Austin Light Rail Phase 1

Final Environmental Impact Statement

Appendix F-5: Threatened and Endangered Species Technical Report

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Acronyms and Abbreviations

Term/Acronym	Definition
ATP	Austin Transit Partnership
BCCP	Balcones Canyonlands Conservation Plan
BMP	best management practice
City	City of Austin
CRZ	critical root zone
dbh	diameter at breast height
DEIS	Draft Environmental Impact Statement
EMST	Ecological Mapping Systems of Texas
EOR	Element Occurrence Record
FEIS	Final Environmental Impact Statement
FTA	Federal Transit Administration
Project	Austin Light Rail Phase 1 Project
ROD	Record of Decision
ROW	right-of-way
SFR	Source Feature Record
SGCN	Species of Greatest Conservation Need
TPWD	Texas Parks and Wildlife Department
TXNDD	Texas Natural Diversity Database
USFWS	U.S. Fish and Wildlife Service

1 Introduction

This technical report provides the basis of analysis included in the Draft Environmental Impact Statement (DEIS) and supports decisions made in the combined Final Environmental Impact Statement (FEIS)/Record of Decision (ROD). The analysis and references in this technical report remain unchanged from the DEIS except for technical updates. With the exception of a reduction of 6 protected trees and 8 heritage trees, there are no changes to effects on threatened and endangered species or other biological resources from technical updates made since publication of the DEIS.

The Federal Transit Administration (FTA) and Austin Transit Partnership (ATP) are completing an environmental review of the Austin Light Rail Phase 1 Project (the Project) in Austin, Texas. This threatened and endangered species technical report was prepared to support the Project's DEIS and FEIS/ROD in accordance with the National Environmental Policy Act and related laws and regulations. FTA and ATP are the Lead Agencies in the National Environmental Policy Act process.

This report identifies existing conditions and evaluates the potential effects of the Project's No Build Alternative and Build Alternative for rare, threatened, and endangered species. This report also provides a general description of habitat (i.e., flora and fauna); identifies potential occurrence of federally listed or state-listed rare, threatened, and endangered species; migratory birds; and bald and golden eagles; and assesses potential effects on wildlife habitat, threatened and endangered species habitat, and protected trees as a result of the Project. In addition, measures to avoid and minimize potential effects are identified in this report, which is based on preliminary engineering information that is currently available.

2 Regulatory Setting

Construction and operation of the Project may be subject to environmental regulations at the federal, state, and local levels. Additional information about applicable federal, state, and local regulations is provided below.

2.1 Federal Regulations

2.1.1 Endangered Species Act of 1973

The U.S. Fish and Wildlife Service (USFWS) has legislative authority to list and monitor the status of species whose populations are considered to be imperiled. This federal legislative authority for the protection of threatened and endangered species issues from the Endangered Species Act of 1973 and its subsequent amendments. Regulations supporting this act are codified and regularly updated in Title 50 Code of Federal Regulations Sections 17.11 and 17.12. The federal process stratifies potential

candidates based upon the species' biological vulnerability. Species listed as endangered or threatened by the federal government are provided full protection. This protection not only prohibits the direct take of a protected species, but it also includes a prohibition of indirect take, such as destruction of designated critical habitat. Listed plant species are not protected from take, although it is illegal to collect or maliciously harm them on federal land, and potential effects would need to be considered for projects requiring Section 7 consultation for federal actions.

USFWS also maintains a list of candidate species. Candidate species are plant or animal species for which USFWS has sufficient information on file regarding biological vulnerability (or threats) to support a proposal that would list them as endangered or threatened under the Endangered Species Act but have yet to be listed. Candidate species are provided no statutory protection under the Endangered Species Act.

Similarly, proposed endangered or proposed threatened species are those that USFWS has determined is in danger of extinction or is likely to become in danger of extinction, respectively, throughout its range. Proposed species are provided no statutory protection under the Endangered Species Act, although federal agencies are required to confer via a "conference consultation" with USFWS if their action would jeopardize the continued existence of such species.

2.1.1.1 Endangered Species Act Prohibitions

Section 9 of the Endangered Species Act prohibits the take of any plant or animal species listed as endangered or threatened. Take, as defined by the act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." Harm is defined in regulations implementing the Endangered Species Act as "any act that kills or injures the species, including significant habitat modification." This protection also includes a prohibition of indirect take, such as destruction of habitat. Additionally, Section 9 prohibits removing, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction. The Endangered Species Act and accompanying regulations provide the necessary authority and incentive for individual states to establish their own regulatory vehicle for the management and protection of threatened and endangered species.

2.1.1.2 Endangered Species Act Authorization Process for Federal Action

Section 7 of the Endangered Species Act requires that federal agencies consult with USFWS to ensure that projects they authorize, fund, or carry out would not jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify designated critical habitat. In effect, Section 7 provides a means for USFWS to authorize the take of threatened and endangered species and their habitat by federal agencies.

Section 7(a)(2) requires that federal agencies review any action they are authorizing, funding, or conducting and determine whether the action may affect federally listed and proposed species, or proposed or designated critical habitat. If the protected species

are present and are likely to be adversely affected the federal agency must complete a Biological Assessment that identifies the threatened or endangered species that are likely to be affected by the action and consult with USFWS.

Formal consultation is concluded when USFWS formulates a Biological Opinion that identifies reasonable and prudent alternatives to the proposed action (if the action may jeopardize the continued existence of a species) or an incidental take statement (if the action would not jeopardize the continued existence of a species). Implementation of the Project must comply with the Biological Opinion.

2.1.1.3 Critical Habitat

USFWS has the authority to designate critical habitat under the Endangered Species Act. Critical habitats are specific geographic areas that contain features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitats are also defined as specific areas outside the geographical area occupied by the species at the time it is listed but a determination has been made that such areas are essential for the conservation of the species. The designation of critical habitat units for a listed species helps focus conservation activities by identifying areas that contain essential habitat features, regardless of whether they are currently occupied by the listed species. Not all federally listed threatened or endangered species have designated critical habitat. As with proposed species, federal agencies are required to confer with USFWS via a conference consultation if actions would potentially destroy or adversely modify proposed crticial habitat.

Balcones Canyonlands Conservation Plan

The Balcones Canyonlands Conservation Plan (BCCP) is a regional habitat conservation plan, developed through section 10 of the Endangered Species Act, that provides a relatively efficient process for development activities to comply with the Endangered Species Act while also protecting sensitive habitat in the Balcones Canyonlands Preserve. The BCCP includes a USFWS 10(a)(1)(b) permit (i.e., an incidental take permit) issued jointly to Travis County and the City of Austin (City), a Habitat Conservation Plan, and Environmental Impact Statement approved in 1996. Travis County issues permits for developments that participate and mitigate through the BCCP rather than directly with USFWS through more time-consuming consultations. The City administers the infrastructure permitting process for the BCCP. Mitigation through the BCCP provides regulatory certainty to development stakeholders.

The BCCP was created to protect eight federally listed endangered species and 27 species of concern that currently are not afforded federal protection (described in detail in Section 4.5). Protection of the BCCP species of concern and their habiat, via habitat preserve management and mitigation through the BCCP, allows for development activities to continue within Travis County while helping to prevent the species of concern from being federally listed as threatened or endangered.

2.1.2 Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act of 1918 is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protects selected species of birds that occur in more than one of the countries at some point during their annual life cycle. The Migratory Bird Treaty Act protects migratory birds and their nests, eggs, young and parts from possession, sale, purchase, barter, transport, import, export and take. For purposes of the act, take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The Migratory Bird Treaty Act applies to migratory birds identified in regulation. The act protects all birds occurring in the United States except for several nonnative species (e.g., house sparrow, European starlings, and rock pigeons) and non-migratory upland game birds. USFWS implements and enforces the Migratory Bird Treaty Act; is the federal lead agency for managing and conserving migratory birds in the United States; regulates the take of migratory birds for educational, scientific, and recreational purposes; and requires that harvests be limited to levels that prevent overutilization. Special Purpose Permits issued under 50 Code of Federal Regulations 21.27 are required if an action would take, possess, or involve the sale or transport of birds protected by the Migratory Bird Treaty Act.

Executive Order 13186 directs each federal agency taking actions having or likely to have a negative effect on migratory bird populations to work with USFWS to develop an agreement to conserve those birds under the Migratory Bird Treaty Act. On December 22, 2017, the U.S. Department of the Interior issued a memorandum (M-37050) outlining that the Migratory Bird Treaty Act does not prohibit incidental or accidental take. This memorandum found that, consistent with the text, history, and purpose of the Migratory Bird Treaty Act, the statute's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests or their eggs (U.S. Department of the Interior 2017).

2.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940, as amended, prohibits anyone without a permit issued by USFWS from "taking" bald or golden eagles including their parts, nests or eggs. The act defines "take" to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Regulations implementing the Bald and Golden Eagle Protection Act define "disturb" to mean "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior or (3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior." USFWS has a permitting process for activities that may disturb eagles or take an eagle nest where their location poses a risk to human or eagle safety. There are two established permit routes regarding bald and golden eagles, a programmatic take permit and an individual take permit. USFWS defines programmatic take as ‘‘take that

(1) is recurring, but not caused solely by indirect effects, and (2) occurs over the long term and/or in a location or locations that cannot be specifically identified.'' A programmatic permit covers other take in addition to programmatic take but can be a much longer permitting process compared to individual take permits. An individual take permit would be required for removal of an active or inactive nest. Additional information on eagle protections, life histories, effects, guidelines, and recommendations can be found in USFWS' National Bald Eagle Management Guidelines (USFWS 2007).

2.1.4 Executive Order 13112, Invasive Species

Executive Order 13112 requires federal agencies to identify actions that may affect invasive species; use relevant programs to prevent introduction of invasive species; detect, respond and control such species; monitor invasive species populations; provide for restoration of native species; conduct research on invasive species and promote public education.

2.1.5 Fish and Wildlife Coordination Act of 1934

The Fish and Wildlife Coordination Act of 1934 and subsequent amendments (16 United States Code 662) protect wildlife when federal actions result in the control or modification of a natural stream or body of water. The act requires federal agencies to consider the effect that water-related projects have on fish and wildlife resources, act to prevent loss or damage to these resources and provide for the development and improvement of these resources.

2.1.6 Executive Memorandum on Environmentally and Economically Beneficial Landscaping

The Executive Memorandum on Environmentally and Economically Beneficial Landscaping, effective April 26, 1994, encourages environmentally and economically beneficial landscaping practices to be considered at federal facilities and for federally funded projects.

2.2 State of Texas Regulations

2.2.1 Texas Parks and Wildlife Code

Endangered species legislation was passed in Texas in 1973. Subsequently, revisions to the Texas Parks and Wildlife Code in 1975, 1981, and 1985 established a state regulatory vehicle for the management and protection of threatened and endangered species. Chapters 67 and 68 (1975 revisions) of the Texas Parks and Wildlife Code authorize Texas Parks and Wildlife Department (TPWD) to formulate lists of threatened and endangered fish and wildlife species and to regulate the taking or possession of those species. A 1981 revision (and 1985 amendment) to this code provides authority for TPWD to designate and protect plant species as threatened or endangered and to prohibit commercial collection or sale of these species without permits. TPWD is the state enforcing agency for the management and protection of state-listed threatened

and endangered species. However, as the federal enforcing agency, USFWS has the final authority. The Texas Natural Diversity Database (TXNDD) catalogs, monitors, and provides information on rare, threatened, and endangered species reported occurrences and communities of concern. However, TXNDD provides potential presence data only and is not a substitute for site-specific biological surveys.

The ensuing regulations of the Texas Administrative Code are Sections 65.171-177 and 69.1-9 (Chapters 67, 68 and 88 of the Texas Parks and Wildlife Code). These sections regulate the taking, possessing, transporting, exporting, processing, selling/offering for sale or shipping of endangered or threatened species of fish, wildlife, and plants. Neither specific criteria for the listing of plant and animal species nor protection from indirect take (e.g., destruction of habitat or unfavorable management practices) is found in either of the above-mentioned statutes or regulations. Based on this information, unlike the federally listed species, no protection of habitat is afforded to species that are only listed by the state. Furthermore, the State of Texas does not have a program in place to permit incidental take of listed or non-listed species; therefore, no state permits are applicable.

Texas Parks and Wildlife Code Title 5, Subtitle B, Chapter 64, Subchapter A, states that no person may: (1) catch, kill, injure, pursue, or possess, dead or alive, or purchase, sell, expose for sale, transport, ship, or receive or deliver for transportation, a bird that is not a game bird; (2) possess any part of the plumage, skin, or body of a bird that is not a game bird; or (3) disturb or destroy the eggs, nest, or young of a bird that is not a game bird. No exemptions to this regulation exist for incidental take. Additionally, there is no permitting process for incidental take of non-game birds.

Texas Parks and Wildlife Code Sections 66.007 and 66.0072 and Texas Administrative Code Title 31, Part 2, Chapter 57, Subchapter A, give TPWD the authority to develop a list of exotic, harmful, or potentially harmful fish, shellfish and aquatic plants that may not be possessed, transported, or introduced into public waters except as authorized by permit issued by TPWD. Possession or transfer of controlled aquatic invasive species including the eggs, seeds, or fragments of living or dead individuals, is punishable as a Class C Misdemeanor (with a fine up to $500), with elevated fines for repeated violations.

2.2.2 State Wildlife Action Plan

In addition to the federal and state regulations outlined above, each state has completed a Wildlife Action Plan or Comprehensive Wildlife Conservation Strategy designed to stabilize and recover wildlife species that are in decline, already threatened or endangered, or representative of the health and diversity of the state's habitats and other wildlife. The latest iteration of the Texas plan was approved by USFWS in 2024 and includes a series of handbooks and documents referred to as the State Wildlife Action Plan (TPWD 2023a). TPWD established the State Wildlife Action Plan to replace the 2013 Texas Conservation Action Plan and to provide a statewide 'roadmap' for research, restoration, management, and recovery projects addressing Species of Greatest Conservation Needs (SGCN) and important habitats. Such SGCN include

terrestrial, freshwater, and marine birds, mammals, reptiles, amphibians, invertebrates, fishes, plants and plant communities. The goal of the plan is ultimately to conserve and improve the status of these species and, as possible, prevent listings under the Endangered Species Act.

2.2.3 Texas Commission on Environmental Quality, Edwards Aquifer Protection Program

The Texas Commission on Environmental Quality has established the Edwards Aquifer Protection Program to regulate construction activities that have the potential to affect groundwater quality in the Edwards Aquifer, which serves as a water supply for much of central Texas. The recharge zone of the Edwards Aquifer is defined as the land surface area where caves, sinkholes, faults, fractures, or other permeable features provide pathways for recharge of surface waters into the Edwards Aquifer, and the contributing zone is the area or watershed where runoff from precipitation flows downgradient to the recharge zone of the Edwards Aquifer (Texas Commission on Environmental Quality 2005). The Project lies near, but outside of, the recharge and contributing zones of the Edwards Aquifer and is therefore not subject to Edwards Aquifer Protection Program restrictions or oversight of ground disturbance. However, local/municipal regulations associated with aquifer management may still apply.

2.3 City of Austin Regulations

2.3.1 Environmental Criteria Manual

Per City of Austin Land Development Code Section 25-8-68, development within the City's planning jurisdiction that may contain habitat for federally listed threatened or endangered species must give notice of the application to the following:

- USFWS;
- Balcones Canyonlands Conservation Plan Coordinating Committee Secretary; and
- Hays, Travis, or Williamson County, as applicable depending on project location.

The notice must include a statement that the Project development could cause the loss of threatened or endangered species habitat.

2.3.2 Protected and Heritage Trees

Protected and heritage trees are defined and regulated under the Land Development Code, which requires an application and approval of a site plan, including a survey of all trees 8 inches in diameter at breast height (dbh) or greater, for a project within Austin (see **Figure 1**). Proposed removal of any tree that is 8 inches or greater in dbh must be indicated on a site plan and approved by the City Arborist. Based on City regulations, a protected tree is defined as any tree with a dbh of 19 inches or greater, and a heritage tree is defined as a species listed in Land Development Code Chapter 25-8, Subchapter

B, Article 1 with a dbh of 24 inches or greater. The tree species on the heritage tree list include Texas ash (*Fraxinus albicans*), bald cypress (*Taxodium distichum*), American elm (*Ulmus americana*), cedar elm (*Ulmus crassifolia*), Texas madrone (*Arbutus xalapensis*), bigtooth maple (*Acer grandidentatum*), all oak species (*Quercus* spp.), pecan (*Carya illinoinensis*), Arizona walnut (*Juglans major*), and eastern black walnut (*Juglans nigra*).

Figure 1: Levels of Tree Ordinance Protection

Source: City of Austin Environmental Criteria Manual.

A tree review is required under a Site Plan for protected and heritage trees impacted by development, including trees proposed for removal, disturbance within the critical root zone (CRZ), and/or pruning that exceeds 25 percent of the crown. The CRZ is a circle centered on the tree where the radius of the circle is a number of feet equal to the diameter in inches of the tree. CRZ protection for protected and heritage trees includes no cut or fill within the quarter CRZ. The entirety of the half CRZ must be protected with the exception that cut or fill of 4 inches or less is allowed with the half CRZ and at least 50 percent of the total area (square footage) of the CRZ must be preserved at natural grade with natural ground cover. Variances are required for heritage trees to be removed. For trees with a dbh of 30 inches or greater, the variance must go through the City's public process and will be determined through coordination with the City. The City may require mitigation for the removal of any regulated tree that is 8 inches in dbh or greater (Land Development Code Section 25-8-604).

Per the City's Environmental Criteria Manual, the following tree species may require a permit but do not require mitigation: Arizona Ash (*Fraxinus velutina*), tree of heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), paper mulberry (*Broussonetia papyrifera*), white mulberry (*Morus alba*), Chinese parasol (*Firmiana simplex*), *Koelreuteria* spp., ligustrum (*Ligustrum* spp.), chinaberry (*Melia azedarach*), vitex (*vitex*

agnus-castus), photinia (*Photinia spp.*), Chinese pistache (*Pistacia chinensis*), salt cedar (*Tamarix* spp.), Chinese tallow (*Triadica sebifera*), and Siberian elm (*Ulmus pumila*).

3 Methodology

The Study Area for the natural resources assessment includes the limits of Project construction, which include the right-of-way (ROW), guideway, stations, operations and maintenance facility, park-and-rides, proposed roadway reconstruction and bicycle and pedestrian facility improvements, stormwater infrastructure, and contractor access and laydown/staging areas.

An investigation of rare, threatened, and endangered species, and/or potentially suitable habitat for these species that are within or near the Study Area was undertaken to identify and document the underlying conditions within the Study Area. The investigation aimed to evaluate any concerns that could affect the construction or operation of the Project. Because the proposed Project includes portions of two previously separate transit proposals (i.e., Orange Line and Blue Line), the current investigation incorporates findings from the previous investigations, along with limited field investigation effort on March 20, 2024, to verify vegetative communities (including protected trees), wildlife habitat, migratory bird use, and potential habitat for rare, threatened, and endangered species within the Study Area. In addition, data for protected and heritage trees (provided by ATP) were evaluated as part of the investigation. Additional field investigations would be required to fully evaluate the affected environment for the current Study Area.

3.1 Vegetation

The Study Area for the vegetative communities encompasses the limits of Project construction for the Build Alternative. A desktop analysis was conducted to identify potential vegetation concerns within the Study Area using the following publicly available data sources:

- TPWD Ecological Mapping Systems of Texas (EMST) Geographic Information System data to identify vegetative communities in the Study Area (TPWD 2014);
- Ecoregions of Texas to identify ecoregions within the Study Area (Griffith et al. 2007); and
- ATP’s Tree Impact Assessment Data to identify trees and potential effects on trees within the Study Area.

3.2 Wildlife

The Study Area for the wildlife analysis encompasses the limits of Project construction for the Build Alternative. A desktop analysis was conducted to identify potential wildlife assemblages and the occurrence of threatened, endangered, and SGCN species within the Study Area using the following publicly available data sources:

- TPWD TXNDD Geographic Information System data to identify occurrences of threatened, endangered, and SGCN occurrences in the Study Area and within a specified search radius (TPWD 2024);
- TPWD's Rare, Threatened, and Endangered Species of Texas data for Travis County (TPWD 2023b);
- Project-specific information provided through USFWS's online platform—Information for Planning and Consultation (IPaC) System—as shown in the USFWS Species List(s) dated January 2, 2024 (USFWS 2024a);
- USFWS' Karst Zone Data and Mapping Application (USFWS 2018a);
- Texas Commission on Environmental Quality's Geographic Information System Data Hub to identify the Edwards Aquifer (Texas Commission on Environmental Quality 2023); and
- Texas Speleological Society data identifying caves, springs, and karst features within a specified radius from the Study Area (Texas Speleological Society 2024).

3.3 Critical Habitat

The Study Area for critical habitat analysis encompasses the limits of Project construction for the Build Alternative. A desktop analysis was conducted to identify critical habitat units within the Study Area using the following publicly available data sources:

- Project-specific information provided through USFWS's online platform, Information for Planning and Consultation (IPaC) System, as shown in the USFWS Species List(s) dated January 2, 2024 (USFWS 2024a); and
- USFWS Critical Habitat Mapper for critical habitat units near the Study Area (USFWS 2024b).

4 Affected Environment

4.1 Vegetation

4.1.1 Ecoregions

The Study Area is located within the Texas Blackland Prairies Ecoregion. The Texas Blackland Prairies Ecoregion is distinguished from surrounding regions by predominantly prairie vegetation and is named for the deep, fertile black soils that characterize the area. Blackland Prairies soils once supported a tallgrass prairie dominated by tall-growing grasses such as little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), yellow Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). This region now contains a higher percentage of cropland than adjacent regions, and pasture and forage production for livestock is common. Large areas of the region have been converted to urban and industrial uses as well. While a few small remnants of grassland remain, virtually all the native Blackland Prairie communities are gone (Griffith et al. 2007). The portion of the Study Area north of Lady Bird Lake can be characterized as dense urban land use in central Austin. South of Lady Bird Lake, the Study Area can be characterized as urban residential and commercial land uses with closed drainage. Lady Bird Lake and several named streams, unnamed tributaries, and open swales are within and adjacent to the Study Area.

The Study Area is bordered by the Edwards Plateau and Post Oak Savannah Ecoregions. The uniqueness of this confluence of ecoregions includes a vast shift in wildlife and vegetation throughout the Austin area. The Edwards Plateau is a karst ecosystem to the west of the Study Area and is characterized by limestone bedrock covered by thin soils, karst features such as sink holes, caves, and springs, and unique biology both on the surface and subterranean.

4.1.2 TPWD EMST Vegetation Types

A total of 12 EMST habitat types were mapped within the Study Area (see **Table 1** and **Figure 2** through **Figure 7**) (TPWD 2014). A review of the TPWD EMST revealed that approximately 83 percent of the Study Area is urbanized. Approximately 44.5 percent is mapped as urban low intensity, and approximately 38.5 percent is mapped as urban high intensity. TPWD defines Urban Low Intensity as built-up areas, but not entirely covered by impervious cover, and includes most of the non-industrial areas within cities and towns. Urban high intensity is defined as built-up areas with wide transportation corridors and predominately consists of non-impervious cover (TPWD 2014).

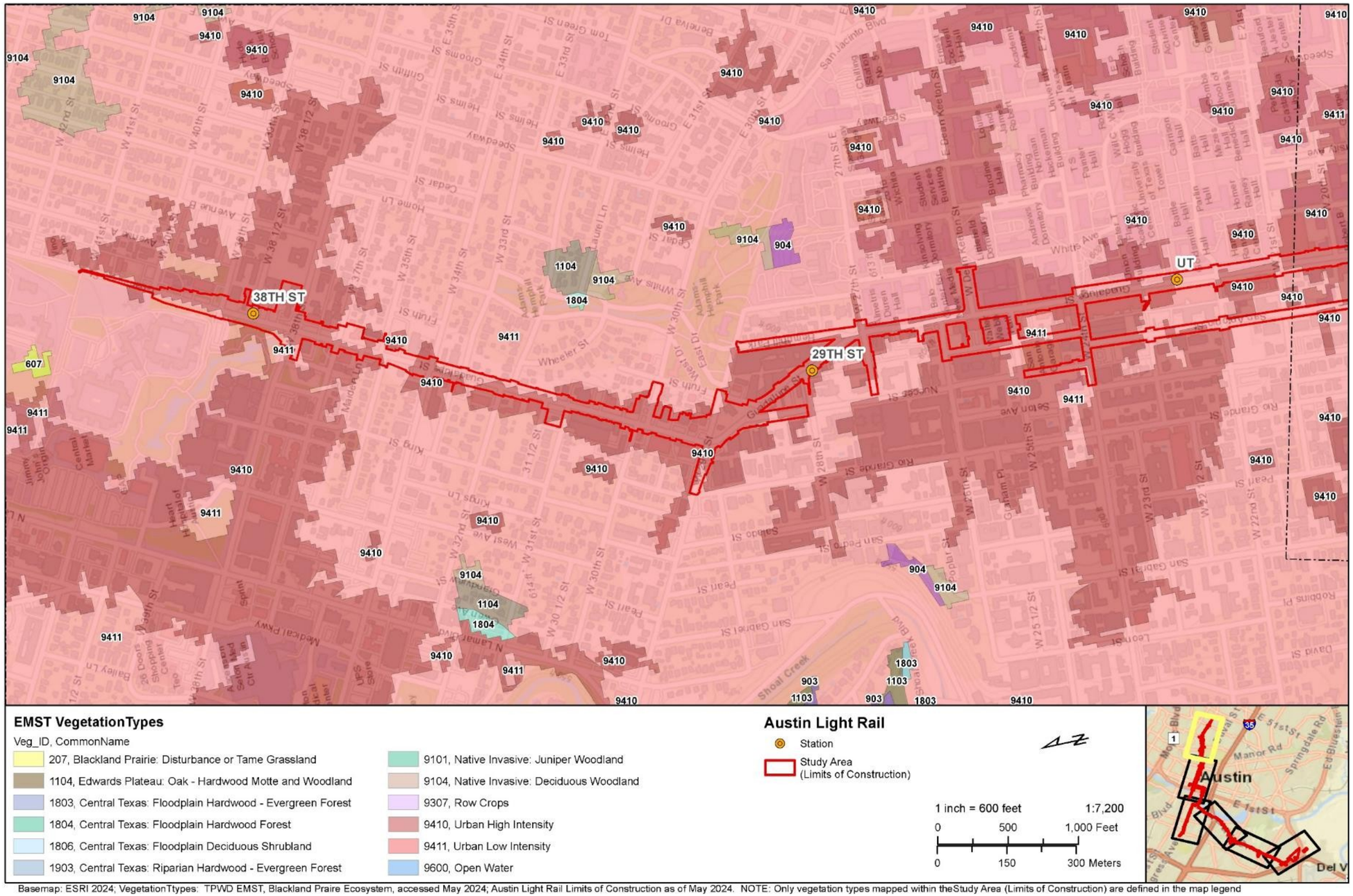
The remaining approximately 17 percent comprises open water (0.6 percent) and 9 other habits (i.e., grasslands, mottes, woodlands, forests, shrublands, and row crops). Habitat that includes open water can range from reservoirs, rivers, lakes, canals, ponds, and marine water. The Study Area includes parts of the Colorado River and Lady Bird Lake, as well as other smaller open water bodies.

Table 1: EMST Vegetation Types Within the Study Area

Veg ID	Vegetation Type	Area (acres)	Percent Cover
207	Blackland Prairie: Disturbance or Tame Grassland	23.83	7.81
1104	Edwards Plateau: Oak - Hardwood Motte and Woodland	0.00	0.00004
1803	Central Texas: Floodplain Hardwood - Evergreen Forest	0.95	0.31
1804	Central Texas: Floodplain Hardwood Forest	2.11	0.69
1806	Central Texas: Floodplain Deciduous Shrubland	0.07	0.02
1903	Central Texas: Riparian Hardwood - Evergreen Forest	0.42	0.14
9101	Native Invasive: Juniper Woodland	0.05	0.02
9104	Native Invasive: Deciduous Woodland	18.02	5.90
9307	Row Crops	3.86	1.26
9410	Urban High Intensity	136.20	44.61
9411	Urban Low Intensity	118.00	38.65
9600	Open Water	1.76	0.58
Total	**Study Area (Limits of Project Construction)**	**305.27**	**100**

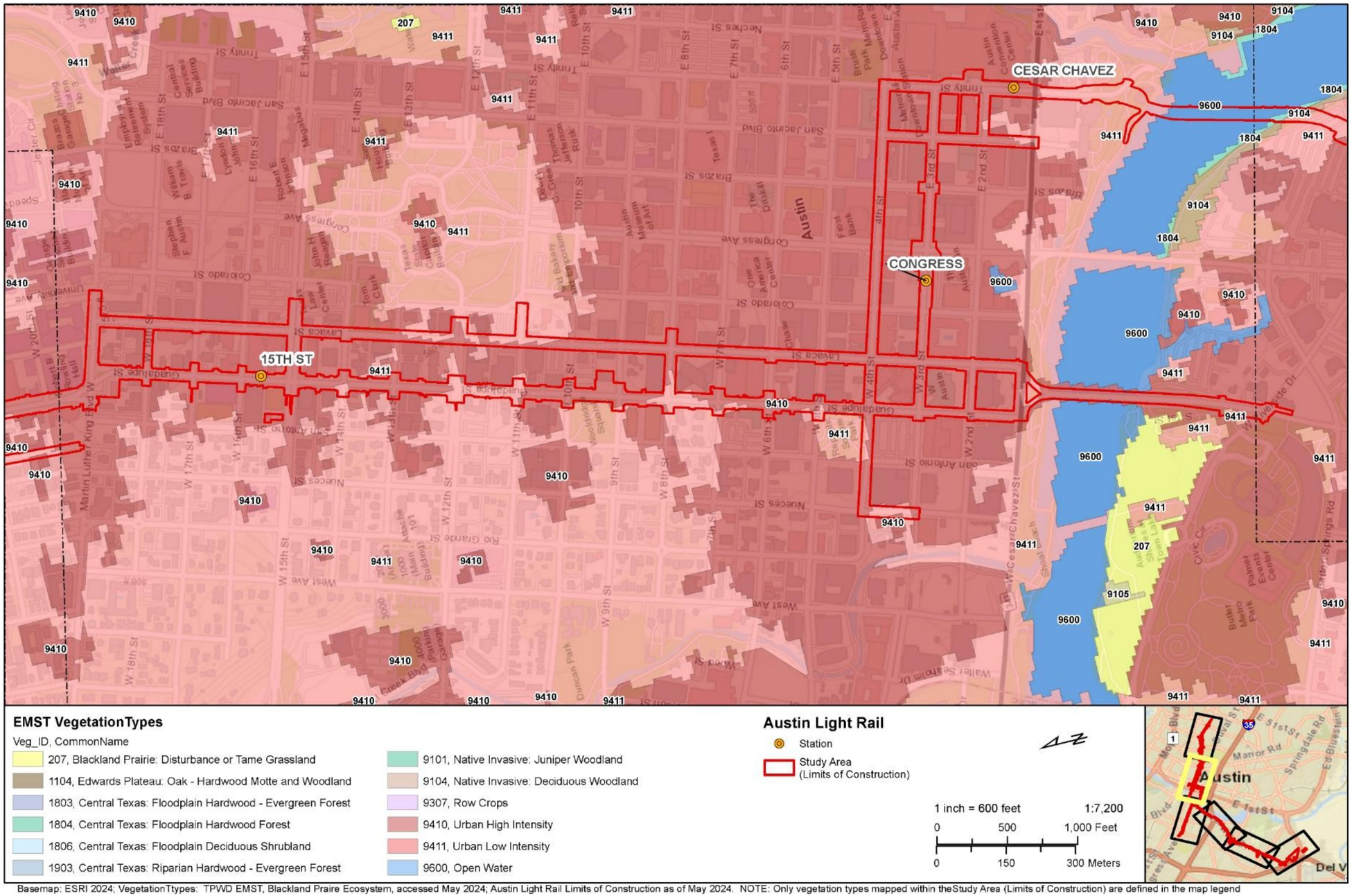
Source: TPWD 2024.

Figure 2: EMST Data within the Study Area (Map 1 of 6)



Basemap: ESRI 2024; VegetationTtypes: TPWD EMST, Blackland Praire Ecosystem, accessed May 2024; Austin Light Rail Limits of Construction as of May 2024. NOTE: Only vegetation types mapped within theStudy Area (Limits of Construction) are defined in the map legend

Figure 3: EMST Data within the Study Area (Map 2 of 6)



Basemap: ESRI 2024; VegetationTtypes: TPWD EMST, Blackland Praire Ecosystem, accessed May 2024; Austin Light Rail Limits of Construction as of May 2024. NOTE: Only vegetation types mapped within theStudy Area (Limits of Construction) are defined in the map legend

Figure 4: EMST Data within the Study Area (Map 3 of 6)

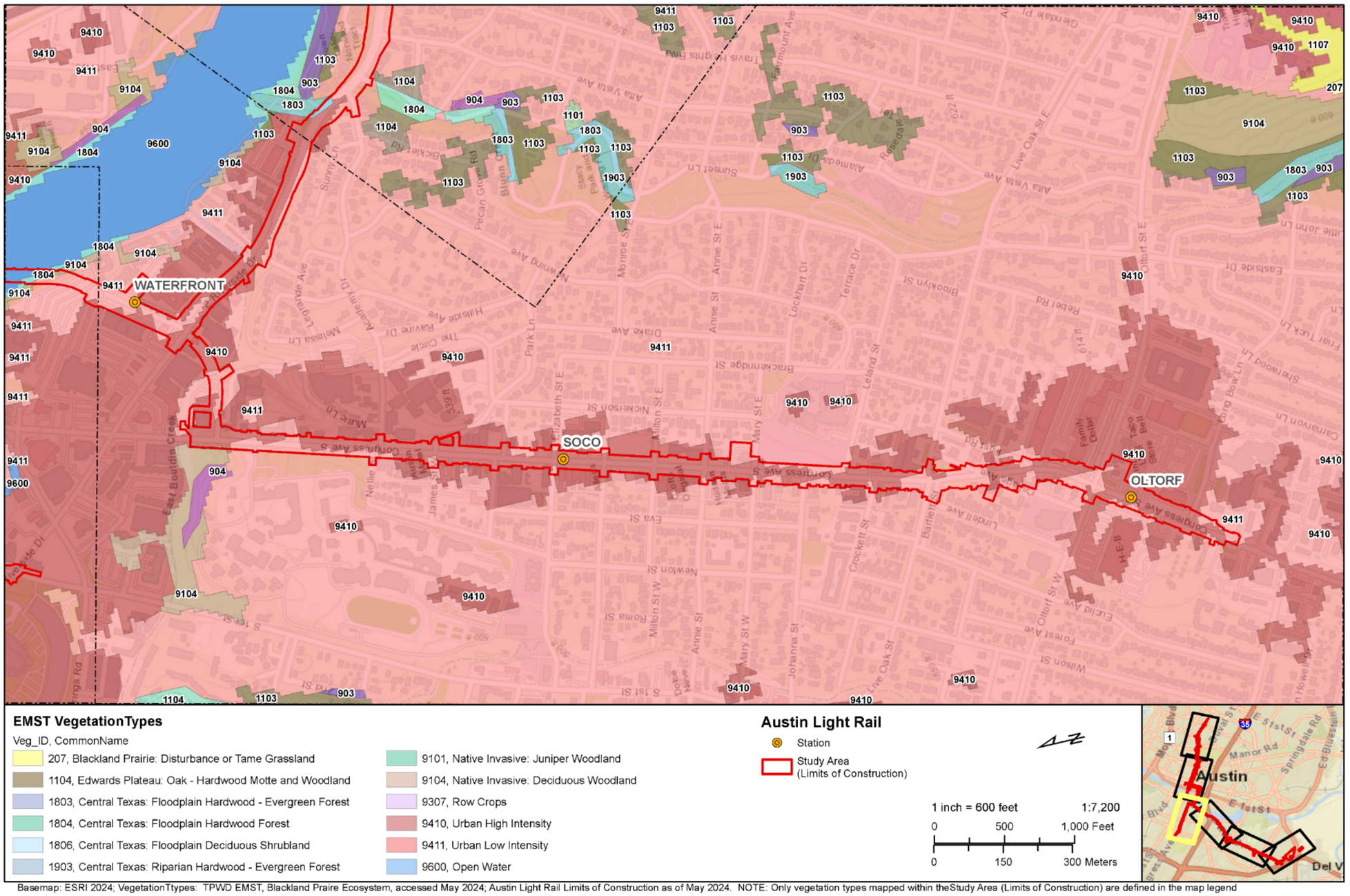


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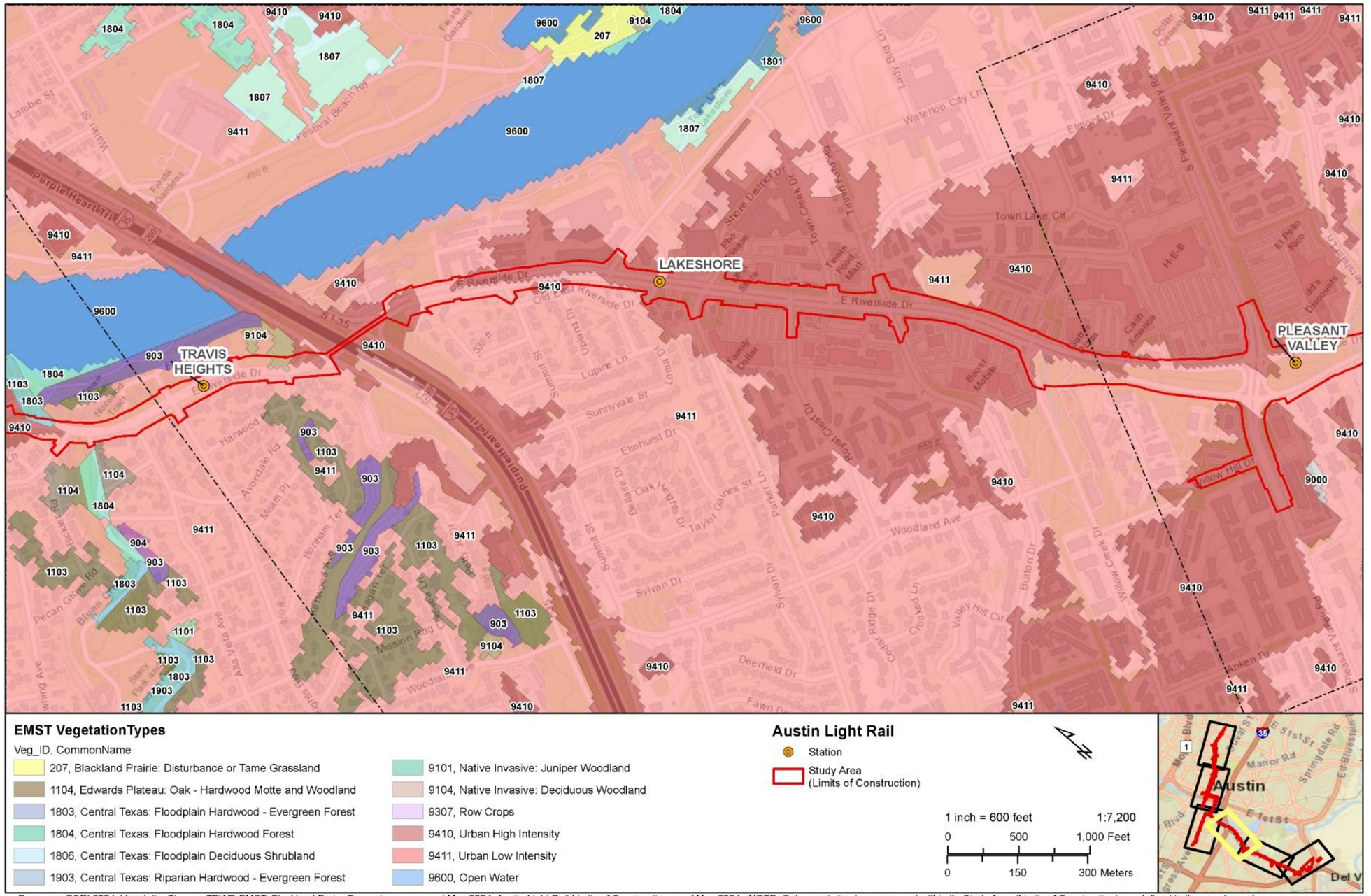
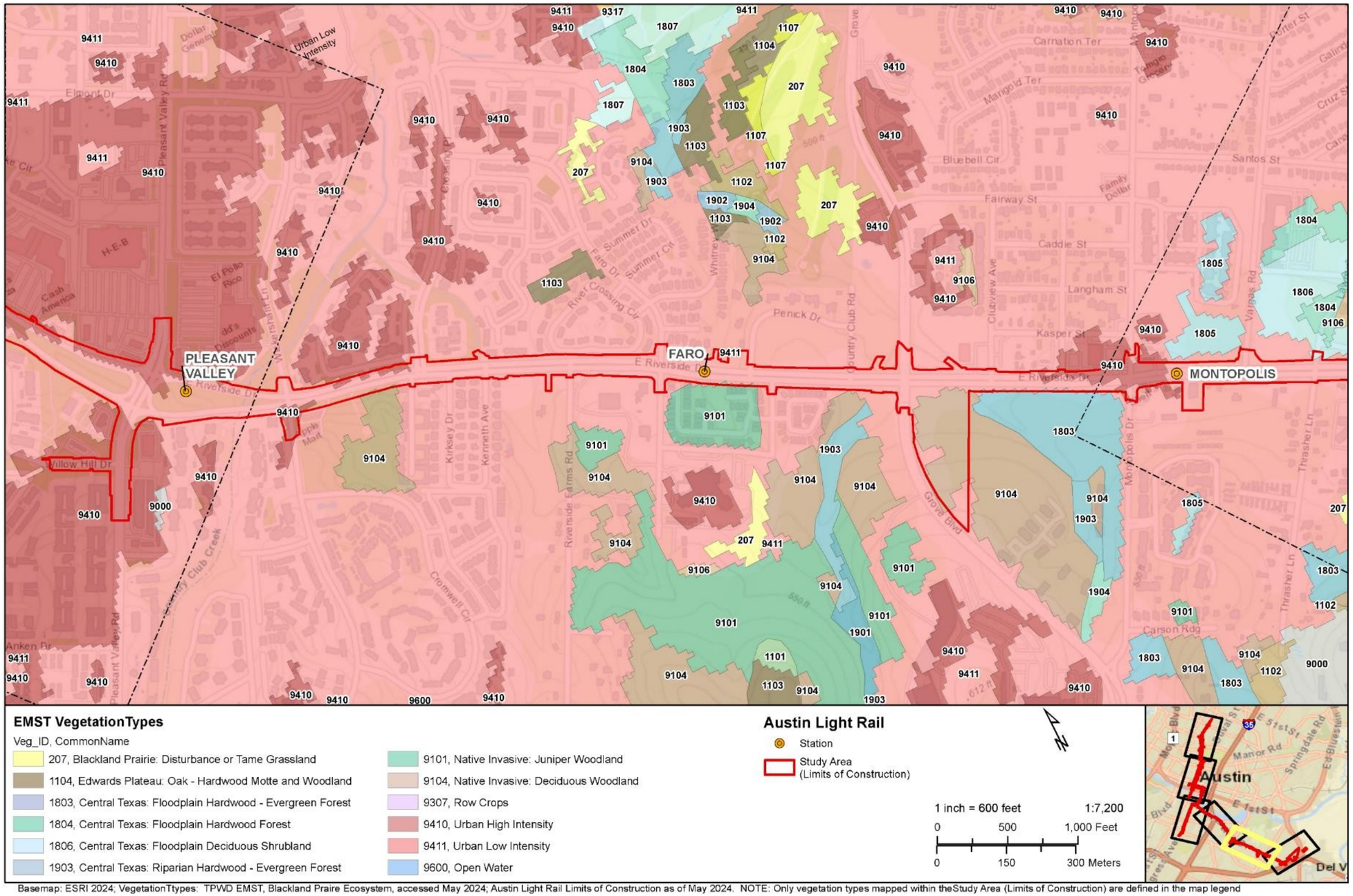
Figure 5: EMST Data within the Study Area (Map 4 of 6)



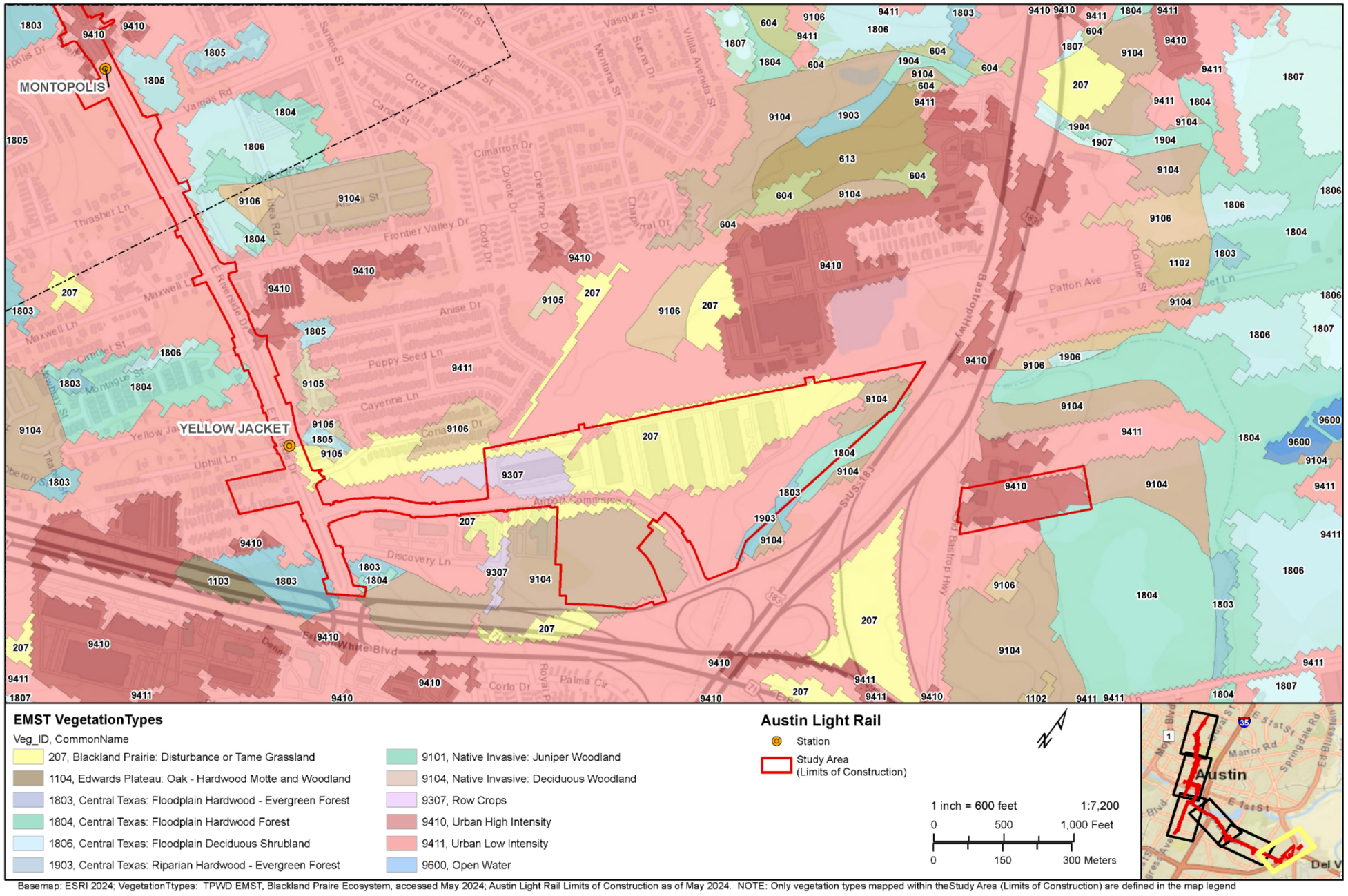
Basemap: ESRI 2024; VegetationTtypes: TPWD EMST, Blackland Praire Ecosystem, accessed May 2024; Austin Light Rail Limits of Construction as of May 2024. NOTE: Only vegetation types mapped within theStudy Area (Limits of Construction) are defined in the map legend

Figure 6: EMST Data within the Study Area (Map 5 of 6)



Basemap: ESRI 2024; VegetationTtypes: TPWD EMST, Blackland Praire Ecosystem, accessed May 2024; Austin Light Rail Limits of Construction as of May 2024. NOTE: Only vegetation types mapped within theStudy Area (Limits of Construction) are defined in the map legend

Figure 7: EMST Data within the Study Area (Map 6 of 6)



Basemap: ESRI 2024; VegetationTtypes: TPWD EMST, Blackland Praire Ecosystem, accessed May 2024; Austin Light Rail Limits of Construction as of May 2024. NOTE: Only vegetation types mapped within theStudy Area (Limits of Construction) are defined in the map legend

4.1.3 Protected and Heritage Trees

ATP provided tree data for the Project in February 2024. Based on dbh and species data, 245 protected trees and 211 heritage trees (excluding dead/dying trees) were identified within the Study Area. **Table 2** describes the number of trees identified per species and protection status. In addition to the species shown in **Table 2**, 43 mitigation exempt species and 5 unidentified species were surveyed. There are 1,380 trees that are species listed in Appendix F of the City's Environmental Criteria Manual and 228 that are non-Appendix F species. In total, there were 2,112 trees surveyed in the Study Area based on CRZ data.

Table 2: Protected and Heritage Trees Within the Study Area

Common Name	Scientific Name	Number of Protected Trees	Number of Heritage Trees*
American Elm	*Ulmus americana*	9	14
Ashe Juniper	*Juniperus ashei*	1	-
American Sycamore	*Platanus occidentalis*	-	1
Bald Cypress	*Taxodium distichum*	2	8
Black Willow	*Salix nigra*	2	-
Eastern Red Cedar	*Juniperus virginiana*	4	-
Cedar Elm	*Ulmus crassifolia*	20	4
Crepe Myrtle	*Lagerostroemia indica*	15	-
Cabbage Palm	*Sabel palmetto*	8	-
Callery/Bradford Pear	*Pyrus calleryana*	5	-
Chinkapin Oak	*Quercus muehlenbergii*	-	3
Desert Willow	*Chilopsis linearis*	4	-
Eastern Cottonwood	*Populus deltoides*	2	-
Engelmann Oak	*Quercus engelmannii*	1	-
Hackberry	*Celtis occidentalis*	15	-
Honey Mesquite	*Prosopis glandulosa*	8	-
Live Oak	*Quercus virginiana*	110	152
Loblolly Pine	*Pinus taeda*	11	-
Pecan	*Carya illinoinensis*	22	16
Post Oak	*Quercus stellata*	3	6
Shumard Oak	*Quercus shumardii*	2	-
Texas Ash	*Fraxinus albicans*	1	7
	Total	**245**	**211**

*Tree species that are unknown/NA are not included on the list of heritage trees defined in Land Development Code. These species, with a dbh of 19 inches or greater, are only considered protected under the City ordinance.

4.2 Groundwater/Surface Water

According to the Texas Water Development Board, the Study Area encompasses the Austin-Travis Lakes watershed (8-digit hydrologic unit code 12090205). Within this 8-digit hydrologic unit code, the Project is located in two subwatersheds (12-digit hydrologic unit codes 120902050306 and 120902050409), including the Town Lake-Colorado River and the Carson Creek-Colorado River (see **FEIS Appendix F-4**).

Various groundwater and surface water features are present within the Study Area, including the Edwards Aquifer, as modeled by the Texas Water Development Board (2024); Lady Bird Lake; various named creeks; and unnamed streams and drainage swales. In addition, springs and potential recharge features (caves and sinks) were identified in the surrounding area, but none were identified within the Study Area. Due to local geology and climate, stormwater runoff can travel outside of the Study Area into other nearby watersheds via surface water features such as streams and vegetated swales and/or into the aquifer through recharge features.

The Study Area overlays the Edwards Aquifer, a major aquifer in the Balcones Fault Zone located in south central Texas (Texas Water Development Board 2024). The Edwards Aquifer occurs in a karst landscape characterized by the dissolution of limestone bedrock, often resulting in the formation of sinkholes and caves. In general, a typical karst landscape forms when surface water interacts with and enters the subsurface through cracks, fractures, and holes that have been dissolved into the bedrock. After traveling underground, sometimes for long distances, this water is then discharged from springs, many of which are cave entrances (National Park Service 2022). The Edwards Aquifer is considered one of the most permeable and productive aquifers in the world and therefore water levels and spring flows associated with this aquifer are highly susceptible to changes resulting from rainfall, drought, and pumping (Texas Water Development Board 2024). The aquifer and springs flowing from the aquifer provide habitat for several threatened and endangered species (Edwards Aquifer Authority 2021).

A portion of the Study Area overlays the Barton Springs segment of the Edwards Aquifer (Barton Springs/Edwards Aquifer Conservation District 2024). Barton Springs, emerging from this segment of the Edwards Aquifer, is a complex of springs approximately 1 mile west of the Study Area in Zilker Park. Parthenia Spring is the largest spring within the complex with its flow comprising approximately 90 percent of the total discharge from Barton Springs. For additional aquifer and spring information, see **FEIS Appendix F-4**.

4.3 Common Wildlife

The term “wildlife” includes all animal species except those identified as protected by law, rare, and/or SGCN (see Sections 4.5 and 4.6). This discussion is divided into the following vertebrate wildlife categories: amphibians and reptiles, fish, mammals, and birds. **Table 3** through **Table 6** present the most common vertebrate species with the potential to inhabit the Study Area based on ranges that intersect the Study Area,

potential occurrence in relation to EMST vegetation types, and other species-specific habitat requirements. These tables are not all-inclusive for wildlife species that could occur in the Study Area.

4.3.1 Amphibians and Reptiles

Table 3 lists some of the most common amphibian and reptile species, organized by family. Most of these species are likely to occur in vegetation types associated with natural areas, including woodlands along drainages, greenspaces, and landscaped vegetation within the Study Area. Specifically, water snakes (*Nerodia* spp.), garter snakes (*Thamnophis* spp.), and the cottonmouth (*Agkistrodon piscivorus*), as well as salamanders, frogs, and toads, and turtle species, tend to occur in habitats near water and are more commonly found in the identified EMST types (see **Table 1**), as well as any other vegetation type that occurs near a water source.

Table 3: Common Amphibian and Reptile Species with Potential to Occur in the Study Area

Common Name	Scientific Name
Frogs and Toads	
Couch's spadefoot	*Scaphiopus couchi*
Cliff chirping frog	*Eleutherodactylus marnockii*
Blanchard's cricket frog	*Acris blanchardi*
Green treefrog	*Hyla cinerea*
Gray treefrog	*Hyla cinerea*
Spotted chorus frog	*Pseudacris clarkii*
Green toad	*Anaxyrus debilis*
Gulf Coast toad	*Incilius nebulifer*
Rio Grande leopard frog	*Lithobates berlandieri*
Bullfrog	*Lithobates catesbeiana*
Western narrow-mouthed toad	*Gastrophryne olivacea*
Turtles	
Texas river cooter	*Pseudemys texana*
Pond slider	*Trachemys scripta*
Spiny softshell	*Apalone spinifera*
Lizards	
Mediterranean gecko [1]	*Hemidactylus turcicus*
Prairie lizard	*Sceloporus consobrinus*

Common Name	Scientific Name
Texas spiny lizard	*Sceloporus olivaceus*
Green anole	*Anolis carolinensis*
Little brown skink	*Scincella lateralis*
Common spotted whiptail	*Aspidoscelis gularis*
Six-lined racerunner	*Aspidoscelis sexlineatus*
Snakes	
Texas threadsnake	*Rena dulcis*
Great Plains ratsnake	*Pantherophis emoryi*
Texas ratsnake	*Pantherophis obsoleta*
Eastern hog-nosed snake	*Heterodon platirhinos*
Common kingsnake	*Lampropeltis getula*
Western coachwhip	*Masticophis flagellum testaceus*
Blotched watersnake	*Nerodia erythrogaster*
Diamond-backed watersnake	*Nerodia rhombifer*
Rough greensnake	*Opheodrys aestivus*
Gophersnake	*Pituophis catenifer*
Black-necked gartersnake	*Thamnophis cryptopsis*
Checkered gartersnake	*Thamnophis marcianus*
Western ribbonsnake	*Thamnophis proximus*
Rough earthsnake	*Virginia striatula*
Texas coralsnake	*Micrurus tener*
Copperhead	*Agkistrodon contortrix*
Cottonmouth	*Agkistrodon piscivorus*
Western diamond-backed rattlesnake	*Crotalus atrox*

Source: Dixon 2013, as cited in AECOM 2022.
[1] Introduced

4.3.2 Fish

The Study Area lies within the Colorado River basin. Aquatic habitats within the Study Area are influenced by Lady Bird Lake (the Colorado River) and its tributaries, including Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek. Regional planning groups make recommendations for the designation of ecologically unique river and stream segments as part of regional water plans. These segments are known as Ecologically Significant

Stream Segments. There are no Ecologically Significant Stream Segments within the Study Area. Other water considerations, including waters of the U.S., are addressed in **FEIS Appendix F-4**. Common species with potential to inhabit waters in and around the Study Area, most notably Lady Bird Lake (the Colorado River), are included in **Table 4**.

Table 4: Common Fish Species with Potential to Occur in the Study Area

Common Name	Scientific Name
Longnose gar	*Lepisosteus osseus*
Gizzard shad	*Dorosoma cepedianum*
Grass carp [1]	*Ctenopharyngodon idella*
Red shiner	*Cyprinella lutrensis*
Blacktail shiner	*Cyprinella venusta*
Common carp [1]	*Cyprinus carpio*
Golden shiner [1]	*Notemigonus crysoleucas*
Fathead minnow	*Pimephales promelas*
Bullhead minnow	*Pimephales vigilax*
River carpsucker	*Carpiodes carpio*
Smallmouth buffalo	*Ictiobus bubalus*
Black bullhead	*Ameiurus melas*
Yellow bullhead	*Ameiurus natalis*
Blue catfish	*Ictalurus furcatus*
Channel catfish	*Ictalurus punctatus*
Flathead catfish	*Pylodictis olivaris*
Western mosquitofish	*Gambusia affinis*
White bass	*Morone chrysops*
Striped bass [1]	*Morone saxatilis*
Redbreast sunfish[1]	*Lepomis auritus*
Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gulosus*
Orangespotted sunfish	*Lepomis humilis*
Bluegill	*Lepomis macrochirus*
Redspotted sunfish	*Lepomis miniatus*
Longear sunfish	*Lepomis megalotis*

Common Name	Scientific Name
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Freshwater drum	*Aplodinotus grunniens*

Source: Thomas et al. 2007, as cited in AECOM 2022.
[1] Introduced

4.3.3 Mammals

Common mammalian species with potential to inhabit the Study Area are listed in **Table 5**. The Study Area is located within a highly urbanized environment; however, several mammalian species have adapted well to human-modified habitats. The Virginia opossum (*Didelphis virginiana*) and nine-banded armadillo (*Dasypus novemcinctus*) can be found in a variety of habitats, including all of the EMST vegetation types within the Study Area.

Bats that could occur within the Study Area are cave adapted species that utilize man-made structures for roosting (e.g., Brazilian [Mexican] free-tailed bat [*Tadarida brasiliensis*] or are forest dwellers (e.g., evening bat [*Nycticeius humeralis*]) that utilize trees and snags for roosting). Bats may be found in any of the EMST types, including Urban High Intensity and Urban Low Intensity. The riparian areas along Lady Bird Lake and other streams within the Study Area and undeveloped properties, such as portions of the operations and maintenance facility, support mature trees that can provide suitable habitat for tree dwelling bats.

In addition, the largest urban bat roost in the world is located within the Study Area at the Congress Avenue bridge over Lady Bird Lake (the Colorado River). Mexican free-tailed bats, one of the most abundant bat species in the United States and Mexico, including on the Edwards Plateau of Central Texas, provide important ecological and economic benefits in Austin, including ecotourism, merchandising, and pest control. A primary food source of Mexican free-tailed bats is adult flying lepidopteran species, such as moths, the larvae of which are documented agricultural pests. Since the early 1980s, the Congress Avenue Bridge has supported an estimated 500,000 to 2,500,000 Mexican free-tailed bats (Schmidly and Bradley 2016; Tuttle 2022). Mexican free-tailed bats are considered a migratory species that spend summers in caves and bridges throughout Texas and beyond, and they overwinter in Mexico. Central Texas, however, is known to have large overwintering populations of Mexican free-tailed bats (Davis et al. 1962; Spenrath and LaVal 1974; Glass 1982; Scales and Wilkins 2007; Zara 2023). Recent observations suggest that overwintering populations of Mexican free-tail bats are increasing in size (Weaver 2012), and substantial overwintering colonies have been documented at Congress Avenue based on radar data observations of bat flights from the Bridge. Flight data indicate that there were still more than 200,000 bats flying from the bridge in December 2019 (and reported similar numbers in December 2021); documented 100,000 flying in January 2021; and 50,000 flying in

February 2021 (Mackenzie 2022), indicating that the overwintering population is greater in number since not all bats will emerge during winter months.

Carnivores and even-toed ungulates mostly consist of habitat generalists that can also be found in all of the EMST vegetation types. Rodents also occur in varying habitat types. According to Schmidly and Bradley (2016), squirrels are tree dwelling species that can be found in any of the woodland or forest vegetation types. Nutria (*Myocastor coypus*) are found in aquatic habitats and would mostly be associated with water in the Central Texas EMST types, as well as any aquatic habitats within the Study Area. The white-footed deermouse (*Peromyscus leucopus*) is typically found in bottomland forests and woodlands associated with drainages and would potentially be found in all the Central Texas EMST types. The North American deermouse (*Peromyscus maniculatus*) and hispid cotton rat (*Sigmodon hispidus*) are habitat generalists and may be found in vegetated areas within any of the EMST types. The eastern cottontail (*Sylvilagus floridanus*) is also a habitat generalist, but typically inhabits areas with abundant brush cover. They would be expected to occur in any of the shrubland EMST types or in brushy areas found within other EMST types.

Table 5: Common Mammalian Species with Potential to Occur in the Study Area

Common Name	Scientific Name
Marsupials	
Virginia opossum	*Didelphis virginiana*
Armadillos	
Nine-banded armadillo	*Dasypus novemcinctus*
Bats	
Silver-haired bat	*Lasionycterus noctivagans*
Mexican free-tailed bat	*Tadarida brasiliensis*
Evening bat	*Nycticeius humeralis*
Carnivores	
Coyote	*Canis latrans*
Common gray fox	*Urocyon cinereoargenteus*
Bobcat	*Lynx rufus*
Striped skunk	*Mephitis*
Northern raccoon	*Procyon lotor*
Even-toed Ungulates	
Feral hog [1]	*Sus scrofa*
White-tailed deer	*Odocoileus virginianus*

Common Name	Scientific Name
Rodents	
White-footed deermouse	*Peromyscus leucopus*
North American deermouse	*Peromyscus maniculatus*
Hispid cotton rat	*Sigmodon hispidus*
Rock squirrel	*Otospermophilus variegatus*
Eastern fox squirrel	*Sciurus niger*
Nutria [1]	*Myocastor coypus*
House mouse [1]	*Mus musculus*
Black rat [1]	*Rattus rattus*
Rabbits	
Eastern cottontail	*Sylvilagus floridanus*

Source: Schmidly and Bradley 2016.
[1] Introduced

4.3.4 Birds

There are numerous year-round, summer, and winter resident, as well as migrant, avian species with potential to occur in the Study Area. The Study Area is located within the Central Flyway, a major bird migration corridor that leads to the Texas coast and Central/South America. **Table 6** lists some of the most common avian species, organized by family, with the potential to occur in the Study Area.

Additionally, **Table 6** identifies the species as year-round residents or migrants and provides what season migrants may be present. Note that all species except those denoted by an asterisk are native and protected from take under provisions of the Migratory Bird Treaty Act (see Section 4.4). Avian families most commonly found in the central Texas EMST types, as well as any other vegetation type that occurs near ponds, wetlands, or other water sources, include swans, geese and ducks; grebes; cormorants; bitterns and herons; rails, gallinules and coots; plovers; sandpipers, phalaropes and allies; and gulls, terns and allies. Many of these species will form colonial wading bird colonies, which are considered sensitive wildlife features and tracked by TPWD. No TXNDD Element of Occurrence Records (EORs) for colonial wading bird colonies were identified within the Study Area, although there are known rookeries in nearby areas of Lady Bird Lake. Typical grassland- and savanna-associated families potentially found in the associated EMST types include New World sparrows and meadowlarks, as well as northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), mourning dove (*Zenaida macroura*), and scissor-tailed flycatcher (*Tyrannus forficatus*). Species usually associated with woodlands and forests that could potentially occur in the associated EMST types, as well as any other woodland or forest EMST types, include eagles, owls, woodpeckers, and wood warblers. Other avian families and species listed below

typically occur in a variety of habitats and can be found in any of the EMST types within the Study Area.

Table 6: Common Avian Species with Potential to Occur in the Study Area

Common Name	Scientific Name	Season
Swans, Geese and Ducks		
Black-bellied whistling-duck	*Dendrocygna autumnalis*	Year-round
Snow goose	*Chen caerulescens*	Migration
Canada goose	*Branta canadensis*	Winter
Mute swan [1]	*Cygnus olor*	Year-round
Wood duck	*Aix sponsa*	Year-round
Gadwall	*Anas strepera*	Winter
American wigeon	*Anas americana*	Winter
Mallard	*Anas platyrhynchos*	Winter
Blue-winged teal	*Anas discors*	Winter
Northern shoveler	*Anas clypeata*	Winter
Northern pintail	*Anas acuta*	Winter
Green-winged teal	*Anas crecca*	Winter
Canvasback	*Aythya valisineria*	Winter
Redhead	*Aythya americana*	Winter
Ring-necked duck	*Aythya collaris*	Winter
Lesser scaup	*Aythya affinis*	Winter
Bufflehead	*Bucephala albeola*	Winter
Ruddy duck	*Oxyura jamaicensis*	Winter
Grebes		
Pied-billed grebe	*Podilymbus podiceps*	Year-round
Eared grebe	*Podiceps nigricollis*	Winter
Cormorants		
Double-crested cormorant	*Phalacrocorax auritus*	Winter
Neotropic cormorant	*Phalacrocorax brasilianus*	Summer
Bitterns and Herons		
Great blue heron	*Ardea herodias*	Year-round

Common Name	Scientific Name	Season
Great egret	*Ardea alba*	Year-round
New World Vultures		
Black vulture	*Coragyps atratus*	Year-round
Turkey vulture	*Cathartes aura*	Year-round
Osprey, Eagles, Kites and Hawks		
Osprey	*Pandion haliaetus*	Winter
Bald eagle	*Haliaeetus leucocephalus*	Winter
Northern harrier	*Circus cyaneus*	Winter
Sharp-shinned hawk	*Accipiter striatus*	Winter
Cooper's hawk	*Accipiter cooperii*	Year-round
Red-shouldered hawk	*Buteo lineatus*	Year-round
Red-tailed hawk	*Buteo jamaicensis*	Year-round
Falcons		
Crested caracara	*Caracara cheriway*	Year-round
Peregrine falcon	*Falco peregrinus*	Year-round
American kestrel	*Falco sparverius*	Winter
Rails, Gallinules, and Coots		
American coot	*Fulica americana*	Year-round
Plovers		
Killdeer	*Charadrius vociferus*	Year-round
Sandpipers, Phalaropes and Allies		
Wilson's snipe	*Gallinago delicata*	Winter
Spotted sandpiper	*Actitis macularius*	Winter
Gulls, Terns and Allies		
Ring-billed gull	*Larus delawarensis*	Winter
Pigeons and Doves		
Rock pigeon [1]	*Columba livia*	Year-round
Eurasian collared-dove [1]	*Streptopelia decaocto*	Year-round
White-winged dove	*Zenaida asiatica*	Year-round
Mourning dove	*Zenaida macroura*	Year-round

Common Name	Scientific Name	Season
Cuckoos and Allies		
Greater Roadrunner	*Geococcyx californianus*	Year-round
Owls		
Eastern screech owl	*Megascops asio*	Year-round
Great horned owl	*Bubo virginianus*	Year-round
Barred Owl	*Strix varia*	Year-round
Nighthawks and Nightjars		
Common nighthawk	*Chordeiles minor*	Summer
Swifts		
Chimney swift	*Chaetura pelagica*	Summer
Hummingbirds		
Ruby-throated hummingbird	*Archilochus colubris*	Summer
Woodpeckers		
Red-bellied woodpecker	*Melanerpes carolinus*	Year-round
Ladder-backed woodpecker	*Dryobates scalaris*	Year-round
Downy woodpecker	*Dryobates pubescens*	Year-round
Tyrant Flycatchers		
Eastern phoebe	*Saynoris phoebe*	Year-round
Great-crested flycatcher	*Myiarchus crinitus*	Summer
Western kingbird	*Tyrannus verticalis*	Summer
Scissor-tailed flycatcher	*Tyrannus forficatus*	Summer
Vireos		
White-eyed vireo	*Vireo griseus*	Summer
Red-eyed vireo	*Vireo olivaceus*	Summer
Jays and Crows		
Blue jay	*Cyanocitta cristata*	Year-round
American crow	*Corvus brachyrhynchos*	Year-round
Martins and Swallows		
Purple martin	*Progne subis*	Summer
Cliff swallow	*Petrochelidon pyrrhonta*	Summer
Barn swallow	*Hirundo rustica*	Summer

Common Name	Scientific Name	Season
Chickadees and Titmice		
Carolina chickadee	*Poecile carolinensis*	Year-round
Black-crested titmouse	*Baeolophus atricristatus*	Year-round
Wrens		
House wren	*Troglodytes aedon*	Winter
Carolina wren	*Thryomanes ludovicianus*	Year-round
Bewick's wren	*Thryomanes bewickii*	Year-round
Kinglets		
Ruby-crowned kinglet	*Regulus calendula*	Winter
Thrushes		
Eastern bluebird	*Sialia sialis*	Summer
American robin	*Turdus migratorius*	Year-round
Mockingbirds and Thrashers		
Northern mockingbird	*Mimus polyglottos*	Year-round
Starlings		
European starling [1]	*Sturnus vulgaris*	Year-round
Wagtails and Pipits		
American pipit	Anthus rubescens	Winter
Cedar waxwing	Bombycilla *cedrorum*	Winter
Wood Warblers		
Black and white warbler	*Mniotilta varia*	Summer
Black-throated green warbler	*Setophaga virens*	Migration
Orange-crowned warbler	*Vermivora celata*	Winter
Nashville warbler	*Vermivora ruficapilla*	Migration
Yellow warbler	*Setophaga petechia*	Migration
Yellow-rumped warbler	*Setophaga coronata*	Winter
New World Sparrows		
Chipping sparrow	*Spizella passerina*	Winter
Vesper sparrow	*Pooecetes gramineus*	Winter
Field sparrow	*Spizella pusilla*	Winter

Common Name	Scientific Name	Season
Lark sparrow	*Chondestes grammaus*	Year-round
Savannah sparrow	*Passerculus sandwichensis*	Winter
White-crowned sparrow	*Zonotrichia leucophrys*	Winter
White-throated sparrow	*Zonotrichia albicollis*	Winter
Song sparrow	*Melospiza melodia*	Winter
Lincoln's sparrow	*Melospiza lincolnii*	Winter
Cardinals and Allies		
Summer tanager	*Piranga rubra*	Summer
Northern cardinal	*Cardinalis cardinalis*	Year-round
Painted bunting	*Passerina ciris*	Summer
Blackbirds, Meadowlarks and Orioles		
Red-winged blackbird	*Agelaius phoeniceus*	Year-round
Eastern meadowlark	*Sturnella magna*	Year-round
Orchard oriole	*Icterus spurius*	Summer
Common grackle	*Quiscalus quiscula*	Winter
Great-tailed grackle	*Quiscalus mexicanus*	Year-round
Brown-headed cowbird	*Molothrus ater*	Year-round
Finches and Allies		
House finch	*Carpodacus mexicanus*	Year-round
Lesser goldfinch	*Spinus psaltria*	Year-round
American goldfinch	*Spinus tristis*	Winter
Old World Sparrows		
House sparrow [1]	*Passer domesticus*	Year-round

Source: Lockwood and Freeman 2014.
[1] Introduced

4.4 Wildlife Corridors

Wildlife is often observed crossing roadways, resulting in a safety hazard that causes millions of dollars annually in repairs and medical costs due to wildlife vehicle-collisions (Federal Highway Administration 2008). Existing land use in the Study Area primarily consists of residential and commercial developments. However, several parks and greenbelts situated along waterways were identified within and adjacent to the Study Area. Although wildlife corridors are heavily fragmented in this urban landscape, wildlife utilize these features for migration, dispersal, and other movements across the landscape. Wildlife corridors identified within the Study Area include Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake, East Bouldin Creek, and associated greenbelts.

4.5 Protected Species

This section describes habitats and potential of occurrence for species that are protected under provisions of federal and state laws and local ordinances as outlined in Section 2.

4.5.1 Threatened and Endangered Species

Twenty-five federally and/or state-listed threatened, endangered, proposed threatened, proposed endangered, and candidate species were identified by USFWS as having the potential to occur in the Study Area and identified by TPWD as having the potential to occur in Travis County. **Attachment A** lists these species, their habitat descriptions, and suitable habitat determinations within the Study Area. **Figure 8** and **Table 7** and **Table 8** present EORs and Source Feature Records (SFRs) for federally and state-listed protected species and SGCN (see Section 4.6) within a 0.5-mile search radius from the Study Area. There are no EORs for federally or state-listed threatened or endangered species within the Study Area. The following subsections discuss species where potential suitable habitat was identified within the Study Area.

Figure 8: TXNDD Element Occurrence Records and Source Feature Records that Intersect a 0.5-mile Radius of the Study Area

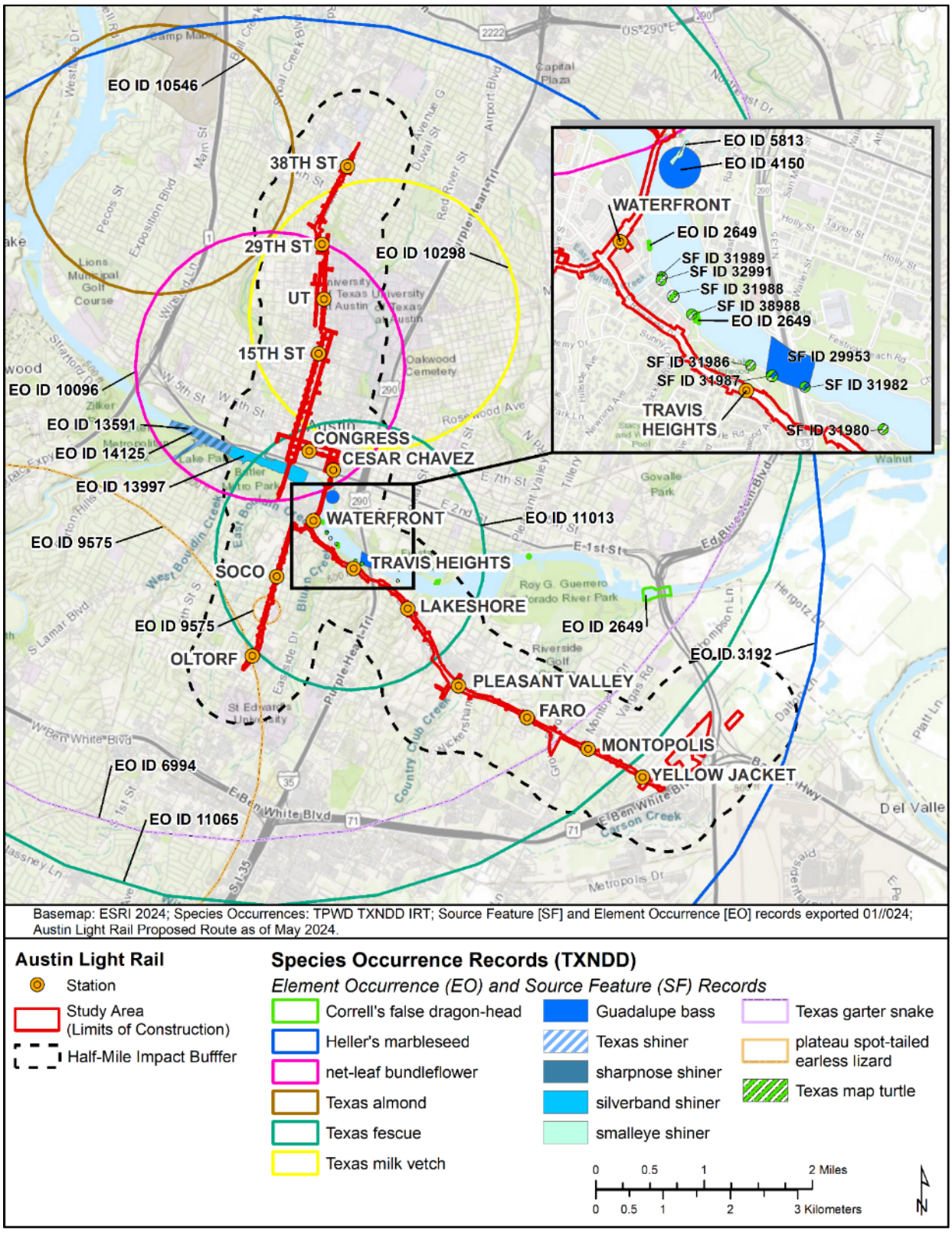


Table 7: Element Occurrence Records Intersecting the Study Area

EOR ID	Scientific Name	Common Name	Last Observation (Year)	Approximate Distance to Study Area (mile)
2649	*Physostegia correllii*	Correll's false dragon-head	2020	0.3
4150	*Micropterus treculii*	Guadalupe bass	1977	0.1
3192	*Onosmodium helleri*	Heller's marbleseed	1943	within (10-mi diameter record; entire Study Area contained inside the EOR)
10096	*Desmanthus reticulatus*	net-leaf bundleflower	1916	1.6
9575	*Holbrookia lacerata*	plateau spot-tailed earless lizard	1953	within (multiple polys in this record, one of which has its center INSIDE Study Area)
14125	*Notropis oxyrhynchus*	sharpnose shiner	1884	0.4
13997	*Notropis shumardi*	silverband shiner	1951	inside Study Area (in river)
5813	*Notropis buccula*	smalleye shiner	1952	0.1
10546	*Prunus minutiflora*	Texas almond	1946	1.5
11065	*Festuca versuta*	Texas fescue	1917	within (10mi diameter record; majority Study Area contained inside the EOR)
11013	*Festuca versuta*	Texas fescue	1921	within (5mi diameter record, approx center is approx in the Study Area)
6994	*Thamnophis sirtalis annectens*	Texas garter snake	1942	within (10mi diameter record; majority Study Area contained inside the EOR)
10298	*Astragalus reflexus*	Texas milk vetch	1908	0.7
13591	*Notropis amabilis*	Texas shiner	1884	0.4

Source: TPWD 2024.

Table 8: Source Feature Records Intersecting the Study Area

SFR ID	Scientific Name	Common Name	Approximate Distance to Study Area (mile)
29953	*Micropterus treculii*	Guadalupe bass	0.1
31980	*Graptemys versa*	Texas map turtle	0.1
31982	*Graptemys versa*	Texas map turtle	0.1
31986	*Graptemys versa*	Texas map turtle	0.1
31987	*Graptemys versa*	Texas map turtle	0.1
31988	*Graptemys versa*	Texas map turtle	0.1
31989	*Graptemys versa*	Texas map turtle	0.1
32991	*Graptemys versa*	Texas map turtle	0.1
38988	*Graptemys versa*	Texas map turtle	0.1

Source: TPWD 2024.

4.5.1.1 Karst Invertebrates

Karst invertebrates are obligatory cave species known as troglobites. They spend their entire life cycle underground, and their physiology is characterized by reduced or absent eyes, lack of pigmentation, elongation of sensory appendages, and low metabolic rates. Compared to surface species, troglobitic species generally have smaller geographic ranges and specific limitations to a particular geographic area, making them biogeographically distinct (Porter 2007) and are particularly susceptible to extinction (Elliott and Reddell 1989; Culver et al. 2000).

Habitat for federally listed karst invertebrates occurs in limestone caves and mesocavernous voids (i.e. humanly impassable voids within the bedrock). Within this environment, these animals are dependent on high humidity, stable temperatures, and external energy sources. Nutrient sources can include large particle sizes that enter through obvious entrances, such as leaf litter, particulate organic carbon, animal droppings, and animal carcasses (USFWS 2011). The primary threat to karst invertebrate species is habitat loss due to increased human population and urbanization. Threats associated with increased urbanization include filling in and collapsing of caves, alteration of drainage patterns, alteration of surface plant and animal communities, contamination, and vandalism (USFWS 2011, 2012, 2018b-h). In addition, the continued spread of non-native, invasive species, such as the red-imported fire ant (*Solenopsis invicta*) and the tawny crazy ant (*Nylanderia fulva*), pose a serious threat to karst invertebrates through direct predation and competition with native species (Taylor et al. 2004; USFWS 2011, 2018b-h). This is a particularly important issue for protected invertebrates in central Texas because many of the caves in this region are shallow and provide refuge to invasive arthropods during temperature extremes.

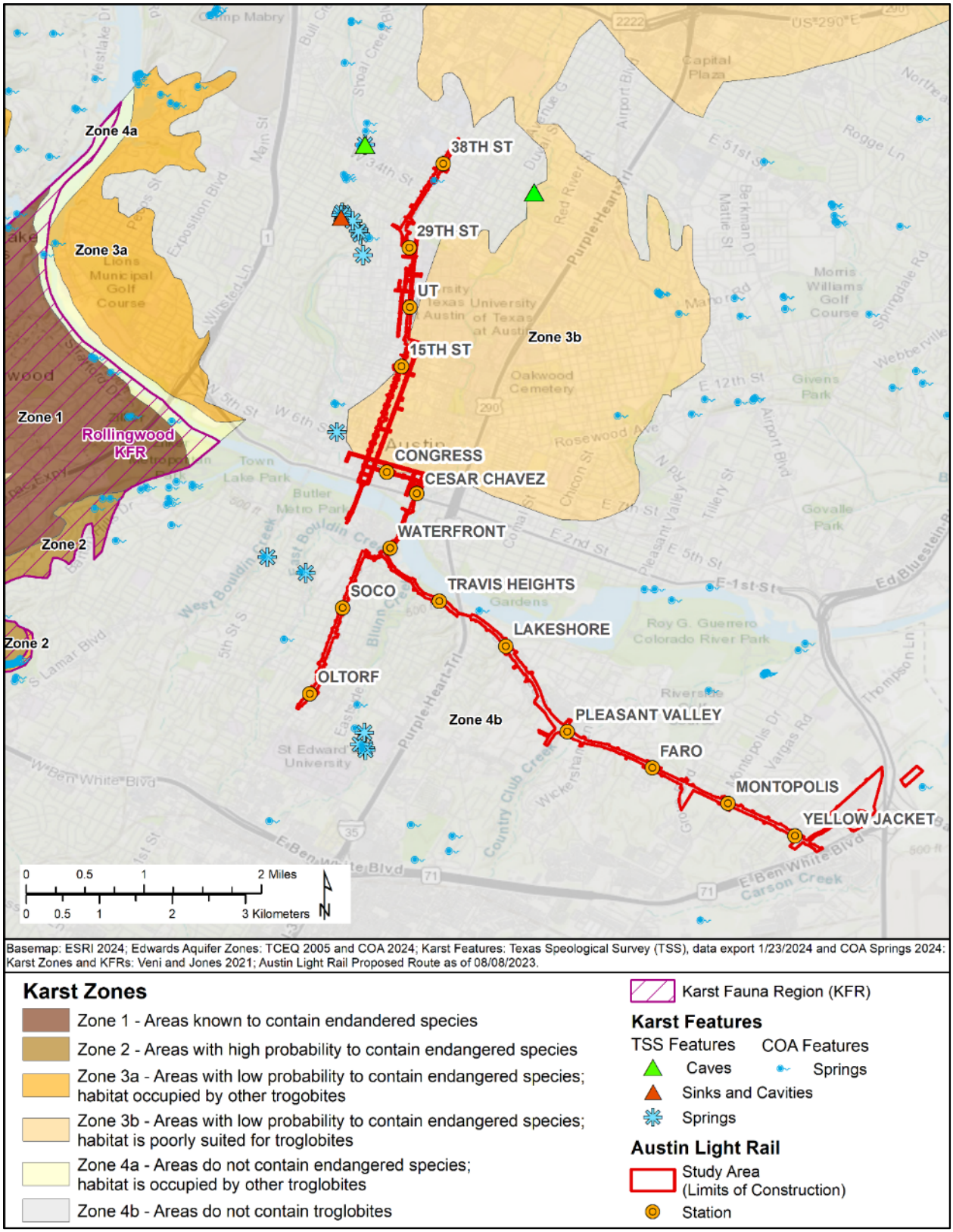
USFWS recognizes six karst zones for Travis County, which define areas of varying likelihood for the occurrence of federally listed invertebrate species (USFWS 2021):

- **Zone 1:** Areas known to contain endangered karst invertebrate species;
- **Zone 2:** Areas with a high probability to contain endangered karst invertebrate species;
- **Zone 3a:** Areas with a low probability to contain endangered karst invertebrate species; habitat occupied by other troglobites;
- **Zone 3b:** Areas with a low probability to contain endangered karst invertebrate species; habitat is poorly suited for troglobites;
- **Zone 4a:** Areas that do not contain endangered karst invertebrate species; habitat occupied by other troglobites; and
- **Zone 4b:** Areas that do not contain troglobites.

Karst zones are further divided into karst fauna regions, which are delineated geographic areas based on local area geology that may reduce or limit interactions between troglobite populations (USFWS 2011; George Veni and Associates 2007). Karst Zone 3b is mapped within a portion of the Study Area located approximately between Lady Bird Lake and UT Station (see **Figure 9**). While the Study Area is not located within a karst fauna region, there are two karst fauna regions located to the west: Rollingwood and Central Austin. The Rollingwood Karst Fauna Region contains the federally listed Bee Creek Cave harvestman (*Texella reddelli*). This species is known from four caves in Travis County within the Rollingwood Karst Fauna Region (USFWS 2009, 2018h). The Central Austin Karst Fauna Region contains the federally listed Bone Cave harvestman (*Texella reyesi*). The Bone Cave harvestman is known from 203 caves in Travis and Williamson Counties (USFWS 2018h). However, since the Study Area is not located within a karst fauna region, it is anticipated that these species would not occur in areas potentially affected by the Project.

While there are no known karst features within the Study Area, features without surface expression or subterranean voids may be encountered during bedrock disturbing construction activities. No EORs or SFRs for karst species listed as rare or SGCN were identified within the Study Area (see **Figure 8**).

Figure 9: Karst Zones and Karst Fauna Regions in the Study Area



Based on cave and karst feature records requested from the Texas Speleological Society database within 0.5 mile from the Study Area, the nearest known cave is Seiders Spring Cave located approximately 0.3 mile west-northwest of the Study Area. This cave is a horizontal feature in a cliff that has been intersected with urban infrastructure including a storm drain and pipe presumably from a sump pump in a building on the surface. This cave was developed in the Buda Limestone. Another cave, Hancock Cave, which was presumably filled during construction of the Hancock Golf Course, is located approximately 0.5 mile east of the Study Area. This cave was reportedly a crawlway cave in the Austin Chalk, with a solution cavity reported beneath the Hancock shopping center to the east. Several voids were encountered in the Austin Chalk by the cross-town sewer tunnel not far to the south. No TXNDD EORs or SFRs for federally and state-listed karst species were identified within the Study Area (see **Figure 8**).

4.5.1.2 *Eurycea* Salamanders

The Jollyville Plateau salamander (*Eurycea tonkawae*) was federally listed as a threatened species on August 20, 2013 (USFWS 2013a). The known range of the Jollyville Plateau salamander includes northwestern Travis County and southern Williamson County. USFWS has designated 32 critical habitat units (USFWS 2013b).

The Barton Springs salamander (*Eurycea sosorum*) was federally listed as an endangered species under the Endangered Species Act by USFWS on April 30, 1997 (USFWS 1997). The known range of the Barton Springs salamander is Southern Travis and Northern Hays Counties, Texas including a mile west of the Study Area. There is no critical habitat designated for this species.

The Austin blind salamander (*Eurycea waterlooensis*) was federally listed as endangered species under the Endangered Species Act by USFWS on August 20, 2013 (USFWS 2013a). The known range of the Austin blind salamander is the Barton Springs complex in Travis County, Texas, west of the Study Area. USFWS has designated critical habitat at the Barton Springs complex only (USFWS 2013b).

Central Texas *Eurycea* salamanders are neotenic, retaining their external gills even after reproductive maturity, and never metamorphosize into a wholly terrestrial form. *Eurycea* salamander detections in Texas are largely associated with spring outflows along the Balcones Escarpment or within the subterranean waters of caves and in wells throughout the Edwards Aquifer. Habitat per USFWS (2013a) for Jollyville Plateau salamanders includes water from the Edwards-Trinity Aquifer in sufficient quantity and quality to meet their life history requirements. Interstitial spaces within the rocky substrate of the surface aquatic habitat ranging from sand to boulders, virtually any minimally sedimented rocky substrate large enough to provide salamanders with cover, shelter, and foraging habitat are also habitat requirements. Some species have also been observed inhabiting leaf litter, algal mats, aquatic moss, or aquatic macrophytes. Location records only represent sites at which salamander detection is practicable, and it is important to note that springs, caves, and wells alone do not constitute the entirety of the available habitat for *Eurycea* salamanders.

Primary threats to *Eurycea* salamanders are the degradation of the quality and quantity of water that feeds spring habitat resulting from urban expansion and modification of surface salamander habitat by human activities (USFWS 2016). Jollyville Plateau salamanders are also known to utilize groundwater refugia when surface habitat is dry (Bendik and Glusenkamp 2012).

No TXNDD EORs or SFRs for protected *Eurycea* species were identified within the Study Area (see **Figure 8**). Critical habitat for *Eurycea* species discussed is present to the west of the Study Area (see Section 4.5.3).

4.5.1.3 Mollusks

Two freshwater mussel species, Texas fatmucket (*Lampsilis bracteata*) and Texas pimpleback (*Cyclonaias petrina*), are identified by USFWS and/or TPWD county list to potentially be in the Study Area. These species were proposed for federal listing as endangered species under the Endangered Species Act by USFWS on August 26, 2021, and formally listed as threatened on June 4, 2024.

The Texas fatmucket is currently known from upper tributaries of the Colorado River basin. Typical mesohabitat preferences for the Texas fatmucket include sand, mud, and gravel substrates among larger cobbles, boulders, bedrock ledges and crevices, horizontal cracks in bedrock slabs, vegetated macrophyte runs, roots of cypress trees, and vegetation along steep banks and bank cuts (Inoue et al. 2020). Host fishes for the Texas fatmucket include bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), Guadalupe bass (*Micropterus treculii*), and largemouth bass (*M. salmoides*) (Howells 1997; Johnson et al. 2012; Ford and Oliver 2015). The primary threats to the Texas fatmucket include increased fine sediment; changes to water quality; altered hydrology in the form of inundation, loss of flow, and scouring of substrate; predation and collection; and barriers to host fish movement.

The Texas pimpleback occurs only within the Colorado River Basin with five isolated populations in the Concho, Upper San Saba, Lower San Saba/Colorado, Llano, and Lower Colorado rivers. The Texas pimpleback is often found in medium to large streams with mud, sand, and gravel substrates as well as bedrock outcroppings with crevices and cracks filled with gravel (USFWS 2019). Recent laboratory studies with a closely related species (Guadalupe orb [*Cyclonaias necki*]) suggest channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictus olivaris*), and tadpole madtom (*Noturus gyrinus*) are likely host fish (Dudding 2019).

While host fishes for these mollusk species may be present in the Study Area, neither the Texas fatmucket nor the Texas pimpleback are reservoir tolerant and are not known to occur in the area's urban creeks. The nearest location for either mollusk species is in lower Onion Creek, near the confluence of the Colorado River. In addition, Lady Bird Lake is listed as a Group 5 stream by USFWS, while the remaining streams that transect the Study Area are undesignated; Group 5 streams are those where no federally or state-listed freshwater mussels occur, but mussels are known to occur; or, perennial streams where it is anticipated that live freshwater mussels may occur, but

presence or diversity have not been confirmed (USFWS and TPWD 2021, 2023). As of April 2024, the Texas Freshwater Mussel Survey Protocol has been updated to reflect new coordination procedures for Group 5 streams and should be used for all future coordination efforts with TPWD and USFWS (USFWS and TPWD 2024). No TXNDD EORs or SFRs for mollusk species were identified within the Study Area (see **Figure 8**).

4.5.1.4 Monarch Butterfly

Listing of the monarch butterfly (*Danaus plexippus*) under the Endangered Species Act was determined as warranted, but precluded as of December 2020 by higher priority listing actions, resulting in candidate status of the species. The monarch butterfly is found throughout Texas in a variety of open habitats, including pastures, prairies, open woodlands, savannas, roadside, and other habitats with abundant nectar plants and/or various species of host plants in the Asclepiadaceae family. This species is a habitat generalist and suitable habitat may be present along vegetated roadsides and other open urbanized areas with nectar and/or host plants. As the species is not a listed species, conservation actions to conserve monarch butterflies are voluntary. No TXNDD EORs or SFRs for monarch butterflies were identified within the Study Area (see **Figure 8**).

4.5.1.5 Tricolored Bat

The tricolored bat (*Perimyotis subflavus*) was proposed for listing as endangered species under the Endangered Species Act by USFWS on September 14, 2022. The tricolored bat is an over-dispersed species that roosts singly or in small groups in caves, mines, roadway culverts, and other human-made structures. During non-hibernating seasons, tricolored bat roosts among leaf clusters, Spanish moss, and lichen as well as on the sides of buildings (USFWS 2024b). Stable tricolored bat populations rely on a matrix of interconnected habitats to maintain genetic diversity and provide connectivity between hibernation sites and foraging or summer roosting sites. Roosting, foraging, and travel corridors may also include emergent wetlands, fencerows, edges of agricultural fields, fields, and pastures (USFWS 2024a). White-nose syndrome is the biggest threat to the continued persistence of the tricolored bat, and the spread of the disease is estimated to have caused 90 to 100 percent declines in population across 59 percent of the species' range. Other threats to tricolored bat populations include wind farms and habitat loss. Developed, urbanized areas typically do not provide suitable habitat for the tricolored bat (USFWS 2024b). No TXNDD EORs or SFRs for tricolored bats were identified within the Study Area (see **Figure 8**).

4.5.2 Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act Species

Bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and their nests are federally protected from take under provisions of the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Golden eagles do not breed within the Study Area, although they may occur infrequently in the area as scarce visitors. Suitable nesting habitat for the bald eagle was identified within the Study Area along Lady Bird

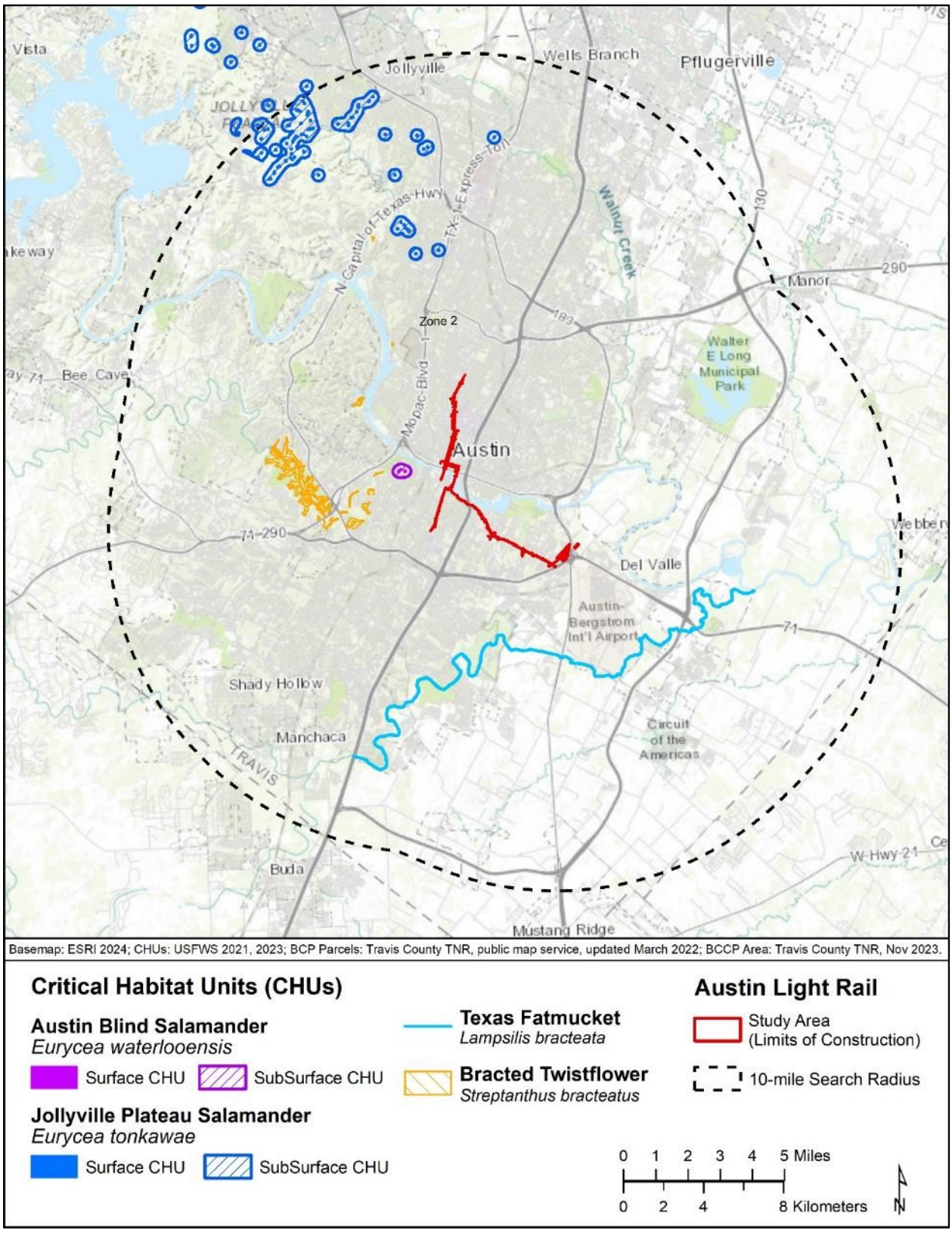
Lake; however, this species is not known to nest in this area and no known nests were identified in the Project vicinity. In addition, no EORs or STRs were identified for the bald eagle within the Study Area (see **Figure 8**).

Migratory birds and their nests are federally protected under provisions of the Migratory Bird Treaty Act. The Migratory Bird Treaty Act states that it is unlawful to kill, capture, collect, posses, buy, sell, trade, or transport any migratory bird, nest, or egg in part or in whole, without federal permit issues in accordance with the act's polices and regulations. Multiple migratory bird species have potential to nest within and adjacent to the Study Area. Suitable habitat identified for migratory birds includes wooded and forested areas (particularly along waterways), fencerows, fields, and other undeveloped, suburban, or landscaped areas within the Study Area. Several natural areas were identified within the Study Area as having a high likelihood to support migratory bird nesting habitat, including riparian corridors and associated greenspaces along Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek. Other undeveloped properties such as the operations and maintenance facility also provide suitable habitat for nesting. Additionally, some migratory birds, including swallows (e.g., *Petrochelidon* spp. and *Hirundo rustica*), often nest on man-made structures such as bridges, large culverts, and overpasses. Potential suitable habitat for swallows was identified along bridges, large culverts, and overpasses within the Study Area, including stream crossings at South First Street and Lady Bird Lake and at South Congress Avenue and East Bouldin Creek. During field work in 2022 for the Orange Line, evidence of migratory bird nesting was observed under bridges during field investigations at South First Street and Lady Bird Lake.

4.5.3 Critical Habitat

Critical habitat is defined as habitat that is designated or proposed by USFWS that contains features essential to the conservation of a listed species and that may require special management and protection. There are no designated or proposed critical habitats within the Study Area (see **Figure 10**). Within 10 miles of the Study Area, there is designated critical habitat for the Austin blind and Jollyville Plateau salamanders, the bracted twistflower, and proposed critical habitat for the Texas fatmucket. The Austin Blind salamander critical habitat was mapped in the vicinity of Barton Springs, approximately 1 mile west of the Study Area. The nearest Jollyville Plateau salamander critical habitat was mapped in the vicinity of Balcones District Park, approximately 1.2 miles west of the Study Area. The nearest critical habitat for the bracted twistflower was mapped along Barton Creek, approximately 1.8 miles west of the Study Area. Proposed critical habitat for the Texas fatmucket was mapped along Onion Creek between Interstate 35 and the Colorado River, approximately 2.5 miles south of the Study Area. No other USFWS designated critical habitats were identified within 10 miles of the Study Area (USFWS 2024b).

Figure 10: Critical Habitat Units within 10 miles of the Study Area



4.6 Species of Greatest Conservation Need

The TPWD identified 94 SGCN as having the potential to occur in Travis County. **Attachment B** lists the SGCN, habitat descriptions, potential for occurrence within the Study Area, and habitat determinations based on desktop data and limited field investigations. **Figure 8** displays TXNDD EORs and SFRs for SGCN within the Study Area. SGCN generally are not formally protected by federal or state law; however, all birds in this section are protected under provisions of the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (see Section 4.5).

As detailed in **Attachment B**, potential suitable habitat for 24 state-listed SGCN was identified within the Study Area. The majority of habitat for these species was identified along drainages, water quality ponds, riparian areas, and greenspaces within the Study Area.

All EORs and SFRs that intersect the Study Area were identified for SGCN. Potential effects on SGCN, as well as best management practices (BMP) designed to minimize effects on these species, are outlined in Sections 5.2.1.3, 5.2.2.3, and 6, respectively.

4.6.1 Amphibians

Potentially suitable habitat was identified within the Study Area for one amphibian SGCN, the Woodhouse's toad (*Anaxyrus woodhousii*). This species could utilize aquatic habitats within the Study Area, including Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek. The Woodhouse's toad is considered a habitat generalist and utilizes terrestrial habitats; therefore, potential suitable habitat for this species was identified in relatively natural settings located throughout the Study Area. No EORs or SFRs for amphibians listed as SGCN were identified within the Study Area (see **Figure 8**).

4.6.2 Birds

The Lady Bird Lake riparian corridor was identified as potentially suitable habitat within the Study Area for one SGCN, the bald eagle. However, due to the urbanized nature of this section of the Colorado River, the bald eagle is not expected to nest in the vicinity of the Study Area. See Section 4.5.6 for more information. No potential suitable habitat was identified within the Study Area for any other birds listed as SGCN in Travis County. No EORs or SFRs for birds listed as SGCN were identified within the Study Area (see **Figure 8**).

4.6.3 Fish

Aquatic habitats along Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek, were identified as potential suitable habitat within the Study Area for four fish listed as SGCN, the American eel (*Anguilla rostrata*), Guadalupe bass (*Micropterus treculii*), silverband shiner (*Notropis shumardi*), and Texas shiner (*Notropis amabilis*). One EOR and one

SFR for the Guadalupe bass were identified near the Study Area along Lady Bird Lake at the mouth of Waller Creek and at the crossing of Interstate 35 at Lady Bird Lake, respectively. One EOR for the silverband shiner was identified within the Study Area along Lady Bird Lake at the mouth of Shoal Creek. One EOR for the Texas shiner was also identified along Lady Bird Lake at the mouth of Barton Creek (upstream of the Study Area). No additional EORs or SFRs for fish listed as SGCN were identified within the Study Area (see **Figure 8**).

4.6.4 Insects

Potential suitable habitat was identified for one insect listed as SGCN, a caddisfly, along streams within the Study Area, including Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek. This species is expected to occur in riparian and riverine habitats with water. No EORs were identified for a caddisfly within the Study Area. No additional suitable habitat was identified within the Study Area for any other insects listed as SGCN in Travis County.

4.6.5 Karst Invertebrates

Karst Zone 3b is mapped within a portion of Study Area (**Figure 9**), located generally between the Congress Avenue and UT West Mall stations, but none of the Study Area is situated in areas mapped as a karst fauna region. While there are no known karst features within the Study Area and there is a low probability of occurrence of protected karst invertebrates in Karst Zone 3b, features without surface expression or subterranean voids may be encountered during bedrock disturbing construction activities. No EORs or SFRs for karst species listed as SGCN were identified within the Study Area (see **Figure 8**).

4.6.6 Mammals

Potential suitable habitat was identified within the Study Area for seven mammals listed as SGCN in Travis County. The big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*) are known to occur in woodlands and forested areas while the northern yellow bat (*Lasiurus intermedius*) prefers to roost in palm trees near water and open areas. Roosting habitat for these bat species was identified within the Study Area along Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek, other undeveloped wooded properties such as the operations and maintenance facility, and open areas near water. Cave myotis (*Myotis velifer*) and other cave-dwelling bats are known to utilize man-made structures within urban environments where natural caves are not available (Bat Conservation International 2024). Potential suitable habitat for cave-dwelling bats was identified along bridges and culverts within the Study Area, including stream crossings. No EORs or SFRs for bat species listed as SGCN in Travis County were identified within the Study Area. However, the largest urban bat roost in the world is located within the Study Area at the Ann W. Richards Congress Avenue

bridge over Lady Bird Lake housing Mexican free-tailed bats year-round (see Section 4.3.3).

The eastern spotted skunk (*Spilogale putorius*), long-tailed weasel (*Mustela frenata*), and swamp rabbit (*Sylvilagus aquaticus*) are listed as SGCNs in Travis County. Potential suitable habitat for these species was identified within the Study Area along riparian corridors where woodlands occur near water. The eastern spotted skunk is considered a habitat generalist in undeveloped landscapes but generally occurs in rural areas. The long-tailed weasel may occur in a variety of habitats but usually lives in rural settings close to water. The swamp rabbit is also more common in east Texas, typically inhabiting poorly drained, low-lying areas such as marshes and river bottoms (Schmidly and Bradley 2016). No EORs or SFRs for these species listed as SGCNs were identified within the Study Area. Although suitable habitat was identified within the Study Area, they are not expected to regularly occur in or inhabit the Study Area due to species-specific range limitations and limited habitat availability within an urbanized landscape.

4.6.7 Reptiles

Potentially suitable habitat for five reptiles listed as SGCN in Travis County was identified within and adjacent to the Study Area along Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake (the Colorado River), and East Bouldin Creek. The Texas garter snake (*Thamnophis sirtalis annectens*) may be found within the Study Area in damp, open areas near water. The eastern box turtle (*Terrapene carolina carolina*) and western box turtle (*Terrapene ornata*) are primarily terrestrial turtles that would be expected to occur in similar habitats within the Study Area, including woodlands, grasslands, and associated ecotones. These turtle species may use pools of water in the summer. The Texas map turtle (*Graptemys versa*) is an aquatic species, restricted to rivers and impoundments such as the reservoir created by Lady Bird Lake. In addition to these species typically associated with aquatic habitats, potentially suitable habitat is present for the plateau spot-tailed earless lizard (*Holbrookia lacerata*), which can occur in a variety of locations such as open fields, graded roadways, cleared and disturbed areas, and various woodlands.

One EOR for the Texas Garter Snake was identified within a large portion of the Study Area between approximately Braker Lane and State Highway 71. One EOR for the plateau spot-tailed earless lizard was identified within the Study Area. Eight EORs for the Texas map turtle were identified along the southern bank of Lady Bird Lake. No other EORs or SFRs for reptiles listed as SGCN were identified within the Study Area.

4.6.8 Plants

Potentially suitable habitat for five plants listed as SGCNs in Travis County was identified within the Study Area. See **Attachment B** for specific habitat descriptions and determinations. Potentially suitable habitat for Correll's false dragon-head (*Physostegia correllii*) was identified throughout the Study Area wherever wet, silty clay loams occur along creek beds and drainages. Potentially suitable habitat for glandular gay-feather

(*Liatris glandulosa*) may be present in the Study Area where limestone outcrops occur. Potentially suitable habitat for low spurge (*Euphorbia peplidion*) may be present throughout the Study Area where vernally moist habitats are present. Potentially suitable habitat for Texas milkvetch (*Astragalus reflexus*) was identified throughout the Study Area along roadsides with herbaceous vegetation. Tree dodder (*Cuscuta exaltata*) is a parasitic plant that grows on woody vegetation (e.g., oaks and elms); therefore, potential suitable habitat for tree dodder may be found in trees and other woody vegetation throughout the Study Area.

Six EORs were identified for plants listed as SGCN with potential suitable habitat located in the Study Area. One EOR for Heller's marbleseed was identified over a large area within the Study Area, approximately centered on Lady Bird Lake. Two EORs for Correll's false dragon-head were identified near the Study Area along the southern bank of Lady Bird Lake. One EOR for the Texas almond was identified west of the Study Area near Shoal Creek. Two EORs for the Texas fescue were identified within the Study Area, approximately centered on Lady Bird Lake. One EOR for the Texas milkvetch was identified within the Study Area between 34th Street and 7th Street.

One EOR for the net-leaf bundleflower was identified within the Study Area between 29th Street and Barton Springs Road. However, no potential suitable habitat for this species was identified within the Study Area. It should be noted that this observation was recorded in 1916 and development since that time likely displaced potential suitable habitat for the net-leaf bundleflower within the Study Area.

4.7 Balcones Canyonlands Conservation Plan Species of Concern

As previously stated, there are 27 species of concern that are covered under the BCCP and have the potential to occur in Travis County. **Attachment C** lists the BCCP species of concern, habitat descriptions, potential for occurrence within the Study Area, and habitat determinations based on desktop data and limited field investigations. BCCP species of concern generally are not protected by federal or state law; however, habitat for the species is managed at the Balcones Canyonlands Preserve and mitigated for via project participation in the BCCP in efforts to preclude the species of concern from federal listing as threatened or endangered (see Section 2.1).

As detailed in **Attachment C**, potentially suitable habitat for BCCP species of concern was not identified within the Study Area. The majority of habitat for these species is associated with karstic geology and vegetation associations not known from within the Study Area. However, given the karst geology and aquifer within portions of the Study Area, it is possible that previously unknown karst features or subterranean conduits could be discovered during construction.

5 Environmental Consequences

This section provides an analysis of the potential natural resources effects of the No Build Alternative and the Build Alternative. These natural resources include vegetation, wildlife, protected species, and their habitats.

5.1 No Build Alternative

Under the No Build Alternative, the Project would not be built. The No Build Alternative is defined as the existing transportation system as well as any committed highway and transit improvements defined in the Capital Area Metropolitan Planning Organization *2045 Regional Transportation Plan* (Capital Area Metropolitan Planning Organization 2024) except for the Project. Any effects related to threatened and endangered species and their habitat because of the committed improvements are unknown at this time and would be determined for each individual project.

As documented in **FEIS Appendix E-2**, a consequence of the No Build Alternative would be that a lower density of residential and commercial development would occur at key points along the light rail alignment because the higher density, transit-oriented development planned around light rail might not occur or occur in less dense development patterns. By not building the Project, some portion of this development would likely occur on the urban fringe rather than in the existing urban centers that would be served by the Project. This type of development in less developed areas would result in an increase in potential habitat disturbance, displacement and/or take of common wildlife or protected species, and dissection of habitat corridors.

5.2 Build Alternative

The Study Area used to evaluate natural resources in the following sections is consistent with the Preferred Alternative as defined in the FEIS/ROD. Additional Project details and field investigation efforts would be necessary to fully evaluate the potential effects and environmental consequences of the Build Alternative as the Project design is refined.

5.2.1 Operational (Long-Term) Effects

The following sections describe the potential operational effects on vegetation, wildlife, protected species, and critical habitat under the Build Alternative.

5.2.1.1 Vegetation

Operational effects on vegetation and protected and heritage trees would be limited to ongoing vegetation maintenance within the permanent ROW. Maintenance activities would include mowing and tree branch trimming or removal. Implementing a sustainable, native landscape with environmentally friendly infrastructure can have restorative effects on the Study Area. Potential long-term effects on protected plants,

including those with potentially suitable habitat within the Study Area (see below for additional information), would be similar to those for vegetation in general. No additional effects on vegetation are anticipated as a result of the operation of the Project. Most effects on vegetation and protected and heritage trees would be associated with construction-related (short-term) effects (see Section 5.2.2).

5.2.1.2 Wildlife

Post-construction operational effects are anticipated to be minor on wildlife in the immediate vicinity of the Project. The Build Alternative was designed to utilize existing ROW and bridges to the extent possible to avoid and minimize effects on wildlife. New bridges are proposed across Lady Bird Lake and East Bouldin Creek as are replacements of existing bridges and culverts along the Study Area at named and unnamed streams. The currently developed nature of the Study Area has likely already displaced sensitive species from the Study Area. Common wildlife species within the Study Area are currently exposed to existing vehicular traffic and other human disturbance regularly. Wildlife could be struck or displaced by rail vehicles during operation of the Build Alternative, but populations of wildlife species currently nesting, foraging, or otherwise occupying these areas have likely acclimated to human-induced disturbance. Wildlife species within the Study Area are currently exposed to strikes by vehicular traffic; therefore, such effects on these wildlife species from the Build Alternative may be considered negligible.

In areas where habitat would be affected along existing or proposed ROW, similar habitats are available in adjacent areas. The removal of existing habitat, even in the form of small landscapes, could affect biodiversity within the Study Area. Small fauna such as lizards and beneficial insects and other invertebrates (e.g., pollinators, prey, decomposers) can be found within small landscapes in urban settings. Implementing a sustainable, native landscape can potentially improve habitat from existing conditions by providing additional habitat and protection for wildlife within the Study Area.

The Mexican free-tailed bat colony at Ann W. Richards Congress Avenue Bridge may be affected by the long-term operation of the Project. This colony is the largest urban bat colony in the world, provides ecotourism opportunities, and is important to the ecology and agriculture of the area by contributing to pollination, seed dispersal, and insect predation. The proposed new bridge across Lady Bird Lake would be within the current flightpath of the bats as it would be approximately 27 feet over the lake's surface elevation, the typical height of a foraging path, approximately 0.25 mile downstream of the Ann W. Richards Congress Avenue Bridge. While Mexican free-tailed bats can fly up to approximately 2 miles, foraging typically happens between approximately 20 to 50 feet (Wilkins 1989). This places the new proposed bridge within the typical foraging path of bats emerging the Ann W. Richards Congress Avenue Bridge and foraging along Lady Bird Lake. As such, it is possible that collisions with moving trains could occur. However, the existing Interstate 35 bridge is also within the foraging path and has not been documented to impede the flight path of the colony. The new bridge would not have the constant disturbance of vehicular traffic over roadway bridges, but the new bridge would have regular, intermittent disturbance from railway traffic. Permanent

indirect effects on roosting bats at the proposed new bridge (due to operational-related disturbances) may occur from the associated traffic noise, vibration, light, presence of vehicular/pedestrian use (Zara 2023), and localized water quality alteration associated with additional guano deposits below the bridge.

Operational lighting could affect the bats as well (Zara 2023) by disrupting foraging areas, roosting and reproduction, and navigation and communication.

5.2.1.3 Protected Species and Critical Habitat

Potential suitable habitat was identified within the Study Area for federally and state-listed threatened, endangered, and candidate species. Habitat for species protected under provisions of the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act was also identified within the Build Alternative ROW. Under the Build Alternative, and with implementation of avoidance and minimization measures in Section 6, no adverse effects on federally and state-listed threatened, endangered, or candidate species are anticipated from the Project. However, minor effects on protected species could occur from operation and maintenance of the Build Alternative, but it is anticipated that these Project-related activities would not result in adverse effects on these species or result in direct take. However, additional Project details would be required to fully evaluate potential environmental consequences to protected species and critical habitat.

Karst Invertebrates

Karst Zone 3b is mapped in a portion of the Study Area, generally between Lady Bird Lake and UT Station, and has the potential for suitable karst invertebrate habitat although there is a low probability of occurrence of protected karst invertebrates in these mapped areas. Karst fauna regions, which are known to harbor protected karst invertebrates, are not mapped in the Study Area. Furthermore, no karst features are known from the Study Area. However, while much of the Study Area is located out of mapped karst zones, contamination of karst habitat could still occur if hazardous substances or petroleum products are spilled and subsequently leach into subsurface or aquifer via overland flow or subterranean conduits. Operational activities, such as fueling and maintenance, would require the use of potential hazardous substances and petroleum products. Contamination would be more likely in areas of porous soils, exposed bedrock, or karst features with surface expression. However, stormwater runoff, particularly from large rain events, can transport these hazardous materials far from the Study Area potentially to waterways or into karst features that reach the aquifer. Previously unknown karst features could be uncovered during construction activities, which could result in exposed, subterranean conduits for sediment or contaminant mobilization and subsequent effects on karst invertebrates. While it is anticipated that operational activities would not adversely affect karst invertebrates, additional project details and field investigation efforts would be necessary to fully evaluate the Study Area for potential Project-related effects on karst invertebrates.

By implementing hazardous materials BMPs and implementing water quality BMPs, as discussed in **FEIS Appendix F-4** and **FEIS Appendix F-3**, potential effects from

operational activities on karst invertebrate species and their habitat would be mitigated. Additional operational effects on karst species are not anticipated as a result of the Build Alternative.

Eurycea Salamanders

Eurycea salamanders rely on groundwater to provide suitable habitat. Operational activities, such as fueling and maintenance, would require the use of potential hazardous substances and petroleum products. Groundwater contamination could occur if hazardous substances or petroleum products are spilled and subsequently leach into the groundwater through the ground or directly into springs orifices. Contamination would be more likely in areas of porous soils and shallow groundwater or aquifer outcrops. Groundwater wells could also provide a direct route for spills to access groundwater. The increase in impervious cover may alter the groundwater recharge rate; however, the altered rate of recharge likely would not affect groundwater quality. It is anticipated that operational activities would not adversely modify or otherwise affect groundwater or springs critical to *Eurycea* salamanders. By implementing hazardous materials BMPs and implementing water quality BMPs, as discussed in **FEIS Appendix F-4**, potential effects on groundwater quality would be mitigated.

Mollusks

While aquatic habitat was identified along Lady Bird Lake and named and unnamed streams within the Build Alternative ROW, protected mollusks are not expected to occur in these areas. Operational activities would not adversely modify or otherwise affect Lady Bird Lake or named and unnamed streams. Operational effects on protected mollusks are not anticipated as a result of the Build Alternative.

Monarch Butterfly

Potentially suitable habitat for the monarch butterfly may be present throughout the Study Area where milkweeds and nectar plants are present. However, most effects on vegetation from the Build Alternative would occur in previously developed landscapes (Urban High Intensity and Urban Low Intensity), which compose approximately 83 percent of the Study Area. Operational effects on the monarch butterfly would be limited to ongoing mowing within the permanent ROW. No additional effects on the monarch butterfly are anticipated as a result of the operation of the Project.

Tricolored Bat

Potentially suitable tricolored bat habitat may be present throughout the Study Area where mature trees with leaf clusters, Spanish moss, peeling bark, and/or tree snags are present. Operational effects would be limited to ongoing vegetation maintenance within the permanent ROW, including tree branch trimming or pruning. No additional effects on the tricolored bat are anticipated as a result of the operation of the Project.

Bracted Twistflower

While the bracted twistflower has an EOR intersecting with the Study Area, potentially suitable habitat for the species is not present within the Study Area. Operational activities would not modify or otherwise affect habitat for the bracted twistflower. Operational effects on the bracted twistflower are not anticipated as a result of the Build Alternative.

Critical Habitat

No critical habitat was identified within the Study Area or within 1 mile of the Study Area. It is expected that operational activities would have no effect on critical habitat.

Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act Species

Suitable nesting habitat for the bald eagle was identified within the Study Area along Lady Bird Lake; however, this species is not known to nest in this area although they have been seen upstream of Lady Bird Lake on Lake Austin. Suitable nesting habitat for migratory birds is present throughout the Study Area at bridges, culverts, and overpasses and within wooded and forested areas, fencerows, fields, and other undeveloped or vegetated areas within the Study Area. Operational effects on bald eagles or migratory birds would primarily be limited to ongoing vegetation maintenance within the permanent ROW. Maintenance activities would include mowing and tree branch trimming or removal. It is possible that bird strikes could occur as a result of the operation of the Project, including at the new crossing of Lady Bird Lake; however, implementation of measures in Section 6 would identify whether such effects exist.

Species of Greatest Conservation Need

Potentially suitable habitat was identified within the Study Area for 24 state-listed SGCN. Operational effects under the Build Alternative may occur to SGCN from the operation and maintenance of the Build Alternative but would not adversely affect the species or result in direct take. The majority of effects on EMST vegetation from the Build Alternative would occur in previously developed landscapes (Urban High Intensity and Urban Low Intensity); therefore, effects on SGCN would be similar to effects described in Section 5.2.1.2 for general wildlife.

Balcones Canyonlands Conservation Plan Species of Concern

As stated above for karst invertebrates (see Section 5.2.1.3), the BCCP species of concern that are karst- and aquifer dependent could potentially be affected if previously unknown karst features or subterranean conduits are uncovered during construction. Potential effects on BCCP species of concern are expected to be similar to those discussed above for karst invertebrates.

While it is anticipated that operational activities would not adversely affect such BCCP species of concern, additional project details and field investigation efforts would be

necessary to fully evaluate the Study Area for potential Project-related effects. Furthermore, the Study Area is not located within a BCCP karst habitat/fee zone. None of the other BCCP species of concern have potentially suitable habitat within the Study Area.

5.2.2 Construction-Related (Short-Term) Effects

The following sections describe the potential construction-related effects on vegetation, wildlife, protected species, and critical habitat because of the Build Alternative.

5.2.2.1 Vegetation

Most vegetation within the Study Area consists of introduced and adapted species that have been planted or modified for human development and landscaping. **Table 1** identifies estimated acreage of mapped vegetation types present within the Study Area.

Short-term, construction-related effects on vegetation from the Build Alternative would be minimal and include dust accumulation, stormwater runoff, and erosion from active construction sites that could inhibit natural plant processes. These effects would be indirect and temporary. In areas of temporary effects in vegetated areas, existing vegetation would be returned to pre-construction conditions or improved conditions after the Project is completed (see Section 6).

Effects from the Build Alternative would result in the permanent loss or modification of native, introduced, and/or adapted vegetation. Effects on vegetation would be limited to that necessary for the construction, operation, and maintenance of the Build Alternative (see Section 6). Permanent effects from the construction of the Project would involve vegetation removal; ground clearing; placement of fill material; and construction culverts, bridges, embankments, stations, the operations and maintenance facility, park-and-rides, and associated light rail facilities. These activities could potentially result in disturbance and modification of existing plant species composition. In some cases, vegetation would be permanently modified while in other cases vegetation would revert to pre-construction conditions or improved conditions with planning. Until ground disturbing activities are completed and ground stabilization occurs, the potential would exist for increased sediment transport during precipitation events and an increased potential for the introduction or spread of non-native and invasive plant species. Construction equipment often transports soil and seeds from one jobsite to another and could be another source of non-native and invasive plant species. However, the Build Alternative was designed to avoid and minimize effects on vegetation by utilizing existing ROW and bridges, where applicable, and proposed stations and operational facilities would be located within previously developed areas. Additionally, ATP would develop a Stormwater Pollution Prevention Plan to mitigate effects on soil stabilization, as outlined in Section 6 and the **FEIS Appendix F-4**.

In addition, trees identified as protected by the City would be removed during clearing activities. Based on an assessment of trees data provided by ATP, 245 protected trees and 211 heritage trees (excluding dead/dying trees) were identified within the Study

Area. The tree data include a percentage-based preservation matrix to identify an in-place preservation probability for existing trees in the Study Area (see **Figure 11**). The decision matrix analyzes four levels of the impact assessment: health, species, program effect, and utility effect. The Tree Task Force implemented a conservative approach for each tree assessed. For example, if a tree is considered 60 percent preservable, all 60 percent categories in the decision matrix must be satisfied at the least. If a tree only met three of the four matrix categories, but was lower in one analysis category, the tree was designated to carry the lowest percent of in-place preservability. Summaries of preservation probability for protected and heritage trees by species is provided in **Table 9** and **Table 10**, respectively. Locations of trees are provided in **Figure 12** through **Figure 33**.

The Project is being designed to avoid removing or impacting protected and heritage trees where feasible, and each tree will be evaluated to determine potential for avoidance during future design phases. Design Options and some design features (e.g., sidewalks) that could be relocated or shifted may minimize and avoid impacts. The Woolridge Square Station, Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside, and Cesar Chavez Station Design Options would result in no additional tree impacts compared to the Build Alternative. Additional trees may be avoided by implementing the Lady Bird Lake Bridge Extension (three protected and five heritage), Travis Heights Station (three protected and one heritage), and Grove Station (two heritage) Design Options, as shown in **Table 11**. Locations of all trees are provided in **Figure 12** through **Figure 33**.

Figure 11: Preservation Probability Decision Matrix Developed by the Tree Task Force for the Tree Impact Assessment

	0%	30%	60%	90%
HEALTH	• Dead / Dying	• Poor (Damaged) • Poor (Diseased) • Imminent Hazard	• Good	• Good
SPECIES	• Invasive	• Heritage • Appendix F • Non-Appendix F	• Heritage • Appendix F • Non-Appendix F	• Heritage • Appendix F • Non-Appendix F
PROGRAM IMPACT	• Guideway • Guideway / Vehicular Lane • Vehicular Lane • OMF (building footprint)	• Vehicular Lane / Bike Path • Bus Stop • TPSS / CBTC Facility • Wall	• Bike Path • Bike Path / T&F Zone • Shared-Use Path • OMF (site footprint)	• T&F Zone • T&F Zone / Sidewalk • Sidewalk • Sidewalk / Bike Path • Boardwalk (Parkland) • Park & Ride (P&R)
UTILITY IMPACT	• Electric - UG - TxDOT • Electric - OH - Trans. • Pipeline - Exxon • Pipeline - Sunoco	• Electric - UG - AE - Duct • Electric - UG - AE • Electric - OH • Electric - OH - Dist. • Wastewater - COA - Pipe • WaterChilled - COA - Supply • WaterChilled - COA - Return • WaterChilled - COA - Conduit	• Electri c- UG - COA - Lighting • Electric - UG - COA - TrafficSignal • SS - Pipe • SS - Manhole • SS - Inlet • SS - COA - Pipe • SS - Private - Pipe • Water - COA - Pipe • Water - Private - Pipe • WaterReclaimed - COA - Pipe	• Electric - OH- Guy • Gas - TxGas - Abandoned • Gas - TxGas - Pipe • Gas - TxGas - ToBeRemoved • Telecomm - UG - MiscProvider • None

Table 9: Protected Trees Within the Study Area (Build Alternative)

Common Name	Species Map ID	Preservation Probability					Total
		0%	30%	60%	90%	100%	
American Elm	AE	4	4	0	0	1	9
Ashe Juniper	AJ	1	0	0	0	0	1
Bald Cypress	BC	0	0	0	1	1	2
Black Willow	BWW	2	0	0	0	0	2
Easter Red Cedar	CDR	0	3	0	0	1	4
Cedar Elm	CE	8	4	3	0	5	20
Crepe Myrtle	CM	4	2	6	0	3	15
Cabbage Palm	CPM	3	2	3	0	0	8
Callery/Bradford Pear	CPR	2	0	0	0	3	5
Desert Willow	DW	0	4	0	0	0	4
Eastern Cottonwood	EC	1	1	0	0	0	2
Engelmann Oak	EO	0	0	1	0	0	1
Hackberry	HB	3	4	5	3	0	15
Honey Mesquite	HM	1	7	0	0	0	8
Live Oak	LO	19	34	21	16	20	110
Loblolly Pine	LP	10	0	0	0	1	11
Pecan	PN	4	8	3	2	5	22
Post Oak	PO	0	1	0	0	2	3
Shumard Oak	SO	0	0	1	1	0	2
Texas Ash	TA	0	1	0	0	0	1
	Total	**62**	**75**	**43**	**23**	**42**	**245**

Table 10: Heritage Trees Within the Study Area (Build Alternative)

Common Name	Species Map ID	Preservation Probability					Total
		0%	30%	60%	90%	100%	
American Elm	AE	4	8	0	0	2	14
American Sycamore	AS	0	0	1	0	0	1
Bald Cypress	BC	3	0	0	3	2	8
Cedar Elm	CE	1	0	1	0	2	4
Chinkapin Oak	CO	1	0	0	1	1	3
Live Oak	LO	16	47	37	17	35	152
Pecan	PN	2	2	1	2	9	16
Post Oak	PO	0	2	0	1	3	6
Texas Ash	TA	3	0	2	1	1	7
Total		**30**	**59**	**42**	**25**	**55**	**211**

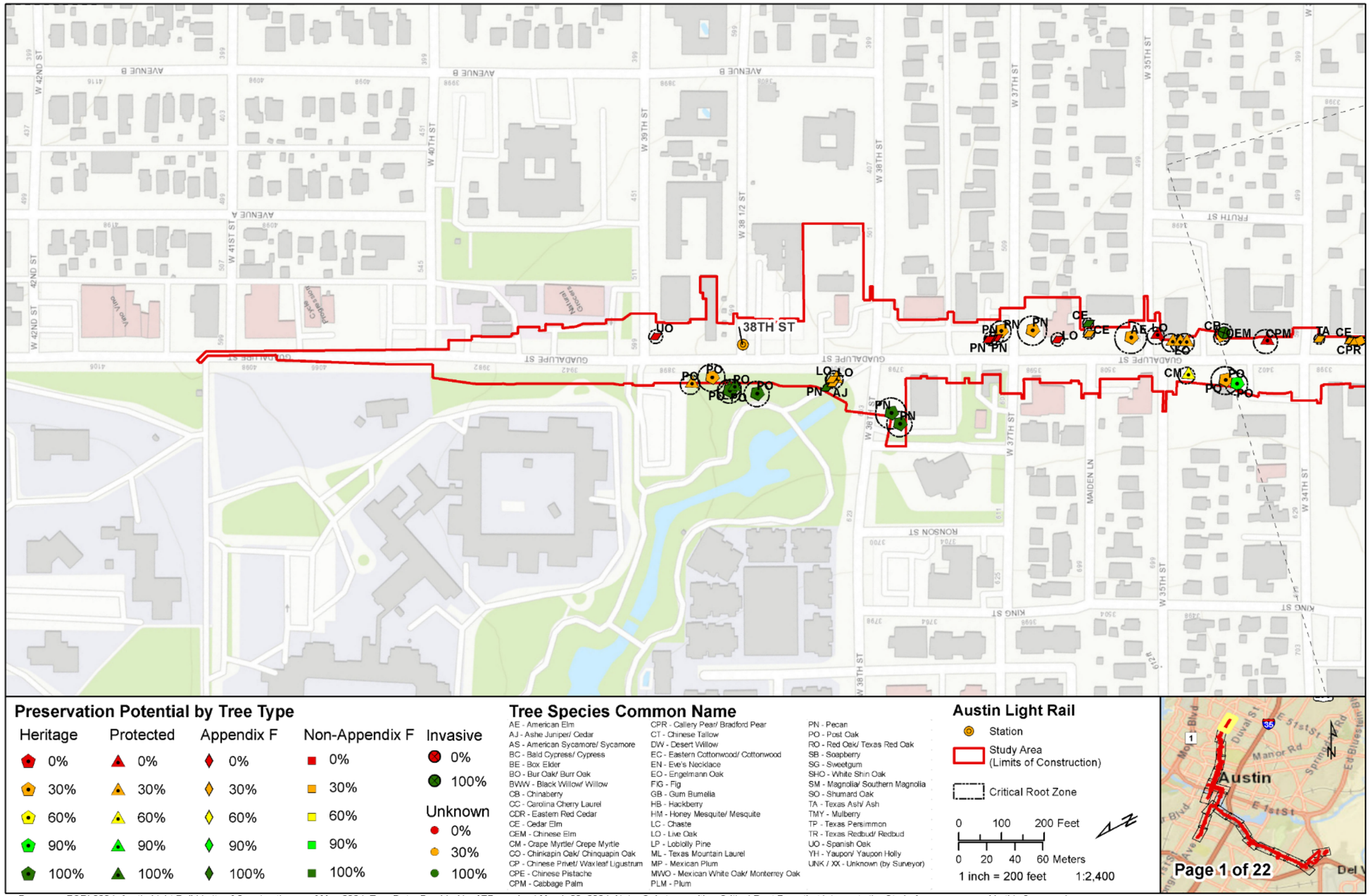
Table 11: Trees Potentially Impacted Within Design Options

Common Name	Build Alternative		Design Option											
			Lady Bird Lake Bridge Extension		Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside		Woolridge Square Station		Cesar Chavez Station		Travis Heights Station		Grove Station	
	H	P	H	P	H	P	H	P	H	P	H	P	H	P
American Elm	14	9	13	8	14	9	14	9	14	9	14	9	14	9
Ashe Juniper	-	1	-	1	-	1	-	1	-	1	-	1	-	1
American Sycamore	1	-	1	-	1	-	1	-	1	-	1	-	1	-
Bald Cypress	8	2	7	2	8	2	8	2	8	2	8	2	8	2
Black Willow	-	2	-	2	-	2	-	2	-	2	-	2	-	2
Eastern Red Cedar	-	4	-	4	-	4	-	4	-	4	-	4	-	4
Cedar Elm	4	20	4	20	4	20	4	20	4	20	4	20	4	20
Crepe Myrtle	-	15	-	15	-	15	-	15	-	15	-	14	-	15
Cabbage Palm	-	8	-	8	-	8	-	8	-	8	-	8	-	8
Callery/Bradford Pear	-	5	-	5	-	5	-	5	-	5	-	5	-	5
Chinkapin Oak	3	-	2	-	3	-	3	-	3	-	3	-	3	-
Desert Willow	-	4	-	4	-	4	-	4	-	4	-	4	-	4
Eastern Cottonwood	-	2	-	2	-	2	-	2	-	2	-	2	-	2
Engelmann Oak	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Hackberry	-	15	-	15	-	15	-	15	-	15	-	15	-	15
Honey Mesquite	-	8	-	8	-	8	-	8	-	8	-	8	-	8
Live Oak	152	110	151	110	152	110	152	110	152	110	152	110	150	110

Common Name	Build Alternative		Design Option											
			Lady Bird Lake Bridge Extension		Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside		Woolridge Square Station		Cesar Chavez Station		Travis Heights Station		Grove Station	
	H	P	H	P	H	P	H	P	H	P	H	P	H	P
Loblolly Pine	-	11	-	9	-	11	-	11	-	11	-	11	-	11
Pecan	16	22	16	22	16	22	16	22	16	22	15	21	16	22
Post Oak	6	3	6	3	6	3	6	3	6	3	6	3	6	3
Shumard Oak	-	2	-	2	-	2	-	2	-	2	-	2	-	2
Texas Ash	7	1	6	1	7	1	7	1	7	1	7	1	7	1
Total	211	245	206	242	211	245	211	245	211	245	210	242	209	245
Total Change by Design Option	-	-	-5	-3	-	-	-	-	-	-	-1	-3	-2	-

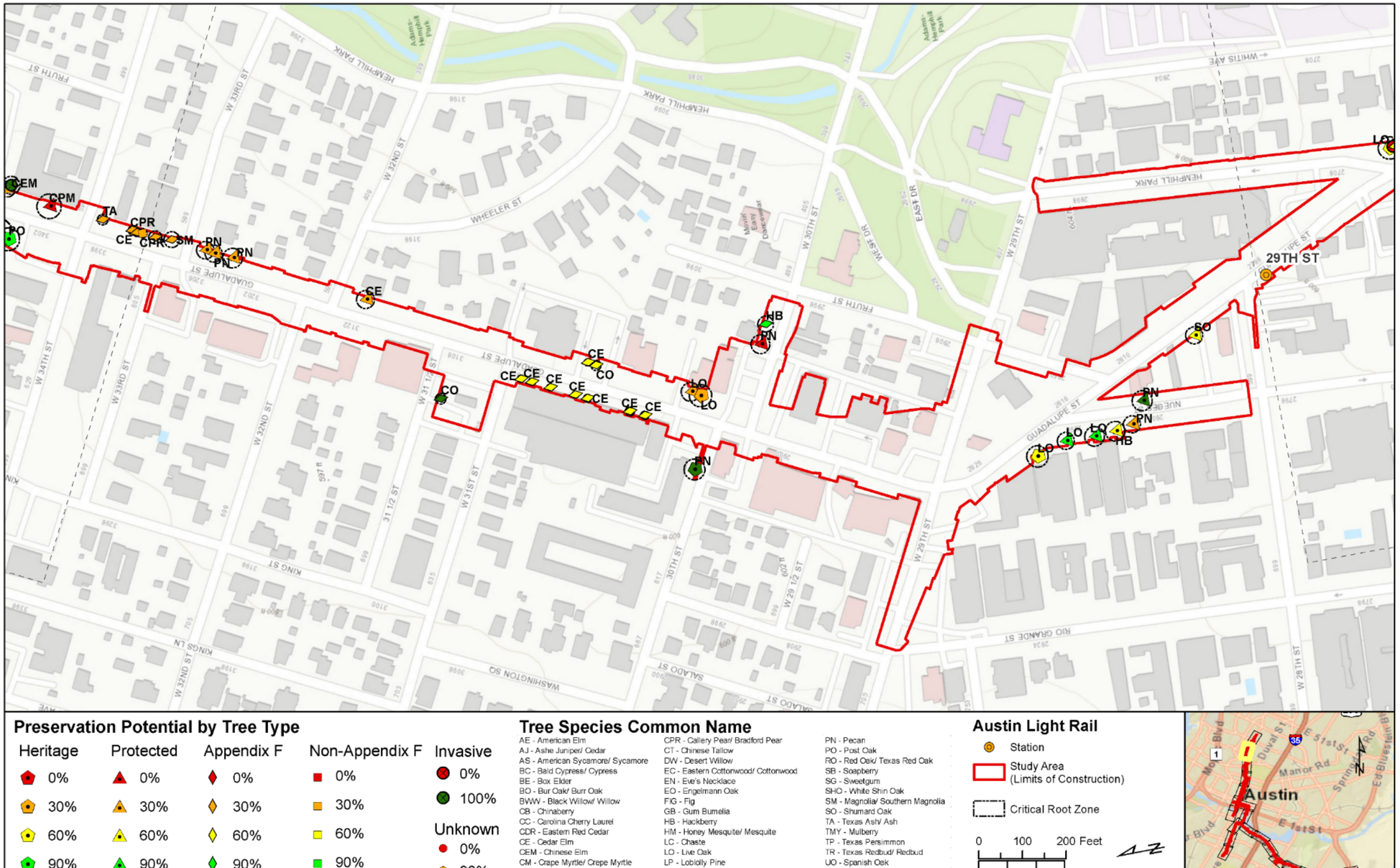
H = Heritage; P = Protected

Figure 12: Protected and Heritage Trees within the Study Area (Map 1 of 22)



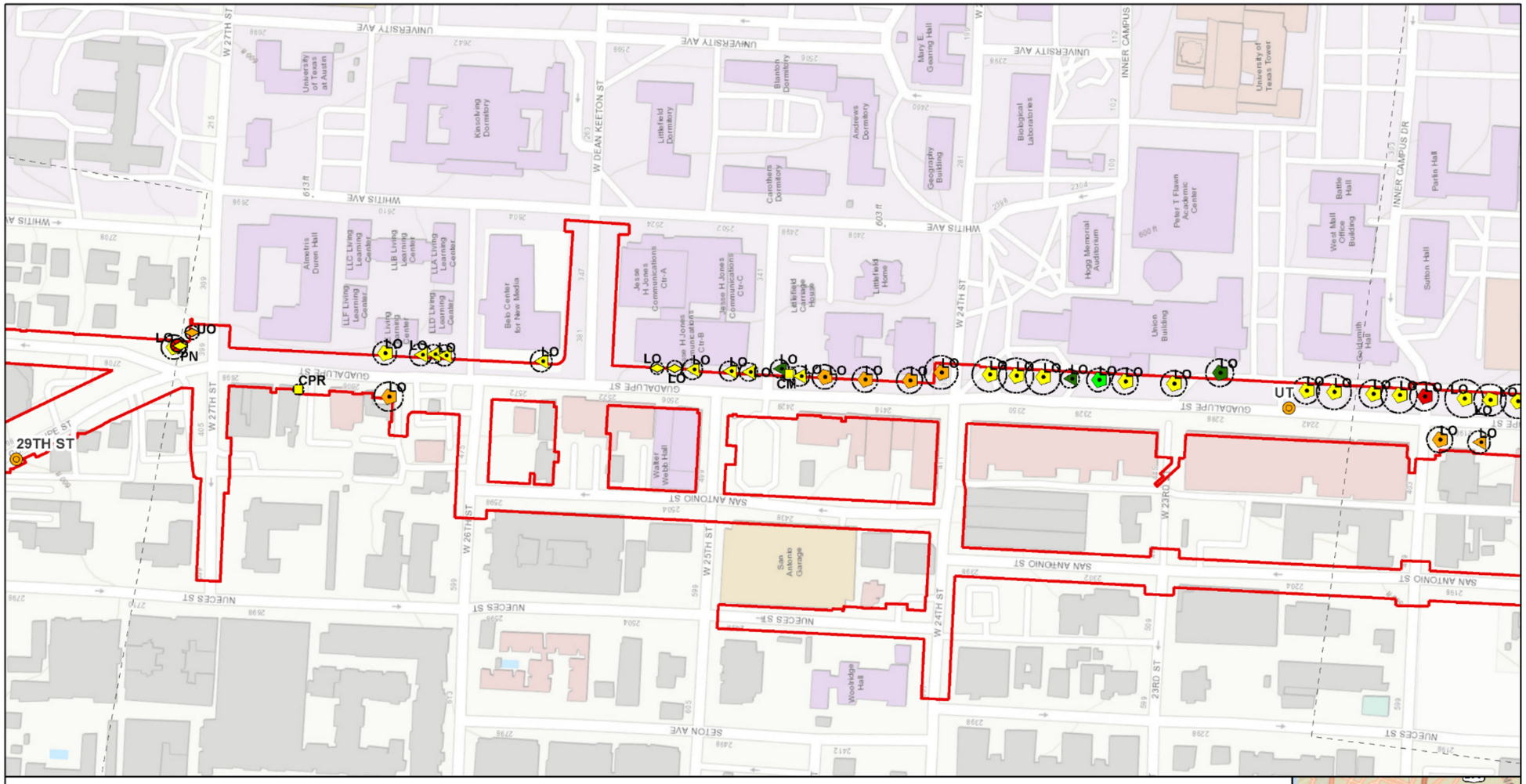
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 13: Protected and Heritage Trees within the Study Area (Map 2 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 14: Protected and Heritage Trees within the Study Area (Map 3 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

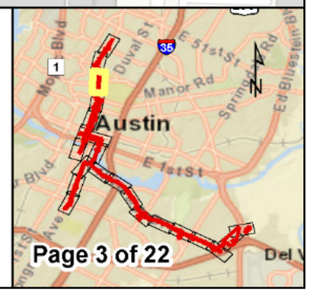
Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
CB - Chinaberry
CC - Carolina Cherry Laurel
CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
MP - Mexican Plum
MWO - Mexican White Oak/ Monterrey Oak
PLM - Plum
PN - Pecan
PO - Post Oak
RO - Red Oak/ Texas Red Oak
SB - Soapberry
SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

Austin Light Rail

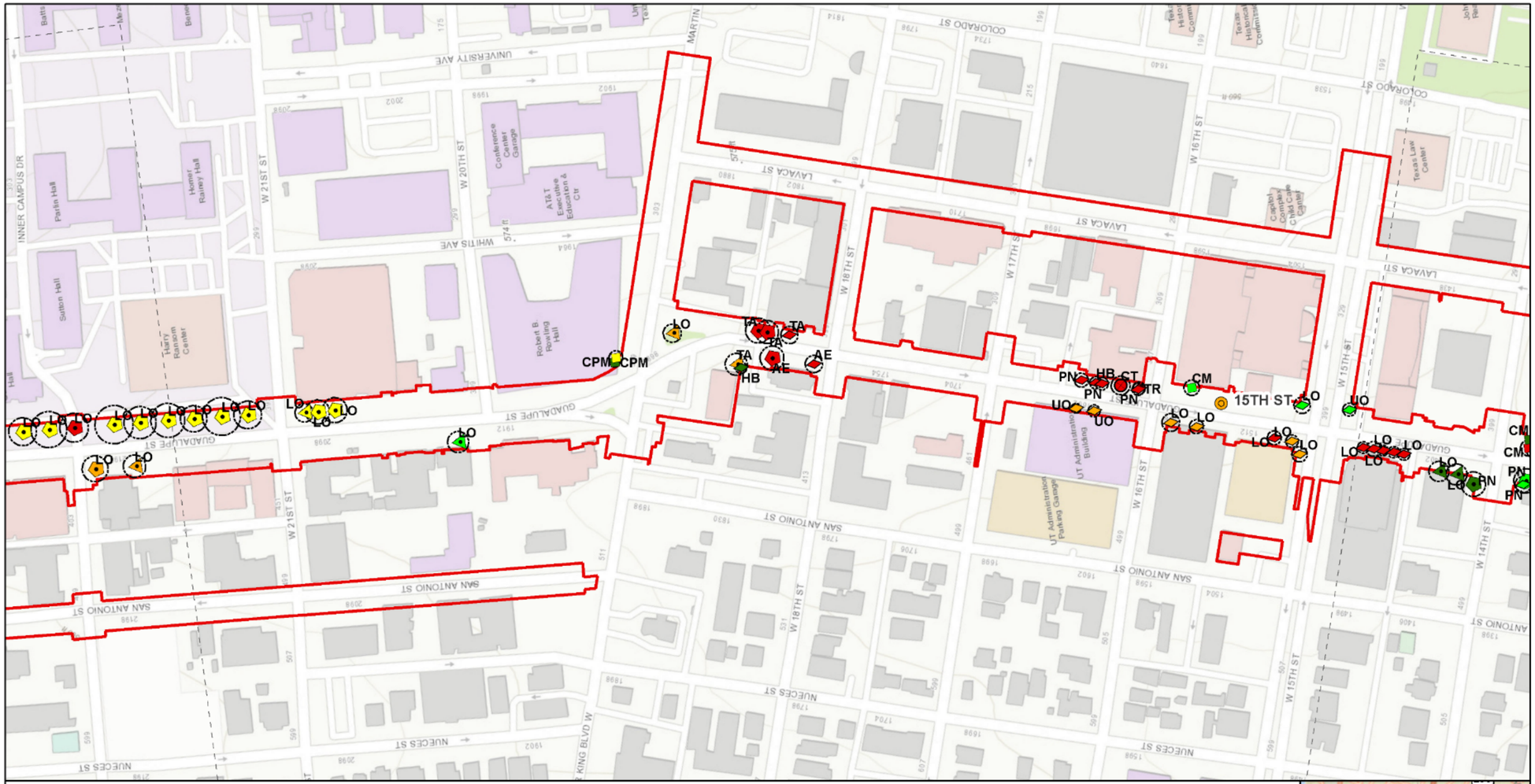
Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400



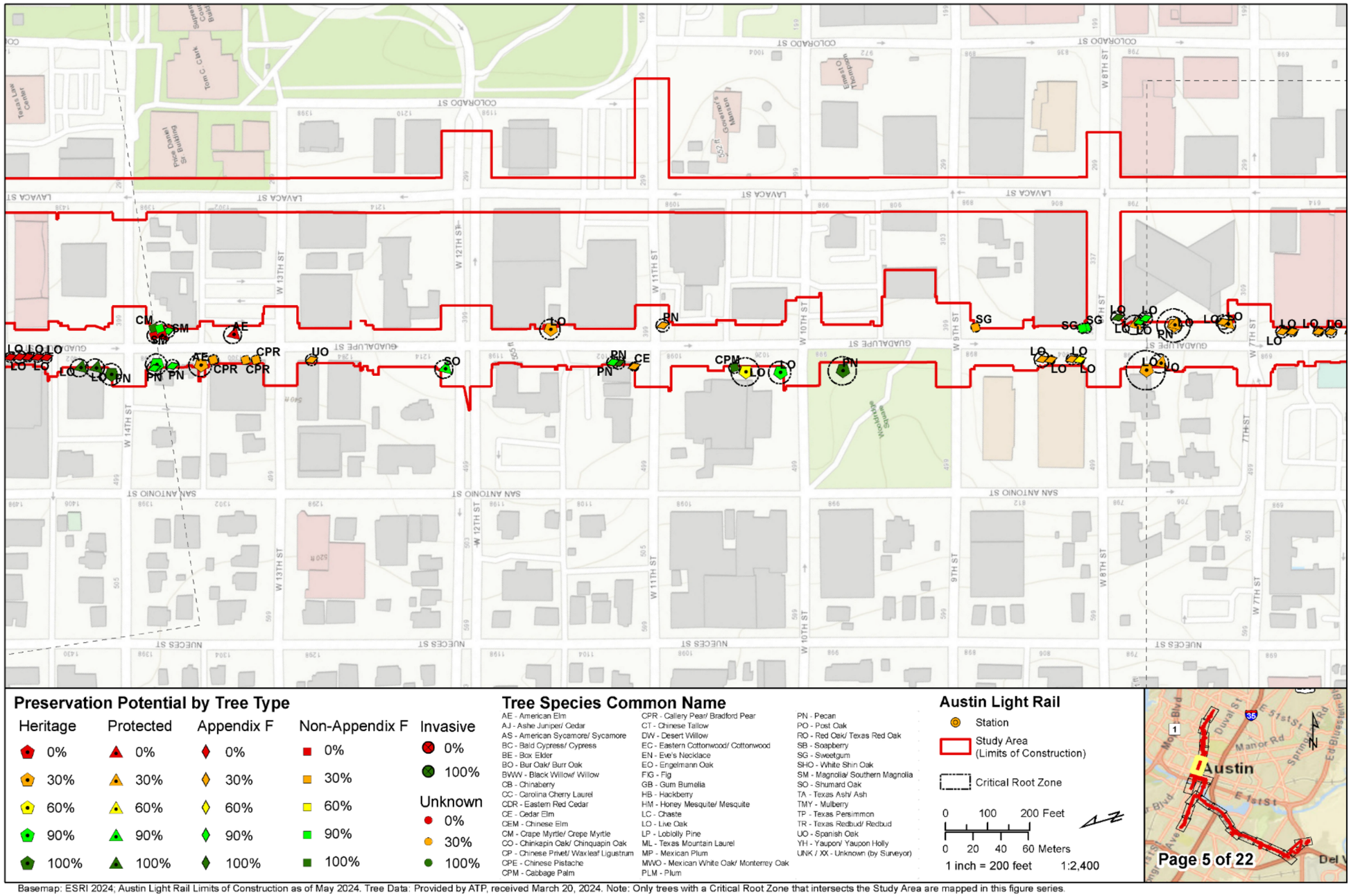
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 15: Protected and Heritage Trees within the Study Area (Map 4 of 22)



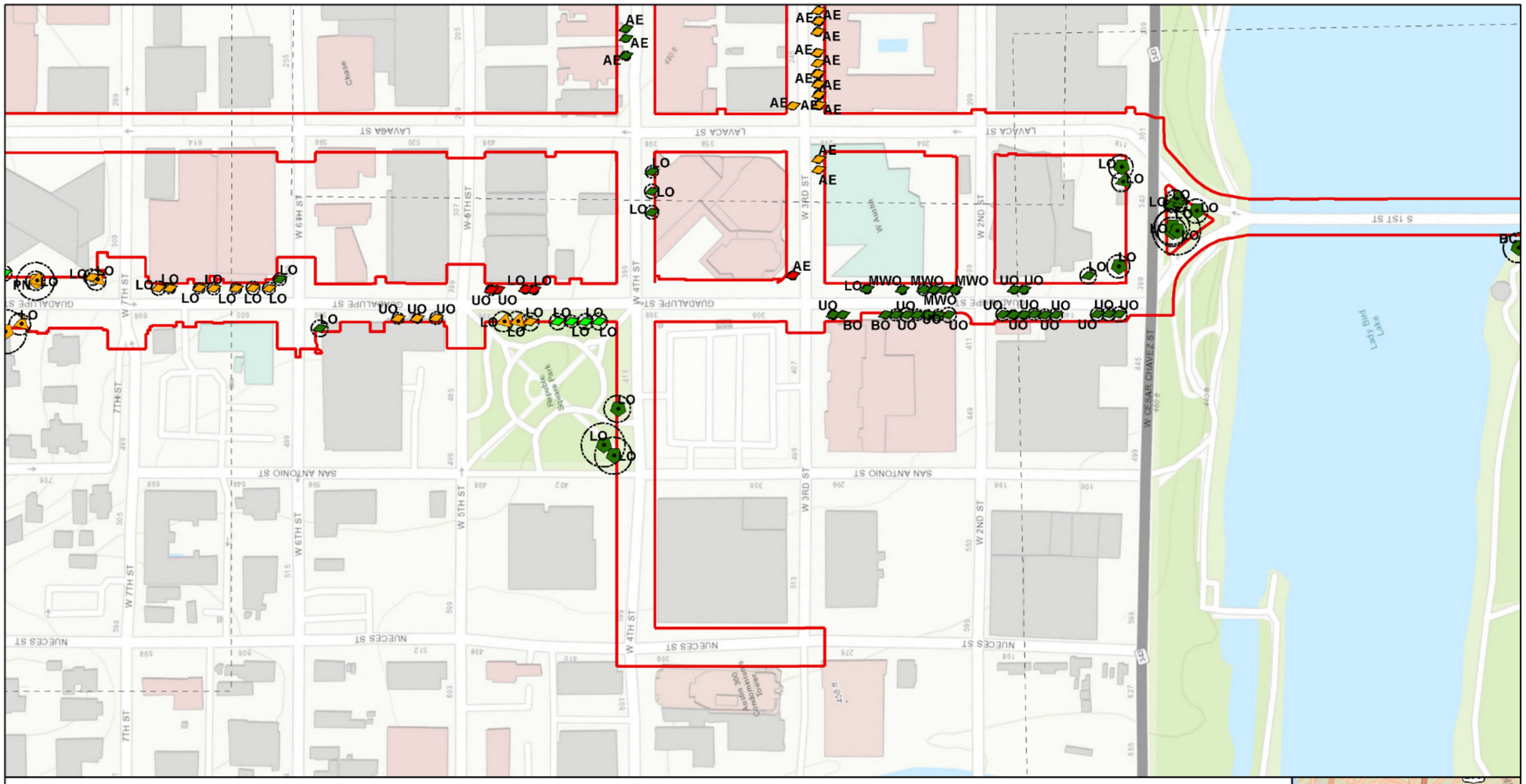
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 16: Protected and Heritage Trees within the Study Area (Map 5 of 22)



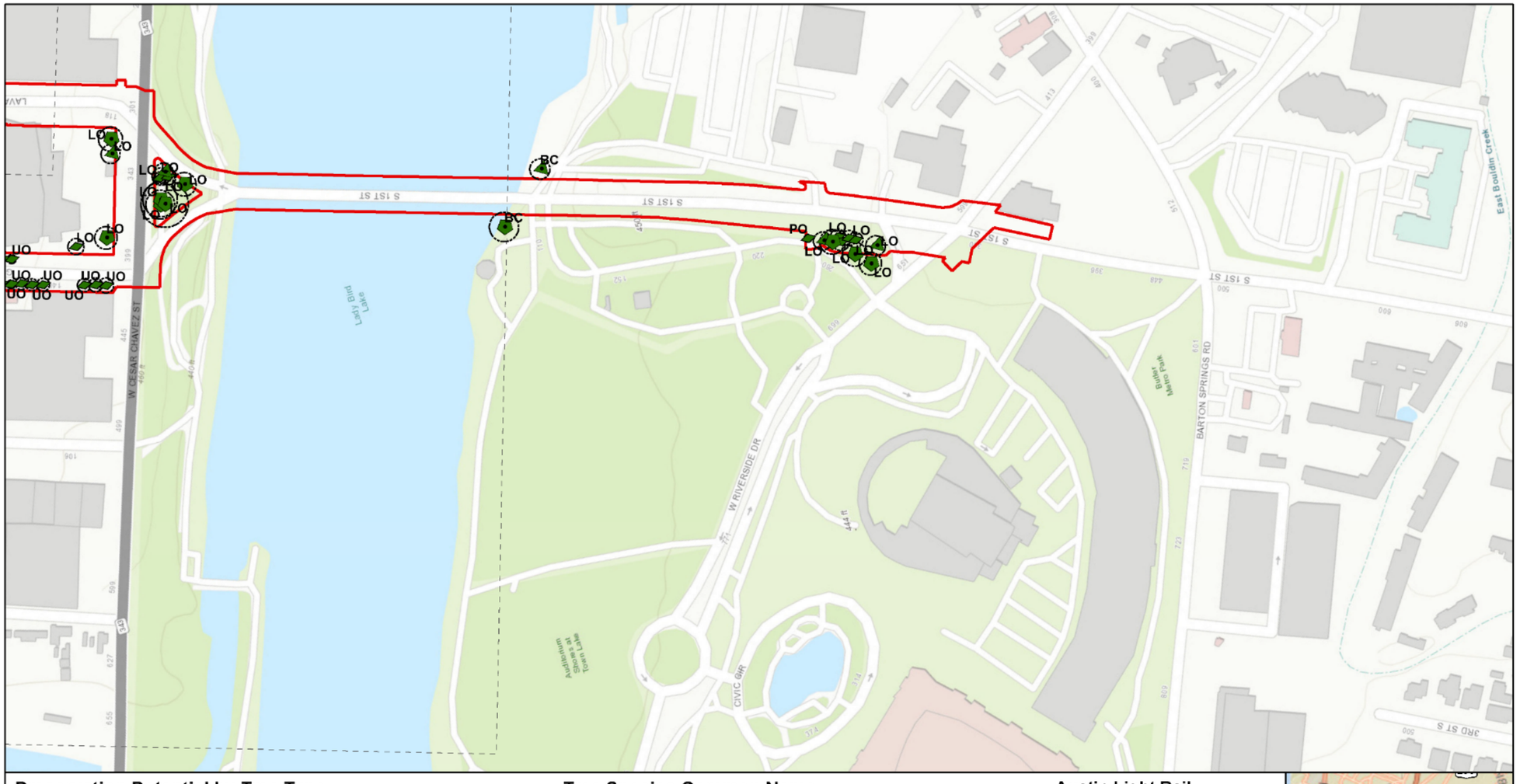
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 17: Protected and Heritage Trees within the Study Area (Map 6 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 18: Protected and Heritage Trees within the Study Area (Map 7 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

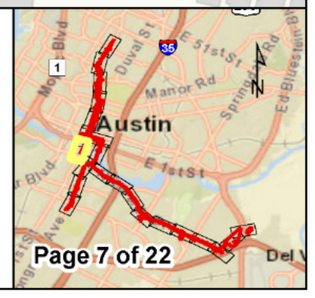
Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
CB - Chinaberry
CC - Carolina Cherry Laurel
CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
MP - Mexican Plum
MWO - Mexican White Oak/ Monterrey Oak
PLM - Plum
PN - Pecan
PO - Post Oak
RO - Red Oak/ Texas Red Oak
SB - Soapberry
SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

Austin Light Rail

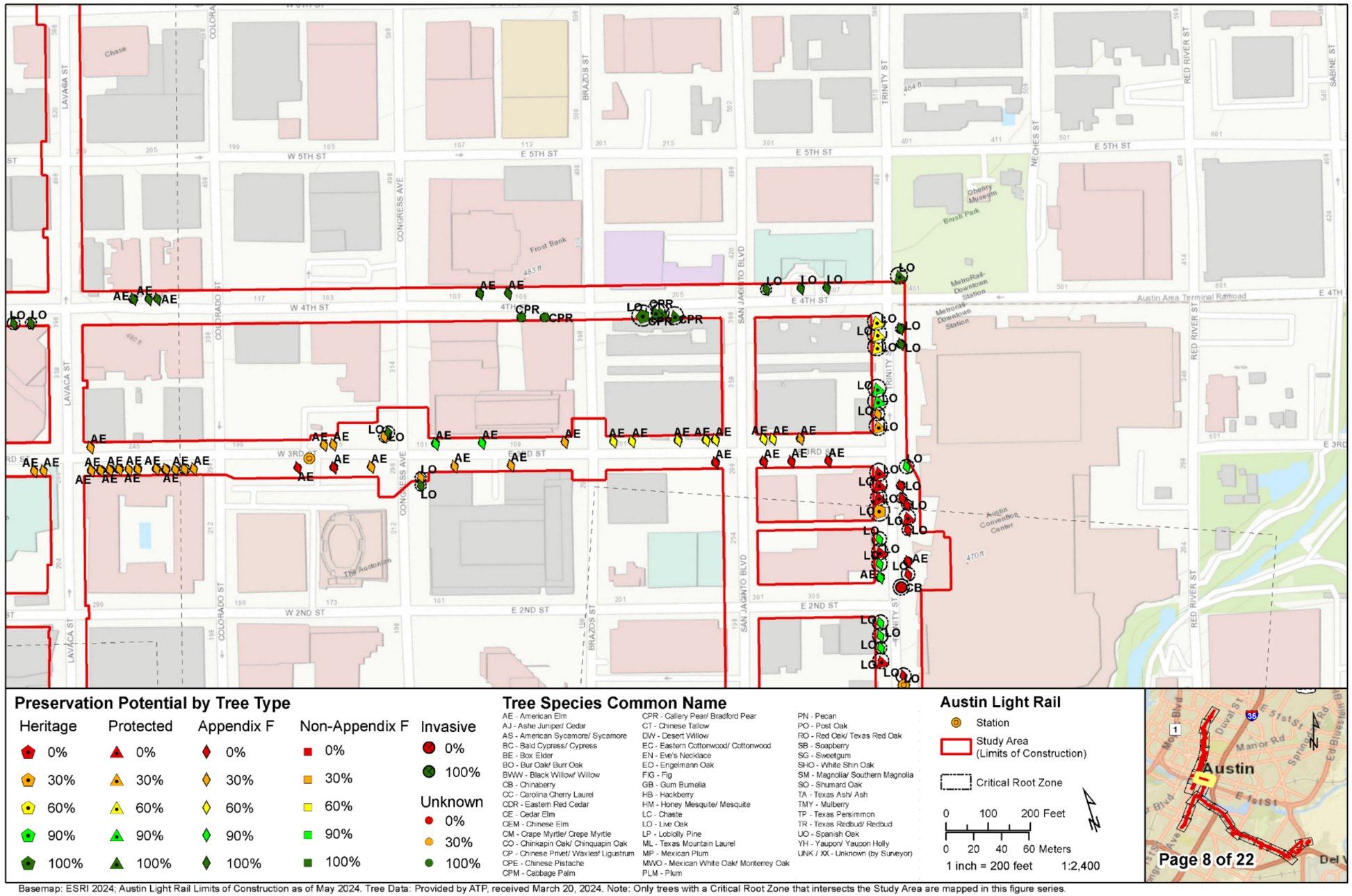
Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400



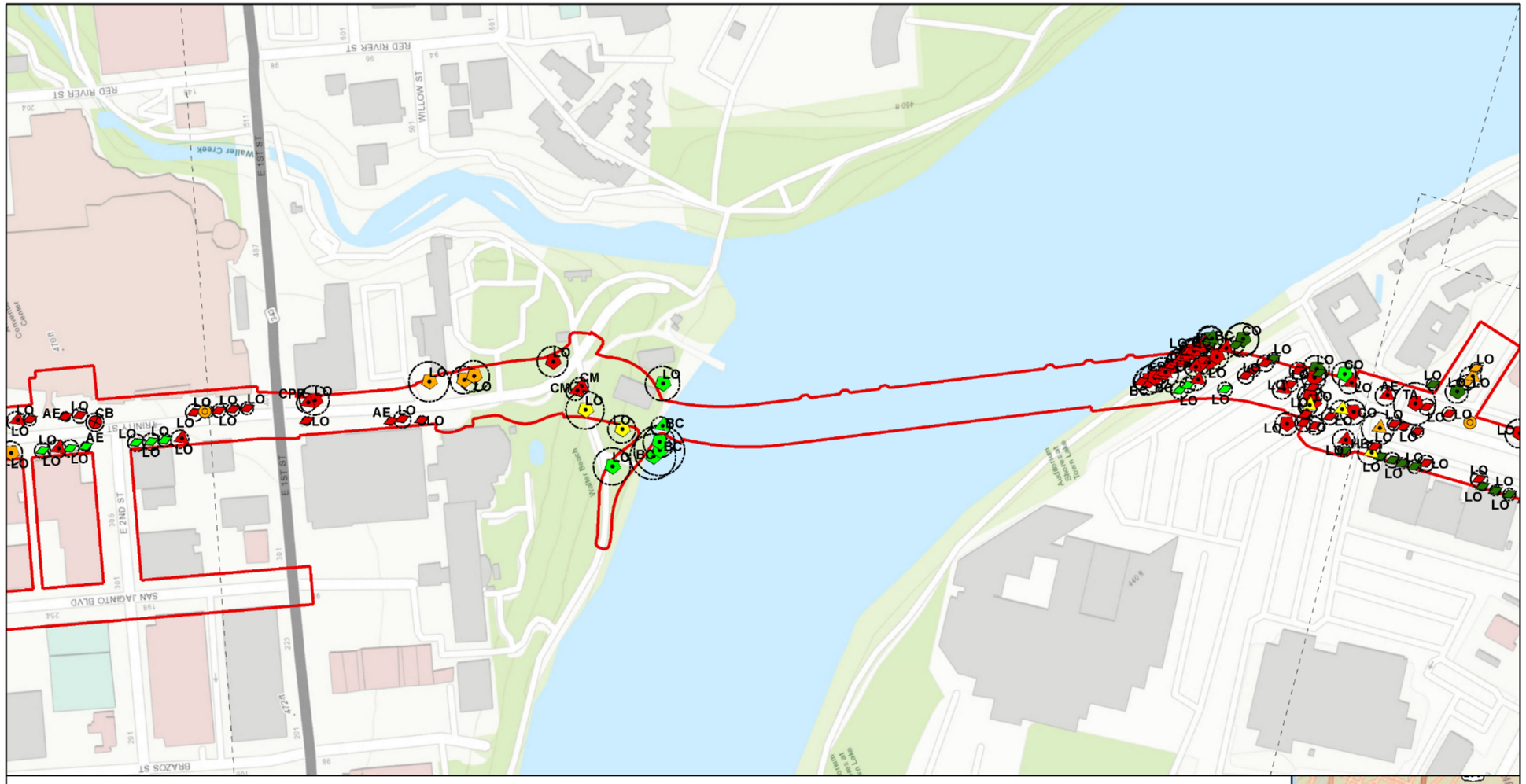
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 19: Protected and Heritage Trees within the Study Area (Map 8 of 22)



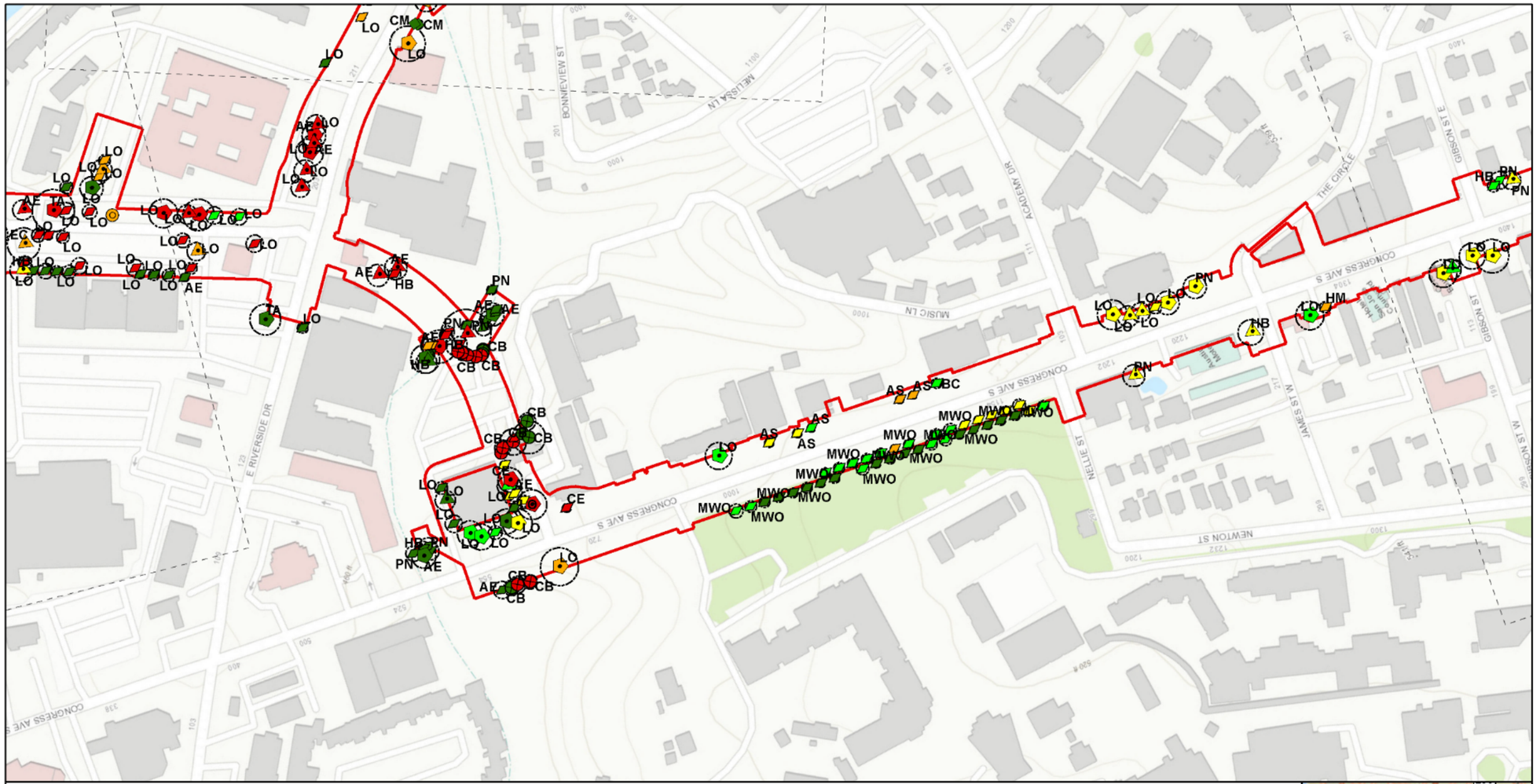
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 20: Protected and Heritage Trees within the Study Area (Map 9 of 22)



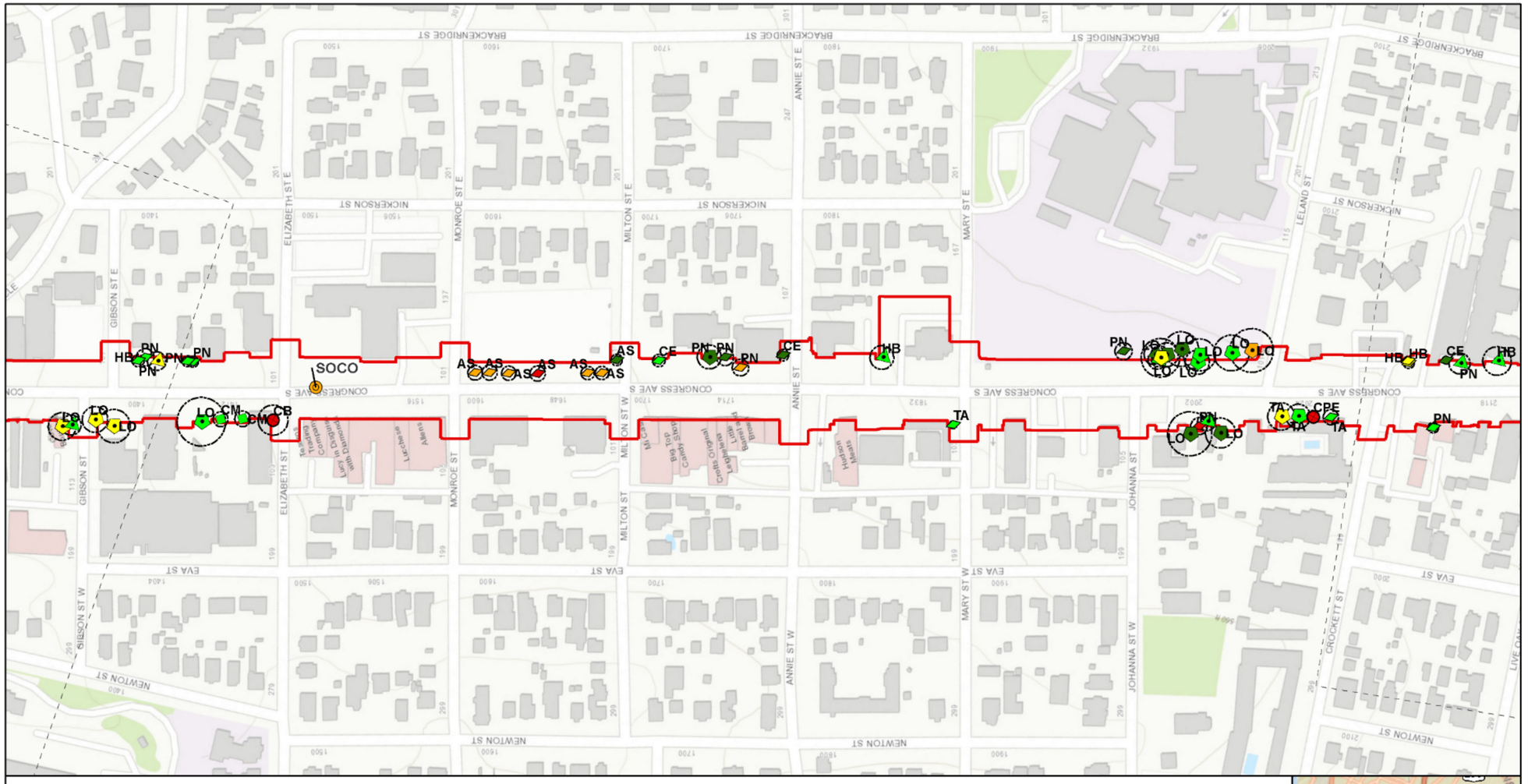
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 21: Protected and Heritage Trees within the Study Area (Map 10 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 22: Protected and Heritage Trees within the Study Area (Map 11 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
CB - Chinaberry
CC - Carolina Cherry Laurel
CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
MP - Mexican Plum
MWO - Mexican White Oak/ Monterrey Oak
PLM - Plum
PN - Pecan
PO - Post Oak
RO - Red Oak/ Texas Red Oak
SB - Soapberry
SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

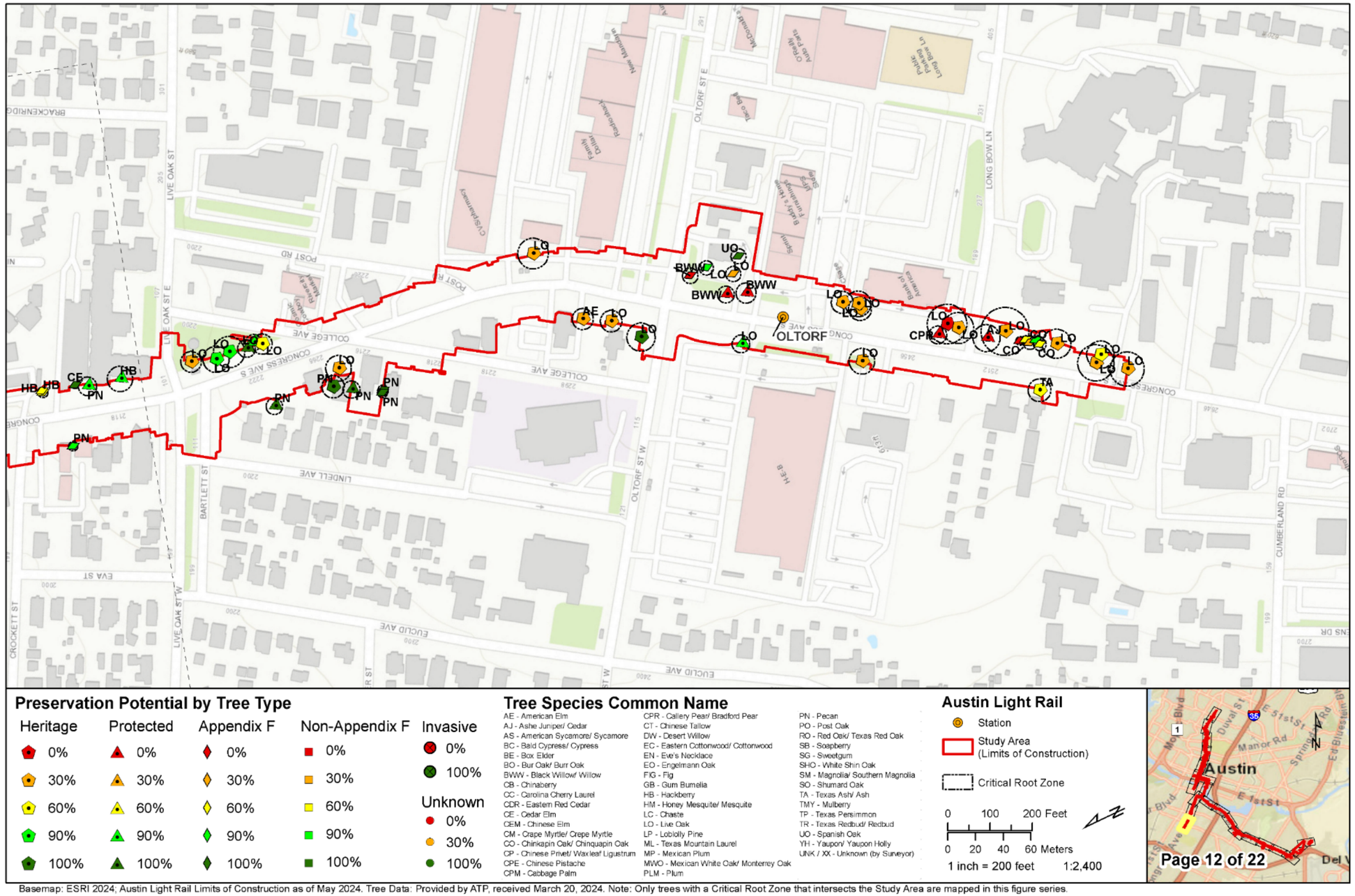
Austin Light Rail

- Station
- Study Area (Limits of Construction)
- Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400

Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 23: Protected and Heritage Trees within the Study Area (Map 12 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
CB - Chinaberry
CC - Carolina Cherry Laurel
CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
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SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

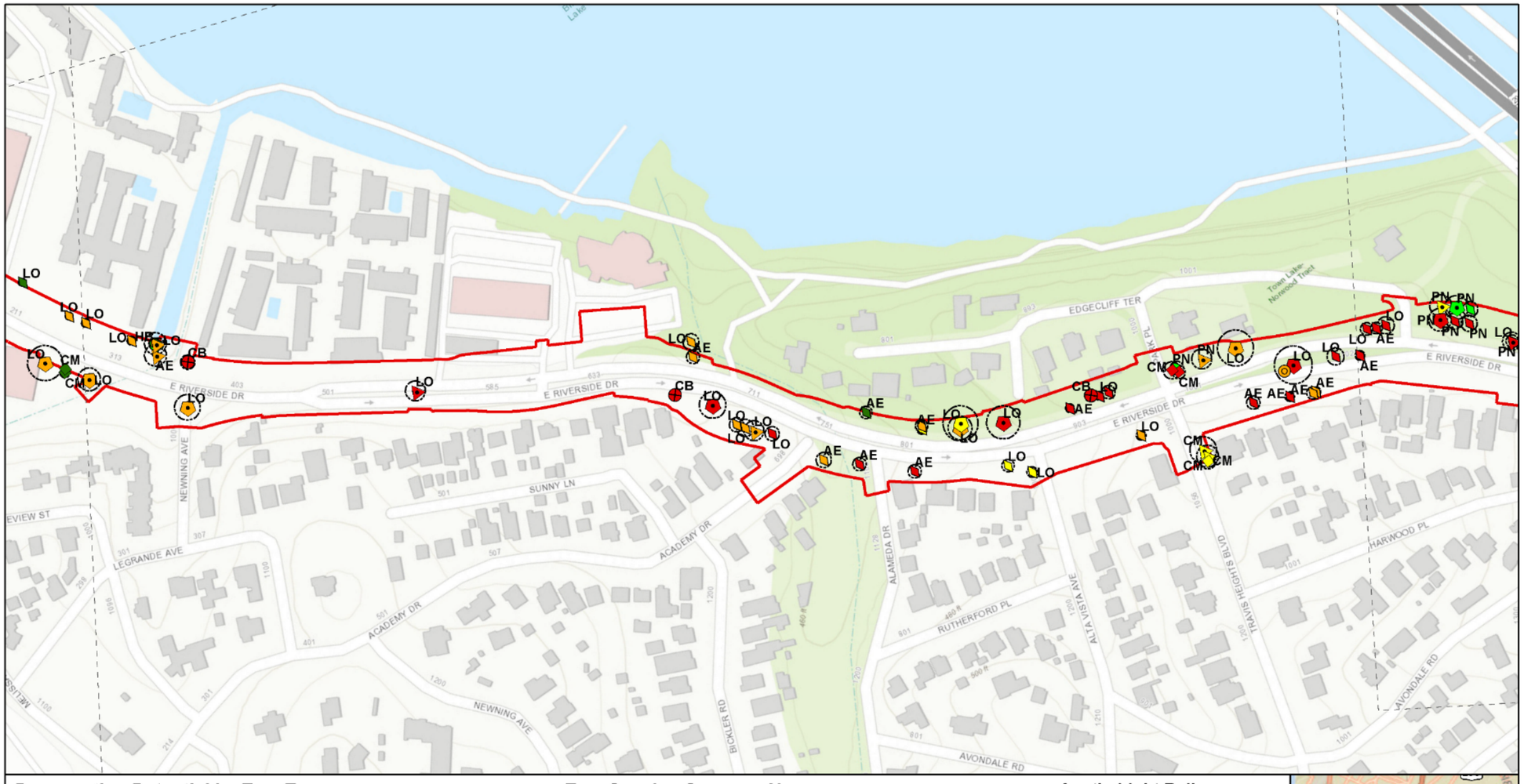
Austin Light Rail

Station
Study Area
(Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400

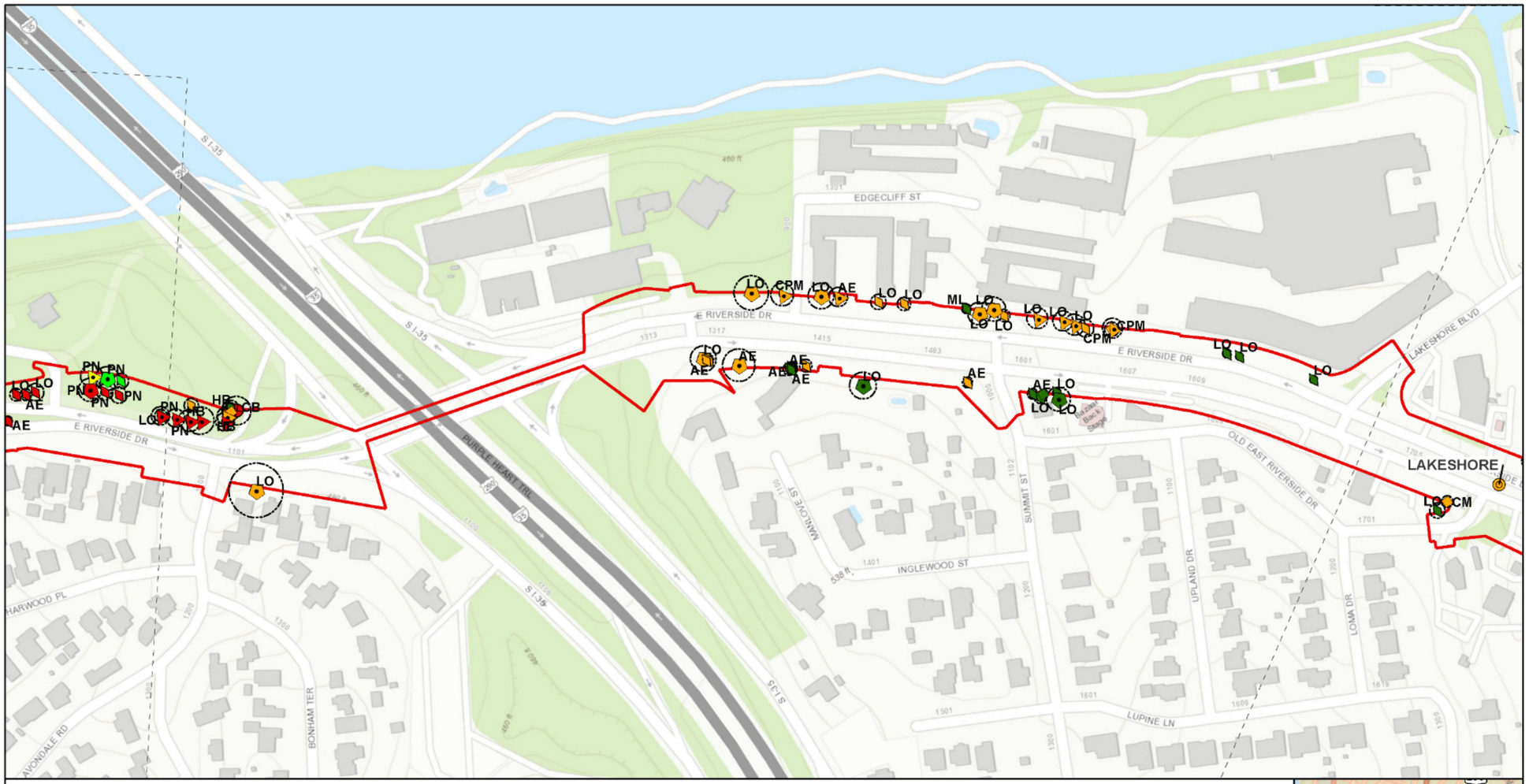
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 24: Protected and Heritage Trees within the Study Area (Map 13 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 25: Protected and Heritage Trees within the Study Area (Map 14 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
CB - Chinaberry
CC - Carolina Cherry Laurel
CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
MP - Mexican Plum
MWO - Mexican White Oak/ Monterrey Oak
PLM - Plum
PN - Pecan
PO - Post Oak
RO - Red Oak/ Texas Red Oak
SB - Soapberry
SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

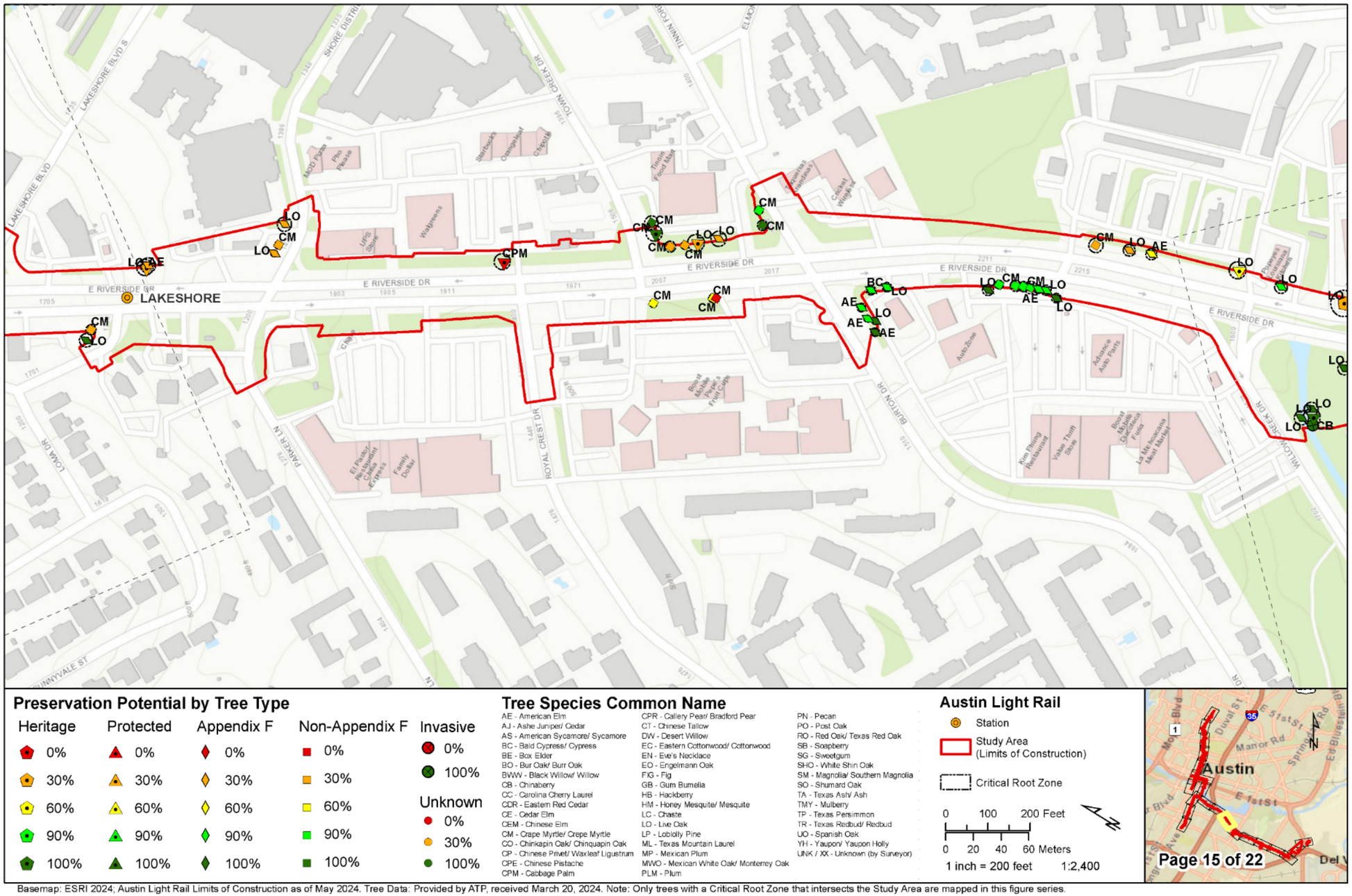
Austin Light Rail

Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400

Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 26: Protected and Heritage Trees within the Study Area (Map 15 of 22)

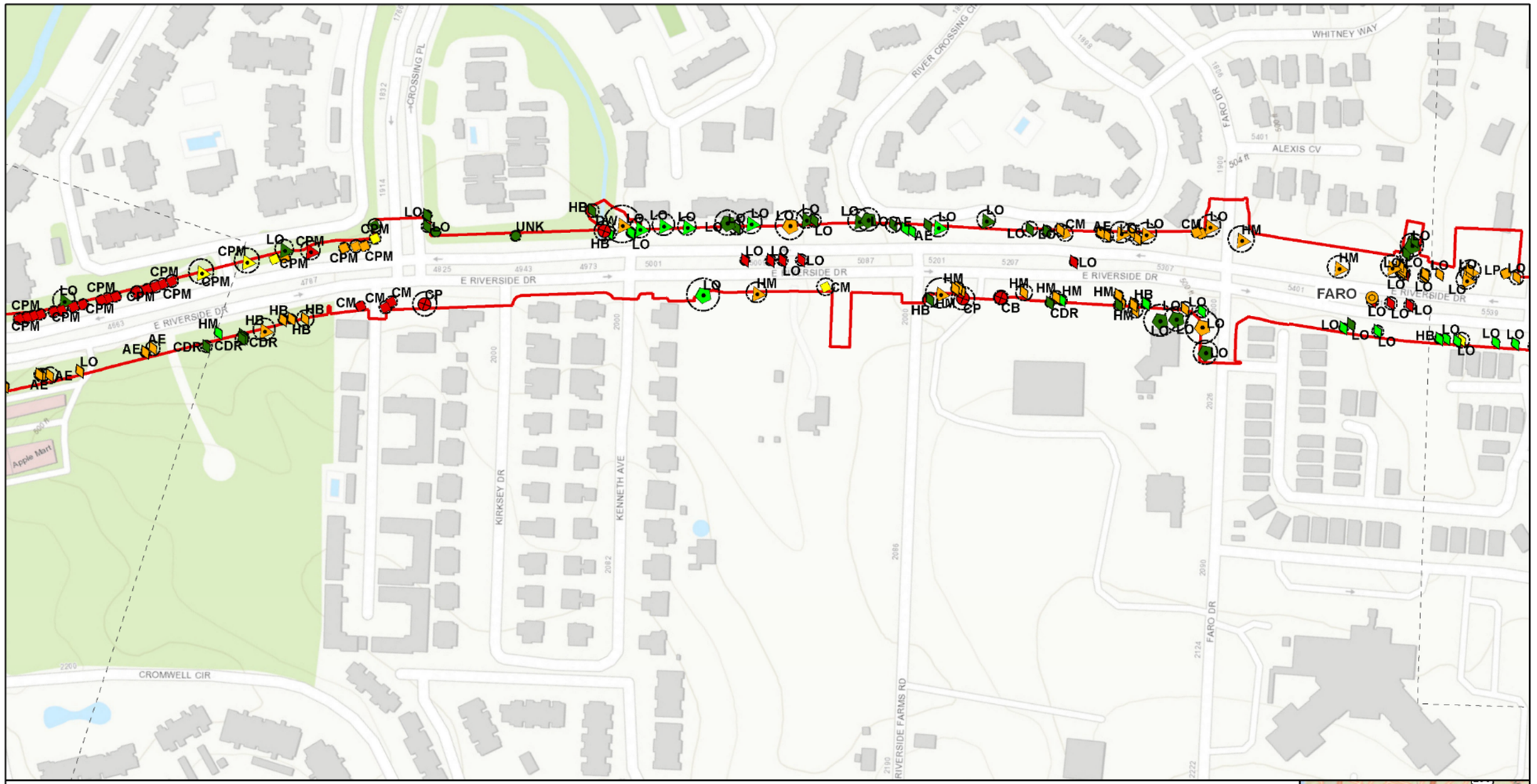


Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 27: Protected and Heritage Trees within the Study Area (Map 16 of 22)

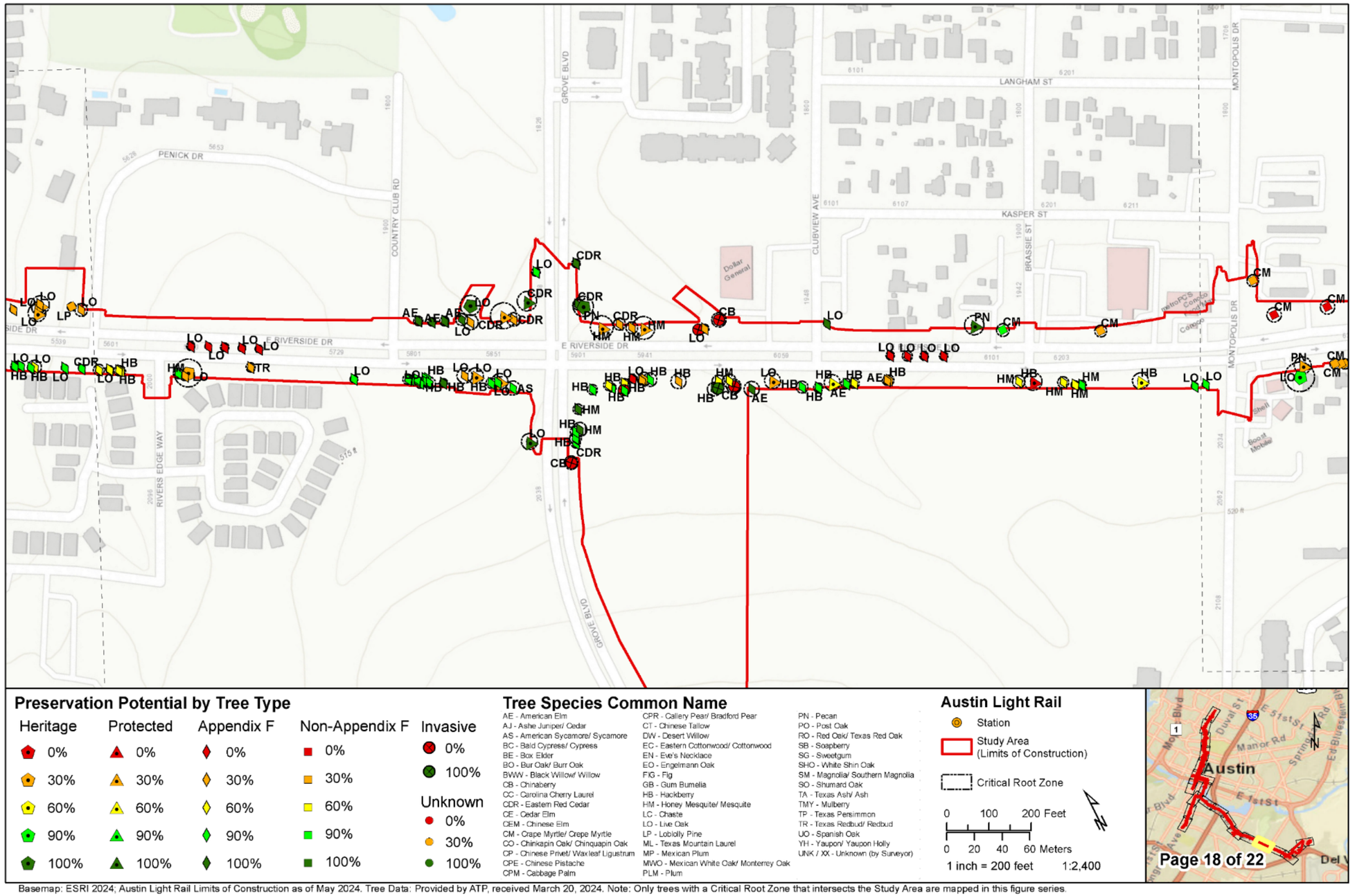
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 28: Protected and Heritage Trees within the Study Area (Map 17 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 29: Protected and Heritage Trees within the Study Area (Map 18 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
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BE - Box Elder
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CDR - Eastern Red Cedar
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
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ML - Texas Mountain Laurel
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SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

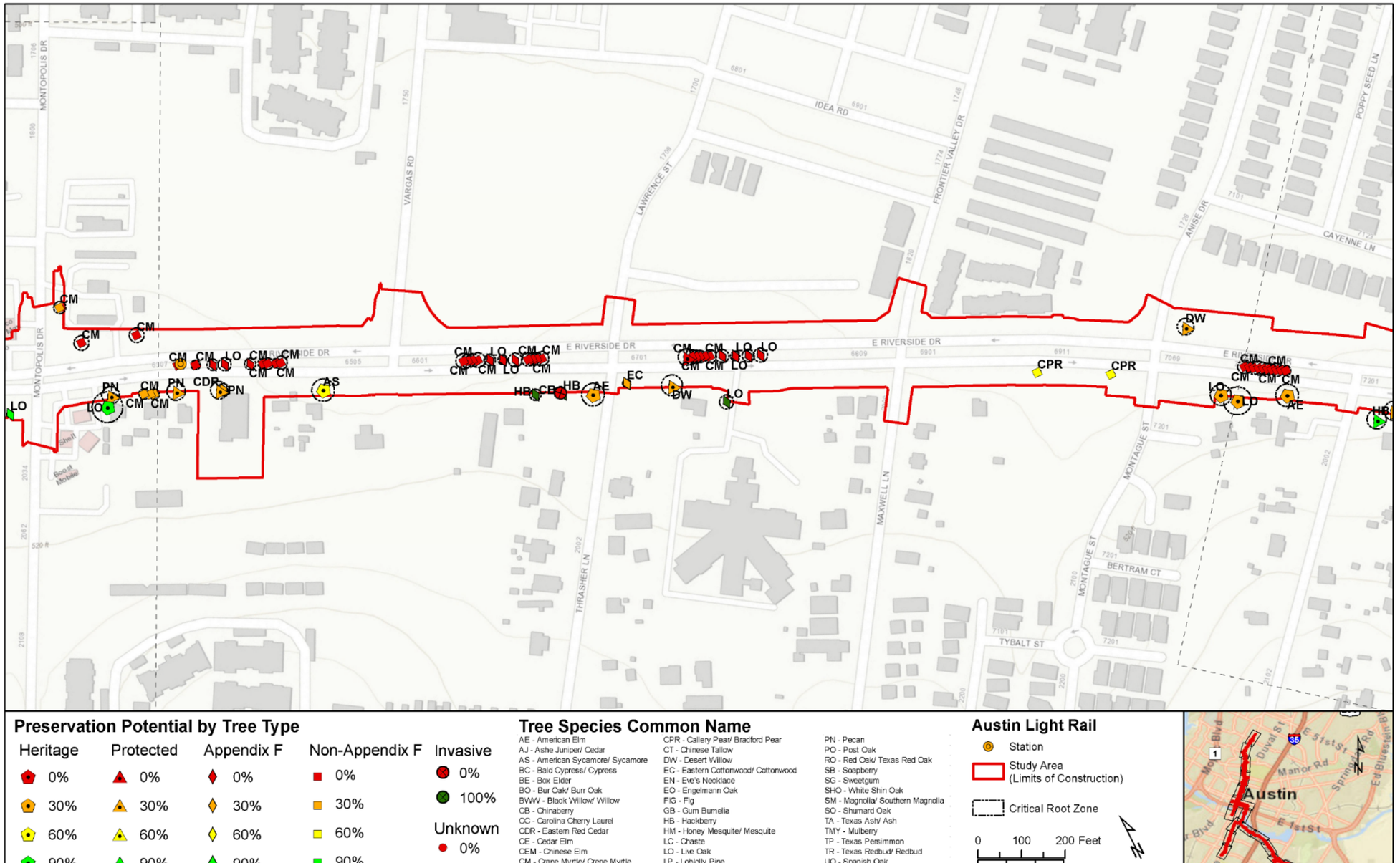
Austin Light Rail

Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400

Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 30: Protected and Heritage Trees within the Study Area (Map 19 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
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BC - Bald Cypress/ Cypress
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BWW - Black Willow/ Willow
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CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
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HM - Honey Mesquite/ Mesquite
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LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
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PLM - Plum
PN - Pecan
PO - Post Oak
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SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

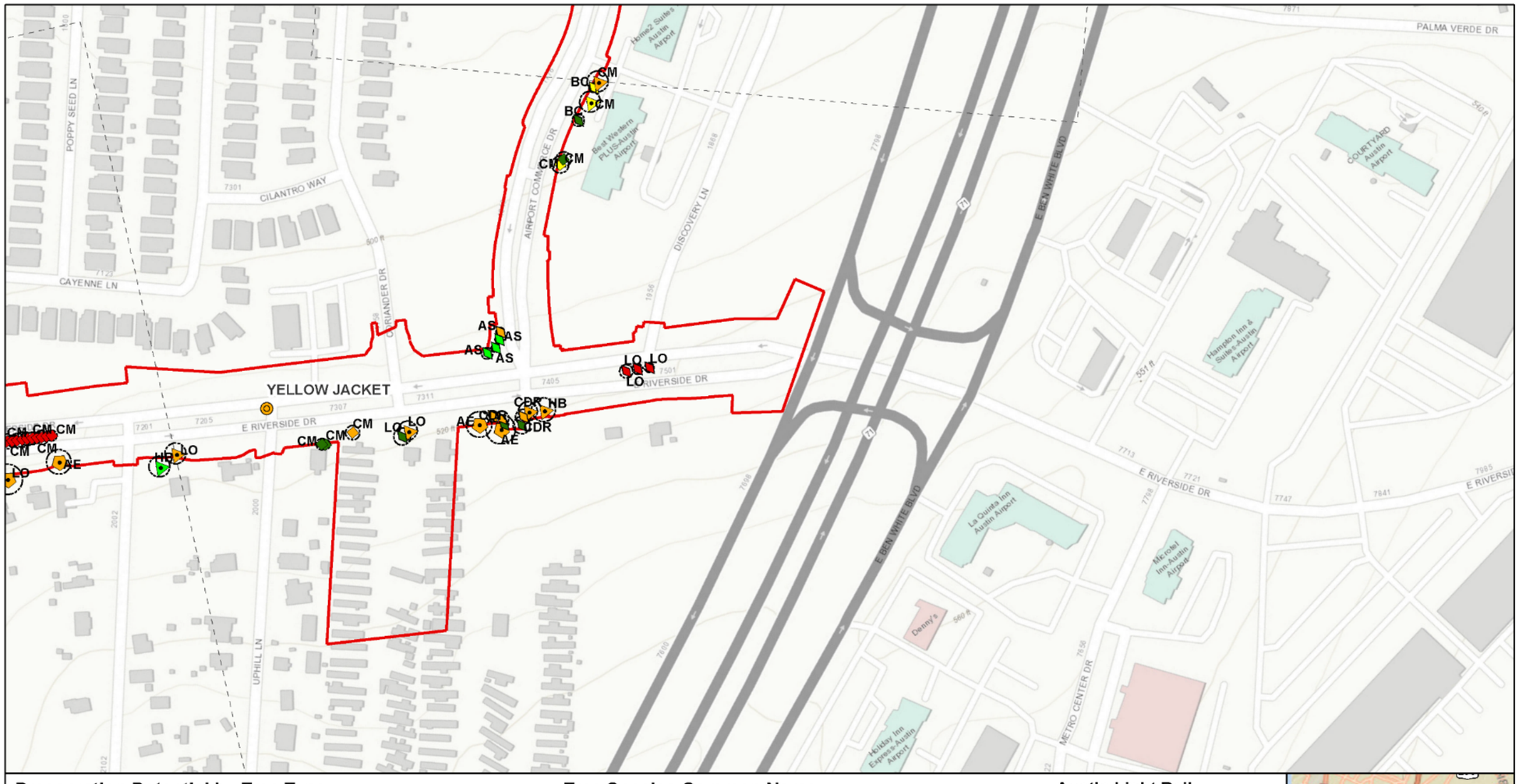
Austin Light Rail

Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400

Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 31: Protected and Heritage Trees within the Study Area (Map 20 of 22)



Preservation Potential by Tree Type

Heritage	Protected	Appendix F	Non-Appendix F	Invasive	Unknown
0%	0%	0%	0%	0%	0%
30%	30%	30%	30%	100%	30%
60%	60%	60%	60%		100%
90%	90%	90%	90%		
100%	100%	100%	100%		

Tree Species Common Name

AE - American Elm
AJ - Ashe Juniper/ Cedar
AS - American Sycamore/ Sycamore
BC - Bald Cypress/ Cypress
BE - Box Elder
BO - Bur Oak/ Burr Oak
BWW - Black Willow/ Willow
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CC - Carolina Cherry Laurel
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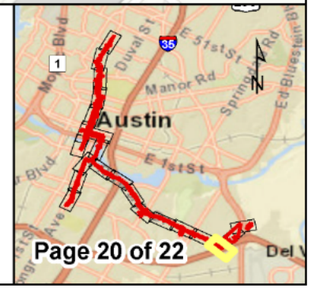
CE - Cedar Elm
CEM - Chinese Elm
CM - Crape Myrtle/ Crepe Myrtle
CO - Chinkapin Oak/ Chinquapin Oak
CP - Chinese Privet/ Waxleaf Ligustrum
CPE - Chinese Pistache
CPM - Cabbage Palm
CPR - Callery Pear/ Bradford Pear
CT - Chinese Tallow
DW - Desert Willow
EC - Eastern Cottonwood/ Cottonwood
EN - Eve's Necklace
EO - Engelmann Oak
FIG - Fig
GB - Gum Bumelia
HB - Hackberry
HM - Honey Mesquite/ Mesquite
LC - Chaste
LO - Live Oak
LP - Loblolly Pine
ML - Texas Mountain Laurel
MP - Mexican Plum
MWO - Mexican White Oak/ Monterrey Oak
PLM - Plum
PN - Pecan
PO - Post Oak
RO - Red Oak/ Texas Red Oak
SB - Soapberry
SG - Sweetgum
SHO - White Shin Oak
SM - Magnolia/ Southern Magnolia
SO - Shumard Oak
TA - Texas Ash/ Ash
TMY - Mulberry
TP - Texas Persimmon
TR - Texas Redbud/ Redbud
UO - Spanish Oak
YH - Yaupon/ Yaupon Holly
UNK / XX - Unknown (by Surveyor)

Austin Light Rail

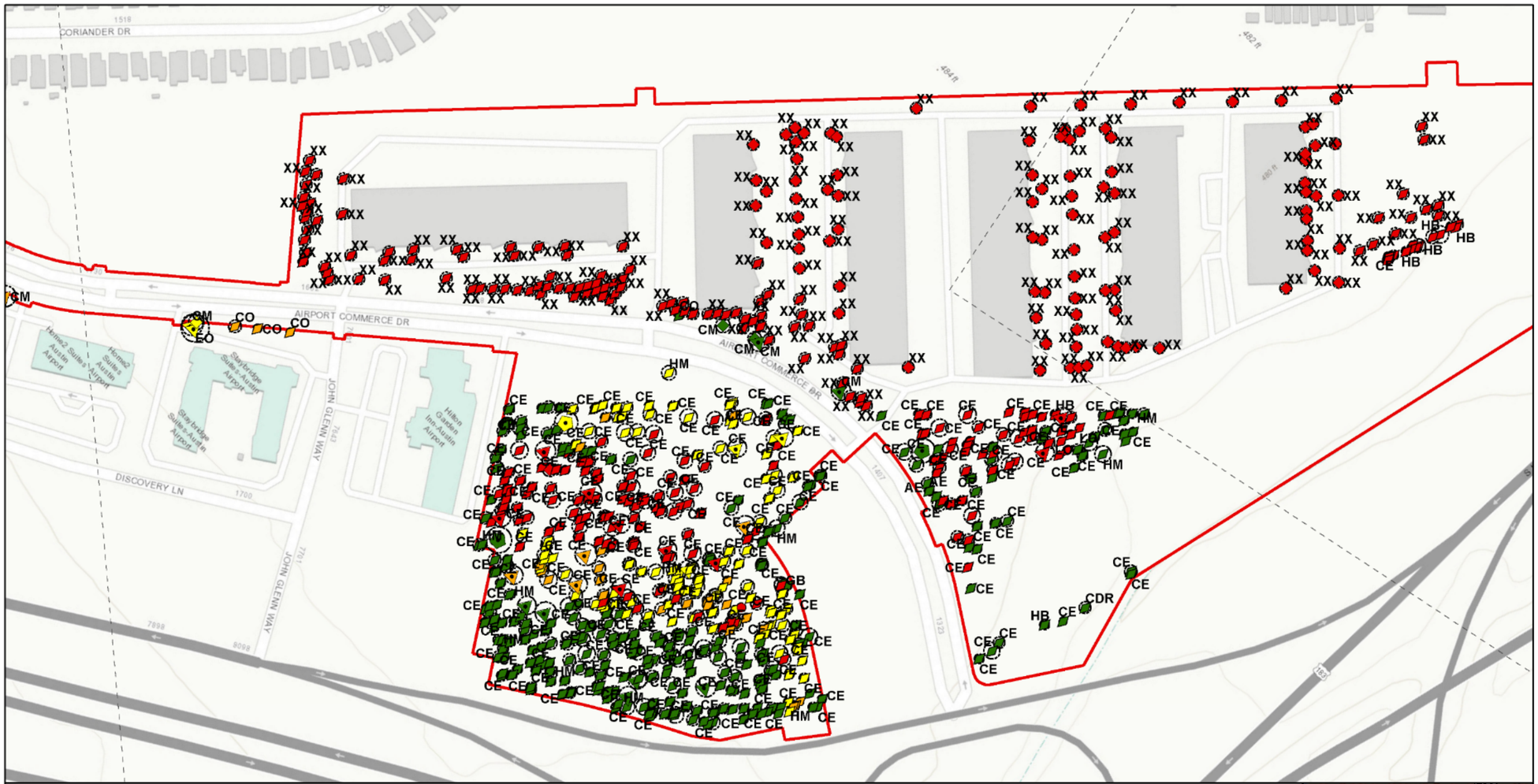
Station
Study Area (Limits of Construction)
Critical Root Zone

0 100 200 Feet
0 20 40 60 Meters
1 inch = 200 feet 1:2,400



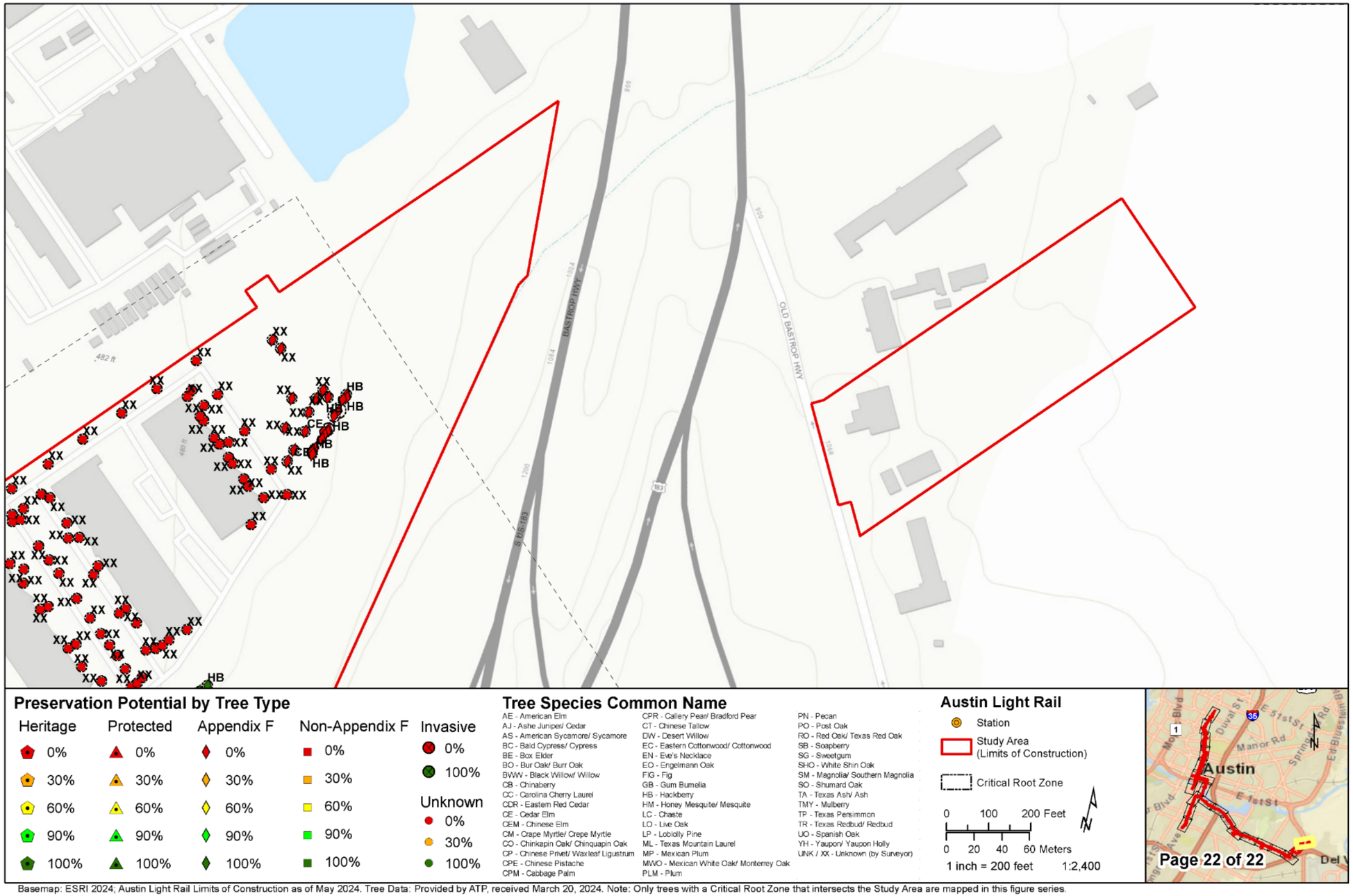
Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 32: Protected and Heritage Trees within the Study Area (Map 21 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

Figure 33: Protected and Heritage Trees within the Study Area (Map 22 of 22)



Basemap: ESRI 2024; Austin Light Rail Limits of Construction as of May 2024. Tree Data: Provided by ATP, received March 20, 2024. Note: Only trees with a Critical Root Zone that intersects the Study Area are mapped in this figure series.

In addition, potential short-term effects on protected plants, including those with potentially suitable habitat within the Study Area (see below for additional information), would be similar to those for vegetation in general. Areas converted from vegetated, pervious cover to impervious cover would constitute a permanent loss of vegetation.

5.2.2.2 Wildlife

Temporary, construction-related effects on wildlife from the Build Alternative would include dust, noise, lights, vibration, and fencing from active construction sites and equipment, as well as potential effects on water quality from construction site stormwater discharge. A Stormwater Pollution Prevention Plan would be developed for construction of the Project as outlined in **FEIS Appendix F-4**. The effects of construction noise (e.g., equipment involved in site preparation, grading, and earthwork; and the installation of the rail tracks, bridges, and other infrastructure) on wildlife would be limited to the immediate area of the construction site. Wildlife species within the Study Area are currently exposed to noise and vibration from existing roadways and development; therefore, temporary effects on these wildlife species because of the Build Alternative would be negligible.

However, wildlife may be directly affected by displacement due to habitat conversion within the Study Area. Birds may experience the loss of nesting, foraging, and cover habitats that could affect fecundity and survival. Wildlife occupying the Study Area would be pushed into adjacent habitats where they would be forced to compete with existing populations for food and shelter. Mammal and bird species with larger home ranges or species that migrate could be affected by habitat fragmentation and the increased risk of wildlife/vehicle collisions.

Permanent effects would occur from the placement of new bridge support structures across Lady Bird Lake. The bridge placement would include effects on aquatic species through permanent alteration of the habitat and temporary effects from sediment disturbance for bridge pier placement. Fish in the Study Area may also experience harassment effects (in the form of disturbance of normal behavior or activities) as a result of temporary construction effects. The use of cofferdams and dewatering, if required, could strand fish and other aquatic species.

The Ann W. Richards Congress Avenue Bridge provides suitable roosting habitat for the Mexican free-tailed bat as both a summer maternal colony of up to 1.5 million bats and an overwintering population of a much smaller size. The colony already experiences substantial noise related to car traffic and music festivals. These noise activities have not deterred the maternal colony from roosting or emerging; however, noise activities could delay the emergence of the bat colony or affect their echolocation and thus behavior (Zara 2023). Temporary construction lighting could affect the bats' emergence from or return flights to Ann W. Richards Congress Avenue Bridge. Siting of the new bridge is approximately 0.25 mile downstream from the Ann W. Richards Congress Avenue Bridge. The bats' typical foraging path and flight path may be impeded by construction activities.

Trees are proposed to be removed within the Study Area for certain elements of the Project. Wildlife and insects regularly use trees for habitat, foraging, and nesting. Removal of trees will permanently remove this habitat from the Build Alternative ROW. Removed trees are proposed to be replaced per the City's Tree Ordinance, but replacement trees would be of a smaller size than the trees to be removed and would require many years to reach the size of the original trees. Further evaluation of tree data would be necessary to fully evaluate Project-related effects associated with tree removal.

Effects on wildlife corridors and aquatic species at surface water crossings including creeks, drainages, and unnamed tributaries, would be expected to occur. Temporary effects would include impediments to movement due to construction fencing and grading and temporary fill from construction access, staging, and laydown areas. At crossings where existing culverts are present, effects within the footprint of the existing structure would likely be temporary. The feature would be replaced in kind, but any wildlife using culverts as habitat would be temporarily displaced. Effects outside of the existing structure for widening of culverts or stabilizing of creek banks are assumed to be permanent and may increase potential habitat or wildlife corridors available to certain species while removing potential habitat for others.

There are currently no permitting mechanisms or regulatory requirements for incidental take of non-protected wildlife species in Texas; however, effects on wildlife as a result of the Build Alternative would be minimized through the implementation of mitigation measures as described in Section 7.

5.2.2.3 Protected Species and Critical Habitat

Potential suitable habitat was identified within the Study Area for federally and state-listed threatened, endangered, and candidate species. Habitat for species protected under provisions of the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act was also identified within the Build Alternative ROW. Under the Build Alternative, and with implementation of mitigation measures in Section 7, no adverse effects on federally and state-listed threatened, endangered, or candidate species are anticipated from the Project. However, minor temporary and permanent effects on protected species could occur from construction of the Build Alternative but would not adversely affect them or result in direct take.

Karst Invertebrates

Karst Zone 3b is mapped in a portion of the Study Area, generally between Lady Bird Lake and UT Station, and has the potential to provide suitable karst invertebrate habitat although there is a low probability of occurrence of protected karst invertebrates in these mapped areas. However, none of these areas are within a mapped karst fauna region. While karst features may not be recorded within the Build Alternative ROW, karst features may be encountered during ground disturbing activities during construction, such as excavating and grading bedrock. If karst features are encountered during construction, it could expose karst invertebrates in climate-stable subterranean

environments to the surface climate (i.e., unstable temperature and humidity) and could expose newly exposed potential karst invertebrate species habitat to construction debris and stormflow. Water in karst aquifers generally flows in a specific direction, but localized flowpaths can move in any direction due to the complexity of mesocavernous voids within the bedrock. This means that stormwater, construction runoff, or construction debris including soil, dust, and tailings could enter into a newly exposed karst feature and travel to karst zones 1 or 2, which may have a greater likelihood of being inhabited by protected karst invertebrate species.

Contamination of karst habitat or groundwater could occur if hazardous substances or petroleum products are spilled and subsequently leach into the subsurface or aquifer. Stormwater runoff particularly from large rain events could transport these hazardous materials or construction materials far from the Study Area potentially to waterways or into karst features that reach the aquifer. Implementing hazardous materials and water quality BMPs would mitigate these potential effects.

During the Orange Line review, informal coordination was initiated with USFWS on February 4, 2021. Based on that correspondence, additional coordination was completed with the Travis County's BCCP Administrator on March 31, 2021. The BCCP Administrator stated that "Capital Metro's Orange Line project is located outside of the BCCP participation area as well as outside of known cave features located just beyond the participation area boundary. Therefore, the project would not affect karst species and no further coordination with the Balcones Canyonlands Preserve would be necessary" (Travis County 2021, as cited in AECOM 2022). Follow-up coordination was completed with USFWS on May 17, 2021. USFWS stated that "Because you do not believe there will be effects on federally listed species, there would be no need to consult under the [Endangered Species Act]" (USFWS 2021, as cited in AECOM 2022). It is anticipated USFWS would take a similar approach for the revised alignment in the Study Area.

Additional surveys would be completed as necessary during final design, as stated in **FEIS Appendix F-3** and **FEIS Appendix F-4**, to fully evaluate the Study Area. In addition, by implementing hazardous materials BMPs and water quality BMPs, as discussed in **FEIS Appendix F-3** and **FEIS Appendix F-4** and stated in Section 6 of this report, potential effects from operational activities on karst invertebrate species and their habitat would be mitigated.

Eurycea Salamanders

Eurycea salamanders rely on groundwater to provide suitable habitat. Construction activities could alter stormwater flow paths or transport construction materials such as soils, dust, and tailings into springs outside of the Build Alternative ROW. There are a number of springs to the west of the Study Area that were identified along Shoal Creek and other locations (see **Figure 9**). *Eurycea* salamanders are not known from the Shoal Creek watershed and other locations; therefore, salamanders would not be affected by overland flow to the springs within these parts of the Study Area.

Groundwater contamination could occur if hazardous substances or petroleum products used during construction are spilled and subsequently leach into the groundwater through the ground or if karst features are encountered during construction that provide a direct connection to the groundwater. Contamination leaching into the groundwater would be more likely in areas of porous soils and shallow groundwater or aquifer outcrops. Groundwater wells and exposed karst features could also provide a direct route for spills or sediment laden construction runoff to access groundwater.

There are no known springs or karst features within the Build Alternative ROW, but karst features may be exposed during construction. By implementing hazardous materials BMPs and implementing water quality BMPs, as discussed in **FEIS Appendix F-4**, and in Section 6, potential effects on groundwater quality and *Eurycea* salamanders would be mitigated.

Mollusks

While aquatic habitat was identified along Lady Bird Lake and named and unnamed streams within the Build Alternative ROW, protected mollusks are not expected to occur in these areas. Construction would not adversely modify or otherwise affect Lady Bird Lake or named and unnamed streams. Construction-related effects on protected mollusks are not anticipated as a result of the Build Alternative.

Monarch Butterfly

Potentially suitable habitat for the monarch butterfly may be present throughout the Study Area where milkweeds and nectar plants are present. However, as described in Section 5.2.1, most of effects on EMST vegetation from the Build Alternative would occur in previously developed landscapes (Urban High Intensity and Urban Low Intensity). Short-term, construction-related effects on native vegetation from the Build Alternative would be minimal and include dust accumulation and erosion from active construction sites that could inhibit natural plant processes. These effects would be temporary and existing native and landscaped vegetation would be expected to return to previous conditions following construction. See Section 6 for minimization measures applicable to monarch butterfly habitat.

Tricolored Bat

Potentially suitable tricolored bat habitat may be present throughout the Study Area where mature trees with leaf clusters, Spanish moss, peeling bark, and tree snags are present. Tricolored bats may also use culverts or bridges as habitat. Short-term construction related effects on tricolored bats would be limited noise, dust, lights for night construction, and construction vibrations to manmade structures that may be inhabited. Permanent effects include removal of trees and replacement of culverts and bridges that provide potential suitable habitat. The removal of trees during the roosting season, April through September, could result in the loss of juvenile or adult bats. See Section 6 for minimization measures applicable to tricolored bat habitat.

Bracted Twistflower

While the bracted twistflower has an EOR intersecting with the Study Area, potential suitable habitat for the species is not present within the Study Area. Short-term construction-related activities would not modify or otherwise affect habitat for the bracted twistflower.

Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act Species

Suitable nesting habitat for the bald eagle was identified within the Study Area along Lady Bird Lake; however, this species is not known to nest in this area although they have been seen upstream of Lady Bird Lake on Lake Austin. No permanent or temporary effects on the bald eagle are anticipated from the Build Alternative.

Suitable nesting habitat for migratory birds is present throughout the Study Area as bridges and overpasses and within wooded and forested areas, fencerows, fields, and other undeveloped or vegetated areas within the Study Area. The removal of vegetation or otherwise disturbing nests during the breeding bird season, generally March through September, could result in the loss of active bird nests and potentially juvenile or adult birds. The Migratory Bird Treaty Act prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing of migratory birds, their eggs, parts and nests, except when specifically authorized by USFWS, and there is no incidental take permit process for migratory bird species alone. The primary potential effect on breeding birds would be related to active nests. Measures would be taken to identify active nests, avoid take when active nests are identified, and deterrents for preventing migratory bird nesting within the Study Area will be implemented (see Section 6). Avoiding take of migratory birds and/or their active nests would be addressed in a manner consistent with the Migratory Bird Treaty Act.

Species of Greatest Conservation Need

As described in Section 4.6, potential suitable habitat was identified within the Study Area for 24 SGCN. Under the Build Alternative, no adverse effects on SGCN are anticipated under the Build Alternative. However, minor temporary and permanent effects on SGCN could occur from construction, operation, and maintenance of the Build Alternative but would not adversely affect them. Effects on SGCN would be similar to effects described in Section 5.2.2 for general wildlife.

Balcones Canyonlands Conservation Plan Species of Concern

As stated above for karst invertebrates (see Section 5.2.2.3), the BCCP species of concern that are karst- and aquifer dependent could potentially be affected if previously unknown karst features or subterranean conduits are uncovered during construction. Potential effects on BCCP species of concern karst species are expected to be similar to those discussed above for karst invertebrates. While it is anticipated that short term activities would not adversely affect such BCCP species of concern, additional project details and field investigation efforts would be necessary to fully evaluate the Study

Area for potential Project-related effects. Furthermore, the Study Area is not located within a BCCP karst habitat/fee zone. None of the other BCCP species of concern have potentially suitable habitat within the Study Area.

6 Compliance and Conservation Measures

6.1 Vegetation

During construction of the Project, potential effects on vegetation would be minimized by adhering to compliance measures and permitting described in the following sections. ATP included design features to avoid and minimize potential effects on vegetation, including primarily using existing roadway structures and previously developed land. ATP would acquire the necessary permits before initiating construction. Additional information regarding protected plants is provided below in Section 6.3.9.

6.1.1 Compliance Measures

Prior to construction, an updated protected tree survey would be conducted to identify all trees with a dbh of 8 inches or greater as required by City ordinances (Land Development Code Chapter 25-8, Subchapter B, Article 1). Within parklands, the tree survey will include all trees with a dbh of 4 inches or greater (Environmental Criteria Manual Section 5.3.1).

Coordination with the City would be conducted as design progresses to identify avoidance, minimization, and mitigation measures for each tree. Variances are required for heritage trees to be removed or affected exceeding code requirements and will be requested during coordination. For trees with a dbh of 30 inches or greater, the variance must go through the public process which is ongoing and would be determined through coordination with City. All variance requests regardless of dbh of the tree must be approved by the City Council. Mitigation may be required for the removal of any tree that is 8 inches in dbh or greater in the form of relocation, planting, and/or payment (Land Development Code Chapter 25-8, Subchapter B, Article 1; Environmental Criteria Manual Section 3). Mitigation (relocation, replacement, etc.) of trees would be determined through coordination with the City Arborist. Plan sheets including the location of each tree would be included in coordination and submittals to the City. These plan sheets would be cross-referenced to the most recent tree survey, which shows data for each tree, including species, size, health, etc.

Mitigation exempt species may require a permit, but do not require mitigation per Environmental Criteria Manual Section 3.5.4.

6.1.2 Conservation Measures

To avoid, minimize, and mitigate potential effects of the Project on vegetation, ATP would comply with the following BMPs (TPWD 2021):

- Project staging areas, stockpiles, temporary construction easements, and other Project-related sites should be situated in previously disturbed area;
- During vegetation clearing and construction, vehicles and equipment would be washed free of plant debris and seeds before entering and leaving worksites to avoid potential transport of nonnative seed to construction areas;
- To the extent practicable, vegetation clearing will be minimized throughout the Study Area and native vegetation removal will be avoided;
- Protected and heritage native trees would be avoided to the greatest extent practicable;
- Activities should be planned to preserve protected and heritage trees, particularly native acorn, nut, or berry producing varieties. These types of vegetation have high value to wildlife as food and cover;
- Affected vegetation would be replaced with in-kind on-site replacement or restoration of native vegetation to the maximum extent practicable;
- Strategic mitigation and landscape restoration, such as tree clusters and riparian restoration zones will be implemented as they can provide improved conditions over one for one tree replacement in affected areas;
- Replacement trees would be of equal or better wildlife quality than those removed and be regionally adapted native species;
- A maintenance plan for planted trees would be developed that ensures at least an 85 percent survival rate after 3 years;
- Locally adapted native species would be used in landscaping;
- Locally adapted native seed mixes will follow the City's native seed mix standard specifications; and
- The City's Tree Ordinance would be adhered to for tree removal.

The City is working collaboratively to investigate and propose regulatory modifications, including amendments to Land Development Code and permitting procedures necessary to assure implementation and construction of Project Connect. These may include modifications to the way tree effects and mitigation are considered, tracked, and reported to accommodate the unique challenges of linear mobility and large transit projects.

6.2 Wildlife

There are currently no permitting mechanisms or regulatory requirements for incidental take of non-protected wildlife species in Texas; however, effects on wildlife as a result of the Build Alternative would be minimized through the implementation of mitigation measures, as described in Section 7. Additionally, the following BMPs would benefit all wildlife:

- Disturbed areas would be covered and/or treated with dust suppression techniques, including, but not limited to, soil binders, sprinkling, or watering. This would also include effectively controlling fugitive dust emissions by the application of water, presoaking, or other dust suppression techniques during all clearing, grubbing, scraping, excavation, grading, cut and fill, and demolition activities. If winds are greater than 25 miles per hour, the exposed work area would be soaked, or dust-generating activities would be suspended.

- Site training would occur prior to and during construction. A qualified biologist would develop appropriate environmental training that would be administered to all on-site personnel before beginning work. The training would include the definition of “take” relative to protected species, the potential presence of wildlife species, reporting requirements, and measures to be taken to minimize effects on the natural environment.

- Any obvious wildlife or bird mortalities as a result of the construction and operation of the Project would be recorded and documented.

- Best efforts will be made to install erosion control BMPs in a manner to exclude wildlife from the project area. The site will be inspected frequently to identify and respond to any instances of trapped wildlife.

6.2.1 Mexican Free-Tailed Bats

There are currently no permitting mechanisms or regulatory requirements for incidental take of Mexican free-tailed bats; however, the colony at the Ann W. Richards Congress Avenue Bridge is of substantial importance to the City both economically and environmentally. The bridge is outside of the Study Area and reasonably foreseeable effects on the colony at the bridge would be avoided. The following BMPs are proposed to further minimize and mitigate for the Mexican free-tailed bat:

- Construction activities will be avoided at the Ann W. Richards Congress Avenue Bridge;

- Construction activities resulting in high decibel noise disturbance at Lady Bird Lake should occur between November and February as to avoid disturbing the largest population of Mexican free-tailed bats at Ann W. Richards Congress Avenue Bridge;

- During construction, lighting should be shielded from the bat roosting area;
- Construction lighting should be minimized during the general bird nesting season by scheduling work activities between dawn and dusk;
- If night construction is necessary, lighting should be only as bright as necessary to effectively conduct work, minimally required by Occupational Safety and Health Administration standards and should be in use only in the immediate area where active construction is underway; and
- Permanent lighting that could influence the bat roosting area should follow the International Dark-Sky Association (2024) recommendations, including fixtures that are fully shielded and emit no light above the horizontal plane; no sag or drop lenses, side light panels, or up light panels on the fixtures; and if red light cannot be used, should use only warm-toned (3000K and lower) white, amber, or filtered LED light sources. Permanent lighting proposed on or beneath the new bridge should be dim and directional (downward facing or away from existing/potentially new bat colonies), and only as bright as necessary to minimize these effects. Red light appears to have no effect on bat activity, while white and green light may cause disturbances to bats (Spoelstra et al. 2017); thus, red lighting should be used if possible. As a mitigative measure that would improve light pollution of bat habitat from existing conditions, part-night lighting, dimming, or motion-sensitive lighting may help to provide bats with a dark travel corridor and ease navigation back to their bridge roost (Rowse et al. 2015).

6.3 Protected Species

6.3.1 Karst Invertebrate Species

The Study Area includes Karst Zone 3b, although there is a low probability of occurrence of protected karst invertebrates in these mapped areas, and is not located in a karst fauna region. Informal coordination was initiated with USFWS and Travis County's BCCP Administrator in February through May 2021. Informal coordination with USFWS, Travis County, and TPWD may continue through final design to identify potential effects and BMPs for wildlife and protected species, as necessary. While it may be unlikely to encounter karst invertebrate species within the Study Area, there is still potential to encounter karst features during construction.

If karst features are encountered during bedrock excavation activities, they will be evaluated by a permitted scientist for the presence of karst invertebrate habitat. Work at the feature and within a 50-foot buffer around the feature will cease until the feature is evaluated. While a feature is being evaluated, the surface expression will be covered to minimize the influence of diurnal variations in surface temperature. Protection of the feature may include a wood cover, plastic sheeting, and/or blanket that is weighted down with rocks around the perimeter. During periods of high temperatures (>100° F), a piece of insulation will be added to the cover. Appropriate BMPs will be implemented to prevent surface runoff from entering the feature.

- If the discovered feature does not meet the criteria for potential karst habitat, then work may proceed.

- If the feature meets the criteria for potential karst habitat, then it will be cordoned off as a no work zone. Presence/absence surveys following protocols detailed by USFWS (2015) will commence when karst invertebrate habitat is determined to be potentially present.

    - If no federally listed species are discovered during presence/absence surveys, work may proceed after completion of the surveys.

    - If a discovered feature is determined to be occupied or presumed occupied by a federally listed species, then USFWS will be contacted, and consultation will be initiated.

6.3.2 *Eurycea* Salamanders

Eurycea salamanders rely on groundwater fed surface habitats and subsurface groundwater habitats. Construction in karst bedrock has the potential to hit groundwater conduit paths at shallower depths than expected. If groundwater conduits (e.g., recharge feature, mesocavernous voids) are encountered during construction, project-related effects on salamanders could potentially occur via sediment mobilization and alteration of groundwater flowpaths to the deeper habitat of the aquifer. Guidelines for encountering groundwater in voids during construction should be implemented if encountered following the procedures outlined in the City's Specs for Void and Water Flow Feature Mitigation, R161-08.06 of the City's Environmental Criteria Manual.

6.3.3 Aquatic Species

Suitable habitat is not present for any federally listed aquatic species, but suitable habitat for some aquatic SGCN and common species may be present. The Stormwater Pollution Prevention Plan for construction general permit or any conditions of the Section 401 water quality certification as seen in **FEIS Appendix F-4** include BMPs that would mitigate effects of the project on aquatic species. Stormwater quality BMPs would ensure that local water quality degradation would not occur as a result of the Project. A Spill Prevention Control and Countermeasure Plan would ensure that any incidental releases of fuel or other materials are remediated. Implementation of these plans and the associated BMPs would result in avoidance of effects on any aquatic species habitats. The following additional BMPs for aquatic species would be implemented during construction of the Build Alternative:

- Minimize effects on wetlands, temporary and permanent open water features, including depressions, and riverine habitats;

- Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges;

- Riparian buffer zones should remain undisturbed where practicable;
- Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features;
- When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing;
- Removal and proper disposal of rubbish found near bridges within the ROW to minimize the risk of pollution. Rubbish does not include brush piles or snags;
- Use spanning bridges rather than culverts where possible;
- Staggered culverts that concentrate low flows but provide conveyance of higher flows through staggered culverts placed at higher elevations should be incorporated where possible;
- Bottomless culverts that allow fish and other aquatic wildlife passage in the low flow channel should be incorporated where possible. If bottomless culverts are not used, making a low flow channel for fish passage is recommended;
- For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs;
- Avoid placing riprap across stream channels when possible and instead use alternative stabilization such as biotechnical stream bank stabilization methods including live native vegetation or a combination of vegetative and structural materials. When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of aquatic and terrestrial wildlife underneath the bridge. In some instances, rip rap may be buried, back-filled with topsoil and planted with native vegetation;
- Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-construction equipment interactions in construction areas directly adjacent, or that may directly affect, potential aquatic habitat;
- For sections of the Project adjacent to or within wetlands, streams, and other aquatic features, install wildlife barriers that prevent animals from entering construction areas. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two; and

- Apply hydromulching and/or hydroseeding per the City's Standard Specifications Manual (additional information provided above in Section 6.1.2) in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move; therefore, allowing expansion of the mesh openings. The use of plastic netting should be avoided when:
    - work is directly adjacent to the water, minimize effects on shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs); and
    - dewatering or relocating aquatic resources is necessary, a TPWD Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters and a prerequisite Aquatic Resource Relocation Plan will be required to relocate/introduce fish and/or shellfish into public waters of the state.

6.3.4 Bird Species

In addition to complying with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, the following BMPs will be employed to avoid, minimize, and mitigate the effects of the Project to migratory bird species:

- Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse effects on nesting birds;
- Up to 5 days prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. If active nests are observed during surveys, TPWD recommends a minimum of a 150-foot buffer of vegetation remain around the nests until the young have fledged or the nest is abandoned with potentially greater buffer distances for certain species;
- Do not disturb, destroy, or remove active nests, including nests of ground nesting birds, during the nesting season;
- If unoccupied, inactive nests will be removed, ensure that nests are not protected under the Endangered Species Act, Migratory Bird Treaty Act, or Bald and Golden Eagle Protection Act;
- Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit;

- Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional effects;

- Minimize construction noise above ambient levels during the general bird nesting season to minimize adverse effects on birds;

- Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk;

- To reduce effects on migrating birds, during nighttime construction and operation, the minimum amount of nighttime lighting needed for safety and security would be used and it would be shielded down;

- If rookeries are encountered, avoid, and minimize disturbance during nesting to protect rookery species and their habitat;

- Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a rookery or heronry periphery should be avoided. Using areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season (February through August); and

- Clearing activities or construction using heavy machinery in a secondary buffer area of 3,281 feet (1 kilometer) from the heronry/rookery periphery, if identified during the Project, should be avoided during the breeding season (courting and nesting).

6.3.5 Monarch Butterfly

The monarch butterfly may be present in the Study Area. The following BMPs have been provided by TPWD and United States Department of Agriculture's Natural Resources Conservation Service:

- Use the Monarch Wildlife Habitat Evaluation Guide (U.S. Department of Agriculture 2018) as a decision-support tool to inform the planning process, and to implement a plan to restore degraded habitat;

- Mowing or shallow-tilling should occur in no more than 1/2 of the habitat per year, if possible. Leave patches of unmowed and untilled habitat for the entire year;

- When mowing does occur, it should be minimized, set for high-mowing, and conducted outside of the growing season;

- Native plants and seed mixes should be procured from local eco-type providers. Seed mixes should be diverse, include milkweed species, and include as many ecoregion natives as possible ensuring full season nectar and habitat resources; and

- Use an Integrated Pest Management Strategy for controlling weedy or invasive plants by minimizing broad use of certain herbicides and surfactants near intact habitats used by native pollinators (TPWD 2016). Reduce application timing to periods of low pollinator activity and not during peak bloom season.

6.3.6 Bat Species

The following survey and exclusion protocols should be followed prior to commencement of construction activities; for the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings:

- Inform the USFWS and TPWD Wildlife Habitat Assessment Program during initial collaborative review phase for projects that may affect bat species, including the tricolored bat;

- A qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within 1 year before construction;

- For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most 4 weeks prior to scheduled disturbance to confirm absence of bat;

- If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction;

- If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features;

- In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with USFWS and TPWD; and

- Avoid the removal of trees during the pupping season (May 1 through July 15) and during the winter torpor season (December 15 through February 15) to minimize effects on bats during these periods.

6.3.7 Terrestrial Reptile Species

Suitable habitat for the eastern box turtle, plateau spot-tailed earless lizard, Texas garter snake, Texas map turtle, and western box turtle was identified within the Study Area. The following BMPs will minimize and mitigate effects from the Project:

- Applying hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, erosion control blankets would be utilized;
- Installing escape ramps for open trenches and excavated pits, at an angle of less than 45 degrees in areas left uncovered;
- Minimization and avoidance would be taken on disturbing or removing downed trees, rotting stumps and leaf litter where feasible;
- Advising contractors of potential occurrences in the Study Area and to avoid harming the species if encountered; and
- If box turtles are present in the Study Area, they should be removed from the area and relocated by a qualified biologist between 328 feet (100 meters) and 656 feet (200 meters) from the Study Area. After removal of the individuals, the area that will be disturbed during active construction and exclusion fencing should be installed to exclude reentry by turtles and other reptiles.

6.3.8 Wildlife Corridors

Wildlife corridors were identified within the Study Area at Blunn Creek, Carson Creek, Country Club Creek and associated tributaries, Lady Bird Lake, East Bouldin Creek, and associated greenbelts. The following BMPs and previously discussed BMPs will minimize and mitigate for effects on wildlife corridors from Project effects:

- Design bridges for adequate vertical and horizontal clearances under the bridge to allow for terrestrial wildlife to safely pass under the road; and
- A span wide enough to cross the stream and allow for dry ground and a natural surface path under the roadway is encouraged. For culverts, incorporation of an artificial ledge inside the culvert on one or both sides for use by terrestrial wildlife is recommended.

6.3.9 Plant Species

Suitable habitat for Correll's false dragon-head, low spurge, glandular gay-feather, Texas milkvetch, and tree dodder were identified within the Study Area. The following BMPs will minimize and mitigate effects from the Project:

- Survey the Study Area during appropriate seasons to allow for correct species identification. Surveys should be performed within areas identified as potentially suitable habitat for the species. Botanical field surveys should be conducted by qualified individual(s) with botanical experience and according to commonly accepted survey protocols. Ensure that any equipment, tools, footwear and clothing are clean prior to entering the project site area to avoid introducing invasive species.

- If SGCN plants are recorded, the surveyor should attempt to determine the complete extent of the occurrence and the approximate number of individuals within the occurrence. Suitable GPS equipment should be used to map the boundaries of the population. Photographs should be taken and/or voucher specimens should be collected (if sufficient plants are present, i.e., more than 10 reproductive plants). Photographs should capture diagnostic characters of the species for verification and should be discussed with TPWD prior to surveys if surveyor is unfamiliar with the species. If required, vouchers should be submitted to TPWD or in one of Texas' major herbaria (e.g., University of Texas at Austin, Botanical Research Institute of Texas, Texas A&M University, Sul Ross State University, etc.).

- If there is a known TXNDD SGCN plant population within the project area and project timing or other constraints do not allow for surveys, TPWD should be contacted as soon as possible to discuss other options.

- If an SGCN plant species is located during surveys of the project area, then following BMPs should be implemented during the construction phase:

    - Avoid effects and minimize unavoidable effects. Plant locations should be protected with temporary barrier fencing and contractors should be instructed to avoid protected areas. Conducting construction outside of the growing season or after a plant has produced mature fruit is the preferred way to avoid/minimize effects on SGCN plant populations. Staging, stockpiles, and other project related sites should not affect SGCN plant populations. After construction begins, minimize herbicide use near SGCN plant populations (if possible, use hand-held spot sprayers, several meters from rare plants, on still or days with little wind).

    - If there are unintended effects on SGCN populations, these effects should be reported to TPWD.

- If the project footprint is finalized or is subject to change AND effects on SGCN plants cannot be avoided, notify TPWD as soon as possible. Early notification will allow adequate time and opportunity to seed bank or otherwise conserve populations prior to construction.

- Submit observation(s) of SGCN plant populations and associated data to the TXNDD and the Environmental Review Team. Data should also be submitted directly to the TXNDD using the appropriate forms. In addition, data should be submitted to the ATP project-assigned biologist Jessica.Schmerler@tpwd.texas.gov. A TXNDD Reporting Form with shapefiles delineating the outer boundary of the population are preferable. Include detailed information on who identified and how a species was identified (resources/references used; diagnostic characters observed). If an SGCN plant population is located near non-native invasive plants, this should be recorded and reported in TXNDD Reporting Form.

- During project period, conduct work during times of the year when plants are dormant and/or conditions minimize disturbance of the habitat.

- Develop a plan based on growing season, mower height/season, etc. for protecting sites into future. Maps should also be developed for rare plant area, which includes no mow areas. Known rare plant sites within the Study Area and/or new sites found in future projects can be added to this map/plan.

- Conducting maintenance outside of the growing season or after a plant has produced mature fruit is the preferred way to avoid/minimize effects on habitat.

- Coordinate with TPWD regarding surveys for protected plants and appropriate BMPs including limiting maintenance (e.g. herbicide treatment) and around known populations.

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Attachment A. Threatened and Endangered Species

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Amphibians						
Austin Blind salamander	*Eurycea waterlooensis*	E	E	This species is a subterranean, aquatic species sometimes observed in surface habitat. Surface populations are known from Barton Springs. Optimal habitat includes springs and caves with flowing water.	No	No groundwater fed springs or streams are present in the Study Area. Project could potentially affect groundwater resources and habitat if undiscovered groundwater conduits are uncovered during construction.
Barton Springs salamander	*Eurycea sosorum*	E	E	This species is an aquatic, neotenic species of salamander found only within Travis and northern Hays counties. Surface populations occur in springs of the Barton Springs Segment of the Edwards Aquifer. Optimal habitat includes springs, spring-fed streams, and caves with flowing water.	No	No groundwater fed springs or streams are present in the Study Area. Project could potentially affect groundwater resources and habitat if undiscovered groundwater conduits are uncovered during construction.
Jollyville Plateau salamander	*Eurycea tonkawae*	T	T	This species is an aquatic, neotenic species of salamander found only within northern Travis and southern Williamson counties. Surface populations occur in springs of the Jollyville Plateau and springs of nearby Brushy Creek. Optimal habitat includes springs, spring-fed streams, and caves with flowing water.	No	No groundwater fed springs or streams are present in the Study Area. Project could potentially affect groundwater resources if undiscovered groundwater conduits are uncovered during construction; however, the known range of this species is located near the Williamson County line and is well upgradient of the Study Area.
Arachnids						
Bone Cave harvestman	*Texella reyesi*	E	NL	A subterranean obligate, the species occurs in small isolated karstic features within the Edwards Limestone Formation. Sensitive to low humidity and temperature, it is found under large rocks in dark cool parts of caves. It is known from 203 different caves and six karst fauna regions in Travis and Williamson Counties.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.
Bee Creek Cave (Reddell) harvestman	*Texella reddelli*	E	NL	A subterranean obligate, the species occurs in small isolated karstic features within the Edwards Limestone Formation. Sensitive to low humidity and temperature, it is found under large rocks in dark cool parts of caves. It is known from 4 caves in the Rollingwood Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Tooth Cave pseudoscorpion	*Tartarocreagris texana*	E	NL	This subterranean, obligate pseudoscorpion inhabits karstic features within the Edwards Limestone Formation. It is known only from 5 caves in the Jollyville Plateau Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.
Tooth Cave spider	*Neoleptoneta myopica*	E	NL	This subterranean obligate species inhabits karstic features within the Edwards Limestone Formation. It is known only from 13 caves in the Jollyville Plateau and McNeil/Round Rock karst fauna regions in Travis and Williamson counties.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.
Birds						
Black Rail	*Laterallus jamaicensis*	T	T	This species may use habitat within Travis County during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia	No	No salt, brackish, and freshwater marshes, pond borders, wet meadows, or grassy swamps are present in the Study Area. Any use of potential migratory stopover habitat within the project area would be incidental and ephemeral.
Golden-cheeked warbler	*Setophaga chrysoparia*	E	E	This migratory species breeds in central Texas along the Balcones Escarpment on the eastern edge of the Edwards Plateau and ranges from southwest of Fort Worth to northeast of Del Rio. Breeding habitat consists of juniper-oak woodlands dominated by Ashe juniper (*Juniperus ashei*) and various oak (*Quercus sp.*) species and deciduous trees found in areas with steep slopes, canyon heads, draws, and adjacent ridgetops. The species is dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are generally placed in upright forks of mature Ashe junipers or various deciduous species. Occupied sites usually contain junipers at least 40 years old.	No	Juniper-oak woodlands with sufficient canopy coverage and age are not present in the Study Area.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Piping Plover	*Charadrius melodus*	T	T	This migratory species overwinters in Texas, where it occurs on beaches, ephemeral sand flats, barrier islands, sand, mud, algal flats, washover passes, salt marshes, lagoons, and dunes along the Gulf Coast and adjacent offshore islands, including spoil islands in the Intracoastal Waterway. Algal flats appear to be the highest quality habitat because of their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low or very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast.	No	No beaches, ephemeral sand flats, barrier islands, sand, mud, algal flats, washover passes, salt marshes, lagoons, or dunes along the Gulf Coast and adjacent offshore islands are present in the Study Area. Any use of potential migratory stopover habitat within the project area would be incidental and ephemeral.
Rufa Red Knot	*Calidris canutus rufa*	T	T	The species is a winter resident and migrant in Texas. It is primarily found in marine habitats such as sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, and mangrove swamps during winter months. It primarily occurs along the Gulf coast on tidal flats and beaches and less frequently in marshes and flooded fields. It has occasionally been observed along shorelines of large lakes and freshwater marshes.	No	No marine habitats such as sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, or mangrove swamps are present in the Study Area. Lady Bird Lake is located within the Study Area; however, this portion of the river is highly urbanized, and the nesting or overwintering range of this species does not overlap the Study Area. Any use of potential migratory stopover habitat within the project area would be incidental and ephemeral.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Swallow-tailed kite	*Elanoides forficatus*	NL	T	This migratory species breeds in the South Central Plains of east Texas and throughout the southeastern U.S. In Texas, breeding habitat occurs between sea level and 230 meters in elevation in bottomland forests, cypress swamps, pine glades, and freshwater marshes skirting large lakes. It nests near the tops of trees that are higher than the surrounding stand, often near a clearing or the edge of a forest or woodland. It prefers to nest in pines, but occasionally uses species such as bald cypress (*Taxodium distichum*), water oak (*Quercus nigra*), or cottonwood (*Populus deltoides*).	No	No lowland forested regions, including swamps and marshes with tall trees, were identified within the Study Area. Lady Bird Lake is located within the Study Area; however, this portion of the river is highly urbanized, and the nesting range of this species does not overlap the Study Area.
White-faced ibis	*Plegadis chihi*	NL	T	The species is found in the Western Gulf Coastal Plains ecoregion of Texas. Preferred habitat includes freshwater wetlands, marshes, ponds, rivers, irrigated land, and sloughs, but it occasionally forages in brackish or saltwater marshes. It nests in marshes in low trees, on the ground in bulrushes (*Scirpus sp.*) or reeds, or on floating mats.	No	No freshwater marshes, sloughs, irrigated rice fields, or brackish habitats were identified within the Study Area.
Whooping crane	*Grus americana*	E	E	This species is found using small ponds, marshes, and flooded grain fields in rural settings for both roosting and foraging. It is a potential migrant via plains throughout most of the state to the coast. It winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	No	No ponds, marshes, or flooded grain fields in rural settings are present within the Study Area. In addition, this species requires open areas for foraging, take-off, and landing and the Study Area is located within a developed, urbanized landscape.
Wood stork	*Mycteria americana*	NL	T	Prefers to nest in large tracts of bald cypress or red mangrove (*Rhizophora mangle*); forages in prairie ponds, flooded pastures or fields, ditches, and other standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	No	No large tracts of bald cypress or red mangrove, prairie ponds, or flooded pastures or fields were identified within the Study Area.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Insects						
Kretschmarr Cave mold beetle	*Texamaurops reddelli*	E	NL	This subterranean obligate species inhabits karstic features within the Edwards Limestone Formation. It is known from 10 caves in the Jollyville Plateau Karst Fauna Region in Travis County. This small beetle is often found under rocks buried in silt.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.
Monarch butterfly	*Danaus plexippus*	C	NL	Found statewide. Adults are found in a variety of habitats including native prairies, pastures, open woodlands and savannas, desert scrub, roadsides, and other habitats with abundant nectar plants, including urbanized areas. Although adults may be present year-round, they are primarily encountered between March and November, and are most commonly observed in the summer and fall during breeding and migration. Caterpillars are found on various species of the family Asclepiadaceae (occasionally treated as a subfamily of Apocynaceae). Common host plants in Texas include milkweeds (*Asclepias spp.*), milkweed vines (*Matelea spp.*), climbing milkweed (*Funastrum spp.*), swallowworts (*Cynanchum spp.*) and Anglepod (*Gonolobus suberosus*). Caterpillars are most frequently observed between April and September.	Yes	This species is a habitat generalist and suitable habitat may be present along vegetated roadsides and other open areas with nectar plants, species of host plants in the Asclepiadaceae family, and/or other desirable species.
Tooth Cave ground beetle	*Rhadine persephone*	E	NL	This subterranean obligate species inhabits karstic features within the Edwards Limestone Formation. It is known from 64 caves in the Cedar Park and Jollyville Plateau Karst Fauna Regions in Travis County, including Tooth and Kretschmarr Caves.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region. Coordination with USFWS indicates that the species is not anticipated to occur within the Study Area.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Mammals						
Tricolored Bat	*Perimyotis subflavus*	PE	NL	In Texas, Tricolored Bats may be found year round. In the spring, summer, and fall they primarily nest on leaves or bark of live and dead trees, or epiphytic vegetation such as Spanish moss (*Tillandsia usneoides*). They may also roost among ferns and crevices on limestone and sandstone bluffs and cliffs during this time. From late winter to early spring, they may roost in culverts, abandoned buildings, and large hollow trees. In central Texas caves serve as important roost sites. Tricolored bats typically roost alone or in small groups. During the winter they may go into periods of torpor during colder temperatures however they will emerge to feed on warm evenings. Foraging habitat consists of open woodlands, riparian corridors, and forest edge.	Yes	Trees, abandoned buildings, and/or culverts may be present within the Study Area.
Mollusks						
False spike	*Fusconaia mitchelli*	E	T	Freshwater mussel currently known from the Colorado and Brazos River basins. The species occurs in small to medium-sized streams and rivers with various substrates including mud and mixtures of sand, gravel, and cobble. It is often found in riffle and pool habitats, and host species include the red (*Cyprinella lutrensis*) and blacktail shiner (*C. venusta*).	No	Species is not expected to occur within the Study Area due to impoundment of the Colorado River. Furthermore, no current known populations of this species occur within Travis County.
Texas fatmucket	*Lampsilis bracteata*	E	T	A freshwater mussel reported to occur in slow to moderate flowing water with sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges and slabs, and macrophyte beds. Species is also known from the roots of cypress trees and vegetation along step banks. This species is considered intolerant of reservoirs.	No	Slow to moderate flowing water over various substrates was identified in the Study Area within Lady Bird Lake (the Colorado River) and may be found within other streams located within the Study Area. However, known populations of this species within Travis County occur only in Lower Onion Creek, outside of the Study Area. Potential effects on Onion Creek are not expected.

Common Name	Scientific Name	Listing Status		Habitat Description	Suitable Habitat within Study Area	Determination
		USFWS	TPWD			
Texas fawnsfoot	*Truncilla macrodon*	T	T	A freshwater mussel that is currently limited to the Brazos, Colorado, and Trinity River basins in Texas. The species occupies large streams to medium rivers and is intolerant of impoundment. Little is known about the species due to lack of representative specimens, however it is thought that the species prefers protected areas near shore in water with a moderate current over mud, sandy mud, and gravel substrates. It is also found in perennial irrigation canals for rice. This species is considered intolerant of reservoirs.	No	Species is not expected to occur within the Study Area due to impoundment of the Colorado River. Furthermore, no known populations of this species occur within Travis County.
Texas pimpleback	*Quadrula (Cyclonaias) petrina*	E	T	A freshwater mussel endemic to the middle and lower portions of the Colorado River basin in Texas. The species inhabits medium to large rivers with shallow water and slow to moderate currents. It occurs in gravel-filled cracks in bedrock and microhabitats and on mud, sand, gravel, and cobble substrates. It is intolerant to extremely soft substrates, shifting sands, scoured bottoms, and impoundments.	No	No riffles and runs were identified in the portion of the Colorado River located within the Study Area. This species is not expected to occur in Lady Bird Lake due to impoundment. In addition, no known populations of this species occur within Travis County.
Reptiles						
Texas horned lizard	*Phrynosoma cornutum*	NL	T	The species is found in semi-arid open areas with scattered vegetation comprised of bunchgrass, cacti, yucca, mesquite, acacia, juniper, or other woody shrubs and small trees commonly found in loose sandy or loamy soils.	No	No sparse vegetation, scattered brush, cactus, or scrubby trees, or sandy to rocky areas in arid and semi-arid regions were identified within the Study Area.
Plants						
Bracted twistflower	*Streptanthus bracteatus*	T	T	Flowering plant species found in well-drained gravelly clays and clay loams over limestone in oak-juniper woodlands and associated openings on slopes and canyon bottoms.	No	Oak-juniper woodlands with clay and loam soils along drainages that contain slopes and canyon bottoms are not present in the Study Area.

T = Threatened; E = Endangered; P = Proposed; C = Candidate

* Does not include species under review for federal listing or delisted species in recovery; includes federally listed species included in the on the IPaC utility (USFWS 2024a) (i.e., does not include the entire county and based on the Study Area); state-listed entries include those listed for the entire county.

Attachment B. Species of Greatest Conservation Need

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Amphibians					
Pedernales River Springs salamander	*Eurycea* sp. 6	N	Aquatic; springs, streams and caves with rocky or cobble beds.	No	Springs and streams are present in the Study Area, but the range of this species is limited to the Pedernales River.
Strecker's chorus frog	*Pseudacris streckeri*	Y	Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.	No	No flats, prairies, cultivated fields, or marshes present. Narrow wooded floodplains are present at some stream crossings in the Study Area, but these are in areas of clayey soils without sandy substrates.
Woodhouse's toad	*Anaxyrus woodhousii*	Y	This species is both a terrestrial and aquatic amphibian. It uses a wide variety of terrestrial habitats, including forests, grasslands, and barrier island sand dunes, and equally varied aquatic habitats.	Yes	This species occurs in a wide variety of terrestrial and aquatic habitats and is known to occur in Travis County.
Arachnids					
Bandit Cave spider	*Cicurina bandida*	Y	Very small, subterrestrial, subterranean obligate species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina travisae*	Y	A cave obligate spider.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Eidmannella reclusa*	Y	A cave obligate spider.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris altimana*	Y	A cave obligate pseudoscorpion found in the Rollingwood Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris attenuata*	Y	A cave obligate pseudoscorpion found in the Jollyville Plateau Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris domina*	Y	A cave obligate pseudoscorpion found in the McNeil-Round Rock Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
No accepted common name	*Tartarocreagris infernalis*	Y	A cave obligate pseudoscorpion found throughout Travis and Williamson County Karst Fauna Regions.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris intermedia*	Y	A cave obligate pseudoscorpion found in the Rollingwood Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris proserpina*	Y	A cave obligate pseudoscorpion found in the Rollingwood Karst Fauna Region.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Texella grubbsi*	Y	A subterrestrial, obligate harvestman species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Texella mulaiki*	Y	A subterrestrial, obligate harvestman species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Texella spinoperca*	Y	A subterrestrial, obligate harvestman species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
Birds					
bald eagle	*Haliaeetus leucocephalus*	Y	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	Yes	Tall trees were identified within the Study Area along Lady Bird Lake (the Colorado River). Although this species may migrate through the area, the Study Area consists of urban development along the Colorado River. In addition, this species is not known to nest along this section of the Colorado River and no known nests were identified in the Project vicinity. Therefore, this species is not anticipated to nest or roost within the Study Area. Any occurrence would be considered incidental and ephemeral.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
black-capped vireo	*Vireo atricapilla*	Y	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	No	No patchy oak-juniper woodlands with woody foliage to ground level were identified within the Study Area.
chestnut-collared longspur	*Calcarius ornatus*	Y	Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands	No	No open, shortgrass prairies or cropland were identified within the Study Area.
Franklin's gull	*Leucophaeus pipixcan*	Y	The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.	No	Lady Bird Lake (the Colorado River) is located within the Study Area. However, habitat in this area is highly urbanized. It is anticipated the shoreline would not attract this species within the Study Area, and any occurrence would be incidental and ephemeral.
lark bunting	*Calamospiza melanocorys*	Y	Overall, it is a generalist in most short grassland settings including those with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields.	No	No shortgrass settings with brushy components or playas were identified within the Study Area. In addition, the Study area is heavily urbanized.
mountain plover	*Charadrius montanus*	Y	The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.	No	No prairies, high plains, or plowed fields were identified in the Study Area, which is in a heavily urbanized setting with few native habitats. Any occurrence would be incidental and temporary.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Sprague's pipit	*Anthus spragueii*	Y	The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.	No	No pastures or agricultural fields occur in the Study Area, which is a heavily urbanized setting. Any occurrence would be incidental and temporary.
western burrowing owl	*Athene cunicularia hypugaea*	Y	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows	No	No open grasslands, prairies, or savannas occur in the Study Area. Small vacant lots are present, but these spaces are not in open settings, and the Study Area is in a heavily urbanized area. Any occurrence would be incidental and temporary.
Crustaceans					
Balcones Cave amphipod	*Stygobromus balconis*	Y	Subaquatic, subterranean obligate amphipod	No	There is no groundwater or wells in the Study Area.
Ezell's Cave amphipod	*Stygobromus flagellatus*	Y	Known only from artesian wells	No	There is no groundwater or wells in the Study Area.
No accepted common name	*Lirceolus bisetus*	Y	Habitat description is not available at this time.	No	There is no groundwater or wells in the Study Area.
Fish					
american eel	*Anguilla rostrata*	Y	Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.	Yes	This species is a habitat generalist that can be found in slow- and fast-flowing waters. Lady Bird Lake is present in the Study Area providing habitat for the species. Despite Lady Bird Lake being a reservoir, this species has been observed in Barton Springs Pool and in Barton Creek which feed into Lady Bird Lake.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Guadalupe bass	*Micropterus treculii*	Y	Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures.	Yes	This species is known from tributaries and spring-fed streams to Lady Bird Lake which would provide a direct connection for the species into the Study Area.
silverband shiner	*Notropis shumardi*	Y	In Texas, found from Red River to Lavaca River; Main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel.	Yes	Lady Bird Lake is within the Study Area and is characterized as having slow to moderate current velocities and moderate to deep depths associated with turbid water.
Texas shiner	*Notropis amabilis*	Y	In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools.	Yes	There are records of the species in Lady Bird Lake immediately upstream of the Study Area.
Insects					
American bumblebee	*Bombus pensylvanicus*	Y	Found in open farmlands and fields.	No	No open farmland or fields are present in the Study Area.
Comanche harvester ant	*Pogonomyrmex comanche*	Y	Found in open, sandy, upland woodlands.	No	No open, sandy, upland woodlands are present in the Study Area.
No accepted common name	*Andrena scotoptera*	Y	Strong foraging preference for pricklypoppy species.	No	Pricklypoppy species may be present within the Study Area, but they are anticipated to be isolated and infrequent.
No accepted common name	*Bombus variabilis*	Y	The habitats of its known host species, *B. pensylvanicus*, include open farmland and fields	No	No farmland or fields are present in the Study Area.
No accepted common name	*Lymantes nadineae*	Y	Unknown distribution, probably north of the Colorado River in Travis and Williamson counties	No	The distribution and habitat of the species is unknown.
No accepted common name	*Macrotera parkeri*	Y	Cactus specialist on limestone soils.	No	Cactus species may be present within the Study Area, but they will be isolated.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
No accepted common name	*Neotrichia juani*	Y	Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993).	No	No perennial or ephemeral rivers or small spring-fed streams are present in the Study Area.
No accepted common name	*Oncopodura fenestra*	Y	Caves of Georgetown and North Williamson Karst Fauna Regions and southern Travis County.	No	This Study Area is outside of the range of the species.
No accepted common name	*Rhadine austinica*	Y	Known from caves in the Rollingwood Karst Fauna Region.	No	The Study Area is outside of the Rollingwood Karst Fauna Region.
No accepted common name	*Rhadine subterranea*	Y	Two subspecies are known from caves of McNeil/Round Rock, Cedar Park Karst Fauna Region, Georgetown, and Jollyville Karst Fauna Regions	No	The Study Area is outside of any karst fauna regions.
No accepted common name	*Xiphocentron messapus*	Y	Caddisflies in this Genus often utilize riparian and riverine habitats.	Yes	The habitat specifics for this species are unknown.
Mammals					
Aransas short-tailed shrew	*Blarina hylophaga plumbea*	Y	Excavates burrows in sandy soils underlying mottes of live oak trees or in areas with little to no ground cover.	No	No sandy soils under live oak trees are known in the Study Area.
big brown bat	*Eptesicus fuscus*	Y	Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.	Yes	Wooded areas are present in the Study Area and the species is common in cities where wooded areas are present.
big free-tailed bat	*Nyctinomops macrotis*	Y	Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore	No	Buildings and tree hollows are present in the Study Area and can provide suitable habitat for the species, but the species isn't known from Travis County.
cave myotis bat	*Myotis velifer*	Y	Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.	Yes	Old buildings, bridges, and cliff swallow nests are present in the Study Area.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
eastern red bat	*Lasiurus borealis*	Y	Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East	No	Woodlands are present in and adjacent to the Study Area.
eastern spotted skunk	*Spilogale putorius*	Y	Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.	Yes	There are wooded areas adjacent to the Study Area.
hoary bat	*Lasiurus cinereus*	Y	Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.	Yes	There are forested areas adjacent to the Study Area and Lady Bird Lake provides a waterway acting as a large, open flyway.
long-tailed weasel	*Mustela frenata*	Y	Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.	Yes	The Study Area includes bottomland hardwoods and Lady Bird Lake and its tributaries as a water source.
mountain lion	*Puma concolor*	Y	Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains and riparian zones.	No	The Study Area is highly urbanized without any mountain habitat for the species.
northern yellow bat	*Lasiurus intermedius*	Y	Occurs mainly along the Gulf Coast but inland specimens are not uncommon. Prefers roosting in Spanish moss and in the hanging fronds of palm trees. Common where this vegetation occurs. Found near water and forages over grassy, open areas. Males usually roost solitarily, whereas females roost in groups of several individuals.	Yes	Palm trees are present in and adjacent to the Study Area. Lady Bird Lake provides a water source and many adjacent lots and parkland can provide foraging areas.
swamp rabbit	*Sylvilagus aquaticus*	Y	Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.	Yes	The Study Area includes crossing floodplains, creeks and rivers which could provide habitat for the species.
western hog-nosed skunk	*Conepatus leuconotus*	Y	Habitats include woodlands, grasslands, and deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes.	No	No rocky canyons are present in the Study Area.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Mollusks					
Edwards Plateau liptooth	*Daedalochila gracilis*	Y	A terrestrial snail known from Comal, Kerr, Brandon, Medina, Real, and Uvalde counties.	No	The species is not known from Travis County.
No accepted common name	*Stygopyrgus bartonensis*	Y	A freshwater cave snail known only from Texas.	No	No caves or springs are known from the Study Area.
No accepted common name	*Patera leatherwoodi*	Y	A terrestrial snail known only from western Travis County.	No	The Study Area is not within the known range of the species.
No accepted common name	*Phreatodrobia punctata*	Y	A freshwater subterranean snail that is known from the Edwards-Trinty Aquifer system.	No	No springs or wells are known from the Study Area.
Plants					
arrowleaf milkvine	*Matelea sagittifolia*	Y	Most consistently encountered in thornscrub in South Texas; Perennial; Flowering March-July; Fruiting April-July and Dec?	No	The Primrary Resource Area is not within South Texas thornscrub habitat.
Buckley tridens	*Tridens buckleyanus*	Y	Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov	No	No rocky slopes are present in the Study Area.
canyon bean	*Phaseolus texensis*	Y	Narrowly endemic to rocky canyons in eastern and southern Edwards Plateau occurring on limestone soils in mixed woodlands, on limestone cliffs and outcrops, frequently along creeks. Flowering: May-Oct.	No	No rocky canyons occur within the Study Area.
canyon mock-orange	*Philadelphus texensis var. ernestii*	Y	Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October	No	No honeycomb limestone rimrock along mesic canyons is present in the Study Area.
canyon sedge	*Carex edwardsiana*	Y	Dry-mesic decidous and deciduous-juniper woodlands in canyons and ravines, usually in clay loams very high in calcium on rocky banks and slopes just above streams and stream beds. Carex edwardsiana usually grows near C. planostachys. Fruiting spring (Ball, Reznicek, and 2003).	No	No rocky banks and slopes in canyons and ravines are present in the Study Area.
Correll's false dragon-head	*Physostegia correllii*	Y	Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September	Yes	There are wet, silty clay loams along creek beds and drainages in the Study Area.
glandular gay-feather	*Liatris glandulosa*	Y	Occurs in herbaceous vegetation on limestone outcrops (Carr 2015). Flowering: July-Oct.	Yes	Limestone outcrops may occur in the Study Area.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Glass Mountains coral-root	*Hexalectris nitida*	Y	Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under *Juniperus ashei* in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept	No	There are no *Juniperus ashei* woodlands in the Study Area
gravelbar brickellbush	*Brickellia dentata*	Y	Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct	No	The Study Area crosses creeks, including Blunn Creek, that have frequently scoured gravelly alluvial beds, but they are heavily shaded.
Greenman's bluet	*Houstonia parviflora*	Y	Grass pastures. Feb- Apr. (Correll and Johnston 1970).	No	No pastures are present in the Study Area.
Heller's marbleseed	*Onosmodium helleri*	Y	Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May	No	No oak-juniper woodlands on rocky limestone slopes are present in the Study Area.
low spurge	*Euphorbia peplidion*	Y	Occurs in a variety of vernally-moist situations in a number of natural regions; Annual; Flowering Feb-April; Fruiting March-April	Yes	Vernally-moist habitats are present within the Study Area.
narrowleaf brickellbush	*Brickellia eupatorioides var. gracillima*	Y	Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; Perennial; Flowering/Fruiting April-Nov	No	The Study Area has moist to dry gravelly alluvium, including in Blunn Creek, but they are heavily shaded.
net-leaf bundleflower	*Desmanthus reticulatus*	Y	Mostly on clay prairies of the coastal plain of central and south Texas; Perennial; Flowering April-July; Fruiting April-Oct	No	No clay prairies are present within the Study Area.
Plateau loosestrife	*Lythrum ovalifolium*	Y	Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov	No	No sunny banks or gravelly beds of perennial streams are present in the Study Area.
plateau milkvine	*Matelea edwardsensis*	Y	Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June	No	No juniper-oak and oak-juniper woodlands are present in the Study Area.
rock grape	*Vitis rupestris*	Y	Occurs on rocky limestone slopes and in streambeds; Perennial; Flowering March-May; Fruiting May-July	No	No sunny rocky riverbanks or streambanks are present in the Study Area.
scarlet leather-flower	*Clematis texensis*	Y	Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; Perennial; Flowering March-July; Fruiting May-July	No	No oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams are present in the Study Area.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Stanfield's beebalm	*Monarda stanfieldii*	Y	Largely confined to granite sands along the middle course of the Colorado River and its tributaries; Perennial	No	No granite sands are present in the Study Area.
sycamore-leaf snowbell	*Styrax platanifolius ssp. platanifolius*	Y	Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-May; Fruiting May-Aug.	No	No oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams are present in the Study Area.
Texas almond	*Prunus minutiflora*	Y	Wide-ranging but scarce, in a variety of grassland and shrubland situations, mostly on calcareous soils underlain by limestone but occasionally in sandier neutral soils underlain by granite; Perennial; Flowering Feb-May and Oct; Fruiting Feb-Sept	No	No grassland or shrublands underlain by limestone are present in the Study Area.
Texas amorpha	*Amorpha roemeriana*	Y	Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; Perennial; Flowering May-June; Fruiting June-Oct	No	No juniper-oak woodlands or shrublands on rocky limestone slopes are present in the Study Area.
Texas barberry	*Berberis swaseyi*	Y	Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; Perennial; Flowering/Fruiting March-June	No	No shallow grasslands, shrublands, or canyons are present in the Study Area.
Texas fescue	*Festuca versuta*	Y	Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; Perennial; Flowering/Fruiting April-June	No	No mesic woodlands on stream terraces and canyon slopes are present in the Study Area.
Texas milkvetch	*Astragalus reflexus*	Y	Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June	Yes	Roadsides with calcareous and clay substrates are present in the Study Area.
Texas seymeria	*Seymeria texana*	Y	Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; Annual; Flowering May-Nov; Fruiting July-Nov	No	No grassy opening in juniper-oak woodlands are present in the Study Area.
tree dodder	*Cuscuta exaltata*	Y	Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct	Yes	Host species for this parasitic plant are present in the Study Area.
turnip-root scurfpea	*Pediomelum cyphocalyx*	Y	Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015).	No	No grasslands and openings in juniper-oak woodlands are present in the Study Area.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
Warnock's coral-root	*Hexalectris warnockii*	Y	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years	No	No oak-juniper woodlands on limestone slopes are present in the Study Area.
Wright's milkvetch	*Astragalus wrightii*	Y	On sandy or gravelly soils; Flowering/fruiting: April and May	No	No sandy and gravelly soils are present in the Study Area.
Reptiles					
eastern box turtle	*Terrapene carolina*	Y	Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.	Yes	Forest-field ecotones occur adjacent to the Study Area and pools of water occur adjacent to and within the Study Area.
plateau spot-tailed earless lizard	*Holbrookia lacerata*	Y	Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999).	Yes	There are cleared and disturbed areas present in the Study Area.
slender glass lizard	*Ophisaurus attenuatus*	Y	Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.	No	No habitats with sandy soils occur in the Study Area.
Texas garter snake	*Thamnophis sirtalis annectens*	Y	Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.	Yes	Modified open areas in the vicinity of aquatic features are present in the Study Area.
Texas map turtle	*Graptemys versa*	Y	Aquatic: Primarily a river turtle but can also be found in reservoirs. Can be found in deep and shallow water with sufficient basking sites (emergent rocks and woody debris).	Yes	Lady Bird Lake is a reservoir and the Study Area has sufficient basking sites.

Common Name	Scientific Name	SGCN	Habitat Description	Suitable Habitat within Study Area	Determination
western box turtle	*Terrapene ornata*	Y	Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.	Yes	Open woodlands are adjacent to the Study Area and water sources are present throughout.

Source: Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs. TPWD County Lists of Protected Species and Species of Greatest Conservation Need. [Travis County revised September 01, 2023.] Accessed May 22, 2024. https://tpwd.texas.gov/gis/rtest/.

Attachment C. Balcones Canyonlands Conservation Plan Species of Concern

Common Name	Scientific Name	BCCP Species of Concern	Habitat Description	Suitable Habitat within Study Area	Determination
Arachnids					
Bandit Cave spider	*Cicurina bandida*	Y	Very small, subterrestrial, subterranean obligate meshweaver species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina cueva*	N	Very small, subterrestrial, subterranean obligate meshweaver species. Recommended synonymizing under *C. bandida* (Paquin et al. 2008).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina ellioti*	Y	Very small, subterrestrial, subterranean obligate meshweaver species. This species is now synonymous with *C. buwata* (Cokendolpher 2004).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina reddelli*	Y	Very small, subterrestrial, subterranean obligate meshweaver species. Recommended synonymizing with *C. wartoni* and *C. travisae* (Hedin 2014, as cited in USFWS 2014).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina reyesi*	Y	Very small, subterrestrial, subterranean obligate meshweaver species. Recommended synonymizing under *C. bandida* (Paquin et al. 2008).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina travisae*	Y	A cave obligate meshweaver. Recommended synonymizing with *C. reddelli* and *C. wartoni* (Hedin 2014, as cited in USFWS 2014).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Cicurina wartoni*	Y	Very small, subterrestrial, subterranean obligate meshweaver species. Known from only a single cave on private land. Recommended synonymizing with *C. reddelli* and *C. travisae* (Hedin 2014, as cited in USFWS 2014).	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tayshaneta (=Neoleptoneta) concinna*	Y	A cave obligate spider.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tayshaneta(=Neoleptoneta) devia*	Y	A cave obligate spider.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Eidmannella reclusa*	Y	A cave obligate spider.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.

Common Name	Scientific Name	BCCP Species of Concern	Habitat Description	Suitable Habitat within Study Area	Determination
No accepted common name	*Aphrastochthonius* N. S.	Y	A cave obligate pseudoscorpion.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris comanche*	Y	A cave obligate pseudoscorpion.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris reddelli*	Y	A cave obligate pseudoscorpion.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris intermedia*	Y	A cave obligate pseudoscorpion.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Tartarocreagris* N. S. 3	Y	A cave obligate pseudoscorpion.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Texella comanche*	Y	A subterrestrial, obligate harvestman species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Texella spinoperca*	Y	A subterrestrial, obligate harvestman species.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
Crustaceans					
No accepted common name	*Candona sp. nr. stagnalis*	Y	A groundwater ostracod	No	There is no groundwater or wells in the Study Area.
No accepted common name	*Caecidotea reddelli*	Y	A groundwater isopod	No	There is no groundwater or wells in the Study Area.
No accepted common name	*Trichoniscinae N. S.*	Y	A groundwater isopod	No	There is no groundwater or wells in the Study Area.
No accepted common name	*Miktoniscus N. S.*	Y	A groundwater isopod	No	There is no groundwater or wells in the Study Area.
Insects					
No accepted common name	*Speodesmus* N. S.	Y	A cave adapted millipede.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.

Common Name	Scientific Name	BCCP Species of Concern	Habitat Description	Suitable Habitat within Study Area	Determination
No accepted common name	*Rhadine austinica*	Y	Known from caves in the Rollingwood Karst Fauna Region.	No	The Study Area is outside of the Rollingwood Karst Fauna Region.
No accepted common name	*Rhadine mitchelli*	Y	A cave adapted ground beetle.	No	The Study Area is partially located within Karst Zone 3b, but it is not within any karst fauna region.
No accepted common name	*Rhadine subterranea*	Y	Two subspecies are known from caves of McNeil/Round Rock, Cedar Park Karst Fauna Region, Georgetown, and Jollyville Karst Fauna Regions	No	The Study Area is outside of any karst fauna region.
Canyon mock orange	*Philadelphus ernestii*		Texas endemic; usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering Apr-Jun, fruit dehiscing Sep-Oct.	No	The Study Area is highly urbanized and does not contain any outcrops of limestone exposed as rimrock along mesic canyons in mixed woodlands.
Texabama croton	*Croton alabamensis* var. *texensis*		Texas endemic; in duff-covered loamy clay soils on rocky slopes in forested, mesic limestone canyons; locally abundant on deeper soils on small terraces in canyon bottoms, often forming large colonies and dominating the shrub layer; scattered individuals are occasionally on sunny margins of such forests; also found in contrasting habitat of deep, friable soils of limestone uplands, mostly in the shade of evergreen woodland mottes; flowering late Feb-Mar; fruit maturing and dehiscing by early Jun.	No	The Study Area is highly urbanized and does not contain any duff-covered loamy clay soils on rocky slopes in forested canyons, limestone uplands, or woodland mottes.