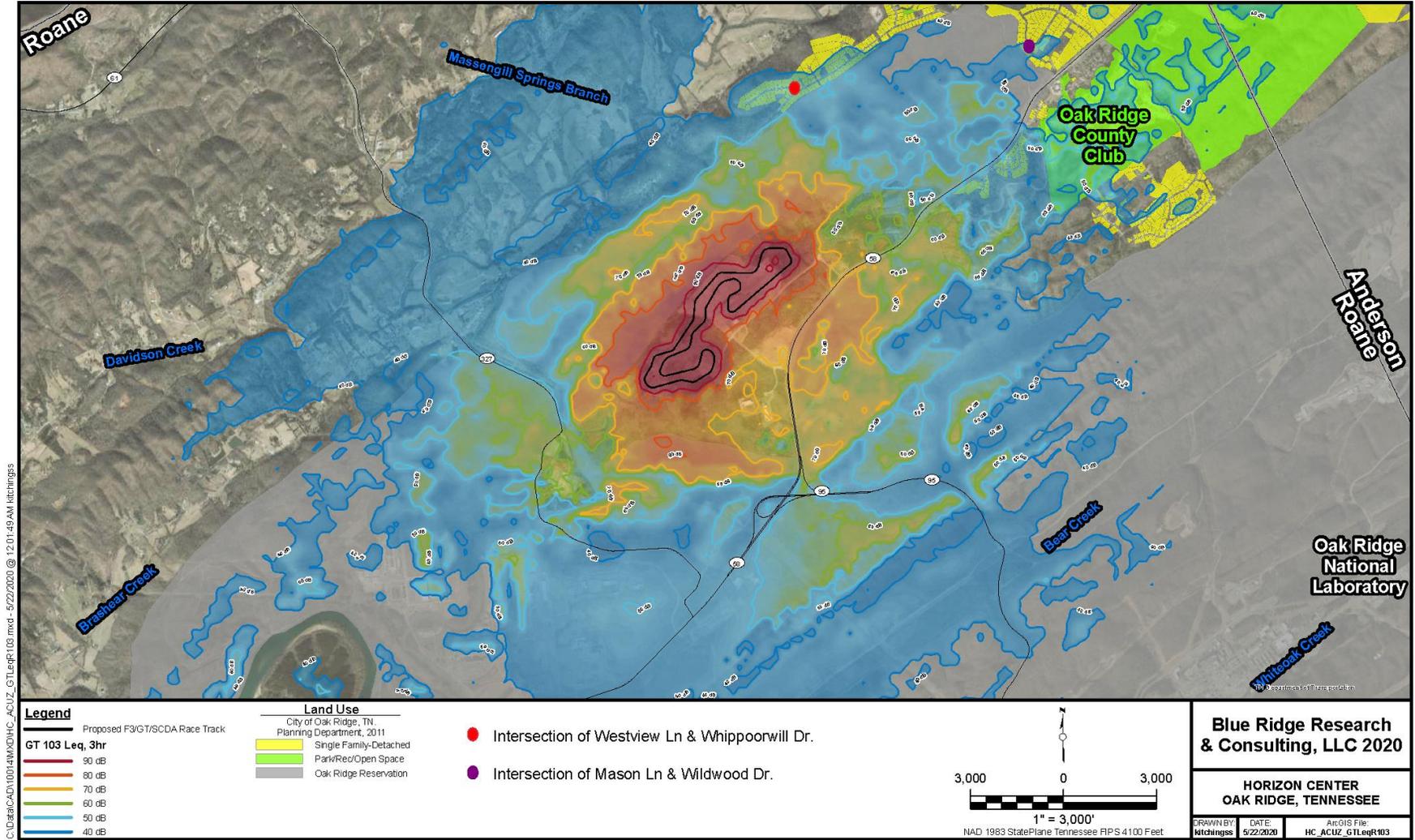


Fig. 3.6. $L_{eqA,3hrs}$ for a conceptual GT Race Day with a 103 dBA racecar noise limit.

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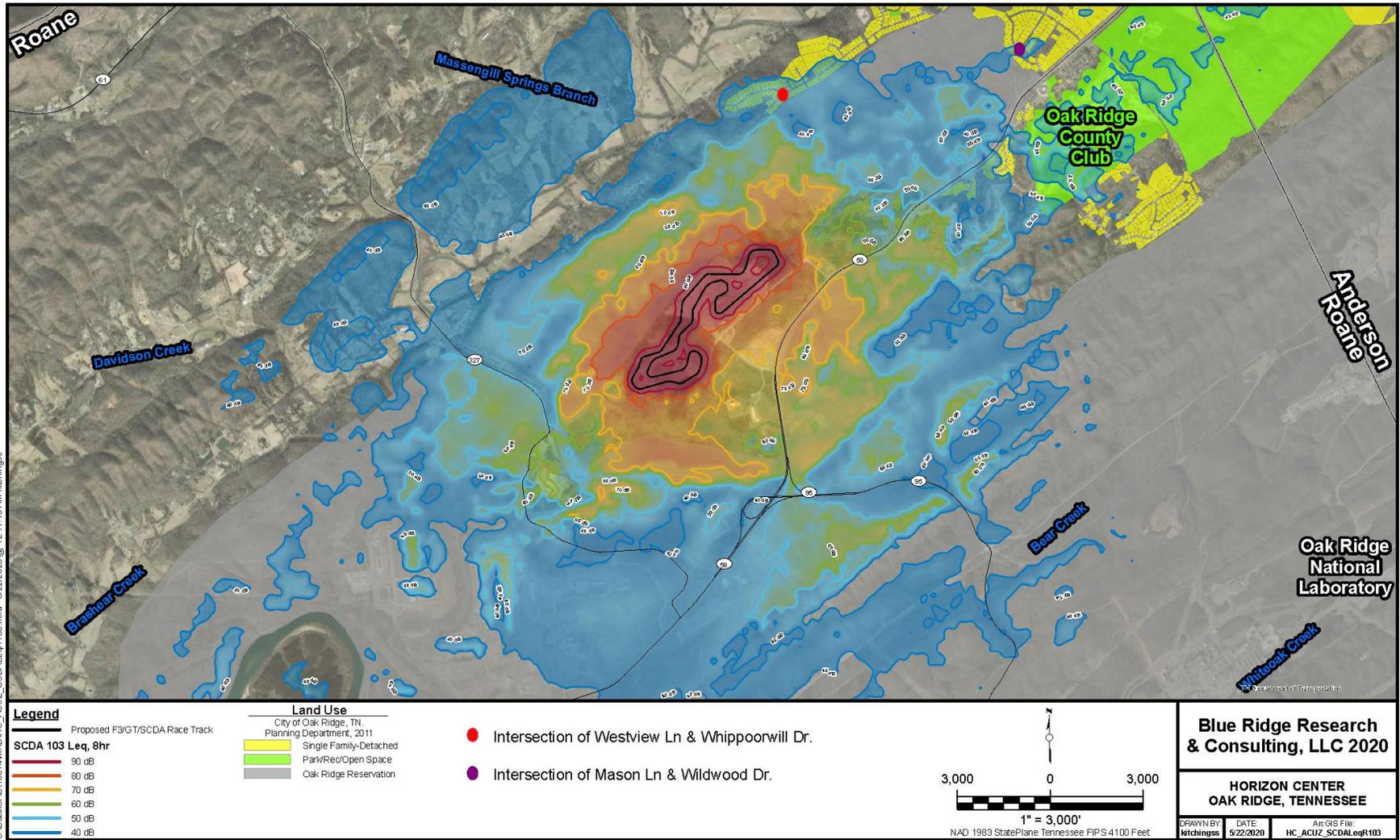


Fig. 3.7. $L_{eqA,8hrs}$ for a conceptual SCDA Driving Event with a 103 dBA racecar noise limit.

3.3 LAND USE

3.3.1 Affected Environment

Parcel ED-1's land is composed of NAs, roadways, and six developable areas planned for future industrial/business park development, with DA 3 and DA 6 having three industrial/business park-type facilities. Although listed as a developable area in 1996, DA 4 was donated in 2010 to the TPGF as a perpetual conservation area. DA 4 is currently managed by the Tennessee Wildlife Resources Agency (TWRA) [DOE/OR/01-2585].

Currently, the City of Oak Ridge is in the process of updating its land use mapping and comprehensive plan, the last update having occurred in 2011. Although Parcel ED-1 identifies as an "industrial park" and is currently occupied by some businesses, the City of Oak Ridge Planning Department's most recent land use classification designates Parcel ED-1 as "vacant" land use. The surrounding DOE land is designated as Oak Ridge Reservation (ORR) land use (City of Oak Ridge Planning Department 2011). However, since the City's update is in process, the land use designations in this EA Addendum are primarily used as a tool to look beyond Parcel ED-1's boundary to evaluate nearby and adjacent land uses for compatibility. It is likely that the vacant land use assigned to Parcel ED-1 will be changed in the next land use mapping update.

Land uses surrounding Parcel ED-1 include the ORR, vacant, and residential (see Fig. 3.8). Beyond the ORR land use are residential and vacant land uses. Parcels of residential land use are located to the northeast, south of State Route (SR) 95 (Oak Ridge Turnpike), and intermittently continue around the ORR, to the north and northwest (City of Oak Ridge Planning Department 2011). The closest, developed residential areas are located to the northeast (0.22 miles) and to the north (0.55 miles).

Zoning

Parcel ED-1 is zoned as Industrial (IND2) and Greenbelt District (G) [see Fig. 3.9]. The IND2 zoned areas include DAs 1, 2, 3, 5, 6, and 7. IND2 allows for facilities and activities that support processing, manufacturing, assembling, fabrication and for warehousing development types (City of Oak Ridge City Council, Municipal Planning Commission, and Community Development Department 2019).

The G-zoned areas include the NAs and DA 4 (currently a conservation area). Currently, Parcel ED-1 maintains its G-zoned areas in their natural state with recreation trails. The G-zoned areas maintain a natural state to support a natural aesthetic, and passive and active recreation activities. Other uses allowed are right-of-way easements, but they require approval from the City Council (City of Oak Ridge City Council, Municipal Planning Commission, and Community Development Department 2019).

New development is required to comply with past NEPA actions including the 1996 and 2003 FONSI and the subsequent transfer of the property title. The current deed for the Horizon Center includes guidance that restricts the allowed development types to industrial/business park. This follows the assigned zoning ordinances for Parcel ED-1.

Recreation

Parcel ED-1 provides opportunities for passive and active recreation via its unpaved trails (see Figs. 3.8 and 3.9 for locations of trails). Parcel ED-1 is part of, and connected to, the City of Oak Ridge's Greenway trails network (City of Oak Ridge 2013). There is bike lane access via SR 95 to the main entrance of the Horizon Center.

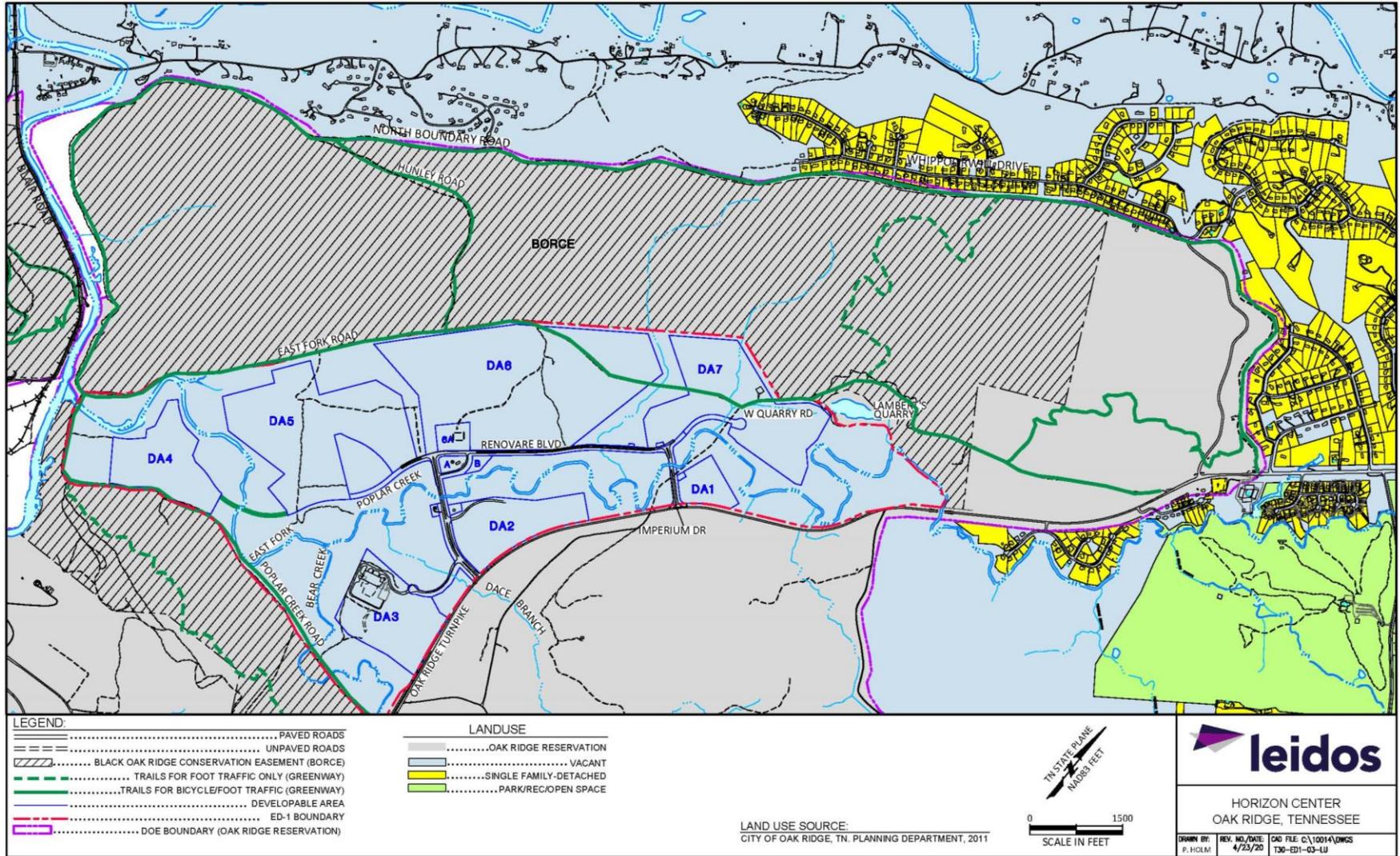


Fig. 3.8. Land use in the Parcel ED-1 vicinity.

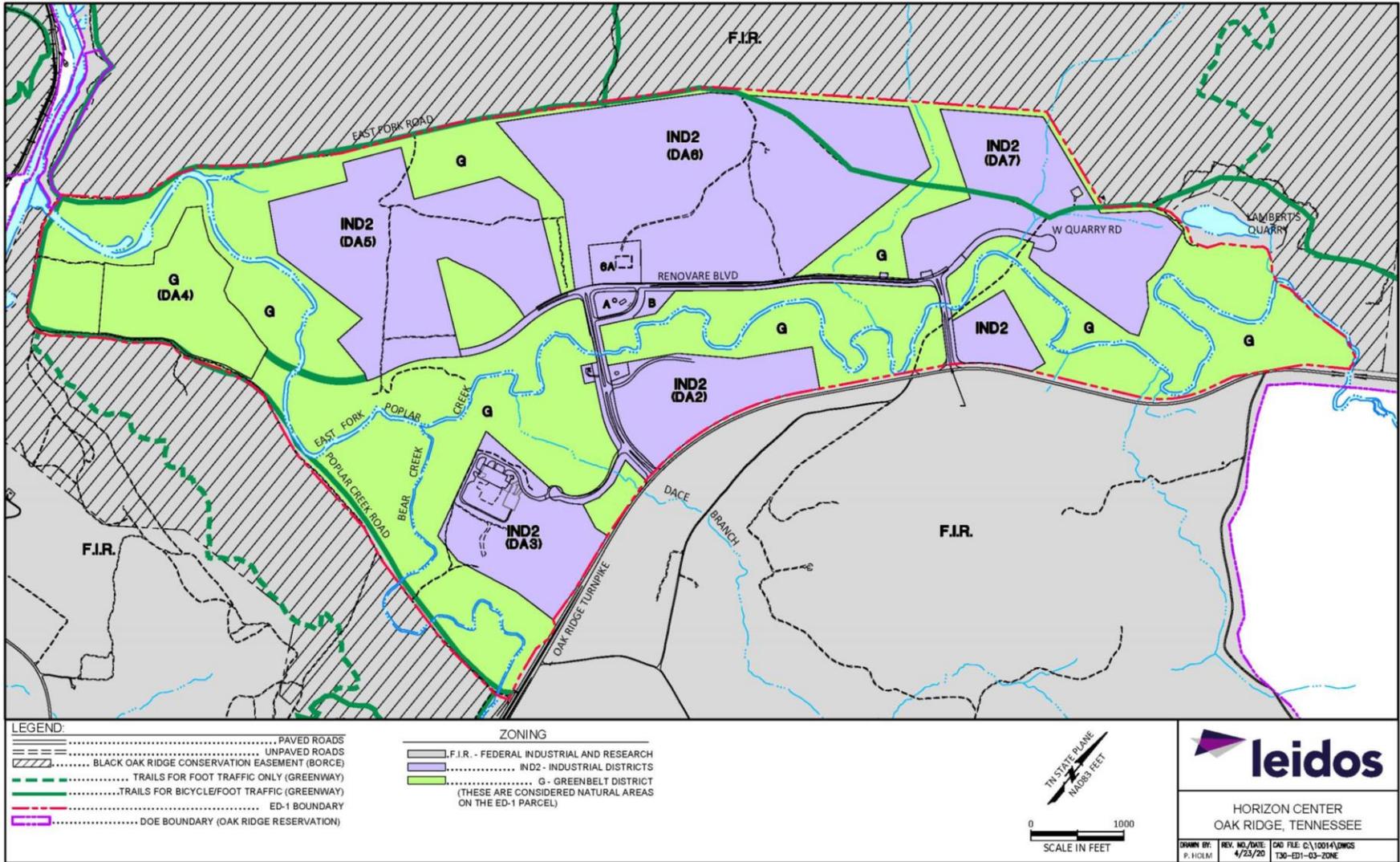


Fig. 3.9. Parcel ED-1 zoning.

Visual Character

The visual character of Parcel ED-1 is typical of a low-density industrial/business park surrounded by NAs, which has been consistent since the completion of the 1996 EA and FONSI. Since 1996, visual changes over time are associated with clearing land in the DAs for future development, roadways and parking areas, and the construction of three industrial buildings.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

As described previously, under the no action alternative, Parcel ED-1 would maintain its current configuration and would continue to be open for development within approved development areas for use as a business/industrial park. Potential impacts associated with land use would be within the scope of those identified in the 1996 EA and 2003 EA Addendum. Development and use of Parcel ED-1 as a business/industrial park since 1996 has not been shown to result in any adverse impacts to local land use, zoning, recreation, or the visual setting. This would be expected to continue under the no action alternative.

3.3.2.2 Proposed Action

The proposed action recommends changes to Parcel ED-1's property deed, land use, and zoning to allow for a mix of activities and development types. The objective is to increase the land's desirability and opportunity for future development [as described in Sect. 1.1 (Purpose and Need for Action) and Sect. 2.1 (Proposed Action)].

DAs 1 through 3 and DAs 5 through 7 would change to a land use and zoning designation that allows mixed-use development and activities including industrial/business park, commercial, residential, and recreational uses. DA 4 would remain an undeveloped natural conservation area. The NA within DA 5 and between DAs 5, 6, and 7 would become developable areas, restricted to easement and access corridors to/from/between future development (e.g. roads, trails, open space, etc.). This would essentially consolidate DAs 5, 6, and 7 into a single, developable parcel north of Renovare Boulevard, with restrictions for the former NAs. Creating a larger parcel for development would improve future development opportunities and potentially attract more economically sustainable development.

Zoning

Zoning changes would need to be approved through both the City of Oak Ridge's Planning Commission and City Council, and can take approximately up to three months. This process starts with submitting the request, via an application, during a meeting held by the Planning Commission. Typically, a sign will be posted on the property to provide public notice of the request for rezoning prior to the Planning Commission's meeting. Thereafter, the Planning Commission will send their recommendation to approve or deny the request to the City Council. The rezoning request, formatted in the form of an ordinance, will go through a first reading at a City Council meeting. Then, the rezoning request ordinance goes through a second reading at a City Council meeting. Sometime, from the first to second reading, a public hearing that is advertised to the public (by law) will take place to allow for public comment. After the public hearing and the two readings are completed, the City Council will make a decision on whether to approve or deny the ordinance, and rezone the property.

As discussed previously, while the current official land use designation for Parcel ED-1 is "vacant," allowable land uses for the parcel, based on previous NEPA documentation, are associated with an industrial/business park. Under the proposed action, allowable land uses for Parcel ED-1 are proposed to

change to include mixed-use land use. While these zoning changes would apply to all DAs except DA 4, this would primarily affect the land areas of DAs 5, 6, 7, and the NAs within/between these parcels. The estimated acreage transferred from industrial to a mixed-use is approximately 406 acres (Table 3.4). The proposed change could have adverse impacts on the relationship between the existing industrial uses and the other proposed uses within the mixed-use categories (Table 3.5) due to compatibility issues and requirements stated in the zoning ordinance. The planning and design phase for redeveloping the DAs and associated NAs will require following the zoning ordinance’s specifications for any assigned district classification. These specifications could include a required distance between industrial uses and residential buildings (City of Oak Ridge City Council, Municipal Planning Commission, and Community Development Department 2019). Additionally, implementing mitigations and design methodology would help establish and maintain a healthy relationship between the industrial uses and the proposed mixed uses including, but not limited to: setbacks, various buffers, clear transportation signage for large vehicles (related to industrial uses), and other BMPs.

Approximately 58 acres of NA (located within DA 5 and between DAs 5, 6, and 7) would be transitioned into access easements (Tables 3.4 and 3.5). The overall impact to Parcel ED-1 from transitioning these portions of NA into access easements would be negligible because DA 4 (approximately 37 acres), originally planned for industrial development, was converted into a perpetual conservation area and will be maintained as such in the future. This would result in a Parcel ED-1 net potential reduction in “natural area” designation of approximately 21 acres.

Table 3.4. Proposed changes by developable area

Location	Existing size (approximate acres)	Allowed development (current zoning district)	Proposed size (approximate acres)	Proposed future use
DA 1	11.5	Industrial business park (IND2)	11.5	Mixed-use (industrial/business park, commercial, residential, and recreation)
DA 2	35.1	Industrial/business park (IND2)	35.1	Mixed-use (industrial/business park, commercial, residential, and recreation)
DA 3	42.4	Industrial/business park (IND2)	42.4	Mixed-use (industrial/business park, commercial, residential, and recreation)
DA 4	37.2	Industrial/business park (G) (perpetual conservation area)	37.2	Natural Area (G) [perpetual conservation area]
DA 5	94.3	Industrial/business park (IND2)	94.3	Mixed-use (industrial/business park, commercial, residential, and recreation)
DA 6	159.4	Industrial/business park (IND2)	159.4	Mixed-use (industrial/business park, commercial, residential, and recreation)
DA 7	72.1	Industrial/business park (IND2)	72.1	Mixed-use (industrial/business park, commercial, residential, and recreation)
Natural Areas	506	Natural Areas (G)	406 ^a	Natural Areas (G)
New Areas	N/A	N/A	57.9	Natural Areas converted to access easements (within DA 5 and between DAs 5, 6, and 7)

^a Does not include DA 4.

DA = developable area. G = Greenbelt District. IND2 = Industrial District. N/A = not applicable.

Table 3.5. Summary of proposed changes to allowable development categories

Use	Existing size (approximate acres)	Proposed size (approximate acres)
Industrial/business park (IND2) ^a	476 ^a	0
Mixed-use (industrial/business park, commercial, residential, and recreation)	0	409
Natural Areas (G)	467 ^b	266 ^a
Natural Areas converted to access easements (within and between DAs 5, 6, and 7)	0	58

^a Includes DA 4.

^b Does not include DA 4 because it was zoned as IND2 prior to 2002. It is already included in the IND2 existing acreage.

DA = developable area. G = Greenbelt District. IND2 = Industrial District. N/A = not applicable.

Recreation

There is one pedestrian/bike trail that cuts through the northern areas of DAs 6 and 7, which is part of the local area greenway (Fig. 3.9). This portion of the greenway is the result of temporary easements on DA 6 and DA 7 that were provided until such time as the DAs were developed. This segment of the greenway (approximately 4,627 linear ft) represents approximately 5.6% of the total local area greenway (approximately 81,989 linear ft). New development would either remove these easements and the associated greenway segments (as well as the segment between the two DAs), or incorporate this trail into site design. Were this segment of the greenway eliminated, the overall impact would be negligible, given availability of other greenway space in the area. Additionally, there may be other compensatory recreational opportunities provided as part of development (e.g., walking and bike trails). If these greenway segments are incorporated into overall site design, there would be no impact on the existing trails network. In the long-term, development of Parcel ED-1 would eventually provide a benefit to the surrounding recreation network if new development includes additional recreational opportunities, and new construction of public parking would improve access (e.g., park and go) to the trails.

Visual Character

Since Parcel ED-1 is already planned for industrial/business park development, there would be no unexpected impacts to the visual character of the land.

Noise

Noise levels would be generated by the proposed motor vehicle test track and research facility on DAs 5, 6, and 7. Based on the results of the noise analysis presented in Sect. 3.2.2, there will be a minimal impact to the surrounding land uses if mitigations are implemented. These mitigations include, but are not limited to, limiting the hours of operation and types/frequency of events conducted on the motor vehicle test track. The hours of operation should be limited to daylight hours, specifically 9 a.m. to 5 p.m. (local time). In addition, a noise limit should be implemented to control the sound exposures to the local neighborhoods. Additionally, the motor vehicle test track design should preserve, to the extent practicable, the existing natural topography of the land to the northwest and southwest to minimize noise propagation in those directions.

Although visitors and any newly constructed buildings within Parcel ED-1 would experience high levels of noise due to racing activity, these noise levels would be consistent with the intended use of the parcel and users would expect such noise levels. However, buildings that are occupied and not necessarily a component

of racetrack operations (e.g., restaurants, office space, hotels, etc.) should be evaluated for mitigations to ensure noise levels in the occupied interior spaces maintain healthy noise levels.

The following considerations and mitigations should be followed to mitigate noise impacts that would be incompatible to land uses within and surrounding Parcel E-1:

- Limit the hours of operation.
- Enforce a noise limit.
- Maintain the existing topography to the northwest and southwest to reduce noise propagation.
- Clearly define limits to racetrack activities. This includes idling engines, revving engines, the number of cars allowed on the track at one time, the duration of a single event, and the number of events per day.
- Evaluate existing buildings on Parcel ED-1 for necessary sound attenuation measures.
- Implement sound attenuation design practices for any new building within Parcel ED-1.

Summary of Impacts

There could be a minimally adverse impact to land use resources from the changes in land use and the allowed types of development for Parcel ED-1. However, there is an expected benefit from implementing the proposed action, as it would improve access to existing recreation resources and better accommodate modern construction practices (since 1998), and it follows urban planning development practices to ensure better, sustainable development.

To ensure impacts remain minimal, the following mitigations are recommended for future development:

- Follow the City of Oak Ridge's Zoning Ordinance.
- Consider the existing residential and industrial uses when designing new development.
- Maintain or relocate the existing recreation trails that are connected to the existing greenway trails network.
- Incorporate setbacks, various buffers, clear transportation signage for large vehicles (related to industrial uses), and other BMPs into the planning and design of Parcel ED-1.
- Restrict building heights to fit into the vicinity's visual character.
- Consider limiting the hours of operation for specific activities to avoid noise and light disturbances to the surrounding residential properties.
- For new developments avoid impacts to the accessibility and function of SR 95 (Oak Ridge Turnpike) and its bike lanes.
- Follow the proposed considerations and mitigations to ensure noise levels generated from a motor vehicle test track would be compatible with land uses within and surrounding Parcel E-1, including:
 - Limit the hours of operation.
 - Enforce a noise limit.
 - Maintain the existing topography to the northwest and southwest to reduce noise propagation.

- Clearly define limits to racetrack activities. This includes idling engines, revving engines, the number of cars allowed on the track at one time, the duration of a single event, and the number of events per day.
- Identify the populated buildings (existing and proposed) within Parcel ED-1 that would require sound attenuation to mitigate noise. Implement sound attenuation design practices for any new building within Parcel ED-1.

3.3.2.3 Alternative 1

Potential impacts associated with zoning, recreation, and visual character would be the same as those described under the proposed action (Sect. 3.2.2.1).

3.4 TERRESTRIAL ECOLOGY

3.4.1 Affected Environment

Terrestrial ecology includes the plant and animal species, habitats, and ecological relationships of the land within the region of interest (ROI), which is defined as the area directly or indirectly affected by the proposed action (Chap. 2). Particular consideration is given to sensitive species, which are those species protected under federal or state law, including threatened and endangered species, migratory birds, and bald and golden eagles. Detailed information regarding terrestrial ecology of the ROI and surrounding area, the ORR, is presented in the *Oak Ridge Reservation Physical Characteristics and Natural Resources* (ORNL/TM-2006/110) reference document.

For the purposes of this EA Addendum, sensitive and protected terrestrial resources include plant and animal species that are federally (USFWS) or state (TDEC) listed for protection.

Vegetation and Wildlife

Vegetation within the ORR boundary consists of eastern deciduous forested areas with large blocks of mature interior forest, extensive areas of undisturbed wetlands, open water, riparian vegetation, and several hundred acres of grassland communities. The large tracts of eastern deciduous hardwood forest provide habitat for a wide diversity of wildlife. The area hosts more than 70 species of fish; about 59 species of reptiles and amphibians; more than 200 species of migratory, transient, and resident birds; and more than 38 species of mammals, as well as numerous invertebrate species (ORNL/TM-2006/110). Wildlife observed within the Parcel ED-1 site includes eight reptile species (three turtles, two lizards, and three snakes), two amphibians (one toad and one frog), 39 species of birds, and 24 mammals (DOE/OR/01-2585). Refer to the 2013 MAP for further details and a complete listing of these species (DOE/OR/01-2585).

Terrestrial resources at the Parcel ED-1 site are managed through various agencies including the USFWS, TDEC, and the TWRA. Site-specific information for vegetation and wildlife that occur within the Parcel ED-1 site is presented in the *Ecological Resources* and *Ecological Monitoring* sections of the relevant past environmental documents (Table 1.1). Ecological resource data have been collected for the site since the 1996 EA analysis. Additionally, the DOE has produced subsequent annual reports (in 1997, 1998, 1999, 2000, 2003, and 2004 [DOE/EA-1113/MAP-97, DOE/EA-1113/MAP-98, DOE/EA-1113/MAP-99, DOE/EA-1113/MAP-2000, DOE/EA-1113/MAP-2002, and DOE/EA-1113/MAP-03]) and employed intensive ecological monitoring efforts (between 1997 to 2000 and 2002 to 2004). Most recently in 2012, the DOE conducted additional ecological monitoring including habitat surveys of wetlands, rare plant locations, and other sensitive ecological resources previously documented at Parcel ED-1 (DOE/OR/01-2585).

According to the 2013 MAP, vegetation within the Parcel ED-1 site consists mainly of areas of mixed pine-hardwood forests, second-growth loblolly pine forests that naturally revegetated following the 1990's pine beetle outbreaks, and cleared areas that have been replanted with tall fescue (DOE/OR/01-2585). Historically, twelve invasive plant species have been identified as occurring on Parcel ED-1 (DOE/EA-1113-A). The most common invasive pest plants observed include Chinese privet (*Ligustrum sinense*), greater periwinkle (*Vinca major*), lesser periwinkle (*Vinca minor*), Nepal grass (*Microstegium vimineum*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*) [DOE/OR/01-2585]. Refer to the 1997 Annual Report (DOE/EA-1113/MAP-97) for a complete listing of the invasive and aggressive exotic plant species on the ORR and exotic species found on Parcel ED-1.

Of the five sensitive vegetation communities known to occur within the area (beech-maple forest, limestone cliffs, limestone barrens, canebrakes, and walnut plantations), three are present within the proposed action area (Fig. 3.10). These include beech-maple forest (located in DA 5), limestone barrens (located in DA 3, DA 5, and DA 7) and two walnut plantations (located within the NA on the floodplain of EFPC near the southeast corner of DA 5, and near the mouth of EFPC adjacent to the North Perimeter Road). A description of these sensitive communities is provided below. Refer to the 2013 MAP for a detailed description of the NAs and DAs 1 through 7 (DOE/OR/01-2585) present on the ORR.

Beech-Maple Forest: Beech-maple forests, rare in Tennessee, consist of closed-canopy hardwood forests primarily comprised of American beech (*Fagus grandifolia*) and sugar maple trees (*Acer saccharum*). The beech-maple forest located in a protected part of DA 5 remains the only documented occurrence of this forest community on the ORR (DOE/OR/01-2585).

Limestone barrens: Limestone barrens include areas dominated by vegetation exclusive to rocky sites where tree growth is inhibited or slowed due to the following conditions: shallow soils over bedrock, a high degree of exposed surface rock, or steep easily erodible slopes (SGI 2020). Within the Parcel ED-1 site, limestone barrens occur in DA 3, DA 5, and DA 7. Within DA 3, there are two possible barren sites located within the forested area in the southwestern portion of DA 3. Within DA 5, there is a limestone barren located along Harrell Road near the Walnut Plantation Access Road. The limestone barren within DA 7 is located near the intersection of the Greenway and the road to Lambert's Quarry. These barrens consist of complexes of small openings dominated by grasses and herbaceous plants in a mixed eastern red-cedar hardwood forest (DOE/OR/01-2585).

Walnut plantations: These areas were originally planted within the Parcel ED-1 site prior to 1977, and are considered an ecological area of historical importance. Walnut Plantation 1 is located within the NA on the floodplain of EFPC near the southeast corner of DA 5. Walnut Plantation 2 is located in the NA near the mouth of EFPC adjacent to the North Perimeter Road. Neither of the walnut plantations at the Parcel ED-1 is currently maintained; both plantations are slowly being colonized by plants in what were formerly mowed areas between the walnut trees (DOE/OR/01-2585).

Special Status Species

Special status plant and wildlife species are subject to regulations under the authority of federal and state agencies. The Endangered Species Act of 1973 (ESA) [16 *United States Code* [U.S.C.] 1532 *et seq.*], as amended, was enacted to protect and recover imperiled species and the ecosystems upon which they depend. The USFWS maintains a list of special status species considered endangered, threatened, or candidate. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. Candidate species include plants and animals that have been studied and proposed for addition by the USFWS to the federal endangered and threatened species list. All federal agencies are required to implement protection programs for endangered and threatened species and to use their authority to further the purposes of the ESA.

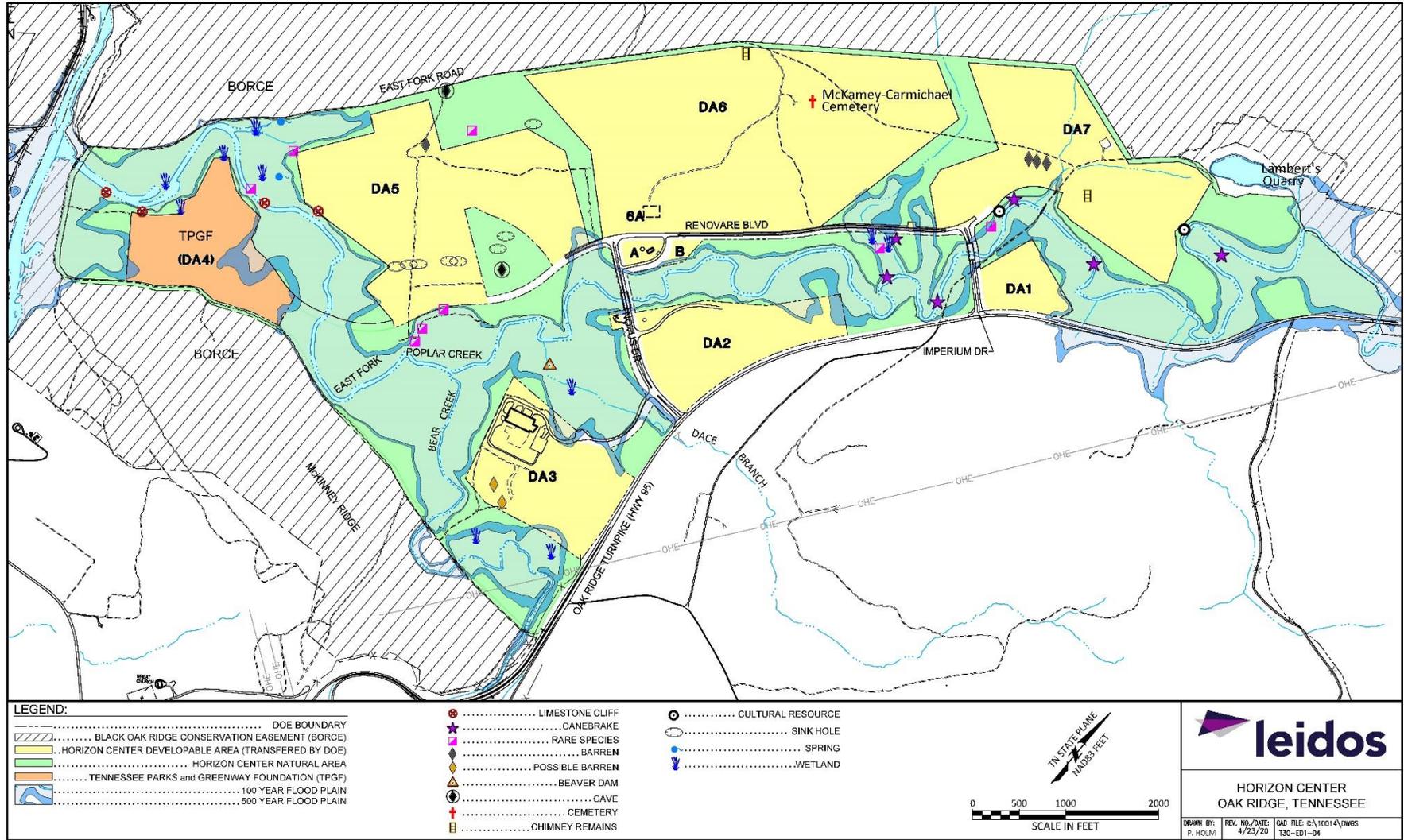


Fig. 3.10. Parcel ED-1 natural/cultural resources.

The USFWS Information for Planning and Consultation (IPaC) online system was accessed to request an *Official Species List* to identify species protected under Sect. 7(c) of the ESA that could occur within the proposed action area. On April 8, 2020, a list was generated by the USFWS Tennessee Ecological Services Field Office (Consultation Code: 04ET1000-2020-SLI-0963) containing eight species - including three mammals, one fish, two clams, and two plants (USFWS 2020). These species are presented in Table 3.6. Refer to Appendix A for a copy of the *Official Species List* consultation letter.

Table 3.6. Federally listed species with potential to occur within the Parcel ED-1 site

Common name	Scientific name	Protection status	Habitat	Historically observed within the Parcel ED-1 site?
<i>Mammals</i>				
Gray Bat	<i>Myotis grisescens</i>	Endangered	Inhabits caves year-round, but may sometimes use man-made tunnels as their summer quarters.	No <i>However, known roosting habitat occurs within the ORR.</i>
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Winters in the large, cool limestone caves with high humidity. They rarely inhabit buildings or other man-made structures. Females deliver their young in hollow trees or beneath tree bark.	
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	Winters in cool, moist caves and mines. In summer, they roost in a variety of shelters including barns and attics, and under tree bark or shutters. They usually roost singly, except for small maternity colonies. They seem to prefer tight crevices and holes, although they will also frequently hang out in the open.	
<i>Clams</i>				
Finerayed Pigtoe	<i>Fusconaia cuneolus</i>	Endangered	Freshwater. Inhabits clear, high-gradient streams in firm cobble and gravel substrates.	No
Shiny Pigtoe	<i>Fusconaia cor</i>	Endangered	Freshwater. Found in shoals and riffles of small- to medium-sized rivers in clear streams with moderate to fast current. It is typically well-burrowed in sand and cobble substrates. It does not appear tolerant of deeper water or reservoirs.	No
<i>Flowering Plants</i>				
Virginia Spiraea	<i>Spiraea virginiana</i>	Threatened	Occurs along rivers and streams and relies on periodic disturbances, such as high-velocity scouring floods, which eliminate competition from trees and other woody vegetation. However, if the frequency and intensity of these floods is too great, the plant may become dislodged and wash downstream into less suitable habitat.	No
White Fringeless Orchid	<i>Platanthera integrilabia</i>	Threatened	Grows in wet, boggy areas at the heads of streams and on sloping areas kept moist by groundwater seeping to the surface. It is often associated with Sphagnum in partially, but not fully, shaded areas.	No

Sources: DOE/OR/01-2585; NatureServe 2020a,b; TWRA 2020a-c; and USFWS 2015, 2016, and 2020.

There are no USFWS federally listed species known to occur within the Parcel ED-1 site (DOE/OR/01-2585). Additionally, no critical habitat for USFWS federally listed species occurs on or near the proposed action area (USFWS 2020). Potential suitable habitat for federally listed bat species occurs within the mixed pine-hardwood forests and second-growth loblolly pine forest.

The TDEC maintains the state list of *Rare Species by County* (TDEC 2020) [Appendix A]. Of the 68 species listed for Roane County, none is known to occur within the Parcel ED-1 site. However, two previously state-threatened plant species have been documented within Parcel ED-1. These include goldenseal (*Hydrastis Canadensis*) and pink lady slipper (*Cypripedium acaule*), now listed as “apparently secure (S4)” by NatureServe (NatureServe 2020c). Refer to Sect. 3.6.6, “Threatened and Endangered Plant Species,” in the 2013 MAP for further details on these species (DOE/OR/01-2585).

Other special status species identified during historical surveys conducted on Parcel ED-1 include state-listed “in-need-of-management animal species” – sharp-shinned hawk (*Accipiter striatlls*), southeastern shrew (*Sorex longirostris*), and Tennessee dace (*Chrosomus tennesseensis*). Refer to Sect. 3.6.15, “Sensitive Animals,” in the 2013 MAP for further details on these species (DOE/OR/01-2585).

Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) [16 U.S.C. §§ 703–712] prohibits actions that result in the pursuit, capture, killing, and/or possession of any protected migratory bird, nest, egg, or parts thereof. The USFWS maintains a list of designated migratory birds known to occur in various regions of the United States. Birds of Conservation Concern (BCC) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCCs have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs).

Parcel ED-1 is located within BCR 28 (Appalachian Mountains) [USFWS 2008]. There are 25 migratory bird species listed in BCR 28 (see Appendix A for the full species list). Additionally, historical surveys conducted through Partners in Flight identified the prairie warbler (*Setophaga discolor*), blue-winged warbler (*Vermivora cyanoptera*), prothonotary warbler (*Protonotaria citrea*), and the cerulean warbler (*Setophaga cerulea*) as occurring on the site (DOE/OR/01-2585).

Bald and Golden Eagles

The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668c), enacted in 1940 and amended several times since, prohibits anyone without a permit issued by the Secretary of the Interior from “taking” bald or golden eagles, including their parts, nests, or eggs. Bald eagles (*Haliaeetus leucocephalus*) have been observed in the winter throughout the ORR (ORNL/TM-2006/110). Bald eagles breed in forested areas near large bodies of water and winter on reservoirs and large rivers in Tennessee (TWRA 2020). Golden eagles (*Aquila chrysaetos*) are a regular winter visitor to Tennessee. However, there are no historic nesting records for this species in the state (TWRA 2018). There are no known bald or golden eagle observations or nesting territories within the Parcel ED-1 site.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

As described previously, under the no action alternative, Parcel ED-1 would maintain its current configuration and would continue to be open for development within approved DAs for use as a business/industrial park. Currently, DAs on Parcel ED-1 are cleared and maintained in a semi-improved

state. Potential impacts to terrestrial ecology at this point under the no action alternative would be associated with the future development of as-of-yet undeveloped DAs and overall maintenance of Parcel ED-1, and would be within the scope of that described in the 1996 EA and 2003 EA Addendum. Based on monitoring data collected since 1996, development and use of Parcel ED-1 as a business/industrial park since 1996 has not been shown to result in any adverse impacts to Parcel ED-1 terrestrial ecology (DOE/OR/01-2585). This would be expected to continue under the no action alternative provided all mitigations and BMPs, as identified in previous NEPA documentation and existing permitting, continue to be implemented.

3.4.2.2 Proposed Action

Under the proposed action, impacts to terrestrial ecosystems would include: (1) temporary and permanent disturbance, degradation, and/or loss of habitat from land-clearing activities; (2) habitat fragmentation; (3) disturbance or displacement of wildlife due to an increase in noise and human activity associated with construction; (4) potential collisions between wildlife and motor vehicles during construction; and (5) increased noise impacts from the proposed Motorsports Park/Vehicle Test Facility.

Temporary and permanent impacts to terrestrial ecology would occur from activities associated with development and land clearing. However, the Parcel ED-1 site is already planned for industrial/business park development, and impacts from land-clearing activities associated within existing DAs were analyzed under the previous scope of analysis (refer to Table 3.1). Therefore, impacts to terrestrial ecology for the proposed action under this EA Addendum will focus on the conversion of 21 acres of NAs to access easements; the clearing of up to 13 acres of NAs within DA 5 and between DAs 5, 6, and 7; and the potential road and/or pedestrian bridges crossing EFPC's branching tributaries.

Vegetation and Wildlife

Under the proposed action, temporary and permanent impacts to vegetation and wildlife habitats would occur from activities associated with development and land clearing. The removal of vegetation such as mixed pine-hardwood forests, second-growth loblolly pine forests, tall fescue, and sensitive beech-maple forests within the NAs would result in permanent habitat loss and could potentially increase fragmentation by reducing habitat connectivity. Trees and other vegetation subject to clearing could support foraging, nesting, and other behaviors for mammals, birds (including migratory birds and BCC), and reptiles. Fragmentation has also been associated with the spread of invasive plant species, where aggressive non-native plants thrive within disturbed ground where native plants have been displaced. EO 11987, *Exotic Organisms*, and DOE 5400.1/Attachment I-1 (DOE/EH--0173T) restrict the introduction of exotic species into natural ecosystems on federally owned land. In an effort to reduce or minimize the spread of invasive species and follow this order, the proponent would revegetate the areas disturbed during construction that are not needed for permanent structures (such as facilities) with native species after construction and land clearing are completed.

Wildlife within the proposed action area would be permanently and/or temporarily disturbed or displaced due to an increase in noise and human activity associated with construction and/or the loss of habitat from land-clearing activities. It is expected that noise effects would be short-term and would only affect wildlife in the immediate project areas. Those affected would generally be able to return to the area(s) after completion of construction and land-clearing activities. While some wildlife might avoid project sites long-term, the affected areas would be small compared with other, similar habitat available nearby. Overall, population-level effects to any species are not expected.

Under the proposed action, wildlife would also be subjected to noise impacts from the Motorsports Park/Vehicle Test Facility. Once in operation, the noise environment would increase over baseline levels (refer to Sect. 3.2). During operation, wildlife may be subjected to sound levels of up to 86 dBA to 103 dBA.

Mammals, in particular, appear to react to noise at sound levels higher than 90 dB, with responses including startling, freezing (i.e., becoming temporarily stationary), and fleeing/flushing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci et al. 1988). While some wildlife might avoid these sites long-term, the affected areas would be small compared with other, similar habitat available nearby in the ORR. Overall, population-level effects to any species are not expected.

Construction activities could also result in potential collisions between wildlife and motor vehicles. In an effort to minimize potential impacts, operational controls would be implemented to reduce adverse effects to wildlife species. These controls include (but are not limited to) seasonal timing of project activities, lower speed limits, ultrasonic warning whistles, hazing animals from the road, and preemptive awareness programs for construction crews. Wildlife strikes by vehicles may occur when animals are present in roadways. Mortality would be greatly reduced by reducing speeds to less than 15 miles per hour and increasing awareness of construction crews to the presence of any animal that might frequent the area. If an animal is observed in the road, vehicles should stop and wait until the animal leaves the road, and if necessary, encourage the animal to move on by driving forward slowly. Roadways associated with a motorsports park would need to be fenced to eliminate the potential for larger wildlife species to enter the track area.

Sensitive vegetation communities within the proposed action area include beech-maple forest (located in DA 5), limestone barrens (located in DA 3, DA 5, and DA 7), and the two walnut plantations (located within the NA on the floodplain of EFPC near the southeast corner of DA 5, and near the mouth of EFPC adjacent to the North Perimeter Road). Direct impacts to these communities would occur should these areas be disturbed, degraded, or cleared. The loss of the beech-maple forest would eradicate the only documented occurrence of this forest community on the ORR. Limestone barrens have become increasingly rare and support unique plant communities of highly specialized species adapted to specific conditions. Walnut plantations are considered an ecological area of historical importance. Where practicable, the proponent would avoid these areas entirely from development to minimize potential adverse impacts to these sensitive communities.

Special Status Species

Because no USFWS federally listed species or designated critical habitats occur within the proposed action area, no impacts to federally listed species would result from implementation of the proposed action. However, direct and indirect impacts to state-listed special status species could occur due to habitat loss from land-clearing activities associated with the proposed action. Impacts would be similar to those previously discussed for wildlife.

Because potential suitable habitat for federally listed bat species is present within the vicinity of the proposed action area, tree removal would occur outside of the active season. As directed under previous NEPA analysis (DOE/EA-1113-A) and Sect. 7 Consultations, the proponent would follow the USFWS-directed seasonal timing protocol that includes a six-month “no cut” period between April 15 through September 15 in which trees would not be disturbed. For tree removal outside of this time period, mist netting would be required to determine if federally listed bat species are present within the area of impact.

Additional species-specific surveys would need to occur prior to land-clearing activities to adequately determine the severity of effects to rare plants (goldenseal and pink ladies-slipper), sharp-shinned hawk (nesting locations), southeastern shrew, and Tennessee dace (aquatic habitats). Under the proposed action, the proponent would continue to coordinate with the various natural resource agencies (including the USFWS, TDEC, and TWRA) that manage the Parcel ED-1 site.

Migratory Birds

In an effort to reduce impacts to migratory birds (including BCC), the proponent would time tree removal and other construction-related activities during certain times of the year. The established “no-cut” period (April 15 through September 15) for bat species also coincides with times of increased migratory bird activity (late March through early May). Tree clearing would be avoided during this time to avoid impacts to both bird and bat species. Land-clearing activities that occur from May 1 to September 1 would be controlled to preclude damage to active nests of passerines. Work during the migratory bird nesting season (April 1 through October 1) would require a migratory bird nesting survey 72 h prior to vegetation disturbance in an area. If surveys discover active nests, the project proponent would implement measures, such as buffer areas or halting work, to prevent nest abandonment until after the migratory bird nesting season or until young have fledged.

Bald and Golden Eagles

No bald or golden eagles are known to nest in or near the proposed action area. Therefore, impacts to bald eagles or sensitive nesting habitats are not likely to occur. If bald or golden eagles, their nests, or their eggs appear near (within 1 mile) the proposed action area prior to the initiation of construction-related activities, the proponent would be required to obtain a permit if disturbance, or relocation, was determined to be necessary.

3.4.2.3 Alternative 1

Under Alternative 1, up to 58 acres of additional NAs would be potentially cleared and/or developed. This would account for 45 more acres than the proposed action and may involve clearing and development of the entirety of the corridors between DAs 5 and 6 and 6 and 7.

Impacts to terrestrial resources would be similar as to those previously described under the proposed action (Sect. 3.4.2.2); however, the overall loss of habitat would be more severe. Vegetation communities and the wildlife species dependent on mixed pine-hardwood forests, second-growth loblolly pine forests, tall fescue, and sensitive habitats would be directly impacted by degradation, and/or loss of habitat from land-clearing activities, and habitat fragmentation. Clearing and development of the entirety of the corridors between DAs 5 and 6 and 6 and 7 would directly affect the ecology of the site. Habitats that support various species of wildlife would be lost due to land clearing. Habitat fragmentation could reduce species connectivity between sites as well as encourage the introduction of invasive species.

In an effort to reduce overall impacts to wildlife species (including special status species), seasonal timing restrictions would be enforced as well as the implementation of wildlife collision protocols. Surveys for state-listed special status species would be coordinated through the various natural resource agencies (USFWS, TDEC, and TWRA) that manage the site.

While any habitat loss could adversely affect individual species, the amount of impacted habitat would be relatively small (less than 1%) compared to similar habitat available within the ORR and intermountain regions of Appalachia. According to the 2006 *Oak Ridge Reservation Physical Characteristics and Natural Resources*, there is an estimated 24,000 acres of forested-hardwood habitat available within the ORR (ORNL/TM-2006/110).

3.5 WATER RESOURCES

3.5.1 Affected Environment

Surface Water

East Fork Poplar Creek (EFPC)

EFPC is a fourth-order stream that bisects Parcel ED-1 just south of DAs 5, 6, 7, and the interconnected NAs (Fig. 3.3). Approximately 4 miles of EFPC are included on the parcel out of a total EFPC stream length of 16 miles. The Tennessee Water Quality Control Board has designated EFPC in the area of Parcel ED-1 as suitable for growth and propagation of fish and aquatic life, for recreation including fishing and swimming, for irrigation and livestock watering, and for wildlife (DOE/EA-1113).

East Fork Tributaries and Smaller Creeks

There are seven small tributaries to EFPC and a small sinkhole stream within the parcel (Fig. 3.9). All seven streams enter EFPC within the parcel, and some lie almost totally within Parcel ED-1. The three northern tributaries and the sinkhole tributary are typically seasonal, with subsurface flow and surface drying during periods of limited rainfall (DOE/EA-1113).

Local Hydrology

Parcel ED-1 is located in a flat, low-lying area and is prone to flooding from EFPC. The existing surface runoff and seepage flow to the creek is moderated by the soils and vegetation on the site. A forested or otherwise intensely vegetated surface will mitigate flooding by the following methods: (1) delaying the overland flow of runoff to surface water since flow over a vegetated surface is slow, (2) promoting infiltration since the delay provides a longer opportunity to infiltrate, and (3) removing water to the atmosphere by means of transpiration through the plants themselves (DOE/EA-1113).

Groundwater

Parcel ED-1 is located predominantly in a groundwater discharge regime along the axis of the East Fork Valley. Depth to groundwater is expected to range from 15 to 20 ft along the crests of the low-lying hills within the site area along EFPC (DOE/OR/01-2585).

Sinkholes

There are a number of sinkholes and sinking streams (streams that disappear underground) within Parcel ED-1. Sinkholes are located in DA 5, DA 6, DA7, and the NAs. The largest sinkhole is located in the NA between DAs 5 and 6. Several smaller sinkholes have been located in DAs 5 and 7 (Fig. 3.9). Most of the other sinkholes within Parcel ED-1 are very small and/or shallow (DOE/OR/01-2585). There are two distinct sinking streams: one along the northern boundary of the site and the other at the eastern edge of the large sinkhole in the northern portion of the parcel (DOE/EA-1113).

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

As described previously, under the no action alternative, Parcel ED-1 would maintain its current configuration and would continue to be open for development within approved DAs for use as a

business/industrial park. Currently, DAs on Parcel ED-1 are cleared and maintained in a semi-improved state. Potential impacts to water resources at this point under the no action alternative would be associated with the addition of impervious surfaces to as-of-yet undeveloped DAs and would be within the scope of that described in the 1996 EA and 2003 EA Addendum. Based on monitoring data collected since 1996, development and use of Parcel ED-1 as a business/industrial park since 1996 has not been shown to result in any adverse impacts to associated water resources (DOE/OR/01-2585). This would be expected to continue under the no action alternative provided all mitigations and BMPs, as identified in previous NEPA documentation and existing permitting, continue to be implemented.

3.5.2.2 Proposed Action

Development associated with the proposed action would include: (1) build-out of DAs 5, 6, and 7; (2) clearing and potentially paving of up to 13 acres of NAs within DA 5 and between DAs 5, 6, and 7; and (3) extension of access roads and utilities. This would also include the potential road and/or pedestrian bridges crossing EFPC's branching tributaries. Changing allowable land uses on DAs 1, 2, and 3 would not have any direct impacts to water resources, and development of these DAs falls within the scope of previous NEPA analysis. As a result, potential impacts to water resources associated with mixed-use development of DAs 1, 2, and 3 are not discussed further.

Surface Water

Surface water resources on and near DAs 5, 6, and 7 could be affected by the alteration of local hydrology; soil erosion, runoff, and sedimentation; and contaminated stormwater runoff.

New development consisting of impenetrable surfaces can affect the local hydrology, including increasing the volume of runoff and eventually resulting in an increase of flooding events of the nearby streams and low-lying areas. Mitigations will need to be implemented for any proposed development to ensure proper management of runoff, and to reduce localized flooding and waterborne particulates into streams. Also, per the 2013 MAP, the latest version of the *Tennessee Erosion & Sediment Control Handbook* (TDEC 2012) will be followed (DOE/OR/01-2585).

Impacts to streams would be minimized by developing an Erosion and Stormwater Management plan (per guidance from the City of Oak Ridge's Zoning Ordinance) for the proposed action (City of Oak Ridge City Council, Municipal Planning Commission, and Community Development Department 2019). This would include required mitigations already outlined in the 1996 EA, such as: including contouring paved areas to direct runoff into man-made catchment basins; preserving and planting new natural vegetation areas to impede stormwater flow and increase infiltration; implementing buffer zones of at least 30 m (100 ft) on each side of streams; and restoration of any stream banks, stream sides, and riparian zones (DOE/EA-1113).

A complete analysis of local hydrology would be part of the design of new facilities, and mitigations would be included in design specifications for new construction. Measures implemented to reduce the degradation of surface water quality must follow the MAP and the City of Oak Ridge's Zoning Ordinance.

Groundwater

Design specifications for new construction would be required to carefully consider the location of existing sinkholes to not only avoid development activities near sinkholes, but also include BMPs to avoid impacts to existing sinkholes. Implementing stormwater runoff mitigations and BMPs as discussed above around sinkholes would serve to minimize adverse impacts.

3.5.2.3 Alternative 1

The main difference between the proposed action and Alternative 1 would be the amount of additional NA potentially cleared and/or developed; up to 58 acres under Alternative 1 (45 more acres than the proposed action). Under the proposed action, only some portions of the corridors between DAs 5 and 6 and 6 and 7 may be utilized for development and cleared to support roadway/connectivity development. Alternative 1 may involve clearing and development of the entirety of the corridors between DAs 5 and 6 and 6 and 7.

Overall, although the amount of acreage potentially affected may increase slightly over the proposed action, impacts to surface water and groundwater, and associated mitigations and BMPs to avoid or minimize potential adverse impacts, would be the same as those described under the proposed action.

3.6 FLOODPLAINS/WETLANDS

3.6.1 Affected Environment

The 100- and 500-year floodplains within Parcel ED-1 are located along EFPC and its tributaries (Fig. 3.9). The 100-year floodplain contains approximately 287 acres of predominantly bottomland hardwoods and pine plantations (DOE/EA-1113-A). Past encroachment of the floodplain within Parcel ED-1 has included construction of culverts, utilities, bridges, and roads as part of the initial development of the site.

Several wetlands have been described within the NA at Parcel ED-1 (Fig. 3.9) [DOE/OR/01-2585; DOE/EA-1113]. All of the wetlands are associated with EFPC and its tributaries. Five of the wetlands are located at the western edge of Parcel ED-1, upstream from the confluence of EFPC with Poplar Creek. Two wetlands are located along Bear Creek and one wetland is located along Dace Branch in the southern portion of Parcel ED-1. Two wetlands are located along the unnamed tributary that flows between DA 6 and DA 7. These small wetlands are located south of Renovare Boulevard. Additional details on wetlands in Parcel ED-1 can be found in the 2013 MAP (DOE/OR/01-2585).

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the no action alternative, Parcel ED-1 would maintain its current configuration and would continue to be open for new business within approved DAs. Currently, DAs on Parcel ED-1 are cleared and maintained in a semi-improved state. Potential impacts to floodplains at this point under the no action alternative would be associated with the future development of as-of-yet undeveloped DAs and would be within the scope of that described in the 1996 EA and 2003 EA Addendum. Based on monitoring data collected since 1996, development and use of Parcel ED-1 as a business/industrial park since 1996 has not been shown to result in any adverse impacts to floodplains (DOE/OR/01-2585). This would be expected to continue under the no action alternative provided all mitigations and BMPs, as identified in previous NEPA documentation and existing permitting, continue to be implemented.

3.6.2.2 Proposed Action

The proposed action involves the conversion of 21 acres of NAs; the clearing of up to 13 acres of NAs within DA 5 and between DAs 5, 6, and 7; and the potential road and/or pedestrian bridges crossing EFPC's branching tributaries. The Parcel ED-1 site is already planned for industrial/business park development, and impacts from associated actions within existing DAs were analyzed under the previous scope of

analysis (refer to Table 3.1). Previous analysis included the requirements associated with the placement of bridges and roads in floodplains.

Of the areas involved in the proposed action, only the NA corridors between DAs 5, 6, and 7 contain floodplains. Therefore, impacts to floodplains for the proposed action under this EA Addendum focus on the NA corridors between those locations. There are no known wetlands located in these corridors and therefore no wetland impacts are anticipated. A wetland survey would be completed prior to any construction as described in the 1996 EA and the 2003 EA Addendum. A Clean Water Act of 1972 (CWA), Sect. 404 permit would be required should it be determined that there are unavoidable impacts to wetlands or other waters of the U.S.

Implementation of the proposed action is most likely to impact the floodplain located within the NA corridor between DAs 6 and 7 (Fig. 3.9). However, the 100-year floodplain does not include the entire NA corridor, and construction of bridges, roads, and culverts north of the floodplain would avoid direct impacts to the floodplain. Indirect impacts to floodplains through increases in surface water runoff would be avoided by complying with the stormwater and effluent requirements described in the 1996 EA and summarized in Sect. 3.5 (Water Resources) of this EA Addendum.

Floodplains are also present along the unnamed tributary that bisects DA 7 and in the southern portion of the NA corridor between DA 5 and DA 6 adjacent to the intersection of Renovare Boulevard and Novus Drive (Fig. 3.9). Impacts to these floodplains would be avoided if construction occurs to the north of these locations and outside of the floodplain boundaries.

Should construction within the floodplains be unavoidable, the developer would be responsible for compliance with all federal, state, and local floodplain regulations. This would include required permits and mitigations already outlined in the 1996 EA such as bridging creeks or placing culverts to minimize hydrology changes.

3.6.2.3 Alternative 1

The main difference between the proposed action and Alternative 1 would be the amount of additional NA potentially cleared and/or developed; up to 58 acres under Alternative 1 (45 more acres than the proposed action). Impacts to the 100-year floodplain would vary depending upon the type of development. Clearing activities that do not include construction within the floodplain would not introduce new, direct floodplain impacts. Indirect impacts to floodplains through increases in surface water runoff would be avoided by complying with the stormwater and effluent requirements described in the 1996 EA and summarized in Sect. 3.5 (Water Resources) of this EA Addendum.

Should construction within the floodplains be unavoidable, the developer would be responsible for compliance with all federal, state, and local floodplain regulations. This would include required permits and mitigations already outlined in the 1996 EA such as bridging creeks or placing culverts to minimize hydrology changes. There are no known wetlands located in the areas proposed for construction and, therefore, no wetland impacts are anticipated. A wetland survey would be completed prior to any construction as described in the 1996 EA and the 2003 EA Addendum. A CWA, Sect. 404 permit would be required should it be determined that there are unavoidable impacts to wetlands or other waters of the U.S.

3.7 INTENTIONAL DESTRUCTIVE ACTS

DOE is required to consider intentional destructive acts, such as sabotage and terrorism, in each EIS or EA that it prepares. As at any location, the possibility exists for random acts of violence and vandalism. Because Parcel ED-1 is essentially public property and has no DOE-related facilities, the risk of terrorist acts is minimal. Proposed land use changes and potential future development would not change the current security precautions for other DOE properties. It is also anticipated that security measures (e.g., gates and fences) typical of small industrial parks and other commercial developments would be implemented and serve as an impediment to assault by trucks or other vehicles.

3.8 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Overall, impacts associated with the proposed action and Alternative 1 are mainly associated with development activities, and include impacts from ground disturbance and land clearing. For comparative purposes, Table 3.7 provides a summary of impacts by alternative for each resource area analyzed.

Table 3.7. Summary of potential environmental consequences by alternative

Resource area	Proposed action	Alternative 1	No action
Noise	<p>Overall, the largest potential noise contributor would be the proposed operation of a motorsports park. However, noise levels are not expected to conflict with surrounding land uses. Based on other existing motorsports parks, cars are typically muffled to limit noise between 86 dBA and 103 dBA at a 50-ft distance from the racetrack. Noise modeling analyses conducted for this EA assumed the same for any proposed motorsports park. Modeling under these noise limitations for three different types of notional cars under two different scenarios (single events and racing events) shows that while noise levels in the immediate area of the racetrack would be loud, noise levels outside of Parcel ED-1 would decrease at distance, with local topography and land cover contributing to noise attenuation. Persons within Parcel ED-1 would be considered “participants,” would be expected to acknowledge racing activity results in loud noise, and would take necessary precautions. Average background noise levels at nearby residential areas would be expected to be between 45 and 50 dBA. The highest noise level anticipated, based on modeling results, would be under 50 dBA for a 103 dBA noise level restriction 50 ft from the racetrack. While noise from racing events may be noticeable for nearby residential areas, the noise would not be expected to interfere with daily activities. Noise level restrictions and limiting operational hours to daytime would serve to minimize potential annoyance.</p>	<p>Potential impacts would be the same as the proposed action.</p>	<p>Parcel ED-1 would continue to be available as an industrial/business park. Noise levels would continue as baseline.</p>
Land Use	<p>Overall, allowing mixed-use on Parcel ED-1 would not result in adverse land use-related impacts. Parcel ED-1 is already zoned for industrial use. Allowing a mixed-use zoning would not result in adverse impacts to surrounding land uses and may prove beneficial from a potential reduction in industrial use over less intrusive types of land uses. A change in zoning for Parcel ED-1 may provide for more development opportunities over the long-term.</p> <p>A segment of the local area greenway temporary easement (approximately 4,627 linear ft, or 5.6%, of the total local area</p>	<p>Potential impacts would be the same as the proposed action.</p>	<p>Parcel ED-1 would continue to be available as an industrial/business park. Maintaining the status quo may continue to limit development interest, as has been the case since 1996. Overall, potential impacts under the no action alternative would remain within the scope of those analyzed under previous NEPA documentation for these activities.</p>

Table 3.7. Summary of potential environmental consequences by alternative (cont.)

Resource area	Proposed action	Alternative 1	No action
	<p>greenway [approximately 81,989 linear ft]) would either be removed or incorporated into site design. The overall impact would be negligible, given availability of other greenway space in the area and compensatory recreational opportunities provided as part of development (e.g., walking and bike trails). In the long-term, development of Parcel ED-1 would eventually provide a benefit to the surrounding recreation network if new development includes additional recreational opportunities, and new construction of public parking would improve access (e.g., park and go) to the trails.</p>		
<p>Terrestrial Ecology</p>	<p>Temporary and permanent impacts to vegetation and wildlife habitats would occur from activities associated with development and land clearing. The removal of vegetation such as mixed pine-hardwood forests, second-growth loblolly pine forests, tall fescue, and sensitive beech-maple forests within the NAs would result in permanent habitat loss and could potentially increase fragmentation by reducing habitat connectivity.</p> <p>Sensitive vegetation communities within the proposed action area include beech-maple forest, limestone barrens, and two walnut plantations. Direct impacts to these communities would occur should these areas be disturbed, degradation, or cleared. Where practicable, the proponent would avoid these areas entirely from development to minimize potential adverse impacts to these sensitive communities.</p> <p>There are no USFWS federally listed species or designated critical habitats within the proposed action area. State-listed sensitive species are present within the action area. Additional species-specific surveys would need to occur prior to land-clearing activities to adequately determine the severity of effects to rare plants (goldenseal and pink ladies-slipper), sharp shinned hawk (nesting locations), southeastern shrew, and Tennessee dace (aquatic habitats). Under the proposed action, the proponent would continue to coordinate with the various</p>	<p>Although the NA potentially cleared and developed under Alternative 1 would be larger than under the proposed action (up to 58 acres vs. up to 13 acres, respectively), impacts to water resources, terrestrial ecology, and wetlands/floodplains, and associated mitigation requirements to minimize impacts, would be the same.</p>	<p>Parcel ED-1 would continue to be available as an industrial/business park. Potential impacts would be associated with the future development of as-of-yet undeveloped DAs and overall maintenance of Parcel ED-1. Monitoring data collected since 1996 show that activities at Parcel ED-1 have not resulted in any adverse impacts to terrestrial ecology, water resources, or floodplains and wetlands. This would be expected to continue under the no action alternative provided all mitigations and BMPs as identified in previous NEPA documentation and existing permitting continue to be implemented.</p>

Table 3.7. Summary of potential environmental consequences by alternative (cont.)

Resource area	Proposed action	Alternative 1	No action
	<p>natural resource agencies (including the USFWS, TDEC, and TWRA) that manage the Parcel ED-1 site.</p> <p>Seasonal development constraints would be required to mitigate potential impacts to migratory birds.</p>		
Water Resources	<p>Overall, impacts associated with development activities (e.g., ground disturbance) would be within the scope of those identified in previous NEPA documentation. Surface water resources on and near DAs 5, 6, and 7 could be affected by the alteration of local hydrology, soil erosion, runoff, and sedimentation during construction activities, and contaminated stormwater runoff from operations. Prior to construction, an Erosion and Stormwater Management plan (per guidance from the City of Oak Ridge's Zoning Ordinance) for the proposed action would be required.</p> <p>Measures implemented to reduce the degradation of surface water quality from operations would be required and must follow the MAP and the City of Oak Ridge's Zoning Ordinance. Such measures would include required mitigations already outlined in the 1996 EA, such as: contouring paved areas to direct runoff into man-made catchment basins; preserving and planting new natural vegetation areas to impede stormwater flow and increase infiltration; implementing buffer zones of at least 30 m (100 ft) on each side of streams; and restoration of any stream banks, stream sides, and riparian zones.</p> <p>There are several sinkholes within Parcel ED-1 that must be considered for avoidance during development planning and design. Stormwater management systems must also consider minimizing directed runoff to sinkhole areas.</p>		
Floodplains/Wetlands	<p>Overall, impacts associated with development activities (e.g., bridging or placing culverts in creeks) would be within the scope of those identified in previous NEPA documentation. No impacts to wetlands would occur and no direct impacts to floodplains are anticipated. All construction would comply</p>		

Table 3.7. Summary of potential environmental consequences by alternative (cont.)

Resource area	Proposed action	Alternative 1	No action
	with applicable federal, state, and local floodplain regulations. Wetland and floodplain delineations would occur prior to construction and Clean Water Act of 1972, Sect. 404 permits would be required should wetlands or other waters of the U.S. be identified.		

BMP = best management practice.
 DA = Development Area.
 dBA = A-weighted decibel.
 EA = Environmental Assessment.
 ft = feet.
 MAP = Mitigation Action Plan.

NA = Natural Area.
 NEPA = National Environmental Policy Act.
 TDEC = Tennessee Department of Environment and Conservation.
 TWRA = Tennessee Wildlife Resources Agency.
 U.S. = United States.
 USFWS = U.S. Fish and Wildlife Service.

4. CUMULATIVE IMPACTS

Cumulative impacts are those that may result from the incremental impacts of an action considered additively with the impacts of other past, present, and reasonably foreseeable future actions. Cumulative impacts are considered regardless of the agency or person undertaking the other actions (40 *CFR* 1508.7) and can result from the combined or synergistic effects of individually minor actions over a period of time.

4.1 CUMULATIVE IMPACTS BY RESOURCE AREA

Noise

Potential cumulative impacts related to noise would be associated with other actions undertaken in the area that could contribute to the noise environment discussed in this EA. Racetrack noise would be intermittent, occurring only during track use. Within Parcel ED-1, typical mixed-use-type activities would contribute to the noise environment, but would not be expected to increase overall noise levels in any appreciable manner when considered with racetrack noise. Outside of Parcel ED-1, other activities that contribute to the noise environment include traffic and residential activities such as lawn care, etc. These activities would also not be expected to result in any cumulative effect given the intermittent nature of noise-generating events. The largest potential contributor to overall noise would be the potential operation of a new Oak Ridge airport. However, this project is still in the planning phase, and Federal Aviation Administration NEPA analyses would be required to address the potential cumulative impacts of aircraft noise and airport operations with development of Parcel ED-1 and other noise-generating activities in the area.

Land Use

Of the original 58,582 acres of land acquired in 1942 by the federal government, approximately 25,000 acres have been conveyed for residential, commercial, and community development; transportation easements; preservation and recreation; industrial development; and mission-related purposes. Parcel ED-1 is included in this acreage. Parcel ED-1 was previously analyzed for transfer and development in previous NEPA documentation, and development of the parcel would not result in changes in land use of the surrounding area. Additionally, DOE has designated a large portion of the area surrounding Parcel ED-1 as non-development area, and land use in this area would remain as it presently is.

Terrestrial Ecology

Potential cumulative impacts to ecological resources would be associated with other actions undertaken that could affect the same habitats and wildlife species discussed in this EA. Multiple small, incremental effects can become pronounced if they reach some threshold of significance. Sensitive vegetation communities within the proposed action area include beech-maple forest, limestone barrens, and two walnut plantations. Direct impacts to these communities would occur should these areas be disturbed, degraded, or cleared. The beech-maple forest is, in particular, vulnerable to cumulative effects due to its rarity in the region. Where practicable, the proponent would avoid these areas entirely from development to minimize potential adverse impacts to these sensitive communities.

Habitats on the ORR, particularly mature forest areas, are proactively managed, and any activities that could affect these resources are evaluated in detail. Natural resource managers are aware of the ORR's ecological importance to the region and are committed to conserving habitats and species. It is unlikely that additional substantial development of forested areas will occur on the ORR in the near future. If such development were to occur, management actions and planning would be expected to minimize ecological impacts.

Water Resources

The proposed action would not result in any cumulative impacts outside of those previously analyzed. The primary cumulative impacts on water resources result from earthmoving activities and increased impervious areas that have the potential to increase sediment delivery and surface water runoff downstream into watersheds where other similar types of activities are occurring. As long as all construction projects comply with state and federal laws and regulations, mitigations would be implemented to minimize erosion from construction activities and sediment delivery to nearby surface water. This would minimize the cumulative impacts of construction projects in the region that may otherwise result in increased sediment delivery. The use of temporary or permanent storm water controls such as detention or retention basins and other structures, and stabilization of disturbed areas through landscaping and vegetation, would attenuate increases in surface water runoff and increase groundwater recharge through direct percolation, thus offsetting the loss of pervious surface due to construction in the region and minimizing downstream cumulative effects. Although there would potentially be an additional 58 acres of developable area allowed under Alternative 1, per development restrictions as outlined in previous NEPA documentation, there would be no net loss of stream habitat associated with development activities on Parcel ED-1.

Floodplains/Wetlands

Similar to water resources, the proposed action would not result in any cumulative impacts outside of those previously analyzed. The primary cumulative impacts on floodplains and wetlands result from surface disturbance, sediment delivery, and surface water runoff that affect the utility of floodplain and wetland systems. Although there would potentially be an additional 58 acres of developable area allowed under Alternative 1, per development restrictions as outlined in previous NEPA documentation, there would be no net loss of wetland habitat associated with development activities on Parcel ED-1, and development activities within floodplains would be avoided.

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**APPENDIX A.
CORRESPONDENCE**

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075



In Reply Refer To:
Consultation Code: 04ET1000-2020-SLI-0963
Event Code: 04ET1000-2020-E-01331
Project Name: Parcel ED-1 EA

April 08, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office

446 Neal Street

Cookeville, TN 38501-4027

(931) 528-6481

Project Summary

Consultation Code: 04ET1000-2020-SLI-0963

Event Code: 04ET1000-2020-E-01331

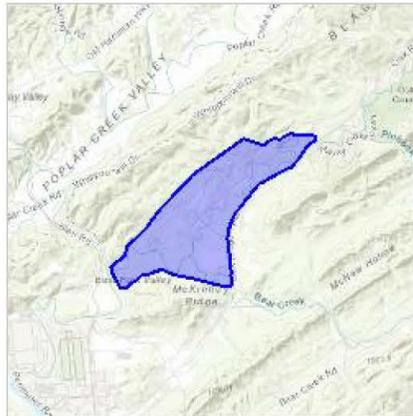
Project Name: Parcel ED-1 EA

Project Type: DEVELOPMENT

Project Description: Proposed Revitalization of Parcel ED-1 at the Horizon Center, Oak Ridge, Tennessee

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/35.958914324203775N84.36974617697601W>



Counties: Roane, TN

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Spotfin Chub <i>Erimonax monachus</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1521	Threatened

Clams

NAME	STATUS
Finerayed Pigtoe <i>Fusconaia cuneolus</i> Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3038	Endangered
Shiny Pigtoe <i>Fusconaia cor</i> Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2573	Endangered

Flowering Plants

NAME	STATUS
Virginia Spiraea <i>Spiraea virginiana</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1728	Threatened
White Fringeless Orchid <i>Platanthera integrilabia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1889	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Rare Species by County

Data is refreshed on or around January and July each year.

Q Go Rows All Actions

County

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County	Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Fed. Status	State Status	Habitat	Wet Habitat Flag
Roane	Vertebrate Animal	Mammal	<u>Sialia sialis</u>	Eastern Spotted Skunk	G4	S3	--	Rare, Not State Listed	Rocky outcrops, open prairies, brushy areas, cultivated fields, and barnyards; more common in east Tennessee; reclusive.	Upland
Roane	Invertebrate Animal	Crustacean	<u>Caecidotea incuna</u>	Incurved Cave Isopod	G204	S1	--	Rare, Not State Listed	Aquatic cave obligate; known from two wet caves in east Tennessee.	Aquatic
Roane	Animal Assemblage	No Data	<u>Rookery</u>	Heron Rookery	G5	SNR	--	Rare, Not State Listed	No Data	No Data
Roane	Vertebrate Animal	Fish	<u>Percina aurantiaca</u>	Tangerine Darter	G4	S3	--	D	Large-moderate size headwater tribs to Tennessee River, in clear, fairly deep, rocky pools, usually below riffles.	Aquatic
Roane	Vertebrate Animal	Bird	<u>Haliaeetus leucorhynchus</u>	Bald Eagle	G5	S3	--	D	Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.	Aquatic
Roane	Vascular Plant	Plant: Gymnosperm	<u>Thuja occidentalis</u>	Northern White Cedar	G5	S3	--	Rare, Not State Listed	Calcareous Rocky Seeps, Cliffs	Upland
Roane	Vascular Plant	Flowering Plant	<u>Helianthus occidentalis</u>	Naked-stem Sunflower	G5	S2	--	S	Limestone Glades And Barrens	Upland
Roane	Vascular Plant	Flowering Plant	<u>Diervilla sessilifolia var. nivalis</u>	Mountain Bush-honeysuckle	G3	S2	--	T	Dry Cliffs And Bluffs	Upland
Roane	Vascular Plant	Flowering Plant	<u>Flodea nuttallii</u>	Nuttall's Waterweed	G5	S2	--	S	Aquatic; Streams And Ponds	Aquatic
Roane	Vertebrate Animal	Fish	<u>Erimacra monachus</u>	Spottin Chub	G2	S2	LTXN	T	Clear upland rivers with swift currents & boulder substrates; portions of the Tennessee River watershed.	Aquatic
Roane	Vertebrate Animal	Fish	<u>Cyprinotus elongatus</u>	Blue Sucker	G304	S2	--	T	Swift waters over firm substrates in big rivers.	Aquatic
Roane	Vertebrate Animal	Bird	<u>Percycaea aedon</u>	Bachman's Sparrow	G3	S1B	--	E	Dry open pine or oak woods; nests on the ground in dense cover.	Upland
Roane	Vascular Plant	Flowering Plant	<u>Platanthera integrifolia</u>	White Fringeless Orchid	G203	G2B3	LT	E	Acidic Seeps And Stream Heads	Possible
Roane	Vascular Plant	Flowering Plant	<u>Platanthera flava var. herbacea</u>	Tuberclted Rein-orchid	G4740	S2	--	T	Swamps And Floodplains	Possible
Roane	Vascular Plant	Flowering Plant	<u>Aralis auriculata</u>	Earleaved False-toglove	G3	S2	--	E	Barrens	Upland
Roane	Vascular Plant	Flowering Plant	<u>Delphinium exaltatum</u>	Tall Larkspur	G3	S2	--	E	Glades And Barrens	Upland
Roane	Vascular Plant	Flowering Plant	<u>Rothloctenium fluviatile</u>	River Bulrush	G5	S1	--	S	Marshes	Possible
Roane	Vascular Plant	Fern and Fern Ally	<u>Asplenium scolopendrium var. americanum</u>	Hart's-tongue Fern	G473	S1	LT	E	Sinks	Possible
Roane	Vascular Plant	Flowering Plant	<u>Juncus brachycephalus</u>	Small-headed Rush	G5	S2	--	S	Seeps And Wet Bluffs	Possible
Roane	Invertebrate Animal	Mollusc	<u>Lampyrus abruptus</u>	Pink Mucket	G2	S2	LE	E	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents; Tennessee & Cumberland river systems.	Aquatic
Roane	Vertebrate Animal	Mammal	<u>Myotis grisescens</u>	Gray Myotis	G4	S2	LE	E	Cave obligate year-round; frequents forested areas; migratory.	Upland
Roane	Invertebrate Animal	Mollusc	<u>Pleurobema cylindrica</u>	Sheepnose	G3	G2B3	LE	E	Large to medium-sized rivers, in riffles and coarse sand/gravel subst; TN & Cumb river systems incl KY Reservoir; W Uplands & Rim.	Aquatic
Roane	Invertebrate Animal	Mollusc	<u>Cumberlandia monodonta</u>	Spectaclecase	G3	G2B3	LE	E	Medium to large rivers; in substrates from mud and sand to gravel, cobble, and boulders; Cumberland and Tennessee river systems.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Draba ramosissima</u>	Branching Whitlow-grass	G4	S2	--	S	Calcareous Bluffs	Upland
Roane	Vascular Plant	Flowering Plant	<u>Erysimum capitatum</u>	Western Wallflower	G5	S1B2	--	E	Rocky Bluffs	Upland
Roane	Vascular Plant	Flowering Plant	<u>Pseudogopphalium helferi</u>	Heller's Catfoot	G405	S2	--	S	Dry Sandy Woods	Upland
Roane	Vascular Plant	Flowering Plant	<u>Ribes missouriense</u>	Missouri Gooseberry	G5	S2	--	S	Rocky Woods	Upland
Roane	Nonvascular Plant	Non-Vascular Plant	<u>Praisia quadrata</u>	A Liverwort	G5	S1	--	T	Seepy Limestone Cliffs And Bluffs	Possible
Roane	Vascular Plant	Flowering Plant	<u>Juglans cinerea</u>	Butternut	G3	S3	--	T	Rich Woods And Hollows	Possible
Roane	Vertebrate Animal	Amphibian	<u>Hemidactylum scutatum</u>	Four-toed Salamander	G5	S3	--	D	Woodland swamps, shallow depressions, & sphagnum mats on acidic soils; middle & east Tennessee.	Possible
Roane	Vascular Plant	Flowering Plant	<u>Marshallia grandiflora</u>	Large-fl Barbara's-buttons	G3	S2	--	E	Rocky River Bars	Possible
Roane	Vascular Plant	Flowering Plant	<u>Liatris cylindrica</u>	Slender Blazing-star	G5	S2	--	T	Barrens	Upland
Roane	Vertebrate Animal	Fish	<u>Chrosomus tennesseensis</u>	Tennessee Dace	G3	S3	--	D	First order spring-fed streams of woodlands in Ridge and Valley limestone region; Tennessee River watershed.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Diervilla lonicera</u>	Northern Bush-honeysuckle	G5	S2	--	T	Rocky Woodlands And Bluffs	Upland
Roane	Vertebrate Animal	Reptile	<u>Pituophis melanoleucus melanoleucus</u>	Northern Pinesnake	G474	S3	--	T	Well-drained sandy soils in pine/pine-oak woods; dry mountain ridges; E portions of west TN, E to lower elev of the Appalachians.	Upland
Roane	Vascular Plant	Flowering Plant	<u>Leucothoe racemosa</u>	Fetter-bush	G5	S2	--	T	Acidic Wetlands And Swamps	Possible
Roane	Vertebrate Animal	Amphibian	<u>Aneides aeneus</u>	Green Salamander	G304	G3B4	--	Rare, Not State Listed	Damp crevices in shaded rock outcrops and ledges; beneath loose bark and cracks of trees and sometimes in/or under logs.	Upland
Roane	Invertebrate Animal	Mollusc	<u>Obovaria retusa</u>	Ring Pink	G1	S1	LE, XN	E	Large rivers in gravel and sand bars; Tennessee & Cumberland river watersheds; many historic locations currently inundated.	Aquatic
Roane	Invertebrate Animal	Mollusc	<u>Pleurobema cooperianus</u>	Orangefoot Pimpleback	G1	S1	LE, XN	E	Large rivers in sand-gravel-cobble substrates in riffles and shoals in deep flowing water; Cumberland & Tennessee river systems.	Aquatic
Roane	Vertebrate Animal	Amphibian	<u>Gyrinophilus nigrilabris</u>	Bern Cave Salamander	G10	S1	C	T	Aquatic cave obligate; Ridge & Valley; formerly included with G. pallidus.	Aquatic
Roane	Vertebrate Animal	Mammal	<u>Perimyotis subflavus</u>	Tri-colored bat	G203	G2B3	--	T	No Data	No Data
Roane	Vascular Plant	Flowering Plant	<u>Spiranthes lucida</u>	Shining Ladies-tresses	G4	S1B2	--	T	Alluvial Woods And Moist Slopes	Possible
Roane	Vascular Plant	Flowering Plant	<u>Panax quinquefolius</u>	American Ginseng	G304	G3B4	--	S-CE	Rich Woods	Possible

Roane	Invertebrate Animal	Mollusc	<u>Fusconia cuneolus</u>	Finerayed Pigtoe	G1	S1	LE, XN	E	Riffles of fords and shoals of mod gradient streams in firm cobble and gravel substrates; middle & upper Tennessee River watershed.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Aureolaria patula</u>	Spreading False-foglove	G3	S3	--	S	Oak Woods And Edges	Upland
Roane	Vascular Plant	Flowering Plant	<u>Oligoneuron album</u>	Prairie Goldenrod	G5	S1S2	--	E	Barrens	Upland
Roane	Invertebrate Animal	Mollusc	<u>Lamprolaima virascens</u>	Alabama Lamprussel	G1	S1	LE	E	Found in sand and gravel substrates in shoal areas of small-medium size rivers; middle and upper TN R system; recently rediscovered in Emory River.	Aquatic
Roane	Invertebrate Animal	Crustacean	<u>Cambarus dewessae</u>	Valley Flame Crayfish	G4	S1	--	E	Primary burrower, open areas with high water tables; northern Ridge & Valley.	Aquatic
Roane	Invertebrate Animal	Mollusc	<u>Fusconia cor</u>	Shiny Pigtoe	G1	S1	LE, XN	E	Shoals and riffles of small-medium sized rivers with mod-fast current over sand-cobble substrates; upper Tennessee River watershed.	Aquatic
Roane	Invertebrate Animal	Mollusc	<u>Quadrula cylindrica strigata</u>	Rough Rabbitsfoot	G3G4T2	G2	LE	E	Small-medium sized rivers, in clear, shallow riffles with sand-gravel substrates; Tenn. & Cumb. river systems; upland form.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Liparis foessli</u>	Fen Orchis	G5	S1	--	T	Calcareous Seeps	Possible
Roane	Vascular Plant	Flowering Plant	<u>Pedicularis lanceolata</u>	Swamp Lousewort	G5	S1S2	--	S	Wet Acidic Barrens And Seeps	Possible
Roane	Vertebrate Animal	Mammal	<u>Sorex dispar</u>	Long-tailed Shrew	G4	S2	--	D	Mountainous, forested areas with loose talus, east Tennessee.	Upland
Roane	Vascular Plant	Flowering Plant	<u>Synthyridium cratense</u>	Barrens Silky Aster	G4?	S1	--	E	Barrens	Upland
Roane	Nonvascular Plant	Non-Vascular Plant	<u>Myuroia bilocata</u>	A Moss	G5	SH	--	S-P	Shale Bluffs	Possible
Roane	Vertebrate Animal	Fish	<u>Hemibarbus flammiea</u>	Flame Chub	G3	S3	--	D	Springs and spring-fed streams with lush aquatic vegetation; Tennessee & middle Cumberland river watersheds.	Aquatic
Roane	Vertebrate Animal	Amphibian	<u>Cryptobranchus alleganiensis</u>	Hellbender	G3	S3	No Status	E	Rocky, clear creeks and rivers with large shelter rocks.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Spiraea virginiana</u>	Virginia Spiraea	G2	S2	LT	E	Stream Bars And Ledges	Possible
Roane	Invertebrate Animal	Mollusc	<u>Lo fluviatilis</u>	Spiny River snail	G2	S2	--	Rare, Not State Listed	Shallow waters of shoals that are rapid to moderate and well-oxygenated; Tennessee River & main tributaries; E Tennessee.	Aquatic
Roane	Invertebrate Animal	Mollusc	<u>Villosa cernuportia</u>	Purple Bean	G1	S1	LE	E	Creeks to medium-sized rivers, headwaters, in riffles with coarse sand & gravel & some silt; upper Tennessee River watershed.	Aquatic
Roane	Vascular Plant	Flowering Plant	<u>Lonicera dioica</u>	Mountain Honeysuckle	G5	G2	--	S	Mountain Woods And Thickets	Possible
Roane	Vertebrate Animal	Mammal	<u>Synaptorynx cooperi</u>	Southern Bog Lemming	G5	G4	--	D	Marshy meadows, wet bays, & rich upland forests.	Possible
Roane	Invertebrate Animal	Mollusc	<u>Pleurobema rubrum</u>	Pyramid Pigtoe	G2G3	S1S2	--	Rare, Not State Listed	Rivers with strong current and firm sand/gravel substrates; TN & Cumb river systems incl KY Reservoir, W Uplands & W Highland Rim.	Aquatic
Roane	Vertebrate Animal	Mammal	<u>Myotis septentrionalis</u>	Northern Myotis	G1G2	S1S2	LT	T	A forest bat whose summer roosts may include caves, mines, live trees and snags; hibernates in caves and mines, often using small cracks and fissures. Notably susceptible to White-Nose Syndrome.	No Data
Roane	Vascular Plant	Flowering Plant	<u>Eurybia schreberi</u>	Schreber's Aster	G4	S1	--	S	Mesic Woods & Seepage Slopes	Upland
Roane	Vertebrate Animal	Reptile	<u>Ophisaurus attenuatus tobicaudus</u>	Eastern Slender Glass Lizard	G5T5	S3	--	D	Dry upland areas including brushy, cut-over woodlands and grassy fields; nearly statewide but obscure; fossorial.	Upland
Roane	Vertebrate Animal	Bird	<u>Limothlypis swainsoni</u>	Swainson's Warbler	G4	S3	--	D	Mature, rich, damp, deciduous floodplain and swamp forests.	Possible
Roane	Invertebrate Animal	Mollusc	<u>Cyrconia stegaria</u>	Fanshell	G1Q	S1	LE, XN	E	Medium to large streams and rivers with coarse sand and gravel substrates; Cumberland and Tennessee river systems.	Aquatic

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If you have any questions or comments, Email ask.tdec@tn.gov or call at (888) 891-TDEC (8332).



APPENDIX B.
PUBLIC/AGENCY INVOLVEMENT ON THE DRAFT
ENVIRONMENTAL ASSESSMENT ADDENDUM

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**APPENDIX C.
NOISE REPORT**

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Blue Ridge Research and Consulting, LLC

Technical Report

Noise Analysis for the Horizon Center Motorsports Park Development at Oak Ridge, Tennessee

16 May 2020

Prepared for

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BRRC 20-03

Prepared by

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1. Introduction

The Department of Energy (DOE) is evaluating the expansion of the allowable land uses in the Horizon Center developmental area in Oak Ridge, TN. One of the potential new land uses involves a private developer to implement a motorsports park. Therefore, a noise analysis for this activity is included as part of the NEPA evaluation. A notional racetrack layout is shown in Figure 1-1. As part of the development process for this motorsports park, an Environmental Assessment (EA) is being prepared. Under the Proposed Action, a road racetrack would be constructed and operated for racing enthusiasts, sanctioned races, and vehicle testing. Under the No Action Alternative, the potential Horizon Center motorsports park would not be constructed. Ambient sound conditions in and around the proposed racetrack would remain as they are today with no significant impacts.

1.1. Description of Motorsports Park / Vehicle Test Facility

The EA Addendum provides the overview of the potential motorsports racetrack [1]:

This activity would potentially involve a motor vehicle test track and research facility on [Development Areas (DA)] 5, 6, and 7, totaling more than 300 acres. Based on preliminary proposals presented to the Oak Ridge IDB, a road course could potentially be developed that is 'suitable for FIA (Federation Internationale de L'Automobile) sanctioned events, such as Formula E, Indy Car, International Motor Sports Association, National Auto Sport Association, and other sanctioning bodies.' Development of a motorsports park would involve roadway and facility development throughout DAs 5, 6, and 7, with potential development of the NA within DA 5 (approximately 12 acres) [as shown in Figure 1-2]. While current proposals are in the preliminary planning phase, other motorsports parks of similar scope are located throughout the country and serve as an example of what such a development might entail...

In addition to the racetrack, motorsports parks have amenities such as garages/car storage, restaurant/dining, a pro shop, lounges, locker rooms and showers, classrooms, fuel services, car wash and detailing, classrooms, and a service center.

As part of the operational concept, the facility will only operate during daylight hours (9 AM to 5 PM) and a noise limit will be implemented to control the sound exposures to the local neighborhoods. For the acoustical modeling, various noise limits were evaluated. These noise limits were modeled at 50 ft from the racetrack and included 86 dBA, 95 dBA, and 103 dBA.

1.2. Report Format

This technical report documents the estimated sound levels from potential race cars as well as sound exposures from racing events. Report elements include definitions of key terms, description of the acoustic modeling, a description of the estimated racecar sound levels, potential racing events, and the acoustical modeling results.

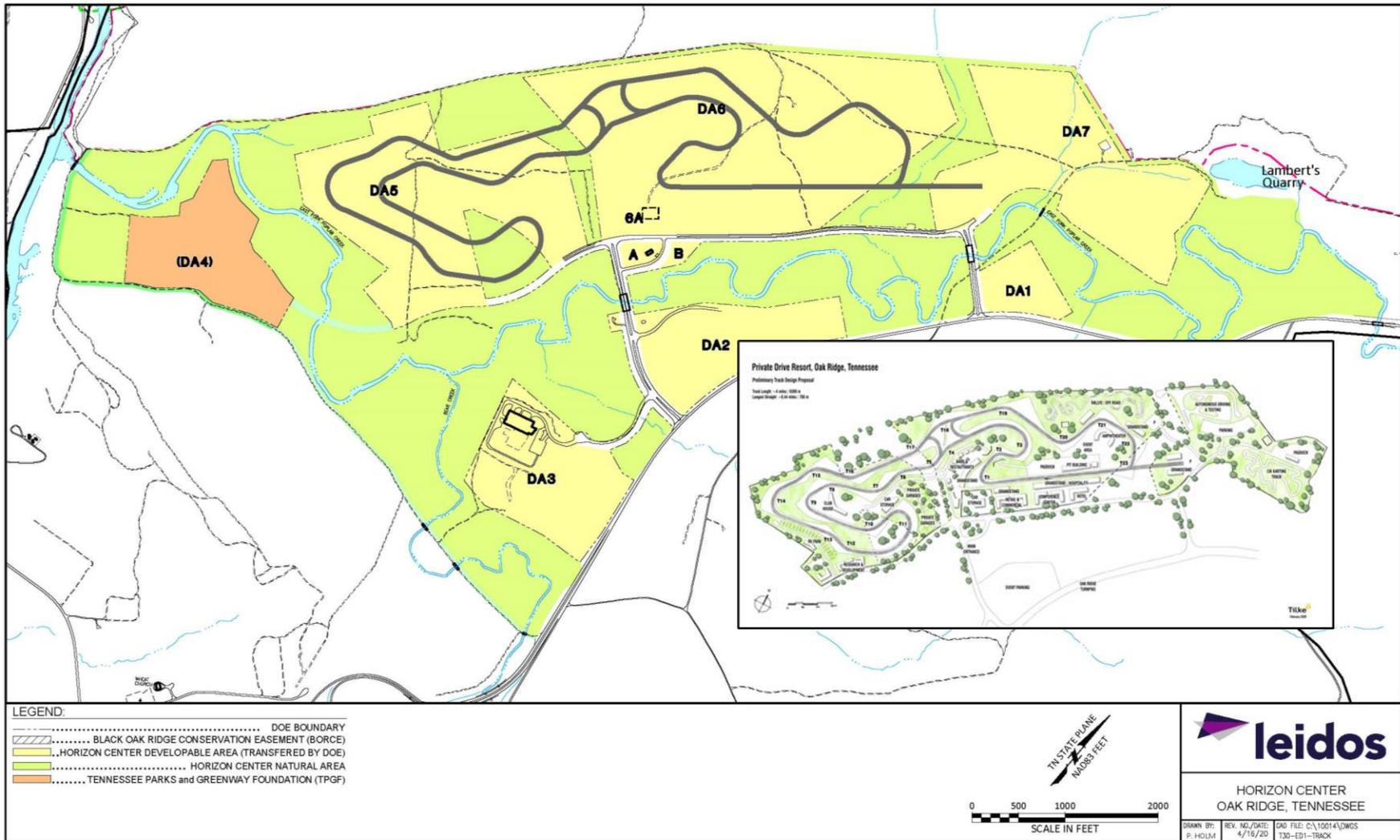


Figure 1-1. Notional Configuration of a Potential Motorsports Park Racetrack.

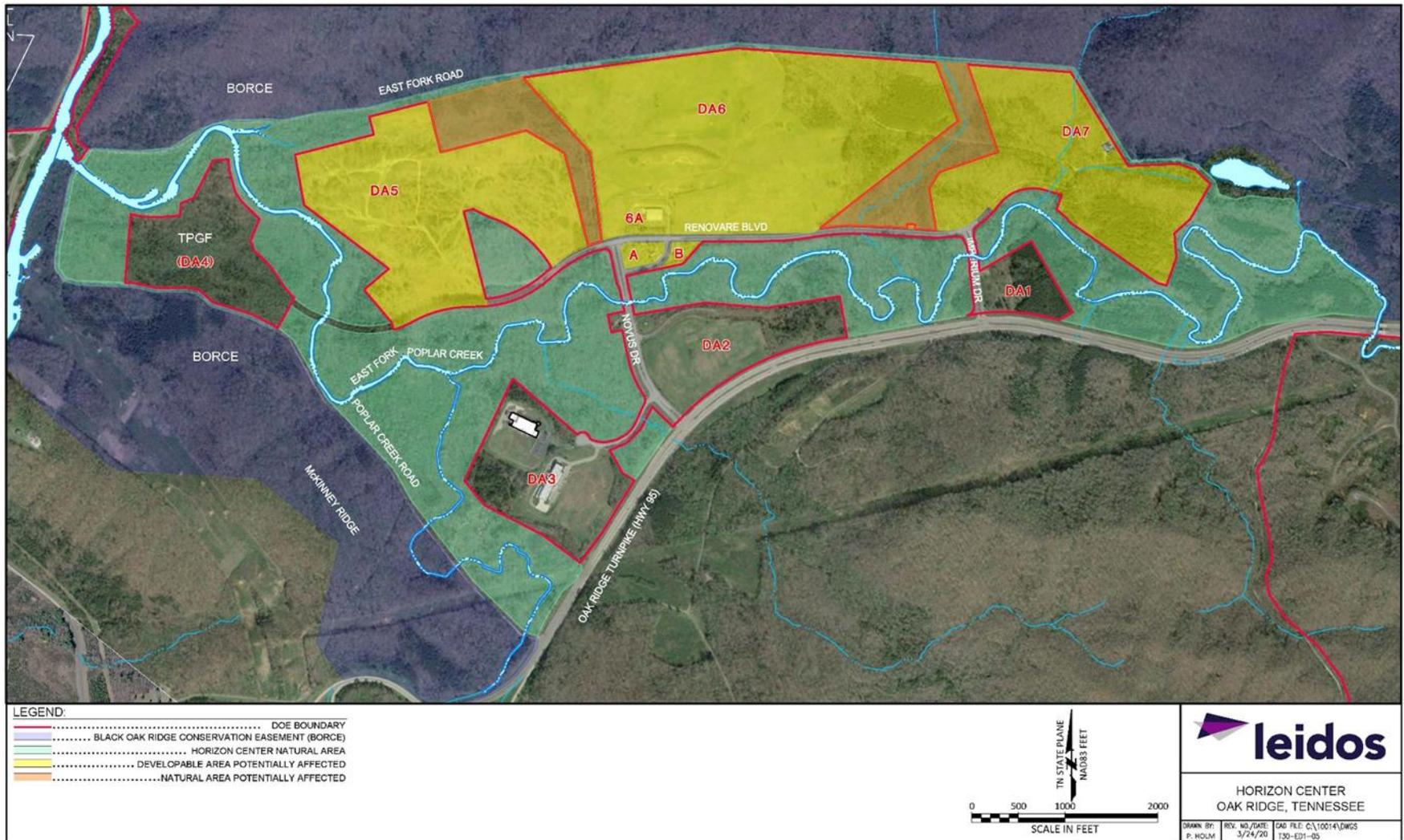


Figure 1-2. Areas Potentially Effected under Proposed Action.

2. Acoustical Modeling Description

For the acoustical analysis of the potential motorsports park, several key terms need to be defined and sound level parameters have to be developed for the reference racecar and conceptual racing events. Several websites were examined to develop these parameters, and example websites are provided in Appendix A.

2.1. Definitions of Key Terms

To assist the reader in understanding the terminology used in characterizing soundscapes, the following definitions are provided:

Acoustical Metrics: Physical measures used to quantify distinct aspects of sound.

Ambient Soundscape: The totality of sounds occurring within a given area. These sounds include natural and human-made sound but exclude the noise source being considered and analyzed.

dB: A Decibel is a logarithmic measurement ratio used to compare sound pressure levels. “A 3-dB change is the threshold of change detectable by the human ear, a 5-dB change is readily noticeable, and a 10-dB change is perceived as a doubling or halving of noise loudness.”

dBA: A logarithmic ratio with the “A” denoting an adjustment to the frequency content of a noise event to represent how the average human ear responds to sound.

L_{Amax}: The maximum sound level is the highest level that occurs for a transient sound event such as a car drive-by.

L_{eq}: The equivalent continuous sound level is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the actual fluctuating noise.

L_{NN}: The sound level that is exceeded NN% of the time for a given period. For example, L₉₀ represents the sound level exceeded for 90% of the measurement period and this level is used to indicate the ambient background sound level for a given area.

2.2. Advanced Acoustic Model (AAM)

AAM utilizes three-dimensional reference sound levels for any vehicle in motion [2]. For the vehicle in motion, the basic sound propagation includes the effects of geometric spreading, air absorption, and finite ground impedance. The propagation routine also includes the effects of varying ground terrain. The effects of varying ground terrain on sound propagation utilizes the geometrical theory of diffraction [3] algorithms developed by Rasmussen [4]. AAM calculates spectral time histories, which allow the calculation of several integrated metrics at receiver locations. These locations can be selected specific points or a grid of uniform points over a defined area. The locations can be on or above the ground. For community assessment, the locations are generally set at 1.5 m (5 ft) above the ground to approximate the height of a person’s ear. Vehicle operations can be defined as single events or multiple events. For this analysis both modes are utilized to describe different aspects of the potential received sound levels from the racetrack operations.

2.3. Reference Sound Levels

For the reference sound level, composite spectra were developed from recordings of two types of racing cars: Formula 3 (F3) and Porsche Cayman. The raw spectra for these cars are from different racing modes, from high speed to low speed turning, and are provided in Figure 2-1 and Figure 2-2. The reference sound levels are composed of the maximum level among the different racing modes and were converted to one-third octave band (OTOB) spectra. The OTOB spectra were then adjusted to generate the three potential racecar noise limits of 86 dBA, 95 dBA, and 103 dBA at a distance of 50 ft from the racetrack. These composite reference OTOB spectra are shown in Figure 2-3 and Figure 2-4.

The F3 sound emission has a tonal quality arising from the whine of the engine. The primary tone occurs between 200 and 300 Hz with more tones around 400 and 600 Hz. The primary tone is a function of engine rotations per minute (RPM). The Porsche Cayman generates a low frequency tone that varies between 150 to 200 Hz. In general, the Porsche Cayman has more low frequency content compared to the F3 for a given racecar sound limit.

The F3 spectra is used for the potential Formula Americas (FA) racing series. The Porsche Cayman spectra is used to represent GT Motorsports (GT) and Sports Car Driving Association (SCDA) events.

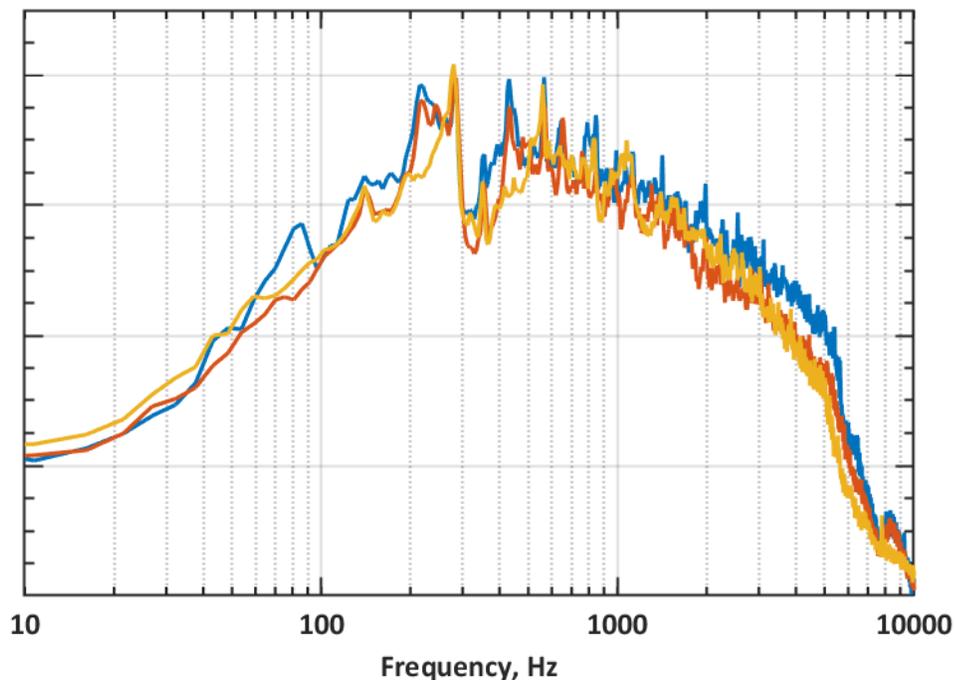


Figure 2-1. Raw Spectra for F3 Racing Car.

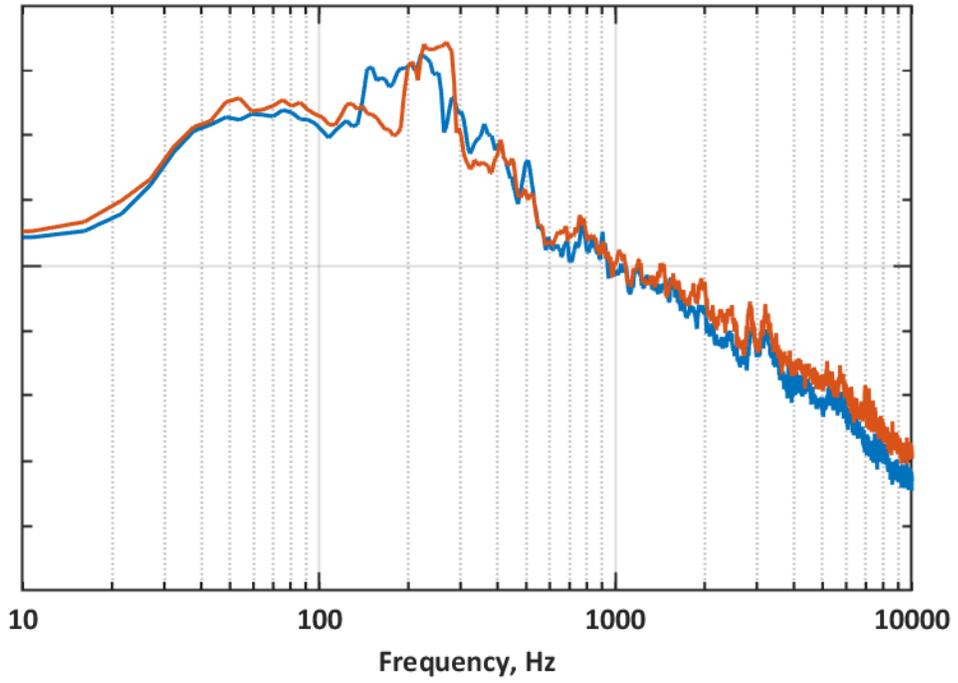


Figure 2-2. Raw Spectra for Porsche Cayman Racing Car.

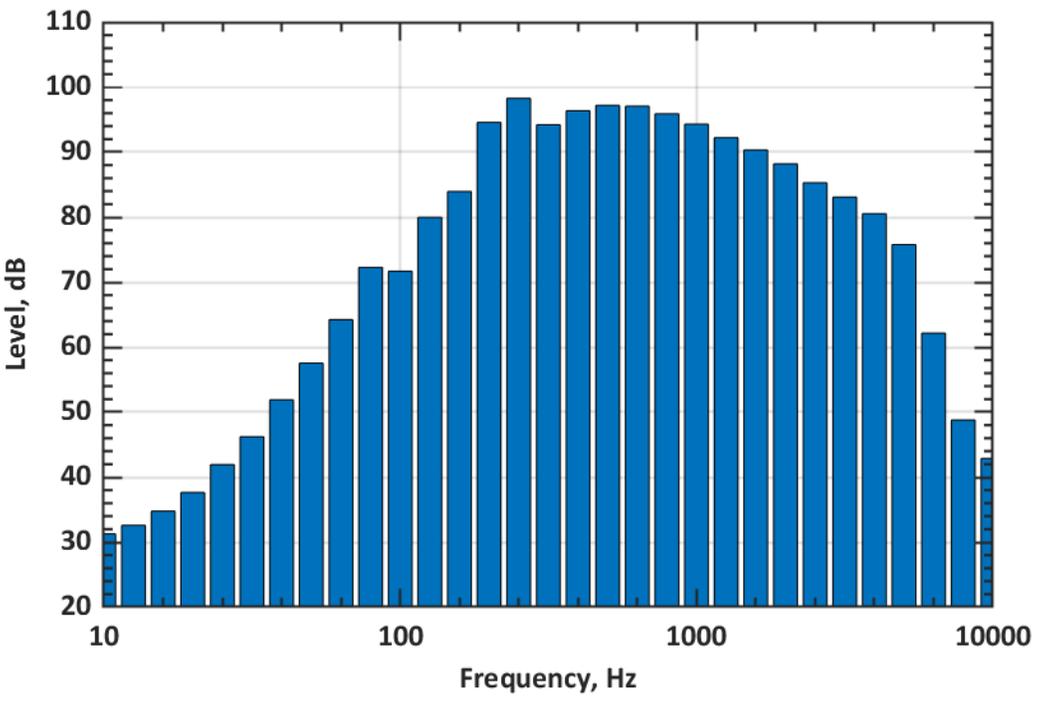


Figure 2-3. Composite Unweighted OTOB Spectrum for Formula 3 Racing Car.

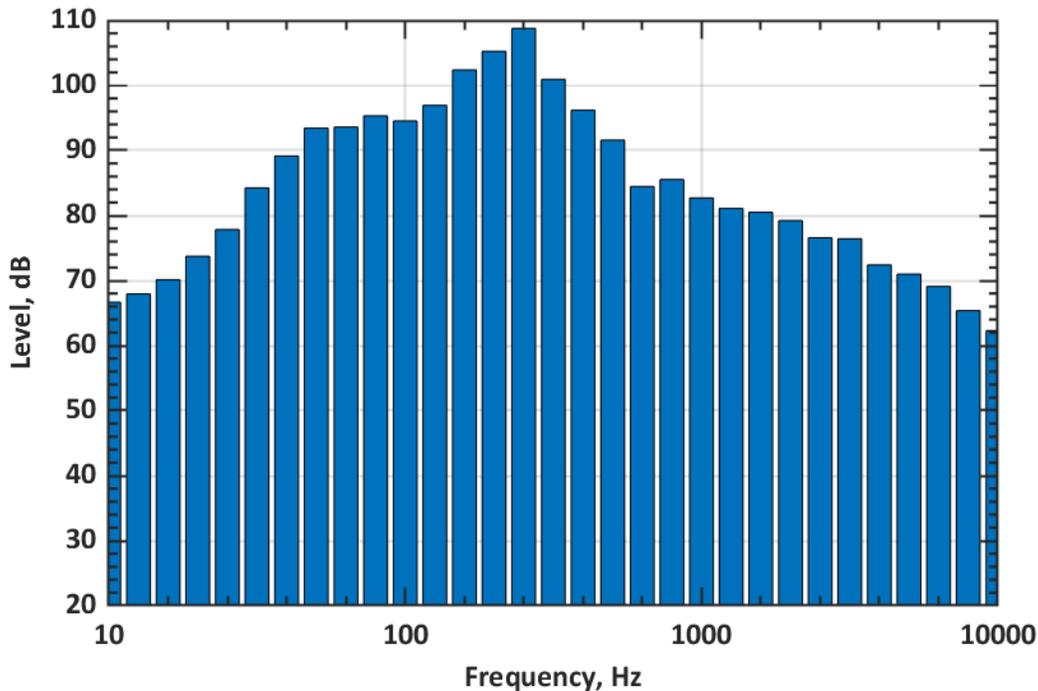


Figure 2-4. Composite Unweighted OTOB Spectrum for Porsche Cayman Racing Car.

2.4. Conceptual Racing/Driving Events

With the reference acoustic data developed and defined, the car trajectory was developed to follow the racetrack centerline, 3 ft above the track. The full lap for the conceptual racetrack is approximately 4 miles. For this analysis, a constant speed was used based on average lap times at current racetracks. For FA, the average speed is set to 110 miles per hour (mph). GT average speed is 90 mph, and SCDA average speed is 70 mph.

For an event, each series has a different level of activity. For FA, race events involve some activity Friday and Saturday with practice and qualifying. On race day, three separate races are conducted with race durations slated to be 35 minutes. FA events vary from 10 to 15 racing cars. For the potential motorsports park, the full lap of the racetrack is assumed in the modeling, such that a 35-minute duration would result in an estimated 16 laps with an average speed of 110 mph. Thus, a FA race day would consist of 720 laps (16 laps * 15 cars * 3 races) occurring over 1.75 hours total. This assumes all cars complete all laps.

For a GT race event, two separate races are conducted with approximately 15 cars. Each race is 90 minutes in duration with an average speed of 90 mph. Using these approximations, each race day would consist of 1,020 laps over 3 hours (the modeling assumes that all cars complete all laps).

SCDA events are not racing events but instead serve as driver training with four different classes of expertise. Each class gets four different 30-minute sessions on the track, and each class has approximately 10 cars with an overall average speed of 70 mph. These estimated parameters will generate 1,280 laps occurring over an 8-hour period. Here also, the modeling assumes all cars complete all laps.

2.5. Ambient Soundscape

Since no standard methodology exists for assessing the potential human reactions to racetrack noise, one common approach is to compare the estimate sounds levels and exposure from the racetrack operation to the local ambient soundscape. In 2015, a sound monitoring study was conducted to explore the potential reactions to the development of an airport in the nearby area [5]. Based on this 2015 study, the site closest to the proposed racetrack location is Site 3 (near Wheat Church) (see **Figure 2-5**), approximately 1.5 miles south. The hourly ambient background levels, as indicated by L_{90} , are shown in Figure 2-6. In this figure, the daytime ambient background level is around 45 dBA.

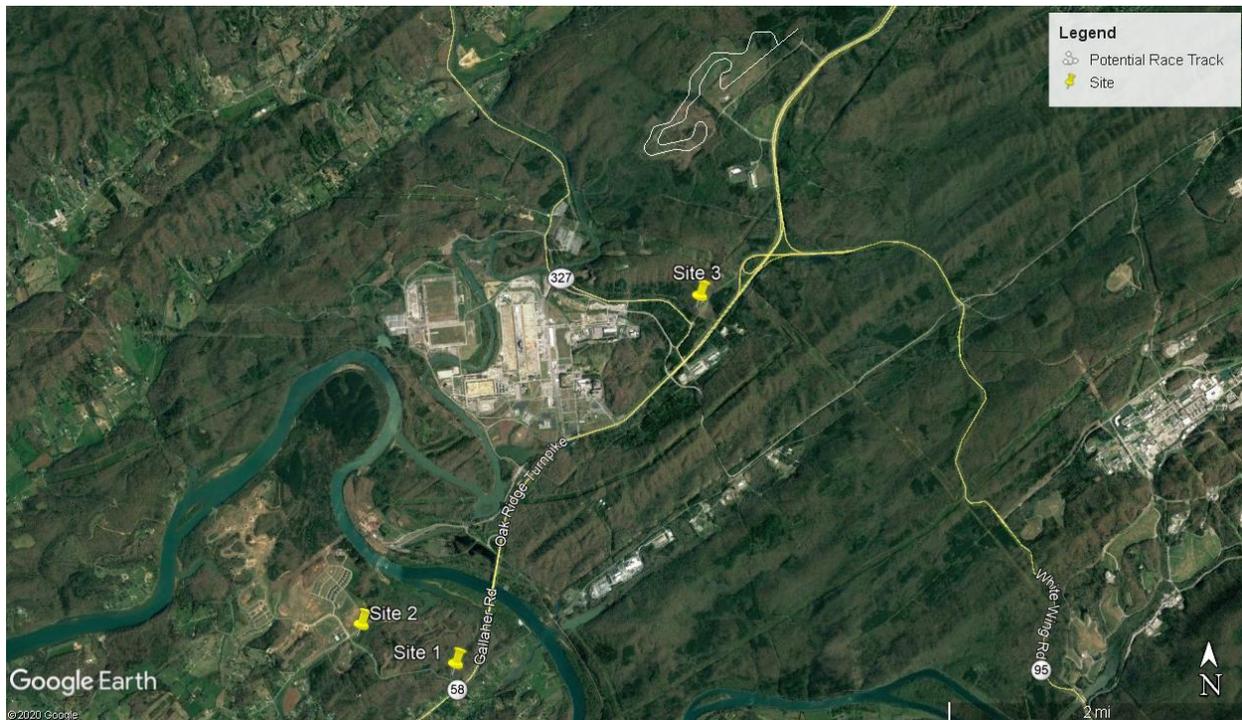


Figure 2-5. Locations of Ambient Site Measurement from 2015 Study [5].

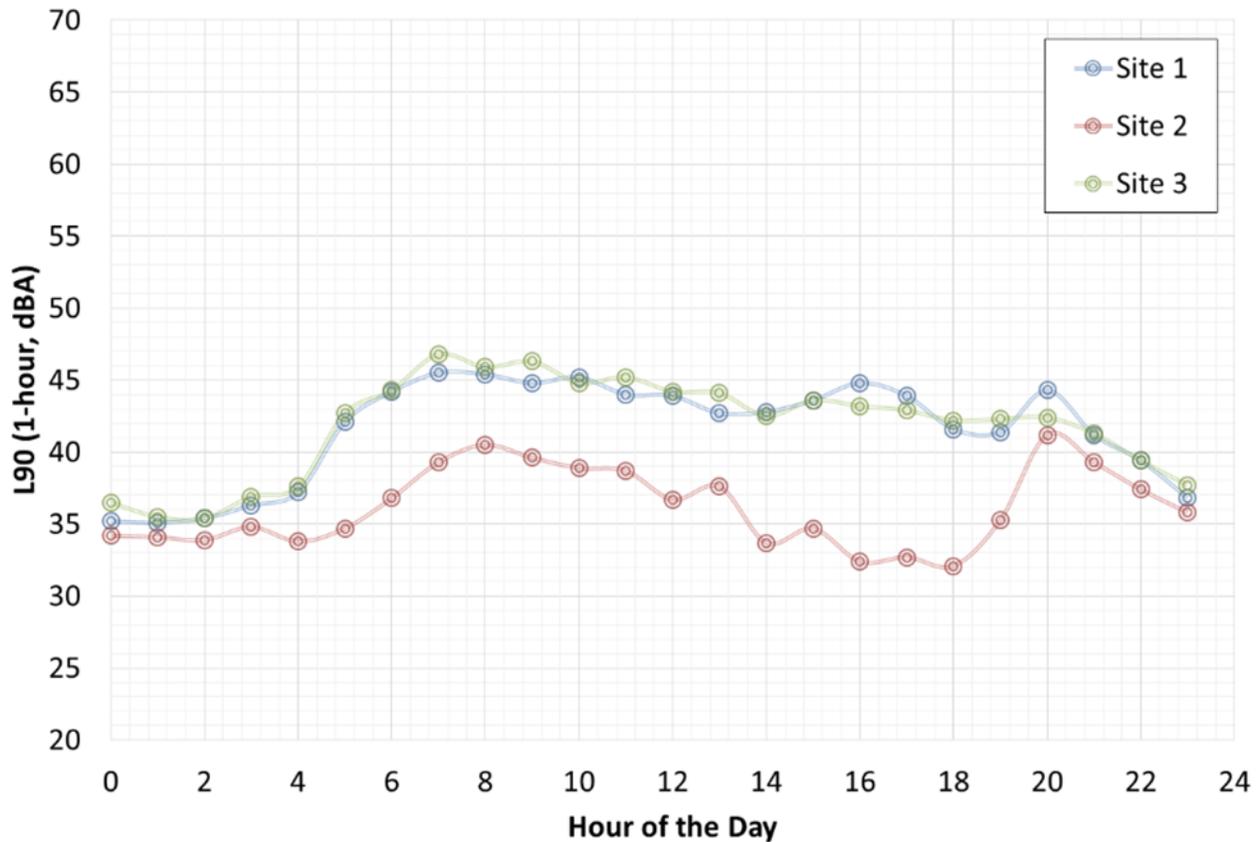


Figure 2-6. Average Hourly L_{90} for Three Sites in the Oak Ridge Area. [5]

3. Results

3.1. Single Car: L_{Amax}

The results for a single car on the racetrack were modeled to provide a mapping of the maximum A-weighted sound level (L_{Amax}) around the racetrack. L_{Amax} is the highest level that occurs for a transient sound event such as a vehicle drive-by. To assist the reader with the results, two nearby residential locations were selected to provide specific modeling results. These residential locations are: (1) the intersection of Westview Ln and Whippoorwill Dr., which is north of the track, and (2) the intersection of Mason Ln and Wildwood Dr., which is to the northeast. Table 3.1 lists the modeled L_{Amax} values at the two representative residential locations for the three different racecar noise limits. All of the values are below 50 dBA. For the 86 dBA racecar noise limit, all of the modeled values are below 40 dBA. For the 95 dBA limit, modeled levels are only above 40 dBA at the north site for the GT and SCDA conceptual racecars, and their modeled sound level is 41 dBA. For the 103 dBA limit, the modeled levels are less than 45 dBA at the north site. At the northeast site, the GT and SCDA conceptual racecars generate modeled levels of 49 and 48 dBA, respectively.

Table 3-1. Modeled L_{Amax} Values for a Single Car on the Racetrack at Two Representative Residential Locations.

Road Intersection	Westview Ln & Whippoorwill Dr.			Mason Ln & Wildwood Dr.		
Racecar Noise Limit (dBA)	Single Event Sound Level -- L_{Amax}					
	F-3	GT	SCDA	F-3	GT	SCDA
86	<40	<40	<40	<40	<40	<40
95	<40	<40	<40	<40	41	41
103	<40	43	44	42	49	48

The overall results of the noise calculations are provided in the next series of graphics. The first series provides the conceptual F3 single racecar results for L_{Amax} with increasing racecar noise limits (Figure 3-1 through Figure 3-3). The second series provides the conceptual GT single racecar results (Figure 3-4 through Figure 3-6), and the third series shows the L_{Amax} results for the conceptual SCDA racecar (Figure 3-7 through Figure 3-9).

The terrain ridgelines to the northwest and southwest reduce the noise propagation in those directions. Additionally, the spectral content of each reference vehicle effects the results: the area exposed to noise from the F3 is smaller due to the F3's higher frequency content relative to the Porsche Cayman. Also, as the racecar noise limits increase, the propagated levels increase in a similar manner. Note that these results are for calm atmospheric conditions, whereas actual atmospheric conditions can vary the received levels. In general, if a receiver is downwind of the racetrack, then the received noise levels may be higher. If a receiver is upwind, then the received levels may be lower. In addition, if a strong temperature inversion exists (atmospheric temperatures increase with altitude), then the received levels may be higher as well.

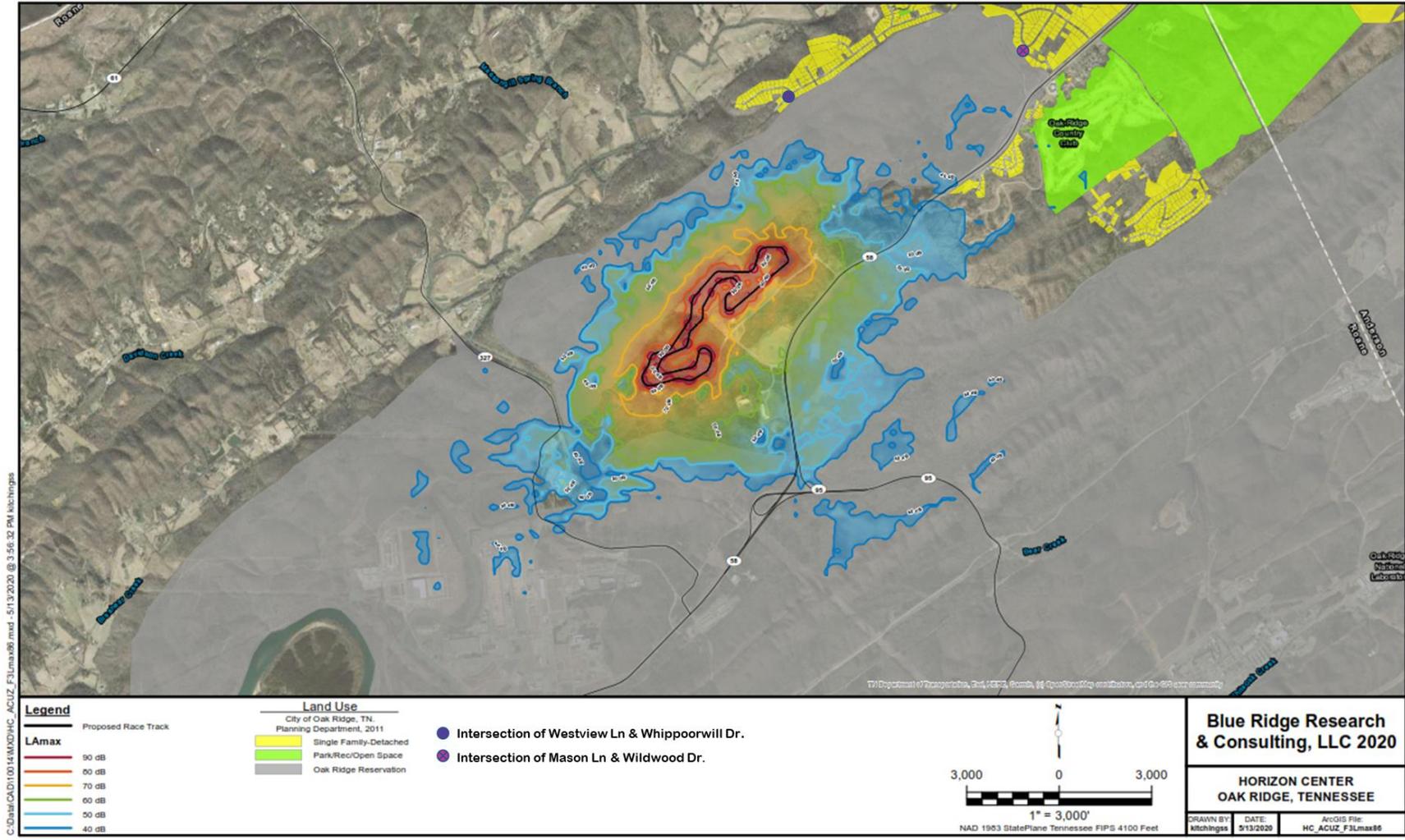


Figure 3-1. F3 Single Car L_{max} for an 86 dBA Racecar Noise Limit.

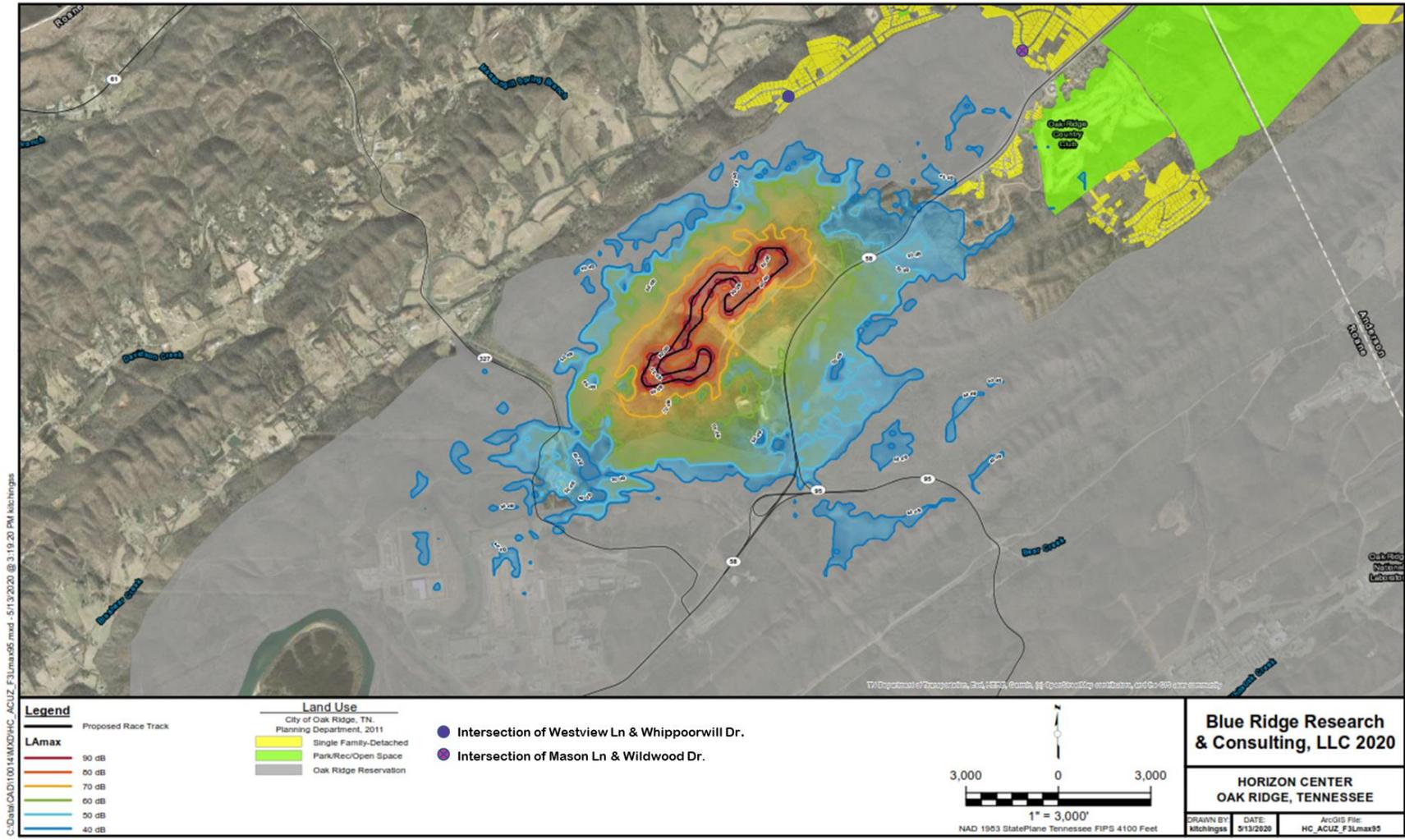


Figure 3-2. F3 Single Car L_{max} for a 95 dBA Racecar Noise Limit.

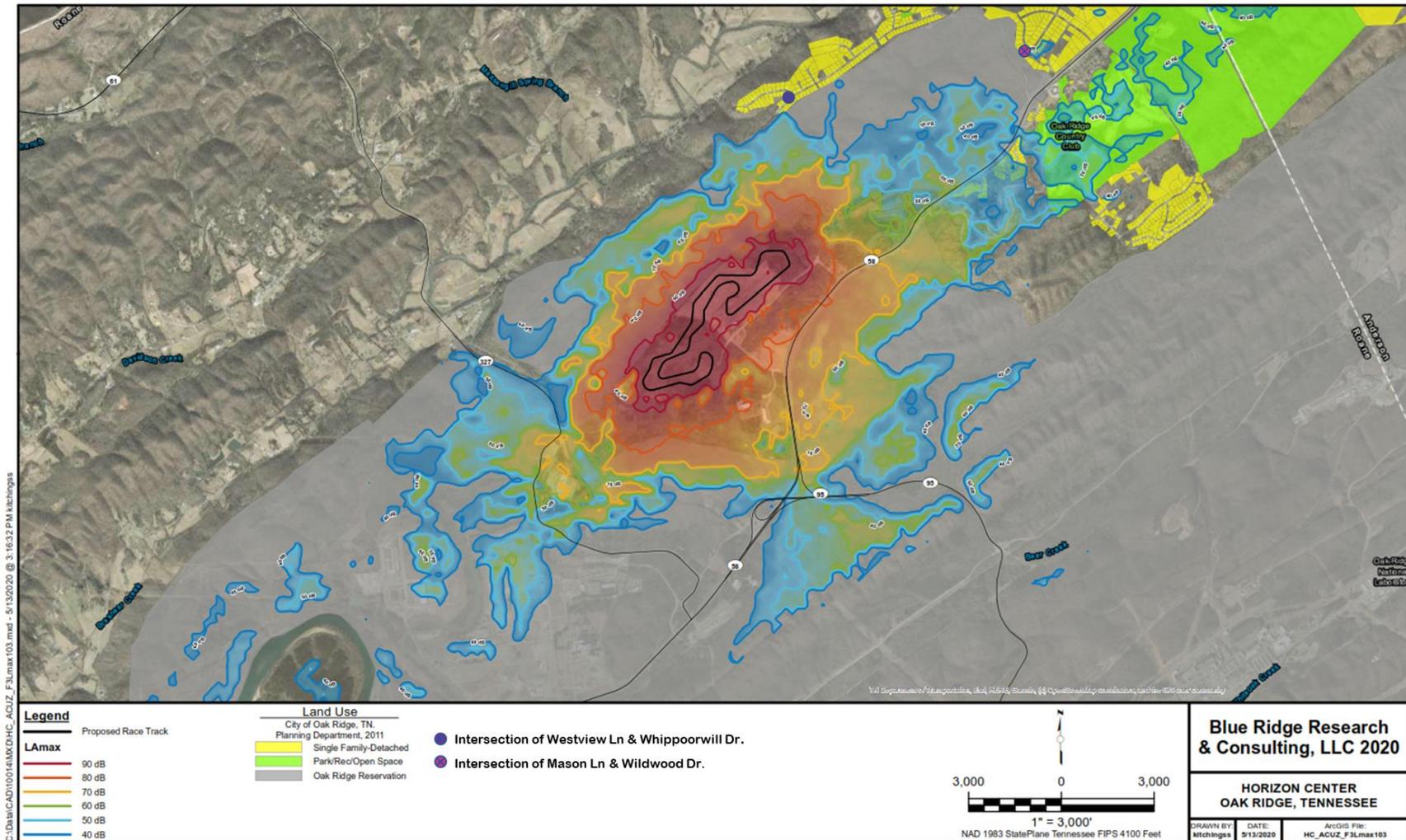


Figure 3-3. F3 Single Car L_{max} for a 103 dBA Racecar Noise Limit.

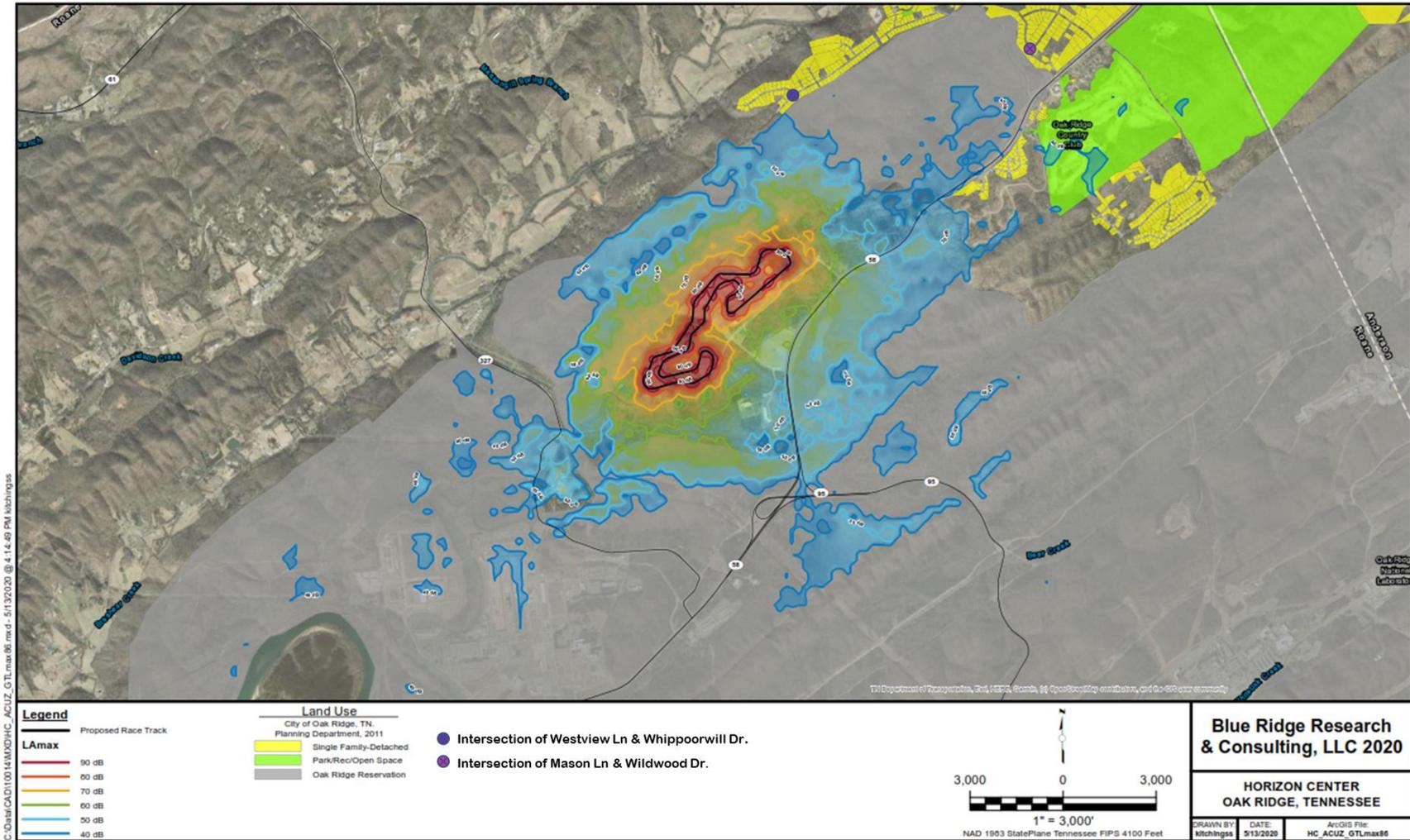


Figure 3-4. GT Single Car L_{max} for an 86 dBA Racecar Noise Limit.

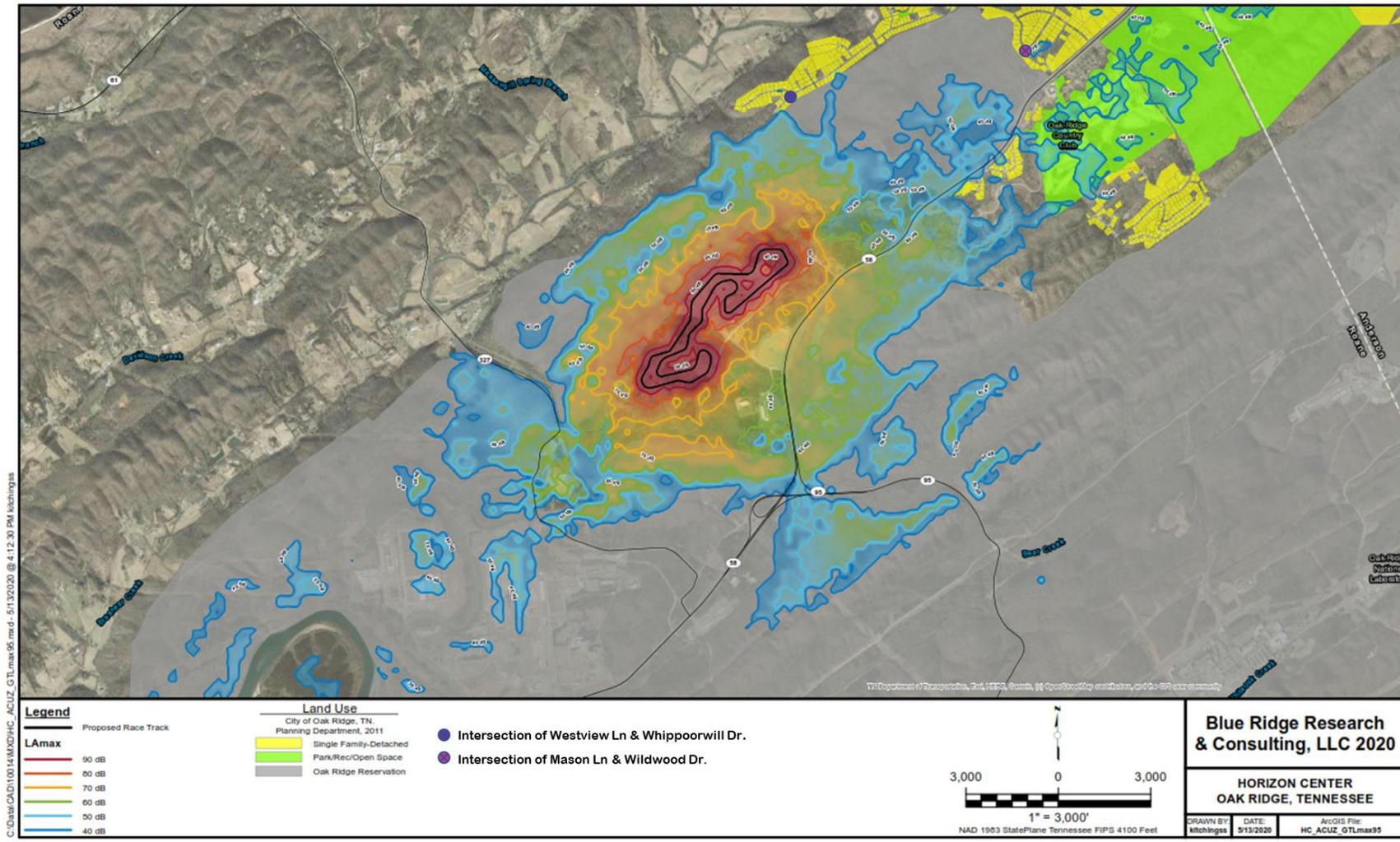


Figure 3-5. GT Single Car L_{max} for a 95 dBA Racecar Noise Limit.

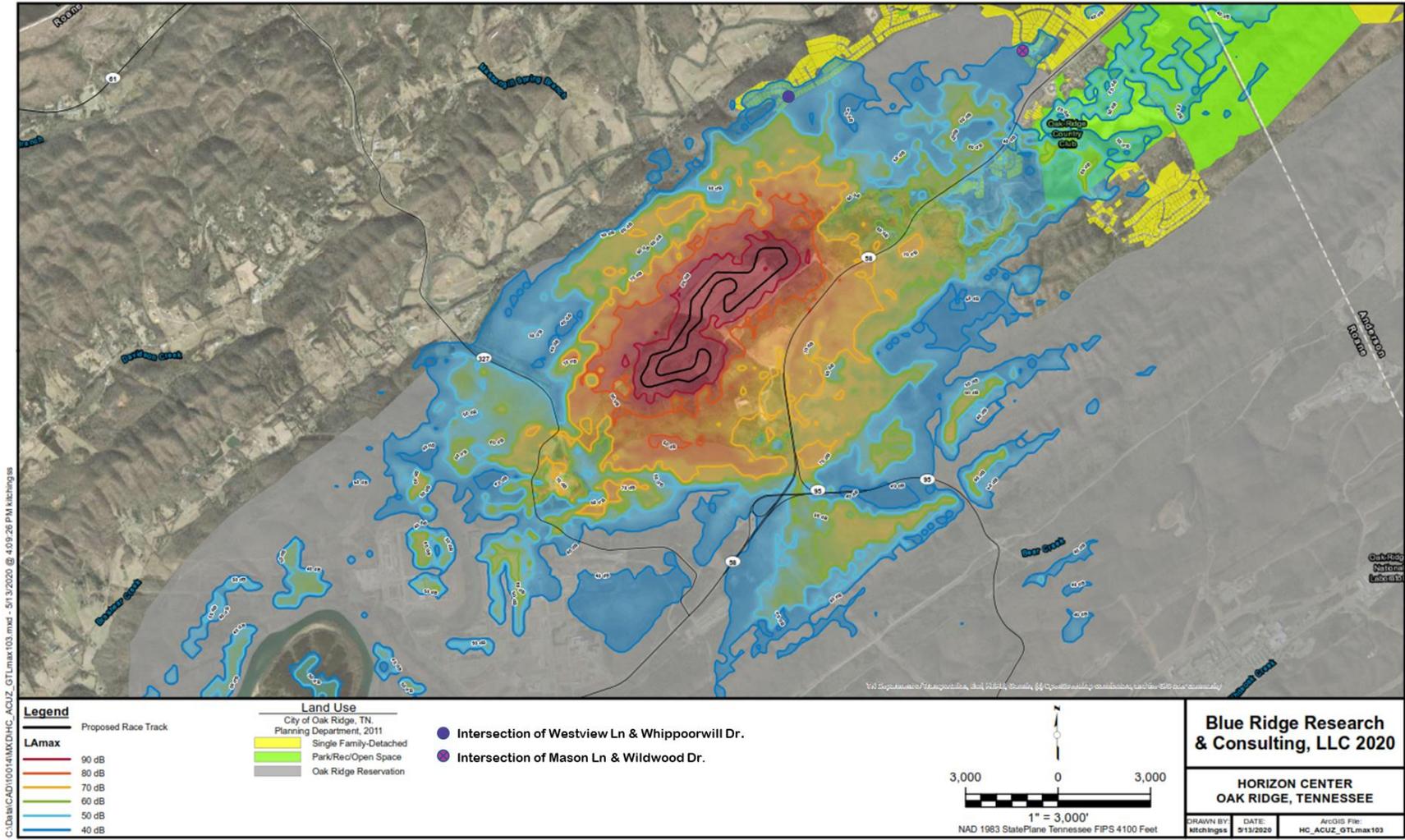


Figure 3-6. GT Single Car L_{Amax} for a 103 dBA Racecar Noise Limit.

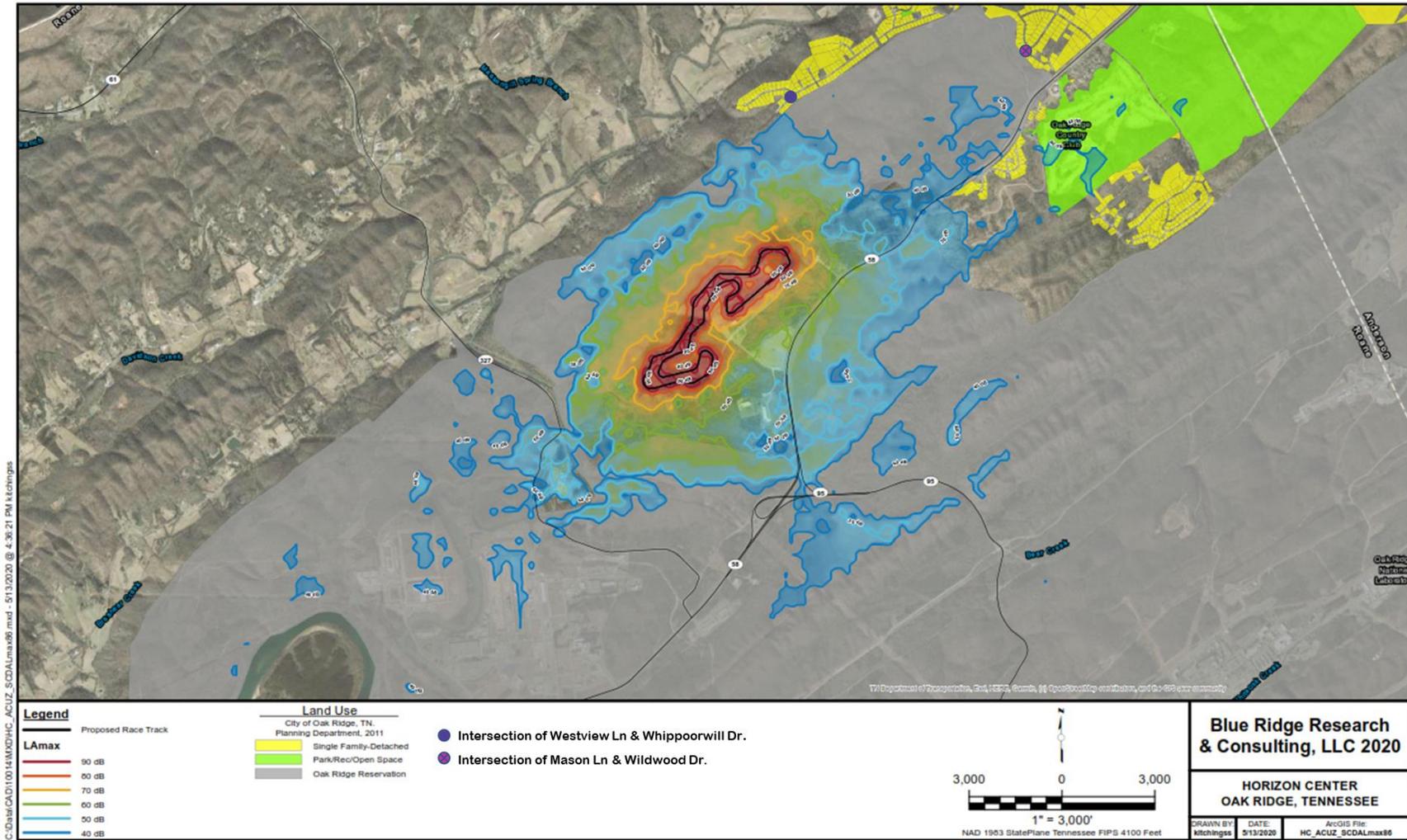


Figure 3-7. SCDA Single Car L_{Amax} for an 86 dBA Racecar Noise Limit.

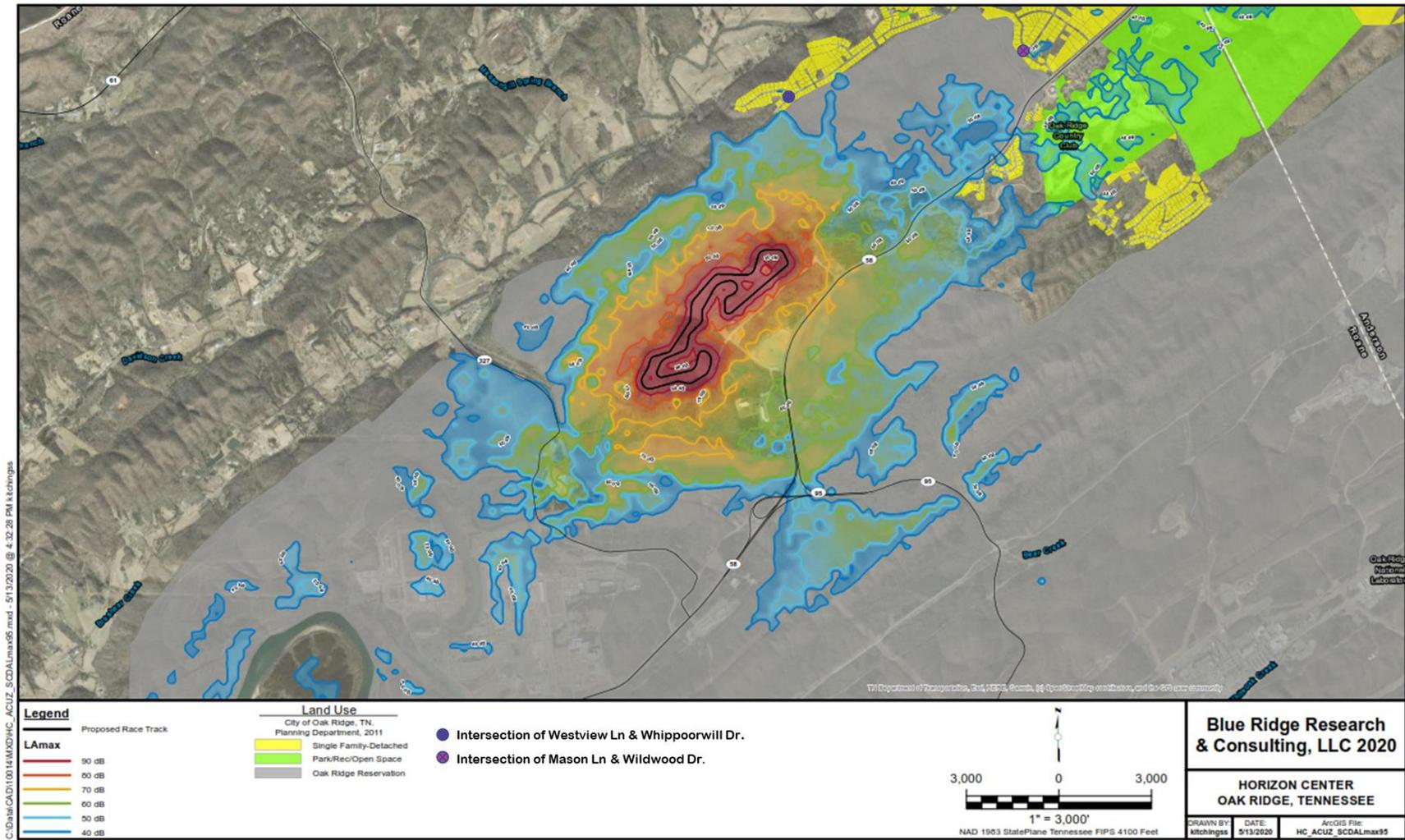


Figure 3-8. SCDALmax Single Car L_{max} for a 95 dBA Racecar Noise Limit.

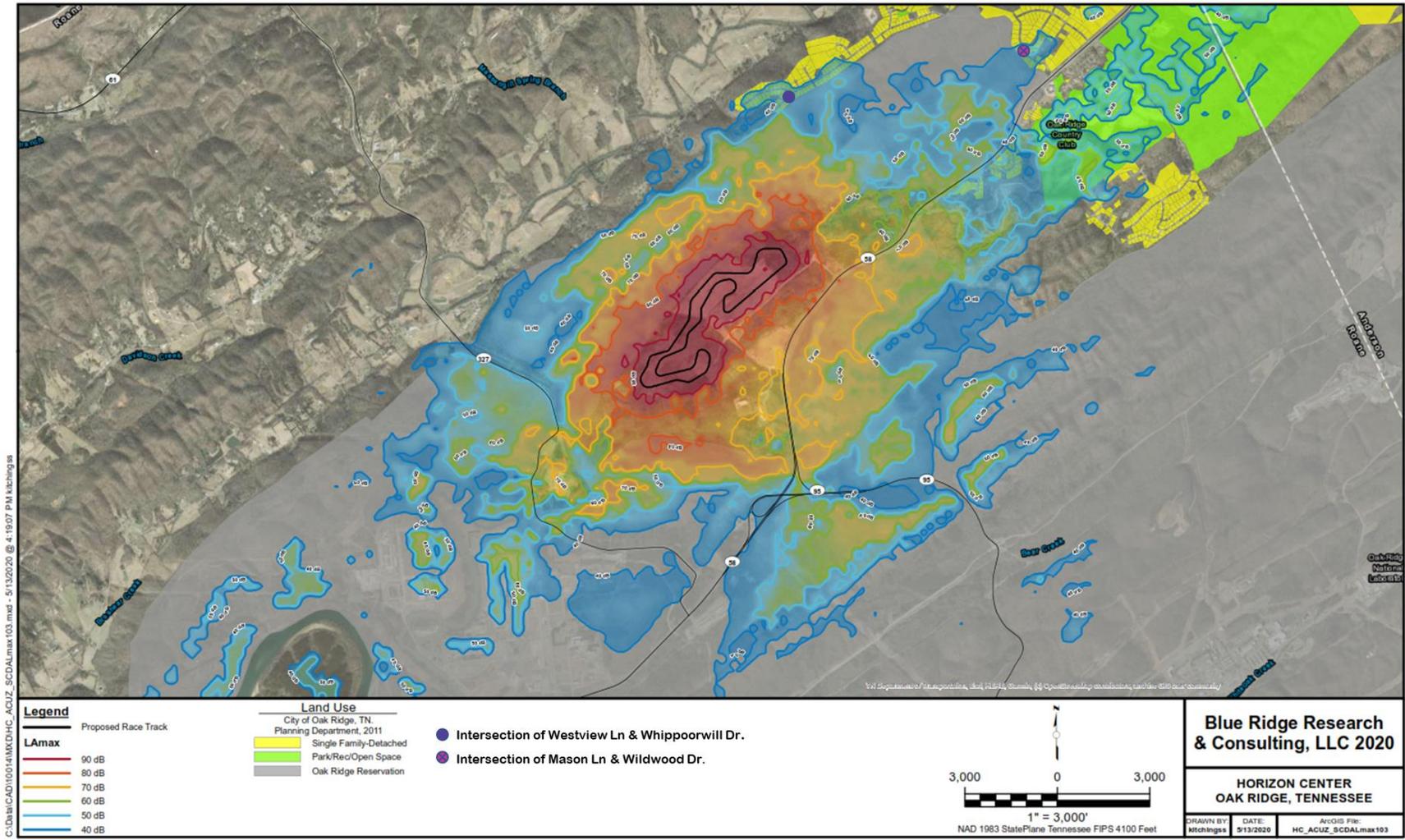


Figure 3-9. SCDALmax Single Car L_{max} for a 103 dBA Racecar Noise Limit.

3.2. Racing/Driving Event Sound Exposures

The estimated exposure levels from racing or driving events are calculated for the event durations. FA events have 1.75 hours of racing, GT races have 3 hours of racing, and SCDA events have 8 hours of active driving on the track. The applicable acoustic metric for evaluating the exposure levels over the event duration is $L_{eq,A}$. Table 3.1 lists the modeled $L_{Aeq,dur}$ values at two representative residential locations near the racetrack for the three different racecar noise limits. All of the values are below 50 dBA $L_{A,eq,dur}$. For the 86 dBA and 95 dBA racecar noise limits, all of the modeled noise exposures are below 40 dBA $L_{A,eq,dur}$. The FA race exposures for the 103 dBA limit are also less than 40 dBA at both locations. At the north site, GT and SCDA events with the 103 dBA limit result in $L_{A,eq,dur}$ values of 47 dBA and 45 dBA, respectively. At the northeast site, GT and SCDA events with the 103 dBA limit result in $L_{A,eq,dur}$ values of 46 dBA and 44 dBA, respectively.

Table 3-2. Modeled $L_{Aeq,dur}$ Values for Racing and Driving Events on the Racetrack at Two Representative Residential Locations.

Road Intersection	Westview Ln & Whippoorwill Dr.			Mason Ln & Wildwood Dr.		
Racecar Noise Limit (dBA)	Race Event Sound Average Exposure Level -- $L_{eq,dur}$					
	FA	GT	SCDA	FA	GT	SCDA
	$L_{eq,1.75hr}$	$L_{eq,3hr}$	$L_{eq,8hr}$	$L_{eq,1.75hr}$	$L_{eq,3hr}$	$L_{eq,8hr}$
86	<40	<40	<40	<40	<40	<40
95	<40	<40	<40	<40	<40	<40
103	<40	47	45	<40	46	44

As with the single car results, the overall results for the racing/driving events are provided in a series of graphics for each conceptual event (FA, GT, and SCDA) with increasing racecar noise limits (86, 95, and 103 dBA). Figure 3-10, Figure 3-11, and Figure 3-12 provide the results for a conceptual FA racing event; Figure 3-13, Figure 3-14, and Figure 3-15 provide the results for a conceptual GT racing event; and Figure 3-16, Figure 3-17, and Figure 3-18 provide the results for a conceptual SCDA driving event.

The FA racing event generates the smallest exposures, which are a combination of vehicle sound emission, number of laps, and race duration. The GT racing event exposure is slightly greater than the SCDA event primarily because of the shorter duration of the event.

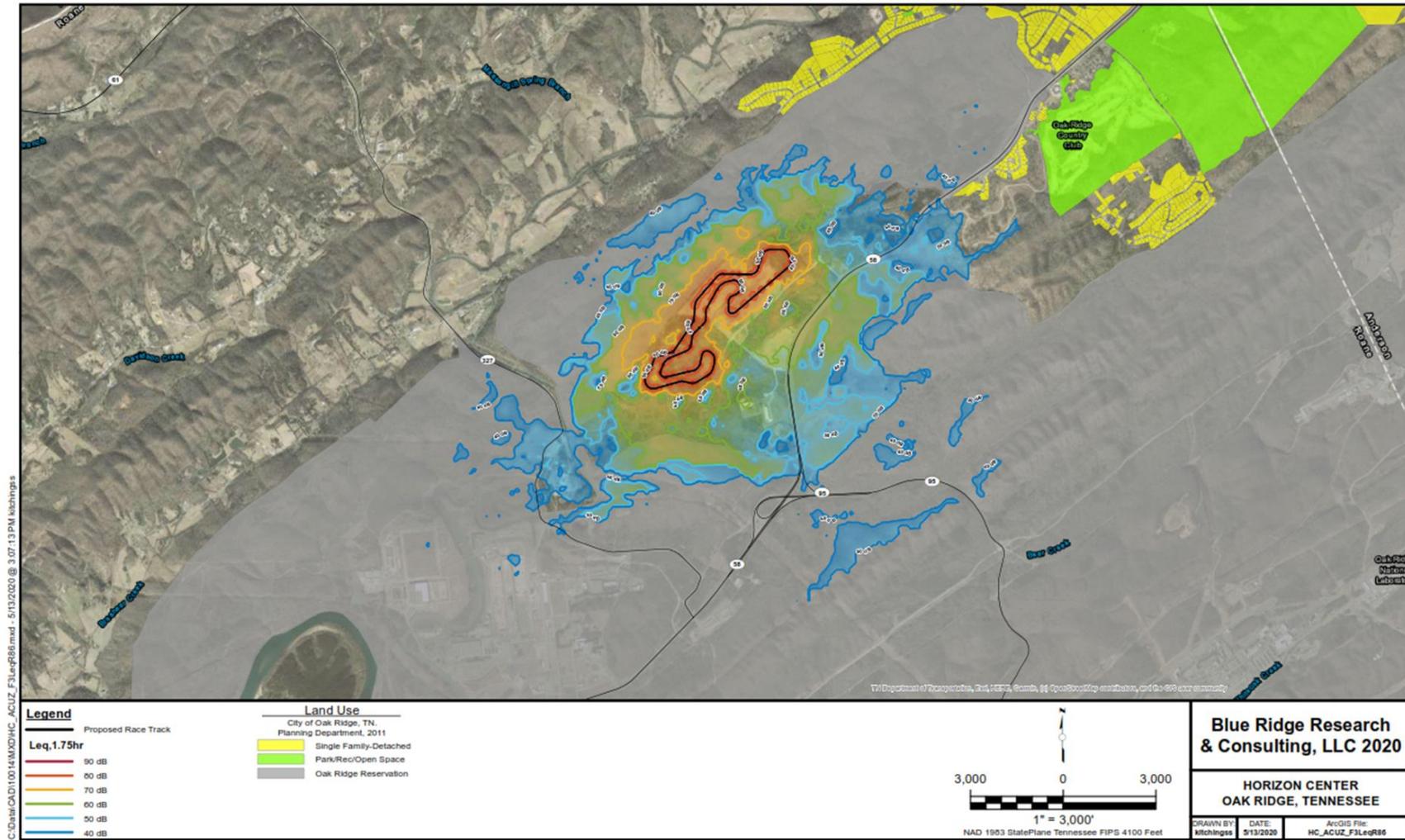


Figure 3-10. LeqA,1.75hrs for a Conceptual FA Race Day with an 86 dBA Racecar Noise Limit.

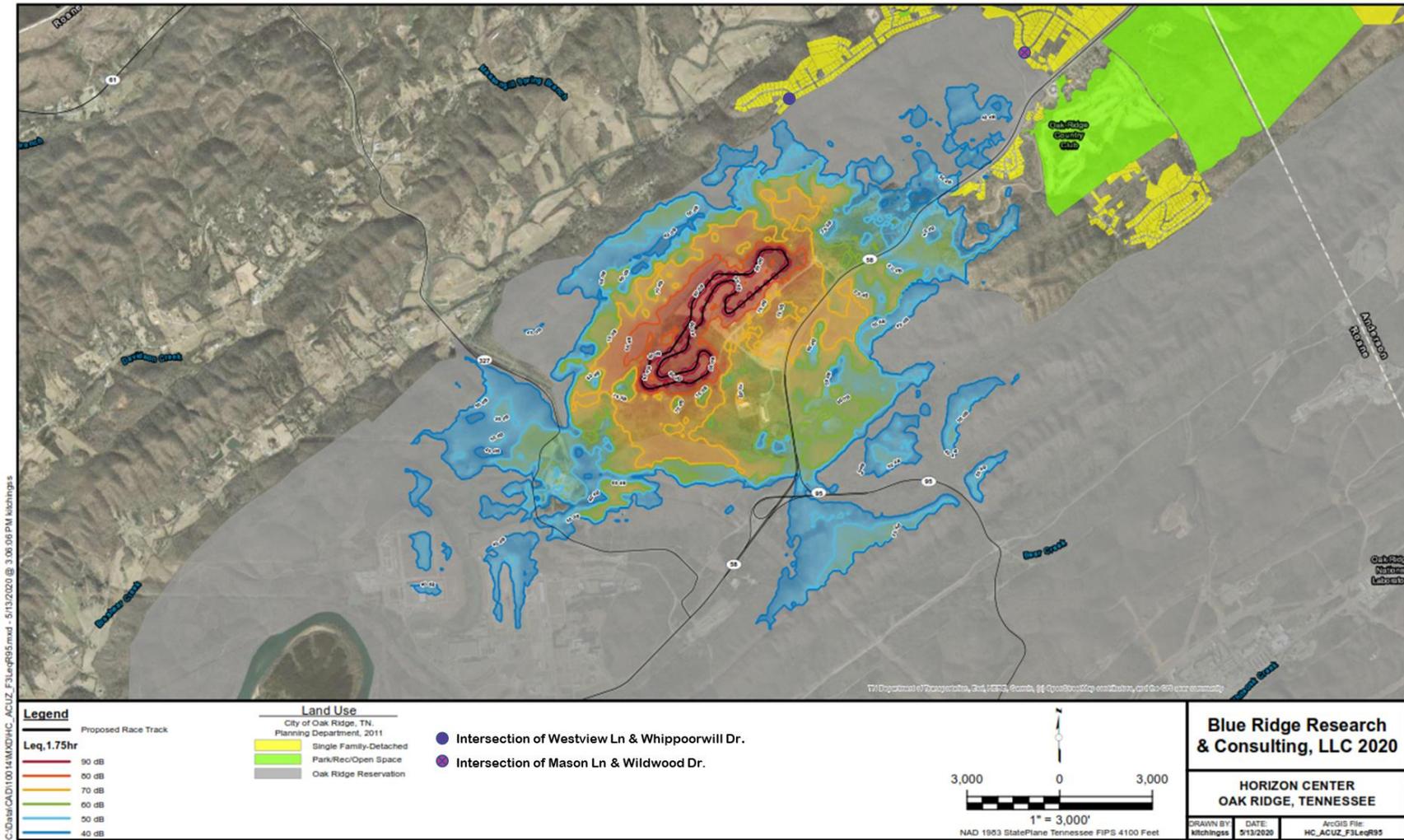


Figure 3-11. $Leq_{A,1.75hrs}$ for a Conceptual FA Race Day with a 95 dBA Racecar Noise Limit.

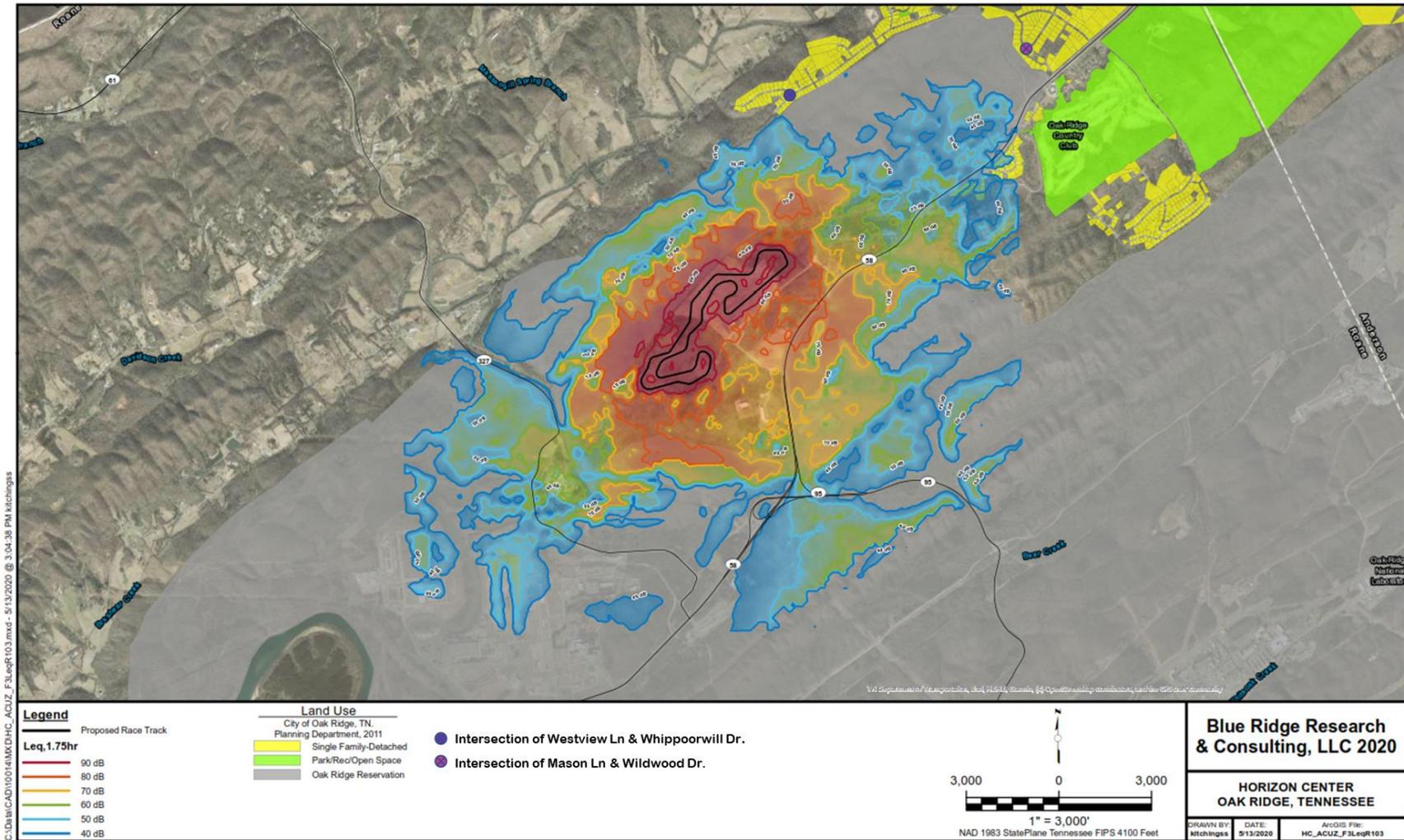


Figure 3-12. $Leq_{A,1.75hrs}$ for a Conceptual FA Race Day with a 103 dBA Racecar Noise Limit.

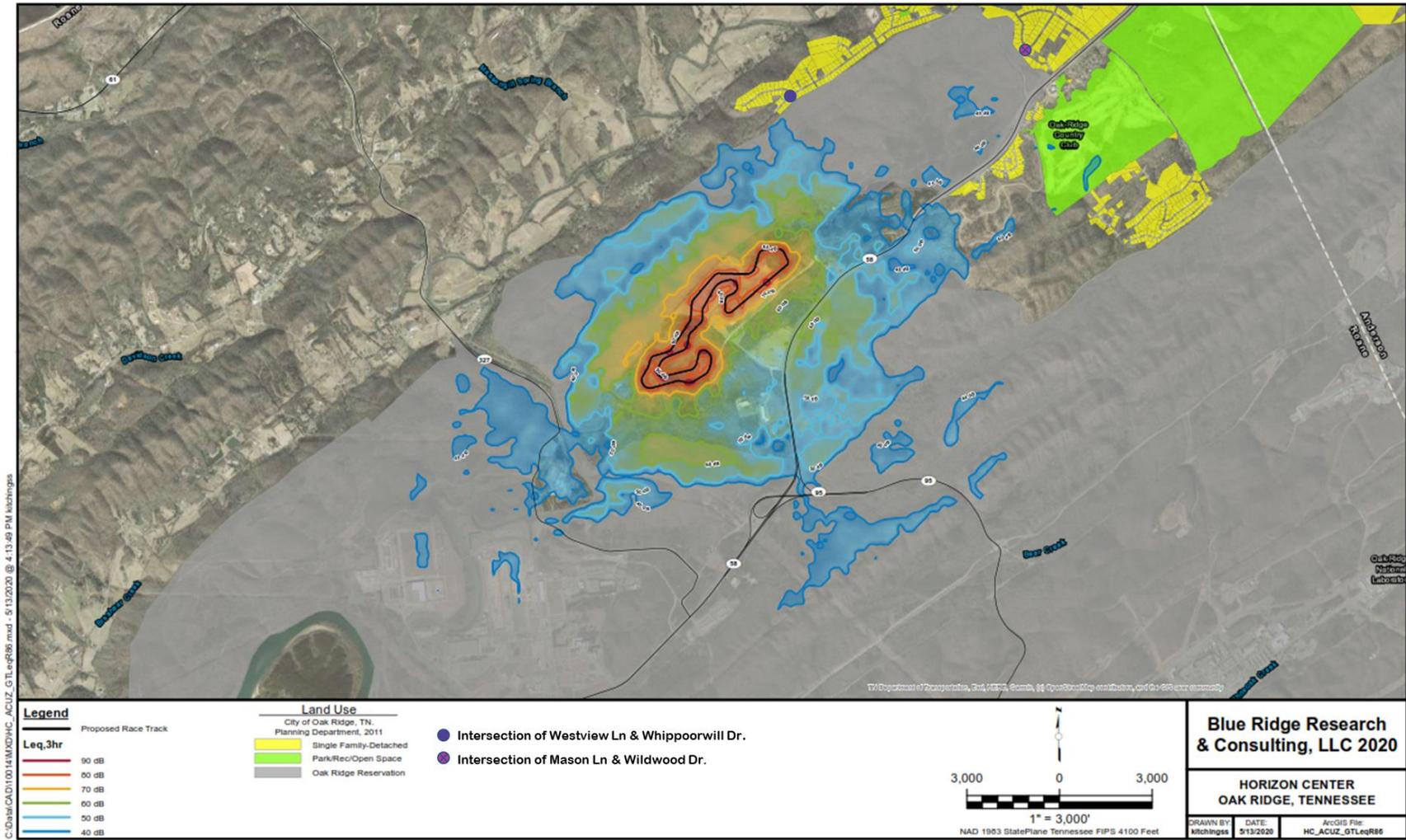


Figure 3-13. LeqA,3hrs for a Conceptual GT Race Day with an 86 dBA Racecar Noise Limit.

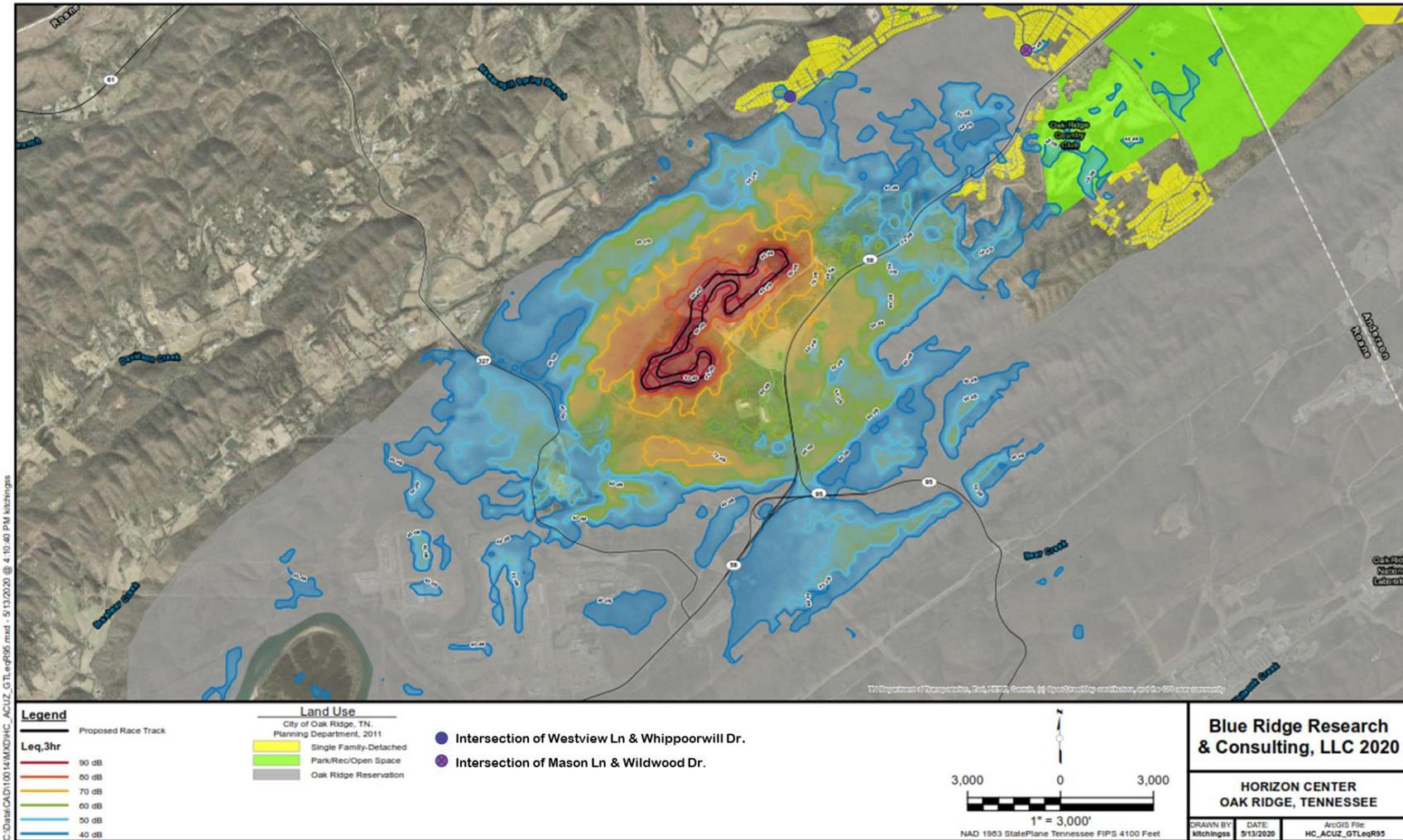


Figure 3-14. LeqA,3hrs for a Conceptual GT Race Day with a 95 dBA Racecar Noise Limit.

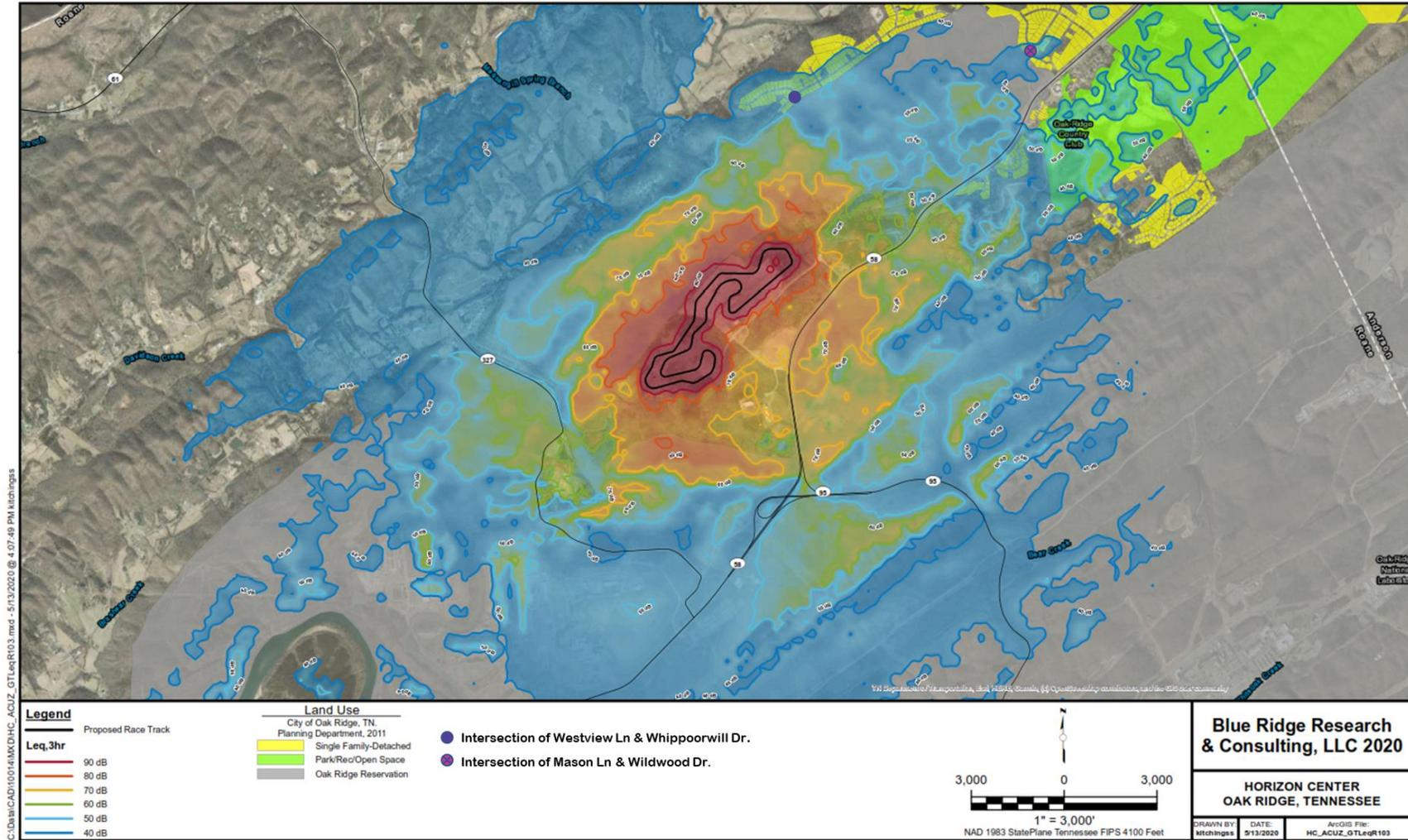


Figure 3-15. $L_{eqA,3hrs}$ for a Conceptual GT Race Day with a 103 dBA Racecar Noise Limit.

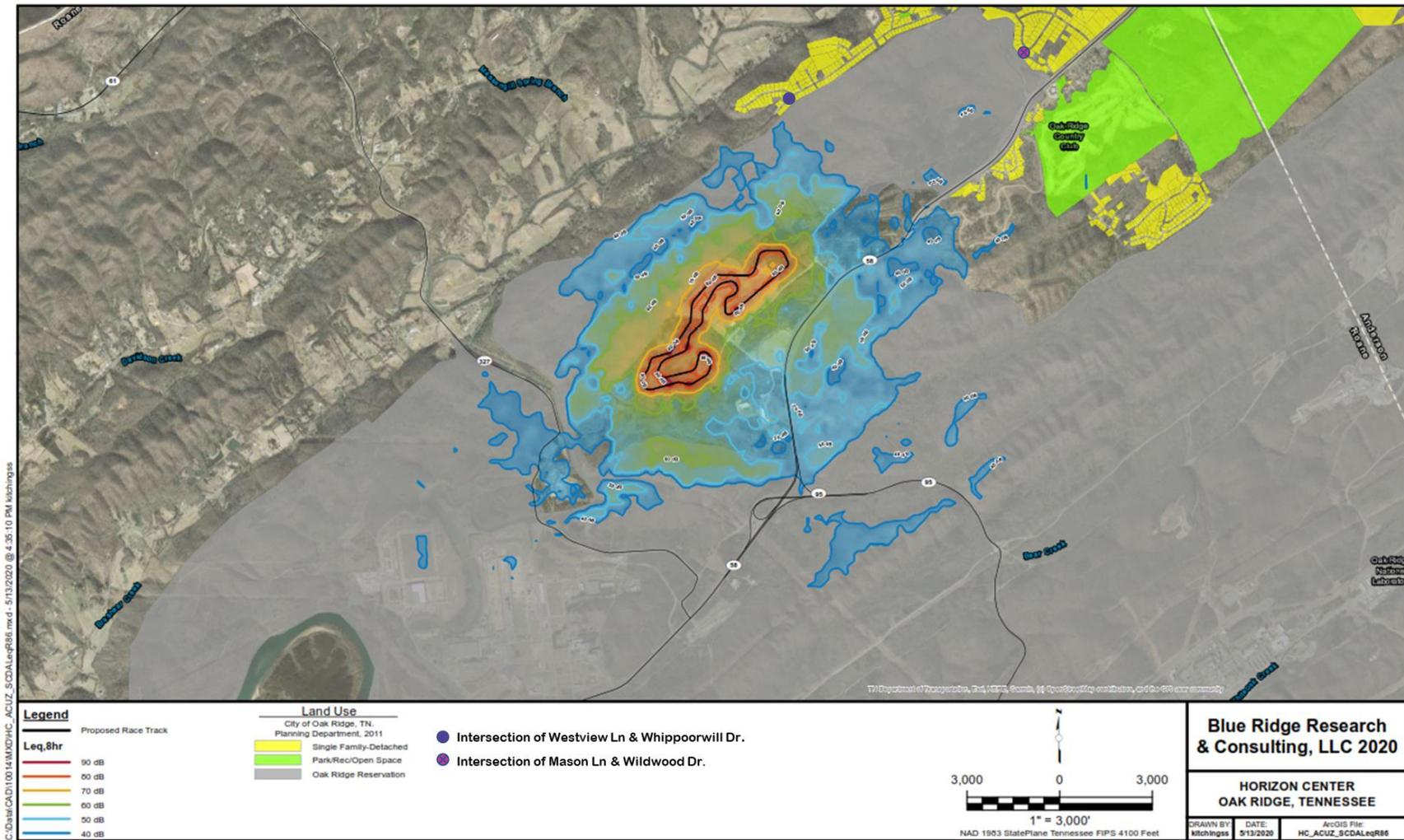


Figure 3-16. $LeqA,8hrs$ for a Conceptual SCDA Driving Event with an 86 dBA Racecar Noise Limit.

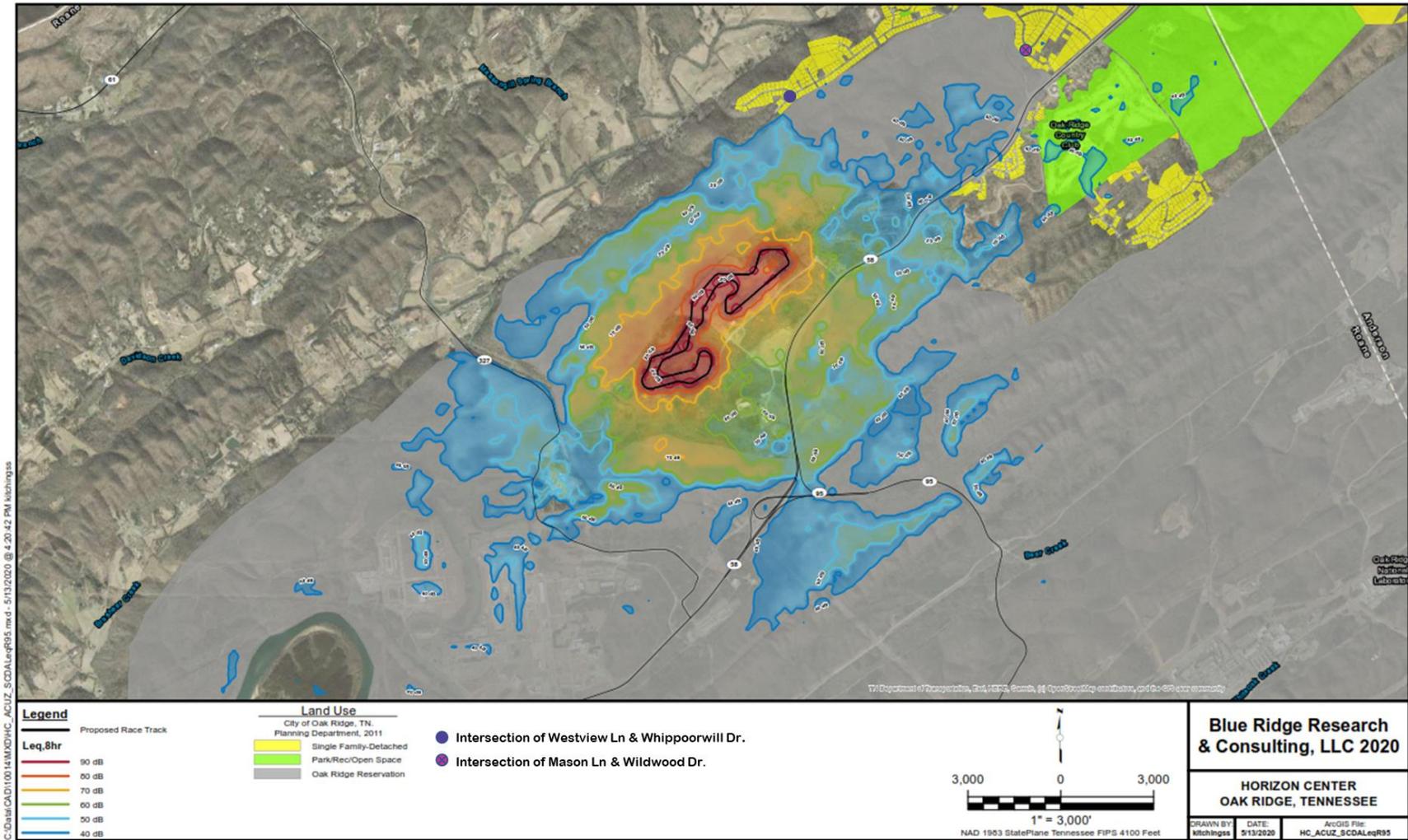


Figure 3-17. $L_{eqA,8hrs}$ for a Conceptual SCDA Driving Event with a 95 dBA Racecar Noise Limit.

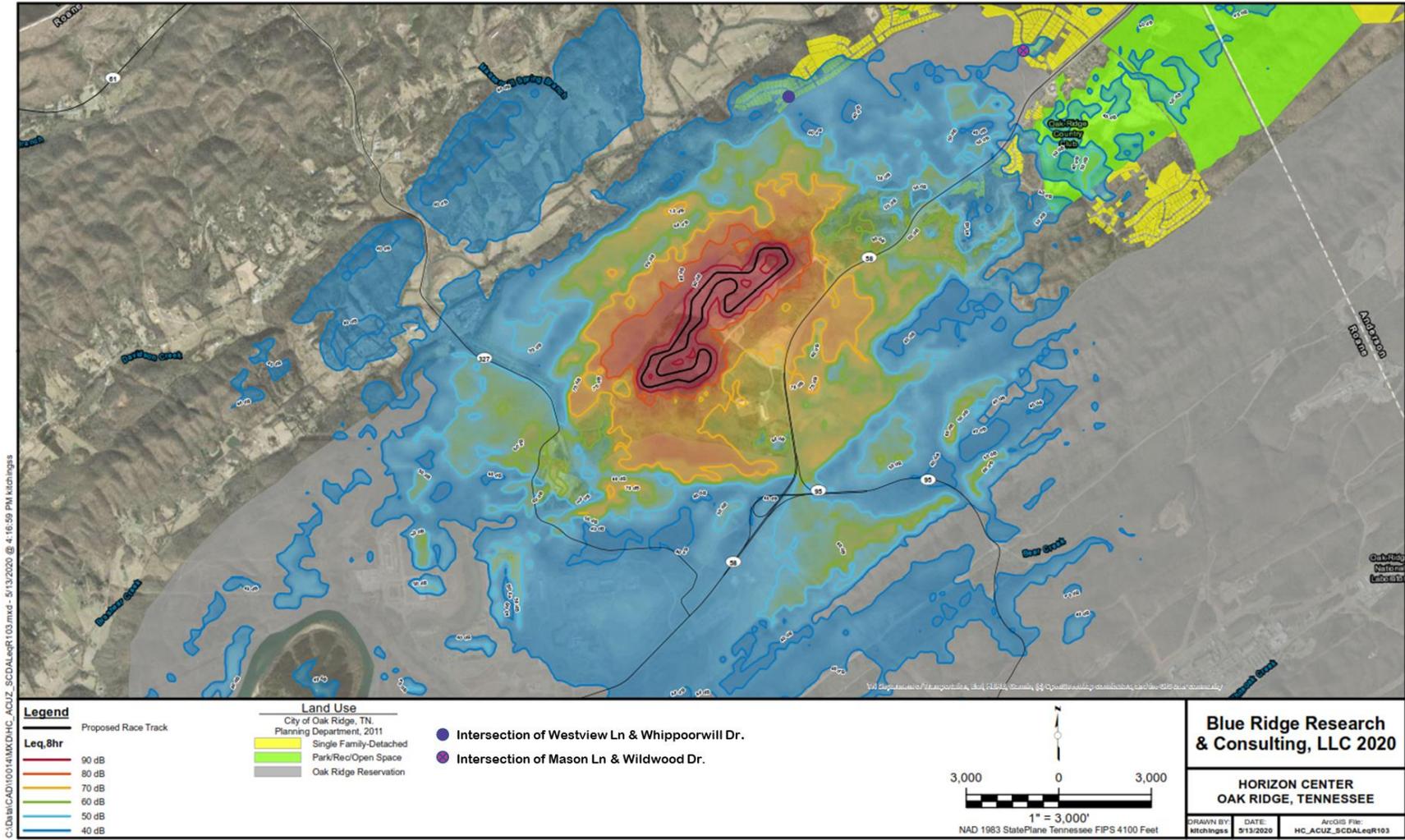


Figure 3-18. $Leq_{A,8hrs}$ for a Conceptual SCDA Driving Event with a 103 dBA Racecar Noise Limit.

References

- [1] Department of Energy, "Environmental Assessment Addendum, Proposed Revitalization of Parcel ED-1 at the Horizon Center, Oak Ridge, TN".
- [2] Bradley, K.A, C. Hobbs, C. Wilmer, and J.J. Czech, "Advanced Acoustic Model Technical Reference and User Manual," Wyle Report WR 16-08, June 2016.
- [3] Keller, J.B., "Geometrical theory of diffraction," J. Optical Soc. Am. 52, 116-130, 1962.
- [4] Rasmussen, K.B., "The Effect of Terrain Profile on Sound Propagation Outdoors," Danish Acoustical Institute Technical Report 111, January 1984.
- [5] Ikleheimer, B.J., "Noise Analysis for the Proposed Oak Ridge General Aviation Airport," BRRC 15-04, May 2015.

Appendix A: Sample Websites for Estimating Racing Parameters

The Formula 3 Sound (F3):

https://www.youtube.com/watch?v=SzFsSpLgeDk&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=2&t=0s

FIA Formula 3 Pure Sound @ Monza (April 30, 2017) | Race 2 & 3:

https://www.youtube.com/watch?v=TTXWChndXa0&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=3&t=0s

Formula 3 Sound (F3):

https://www.youtube.com/watch?v=CdiUp_V84pg&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=3

Great Sound - Formula Renault, F3 and F4 Cars in Action: https://www.youtube.com/watch?v=RJQp-Aw1TMO&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=4

2015 Formula 4 Testing – Sparks & Pure Sound:

https://www.youtube.com/watch?v=ICrRDZlyslW&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=5

Thompson Motor Speedway – Stock Cayman S – BMW CCA HPDE:

https://www.youtube.com/watch?v=qcqB_2_3LY&list=PLd8RQIZBbXOnMRdogJzpjNtFYSKzM2V_N&index=6

SCDA – Thompson Speedway Motorsports Park Spec Miata Test 1.23.5 – Elivan Goulart:

https://www.youtube.com/watch?time_continue=8&v=gwfjNUEWlIE&feature=emb_logo

SCDA Thompson Speedway Motorsports High Performance Driving Events: <https://scda1.com/track-driving-events/thompson-speedway-driving-experiences/>

SCDA Virginia International Raceway Events: <https://scda1.com/track-driving-events/virginia-international-raceway/>

VIR: GT World Challenge America Powered by AWS: <https://virnow.com/events/blancpain-world-challenge/>

GT World Challenge Circuit of the Americas 2020 Results: <https://www.gt-world-challenge-america.com/results/2020/circuit-of-the-americas>

Formula Americas Sebring International Raceway 2019 Results: <https://www.framericas.com/pages/sebring-international-raceway>

Sebring International Raceway: https://en.wikipedia.org/wiki/Sebring_International_Raceway

Circuit of Americas: https://en.wikipedia.org/wiki/Circuit_of_the_Americas

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