Austin Transit Partnership

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Austin Light Rail Phase 1 Project

Water Resources Technical Report

Austin, TX

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Acronyms and Abbreviations

Term/Acronym	Definition
ATP	Austin Transit Partnership
BSEACD	Barton Springs Edwards Aquifer Conservation District
CFR	Code of Federal Regulations
CEF	critical environmental feature
City	City of Austin
DEIS	Draft Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FTA	Federal Transit Administration
GIS	Geographic Information System
ID	Identification
MS4	Municipal Separate Storm Sewer System
Project	Austin Light Rail Phase 1 Project
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TMDL	total maximum daily load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
WOTUS	Waters of the United States

1 Introduction

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 water resources technical report was prepared to support the Project's Draft Environmental Impact Statement (DEIS) 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 provides a general description of water resources (i.e., surface waters, water quality, stormwater, safe drinking water, groundwater, and floodplains) and assesses potential effects relevant to the Project. In addition, this report identifies measures to mitigate potential effects based on currently available preliminary engineering information. The Study Area considered for water resources is based on the limits of Project construction.

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 Clean Water Act

2.1.1.1 Section 404

Section 404 of the Clean Water Act requires authorization from the U.S. Army Corps of Engineers (USACE) for discharges of dredged and fill material into jurisdictional waters of the U.S. (WOTUS), including wetlands. USACE's determination of jurisdictional WOTUS is based on the definition of WOTUS that is considered consistent with the pre-2015 regulatory regime and the U.S. Supreme Court's May 25, 2023, decision from *Sackett* v. *Environmental Protection Agency*. When design has advanced, ATP would coordinate with USACE to determine whether a Nationwide Permit or an Individual Permit is required.

2.1.1.2 Section 401

As part of Section 404 compliance, Section 401 of the Clean Water Act gives the Texas Commission on Environmental Quality (TCEQ) the authority to regulate and enforce the discharge of pollutants into WOTUS, including wetlands. Tier I projects are those that affect less than 1,500 linear feet of stream, affect less than 3 acres of WOTUS, and do not affect rare and ecologically significant wetlands. Tier II projects are those that affect greater than 1,500 linear feet of stream or greater than 3 acres of WOTUS (TCEQ 2023a). Tier I and Tier II projects require the use of TCEQ-approved best management practices, whereas Tier II projects also require an individual certification review by TCEQ (EPA 2023a).

2.1.1.3 Section 402

Section 402 of the Clean Water Act established a National Pollutant Discharge Elimination System permit program and specifies that a National Pollutant Discharge Elimination System permit is required to control discharges of pollutants to surface waters as well as for any storm water discharge associated with industrial activity (EPA 2023b).

In accordance with Section 402 of the Clean Water Act, the State of Texas maintains permitting authority under the National Pollutant Discharge Elimination System. TCEQ's Texas Pollutant Discharge Elimination System (TPDES) program has federal regulatory authority over discharges of pollutants to Texas surface waters, with the exception of discharges associated with oil, gas, and geothermal exploration and development activities, which are regulated by the Railroad Commission of Texas (TCEQ 2023b). Stormwater discharges are considered a point source of pollutants during construction and require permitting under TPDES. TPDES permits require that a project develop and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to and during construction activities. The TCEQ TPDES General Construction Permit (TXR150000) applies to small construction activities that disturb between 1 and 5 acres and large construction activities that disturb 5 acres or more (TCEQ 2023a). In addition, the Multi-Sector General Permit (TXR050000) authorizes stormwater discharges from industrial facilities associated with manufacturing, processing, material storage, and waste material disposal areas (TCEQ 2023c). Under Section 402 of the Clean Water Act, local responsibility and authority for compliance may be delegated through an appropriate TPDES Permit to a local Municipal Separate Storm Sewer System (MS4) operator, which for the Project is the City of Austin (City). The City's MS4 permit is a direct requirement of the Clean Water Act. Compliance with City requirements per Land Development Code Chapter 25-8 allows the City to continue to discharge stormwater into the storm system rather than processing it through the sanitary sewer. Compliance with Land Development Code Chapter 25-8 will allow the City to remain in compliance with its MS4 permit.

2.1.1.4 Section 303(d)

Section 303(d) of the Clean Water Act requires states to identify waterbodies that do not meet federal water quality standards. In Texas, TCEQ must develop Total Maximum Daily Loads (TMDLs) for pollutants that exceed water quality standards in those waterbodies. A TMDL establishes the maximum amount of a pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality (EPA 2023c). According to the Clean Water Act, waters not meeting their intended use are listed as impaired waterbodies in reference to Section 303(d) of the Clean Water Act.

To document impaired waters, TCEQ developed the Texas Integrated Report Index of Water Quality Impairments (TCEQ 2020). The report describes the status of the state's waters, as required by Sections 305(b) and 303(d) of the Clean Water Act. It summarizes the condition of the state's surface waters, including concerns for public health, fitness for use by aquatic species and other wildlife, and specific pollutants and their possible sources. The report classifies the assessed waterbodies by Segment Identification (ID) and name, which describes the specific area within a waterbody that is not in compliance. If a waterbody is in compliance with water quality standards but data show declining water quality trends, indicating the

waterbody may be impaired in the future, the waterbody may be considered threatened. The 2020 report was approved by EPA on May 12, 2020 (TCEQ 2020).

2.1.2 Rivers and Harbors Act of 1899

USACE has statutory authority under Section 10 of the Rivers and Harbors Act to regulate the construction of any structure in or over a navigable WOTUS (EPA 2023c). In addition, a Section 10 permit is required for any structure or work that affects the course, location, or condition of the navigable waterbody.

2.1.3 Executive Order 11990, Protection of Wetlands, 1977

For projects that are undertaken, financed, or assisted by federal agencies, potential effects on wetlands not determined to be WOTUS are regulated under Executive Order 11990, Protection of Wetlands. Wetlands are defined by USACE as areas that, due to a combination of hydrologic and soil conditions, are capable of supporting hydrophytic vegetation. The objective of Executive Order 11990 is to minimize the destruction, loss, or degradation of wetlands while enhancing and protecting the natural and beneficial values. This Executive Order requires federal agencies to avoid or minimize effects on these resources.

2.1.4 Executive Order 11988, Floodplain Management, 1977

Executive Order 11988 requires projects that are undertaken, financed, or assisted by federal agencies to avoid, to the extent possible, the long- and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

2.1.5 Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, 2021

Executive Order 13690 establishes a federal flood risk management standard and a process for further soliciting and considering stakeholder input. It aims to ensure that agencies expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk as well as ensure that projects funded with taxpayer dollars last as long as intended. This Executive Order amends Executive Order 11988, Floodplain Management.

2.1.6 Federal Emergency Management Agency, National Flood Insurance Program, National Flood Insurance Act, 1968

The Federal Emergeny Management Agency (FEMA) manages the National Flood Insurance Program, a program that makes federally backed flood insurance available in those states and communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. These ordinances must meet or exceed federal standards in order to receive future federal financial assistance. The program of flood insurance coverage and floodplain management administered under the National Flood Insurance Act and applicable

federal regulations are promulgated in the Code of Federal Regulations (CFR), Title 44, Subchapter B.

The National Flood Insurance Program also requires participating communities to restrict development in areas prone to flooding and to require that construction of new or substantially improved buildings will minimize or prevent flood damage (FEMA 2020). The National Flood Insurance Program regulatory standards are minimum requirements for floodplain management (44 CFR 60, Criteria for Land Management and Use). Any state or community can adopt more comprehensive and restrictive floodplain management regulations to protect life and property from flooding. Within Texas, the Texas Water Development Board (TWDB) is tasked as the state agency responsible for coordinating the National Flood Insurance Program (Texas Department of Public Safety 2023).

2.1.7 U.S. Environmental Protection Agency, Safe Drinking Water Act, 1974, including Sole Source Aquifer Protection Program

The Safe Drinking Water Act, amended in 1986 and 1996 (42 United States Code 300f et seq.), was developed to protect public health by regulating the nation's public drinking water supply. The Safe Drinking Water Act authorizes EPA to set standards for drinking water quality and then oversee states' implementation of programs to protect water quality. The Safe Drinking Water Act protects drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells; however, it does not regulate private wells serving less than 25 individuals (EPA 2023d). EPA adopts rules under the Safe Drinking Water Act, and the State of Texas must adopt regulations of the same standard. The rules and regulations for public water systems are established by TCEQ in 30 Texas Administrative Code (TAC) Chapter 290 (TCEQ 2023d).

TCEQ created the Source Water Assessment and Protection Program to fulfill the 1996 Amendments to the Safe Drinking Water Act requirements to assess public drinking water sources for susceptibility to certain chemical constituents (TCEQ 2023e).

2.1.8 U.S. Department of Transportation Order 5650.2, Floodplain Management and Protection, 1979

U.S. Department of Transportation Order 5650.2, Floodplain Management and Protection, establishes policies and procedures for transportation projects regarding effects on floodplains (U.S. Department of Transportation 1979). State and federal transportation agencies are expected to avoid and minimize, where practicable or reasonable, adverse effects on floodplains. These agencies are also required to restore and preserve natural and beneficial floodplain functions that are adversely affected by transportation projects. U.S. Department of Transportation Order 5650.2 also prohibits or restricts substantial encroachment of floodplains (floodplain development) that may increase the probability that there would be a loss of human life, likely future damage, or interruption of service to or loss of a vital transportation facility, or a notably adverse effect on natural and beneficial floodplain functions (FTA 2015). Encroachment, defined for the purposes of floodplain management, includes new construction, improvements, and fill and other activities within the regulated floodplain boundary (FEMA 2023a).

U.S. Department of Transportation Order 5650.2 requires that there is an opportunity for public review and comment for any action that is proposed within the base floodplain elevation area or Special Flood Hazard Areas, areas prone to flooding for which communities have established floodplain regulations and development restrictions. This opportunity for public involvement should include public hearing presentations that identify unavoidable floodplain encroachments, measures taken to minimize effects on floodplains, and planned mitigation (FEMA 2023a).

2.2 State of Texas Regulations

2.2.1 Texas Administrative Code, Title 30, Chapter 292, Subchapter A

Under 30 Texas Administrative Code Chapter 292, Subchapter A (November 28, 2002), TCEQ has the continuing rights of supervision of districts and authorities created under Article III, Section 52 and Article XVI, Section 59 of the Texas Constitution. These authorities, identified in the Texas Water Code, Section 9.010, shall report to the Texas Water Advisory Council.

2.2.2 Texas Parks and Wildlife Code, Chapter 86, Marl, Sand, Gravel, Shell, and Mudshell, 1975

If a stream/creek is perennial or is more than 30 feet wide between the banks, the state claims the bed and the sand and gravel in it as state-owned. A “Sand and Marl” permit from the Texas Parks and Wildlife Department (TPWD) is required to “disturb or take” streambed materials from a streambed claimed by the state. Pursuant to the Texas Parks and Wildlife Code, Chapter 86, Subtitle F, the Texas Parks and Wildlife Commission shall manage, control, and protect marl and sand of commercial value and all gravel, shell, and mudshell located within tidewater limits of the state, and on islands within those limits and within the freshwater areas of the state not embraced by a survey of private land, and on islands within those areas. In some cases, the Texas General Land Office may need to be contacted to determine whether the state claims a streambed.

2.2.3 Texas Water Code, Chapter 36

Texas groundwater conservation districts were created by the Texas Legislature to preserve and protect groundwater and are granted authority in Texas Water Code, Chapter 36 (1995). Texas has 100 established groundwater conservation districts that are authorized with responsibilities to manage groundwater resources. In coordination with surface water management entities, each groundwater conservation district is required to develop groundwater management plans to address management goals. TWDB assists groundwater conservation districts in the development of management plans and provides final approval of plans (TWDB 2021a). Other than coordinating with regional planning groups to develop groundwater management plans, the primary duties of each groundwater conservation district include permitting and registering groundwater wells and adopting and enforcing rules to implement the plan.

2.2.4 Texas Commission on Environmental Quality, Edwards Aquifer Protection Program

TCEQ 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 (TCEQ 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 still apply in regulated zones.

2.3 City of Austin Regulations

2.3.1 Barton Springs Edwards Aquifer Conservation District

The Barton Springs Edwards Aquifer Conservation District (BSEACD) is governed by Texas Water Code, Chapter 36. The BSEACD was created in 1987 with a directive to conserve, protect, and enhance the groundwater resources in its jurisdictional area. It regulates new groundwater wells for uses such as commercial, industrial, public water supply, or irrigation and implements drought management programs (BSEACD 2023a). Portions of the project south of Lady Bird Lake are located within the BSEACD.

2.3.2 City of Austin Code and Criteria

The City has established rules to protect critical environmental features (CEFs), defined as springs and seeps, wetlands, point recharge features (e.g., sinkholes), bluffs, canyon rimrocks, and other naturally occurring features related to aquifer recharge, discharge, and/or surface-groundwater interaction. Pursuant to the City's Land Development Code, an Environmental Resource Inventory report documenting CEFs is required for proposed development located on a tract within the Edwards Aquifer recharge or contributing zone (with boundaries defined by the City based on mapped surface geology), within the Drinking Water Protection Zone, containing a water quality transition zone, containing a critical water quality zone, containing the 100-year floodplain, or with a gradient of more than 15 percent where present in the Study Area.

Per the City's Land Development Code and Environmental Criteria Manual, CEFs must be protected to prevent the loss or contamination of aquifer recharge and maintain the water quality in the aquifers. To protect CEFs, a buffer radius must be established. The standard buffer distance for all CEFs is 150 feet from the center point of the feature with a maximum of 300 feet for point recharge features; however, they may be reduced depending on the CEF. Generally, the buffer distances would be determined after an intensive CEF survey is completed and through coordination with the City's Watershed Protection Department. Additional information on the point recharge features, bluffs, and canyon rimrocks can be found in **DEIS Appendix F-3**. For the purposes of this report, specific Drinking Water Protection Zones and CEFs are defined below.

2.3.2.1 Critical Water Quality Zone and Erosion Hazard Zone

The critical water quality zone, established by the City's Land Development Code, restricts development around certain streams. In the urban watershed where this Project is proposed, the critical water quality zone is consistent with the 100-year floodplain boundary bounded by a minimum and maximum buffer width measured from each side of the stream centerline. For urban watersheds, such as where the Project is located, the minimum width is 50 feet, and the maximum width is 400 feet. An Erosion Hazard Zone provides a boundary that is intended to be protective of resulting stream erosion that could happen in the future. The City's Drainage Criteria Manual provides criteria in evaluating the potential effect from erosion for proposed development near defined waterways.

2.3.2.2 Water Quality Transition Zone

The water quality transition zone is an area adjacent and parallel to the outer boundary of the critical water quality zone established by the City's Land Development Code. These zones vary in width depending on the waterway, as follows:

- **Minor waterways:** 100 feet
- **Intermediate waterways:** 200 feet
- **Major waterways:** 300 feet

The water quality transition zone applies only to water supply rural watersheds, water supply suburban watersheds, and in the Barton Springs Zone, excluding the shorelines on Lake Austin, Lake Travis, and Lady Bird Lake. Per the City's Land Development Code, development in a water quality transition zone that lies over the Edwards Aquifer recharge zone is prohibited except for certain developments and minor drainage facilities or water quality controls necessary to treat the allowed development.

2.3.2.3 Springs and Seeps

Springs and seeps are points or zones where groundwater discharges with enough flow to be measurable, create a pool, or maintain a hydrophytic plant community. A hydrophytic plant community is a plant community dominated by plants that grow in water or very wet soil.

2.3.2.4 Wetlands

Wetlands are saturated areas where aquatic systems transition to terrestrial systems. The water table in these areas is typically at or near the surface, and shallow water may be present. The determination of wetlands is completed following USACE protocols and City requirements (Environmental Criteria Manual Section 1.10.3), as outlined in Section 3.1.

2.3.2.5 Floodplains

Portions of the project in City-regulated floodplains would follow requirements in the City's Land Development Code. Additional federal floodplain management requirements are included in Section 2.1.

2.3.2.6 Stormwater

Stormwater control measures such as detention ponds, open channels, and storm drains substantially reduce downstream flooding, reduce sediment and pollutant loads, and provide debris removal which can benefit water quality. Such control measures provide temporary storage of stormwater runoff during peak rates of runoff. Runoff is then released at a controlled rate that cannot exceed the capacities of the existing downstream drainage systems and/or the predeveloped peak runoff rate of the system, whichever is less. Stormwater management requirements are included in the City's Land Development Code and Drainage Criteria Manual. Additional federal stormwater management requirements are included in Section 2.1.

3 Methodology

The Study Area for the water resources assessment is the limits of the Project, which include the 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 surface waters, water quality, stormwater, safe drinking water, groundwater, and floodplains 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. Tables were included when variances in data among the Design Options were noted during the investigation.

3.1 Surface Waters

On August 29, 2023, EPA and the Department of the Army issued a final rule to amend the final "Revised Definition of 'Waters of the United States'" rule, which was published on January 18, 2023 (33 CFR 328; 40 CFR 120; 88 Federal Register 3004). The January 2023 final rule did not conform to the definition of "waters of the United States" in the U.S. Supreme Court's May 25, 2023, decision from *Sackett* v. *Environmental Protection Agency*. Because parts of the January 2023 Rule were invalid under the Supreme Court's interpretation of the Clean Water Act resulting from the *Sackett* decision, key aspects of regulations were amended to conform to the *Sackett* decision. Subsequently, a conforming rule was published and became effective on September 8, 2023 (88 Federal Register 61964). In addition, due to ongoing litigation, the January 2023 Rule is not currently operative for certain states, including Texas. The January 2023 Rule, as amended by the conforming rule, was implemented in 23 states, the District of Columbia, and the U.S. Territories. In the other 27 states (including Texas), "waters of the U.S." are considered consistent with the pre-2015 regulatory regime and the Supreme Court's decision in *Sackett* until further notice.

As defined by the Clean Water Act and pre-2015 regulatory guidance, potential jurisdictional surface WOTUS include the following (40 CFR 120.2; 33 United States Code 1251):

- All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide and their tributaries;

- All interstate waters including interstate wetlands (all rivers, lakes, and other waters that flow across or form part of state boundaries) and their tributaries;
- All waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, in use, degradation or destruction of which would affect interstate or foreign commerce and their tributaries;
- All impoundments of waters otherwise defined as WOTUS. under the definition and their tributaries; and
- Wetlands adjacent (bordering, contiguous, or neighboring) to the above-mentioned waters (other than waters that are themselves wetlands).

Streams are classified by USACE as follows:

- **Ephemeral stream.** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.
- **Intermittent stream.** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.
- **Perennial stream.** A perennial stream has flowing water year-round during a typical year. The water table is located above the streambed most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Lakes, ponds, and impoundments are open bodies of water formed naturally or by artificial means (constructed for industrial and agricultural uses, power generation, domestic water supply, or aesthetic or recreation purposes [USACE 2020]). For the purposes of this analysis, ponds and lakes are considered separately.

Wetlands are defined by USACE as areas that have sufficient water for sufficient duration to support hydrophytic vegetation (Environmental Laboratory 1987). The wetland classification system developed by Cowardin et al. (1979) includes three primary wetland types:

- Emergent, typically dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This wetland vegetation is present for most of the growing season in most years. Perennial plants generally dominate emergent wetlands.
- Scrub/shrub dominated by woody vegetation less than 20 feet tall. Wetland species may include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.
- Forested, dominated by woody vegetation with a minimum height of 20 feet and at least 30 percent canopy cover.

Wetlands are identified based on three technical parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. TPWD Ecological Mapping Systems of Texas data were used to assess hydrophytic vegetation types within the Study Area that are typically associated with surface water features. These vegetation types are useful in identifying areas that may require further investigation for the presence of potential jurisdictional wetlands. Soils are an important factor when analyzing the potential presence of wetlands because certain areas mapped by the soil survey indicate a general likelihood that hydric soils may be found within a given area. Hydrology is related to the physical setting of the wetland and is influenced by precipitation, surface water flow, groundwater flow, and evapotranspiration. The inflow and outflow of water of a wetland interact to create the hydrology of a wetland.

The Study Area for surface waters encompasses the Build Alternative, defined as the construction area (i.e., the right-of-way, easements, and staging areas) for the Build Alternative. In addition, wetlands were assessed within an additional 150-foot buffer in compliance with the City's Environmental Criteria Manual. A desktop analysis of surface waters was conducted to identify potential jurisdictional WOTUS within the Study Area using the following publicly available data sources:

- Aerial photography (recent and historical) (Google Earth 2017, 2019, 2021);
- TWDB Geographic Information System (GIS) data to identify river basins (2021a);
- TPWD's Ecological Mapping Systems of Texas to assist in determining vegetation associated with surface water features (2023);
- U.S. Geological Survey 7.5-minute Quadrangle Topographic Maps (2019a);
- U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey Reports to identify hydric soils (2019);
- U.S. Fish and Wildlife Service National Wetlands Inventory maps to identify mapped wetlands and deepwater habitats (2023);
- U.S. Geological Survey National Hydrography Dataset to identify mapped watershed drainage networks, including rivers, streams, canals, lakes, ponds, coastline, and dams (2023); and
- City of Austin Watershed Protection Wetland Dataset (2023).

Using desktop findings, a field reconnaissance was performed on March 10-11 and November 10-11, 2021, to identify the presence and locations of WOTUS, including wetlands, within the original Orange and Blue Line project areas. Additional desktop work was performed and field investigations conducted on March 20, 2024, for the current Study Area, the results of which are described in Section 4.1.2 and 4.1.3 of this report. Fieldwork for the current Study Area was conducted within the publicly accessible right-of-way except where noted below. The boundaries of WOTUS, including wetlands, were mapped with a Global Positioning System capable of sub-meter accuracy. Surface water features were visually assessed at the ordinary high-water mark, which is typically indicated by signs of natural lines impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; presence of litter

and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; change in plant community; and/or other appropriate means that consider the characteristics of the surrounding areas.

3.2 Water Quality

Water quality is a measure of the suitability of a waterbody to be used for a particular purpose based on its chemical, physical, and biological characteristics. Surface water quality can be affected by increased pollutant discharges (sediments, nutrients, bacteria, and petroleum products) from construction activities and changes in hydrology and hydraulics. A watershed is an area of land that drains streams and rainfall to a common surface water outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel (U.S. Geological Survey 2019b).

The Study Area for the water quality analysis encompasses multiple geographies varying in size as discussed below:

- **Watershed analysis.** The Study Area for watersheds encompasses the watersheds and subwatersheds that the Build Alternative transects.
- **Impaired waters assessment.** The Study Area for impaired waters encompasses the Build Alternative extent.

A desktop analysis was conducted to identify potential water quality concerns within the Study Area using the following publicly available data sources:

- TWDB GIS data to identify watersheds within a specified search radius (TWDB 2021b);
- TCEQ's GIS Data Hub to identify Section 303(d) impaired waters within a specified search radius (TCEQ 2021); and
- 2020 Texas Integrated Report Index of Water Quality Impairments (TCEQ 2020).

3.3 Stormwater

The Study Area for the stormwater analysis encompasses the Build Alternative extent. A desktop analysis was conducted to identify potential stormwater effects within the Study Area using sources described in Section 3.1 and Section 3.2. Much of the Project is located within heavily urbanized areas with existing impervious cover.

3.4 Safe Drinking Water

The Project overlays the Edwards and Trinity Aquifers; therefore, surface water quality interacts directly with groundwater quality. The Edwards Aquifer is a karst aquifer that contains fractures, caves, sinking streams, and sinkholes that act as conduits to the aquifer from the surface. This means that any surface pollution from stormwater runoff or spills can directly affect the water quality of the aquifer, possibly impairing drinking water and affecting the sensitive ecosystem (TCEQ 2023f).

The Study Area for the safe drinking water analysis encompasses the Build Alternative. A desktop analysis was conducted to identify potential safe drinking water concerns within the Study Area using the following publicly available data sources:

- TWDB GIS data to identify public supply wells within a specified search radius (TWDB 2021b);
- TCEQ's GIS Data Hub to identify Edwards Aquifer data and public supply wells within specified search radii (TCEQ 2021); and
- BSEACD's Aquifer Science web page (BSEACD 2023b).

3.5 Groundwater

The Study Area for the groundwater analysis encompasses the Build Alternative. A desktop analysis was conducted to identify potential groundwater concerns within the Study Area using the following publicly available data sources:

- TWDB GIS data to identify groundwater conservation districts and groundwater wells within specified search radii (TWDB 2021b); and
- U.S. Fish and Wildlife Service's Karst Zone Data and Mapping Application (U.S. Fish and Wildlife Service 2018).

3.6 Floodplains

The Study Area for floodplains and flood zones encompasses the Build Alternative. A desktop analysis was conducted to identify floodplains within the Study Area using the following publicly available data sources:

- FEMA digital Flood Insurance Rate Maps; and
- FEMA Flood Map Service Center (FEMA 2023b).

Floodplains are defined as areas adjacent to a river, formed by the repeated overflow of the natural channel bed, and are used in a general sense to mean the area most prone to flooding, mapped or not (Blanchard 2008).

4 Affected Environment

4.1 Surface Waters

4.1.1 River Basins

According to TWDB, the Study Area is within the Colorado River Basin, the third-largest river basin in Texas. The Colorado River is the sixth-largest river in Texas by average annual flow volume. Lady Bird Lake, an impoundment of the Colorado River, is transected by the Study Area. A review of U.S. Geological Survey 7.5-minute topographic quadrangle maps for Austin East, Texas (November 2023); Austin West, Texas (November 2023); Montopolis, Texas (November 2023); and Oak Hill, Texas (November 2023) identify multiple streams within the Study Area including Blunn Creek, Lady Bird Lake, East Bouldin Creek, Country Club Creek,

Carson Creek, and multiple tributaries. The highest elevation within the Study Area is in the northern limits of the Project at approximately 615 feet above mean sea level. The lowest elevation within the Study Area occurs at approximately 430 feet above mean sea level (the elevation of Lady Bird Lake).

4.1.2 Stream Features

A desktop review of the Study Area was performed to identify the potential presence of WOTUS. Available National Hydrography Dataset data were used to identify the occurrence of potential stream features, and aerial imagery at the highest resolution available was used to confirm presence. According to the National Hydrography Dataset data, nine streams are mapped within the Study Area. The stream features are listed from north to south in **Table 1** and **Table 2** and depicted on **Figure 1** through **Figure 6**. Additionally, the Study Area intersects the critical water quality zone in multiple locations.

Table 1: Stream Features Within the Study Area

Stream Name	Field ID	Stream Type	Average/ Estimated OHWM (feet)	Linear Feet [a]	Figure Number
Colorado River (Lady Bird Lake)	S-01	Perennial (Impounded)	530	234.7	2
East Bouldin Creek	S-02	Intermittent	20	427.4	3
Blunn Creek	S-03	Intermittent	18	200.7	3, 4
Unnamed Tributary to Colorado River	S-04	Intermittent	10	758.7	4
Country Club Creek West	S-05	Intermittent	19	229.8	4,5
Country Club Creek West-1	S-06	Intermittent	6	204.2	5
Country Club Creek East-3	S-07	Intermittent	4	249.0	5
Country Club Creek East	S-08	Intermittent	6	260.7	5
Country Club Creek East-4	S-09	Intermittent	12	352.5	5
Carson Creek Montopolis Tributary	S-10	Intermittent	8	157.6	6
Carson Creek	S-11	Intermittent	12	1,160.6	6
Carson Creek Overflow Tributary	S-12	Intermittent	8	2,012.7	6
Total	--	--	--	6,248.5	--

Source: U.S. Geological Survey 2023.

[a] The linear footage of these features is based on U.S. Geological Survey (2023), City of Austin (2023), and aerial interpretation because not all properties were accessible.

Table 2. Stream Features Within Study Area by Build Alternative and Design Option

Stream Name	ID	Build Alternative Area (ft)	Design Option Area (ft)						Figure Number
			Woolridge Square Station	Cesar Chavez Station	Lady Bird Lake Bridge Extension	Travis Heights Station	Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside	Grove Station	
Colorado River (Lady Bird Lake)	S-01	234.7	234.7	234.7	234.7	234.7	234.7	234.7	2
East Bouldin Creek	S-02	427.4	427.4	427.4	294.6	427.4	427.4	427.4	3
Blunn Creek	S-03	200.7	200.7	200.7	169.9	192.1	200.7	200.7	3, 4
Unnamed Tributary to Colorado River	S-04	758.7	758.7	758.7	758.7	758.7	758.7	758.7	4
Country Club Creek	S-05	229.8	229.8	229.8	229.8	229.8	229.8	229.8	4, 5
Unnamed Tributary to Country Club Creek	S-06	204.2	204.2	204.2	204.2	204.2	204.2	204.2	5
Unnamed Tributary to Country Club Creek	S-07	249.0	249.0	249.0	249.0	249.0	249.0	139.3	5

Stream Name	ID	Build Alternative Area (ft)	Design Option Area (ft)						Figure Number
			Woolridge Square Station	Cesar Chavez Station	Lady Bird Lake Bridge Extension	Travis Heights Station	Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside	Grove Station	
Unnamed Tributary to Country Club Creek	S-08	260.7	260.7	260.7	260.7	260.7	260.7	162.3	5
Unnamed Tributary to Country Club Creek	S-09	352.5	352.5	352.5	352.5	352.5	352.5	228.5	5
Unnamed Tributary to Country Club Creek	S-10	157.6	157.6	157.6	157.6	157.6	157.6	157.6	6
Carson Creek	S-11	1,160.6	1,160.6	1,160.6	1,160.6	1,160.6	1,160.6	1,160.6	6
Unnamed Tributary to Carson Creek	S-12	2,012.7	2,012.7	2,012.7	2,012.7	2,012.7	2,012.7	2,012.7	6

Figure 1: Surface Waters and Floodplains within the Study Area (Map 1 of 6)

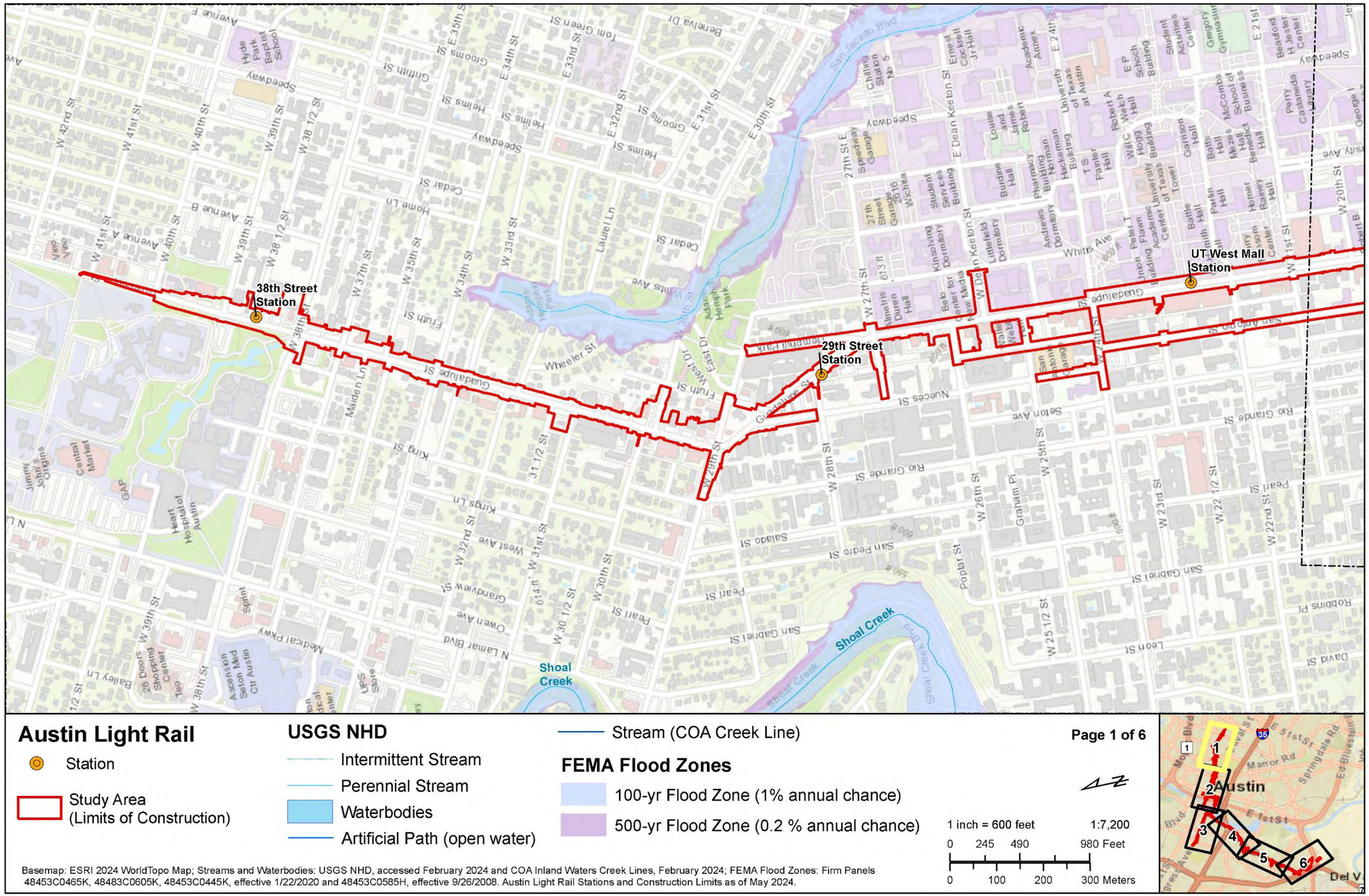


Figure 2: Surface Waters and Floodplains within the Study Area (Map 2 of 6)

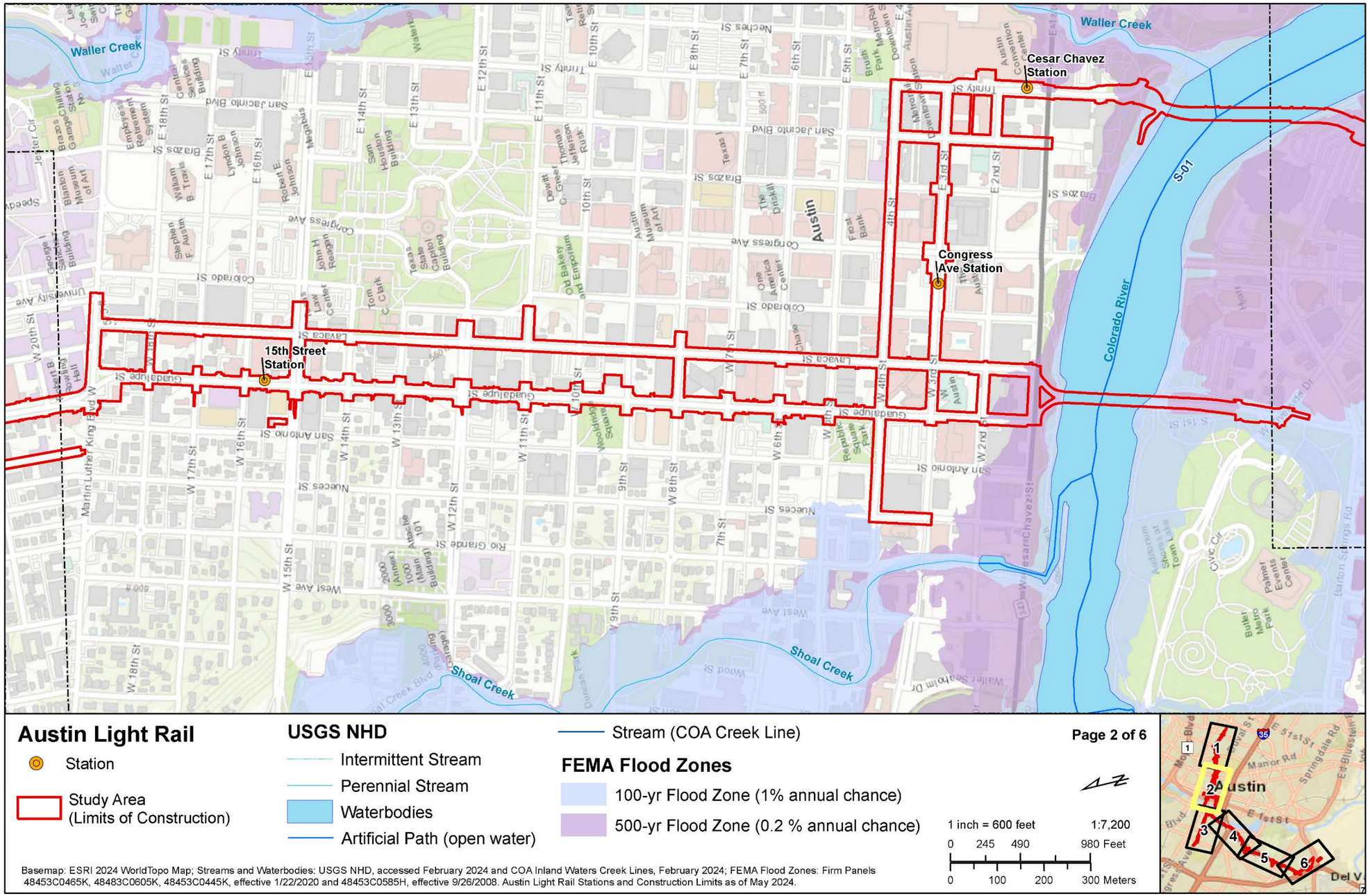


Figure 3: Surface Waters and Floodplains within the Study Area (Map 3 of 6)

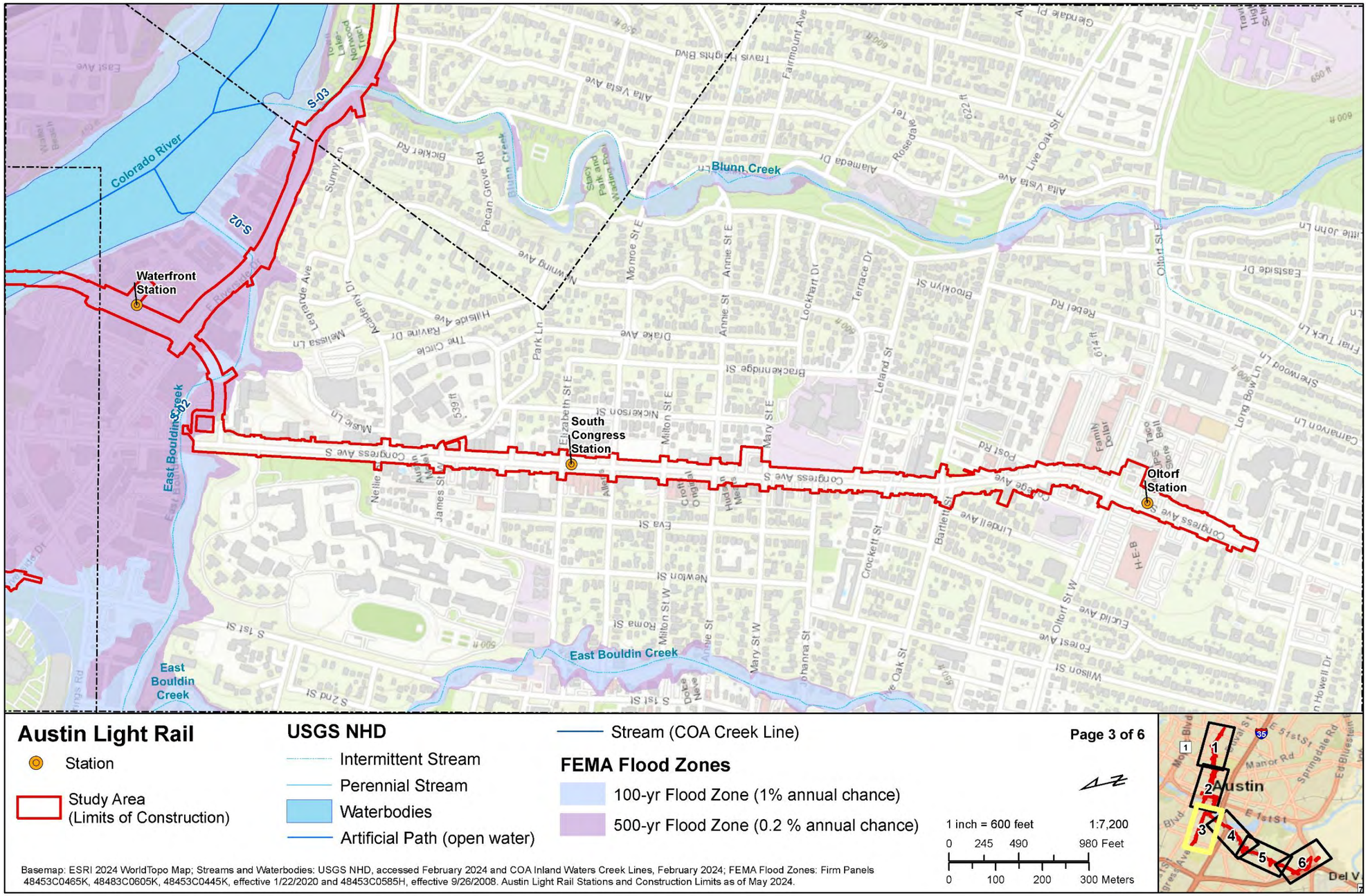


Figure 4: Surface Waters and Floodplains within the Study Area (Map 4 of 6)

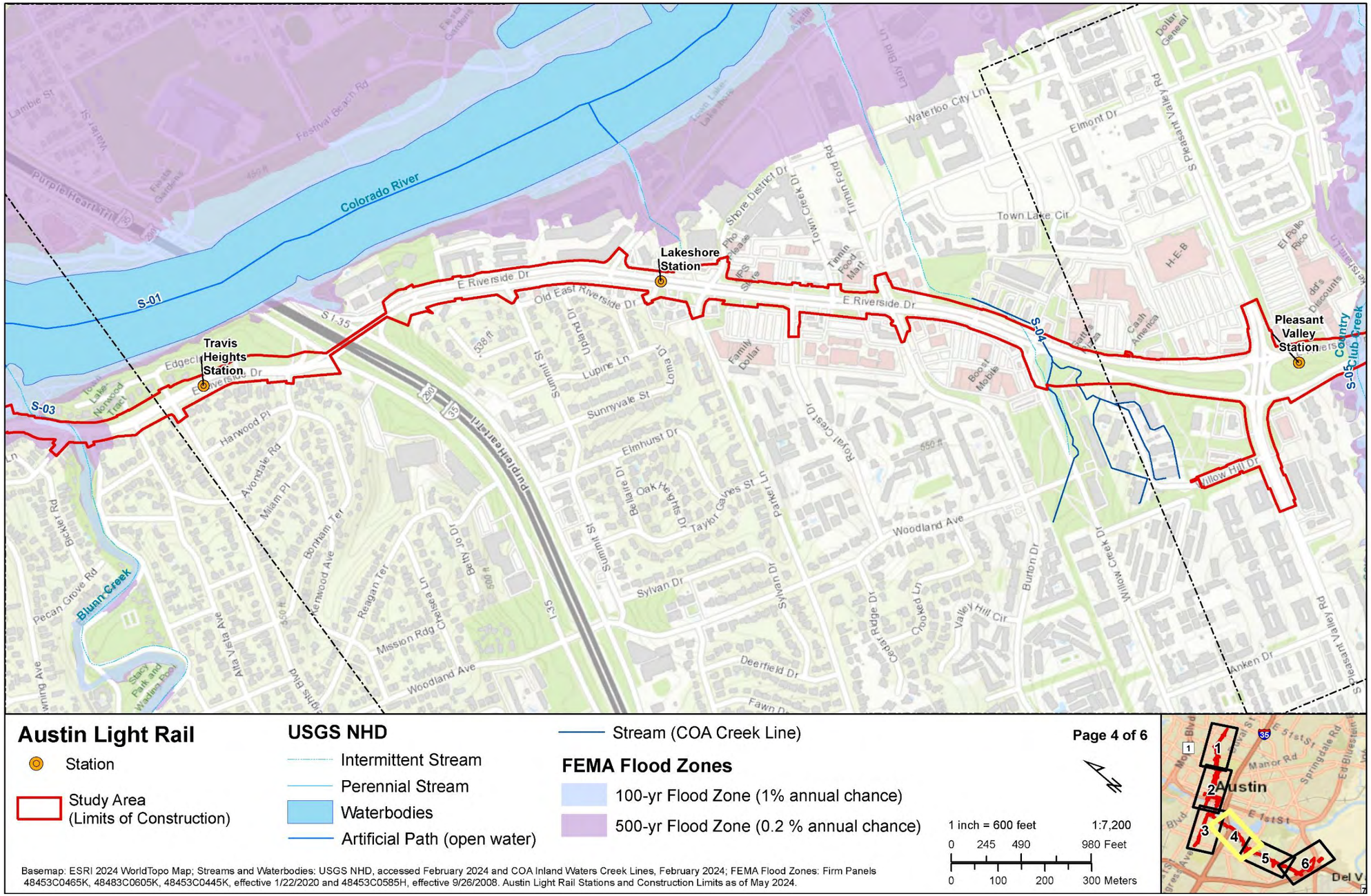


Figure 5: Surface Waters and Floodplains within the Study Area (Map 5 of 6)

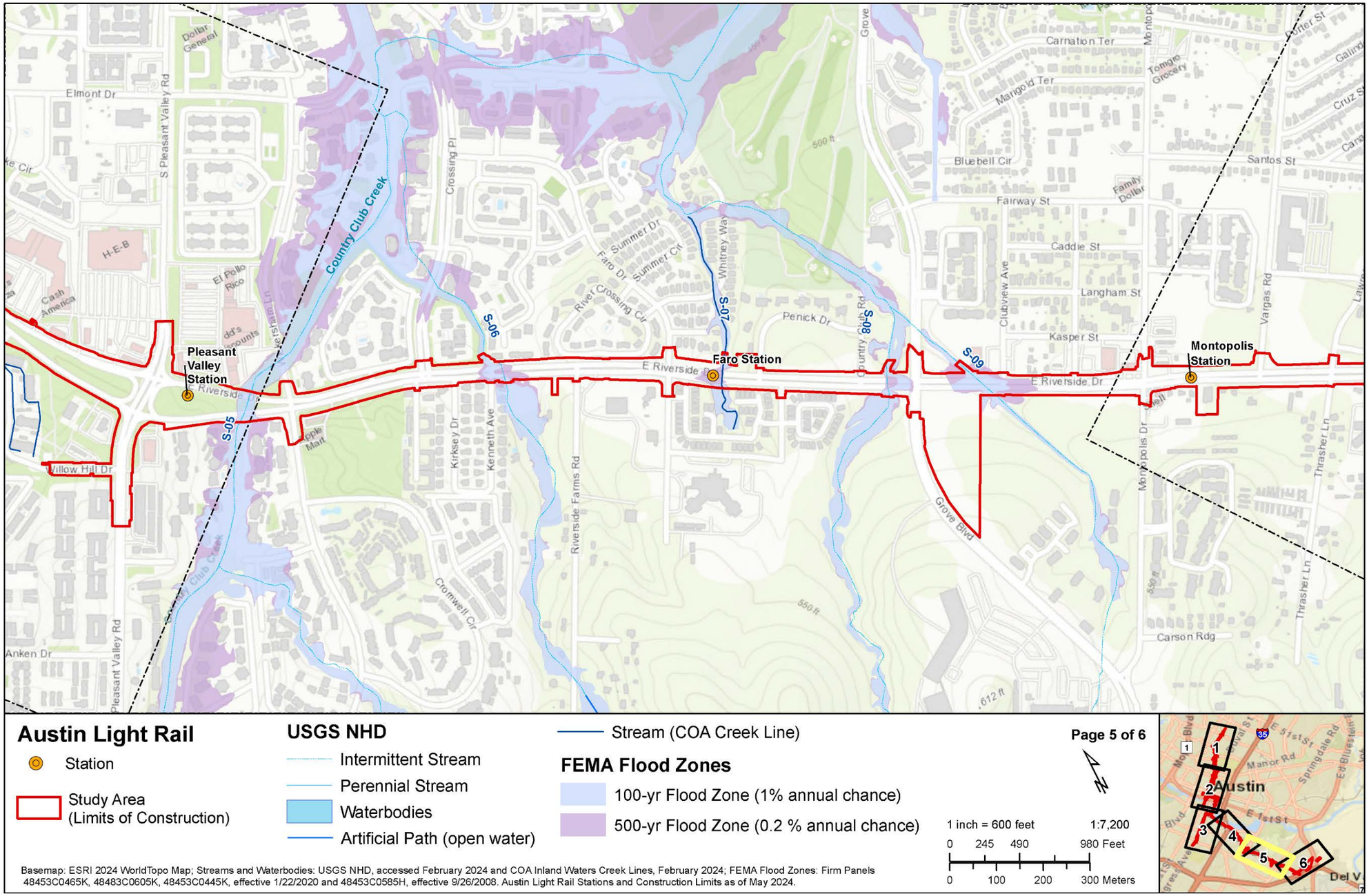
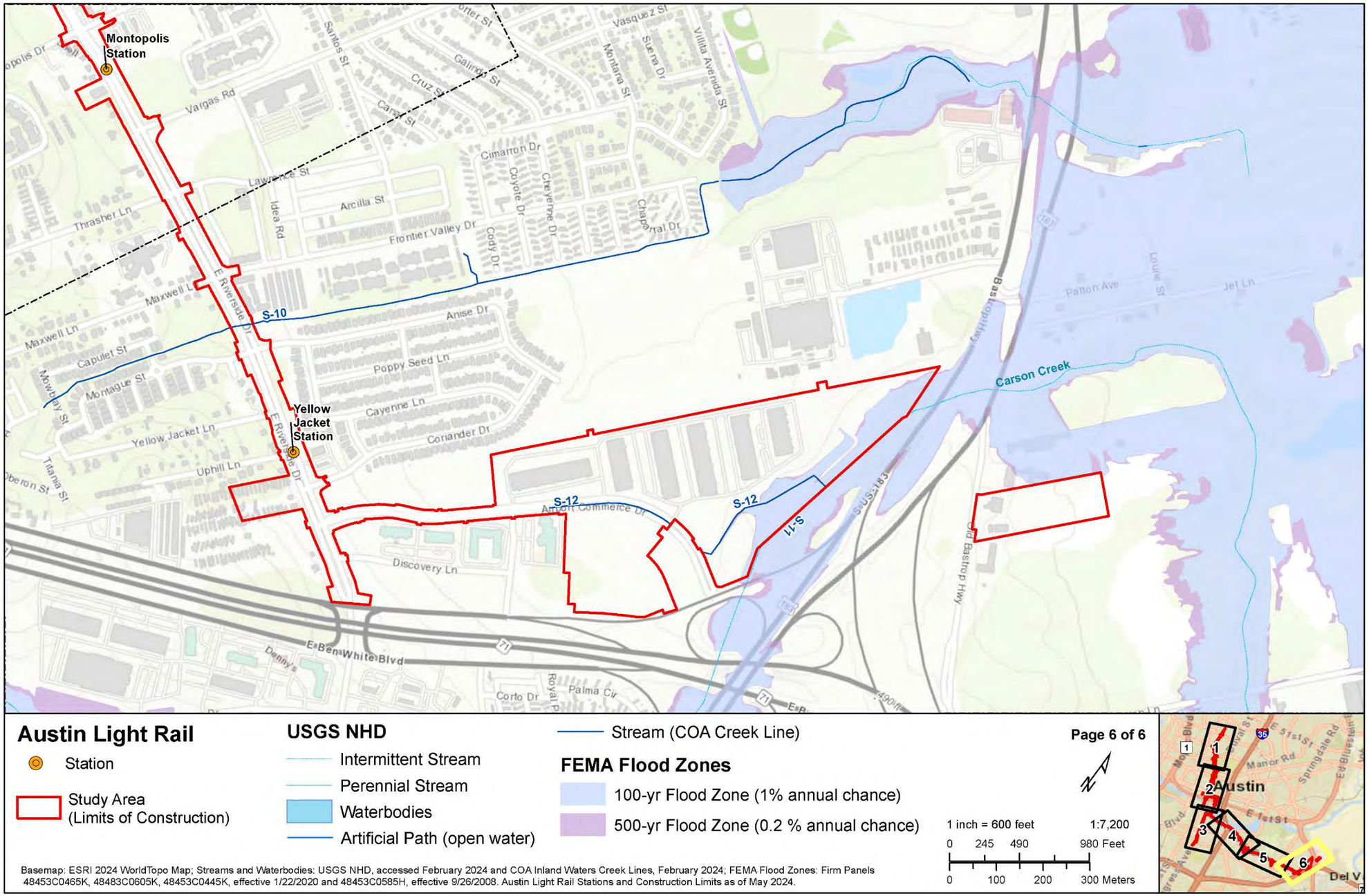


Figure 6: Surface Waters and Floodplains within the Study Area (Map 6 of 6)



4.1.3 Wetlands

The following sections describe the mapped wetland vegetation types and hydric soils within the Study Area. Initial field delineations were conducted within 150 feet of the Study Area on March 10-11 and November 10-11, 2021. The Study Area was adjusted in 2022, 2023, and most recently in January 2024. Recent adjustments included modifications and an overall shortening of the proposed route, removing or relocating 14 stations running in a north-south direction and four in the east-west direction. As a result, the Study Area now includes areas outside the 2021 field delineation footprint. Because additional delineation field efforts will be required on private properties within the updated Study Area, wetlands and other WOTUS were determined via desktop analysis of National Wetlands Inventory (USFWS 2023), City data (City of Austin 2023), and aerial photography. Identified wetlands are presented in **Table 3** through **Table 6** and **Figure 7** through **Figure 12**. Updated field surveys (WOTUS/wetland delineations) will be conducted and incorporated into the Final Environmental Impact Statement.

Table 3: National Wetlands Inventory Mapped Wetlands and WOTUS Within the Study Area

Wetland Classification	Wetland Type	Wetland Description	Feature Area Within Study Area (acres)	Figure Number
L1UBHh	Lake	Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded	3.06	8
R4SBC	Riverine	Riverine, Intermittent, Streambed, Seasonally Flooded	0.19	9
R4SBC	Riverine	Riverine, Intermittent, Streambed, Seasonally Flooded	0.09	9, 10
R4SBC	Riverine	Riverine, Intermittent, Streambed, Seasonally Flooded	0.23	10
R4SBC	Riverine	Riverine, Intermittent, Streambed, Seasonally Flooded	0.61	11
PEM1Ch	Freshwater Emergent Wetland	Palustrine, Emergent, Persistent, Temporary Flooded, Diked/Impounded	0.09	12

Table 4: National Wetlands Inventory Mapped Wetlands and WOTUS Within the Study Area by Build Alternative and Design Option

Wetland Classification	Wetland Type	Build Alternative Area (ac)	Design Option Area (ac)						Figure Number
			Woolridge Square Station	Cesar Chavez Station	Lady Bird Lake Bridge Extension	Travis Heights Station	Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside	Grove Station	
L1UBHh	Lake	3.06	3.06	3.06	3.06	3.06	3.06	3.06	8
R4SBC	Riverine	0.19	0.19	0.19	0.13	0.19	0.19	0.19	9
R4SBC	Riverine	0.091	0.09	0.091	0.091	0.087	0.091	0.091	9, 10
R4SBC	Riverine	0.23	0.23	0.23	0.23	0.23	0.23	0.23	10
R4SBC	Riverine	0.61	0.61	0.61	0.61	0.61	0.61	0.51	11
PEM1Ah	Freshwater Emergent Wetland	0.09	0.09	0.09	0.09	0.09	0.09	0.09	12

Table 5: City-Mapped Wetlands Within the Study Area

Wetland BRG ID	Wetland Name	Case Number	Feature Area Within Study Area (acres)	Figure Number
6570	--	SP-2008-0188C	0.010	10
16403	--	C8-06-0282.0A.SH	0.002	11
17138	--	SP-02-0265D	0.008	11
207265	--	--	0.035	10, 11

Table 6: Previously Identified Wetlands Within the Study Area

Wetland ID	Wetland Name	Feature Area Within Study Area (Acres)	Figure Number
HNTB-B6	--	0.010	10

Source: Original Blue Line Project data collection; identified by HNTB Field Team in support of the referenced document.

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Figure 7: Wetlands and WOTUS within the Study Area (Map 1 of 6)

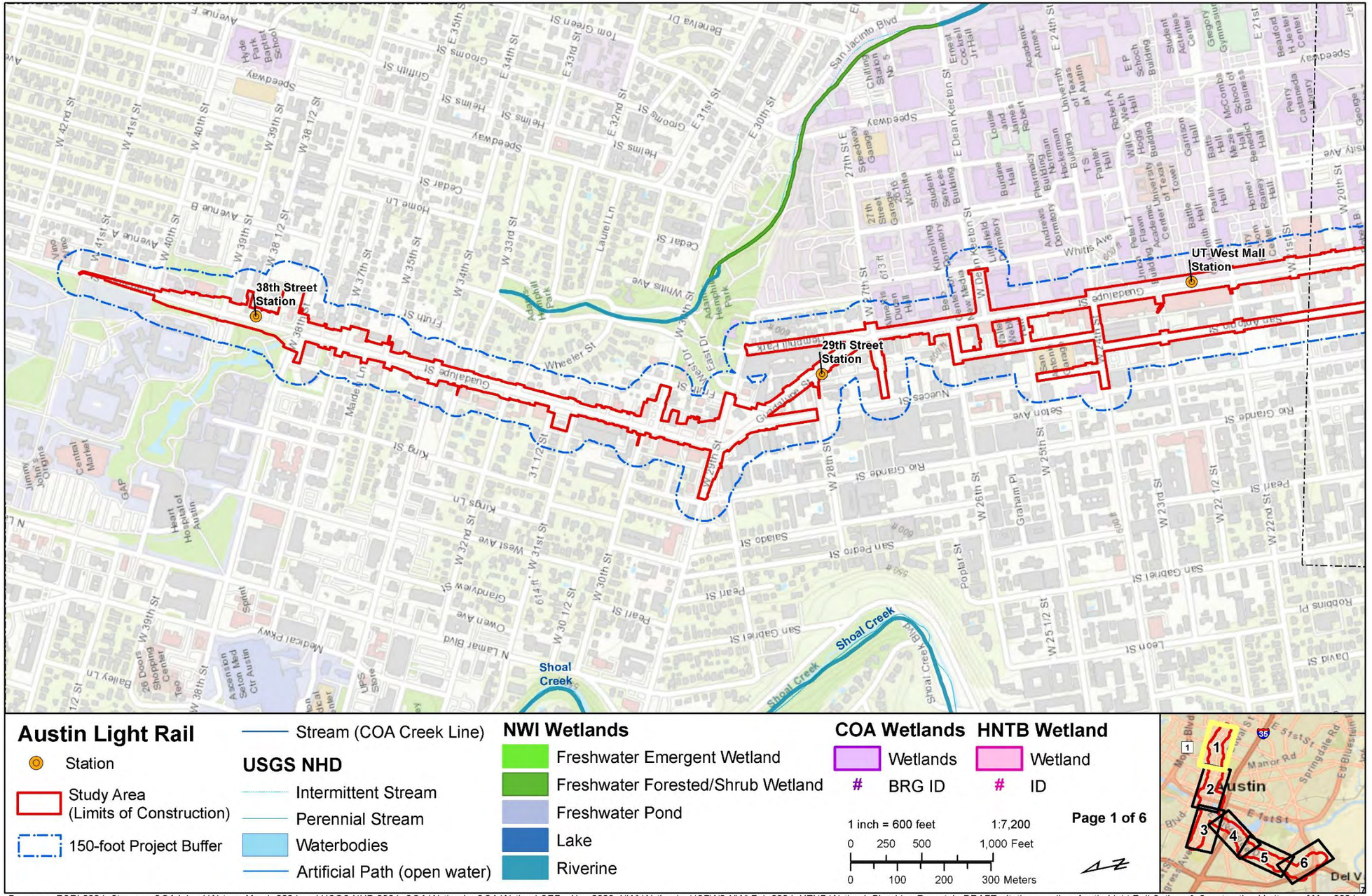

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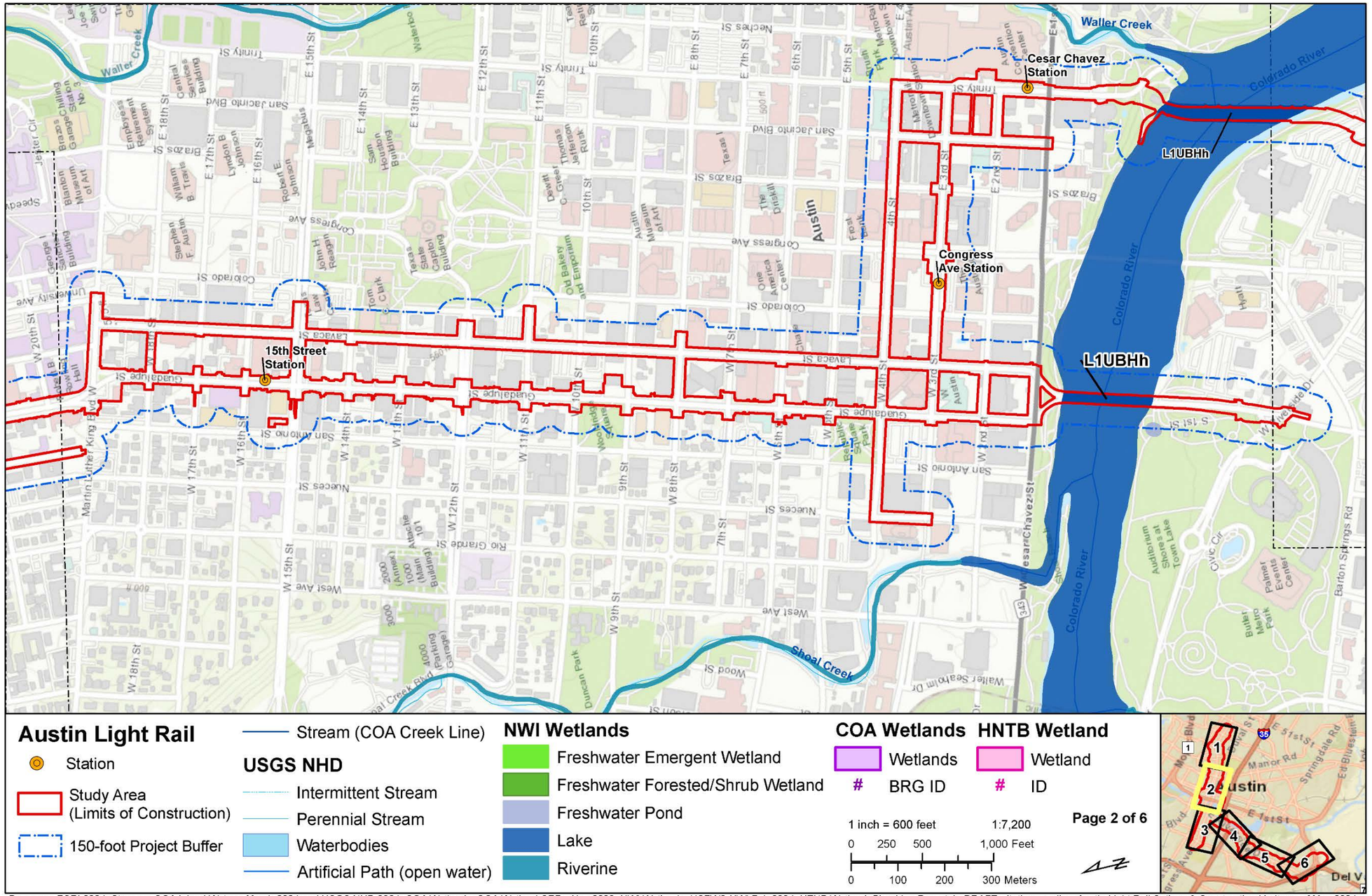
Figure 8: Wetlands and WOTUS within the Study Area (Map 2 of 6)



Basemap: ESRI 2024; Streams: COA Inland Waters, March 2024 and USGS NHD 2024; COA Wetlands: COA Wetland CEFs, Nov 2023; NWI Wetlands: USFWS NWI Feb 2024; HTNB Wetland: Blue Line Report, in DRAFT, citation pending; Austin Light Rail Sations & Construction Limits as of May 2024.

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Figure 9: Wetlands and WOTUS within the Study Area (Map 3 of 6)

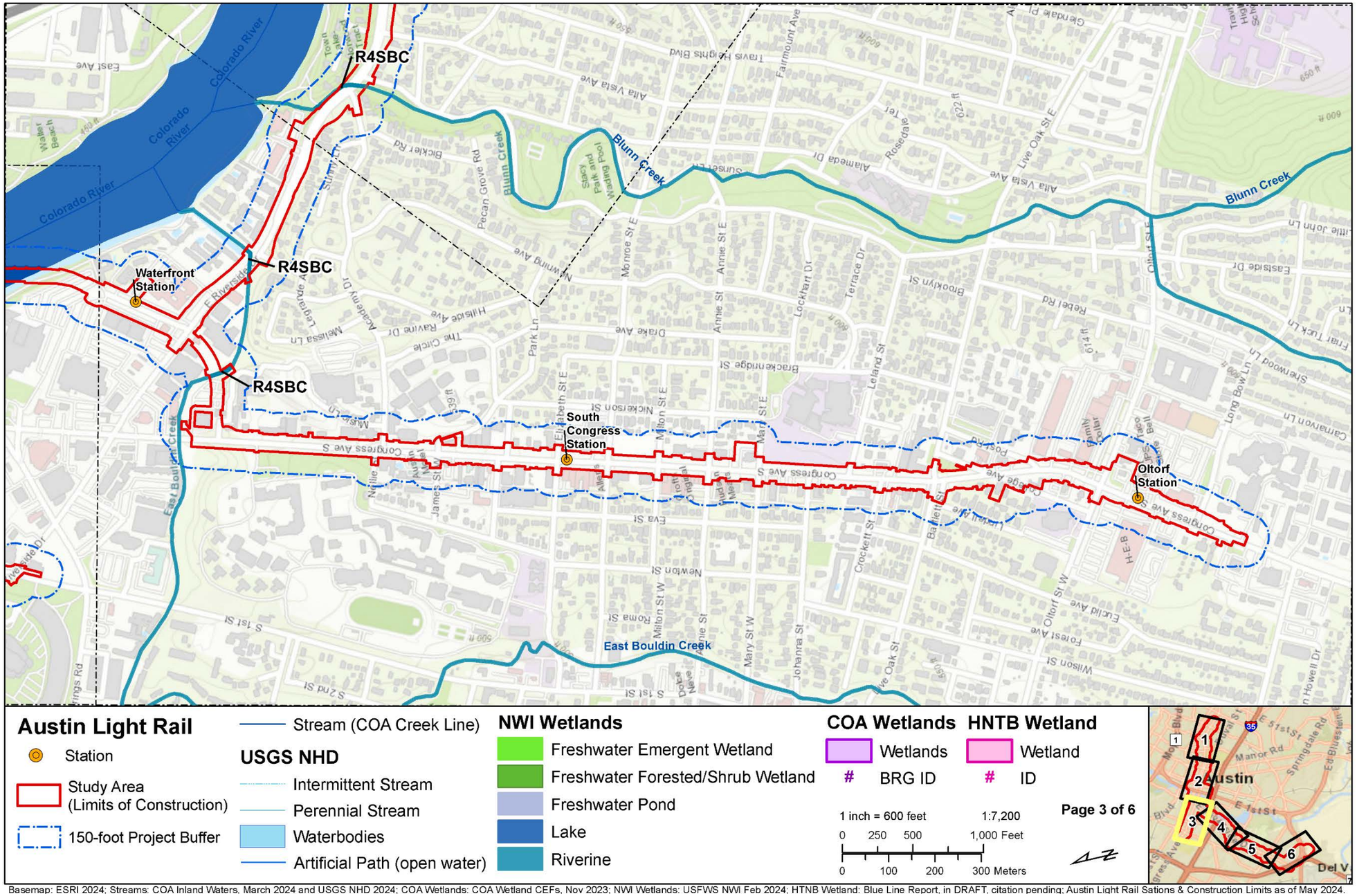

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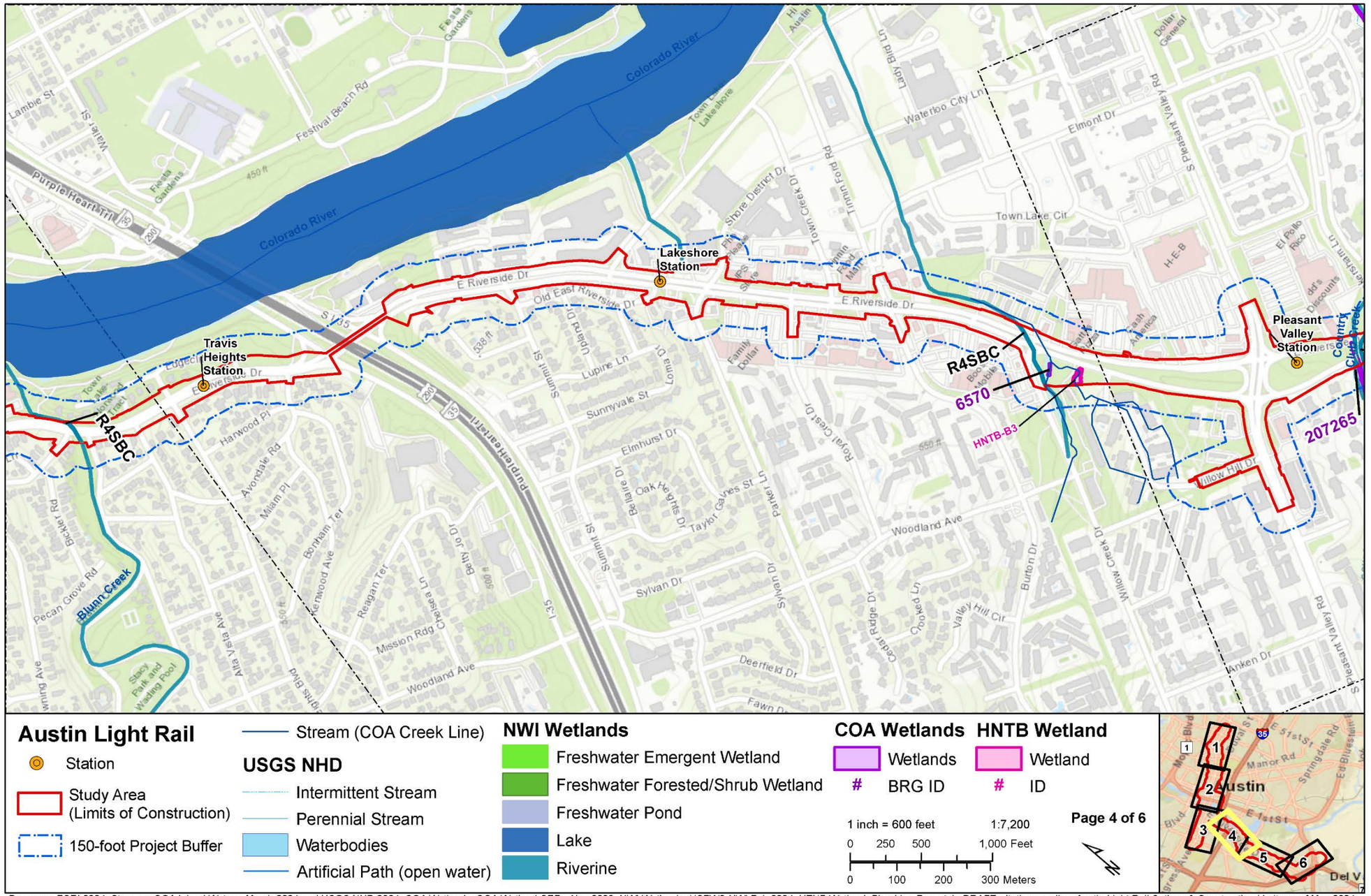
Figure 10: Wetlands and WOTUS within the Study Area (Map 4 of 6)



Basemap: ESRI 2024; Streams: COA Inland Waters, March 2024 and USGS NHD 2024; COA Wetlands: COA Wetland CEFs, Nov 2023; NWI Wetlands: USFWS NWI Feb 2024; HTNB Wetland: Blue Line Report, in DRAFT, citation pending; Austin Light Rail Sations & Construction Limits as of May 2024.

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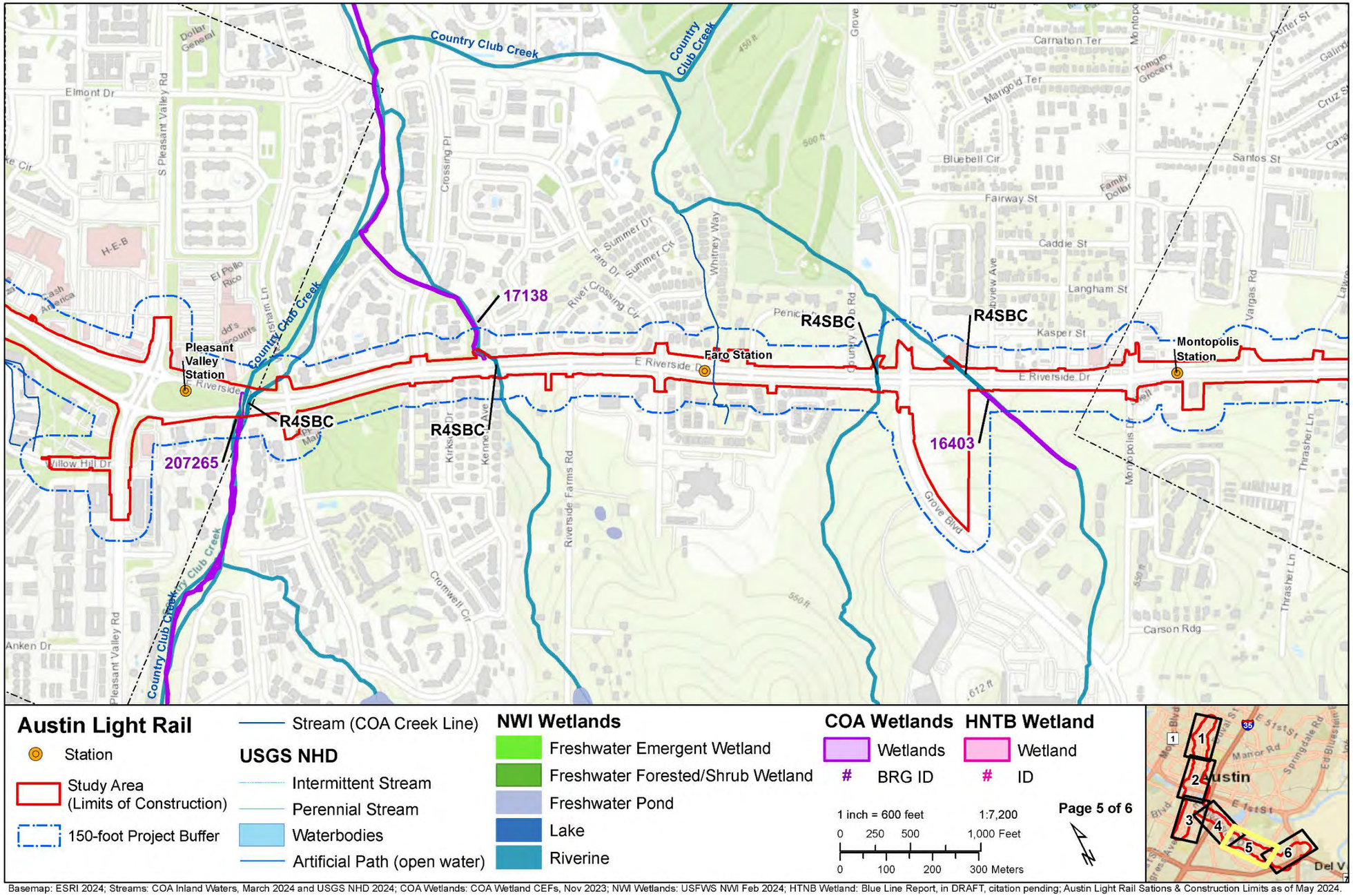
Figure 11: Wetlands and WOTUS within the Study Area (Map 5 of 6)



Basemap: ESRI 2024; Streams: COA Inland Waters, March 2024 and USGS NHD 2024; COA Wetlands: COA Wetland CEFs, Nov 2023; NWI Wetlands: USFWS NWI Feb 2024; HTNB Wetland: Blue Line Report, in DRAFT, citation pending; Austin Light Rail Sations & Construction Limits as of May 2024.

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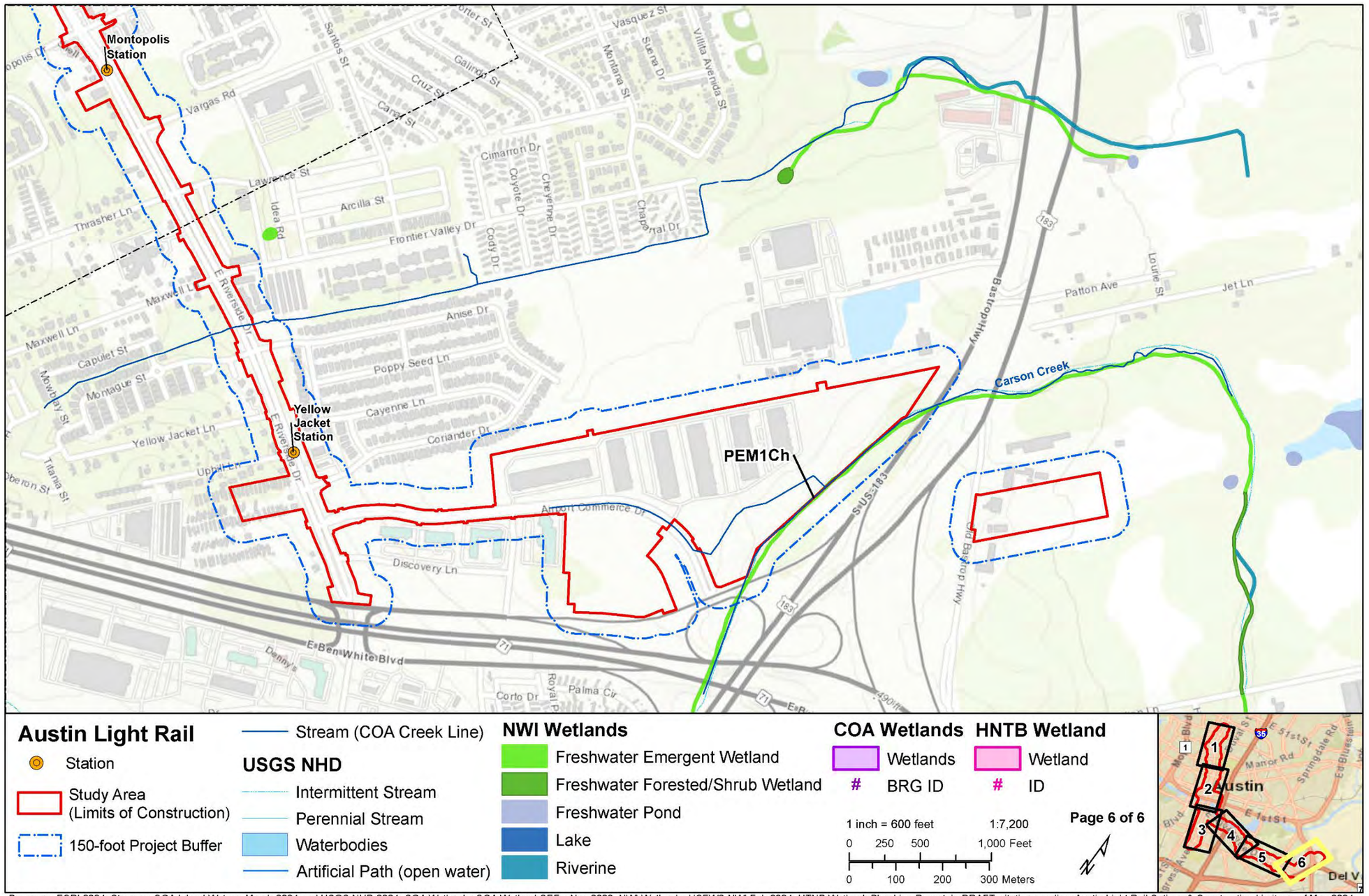
Figure 12: Wetlands and WOTUS within the Study Area (Map 6 of 6)



Basemap: ESRI 2024; Streams: COA Inland Waters, March 2024 and USGS NHD 2024; COA Wetlands: COA Wetland CEFs, Nov 2023; NWI Wetlands: USFWS NWI Feb 2024; HTNB Wetland: Blue Line Report, in DRAFT, citation pending; Austin Light Rail Sations & Construction Limits as of May 2024.

4.1.4 Vegetation

Thirteen vegetation types are present within the Study Area, of which two (Urban High Intensity and Urban Low Intensity) compose approximately 84 percent of the Study Area. The wetland vegetation types present in the Study Area according to TPWD Ecological Mapping Systems of Texas data are described in **Table 7**. These types are based on the Study Area that encompasses the Build Alternative; therefore, the vegetation types discussed in this section may not encompass all of those discussed in **DEIS Appendix F-5**.

Table 7: Wetland Vegetation Types Within the Study Area

Vegetation Type	Description	Estimated Area Within Study Area (acres)
Open Water	This vegetation type includes large lakes, rivers, and marine water as well as some ephemeral ponds. Some mapped areas may support vegetation such as black willow (*Salix nigra*), sea ox-eye daisy (*Borrichia frutescens*), saltwort (*Batis maritima*), rushes (*Juncus* spp.), sedges (*Typha* spp.), and spikerushes (*Eleocharis* spp.).	2.23
Central Texas: Floodplain Hardwood/ Evergreen Forest	This vegetation type has a mix of evergreen and deciduous species in the canopy, with plateau live oak (*Quercus fusiformis*) representing the most common evergreen component.	1.01
Central Texas: Floodplain Hardwood Forest	This vegetation type includes common trees such as pecan (*Carya illinoinensis*), white ash (*Fraxinus americana*), cedar elm (*Ulmus crassifolia*), American elm (*Ulmus americana*), sugar hackberry (*Celtis laevigata*), willows (*Salix* spp.), and eastern cottonwood (*Populus deltoides*).	2.23
Central Texas: Floodplain Deciduous Shrubland	This vegetation type includes a variety of deciduous species such as possumhaw (*Ilex decidua)*, mesquite (*Prosopis glandulosa*), black willow (*Salix nigra*), roughleaf dogwood (*Cornus drummondii*), and common buttonbush (*Cephalantus occidentalis*). Young trees such as green ash (*Fraxinus pennsylvanica*), cedar elm (*Ulmus crassifolia*), winged elm (*Ulmus alata*), and western soapberry (*Sapinus saponaria*) may be present.	0.06
Central Texas: Floodplain Evergreen Shrubland	This vegetation type includes primarily species such as eastern redcedar (*Juniperus virginiana*), huisache (*Vachellia farnesiana*), and yaupon (*Ilex vomitoria*).	0.03

Vegetation Type	Description	Estimated Area Within Study Area (acres)
Central Texas: Riparian Hardwood / Evergreen Forest	This vegetation type contains a mix of evergreen species such as junipers (*Juniperus* spp.) and live oak and deciduous species such as water oak (*Quercus nigra*), American elm (*Ulmus americana*), post oak (*Quercus stellata*), green ash (*Fraxinus pennsylvanica*), cedar elm (*Ulmus crassifolia*), sugar hackberry (*Celtis laevigata*), brasil (*Condalia hookeri*), and colima (*Zanthoxylum fagara*).	0.44

Source: TPWD 2014.

4.1.5 Hydric Soils

According to the U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey Report, the Study Area, defined as the Build Alternative, is mapped as being underlain by 23 soil units (see **DEIS Appendix F-3**). Two soil types have minor components that are at least partly hydric (U.S. Department of Agriculture Natural Resources Conservation Service 2023), and one additional soil type is labeled as "water," as shown in **Table 8**. For additional information about Study Area soils, see **DEIS Appendix F-3**.

Table 8: Hydric Soils Mapped Within the Study Area

Map Unit	Name	Surface Water Association	Area Within Study Area (acres)
Fs	Oakalla soils, 0 to 1% slopes, channeled, frequently flooded	Boggy Creek, Williamson Creek, Little Walnut Creek, Wells Branch	2.22
Tw	Tinn clay, 0 to 1 % slopes, frequently flooded	Country Club Creek	1.01
W	Water	Lady Bird Lake (the Colorado River)	3.21
		Total	**6.44**

Source: U.S. Department of Agriculture Natural Resources Conservation Service 2023.

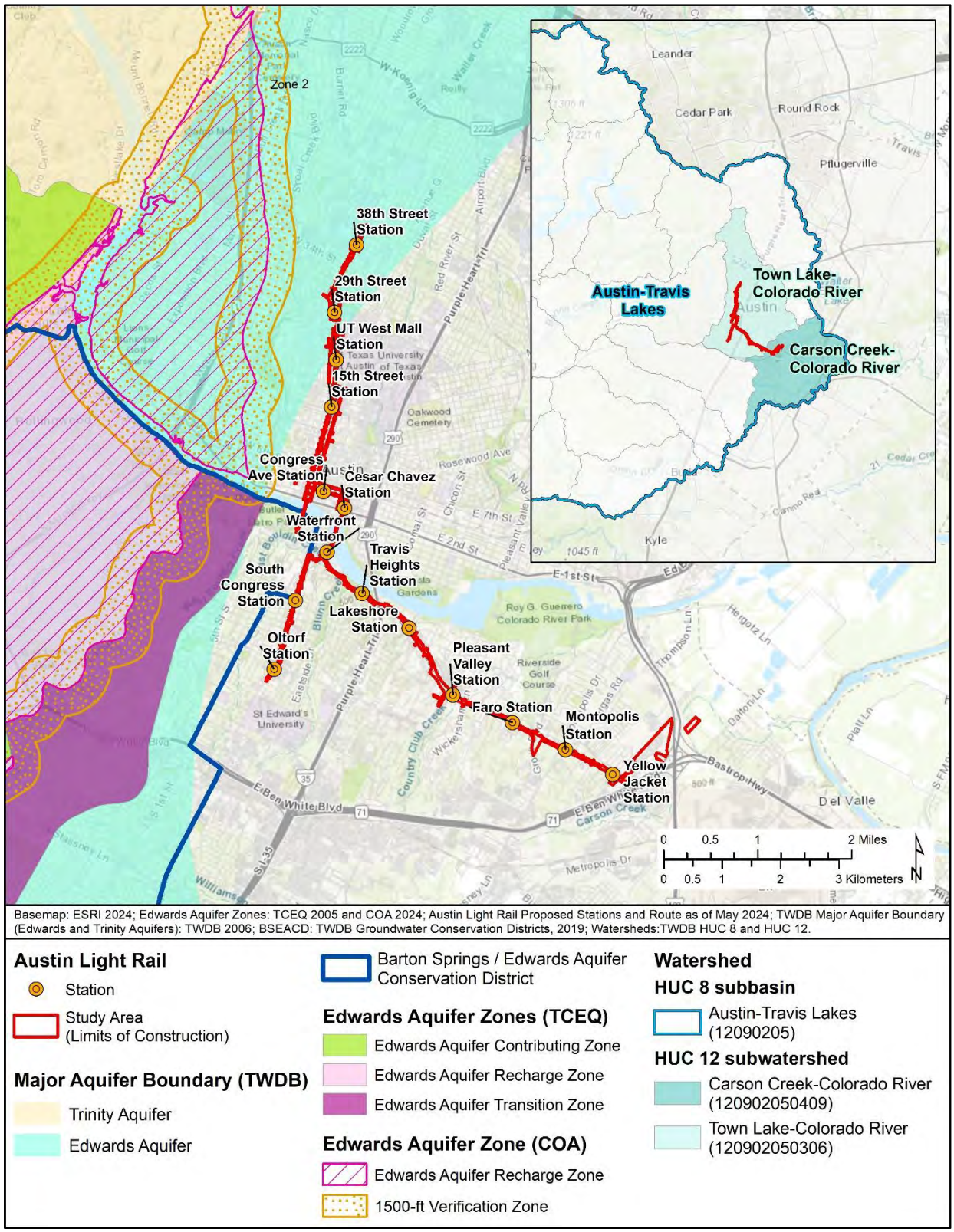
4.2 Water Quality

This section assesses the publicly available data resources mentioned in Section 3.2 of this report with the goal of assessing surface water quality (watersheds and impaired waters) within the Study Area.

4.2.1 Watersheds

According to TWDB, the Study Area encompasses the Austin-Travis Lakes subbasin (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, as shown in **Figure 13**.

Figure 13: Watersheds and Aquifers in the Study Area



4.2.2 Impaired Waters

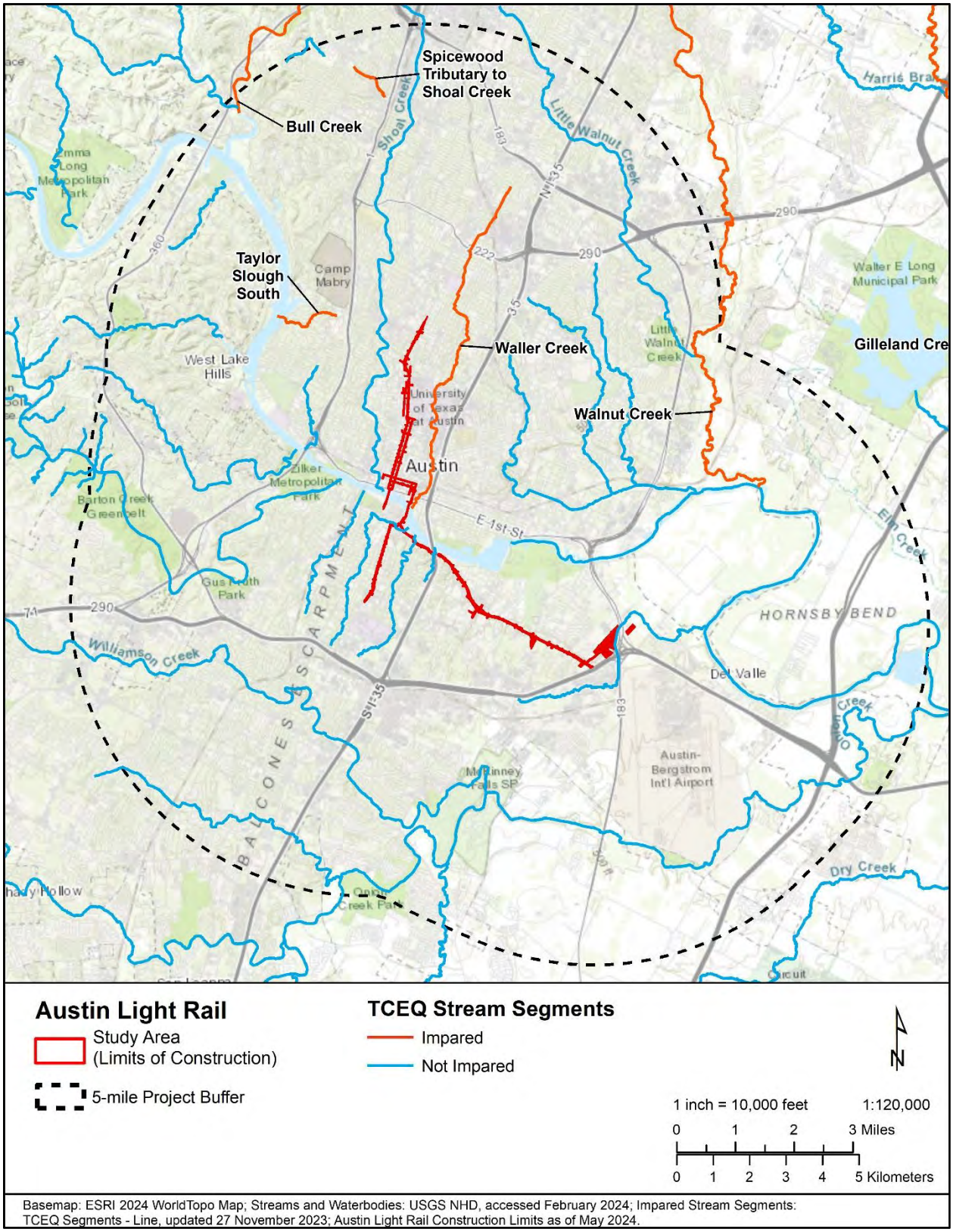
Five impaired stream segments were identified within 5 miles of the Study Area, as described in **Table 9** and shown in **Figure 14**.

Table 9: Impaired Waters Within 5 Miles of the Study Area

Segment Name	Segment ID	Description	Category/ Impairment	Approximate Distance and Direction from Study Area
Walnut Creek	1428B	From the confluence of the Colorado River in east Austin in Travis County to the upstream perennial portion of the stream in north Austin in Travis County	4a - Bacteria in water (Recreation Use)	4.8 miles east
Bull Creek	1403A	From the confluence of Lake Austin in northwest Austin in Travis County to the upstream perennial portion of the stream north of Austin in Travis County	5c - Depressed dissolved oxygen in water	4.8 miles northwest
Spicewood Tributary to Shoal Creek	1403J	From the confluence of an unnamed tributary west of the MoPac Expressway in north Austin in Travis County upstream to the headwaters north of Williamsburg Circle in Travis County	4a - Bacteria in water (Recreation Use)	3.7 miles northwest
Waller Creek	1429C	From the confluence of Lady Bird Lake in central Austin in Travis County to the upstream portion of the stream in north Austin in Travis County	5c - Bacteria in water (Recreation Use)	245 feet east
Taylor Slough South	1403K	From the confluence of Lake Austin in Travis County to the headwaters near South Meadow Circle on the Texas Department of Aging and Disability Services campus in Austin in Travis County	4a - Bacteria in water (Recreation Use)	1.3 miles west

Source: TCEQ 2020.
Notes: **Category 4:** Standard is not supported for one or more designated uses but does not require the development of a TMDL.
Category 4a: All TMDLs have been completed and approved by EPA.
Category 5: Waterbody does not meet applicable water quality standards for one or more designated uses by one or more pollutants.
Category 5c: Additional data or information will be collected and/or evaluated for one or more parameters before a management strategy is selected.

Figure 14: Impaired Segments Within 5 miles of the Study Area



Basemap: ESRI 2024 WorldTopo Map; Streams and Waterbodies: USGS NHD, accessed February 2024; Impared Stream Segments: TCEQ Segments - Line, updated 27 November 2023; Austin Light Rail Construction Limits as of May 2024.

4.3 Stormwater

The entire Study Area is within the City's MS4. Much of the Project is located within heavily urbanized areas with existing impervious cover with little to no stormwater management.

4.4 Safe Drinking Water

Much of the Study Area is underlain by the Edwards Aquifer (EPA 2023e). Additional information on aquifers is provided in Section 4.5.1 of this report.

The majority of Austin's drinking water currently comes from Lake Austin and Lake Travis. Lady Bird Lake (the Colorado River) is considered in Austin Water's *Water Forward Integrated Water Resource Plan* (Austin Water 2018).

According to TCEQ and TWDB, two public water supply wells are located within 0.25 mile of the Study Area, as shown in **Figure 15** through **Figure 19**. They are also identified in **Table 10**.

Table 10: Public Water Supply Wells Within 0.25 mile of the Study Area

State Well Number	System/ Owner Name	Well Depth (feet)	Distance and Direction from Study Area	Figure Number
5842917	City of Austin	55	1,300 feet west	16
5842909	City of Austin	51	1,150 feet west	16

Sources: TCEQ 2021; TWDB 2021b.

4.5 Groundwater

4.5.1 Aquifers

The northern portion of the Study Area overlays the Edwards Aquifer, shown previously in **Figure 13** (TWDB 2021b). The Edwards Aquifer is a major aquifer in the Balcones Fault Zone in southcentral Texas and ranges in depth from 200 to 600 feet (TWDB 2021b). The dissolved limestone that characterizes the geology of the Edwards Aquifer is highly permeable; therefore, water levels and spring flows associated with this aquifer are highly susceptible to changes resulting from rainfall, drought, and pumping (TWDB 2021b).

Within the Edwards Aquifer, a small portion of the Study Area overlays the BSEACD, as shown in **Figure 16** and **Figure 17** (BSEACD 2023b). Groundwater conservation districts are responsible for conserving, preserving, and protecting groundwater resources within their specific jurisdiction (BSEACE 2021b).

4.5.2 Springs

According to City data, there are three springs and one seep within 0.25 mile of the Study Area, none of which are within the Study Area, as shown in **Figure 15** through **Figure 19** (City of Austin 2023).

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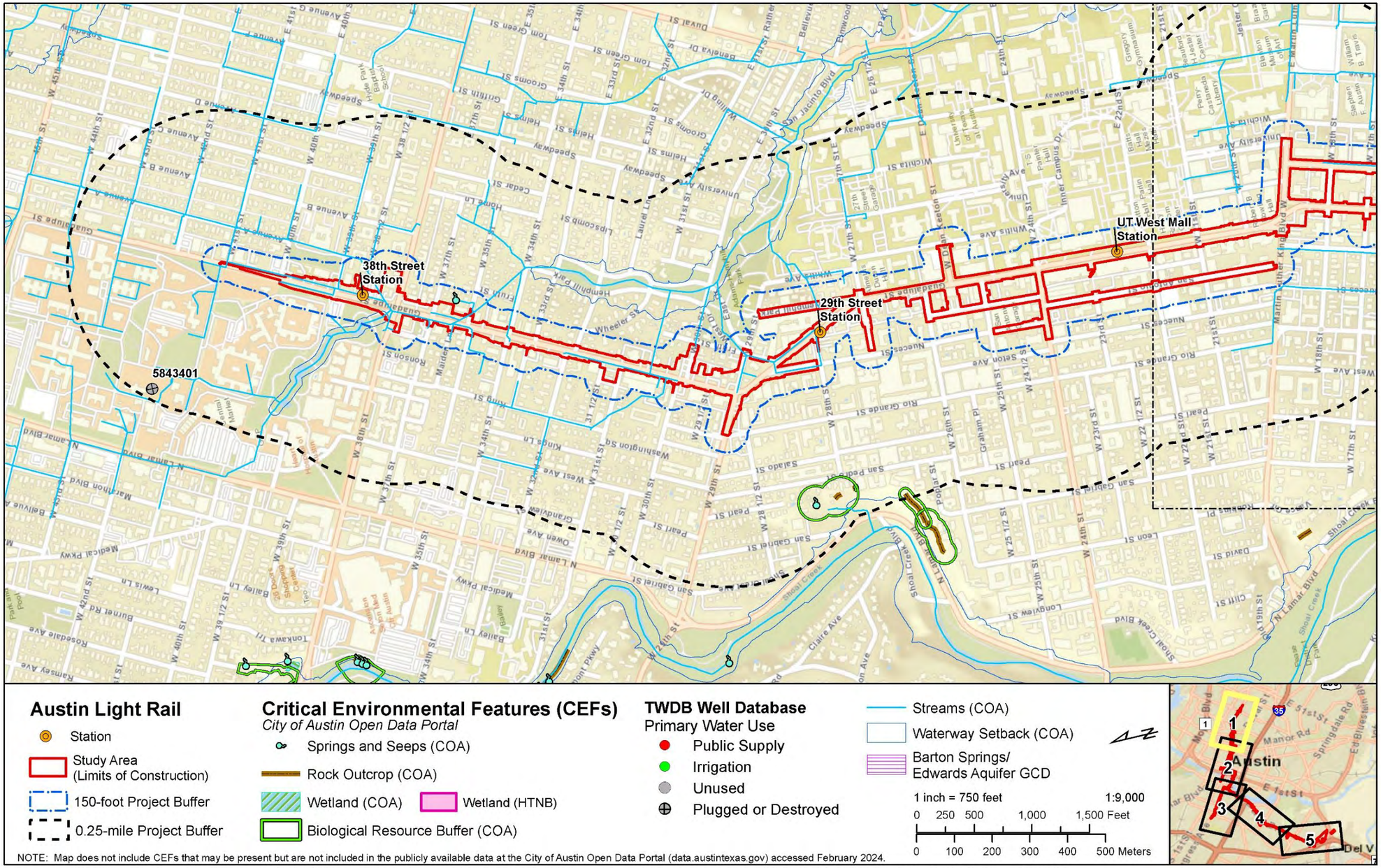
Figure 15: Groundwater Wells and Critical Environmental Features within 0.25 mile of the Study Area (Map 1 of 5)



NOTE: Map does not include CEFs that may be present but are not included in the publicly available data at the City of Austin Open Data Portal (data.austintexas.gov) accessed February 2024.

Basemap: ESRI 2024; CEFs, Streams, and Waterway Setbacks: COA Open Data Portal, accessed Feb 2024; Wells: TWDB Groundwater database, accessed Feb 2024. Austin Light Rail Stations & Construction Limits as of May 2024

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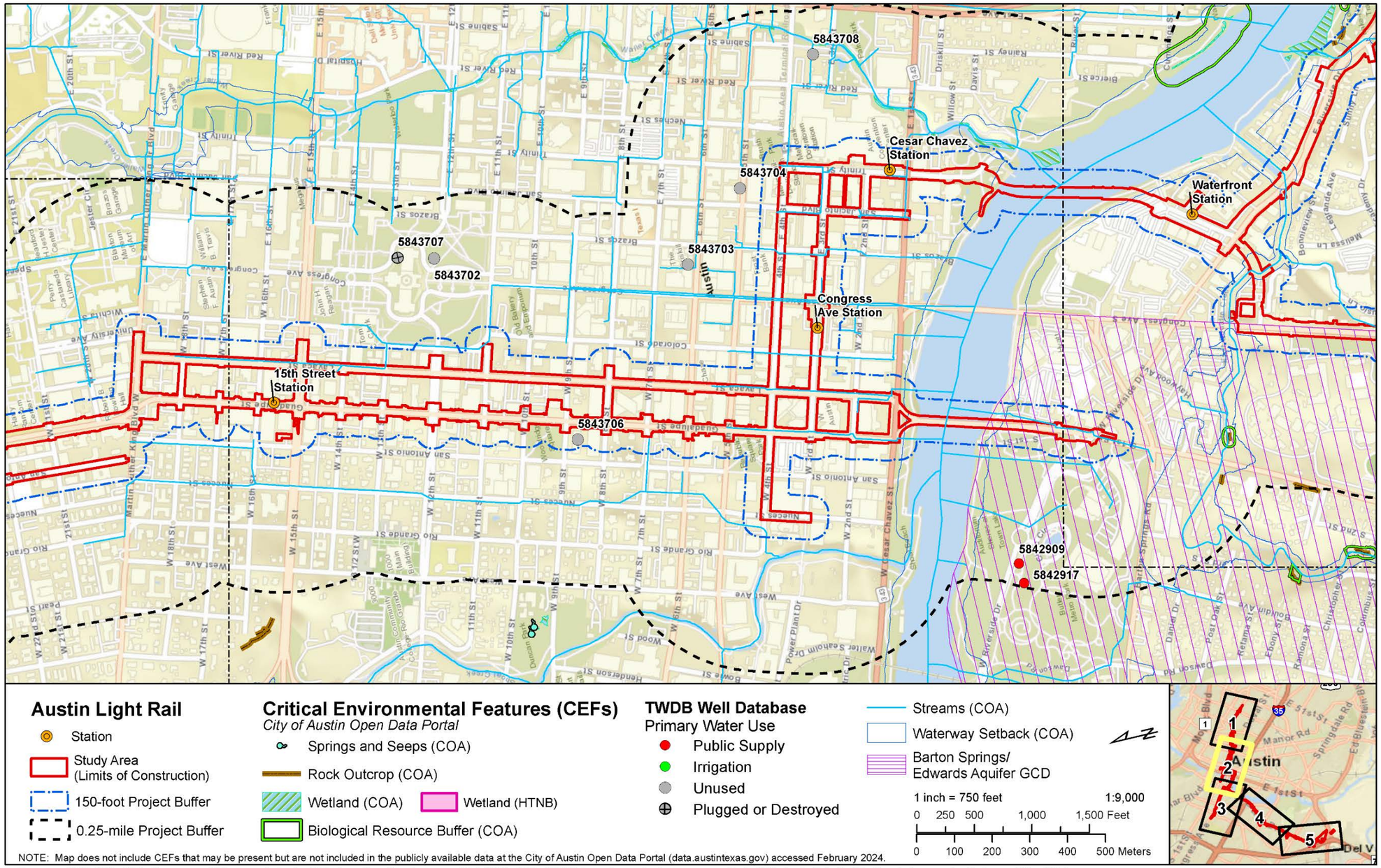
Figure 16: Groundwater Wells and Critical Environmental Features within 0.25 mile of the Study Area (Map 2 of 5)



NOTE: Map does not include CEFs that may be present but are not included in the publicly available data at the City of Austin Open Data Portal (data.austintexas.gov) accessed February 2024.

Basemap: ESRI 2024; CEFs, Streams, and Waterway Setbacks: COA Open Data Portal, accessed Feb 2024; Wells: TWDB Groundwater database, accessed Feb 2024. Austin Light Rail Stations & Construction Limits as of May 2024

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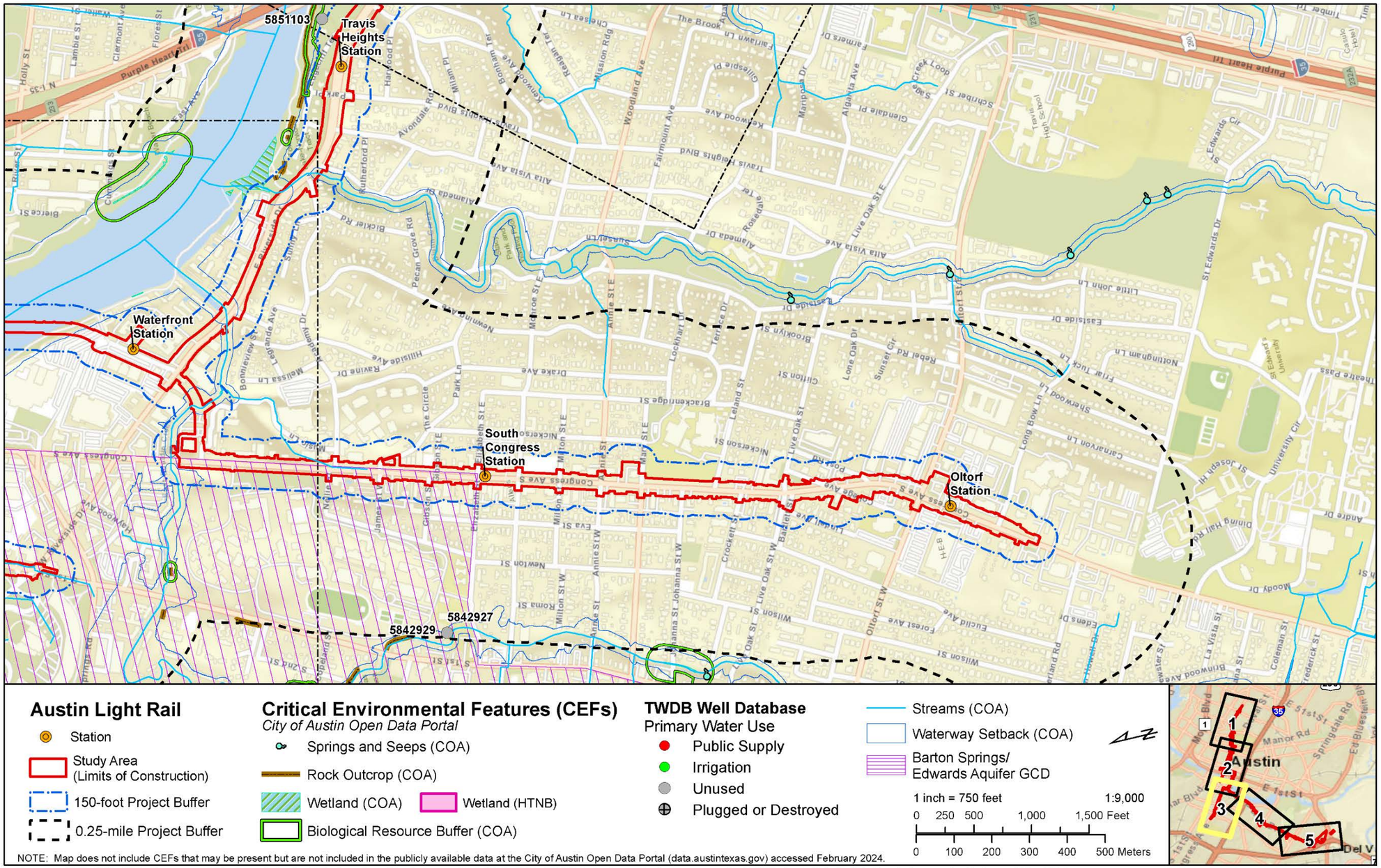
Figure 17: Groundwater Wells and Critical Environmental Features within 0.25 mile of the Study Area (Map 3 of 5)



NOTE: Map does not include CEFs that may be present but are not included in the publicly available data at the City of Austin Open Data Portal (data.austintexas.gov) accessed February 2024.

Basemap: ESRI 2024; CEFs, Streams, and Waterway Setbacks: COA Open Data Portal, accessed Feb 2024; Wells: TWDB Groundwater database, accessed Feb 2024. Austin Light Rail Stations & Construction Limits as of May 2024

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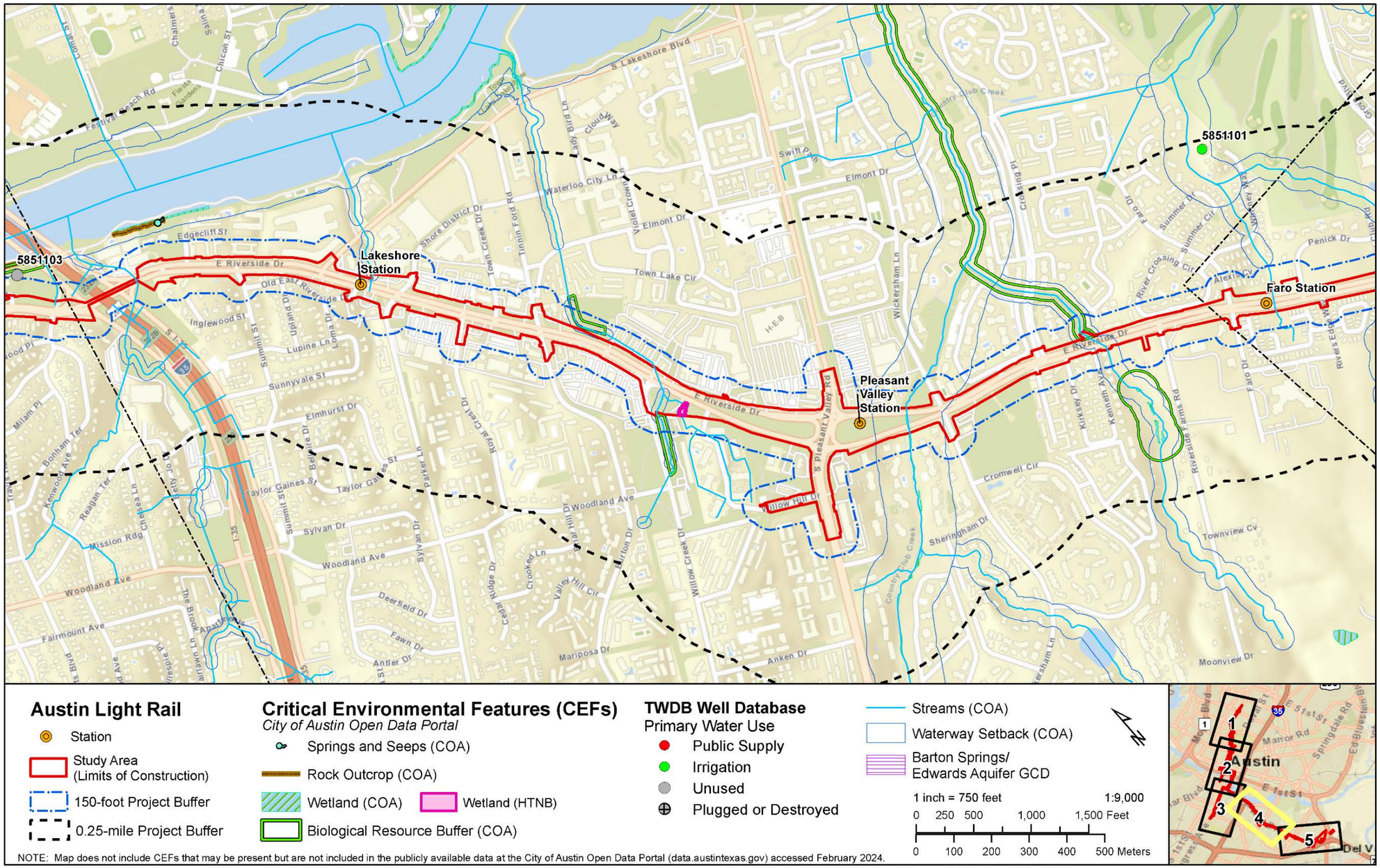
Figure 18: Groundwater Wells and Critical Environmental Features within 0.25 mile of the Study Area (Map 4 of 5)



Austin Light Rail
- Station
- Study Area (Limits of Construction)
- 150-foot Project Buffer
- 0.25-mile Project Buffer

Critical Environmental Features (CEFs)
City of Austin Open Data Portal
- Springs and Seeps (COA)
- Rock Outcrop (COA)
- Wetland (COA)
- Wetland (HTNB)
- Biological Resource Buffer (COA)

TWDB Well Database
Primary Water Use
- Public Supply
- Irrigation
- Unused
- Plugged or Destroyed

- Streams (COA)
- Waterway Setback (COA)
- Barton Springs/ Edwards Aquifer GCD

1 inch = 750 feet 1:9,000
0 250 500 1,000 1,500 Feet
0 100 200 300 400 500 Meters

NOTE: Map does not include CEFs that may be present but are not included in the publicly available data at the City of Austin Open Data Portal (data.austintexas.gov) accessed February 2024.

Basemap: ESRI 2024; CEFs, Streams, and Waterway Setbacks: COA Open Data Portal, accessed Feb 2024; Wells: TWDB Groundwater database, accessed Feb 2024. Austin Light Rail Stations & Construction Limits as of May 2024

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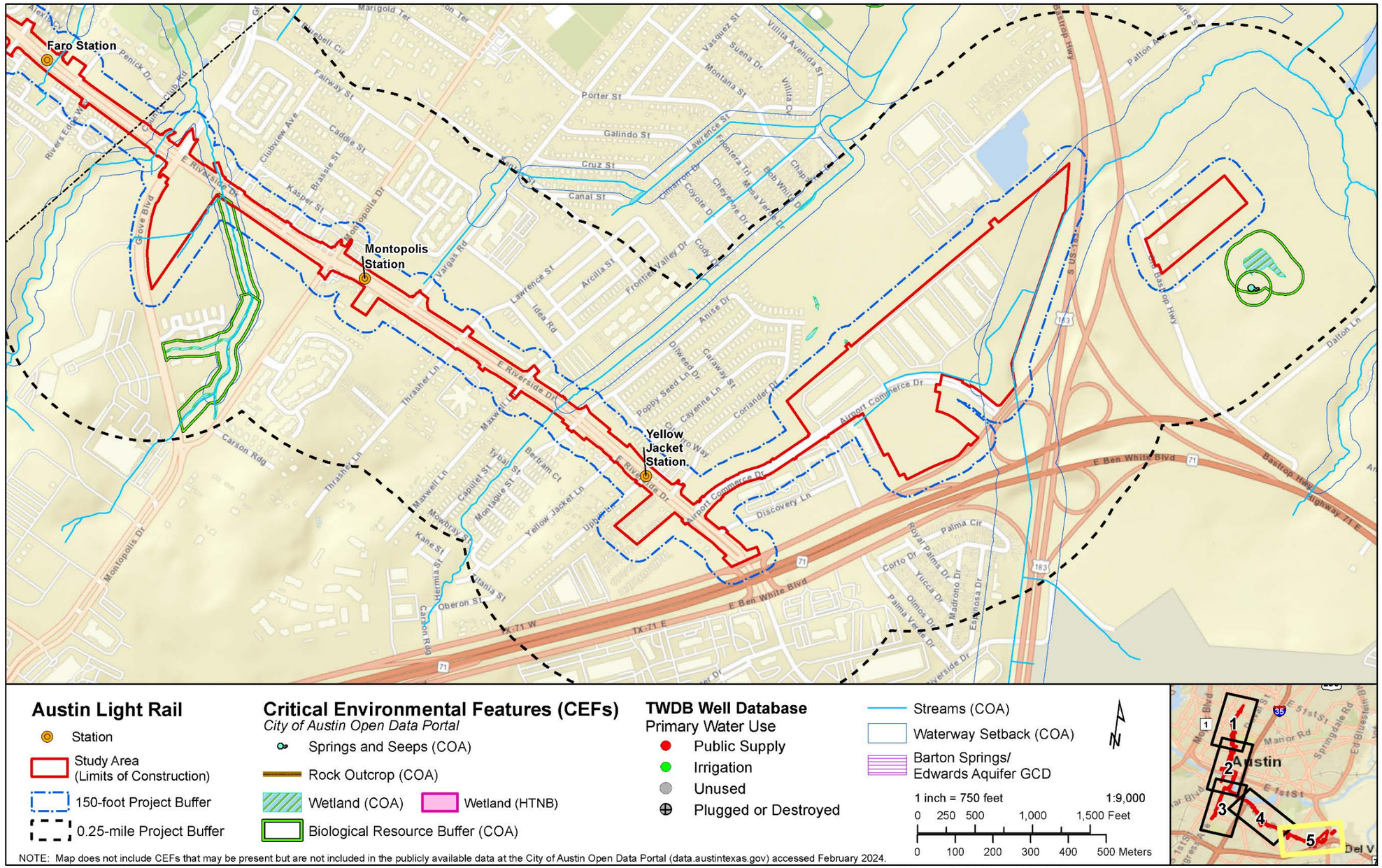
Figure 19: Groundwater Wells and Critical Environmental Features within 0.25 mile of the Study Area (Map 5 of 5)



NOTE: Map does not include CEFs that may be present but are not included in the publicly available data at the City of Austin Open Data Portal (data.austintexas.gov) accessed February 2024.

Basemap: ESRI 2024; CEFs, Streams, and Waterway Setbacks: COA Open Data Portal, accessed Feb 2024; Wells: TWDB Groundwater database, accessed Feb 2024. Austin Light Rail Stations & Construction Limits as of May 2024

4.5.3 Karst Region

The Study Area is within the Balcones Fault Zone karst region. Major caves form by groundwater that flows parallel to the Balcones Fault Zone and discharges at distant and large artesian springs (Texas Speleological Survey 2014). Karst is a type of landscape where the dissolving of the bedrock has created sinkholes, sinking streams, caves, springs, and other characteristic features. In general, a typical karst landscape forms when much of the water falling on the surface 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). For additional information on karst geology, see **DEIS Appendix F-3** and **DEIS Appendix F-5**.

4.5.4 Groundwater Conservation Districts

According to TWDB, a small portion of the Study Area south of Lady Bird Lake (the Colorado River) overlays land managed by the BSEACD. No other groundwater conservation districts are identified within the Study Area.

4.5.5 Groundwater Wells

According to TWDB's groundwater database, there are 13 groundwater wells within 0.25 mile of the Study Area, as shown in **Figure 15** through **Figure 19**. The public water supply wells are identified in **Table 10**. The remaining 11 wells are identified in **Table 11**.

Table 11: TWDB Groundwater Wells Within 0.25 Mile of the Study Area

State Well ID	Owner Name	Primary Water Use	Depth (feet)	Distance and Direction from Study Area	Figure Number
5843401	North Austin State Hospital	Plugged or Destroyed	635	341 feet northwest	15
5843707	State of Texas	Plugged or Destroyed	545	343 feet east	16
5843702	State of Texas	Unused	543	340 feet east	16
5843706	Austin City Library	Unused	530	Within Study Area	16
5843703	Driskill Hotel	Unused	495	156 feet north	16
5843704	F.B. Perry	Unused	485	Within Study Area	16
5843708	Southern Pacific Transportation Co.	Unused	467	7 feet east	16
5842927	TWDB Texas School for the Deaf	Unused	500	360 feet west	17
5842929	TWDB Texas School for the Deaf	Unused	500	360 feet west	17
5851103	Norwood Estate City of Austin	Unused	475	Within Study Area	17, 18
5851101	Q.C. Boatman	Irrigation	470	412 feet north	18

Source: TWDB 2021b.

4.6 Floodplains

According to the FEMA Map Service Center, the Study Area transects the four digital Flood Insurance Rate Map community map panels listed in **Table 12**.

Table 12: Digital Flood Insurance Rate Map Community Map Panels in the Study Area

FIRM Panel Number	Effective Date
48453C0465K	1/22/2020
48453C0445K	1/22/2020
48453C0585H	9/26/2008
48453C0605K	1/22/2020

Source: FEMA 2023b.

A review of the digital Flood Insurance Rate Map community map panels identified the 100-year and 500-year floodplain zone as occurring within the Study Area. These zones generally correspond to mapped water features, including Blunn Creek, Lady Bird Lake (the Colorado River), East Bouldin Creek, Country Club Creek, Carson Creek, and other unnamed drainages.

GIS analysis of FEMA digital Flood Insurance Rate Map data concluded that the Study Area encompasses 16.20 acres of the 100-year floodplain and 17.25 acres of the 500-year floodplain (see **Figure 1** through **Figure 6**). Regulated floodways are areas that encompass the channel of a river or other watercourse and the adjacent lands that must be reserved to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. No floodways have been delineated for drainages within the Study Area.

Table 13. Floodplains in the Study Area by Build Alternative and Design Option

Floodplain	Build Alternative Area (ac)	Design Option Area (ac)					
		Woolridge Suare Station	Cesar Chavez Station	Lady Bird Lake Bridge Extension	Travis Heights Station	Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside	Grove Station
100-year	16.239	16.239	16.239	16.225	16.232	16.239	15.889
500-vear	17.248	17.248	17.248	15.668	17.231	17.248	17.188

5 Environmental Consequences

This section provides an analysis of the potential effects on water resources of the No Build Alternative and the Build Alternative. The water resources include surface waters, water quality, stormwater, safe drinking water, groundwater, and floodplains. Construction effects vary depending on Design Options. As such, additional Project details and field investigation efforts may be necessary to fully evaluate potential effects and environmental consequences to the affected environment in the Study Area. Therefore, the ultimate Project effects will be incorporated into the Final Environmental Impact Statement.

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 *2045 Regional Transportation Plan* (Capital Area Metropolitan Planning Organization 2024) except for the Project. Any effects related to water resources because of the committed improvements are unknown at this time and would be determined for each individual project. 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 impervious area and an associated increase in stormwater runoff in the urban fringe. Stormwater facilities associated with new development in the urban fringe area would reduce potential effects on local streams; however, during the summer they could reduce stream flows, which could degrade water quality.

5.2 Build Alternative and Design Options

The Build Alternative and all Design Options would have similar effects with respect to water resources, with minor differences in floodplain and riverine wetland effects associated with the extension of the bridge over Lady Bird Lake and the elevated Waterfront Station. However, construction effects may be different for the Design Options depending on the ultimate location of the Design Options. As such, additional Project details and field investigation efforts may be necessary to fully evaluate the Study Area for potential effects and environmental consequences to the affected environment resulting from the Build Alternative once additional Design Options details are available. Both short- and long-term effects would be similar for the station alternatives being considered. Therefore, the following water resources discussion applies to both the Build Alternative and the Design Options unless otherwise noted.

5.2.1 Operational (Long-Term) Effects

The following sections describe the potential operational effects on surface waters, water quality, stormwater, safe drinking water, groundwater, and floodplains because of the Build Alternative.

5.2.1.1 Surface Waters

Twelve stream resources were identified within the Study Area. In addition, ten wetland resources (riverine, lake, and freshwater emergent habitats) and two hydric soils were identified within the Study Area. Operational effects on stream and wetland resources would be limited to maintenance of bridges, culverts, and other stormwater management structures and ongoing vegetation maintenance within the permanent right-of-way. Any potential sources of pollution from the construction site that are reasonably expected to affect the quality of discharges would be monitored through the implementation of an SWPPP throughout the construction period. During construction, ATP would restrict construction activities to permanent and temporary workspaces and easements.

According to National Wetlands Inventory data, effects on WOTUS and wetlands would be limited to lake (3.060 acres), riverine (1.121 acres), and freshwater emergent (0.09 acre) habitats for the Build Alternative. This provides the worst-case effect scenario. The effects will be revised as additional Project design is available. The Travis Heights Station Design Option would reduce Project-related effects on riverine wetland habitats to 1.117 acres. The Grove Station Design Option would reduce Project-related effects on riverine wetland habitats to 1.021 acres. The Variation to the Grove Station Design Option would not result in additional effects. The Lady Bird Lake Bridge Extension Design Option would reduce effects on riverine wetland habitats to 1.061 acres. Implementing the Woolridge Square Station, Cesar Chavez Station, and Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside Design Options would result in no change to effects on wetlands.

Permanent effects would occur from the placement of new bridge support structures across Lady Bird Lake. Effects on surface waters would occur for new or widening of existing structures at surface water crossings, including creeks, wetlands, and other drainages such as swales and tributaries, although these effects are anticipated to be minor and associated with modifying existing roadways, bridges, culverts, and other stormwater management structures.

While permanent effects are anticipated, further Project details are needed to fully evaluate each type of effect. Examples of additional information required include Project design details (such as the location and extent of sidewalks, culvert and bridge design, workspaces like temporary utility easements for construction, and other associated facilities) and construction methods (such as open cutting or boring for utility installation, in-place utility abandonment or removal, use of matting in water features for heavy construction equipment, and other undetermined methods).

As indicated in **DEIS Appendix F-3**, prior to construction, ATP would conduct an intensive CEF survey to identify CEFs within 150 feet of the Study Area, as required by the City's Land Development Code. Additional types of CEFs (rimrock, bluff, recharge features) are discussed in **DEIS Appendix F-3**.

5.2.1.2 Water Quality

Transit operations would have potential temporary and permanent effects on water quality, including impaired stream segments, although additional Project details would be necessary for a complete evaluation of effects. When design has advanced, ATP would coordinate with USACE to determine whether a Nationwide Permit or an Individual Permit is required. ATP, under the regulatory review of USACE, would comply with all the conditions required in the Section 404 permit during construction and operation of the Project. Prior to construction and concurrent with the Section 404 process, ATP would complete a Tier II Certification Questionnaire and Alternatives Analysis Checklist for review by TCEQ to obtain Section 401 Water Quality Certification. The Project would follow local water quality requirements provided in Land Development Code Chapter 25-8, including installation of stormwater control measures. Environmental Criteria Manual Section 1.6 (Design Guidelines for Water Quality Controls); and Environmental Criteria Manual Section 1.9 (Need for Water Quality Controls).

5.2.1.3 Stormwater

The Project is designed with the goals of maintaining drainage patterns; ensuring that on-site runoff would be captured, detained, and conveyed; mitigating any potential effects on flooding upstream and downstream; and minimizing potential contamination to surface water, safe drinking water, and groundwater.

New transportation infrastructure, including right-of-way, stormwater management structures, maintenance facilities, stations, and park-and-rides would result in a minor increase in the amount of impervious surface beyond existing conditions, thus influencing surface water flow and potentially slowing recharge of surface water to groundwater. This could increase the opportunity for surface water to capture contaminants and pollutants and carry them to other surface waters or groundwater. Placement of bridge support structures and other fill where the Project may also influence drainage patterns could potentially affect water resources. Potential long-term effects on stormwater from operation and maintenance of the Project would include increased runoff because of the new impervious areas and the potential for surface pollutants (such as oil) to run off into nearby waterbodies. However, the Project would result in a minor increase of new impervious cover by less than 2.0 percent because most of the Build Alternative is impervious cover. Stormwater runoff may have a slightly longer flow path and/or would be

stored temporarily prior to discharge into a stream, but the use of bridges, culvert crossings, and other stormwater management structures would generally allow flow to maintain its pre-construction path. A reclaimed water system would be implemented to further reduce Project-related effects.

Both redeveloped and new impervious cover areas would require compliance with water quality protection measures (Land Development Code Chapter 25-8) to minimize effects of stormwater runoff associated with the Project.

The implementation of compliance and mitigation measures, as detailed in Section 6.2 of this report, would avoid, minimize, and mitigate effects on stormwater, as practicable.

5.2.1.4 Safe Drinking Water

The Project is not anticipated to have a short- or long-term increase in water demand or to increase the groundwater drawdown. Therefore, operational effects on primary sources of safe drinking water or the public water supply are not anticipated.

5.2.1.5 Groundwater

The Project is not anticipated to have a short- or long-term increase in water demand or to increase the groundwater drawdown. 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. 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 minor increase in impervious cover may slow the groundwater recharge rate; however, the rate of recharge would not affect groundwater quality.

By implementing hazardous materials and water quality best management practices, as discussed in Section 6.2, potential effects on groundwater quality would be mitigated.

Potential effects on karst regions and mitigation measures for karst features are discussed in **DEIS Appendix F-3** and **DEIS Appendix F-5**.

5.2.1.6 Floodplains

Operational activities would not modify or otherwise affect the function of floodplains. Operational effects on floodplains are not anticipated as a result of the Build Alternative. Any development proposed in the 100-year fully developed City floodplain would need to comply with Land Development Code Sections 25-8-261 and 25-8-263, and Environmental Criteria Manual Section 1.7.

Project construction would traverse mapped Zone AE (100-year) and Zone X (500-year) floodplains. During planning and conceptual engineering, the Project was designed to avoid and minimize crossings of mapped stream channels. However, the Project would still affect regulatory floodplains because 16.2 acres of the 100-year floodplain and 17.2 acres of the 500-year floodplain are located within the Project's footprint.

The Lady Bird Lake Bridge Extension Design Option, which would extend the bridge spanning Lady Bird Lake on the south shore and include an elevated Waterfront Station, would reduce the Project's effect on regulated floodplains to 16.1 acres of the 100-year floodplain and 15.6 acres of the 500-year floodplain. The Waterfront Station is currently being evaluated as an elevated facility. While Project details are currently being developed, it is anticipated that the final design of the elevated station would result in different floodplain effects from one constructed on the ground; additional Project details would be necessary to fully evaluate these effects. The Grove Station Design Option is proposed within the 100- and 500-year floodplains and would reduce the Project's effect on regulated floodplains to 15.9 acres of the 100-year floodplain and a negligible reduction of less than 0.1 acre of the 500-year floodplain compared to the Build Alternative. The Travis Heights Station Design Option is proposed in the 100- and 500-year floodplains but would have negligible reductions in acreage for both floodplains compared to the Build Alternative. No changes are anticipated with the Woolridge Square Station, Cesar Chavez Station, and Center-Running Bike/Ped. and Shade Tree Facilities on East Riverside Design Options.

The Project design incorporates operational floodplain best management practices, which include swales, vegetative strips, and soil stabilization measures in combination with detention ponds to reduce peak flow rates in compliance with current applicable floodplain requirements. ATP would follow the latest Federal Highway Administration Hydrologic Engineering Center 20 and Hydrologic Engineering Center 18 procedures and guidance found in the Texas Department of Transportation *Hydraulic Design Manual* (Texas Department of Transportation 2019) to maintain stable stream channels and protect existing and planned infrastructure. These procedures apply to hydraulic structures, outfalls, intakes, bridges, rail crossings of roads regulated by the Federal Highway Administration and Texas Department of Transportation, and rail crossings over waterbodies. ATP would evaluate compliance with local floodplain modification requirements implemented by the City's Watershed Protection Department and would incorporate appropriate measures as necessary during final design.

5.2.2 Construction-Related (Short-Term) Effects

The following sections describe the potential construction-related effects on surface waters, water quality, stormwater, safe drinking water, groundwater, and floodplains from the Build Alternative.

5.2.2.1 Surface Waters

During construction of the Project, effects on surface waters, including streams, waterbodies, and wetlands, are anticipated to be minor. Temporary effects would include grading and temporary fill from construction access, staging, and laydown areas. These effects will be quantified when the Project design and construction methods are developed further and permit applications are prepared. Effects on WOTUS during construction would require permits and approvals from the USACE and TCEQ with requirements to avoid, minimize, and mitigate effects.

The Project includes constructing new structures and widening existing structures, including bridges and culverts. At crossings where existing culverts are present, effects within the current

footprint of the existing structure are assumed to be temporary because the feature is considered previously altered within those limits and would be replaced in kind. Effects associated with proposed fill outside of the existing structure for widening the culvert or riprap placement are assumed to be permanent.

Effects on WOTUS during construction would require permits and approvals from USACE and TCEQ that would include requirements to avoid, minimize, and mitigate effects, as described in Section 6.

5.2.2.2 Water Quality

Construction of the Project would result in temporary effects on water quality. Potential effects on water quality would consist of altering the concentration of substances within a waterbody; causing a waterbody to no longer meet a designated use, such as recreation and the ability to support aquatic life; or further degrading an already impaired waterbody. Threatened and impaired waters are close to or already exceed water quality standards for one or more pollutants; a smaller increase of pollutants may affect the ability of the water to meet its designated use than a waterbody where pollutant concentration is historically low. **Table 14** includes the impaired waters that are within 5 miles and within or upstream/downstream of the Build Alternative. None of the impaired waters identified are within the Build Alternative.

Table 14: Affected Impaired Waters Within 5 miles of the Build Alternative

Stream Segment Name	Stream Segment ID	Category/Impairment	Gradient Relative to Project
Walnut Creek	1428B	4a - Bacteria in water (Recreation Use)	Upstream
Bull Creek	1403A	5c - Depressed dissolved oxygen in water	Upstream
Spicewood Tributary to Shoal Creek	1403J	4a - Bacteria in water (Recreation Use)	Upstream
Waller Creek	1429C	5c - Bacteria in water (Recreation Use)	Upstream/ Downstream
Taylor Slough South	1403K	4a - Bacteria in water (Recreation Use)	Upstream

Source: TCEQ 2020.

TMDL implementation plans have been developed by TCEQ for waterbodies impaired with bacteria within and surrounding the Build Alternative (TCEQ 2009, 2015). Stormwater runoff mitigation measures are outlined in TMDL implementation plans for these waterbodies and are summarized in Section 6 (TCEQ 2009, 2015).

5.2.2.3 Stormwater

Construction of the Project would involve ground disturbances, such as excavation and grading, which are anticipated to contribute to short-term effects from erosion and sedimentation; therefore, the volume of sediment in stormwater could increase. Soils may be previously contaminated with petroleum derivatives from vehicles or contaminated sites. Sedimentation and stormwater runoff from construction may result in total suspended solids such as rock, soil, and debris fragments entering downstream water resources. These total suspended solids may also contain bacteria, nutrients, particles, and other constituents attached to sediment or carried separately by stormwater that contribute to pollutant loading. Increased pollutant loading in runoff may affect surface water, water quality, safe drinking water, and groundwater (described in Section 5.2.1). Erosion and sedimentation best management practices (see Section 6), SWPPP controls, and other requirements, such as stormwater permitting and inspections, would be implemented to avoid and minimize effects on stormwater.

5.2.2.4 Safe Drinking Water

There are two public supply wells within 0.25 mile of the Build Alternative. Both wells are upgradient from the Build Alternative (State Well IDs 5842909 and 5842917) (TWDB 2021b). Potential permanent physical effects would occur on groundwater wells, including public water system wells, where construction of the Project would overlap the location of the wells. Based on available data, no public supply wells are located within the Build Alternative. Indirect effects on the wells may occur from the infiltration of contamination or pollutants into the groundwater via downgradient wells. These effects are further discussed in Section 5.2.2.5 and **Table 15** below.

Increased water demand would occur for the duration of construction. Water would be used for construction activities such as dust suppression and mixing concrete. Potable and non-potable water for construction would be supplied from existing surface or groundwater supply systems. Therefore, water demand during construction would not be anticipated to require construction or expansion of a water treatment facility or expanded water entitlements.

5.2.2.5 Groundwater

Sedimentation and runoff from construction of the Project could result in potential temporary effects on groundwater quality due to runoff entering groundwater wells and public supply wells (as identified in Section 5.2.2.4), which is a more direct pathway for runoff to flow to groundwater. Thirteen groundwater wells are located within 0.25 mile of the Build Alternative and could be affected. Ten of these groundwater wells within 0.25 mile are downgradient of the Build Alternative, as shown in **Table 15**.

Potential effects would include the introduction of contaminants from stormwater runoff. Hazardous materials, such as petroleum and oil products used for fueling and maintenance of construction equipment, could also affect groundwater quality if spilled near waterbodies or wellheads, potentially leaching through soil into groundwater.

Table 15: Affected Groundwater Wells

State Well Number	System Name/Owner Name	Well Type	Well Depth (feet)	Gradient
5843401	North Austin State Hospital	Plugged or Destroyed	635	Upgradient
5843707	State of Texas	Plugged or Destroyed	545	Downgradient
5843702	State of Texas	Unused	543	Downgradient
5843706	Austin City Library	Unused	530	Downgradient
5843703	Driskill Hotel	Unused	495	Downgradient
5843704	F.B. Perry	Unused	485	Downgradient
5843708	Southern Pacific Transportation Co.	Unused	467	Downgradient
5842909	City of Austin	Public Supply	452	Upgradient
5842917	City of Austin	Public Supply	450	Upgradient
5842927	TWDB Texas School for the Deaf	Unused	500	Downgradient
5842929	TWDB Texas School for the Deaf	Unused	500	Downgradient
5851103	Norwood Estate City of Austin	Unused	475	Downgradient
5851101	Q.C. Boatman	Irrigation	740	Downgradient

Sources: TCEQ 2021; TWDB 2021b.

The wells within 0.25 mile would not be directly affected but may be indirectly affected by stormwater runoff. These effects would be minimized through the implementation of best management practices as described in Section 6. No springs are located within the Study Area, although one is located within 150 feet near Guadalupe and West 35th Streets (see **Figure 15** through **Figure 19**). There are two additional springs and one seep within 0.25 mile from the Study Area (see **Figure 15** through **Figure 19**). No direct effects on these springs are anticipated because they are outside the Study Area. Indirect effects may occur from sediment and water quality effects. Best management practices would be implemented to minimize and mitigate these effects (see Section 6).

Any construction below the ground surface would locally disturb the uppermost soil layer into which rainwater infiltration occurs. The addition of impervious cover, both temporary and permanent, would alter the infiltration rate into the subsurface within the Build Alternative. Construction could also encounter groundwater. If groundwater is encountered, it is typically removed and disposed of. As discussed in **DEIS Appendix E-8**, mitigation measures would be implemented in areas where construction activities would encounter known or suspected contaminated soil or groundwater to prevent or minimize potential hazardous materials spills and contain areas of known contamination, including both soil and groundwater. Construction

activities near utility corridors by leaking petroleum storage tank sites or dry cleaner facilities may have a higher potential to encounter contaminated materials.

By implementing best management practices and mitigation for temporary and permanent erosion, sediment, and water quality controls discussed in Section 6, the pathway for contamination to reach groundwater would be reduced.

5.2.2.6 Floodplains

ATP would ensure compliance with applicable FEMA regulations, including Executive Order 11988, and the Flood Risk Management Standard. Prior to construction, ATP would obtain a Floodplain Development Permit from FEMA and the local floodplain administrator, the City's Watershed Protection Department, for any effects within FEMA floodplain boundaries. Adherence to local City floodplain modification requirements will be required.

During construction, adverse effects on floodplains, defined as a rise in floodplain elevation, would be minimized through the implementation of mitigation measures discussed in Section 6. Therefore, substantial encroachment of a regulatory floodplain during construction would not occur.

6 Mitigation

6.1 Surface Waters

During construction of the Project, potential effects on surface waters 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 surface waters, including primarily using existing roadway structures over water features (the Colorado River). ATP would acquire the necessary permits as described below before initiating construction.

6.1.1 Compliance Measures

To avoid, minimize, and mitigate potential effects on surface waters because of the Project, ATP would comply with the following compliance measures:

- **Avoidance and Minimization.** In accordance with Section 404(b)(1) guidelines and pursuant to the Final Mitigation Rule (40 CFR 230.91), ATP would take appropriate and practicable steps to avoid and minimize adverse effects on WOTUS during construction. Measures to avoid and minimize effects include, but are not limited to, the following:
    - Temporary fills would consist of materials that would not be eroded by expected high flows;
    - Temporary fills would be removed in their entirety and the affected areas returned to pre-construction elevations as soon as practicable after construction;
    - No activity would be permitted to use unsuitable material (trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged would be free from toxic pollutants (i.e., clean fill);

- The areas affected by temporary fills would be revegetated as soon as practicable after construction following Environmental Criteria Manual Section 1.4 (Erosion and Sedimentation Control Criteria);
- In wetland areas disturbed by construction, a minimum of 12 inches of topsoil material from the wetland would be stockpiled and used as backfill material to restore pre-construction contours, if recommended by City's Watershed Protection Department;
- To preserve stream characteristics to the extent possible, open-bottom culverts would be used in place of closed culverts where practicable; a waiver from the City's Watershed Protection Department may be required; and
- Construction detention basins would be developed in-line or off-channel, as necessary.

- **Maintain Low Flow.** In compliance with the Clean Water Act and under USACE general permit conditions, ATP would design and construct crossings of WOTUS to maintain low flows and avoid stream relocations during construction and operation of the Project. This includes maintaining flows sufficient to support the necessary life cycle movements of those species of aquatic life indigenous to the water body, including those species that normally migrate through the area.
  - All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.
  - If bottomless culverts cannot be used, the crossing should be designed and constructed to minimized adverse effects on aquatic life movements.
  - To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity unless alterations are designed to benefit the aquatic environment (e.g., stream restoration).
  - The activity must not restrict or impede the passage of normal or high flows and must be constructed to withstand expected high flows.
- **Pre-construction Conditions.** In compliance with the Clean Water Act and under USACE general permit conditions, ATP would require the construction contractor to restore pre-construction contours and remove temporary fills from all temporarily affected WOTUS (e.g., temporary equipment crossings or temporary disturbances in construction areas around and beneath the Project) to pre-construction conditions.
- **Clean Water Act Section 404 Permit.** Where avoidance of effects on WOTUS is not practicable, ATP would request authorization under a Section 404 permit from the USACE Fort Worth District prior to initiating construction. ATP, under the regulatory review of USACE, would comply with all the conditions required in the Section 404 permit during construction and operation of the Project. When design has advanced, ATP would coordinate with USACE to determine whether a Nationwide Permit or an

Individual Permit is required. A preconstruction notification will be required because the proposed Project would occur in the vicinity of federally listed species and (potentially) cultural resources eligible for listing on the National Register of Historic Places.

- **Waters of the U.S. Mitigation Plan.** If effects on WOTUS exceed 0.10 acre of loss of wetlands or 0.03 acre of loss of stream channel at any crossing, ATP would develop a mitigation plan as part of a Clean Water Act Section 404 permit to provide compensatory mitigation for unavoidable permanent effects in accordance with the requirements of the Clean Water Act and as agreed upon by the USACE District, including specific mitigation guidelines. The mitigation plan would include sufficient detail to demonstrate measures taken to avoid, minimize, and mitigate the aquatic functions that would be lost or impaired because of the Project.
- **City of Austin Site Development Permit.** ATP would prepare a site plan that details proposed improvements and construction, including locations of facilities, landscaping, detention ponds, utility improvements, and other project components. Site Plans are reviewed for compliance with the City's Land Development Code, including zoning, design standards, drainage and floodplain, water quality, transportation, environmental review, and/or erosion control.

6.2 Water Quality, Stormwater, Safe Drinking Water, and Groundwater

During construction of the Project, potential effects on water quality would be minimized by adhering to compliance measures and permitting described in the following sections. ATP has incorporated drainage features into the design of the Project to maintain water flow, to provide natural filters for stormwater runoff, and to ensure that off-site cross-drainage patterns would not be changed where practicable. In addition, ATP included design features to avoid and minimize potential effects on water quality. ATP would acquire the necessary permits as described below before initiating construction. In addition, green infrastructure, in accordance with the City Green Infrastructure Priority Program, would be implemented to further reduce effects on water quality, stormwater, safe drinking water, and groundwater.

6.2.1 Compliance Measures

The following compliance measures are anticipated to be required for water quality, stormwater, safe drinking water, and groundwater because of the Project.

6.2.1.1 Section 401 Water Quality Certification

Prior to construction and concurrent with the Section 404 process described in Section 6.1.1, ATP would complete a Tier II Certification Questionnaire and Alternatives Analysis Checklist for review by TCEQ to obtain Section 401 Water Quality Certification. TCEQ may request additional information from ATP.

6.2.1.2 TPDES General Construction Permit (TXR150000) and Multi-Sector General Permit (TXR050000)

Prior to construction, ATP would prepare a SWPPP for the Project or for each construction segment and would submit a Notice of Intent to TCEQ (with the appropriate fees) to obtain coverage under the General Construction Permit. Before starting construction, ATP would ensure a copy of the Site Notice is posted at the construction site, and the notice would remain posted until construction is completed. Activities conducted during construction would adhere to General Construction permit requirements.

ATP would obtain authorization under the Multi-Sector General Permit (TXR050000) to discharge stormwater during operation of the Project. ATP would monitor contaminant levels in stormwater discharges annually as set forth in the permit. These results would be maintained on-site with the SWPPP. For waters impaired with bacteria, the TMDL implementation plans collectively conclude that for construction sites, compliance with the TCEQ General Construction Permit is an adequate measure to contain stormwater runoff within the TMDLs.

6.2.1.3 Stormwater Management / Stormwater Pollution Prevention Plan

Prior to construction, ATP would prepare a SWPPP and submit a Notice of Intent to TCEQ to address authorized discharges that would reach WOTUS, including discharges to MS4s that drain to WOTUS, to identify and address potential sources of pollution that are reasonably expected to affect the quality of discharges from the construction site. ATP would be responsible for implementing the SWPPP throughout the construction period. During construction, ATP would restrict construction activities to permanent and temporary workspaces and easements.

ATP would incorporate green infrastructure, such as bioswales, rain gardens, permeable pavement, and green spaces, to the maximum extent practicable to promote infiltration and groundwater recharge, reduce stormwater runoff and standing water, reduce peak stormwater flows, reduce the risk of flooding, and increase soil porosity as outlined in EPA's *Green Infrastructure Opportunities that Arise During Municipal Operations* (2015).

To address Section 401 Water Quality Certification requirements, ATP would identify and implement temporary stormwater controls. ATP would implement sediment control measures prior to the start of and during construction and would isolate the construction area from waterbodies and wetlands. ATP would store dredged and fill material in a way that prevents sedimentation runoff to waterbodies. Control measures may include, but would not be limited to, the following:

- Silt fence;
- Triangular filter dike;
- Rock berm;
- Hay bale dike;
- Erosion control compost;
- Compost filter socks; and
- Mulch filter socks.

ATP would stabilize disturbed areas during construction to prevent sediment from entering adjacent waterbodies and wetlands. Stabilization measures may include, but would not be limited to, the following:

- Temporary vegetation;
- Blankets/matting;
- Mulch;
- Sod;
- Interceptor swale;
- Diversion dike;
- Erosion control compost; and
- Mulch filter socks.

6.2.1.4 MS4 Requirements

As part of compliance with TPDES and any MS4 requirements, prior to construction ATP would provide the City and/or its MS4 operators with a copy of the SWPPP and/or Notice of Intent, where required by local ordinance. During the construction phase, the City and/or its MS4 operators may inspect the construction site as regularly as every 14 calendar days. ATP would conduct regular inspections, maintenance, and recordkeeping to determine whether appropriate control measures have been installed and implemented in accordance with the SWPPP and General Construction Permit.

6.2.1.5 City of Austin Watershed Protection Ordinance

Prior to construction, compliance measures with City land ordinance codes pertaining to watershed protection and stormwater control measures will be incorporated during final design.

6.2.1.6 City of Austin Environmental Resource Inventory

Prior to construction, ATP would conduct an intensive CEF survey to identify CEFs within 150 feet of the Build Alternative, as required by the City's Land Development Code and Environmental Criteria Manual. Following the intensive survey, buffer distances would be coordinated with the City's Watershed Protection Department, and if applicable, variance requests would be submitted.

6.2.2 Mitigation Measures

The following mitigation measures are anticipated to be required for water quality, stormwater, safe drinking water, and groundwater because of the Project.

6.2.2.1 Maintenance and Inspection of Temporary Erosion and Sediment Controls

Prior to construction, City permitting requirements set forth in the City's Land Development Code and Environmental Criteria Manual would be met. During construction, procedures would include the following, at minimum:

- Silt and sediment would be removed from devices no later than when the design capacity of the device reached 50 percent of the original design capacity; and

- Deteriorated materials would be repaired or replaced when discovered.

ATP would regularly inspect the Project area in compliance with General Construction Permit TXR150000. ATP would inspect the Project area, as defined in the SWPPP, to evaluate the condition of erosion and sediment controls. Inspections would be conducted either every 14 calendar days or within 24 hours of a rain event consisting of greater than or equal to 0.5 inch. An alternative schedule would be that ATP conduct regular inspections every 7 calendar days regardless of whether there has been a rainfall event since the previous inspection.

6.2.2.2 Crew Training

Prior to and throughout construction, ATP would hire and maintain a qualified representative to train construction crews and contractors and oversee the installation and maintenance of erosion and sediment controls and other best management practices.

6.2.2.3 Site Restoration and Revegetation

Upon completing construction activities, ATP would restore temporary construction areas to at least the quality of preexisting conditions. Additionally, where feasible, native seed mixes approved by U.S. Department of Agriculture and the City's Environmental Criteria Manual would be used to minimize the introduction of invasive species. Where native seeding is proposed, ATP would verify that seed mixes consist of native species appropriate for the ecoregion. ATP would coordinate site restoration and revegetation requirements, including the control of invasive species, in accordance with other statutory obligations (i.e., Section 404 permit, TPDES, U.S. Fish and Wildlife Service, TPWD), the City's Environmental Criteria Manual, landowner agreements, and local site conditions.

6.2.2.4 Total Suspended Solids / Stormwater Runoff Control (Permanent)

Once construction is completed, ATP would implement final stabilization measures to reduce total suspended solids, soil erosion, and sedimentation to protect adjacent waterbodies. Acceptable measures for stabilization include the following:

- Retention/irrigation systems;
- Extended detention basin;
- Vegetative filter strips;
- Grassy swales;
- Sedimentation chambers;
- Constructed wetlands;
- Wet basins;
- Vegetation-lined drainage ditches;
- Rain gardens;
- Biofiltration ponds;
- Sand filter systems; and
- Mulch filter socks.

6.3 Floodplains

During the conceptual design of the Project, ATP followed design guidelines to avoid or minimize effects on floodplain elevations. ATP:

- avoided and minimized crossings of mapped stream channels;
- fully spanned the stream channel where possible where crossing a regulatory floodplain or an unregulated stream segment would be necessary;
- avoided and minimized pier placement for bridges within floodplains;
- included a minimum freeboard above the base flood elevation (if Zone AE);
- designed low chord elevations of proposed bridges with an additional freeboard above the modeled water surface elevation to protect against increased flooding risk from future development;
- minimized siting construction staging and access areas and temporary fill within a floodplain;
- minimized permanent fill within a floodplain; and
- ensured no adverse effects on adjacent properties/development.

Additionally, during final design, ATP would continue to offset effects on flooding upstream or downstream of the Project by complying with drainage design criteria from local authorities.

6.3.1 Compliance Measures

The following compliance measures are anticipated to be required for the Project.

6.3.1.1 Floodplain Development Permit

During final design, ATP would obtain floodplain development permits from the local floodplain administrator and the City's Watershed Protection Department and would comply with local floodplain regulations, as required by the floodplain development permits.

6.3.1.2 Construction Floodplain Best Management Practices

During construction within floodplains, ATP would implement erosion and sedimentation controls in accordance with TPDES Permit TXR150000. Prior to beginning work, ATP would submit a Notice of Intent to obtain coverage and, on completion of work, a Notice of Termination. ATP would conduct periodic site inspections and maintenance when best management practices are in place to identify and address areas requiring maintenance. ATP would maintain records of all inspections as part of the SWPPP. Local regulatory entities have the authority to conduct additional inspections as they deem necessary.

At the conclusion of construction, site restoration, including vegetation replanting, would be performed by ATP in accordance with TCEQ Clean Water Act Section 401 water quality certification standards (see Section 6.2.1.1).

For all stream crossings temporarily affected during construction, ATP would implement best management practices in accordance with local regulating authorities, any local site development permits, and any USACE Section 404 permits. Typical best management practices may include the following:

- Passage of normal or high downstream flows would be maintained to the maximum extent practicable;
- Temporary fills would consist of materials that would not be eroded by expected high flows;
- Temporary fills would be removed in their entirety and the affected area returned to pre-construction elevation as soon as practicable after construction; and
- The areas affected by temporary fill would be revegetated as soon as practicable after construction following Environmental Criteria Manual Section 1.4 (Erosion and Sedimentation Control Criteria).

6.3.1.3 Operational Floodplain Best Management Practices

During final design, ATP would incorporate permanent floodplain controls that may include swales, vegetative strips, and soil stabilization measures in combination with detention ponds to reduce peak flow rates in compliance with current applicable floodplain permit requirements.

6.3.1.4 Channel Stability

During final design, ATP would follow the latest Federal Highway Administration Hydrologic Engineering Center 20 and Hydrologic Engineering Center 18 procedures to maintain stable stream channels and protect existing and planned infrastructure, including the Texas Department of Transportation *Hydraulic Design Manual* (Texas Department of Transportation 2019). These procedures would apply to hydraulic structures, outfalls, intakes, bridges, rail crossings of roads regulated by the Federal Highway Administration and Texas Department of Transportation, and rail crossings over waterbodies.

6.3.1.5 Local Floodplain Regulations

ATP would evaluate compliance with local floodplain requirements implemented by the City's Watershed Protection Department and would incorporate appropriate measures as necessary during final design. The City's Land Development Code defines prohibited activities and/or encroachment of floodplains.

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