Collin County Future Mobility Study

Phase 1: Visioning

Final Report

October 2021

BURNS McDONNELL

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Future Mobility

Keeping Collin County Connected

Planning for the Future

The Future Mobility Study is an opportunity to identify transportation needs and develop a plan to accommodate population and employment growth in the eastern part of the County.

The study includes Dallas, Rockwall and Hunt counties to help ensure a regional approach to transportation planning.

AUGUST 2020 – RESEARCH AND PLANNING
The initial phase of the study began in August 2020 and focused on preliminary data collection and analysis as well as public and stakeholder outreach.

OCTOBER 2020 – STAKEHOLDER MEETINGS
The study team began meeting with city and county representatives to gather additional information such as transportation planning efforts and current and future developments.

FEBRUARY 2021 – TECHNICAL WORK SESSIONS
Two technical work sessions were held to present study data and gather initial input from city and county representatives.

MAY 2021 – PUBLIC MEETINGS
Information shared at the technical work sessions was presented for public review and comment at virtual and in-person public meetings.

Data Collection and Analysis

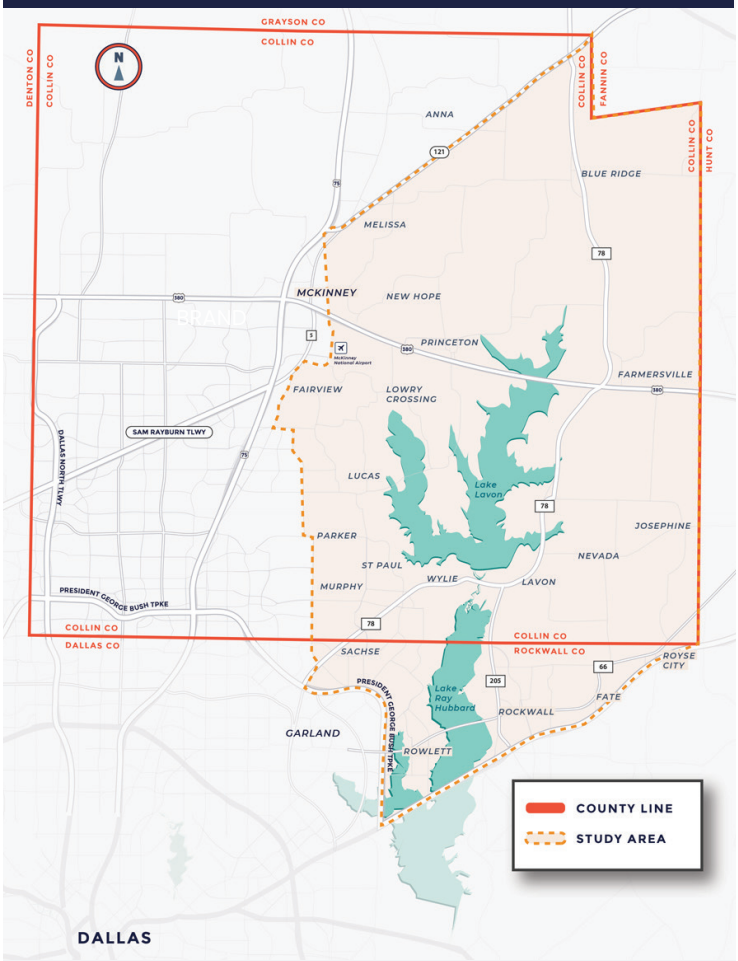
POPULATION AND EMPLOYMENT GROWTH

Population projections were collected from a variety of sources, including the US Census Bureau for historic data through 2010, and the Texas Demographic Center, North Central Texas Council of Governments (NCTCOG), Texas Water Development Board and Collin County Mobility Plan for future projections. All sources show a similar trend – that the population of Collin County will continue to grow at a rapid rate.

According to data from the Texas Water Development Board, population for many of the cities in the eastern part of the County will be near or exceed 100,000 people by 2070.

Employment growth is also an important factor to consider since jobs will attract new residents as well as commuters. The study found that employment growth in the study area is consistent with population projections and in some areas, employment is actually growing at a much higher rate than the population.

FUTURE MOBILITY STUDY AREA



In the last 20 years, Collin County's population has doubled to more than 1 million people. The County's high growth rate is expected to continue and could reach 2.1 – 3.4 million at buildout. Historical data and growth projections show that the County is growing from the southwest to the northeast and east. Developing a cohesive roadway network and planning for future roadway corridors can require years of advance planning and development which is why the County must plan now for growth it expects in 30 years and beyond.

EXPECTED POPULATION GROWTH

CITY	POPULATION INCREASE
ROCKWALL	more than **160%**
FATE & JOSEPHINE	more than **200%**
PRINCETON & ROYSE CITY	more than **700%**
LAVON	more than **1000%**
FARMERSVILLE & NEVADA	almost **2000%**

ENVIRONMENTAL CONSTRAINTS

The study utilized publicly available data to identify land use, major utility corridors, public parks and recreation areas, conservation and environmentally sensitive areas, and natural features.

Notable constraints within the study area include:

Lavon Lake

Lake Ray Hubbard

US Army Corps of Engineers (USACE) land

Several oil and gas pipelines

Several Soil Conservation Site Reservoirs

Many other smaller lakes

EXISTING MAJOR ROADWAYS

In the study area, few major roadways currently exist. Major north-south roadways include FM 1378 (also known as Country Club Road), SH 78 and SH 205. Major east-west roadways include US 380, FM 6, SH 78 and US 66. Most of the major existing roadways within the study area are two lane roadways, while only about 20% of these major roadways are six lanes wide. These two-lane roadways will not meet the demands of the future, projected population in the area.

The study also compared freeways in Collin, Dallas, Tarrant, Denton, Hunt and Rockwall Counties. By the year 2050, Collin County's population could be equal to or greater than Dallas County's population in 2017 with less infrastructure to support projected growth.

SAFETY AND CRASH ANALYSIS

A safety and crash analysis for the study area was completed using TxDOT's Crash Records Information System (CRIS). The study team analyzed five years of crash data from 2015-2019 and found that more than 15,000 crashes were reported in the study area.

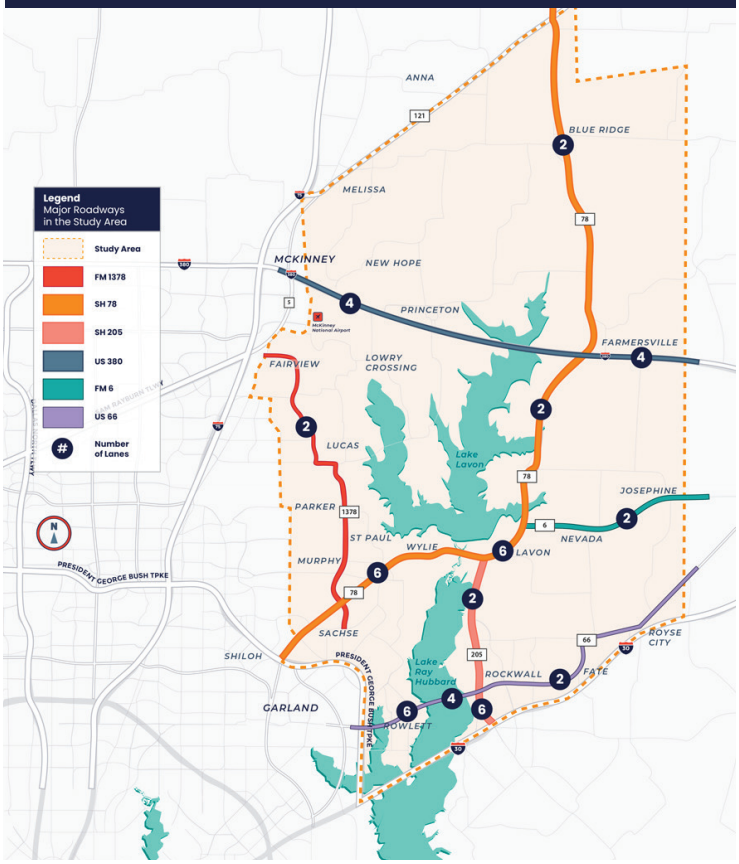
As population continues to increase and roadways become more congested, crash frequency is expected to increase as well.

COMMERCIAL AND RESIDENTIAL DEVELOPMENTS

The eastern part of Collin County has become an attractive location for commercial and residential developers. Data was collected about planned developments, active zoning areas, preliminary plat requests and requests for zoning changes.

The data was mapped to identify areas of development that could limit future transportation options. The area between Lavon and Rockwall showed a significant increase in planned residential developments. So, while these areas may appear very rural today, they will become more developed and will place an even heavier burden on existing transportation infrastructure.

EXISTING MAJOR ROADWAYS



- **+ 50% OF CRASHES RESULTED FROM SIMILAR CAUSES**
  Over half of the crashes were related to intersections resulting from distracted driving, speeding or left turning vehicles.
- **1/3 OF CRASHES RESULTED IN INJURY**
  While most of these crashes were rear end crashes, alarmingly one-third of crashes in the study area resulted in an injury.
- **20% INCREASE IN CRASHES**
  Crashes in the study area increased by 20% from 2015-2019.

ORIGIN-DESTINATION TRAFFIC STUDY

An Origin-Destination (O&D) Traffic Study was conducted to better understand travel patterns in the study area, such as where people begin their trip, where they end their trip, the routes they take and the time of day they travel.

Anonymous data points were collected from mobile devices that traveled along SH 78 and SH 205. Using this new technology, the study team was able to collect and analyze data from various time periods, including prior to and during COVID-19 for comparison. The data generated 2.3 million trips and captured 155,000 unique vehicles.

Despite the majority of the study area being in Collin County, 40% of trips along SH 78 and SH 205 originated in Collin County, 40% in Rockwall County and 20% in Dallas County.

IMPROVEMENTS NEEDED TO MEET DEMAND

The SH 78 corridor is largely serving as a long-distance connection with up to 60% of the current trips over 10-miles long. Since SH 78 varies between two to six lanes, as traffic volumes increase, additional capacity or redundancy in adjacent roadways may be needed to meet the regional demand.

SHORT TRIPS CONTRIBUTE TO PEAK CONGESTION

As future development is realized along the corridor, short trips will likely increase as motorists will not have to travel as far to access shops and restaurants. This will likely increase turning vehicles and congestion and thus increase travel times for both short and long-distance trips.

FUTURE GROWTH WILL INCREASE TRAVEL DEMAND

While this analysis primarily looked at north-south movements, it is clear that due to limited east-west access across Lavon Lake and Lake Ray Hubbard, SH 78 between the lakes is a critical roadway link and a pinch point for traffic. Once vehicles east of Lavon Lake move through the point between the lakes, many trips use FM 544 to get to the interchange of PGBT and US 75 and other major business corridors. This demand will only increase as population grows in east Collin County.

Public and Stakeholder Outreach

STAKEHOLDER MEETINGS

The study team conducted 22 meetings with agencies, cities and counties to discuss the study purpose and scope, tentative timeline, transportation planning efforts, current and future developments, possible constraints and best methods for engaging the public.

TECHNICAL WORK SESSIONS

Two virtual technical work sessions were held in February 2021 to present study data, including results of the origin-destination traffic study, crash analysis and constraints mapping.

Thirty-four people participated and provided initial feedback on transportation needs in the study area.

PUBLIC MEETINGS

Due to COVID-19, public meetings were held in multiple formats to provide a variety of options.

An interactive, virtual public meeting was available on the study website from Monday, May 3, 2021 to Friday, June 4, 2021. During this time, the study website received 2,300 unique visitors and 7,500 page views.

A live presentation of the study materials was held via Zoom on Tuesday, May 4, 2021. Thirty-six people participated in the live presentation.

An in-person public meeting was held on Thursday, May 6, 2021 from 4:00 p.m. to 8:00 p.m., at the Lavon City Hall Community Gym. Sixty people attended the in-person meeting.

Input from the public was collected through an online survey as well as mail and email. The online survey received 244 responses.

OUTREACH ACTIVITIES

2,300	VIRTUAL MEETING ATTENDEES
36	LIVE PRESENTATION ATTENDEES
60	IN-PERSON MEETING ATTENDEES
244	SURVEY RESPONSES

WHAT WE HEARD: OUTREACH THEMES

GROWTH

Survey Question:
Which type of population growth do you feel is most likely to occur in the study area?

Many city and county representatives, particularly in the southeast portion of the County, recognize that transportation improvements are needed to accommodate population and employment growth.

SURVEY RESPONSES

50%	RAPID GROWTH
24%	MODERATE GROWTH
20%	EXPONENTIAL GROWTH
5%	SLOW SUSTAINED GROWTH

CONNECTIVITY

Survey Question:
What types of transportation improvements are you most interested in for the study area? (check all that apply)

In addition to north-south connectivity, east-west connectivity continues to be a challenge in the study area due to environmental constraints such as Lavon Lake and Lake Ray Hubbard.

SURVEY RESPONSES

70%	IMPROVEMENTS TO THOROUGHFARES
47%	CITY STREETS
35%	FREEWAYS
22%	OTHER
8%	NO IMPROVEMENTS NEEDED

TRAFFIC CONGESTION

Most of the major roadways in the study area are two lanes wide with only 20% of the roadways six lanes wide.

Many comments from the public noted long wait times at traffic signals and lack of alternative routes to avoid traffic delays.

Traffic congestion was listed as the top concern for survey respondents.

OTHER CONCERNS

City and county representatives noted concerns about funding and a desire to balance improvements with maintaining a "small town feel."

Comments from the public also included concerns about safety and potential property and environmental impacts.

Recommendations and Next Steps

Based on data presented in this initial phase of the study, including the increased growth that is expected for the study area, it is recommended that Collin County begin to identify improvements and route studies to support future project implementation decisions, preserve land needed for improvements, and determine the potential use of federal funding.

Introduction

Collin County is one of the fastest growing counties in the state and nation. In the last 20 years, the County's population has doubled from approximately 500,000[1] to just over 1 million[2] people. The County's high growth rate is expected to continue and the population could reach 2.1 – 3.4[3] million in the next 30 years and beyond. Historical data and growth projections show that Collin County is growing from the southwest to the northeast and east. The Future Mobility Study was initiated to identify transportation needs and develop a plan to accommodate population and employment growth in the eastern part of the County.

Developing a cohesive roadway network and planning for future corridors can require years of advance planning and development which is why the County must plan now for growth it expects in the next 30 years and beyond. Early planning and public involvement are important for maximizing mobility benefits, identifying transportation options, evaluating and mitigating possible impacts, and preserving land needed for potential improvements.

The Future Mobility Study was built on needs and recommendations identified in the County's 2014 Mobility Plan. The initial phase of the study included preliminary data collection and analysis as well as stakeholder and public outreach. Data collection and analysis included population and employment projections, environmental constraints, commercial and residential developments, major existing and planned roadways, safety and crash analysis, and an origin-destination traffic study.

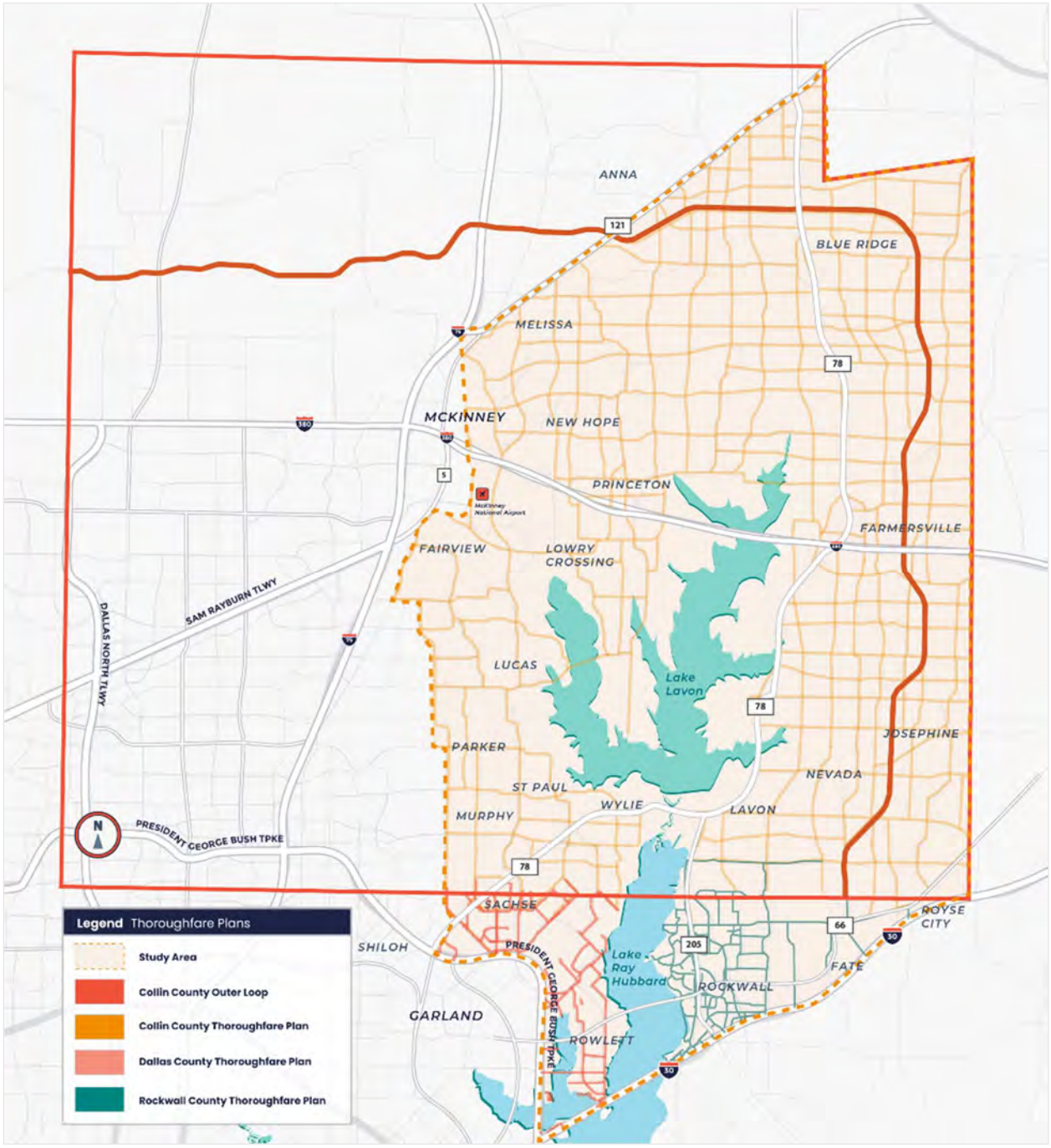
Study Area, Scope and Background

Study Area

The study area is bound by I-30 on the south, SH 121 on the north and the Collin County/Hunt County line on the east. The western boundary is a combination of President George Bush Turnpike, SH 78, FM 2551, SH 5 and Airport Boulevard. **Figure 1** is a map of the study area. Although Collin County led the study because of its broad geographical jurisdiction, input from the public as well as other regional partners is critical for identifying future needs and improvements.

[1] 2000 US Census
[2] 2019 US Census Quick Facts Collin County, Texas
[3] Collin County Mobility Plan

Figure 1: Collin County Future Mobility Study Area



Study Scope

The Future Mobility Study began in August 2020 with preliminary data collection and analysis. In October 2020, the study team began meeting with city and county representatives to gather additional information such as transportation planning efforts and current and future developments. In February 2021, two Technical Work Sessions were held to present study data and gather initial input from city and county representatives. Information shared at the Technical Work Sessions was also presented for public review

and comment in May 2021. This report details findings from the study and also makes recommendations for next steps.

Background

Collin County Mobility Plan

The Future Mobility Study was built on needs and recommendations outlined in Collin County's Mobility Plan which was updated in 2014 and then revised in 2016. The update serves as a guide for future investments in transportation facilities and services in the County.

The plan includes two buildout scenarios for Collin County, 2.1 million which was developed in 2014 and 3.4 million which was developed in 2016.

The buildout scenario that was developed for the 2014 Collin County Mobility Plan Update included constraints such as SH 78 being the only north-south major roadway; limited access across Lavon Lake; lack of water and wastewater infrastructure; and a desire from residents and local leadership for more rural development. These growth-limiting factors influenced the population and employment projections for the eastern part of the County and resulted in a buildout population of 2.1 million.

In 2016, an addendum was developed for the Mobility Plan that removed these growth-limiting factors and assumed the eastern area of the County would develop in a similar suburban pattern to the western half of the County. When these constraints were removed, the buildout scenario produced an ultimate population of 3.4 million.

In both scenarios, municipal comprehensive plans were used to establish buildout projections in the related municipal planning areas.

NCTCOG Collin County Strategic Roadway Plan (CCSRP)

The CCSRP was conducted by NCTCOG from 2017 to 2018 with the purpose of evaluating possible north-south roadway connections to/from Dallas and Rockwall counties, as well as potential east-west roadway connections to/from Hunt and Rockwall counties. None of the roadway proposals identified for the study area in the CCSRP were approved or finalized when the Future Mobility Study began in August 2020.

The recommendations and conceptual alignments in the CCSRP were based solely on technical feasibility and did not identify a final solution type or alignment.

The Future Mobility study team reviewed data gathered and presented during the CCSRP.

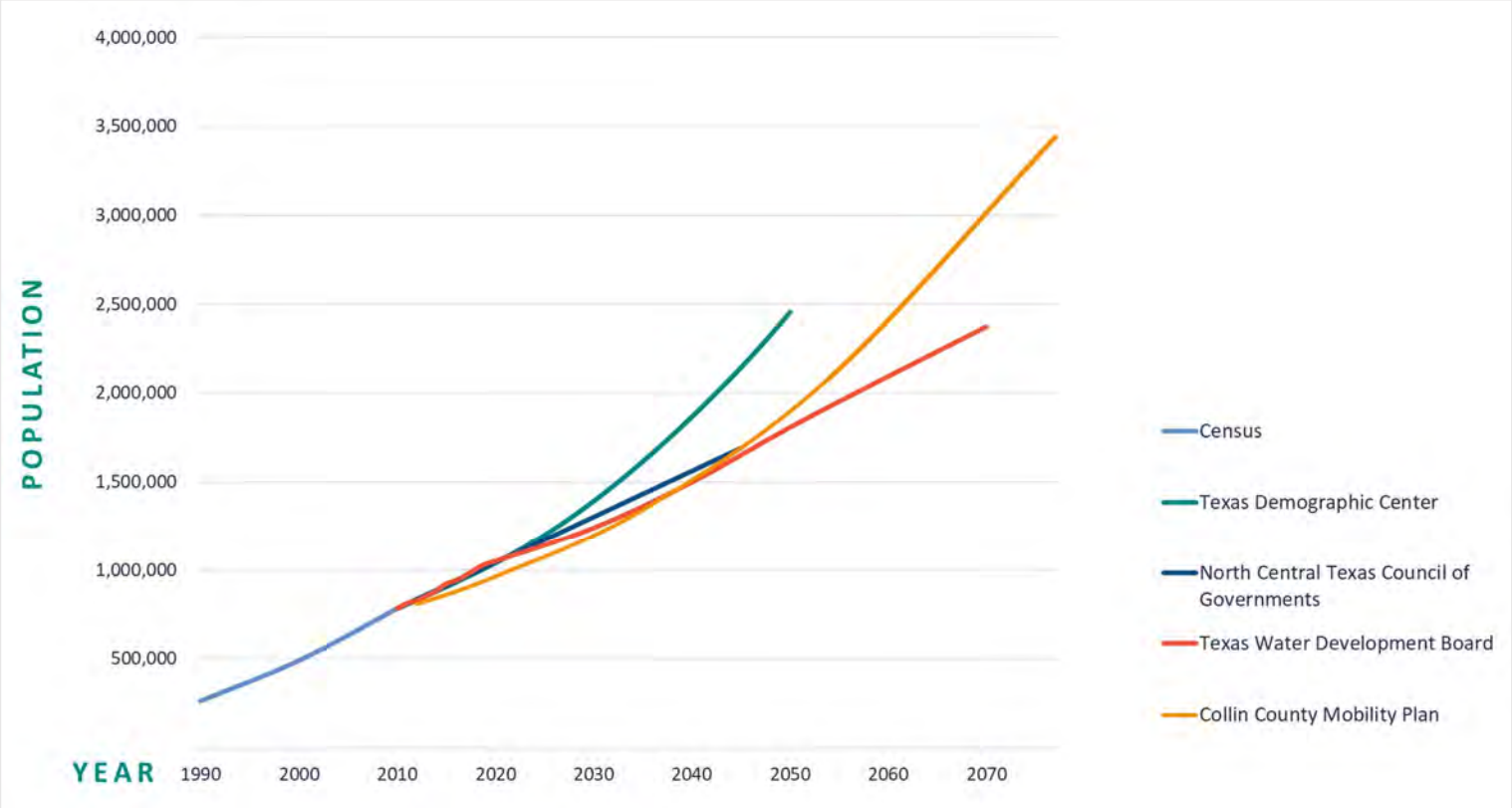
Current and Future Conditions

Population Growth

Figure 2 shows historic and future population growth for Collin County beginning in 1990 through 2070. These population projections are from a variety of sources, including the US Census Bureau for historic data through 2010, and the Texas Demographic Center, North

Central Texas Council of Governments (NCTCOG), Texas Water Development Board and Collin County Mobility Plan for future projections. While the actual numbers and buildout dates may differ between the various sources, all sources show a similar trend – that the population of Collin County will continue to grow at a rapid rate.

Figure 2: Historic and Future Population Growth, Collin County 1990-2070



Study Area Population Densities

The projected population growth in the study area was analyzed using data from the 2016 Addendum to the Collin County Mobility Plan (Figures 3 thru 6). Each shape outlined on the figures represents a Traffic Survey Zone (TSZ). Similar to census tracts, TSZs are zones developed by North Central Texas Council of Governments (NCTCOG) which allow planners to focus on specific neighborhoods and business centers in the region. In several locations, the TSZ may be larger than the city itself and may even extend beyond physical land boundaries.

Figure 3: Study Area Population Density, 2012

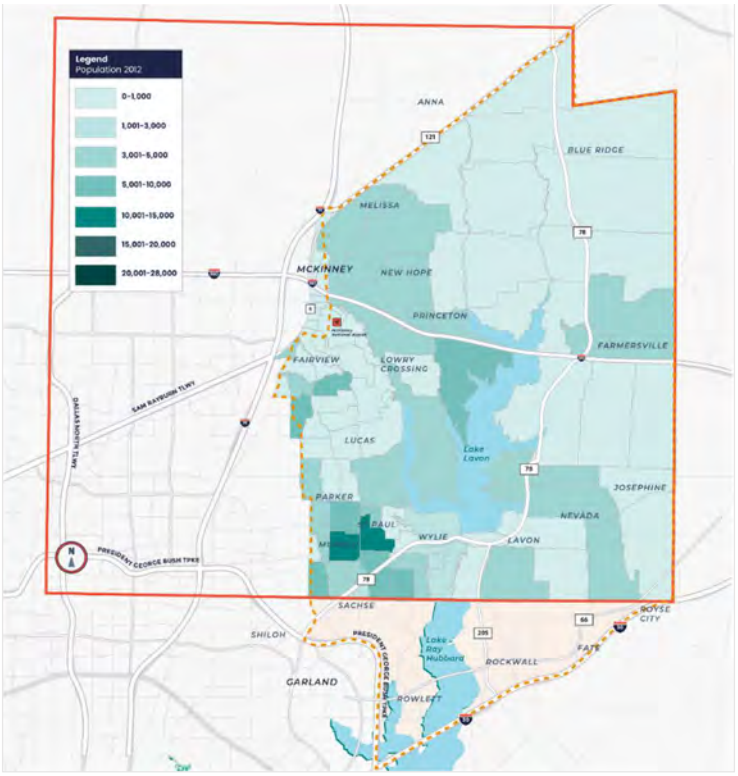


Figure 4: Study Area Population Density, 2020

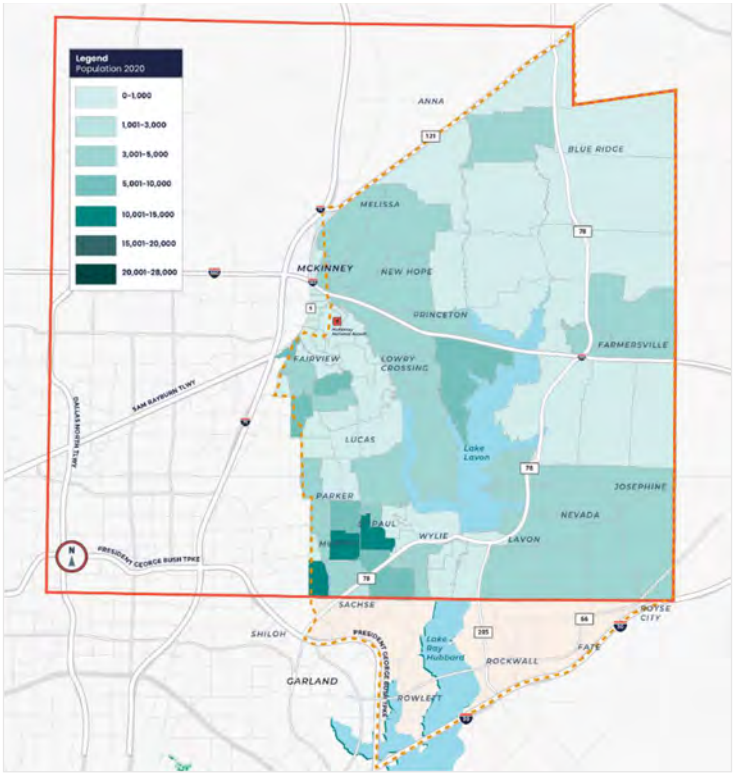


Figure 5: Study Area Population Density, 2035

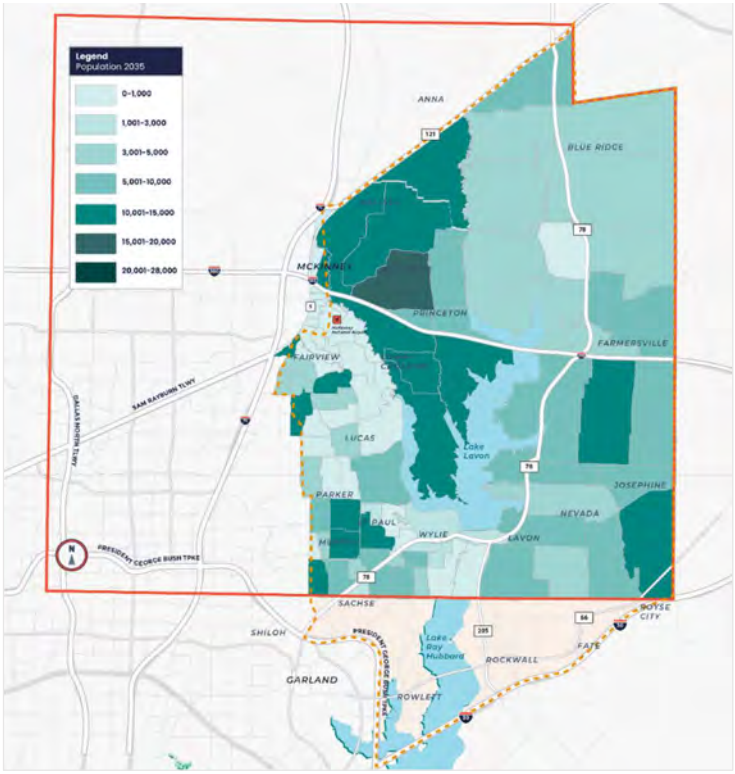
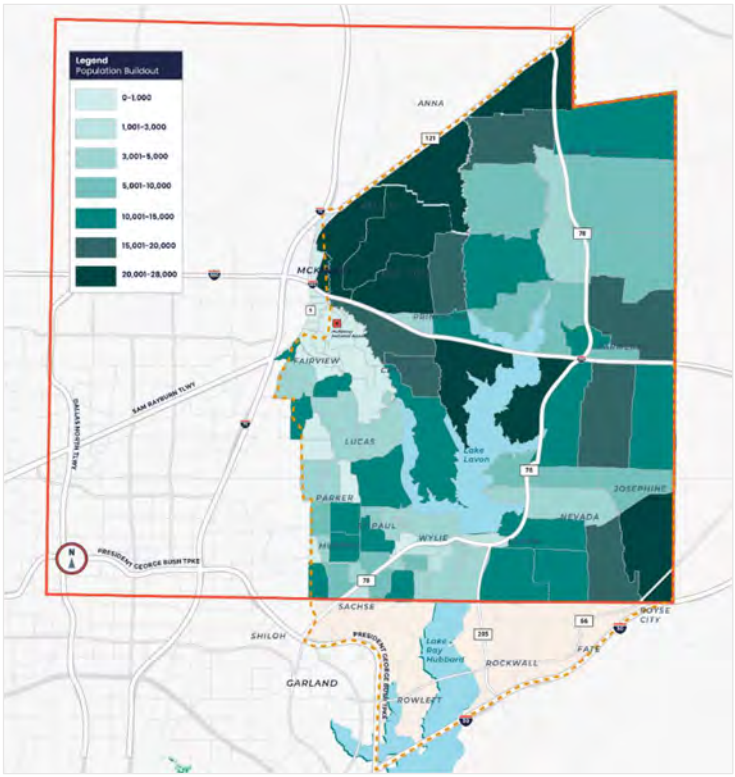


Figure 6: Study Area Population Density, Buildout



In 2012, only the TSZs around Murphy and St. Paul had a population greater than 10,000 and the population for most other TSZs fell below 5,000. From 2012 to 2020 the population densities increased throughout the study area, with the population surpassing 3,000 for each TSZ between Anna and Blue Ridge; near Lowry Crossing, Fairview and Wylie; and in the area containing Lavon, Nevada and Josephine.

From 2020 to 2035, population densities are projected to increase even more across the study area. Almost all TSZs in the northeast portion of the study area around Blue Ridge and Farmersville will reach a population of at least 3,000, similar to the southwest portion of the study area around Lucas, Parker, Murphy, St. Paul and Wylie. TSZs near Princeton will reach a population of at least 5,000 and McKinney, Melissa, and Anna areas will surpass 10,000 people per TSZ, while the New Hope TSZ will reach a population of at least 15,000. Around Lowry Crossing, including the Lavon Lake peninsula, the population will reach at least 10,000 people per TSZ. The TSZs south of Farmersville, and between Royse City and Josephine, will surpass 10,000 people, while most other TSZs in this area around Lavon, Nevada and Josephine will reach a population of at least 5,000. At ultimate buildout, many of the TSZs in the southeast and east portions of the County show a population of 10,000 people or more. The population in the areas near New Hope, McKinney and Melissa; south of Princeton; and between Royse City and Josephine are expected to increase significantly from 2012 with several areas surpassing a population of at least 20,000. So, while many of these areas are very rural today, they will likely become more developed over the next 30 years and beyond.

Growing Cities

According to the Texas Water Development Board, population for most of the cities in the study area are expected to increase from 2020 to 2070 as shown in Figures 7 and 8.

By 2070, population for many of the cities in the eastern part of the County will be near or exceed 100,000 people. Below are some of the highlights of city population increases.

- Rockwall will increase by more than 160%
- Fate and Josephine by more than 200%
- Princeton and Royse City by more than 700%
- Lavon by more than 1,000%
- Farmersville and Nevada by almost 2,000%

Figure 7: Population of Cities in the Study Area, 2020

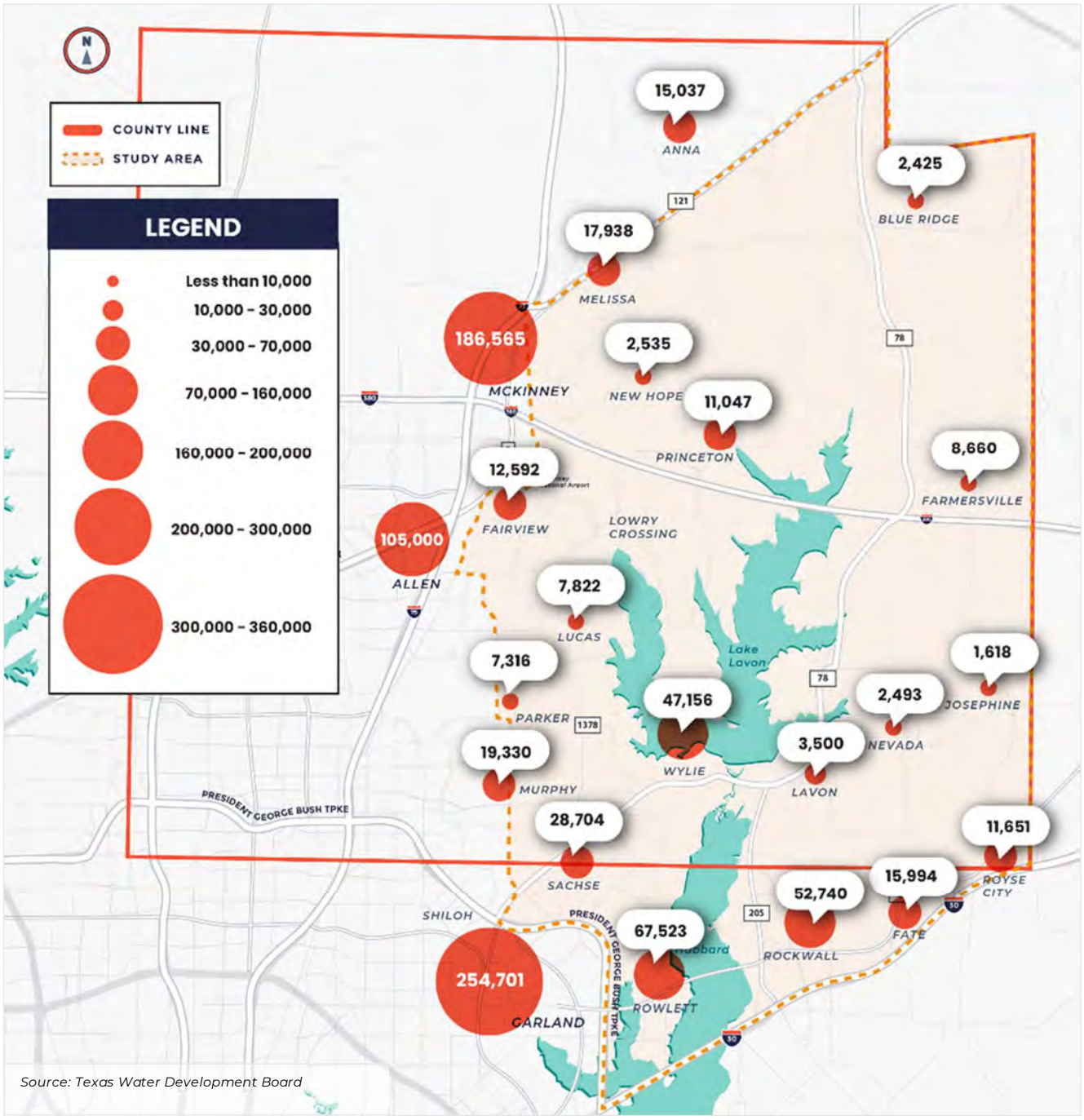
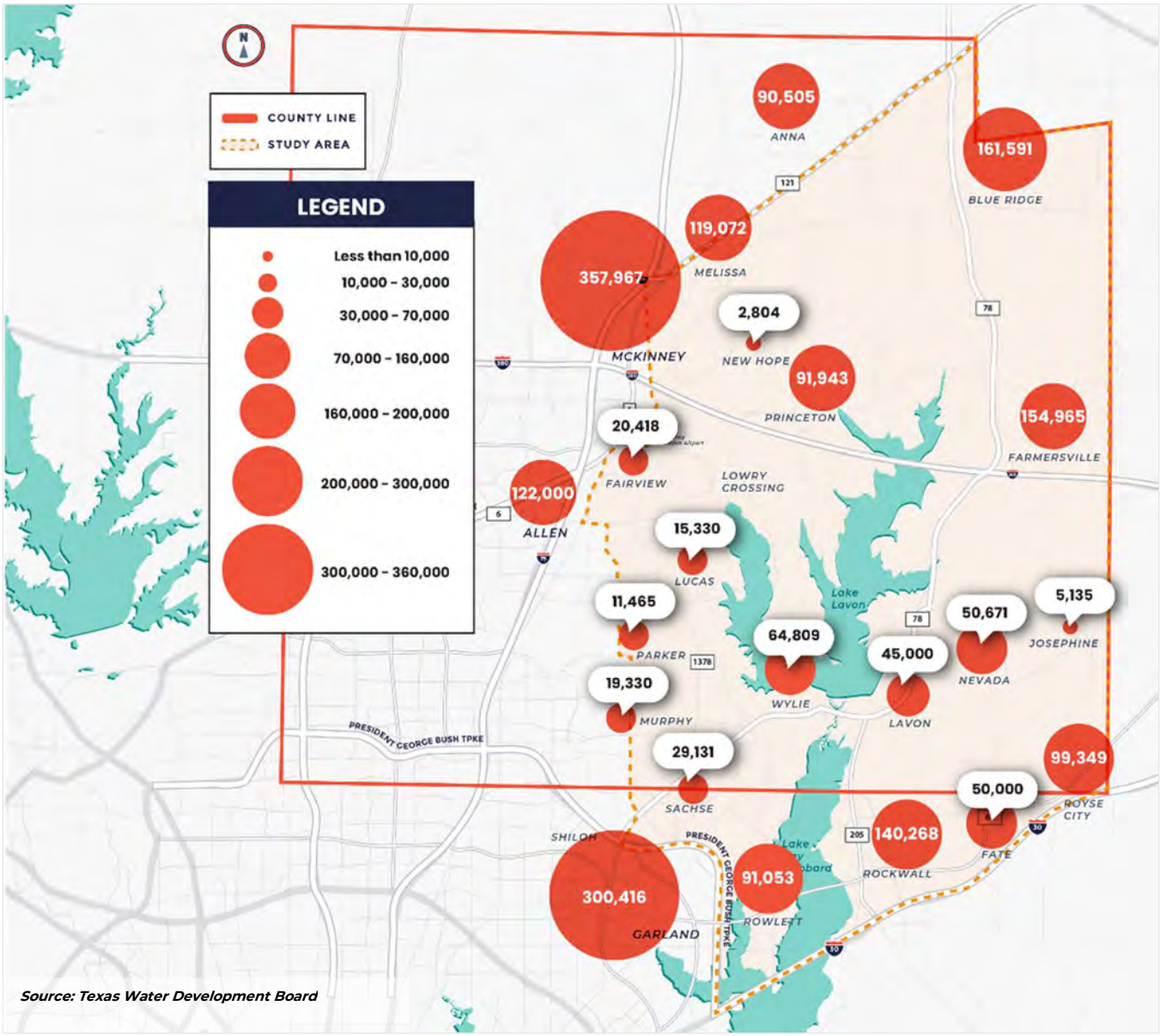


Figure 8: Population of Cities in the Study Area, 2070



Employment Growth

The study team also considered employment growth in Collin County. Employment growth is an important factor to consider since jobs will attract new residents, as well as commuters. Figures 9 thru 12 below show the progression of anticipated employment growth from 2012 to ultimate buildout.

Figure 9: Collin County Employment, 2012

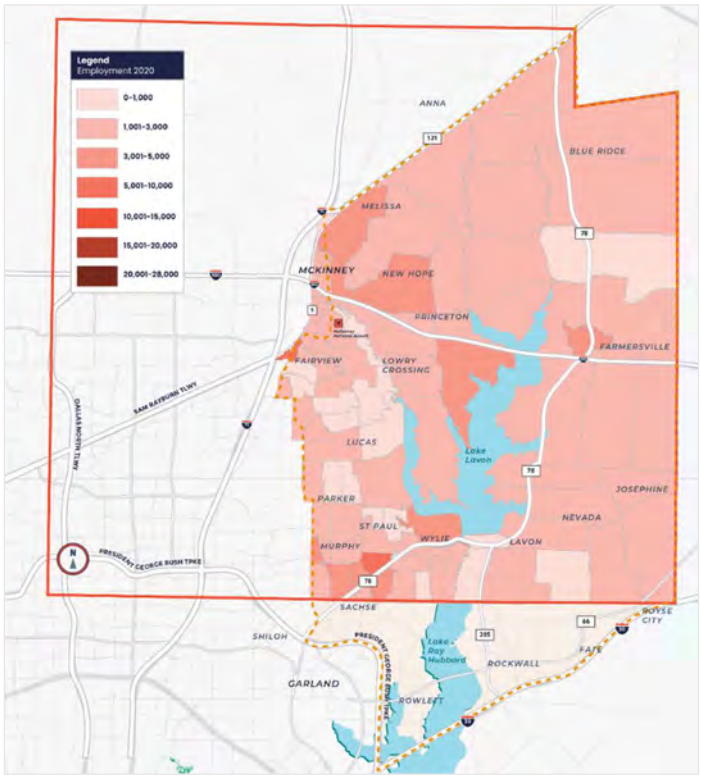


Figure 10: Collin County Employment, 2020

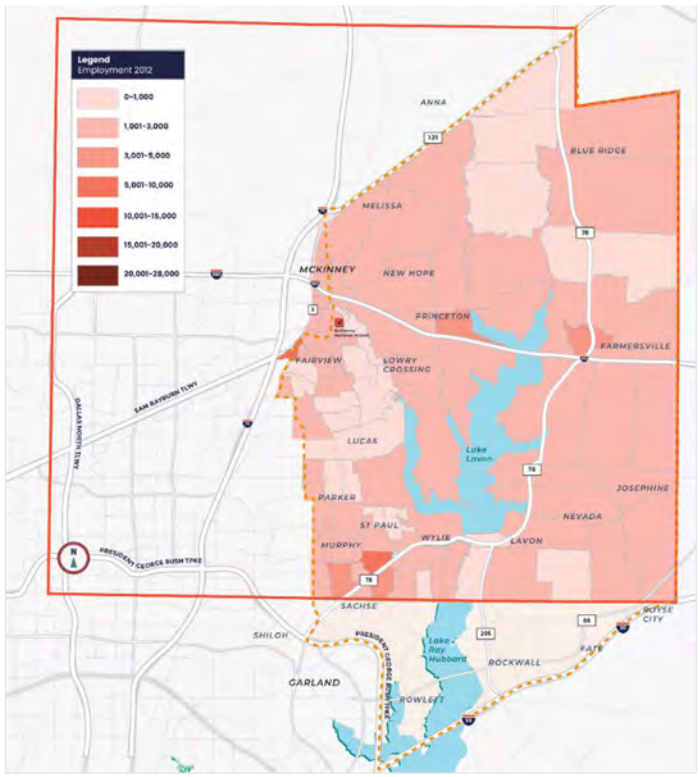


Figure 11: Collin County Employment, 2035

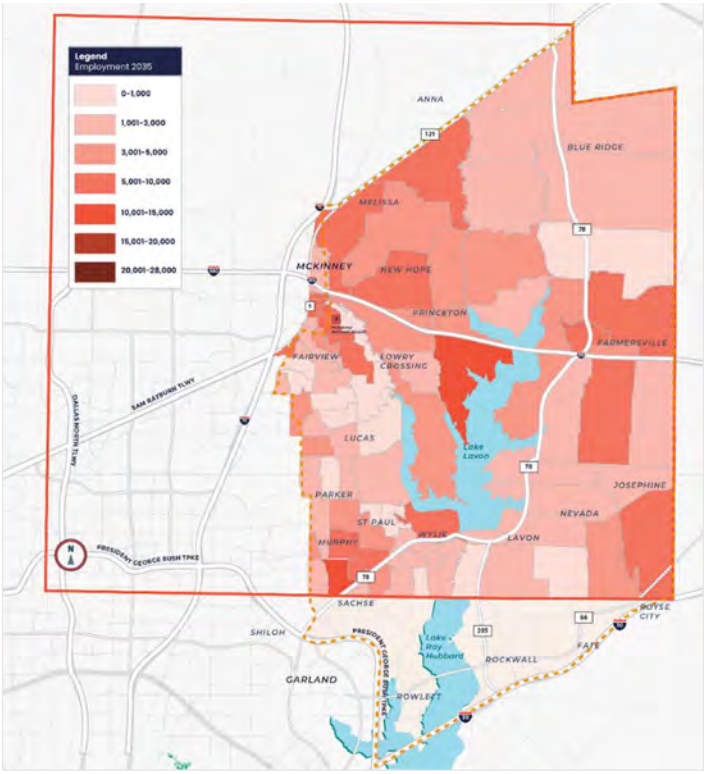
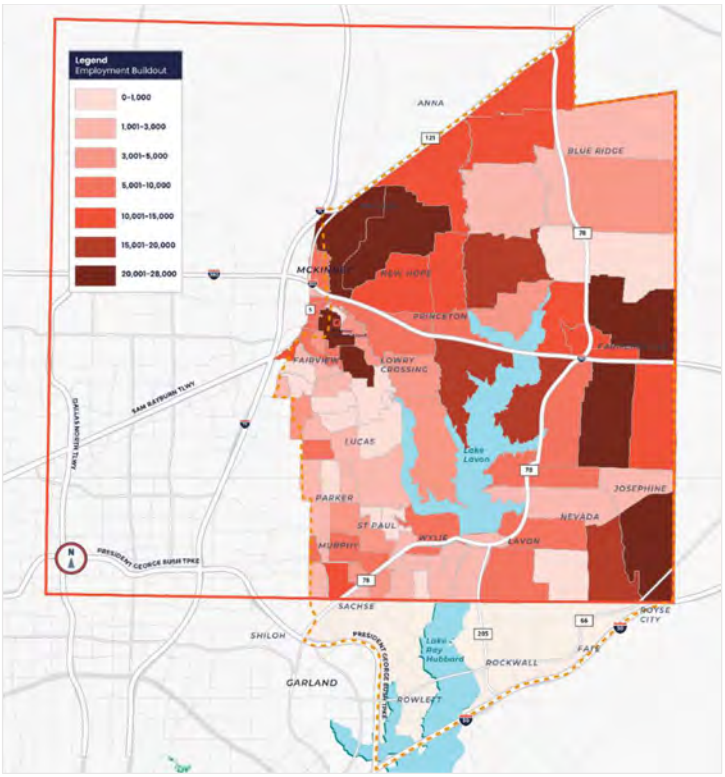


Figure 12: Collin County Employment, Buildout



From 2012 to 2020 employment was fairly even across the study area with increases primarily west of Lavon Lake such as near McKinney, Melissa and New Hope; east of Lowry Crossing; and around Murphy, Wylie and Lucas.

From 2020 to 2035 employment is projected to continue to spread east of McKinney; around Sachse, Murphy and Wylie; east of Lavon Lake near Farmersville; and between Royse City and Josephine. From 2035 to ultimate buildout, employment near McKinney, Farmersville and Josephine is expected to increase significantly.

This growth in employment is consistent with population projections and historic data that shows growth is moving from the southwest to the northeast and east. In some areas, the employment is actually growing at a much higher rate than the population.

Environmental Constraints

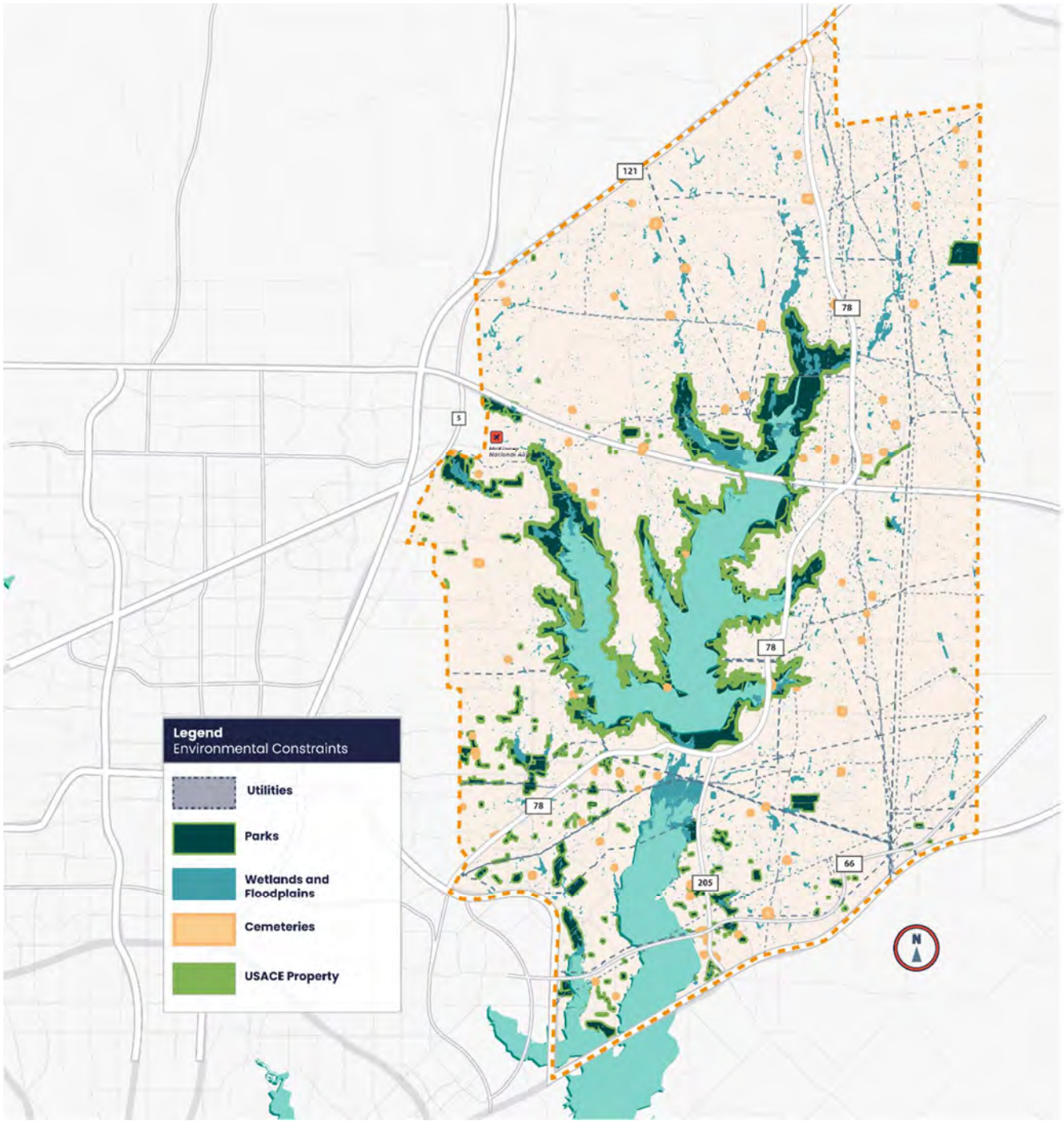
A preliminary collection and analysis of relevant environmental data was conducted within the study area. The data was collected through desktop analyses which means the study team utilized publicly available data to identify land use, major utility corridors, public parks and recreation areas, conservation and environmentally sensitive areas, and natural features.

Figure 13 shows a constraints map developed during the study.

Some of the most notable constraints within the study area are as follows:

- Lavon Lake
- Lake Ray Hubbard
- Many other smaller lakes
- Several Soil Conservation Site Reservoirs
- US Army Corps of Engineers land
- Several oil and gas pipelines

Figure 13: Study Area Environmental Constraints



Existing Land Use

The study area encompasses a total of approximately 329,940 acres of land. According to NCTCOG, the largest land uses in the study area are farmland/ranch lands and residential at approximately 127,827 acres and 93,735 acres, respectively. Appendix A includes a list of major land uses in the study area by category and county.

Cities and incorporated towns within the study area have adopted plans for future land use and improvements to their transportation networks within their corporate limits and extraterritorial jurisdictions. Each local jurisdiction within the study area with a population of 5,000 or more, as well as some of the smaller jurisdictions, have developed a Comprehensive Plan to guide further land use development activity, and a Thoroughfare Plan to serve the travel needs of area residents. Of the jurisdictions in the study area, at least nine have adopted plans.

Future Land Use – Planned Commercial and Residential Developments

The southeast and east portions of Collin County have become an attractive location for commercial and residential developers.

Data was collected about planned developments, active zoning areas, preliminary plat requests, and requests for zoning changes to identify areas of development that may limit future transportation options.

Figure 14 shows some of the planned commercial and residential developments within the study area.

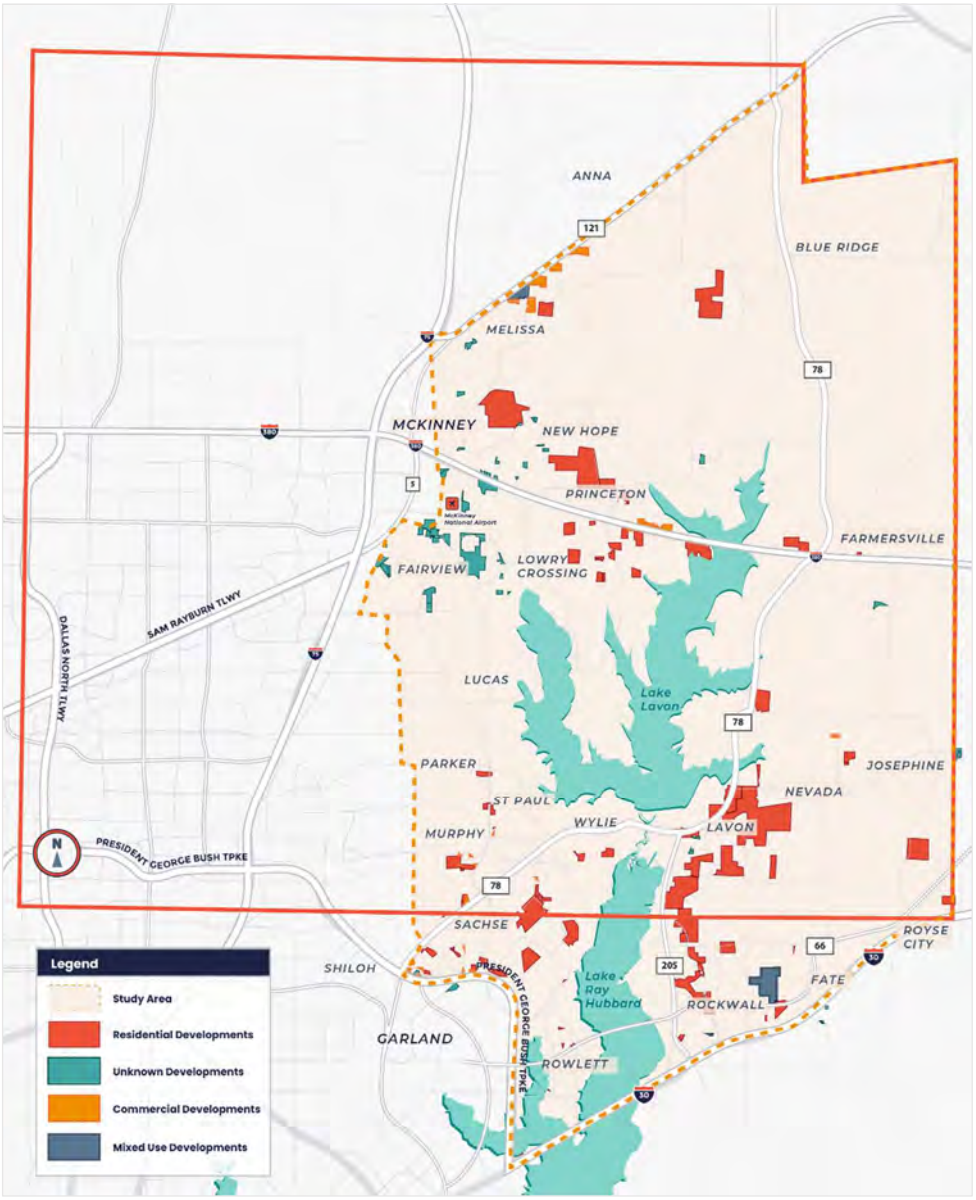


Figure 14: Planned Commercial and Residential Developments

Public Lands, Parks and Recreation Areas

Appendix B presents an inventory of known publicly owned lands, parks and recreation areas that are in the study area. There are 182 municipal and community parks and preserves, four County-maintained parks and 12 parks and recreation areas operated and maintained by the US Army Corps of Engineers (USACE) at Lavon Lake.

Environmentally Sensitive Features

BIOLOGICAL RESOURCES – FEDERAL AND STATE LISTED SPECIES

The Endangered Species Act affords protection for federally listed threatened and endangered species and, where designated, critical habitat for these species. US Fish and Wildlife Service (USFWS) maintains a list of federally threatened and endangered species potentially present for each Texas county.

According to the USFWS, five federally protected bird species may occur in the study area (USFWS 2020). Appendix C shows the county(s) in which each bird species occurs, their federal status, habitat, and if suitable habitat may be present in the study area. No critical habitat for federal species occurs in the study area. See Appendix D for USFWS's Information for Planning and Consultation (iPAC) report for the study area.

State-listed threatened and endangered species are protected by state and local laws within Texas (Chapters 67 and 68 of the TPWD Code and 31 Texas Administrative Code (TAC) 65.171–65.18). According to Texas Parks and Wildlife Department (TPWD), Collin and Rockwall Counties each have 11 state listed threatened and endangered species and Dallas County has 14. See Appendix E for a complete list of TPWD's Annotated County Lists of Rare Species for Collin, Dallas, and Rockwall Counties.

VEGETATION

To assess vegetation in the study area, TPWD's Ecological Mapping Systems of Texas (EMST) was utilized. EMST is part of TPWD's Ecological Systems Classification and Mapping Project in support of their Texas Comprehensive Wildlife Conservation Strategy (TPWD 2014). According to TPWD, there are 44 vegetation types in the study area. The most abundant vegetation type is Blackland Prairie: Disturbance or Tame Grassland (approximately 107,623 acres), followed by Row Crops (approximately 50,145 acres), Urban Low Density (approximately 42,649 acres), Native Invasive: Deciduous Woodland (approximately 33,779 acres) and Open Water (approximately 32,379 acres). Appendix F shows study area EMST by map unit and land cover type. Appendix G shows EMST in the study area.

Water Resources

FLOODPLAINS

Per Executive Order 11988, Floodplain Management, a floodplain is defined as the "lowland and relatively flat area adjoining inland and coastal waters . . . including at a minimum, that area subject to a one percent or greater chance of flooding in any given year." This definition is often referred to as a "100-year floodplain." The Executive Order directs the US General Services Administration to "take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains."

Approximately 81,323 acres of 100-year floodplain (flood zone A and AE) occur in the study area which is shown in Appendix H. These areas are associated with the numerous named streams and their tributaries.

Most of the study area is in the Trinity River Basin, except for the southeastern portion of the study area, which is in the Sabine River basin. Two major reservoirs bisect the study area: Lavon Lake and Lake Ray Hubbard, as shown also in Appendix H. Both reservoirs are an impoundment of the East Fork Trinity River. Lavon Lake is maintained by the USACE and Lake Ray Hubbard is maintained by the City of Dallas. The study area has numerous named Waters of the US and tributaries that fall under the jurisdiction of the USACE and are regulated by Section 404 of the Clean Water Act.

Executive Order 11990, Protection of Wetlands, that was issued in 1977, requires Federal agencies to minimize the destruction or modification of wetlands where practicable. USFWS National Wetlands Inventory (NWI) is a publicly available resource that provides detailed information on the abundance, characteristics, and potential distribution of US wetlands. The NWI developed a wetland classification system (Cowardin et al. 1979) that is the USFWS and Federal standard for wetland mapping, monitoring and reporting. Figure 15 shows the NWI wetlands identified in the study area by Cowardin type. The most abundant NWI wetlands in the study area include forested and emergent wetlands totaling approximately 6,678 acres and approximately 2,437 acres, respectively. See Appendix H for NWI wetland locations in the study area.

Figure 15: Study Area NWI Wetlands by Cowardin Type (Source: USFWS 2019)

Cowardian Type Wetland	Type Description	Acres
PEM	Palustrine Emergent Wetland	2,437
PSS	Palustrine Scrub Shrub Wetland	981
PFO	Palustrine Forested Wetland	6,678
PUB	Freshwater Pond	3,770
Riverine	Riverine (Contained within channel)	18
Lake	Freshwater impoundment	27,209
Total		41,093

Hazardous Materials

This section briefly describes known potentially hazardous material sites in the study area. These sites include superfund sites, brownfields, landfills, and leaking petroleum storage tanks (LPSTs).

There is one superfund site located in Farmersville, one brownfield site located in Murphy, and four landfills; one in Dallas County and three in Collin County. The study area includes

46 LPSTs in Collin County, 11 LPSTs in Dallas County and 29 LPSTs in Rockwall County. Appendix I shows known hazardous materials in the study area.

Cultural Resources

A review of the Texas Historical Commission's (THC) Archaeological and Historical Sites Atlases was conducted to identify previously recorded cultural resources within the study area, including archeological sites, National Register of Historic Places (NRHP)-listed sites and districts, historic-age cemeteries, and Official Texas Historical Markers (OTHMs), including Registered Texas Historic Landmarks (RTHLs). The review also identified previous cultural resources investigations within the study area. The TxDOT Potential Archeological Liability Map (PALM) was also reviewed to assess the potential for previously unrecorded archeological sites within the study area. The purpose of this review was to identify potential historic (NRHP-listed or eligible) resources under Section 106 of the National Historic Preservation Act (NHPA), Section 4(f) of the Department of Transportation (DOT) Act, and State preservation laws within the study area.

Section 106 of the NHPA requires Federal agencies to consider the effects of projects they carry out, assist, fund, permit, license, on historic properties. The NHPA [54 U.S.C. § 300308] defines a historic property as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the NRHP, including artifacts, records, and material remains related to such a property or resource." If a Federal or Federally assisted project has the potential to affect historic properties, a Section 106 review will take place.

Federally sponsored DOT projects also require compliance with Section 4(f) of the DOT Act of 1966, [recodified as 49 U.S.C. Section 303]. Under this regulation, the Federal Highway Administration or their delegate may not approve use of land from any historic site of national, state, or local significance unless a determination is made that "There is no prudent or feasible alternative to the use of the land"; and the proposed action includes all possible planning to minimize harm to the property resulting from such use (23 Code of Federal Regulations (CFR) 771.135).

State-level regulations relevant to cultural resources include the Antiquities Code of Texas and the Texas Health and Safety Code (THSC). Cultural resources located on land owned or controlled by the State of Texas or its political subdivisions are protected by the Antiquities Code of Texas (Texas Natural Resource Code, Title 9, Chapter 191). Therefore, project impacts within state-owned property and easements are subject to review by the THC, which serves as the State Historic Preservation Office. Direct impacts to cemeteries or burials require compliance with the THSC, as amended. These rules and regulations are available in Title 13, Part 2, Chapter 22, Rule § 22.5 of the TAC.

PREVIOUS CULTURAL RESOURCES INVESTIGATIONS

To date, approximately 165 previous cultural resources investigations are reported on the Archeological Sites Atlas within the study area (Appendix J). The investigations include National Parks Service and Smithsonian Institution-sponsored archeological surveys conducted prior to the impoundment of Lake Ray Hubbard and Lavon Lake in the 1950s and 1960s. Other previous investigations include archeological surveys in support of

infrastructure projects such as roadways, pipelines, and transmission lines permitted under Section 106 of the Antiquities Code of Texas. Most of the study area has not been previously surveyed for cultural resources.

ARCHEOLOGICAL SITES

The review identified 235 previously recorded archeological sites within the study area (Appendix J). Prehistoric archaeological sites in the study area are clustered around the perennial streams, including those dammed to create Lavon Lake, Lake Ray Hubbard, and Soil Conservation Service reservoirs. When assessing potential for previously unidentified prehistoric archeological sites, topography and the availability of raw material, water, and subsistence resources are all taken into consideration. Typical locations of prehistoric archaeological sites could include water crossings, stream confluences, drainages, alluvial terraces, floodplains, upland knolls, and areas where lithic or other subsistence resources could be found. Also examined are the geological processes in the immediate area. These processes are important because geologic events may protect the integrity of an archaeological site by burying it within deep sediments, or alternatively, destroy it through erosional processes. The TxDOT PALM identifies areas along perennial streams within the study area as having high potential for both shallow and deeply buried archeological deposits. The uplands in proximity to the streams generally have moderate potential, while areas distant from perennial water sources generally have low potential. The significance of prehistoric archaeological sites under Section 106 is usually assessed under NRHP Criterion D, that they have yielded or may be likely to yield information important in history or prehistory.

Historic-age archeological sites would be expected adjacent to historic roadways or railways and in areas where buildings appear on historic-age maps or aerial photographs. The significance of historic-age archeological sites and non-archeological historic-age resources under Section 106 is usually assessed under NRHP Criterion A based on associations with events that have made a significant contribution to the broad patterns of our history; NRHP Criterion B, based on associations with the lives of significant persons in our past; or NRHP Criterion C, based on their architectural or engineering significance. Sites eligible under Criterion C embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction. Historic-age resources may also be eligible under NRHP Criterion D.

HISTORIC-AGE NON-ARCHEOLOGICAL RESOURCES

The review identified four NRHP-listed properties and one NRHP-listed historic district within the study area (Figure 16 and Appendix J). NRHP-listed resources include the Aston building, Farmersville Masonic Lodge, and Farmersville Commercial Historic District in Collin County, as well as the Royce City Lodge and First Methodist Church of Rockwall in Rockwall County.

Figure 16: Study Area NRHP-Listed Sites and Districts

Resource	County	NRHP Status
Aston Building	Collin	Listed 1983
Royse City Lodge No. 663 A.F. & A.M.	Rockwall	Listed 1994
Farmersville Masonic Lodge No. 214, A.F. & A.M.	Collin	Listed 2005
First Methodist Church of Rockwall	Rockwall	Listed 2007
Farmersville Commercial Historic District	Collin	Listed 2017

The review also identified 74 historic-age cemeteries within the study area (Appendix J). Ordinarily cemeteries are not considered eligible for the NRHP. However, cemeteries qualify for NRHP inclusion if they meet the significance thresholds outlined under NRHP Criteria Consideration D or contribute to an NRHP-listed or eligible historic district. According to NRHP Criteria Consideration D, a cemetery may be considered eligible for NRHP inclusion if it contains the grave(s) of persons of transcendent importance, is of great age relative to its geographical or historic context, exhibits important design characteristics, is associated with important events, or has the potential to yield important information. Texas cemeteries may also qualify for designation as an Historic Texas Cemetery if it is at least 50 years old and is deemed worthy of recognition for its historical associations. The very nature of a cemetery being a landmark of a family's or community's presence is considered to validate the criteria of historical associations. Any individual, organization, or agency may submit a request for designation.

Finally, the review identified 76 OTHMs within the study area (Appendix J). OTHMs commemorate "diverse topics in Texas history, including: the history and architecture of houses, commercial and public buildings, religious congregations, and military sites; events that changed the course of local and state history; and individuals who have made lasting contributions to our state, community organizations, and businesses" (THC 2020). Marker types include subject markers, Historic Texas Cemetery Markers, and RTHLs. RTHLs are typically standing buildings, structures, sites, or districts.

Environmental Justice Populations

Minority, income, and Limited English Proficiency (LEP) data for the study area was obtained from the 2014-2018 American Community Survey 5-year Estimates (US Census Bureau 2019). For this Environmental Justice (EJ) assessment, data for minority populations, low-income populations, and LEP populations is provided at the Census tract level.

MINORITY AND LOW INCOME

Minority persons include Black (or African American), Hispanic, American Indian, Alaska Native, Pacific Islander, and Asian-American persons (Council on Environmental Quality [CEQ] 1997). Census blocks with a minority population greater than 50 percent are considered high-minority areas. Of the 42 Census tracts that encompass the study area, six Census tracts contain populations with greater than 50 percent minorities. The Census tracts are clustered on the southwestern edge of the study area in the vicinity of Murphy, Sachse, and Rowlett. (Appendix K).

A low-income population is defined as a group of people and/or a community that, as a whole, live at or below the U.S. Department of Health and Human Services (HHS) poverty guidelines. Poverty guidelines are categorized by the number of persons living in a household. The poverty guidelines for a family of four people in 2020 (in the 48 contiguous states), as defined by HHS, is a total annual median household income of $26,200 (HHS 2020); however, for this assessment, 2018 poverty data ($25,100) was utilized due to its georeferenced availability. Census tracts with a median household income that was below the 2018 HHS poverty level are considered low-income areas. Of the 42 Census tracts in the study area, two Census tracts have low-income populations with approximately 22.4 percent and 25.9 percent low-income and are located near Josephine, Wylie and Rockwall (Appendix L).

LIMITED ENGLISH PROFICIENCY

Executive Order 13166, Improving Access to Services for Persons with LEP, requires Federal agencies to examine the services they provide, identify any need for services to those with LEP, and develop and implement a system to provide those services so that LEP persons can have meaningful access to them. Of the 42 Census tracts, three have LEP populations between 19 percent and 26 percent. Appendix M shows the distribution of LEP populations in the study area, with the highest concentrations near Lowry Crossing, McKinney, and Sachse.

Utilities

The study area has numerous major utility corridors for pipelines and electric transmission lines. The pipelines carry natural gas, crude oil, and highly volatile liquid totaling approximately 367 miles of linear infrastructure. Most of the pipelines are clustered in the eastern portion of the study area running north-south and range in diameter from 2 inches (in) to 30 inches. Approximately 328 miles of electric transmission lines cross the study area and are more distributed throughout compared to the pipelines. The main transmission line operators in the study area are Farmers Electric Coop, Inc. and Oncor Electric Delivery Company. Their transmission lines range from 46 kilovolts (kV) to 345 kV. Figure 17 shows the study area utilities, operators, and utility length and size. Appendix N shows the pipelines and transmission lines in the study area.

Figure 17: Major Utilities in the Study Area

Operator	Utility	Name	Length (miles)	Diameter (in) or Kilovolts (kV)
Pipelines*				
Atmos Energy	Natural Gas	D, NT, O, and WN2	133	2-24 in
City of Garland	Natural Gas	Olinger Pipeline	6	16 in
Energy Transfer Company	Natural Gas	Northeast Texas Region	26	10.75-16 in
Kinder Morgan North Texas PL LLC	Natural Gas	KM North Texas Pipeline	8	30 in
Melissa Renewables, LLC	Natural Gas	Melissa Pipeline System	5	4.5 in
Enterprise Crude Pipeline, LLC	Crude Oil	Seaway	61	30 in
Plains Pipeline, LP	Crude Oil	Red Oak Pipeline	32	30 in
OneOK NGL Pipeline, LLC	Highly Volatile Liquid	Sterling Pipeline System	74	6-16 in
Explorer Pipeline Company	Refined Liquid Product	Greenville to Grapevine	22	6-12.75 in
		Total Length	**367**	
Transmission Lines**				
Farmers Electric Coop, Inc	Electricity	Royse, Allen, and Ben Davis	77	138 & 345 kV
Oncor Electric Delivery Company	Electricity	*Not Available*	247	46, 69, 138 & 345 kV
Not Available	Electricity	Royse	4	138 kV
		Total Length	**328**	

*Source: *Texas Railroad Commission and **Homeland Infrastructure Level Data*

Existing Major Roadways

In the study area, few major roadways currently exist. Figure 18 displays the major roadways identified within the study area. Major north-south roadways include FM 1378, also known as Country Club Road, SH 78 and SH 205. Major east-west roadways include US 380, FM 6 and US 66.

FM 1378, on the west side of Lavon Lake, is six lanes from FM 544 to Parker Road, and two lanes from Parker Road north to SH 5 where it currently terminates. SH 78 is six lanes from President George Bush Turnpike to FM 6 and only two lanes from FM 6 north to SH 121. SH 205 is six lanes from I-30 to Rockwall where it becomes a three-lane, one-way couplet through Rockwall. North of Rockwall, SH 205 is two lanes until it terminates at SH 78.

US 380, which is currently being studied by the Texas Department of Transportation (TxDOT), is four lanes from Airport Road to the Collin County/Hunt County line. In Dallas and Rockwall Counties, US 66 is six lanes from Garland to Dalrock Road, and four lanes from Dalrock Road, across Lake Ray Hubbard to Rockwall, where it becomes a three-lane, one-way couplet through Rockwall. East of Rockwall, US 66 is two lanes through Rockwall County and into Hunt County, beyond the study area. FM 6 is two lanes between SH 78 and US 66.

Most of the major existing roadways within the study area are two lane roadways, while only about 20% of these major roadways are six lanes wide. These two-lane roadways will not meet the demands of the future, projected population in the area.

Figure 18: Study Area Major Existing Roadways

Planned Roadways

In October 2020, the study team began meeting with county and city representatives to gather additional information such as current and future transportation planning efforts.

County Thoroughfare Plans

Thoroughfare plans outline future road development to support growth and mobility needs. Figure 19 shows the thoroughfare plans within the study area for Collin, Dallas and Rockwall Counties. The Collin County Thoroughfare Plan was updated in 2020 and includes principal arterials, major arterials and the Collin County Outer Loop.

PRINCIPAL AND MAJOR ARTERIALS

Principal arterials are high-capacity urban roads connecting traffic from minor arterials to freeways or expressways and are shown on Figure 19 in green. Major arterials are on

approximately 1-mile grid spacing and are shown on Figure 19 in orange. Major arterials provide intra-community continuity and offer a lower level of traffic mobility. Visit https://www.collincountytx.gov/mobility/Pages/mobility_plan.aspx for more information about the County's Mobility Plan.

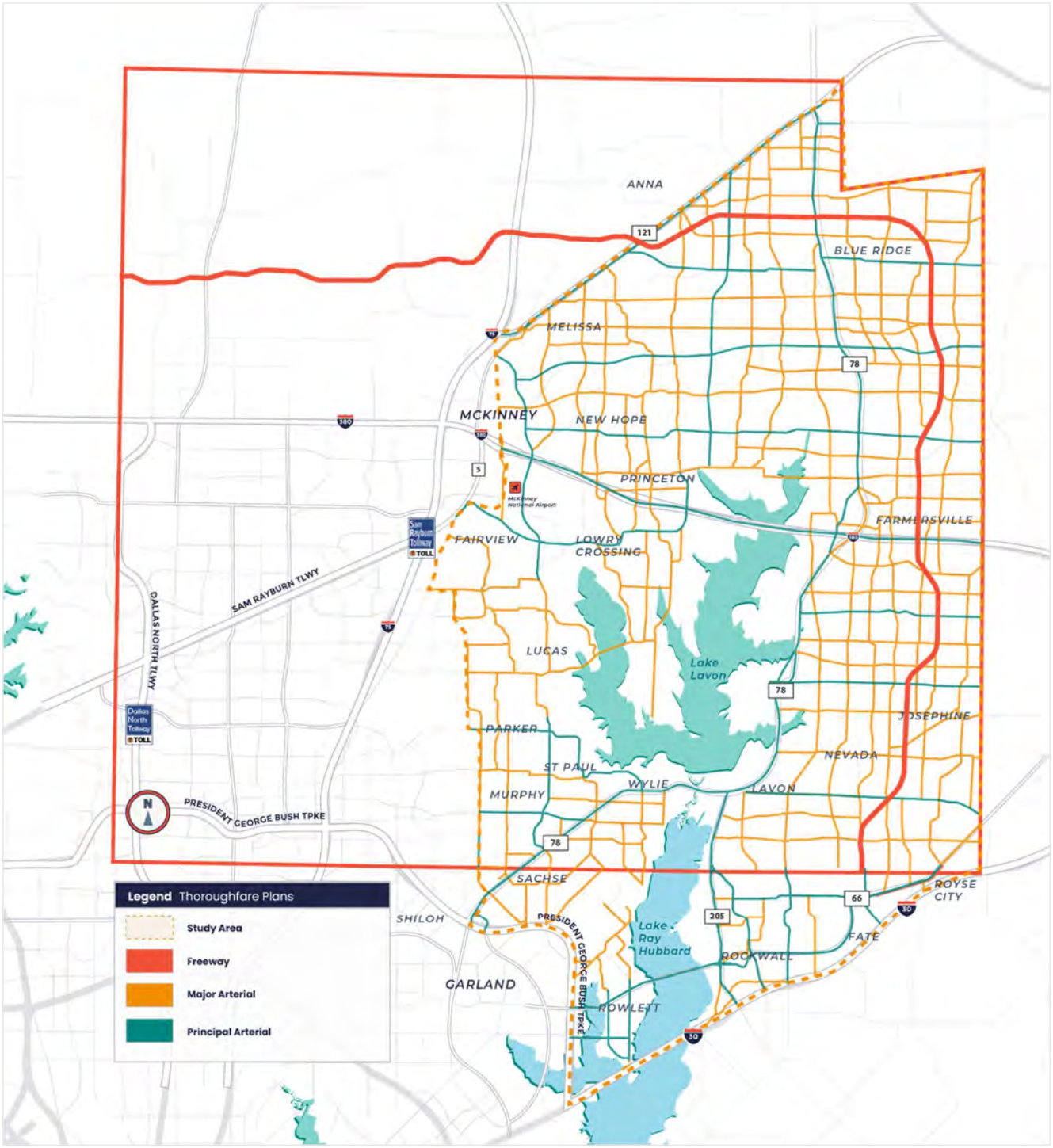
COLLIN COUNTY OUTER LOOP

The Collin County Outer Loop is shown on **Figure 19** in red. The Collin County Outer Loop was initiated in 2002. Most recently, Collin County Commissioners approved contracts with local engineering firms to refine the preferred alignment and finalize the design of several segments. The study team will further consider the Collin County Outer Loop preferred alignment in more advanced phases of project development.

City Thoroughfare Plans

The study team also reviewed City thoroughfare plans for the purpose of comparing the plans to Collin County's plan. Study area municipalities that provided data for review are Anna, Fairview, Farmersville, Josephine, Lavon, McKinney, Melissa and Royse City.

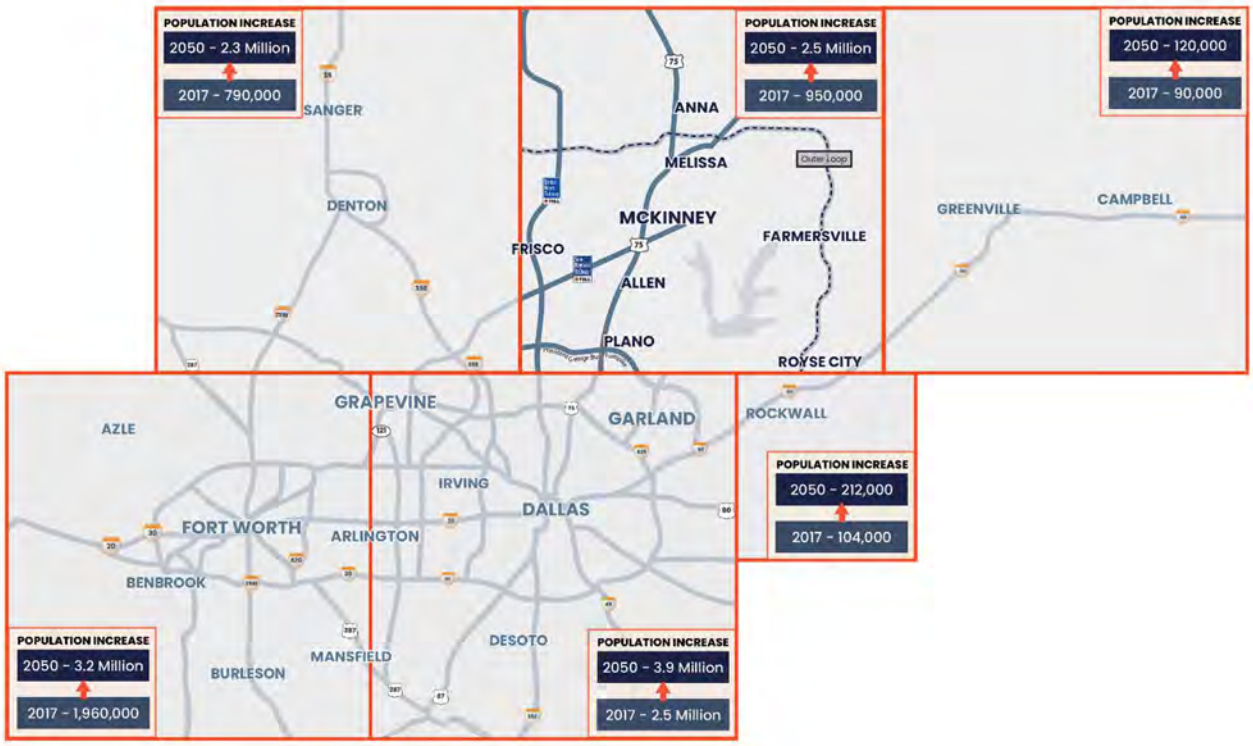
Figure 19: Study Area Thoroughfare Plans



Limited Access Roadway Comparison

Looking at the County level, **Figure 20** is a comparison of Limited Access Roadways, also known as freeways or tollways, in Dallas, Tarrant, Denton, Hunt, and Rockwall Counties. According to population projections from the Texas Demographic Center, by the year 2050, Collin County's population could be equal to or greater than Dallas County's population was in 2017 with less infrastructure to support projected growth.

Figure 20: Limited Access Roadways Comparison



Collin County Transit Study

The Collin County Transit Study is an ongoing study led by NCTCOG that aims to develop a comprehensive public transportation plan that can be strategically implemented and is complementary to other planning efforts. The study will identify transit options, funding options, implementation strategies, governance structure strategies and institutional delivery approach options of recommended services options. More information about the study can be found on NCTCOG's website. The County will consider recommendations from the study in more advanced phases of project development.

Safety and Crash Analysis

A safety and crash analysis for the study area was completed using TxDOT's Crash Records Information System (CRIS). The team analyzed five years of crash data from 2015-2019 and found that more than 15,000 crashes were reported in the study area, which are shown on Figure 21 as a crash heat map. The deeper yellow and red hot-spots indicate areas of high crash frequency.

The location of these hot spots often coincides with major interchanges and intersections and well-traveled roadways, but some other trends were identified:

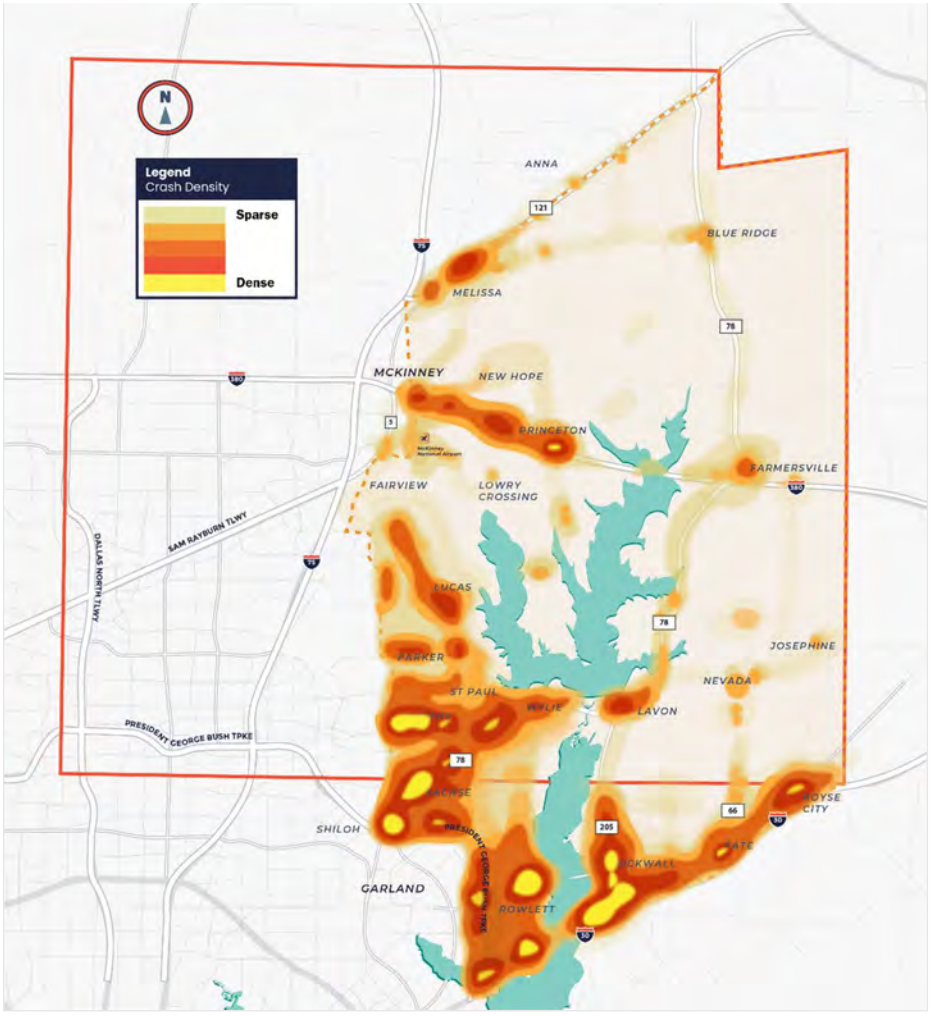
Over half of the crashes were related to intersections resulting from distracted driving, speeding or left turning vehicles.

While most of these crashes were rear end crashes, alarmingly one-third of crashes in the study area resulted in an injury.

The team also found that crashes in the study area increased by 20% from 2015-2019.

As population continues to increase and roadways become more congested, crash frequency is expected to increase as well. As the study progresses, the study team will work to identify opportunities to enhance safety on roadways.

Figure 21: 2015-2020 Crashes (TxDOT CRIS Database)



SH 78 Analysis

Overall crash rate of 90.23 traffic crashes per 100 million vehicle miles is low to average compared to statewide crash rates of a similar roadway facility. Adjusted urban crash rate of 190.92 traffic crashes per 100 million vehicle miles is average compared to statewide crash rates of a similar roadway facility. Adjusted rural crash rate of 65.85 traffic crashes per 100 million vehicle miles is low compared to statewide crash rates of a similar roadway facility.

SH 205 Analysis

Overall crash rate of 174.16 traffic crashes per 100 million vehicle miles is high compared to statewide crash rates of a similar roadway facility. Adjusted urban crash rate of 261.21 traffic crashes per 100 million vehicle miles is high compared to statewide crash rates of a similar roadway facility. Adjusted rural crash rate of 68.52 traffic crashes per 100 million vehicle miles is low compared to statewide crash rates of a similar roadway facility.

Crash Modification Factors

After collecting and analyzing crash data, countermeasures and potential solutions were analyzed and identified. Crash modification factors (CMFs) that could be applied to existing conditions were identified for intersections and segments along SH 78 and SH 205 (**Figure 23**).

Due to the high crash volume present in the data collected, the intersection between SH 78 and SH 205 was analyzed separately (**Figure 22**) to identify a potential reduction of 26% of crashes with improvements to the intersection. Overall, there is not a presence of systemic safety problems, but preventative measures can be taken to improve current safety conditions and prevent high crash rates in the future. As the project area becomes more urbanized, safety at intersections, median openings, and other conflict points must be prioritized. Safety measures to be taken in consideration for future roadway widening and construction include installing turn lanes, ensuring storage lengths can accommodate peak hour traffic, installing lighting for higher visibility, checking and designing for conservative sight distance, providing advanced warning signage, and implementing traffic control measures.

Figure 22: Crash Modification Factors – SH 78 and SH 205 Intersection

Crash Modification Factors				
CMF	Description	Reduction Factor	Preventable Crashes	Crash Reduction
111	Interconnect Signals	10%	178	17.8
138	Install Flashing Yellow Left Arrow	15%	34	5.1
203	Install Raised Median	25%	158	39.5
304	Safety Lighting (Non-Intersection)	40%	22	8.8

Crash Modification Factors				
CMF	Description	Reduction Factor	Preventable Crashes	Crash Reduction
305	Safety Lighting (Intersection)	45%	24	10.8
519	Add Left Turn Lane	25%	94	23.5
520	Lengthen Left Turn Lane	40%	91	36.4
521	Add Right Turn Lane	25%	93	23.25
522	Lengthen Right Turn Lane	40%	91	36.4
		Total	785	201.55
			Total Potential Crash Reduction	26%

Figure 23: Crash Modification Factors – Intersections and segments along SH 78 and 205

Primary Roadway	Texas Crash Modification Factor (CMF)											Potential Crash Reduction at Intersection
	CMF #	107	111	121	124	138	305	516	519	520	521	522	
	Description	Traffic Signal	Interconnect Signal	4-Way Stop	AWS	Flashing Yellow Left	Lighting	Crossover	Left Turn	Lengthen Left	Right Turn	Lengthen Right	
	Reduction Factor	35%	10%	15%	15%	15%	45%	95%	25%	40%	25%	40%	
	Intersecting Roadway	Preventable Crashes (Number of Applicable Crashes)											
SH78	Ranch Road		26			3			18	14	15	14	87%
	Woodbridge Parkway		31			5			13	8	10	8	52%
	Alanis Drive		34			10			22	12	13	12	68%
	West Kirby Street		39			3			27	22	23	22	88%
	East Brown Street		13			1			9	8	8	8	93%
	North Kreymer Lane		31			6			22	16	20	16	88%
	Skyview Court	11		11	11		2	8	6	5	7		100%
	Main Street	11		11	11		2	11	8	8	8		100%
	FM 6		72			24			23	22	23	22	55%
	SH 78 Business F	31		31	31		11		13		8		98%
SH205	Yellow Jacket Lane		12			6			3	3	3		40%
	Memorial Drive	13		13			3	12	11	11	11	11	100%
	North Lakeshore Drive		20			7			10	10	10	10	80%
	Ridge Road West		9			2			5	5	6		66%
										Total Potential Crash Reduction			24%

Origin-Destination Traffic Study

An Origin-Destination (O&D) Traffic Study is one tool engineers and planners can use to better understand travel patterns such as where people begin their trip, where they end their trip, the routes they take, and the time of day they travel. Traditional approaches to O&D studies include vehicle movement analysis, travel surveys, roadside interviews and Bluetooth tracking.

With advances in technology, O&D studies can now be conducted using anonymous data points from mobile devices as they travel through the study area. Using this technology, the study team was able to collect and analyze data from various time periods. For this study, data prior to and during COVID-19 was analyzed.

O&D Study Data

Due to the large amount of traffic data within the study area, the team needed to focus the limits of the O&D study to process the data, observe trends, and identify potential improvements. The team geofenced, or created a virtual perimeter, around SH 78 and SH 205 (**Figure 24**) in the study area to capture the majority of north-south trips.

Once the roadways were geofenced, several data points were collected including trip travel path (coordinates where a trip started and ended as well as incremental points of a trip), trip attributes (duration, length and speed), and the time of day the trip occurred. Data was collected prior to COVID-19 from September 1 to October 31, 2019, as well as during COVID-19 from April 1 to April 30, 2020, just for comparison. The team will continue to work with NCTCOG to review data and monitor changes in traffic patterns due to COVID-19.

Figure 24: Geofenced Area (SH 78, SH 205)

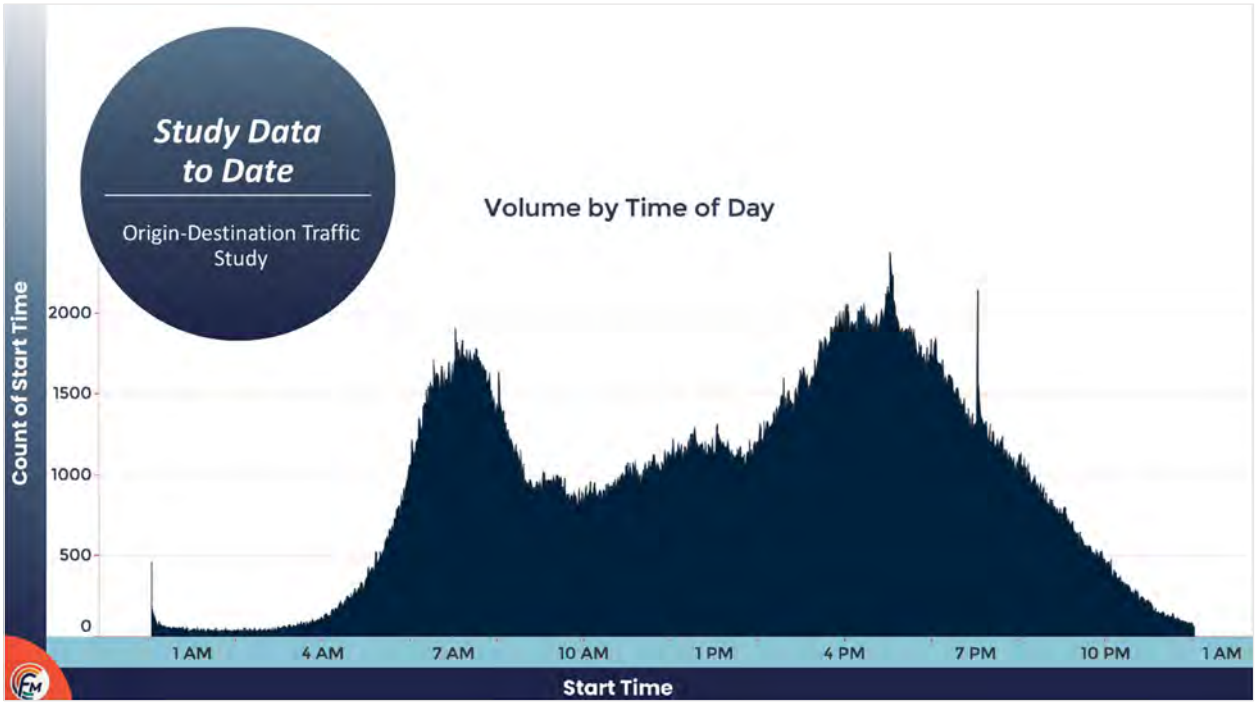
These parameters generated 2.3 million trips and captured 155,000 unique vehicles. As a point of validation, the data was compared to TxDOT's Annual Average Daily Traffic counts and found that approximately 10% of total trips were captured, which is a relatively high percentage of capture for an

O&D study. Given the high percentage of capture, it is believed that the trips analyzed are representative of the overall trends and patterns of vehicles traveling along the studied roadways.

All trips less than 1 mile in length and 5 minutes of duration were removed from analysis. These were considered hyper-local trips and outliers since the focus of the study is on longer local and regional trips to better understand broad travel patterns across the study area.

Of the trips studied pre-COVID, the median trip length and duration was approximately 11 miles and 50 minutes, respectively. This is a quite a bit longer when compared to the average Dallas-Fort Worth commute time of 30 minutes or less according to the American Community Survey and NCTCOG. The most traveled days of the week were weekdays with Friday being the highest. Plotting the volume of trips taken throughout the day (**Figure 25**), the AM peak during weekdays occurred from 6:15 to 9:15 a.m. and the PM peak during weekdays occurred from 3:30 to 6:30 p.m.

Figure 25: Origin-Destination Traffic Study Volumes Pre-COVID



Trip Length Analysis

The trips were then classified into four length categories (short, medium, long and extra-long) to better analyze travel patterns in the AM and PM peak periods during the week, when traffic volumes are at their highest. **Figure 26** shows the classifications by number of miles and associated trip distribution.

Figure 26: Origin-Destination Trip Distribution

Trip Length Category	Trip Length (miles)	Percent of Trip Distribution AM	Percent of Trip Distribution PM
Short	1-10	39%	44%
Medium	10-20	24%	23%
Long	20-50	30%	25%
Extra-Long	>50	7%	8%

High level findings include the following:

- A significant portion of all trips in the PM peak are short trips. This suggests that additional local transportation options or increasing capacity on local arterial connections may help alleviate some of the heaviest congestion on SH 78 during this time. An option may be to work with cities on determining the timing needed to construct roadways in their thoroughfare plan to remove these shorter, local trips from SH 78 as congestion builds.
- As future development is realized along the corridor, short trips will likely increase as motorists will not have to travel as far to access shops and restaurants. This will likely increase turning vehicles and congestion and thus increase travel times for short and long trips.
- With up to 60% of the current trips being over 10-miles long, the SH 78 corridor is largely serving as a long-distance connection. Since SH 78 varies between two to six lanes, as traffic volumes increase, additional capacity or redundancy in adjacent roadways may be needed to meet the regional demand. Consideration should be made as to the size and type of roadways needed in the future that best fit with travel patterns. Longer distance trips would benefit from additional limited access roadways while shorter trips would benefit from local arterial improvements.

AM and PM Trends

Appendices O and P show the AM Peak and PM Peak results for long trips. The orange and purple clusters in these appendices show concentrations of trip origins and destinations. The orange clusters represent popular trip origins and purple clusters represent popular trip destinations.

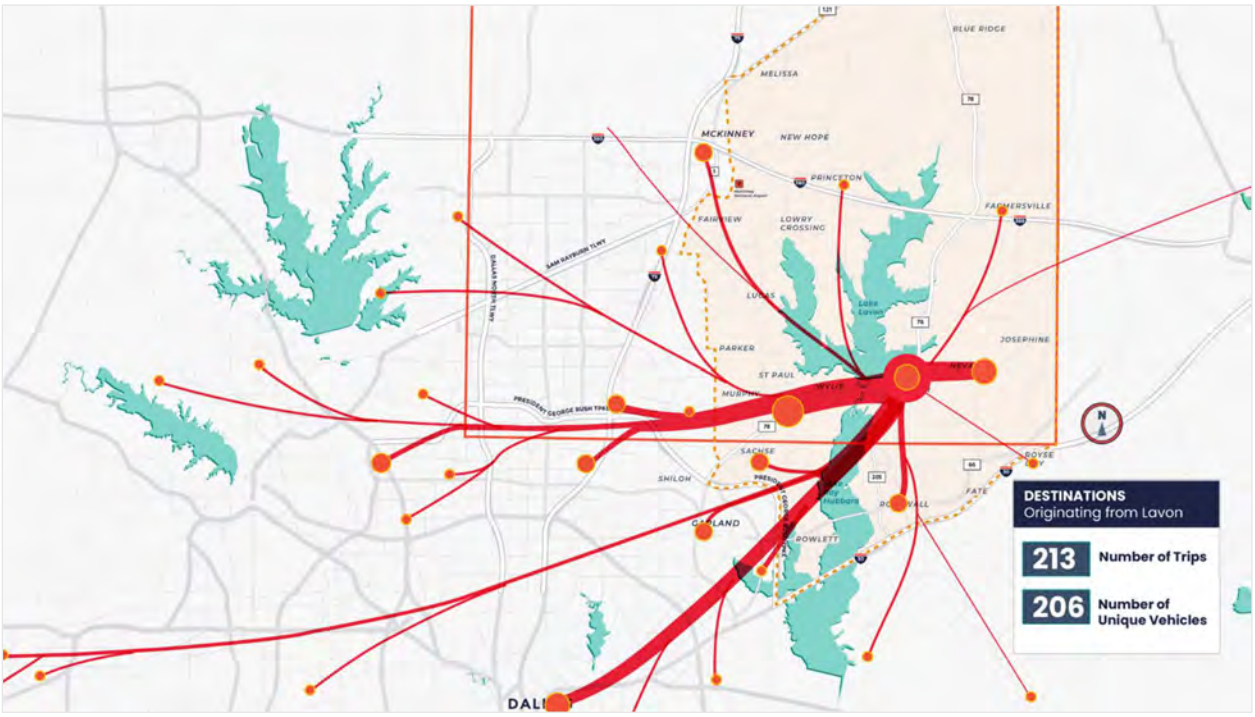
A few of the trends observed include the following:

- The Wylie and Sachse area contains many of the origin points, but the maps also show several origin points east of the lakes.
- There is a clear progression of origins moving to the northeast into the more rural regions as development occurs. Hunt County origins represent 12% of the origin traffic.
- A very clear pattern for destinations is developing along regional business corridors on US 75, President George Bush Turnpike (PGBT), Dallas North Tollway (DNT), and I-35 near Downtown Dallas, along with hotspots in McKinney, Rockwall and Greenville.
- AM short trip origins typically align with some of the denser populated areas, primarily neighborhoods and multi-family housing with some drop-off locations such as schools, daycares, and local businesses. Despite the majority of the study area being in Collin County, 40% of the trips originated in Collin County, 40% in Rockwall County and 20% in Dallas County. Rockwall saw the highest percentage from a city level with one-third of vehicles starting in Rockwall. Notably, most of the trips that started in Rockwall, stayed in Rockwall. Wylie was the second highest origin city with 20% followed by Sachse with 11%.
- Many of the AM short trip destination hot spots align with elementary, middle and high schools, as well as gas stations, local breakfast spots and local businesses. Most of these trips stayed within their city limits or traveled to a nearby city. Rockwall, Wylie, Sachse and Garland are some of the destinations that attracted more trips than others.
- For the AM medium trips, there are many of the same origin trends from the short length trips, but more of the rural origins are showing up as the dispersed blue color. The big change for medium length trips in the AM period peak shows up in the destinations. Destination hot spots along major business corridors in Plano near PGBT and US 75 and in Richardson along US 75 south of PGBT start to form. Rockwall remains a popular destination with other scattered pockets.
- For the AM long trips, origins are even more dispersed than the medium length trips. There is a clear progression of the centroid of the orange zones moving to the northeast into the more rural regions. Hunt County origins represents 12% of the origin traffic.
- Extra-long AM peak trips were a small subset of the trips at only 7% and there were no discernable trends. The trips were very sparse with data points scattered across the greater region.
- In the PM peak, the number of short trips increased, while medium and long trips decreased. For all length trips, the PM peak showed very similar trends to AM peak period trips, but the direction of travel is reversed.

City to City Analysis

Flow maps were created for each city following a city-to-city analysis of the data. As an example, Figure 27 shows the map for Lavon.

Figure 27: Origin-Destination Traffic Study City to City Analysis



LAVON

The red lines show the desired travel paths and ultimate destinations of all trips originating in Lavon. The majority of other cites analyzed showed similar trends to Lavon. Note that the thickness of the lines corresponds to the volume of vehicles and the lines themselves do not follow existing roadways – they show the ideal travel path that vehicles want to take if they were unconstrained by roads.

The thick line from Lavon to the west indicates that these trips would ideally take FM 544 to get to their destination as it is the most direct path. According to NTCOG, the 2045 Travel Demand Model (TDM) movements support this. The thick line from Lavon to the southwest indicates that these trips would ideally cross Lake Ray Hubbard halfway between SH 205 and SH 78. Therefore, traffic could take either SH 78/PGBT or SH 205/I-30 to get to Dallas.

SACHSE

Sachse consists of approximately one-quarter local traffic and three-quarters commuting traffic. Due to its close proximity to the larger metropolitan area, most commuting trips are to adjoining cities with no specific trend in a predominant direction.

Destinations (AM Commuters | Leaving)

1. Sachse 21%
2. Garland 16%
3. Wylie 15%
4. Dallas 12%
5. Plano 9%

Origins (PM Commuters | Returning)

1. Sachse 26%
2. Garland 20%
3. Wylie 18%
4. Dallas 8%
5. Plano 6%

WYLIE

Wylie consists of approximately half commuting traffic and half local traffic during the peak hours. The most predominant movements for commuting trips are to adjacent cities.

Destinations (AM Commuters | Leaving)

1. Wylie 42%
2. Dallas 10%
3. Plano 8%
4. Garland 8%
5. Sachse 5%

Origins (PM Commuters | Returning)

1. Wylie 48%
2. Sachse 9%
3. Garland 8%
4. Dallas 6%
5. Plano 5%

ROCKWALL

Rockwall consists of approximately two-thirds localized traffic with the remaining one-third commuting. The most predominant interactions for commuting trips are located west of Rockwall across Lake Ray Hubbard.

Destinations (AM Commuters | Leaving)

1. Rockwall 65%
2. Dallas 7%
3. Rowlett 3%
4. Plano 3%
5. Garland 3%

Origins (PM Commuters | Returning)

1. Rockwall 64%
2. Dallas 5%
3. Rowlett 4%
4. Fate 4%
5. Garland 3%

FARMERSVILLE

Farmersville consists of approximately half commuting traffic and half local traffic. Commuting trips are predominantly to the west of Farmersville, presumably to US 380.

Destinations (AM Commuters | Leaving)

1. Farmersville 46%
2. McKinney 13%
3. Princeton 6%
4. Plano 4%
5. Wylie 3%

Origins (PM Commuters | Returning)

1. Farmersville 47%
2. McKinney 9%
3. Princeton 8%
4. Wylie 4%
5. Plano 3%

BLUE RIDGE

Blue Ridge consists of approximately one-quarter localized trips and three-quarters commuting traffic. The most predominant commute is to Wylie which involves traversing

most of the SH 78 study area corridor. Other major interactions are spread across an approximate 15-mile radius with no predominant direction.

Destinations (AM Commuters | Leaving)

1. Blue Ridge 21%
2. Wylie 11%
3. Leonard 8%
4. Sherman 7%
5. McKinney 7%

Origins (PM Commuters | Returning)

1. Blue Ridge 27%
2. Farmersville 9%
3. McKinney 7%
4. Wylie 6%
5. Sherman 5%

Major Movements Analysis

The major movements analysis found that SH 78 and SH 205 are important regional roadways for many counties in the region, not just Collin County. These roadways channel Collin County and Hunt County residents into Rockwall and Dallas counties for business and recreational activities. Limited alternatives to these roadways place an emphasis on these roadways performing well.

While the analysis primarily looked at north-south movements, it is clear that due to limited east-west access across Lavon Lake and Lake Ray Hubbard, SH 78 between the lakes is a critical roadway link and a pinch point for traffic. Once vehicles east of the Lavon Lake move through the point between the lakes, many trips use FM 544 to get to the interchange of PGBT and US 75 and other major business corridors. This demand will only increase as population grows in east Collin County. The next phase of this project should consider scenarios to mitigate future traffic congestion between the lakes due to population growth and future development.

Public and Stakeholder Outreach

Outreach Themes

Growth

Many city and county representatives, particularly in the southeast portion of the County recognize that transportation improvements are needed to accommodate population and employment growth. When asked about which type of growth is most likely to occur in the study area, 50% of survey respondents selected rapid growth and 20% selected exponential growth. Only 5% of survey respondents selected slow sustained growth.

Connectivity

In addition to north-south connectivity, east-west connectivity continues to be a challenge in the study area due to environmental constraints such as Lavon Lake and Lake Ray Hubbard. Nearly 70% of survey respondents expressed interest in improvements to thoroughfares while only 8% of respondents selected that no improvements are needed.

Traffic Congestion

Traffic congestion was listed as the top concern for survey respondents. Most of the major roadways in the study area are two lanes wide with only 20% of the roadways six lanes

wide. Many comments from the public noted long wait times at traffic signals and lack of alternative routes to try and avoid traffic delays.

Other Concerns

City and county representatives also noted concerns about funding and a desire to balance improvements with maintaining a "small town feel." Comments from the public also included concerns about potential property and environmental impacts.

Stakeholder Outreach

Individual meetings with regional stakeholders began in October 2020. These initial meetings provided an opportunity to discuss study purpose and scope, tentative timeline, current and future transportation planning efforts, current and future developments, possible constraints, and best methods for reaching stakeholders and the public. A list of the meetings held can be found in Appendix Q.

Technical Work Sessions

Two virtual technical work sessions were conducted in February 2021. Representatives from each county and city were invited to participate. The study data, including the results of the origin-destination traffic study, crash analysis and constraints mapping, were presented at the technical work sessions. Technical work session materials can be found in Appendix R.

Public Meetings

Due to COVID-19 concerns, public meetings were held in multiple formats to provide a variety of options. A virtual public meeting was available on the study website from Monday, May 3, 2021 to Friday, June 4, 2021. A live presentation of the study materials was held via Zoom on Tuesday, May 4, 2021. An in-person public meeting was held on Thursday, May 6, 2021 from 4:00 pm to 8:00 pm, at the Lavon City Hall Community Gym. Input from the public was collected through an online survey as well as mail and email. A summary of the meetings is available in Appendix S.

Study Website

The study team developed an independent website (ccfuturemobility.com) for interested parties to learn more about the study, stay up to date on project news and events, access a list of FAQs, and sign up for project updates and meeting notices.

Stakeholder Database

A comprehensive list of engaged stakeholders can be found in Appendix R.

Recommendations and Next Steps

Based on data presented in this initial phase of the study, including the increased growth that is expected for the study area, it is recommended that Collin County undertake the following initiatives to better understand the need for future projects in a rapidly changing study area:

- Fully process origin-destination data for the entire study area.
- Continue working with municipalities to collect information about planned developments.
- Evaluate current and future roadway plans from TxDOT, cities and counties to identify future needs.
- Work with NCTCOG to improve and perform travel demand model (TDM) runs, including official 2045 NCTCOG TDM, the 2045 Modified TDM and Collin County's full buildout model.
- Consider findings from other studies including the Collin County Regional Trails Master Plan, Collin County Transit Study and Collin County Outer Loop.
- Develop a recommendation of short-term, mid-term and long-term projects to advance the phased development of the Thoroughfare Plan.
- Develop strategies for counties and cities to preserve right-of-way in areas needed for future improvements.
- Obtain right-of-entry (ROE) agreements to field verify select critical parcels for environmental concerns.
- Develop a recommendation for future environmental studies.
- To the extent possible, update demographic information based on information from the 2020 Census.
- Identify possible funding sources for proposed projects.
- Continue to work with and gather feedback from the public, stakeholders, utilities and other agencies including the USACE and TxDOT.

APPENDIX A: EXISTING LAND USE

Category	County	Acres
Residential	Collin	80,602
	Dallas	5,820
	Rockwall	7,313
	Total	**93,735**
Commercial/Retail	Collin	1,643
	Dallas	369
	Rockwall	612
	Total	**2,624**
Parks/Recreation	Collin	13,272
	Dallas	1,332
	Rockwall	1,040
	Total	**15,644**
Water	Collin	24,739
	Dallas	1,870
	Rockwall	8,336
	Total	**34,945**
Farmland/Ranch Land	Collin	118,220
	Dallas	1,276
	Rockwall	8,331
	Total	**127,827**
Vacant	Collin	12,638
	Dallas	2,656
	Rockwall	1,626
	Total	**16,920**

Category	County	Acres
Industrial	Collin	2,403
	Dallas	1
	Rockwall	182
	Total	**2,586**

APPENDIX B: INVENTORY OF PUBLICLY OWNED LANDS, PARKS AND RECREATION AREAS

Name	Location	Ownership/Use(s)
Public Land, Parks and Recreation Areas - Local		
Celebration Park	City of Allen	City neighborhood park and recreation area – picnic pavilion, playground, and athletic fields
Stacy Ridge Park	City of Allen	City neighborhood park and recreation area – picnic pavilion, playground, and athletic fields
The Bluffs at Lost Creek	City of Allen	City neighborhood park and recreation area – picnic pavilion, and playground
Beaver Run Park	Town of Fairview	City park with a playground, basketball court, picnic pavilion, and paved trail
Coyote Park	Town of Fairview	City park with a paved trail connects with Cypress Park
Creekside Park	Town of Fairview	City park with a playground, open space, picnic pavilion, and paved trail
Cypress Park	Town of Fairview	City park with a playground, open space, picnic pavilion, and paved trail
Monarch Park	Town of Fairview	City park with a playground, basketball court, picnic pavilion, and paved trail
The Meadows	Town of Fairview	City park with a playground, basketball court, picnic pavilion, and paved trail
Parkside at Fairview Park	Town of Fairview	City park with open space and paved trail
Veterans Park	Town of Fairview	City park that honors military veterans. There are six monuments.

Name	Location	Ownership/Uses
JW Spain Athletic Complex	City of Farmersville	Community sports complex and recreation center
Memorial Park	City of Farmersville	City park that honors military veterans
Southlake Park	City of Farmersville	City park with open space and a pond
O.E. Carlisle Civic Center	City of Farmersville	City community center
HOA Park Spring Meadow	City of Fate	Community park
HOA Park WC 1A	City of Fate	Community park
HOA Park WC 1D4	City of Fate	Community park
HOA Park WC 2A	City of Fate	Community park
HOA Park WC 6B	City of Fate	Community park
HOA Park WC 6K	City of Fate	Community park
Old Town Park 1	City of Fate	City park with a playground, picnic areas and walking track
Old Town Park 2	City of Fate	City park with a playground, picnic areas and walking track
Robert Smith Family Park	City of Fate	Largest city park in Fate, has disc gold course, picnic areas, athletic fields, and walking track
Alamo Park	City of Garland	City park with a playground picnic area and trail
Armstrong Park	City of Garland	City park with picnic areas, playground and trail
Arnold & Carol Ablon Pavilion	City of Garland	City park with a fishing pier, picnic areas, playground, trails and athletic fields
Audubon Park	City of Garland	City disc golf park
Bisby Park	City of Garland	City park with athletic fields

Name	Location	Ownership/Uses
Bunker Hill Park	City of Garland	City park with open space
Central Park	City of Garland	City park with a baseball complex, football field dog Park, Granger Annex building and Granger Recreation Center
Cody Park	City of Garland	City park with athletic fields
Dorfman Park	City of Garland	City park with open space
Douglas Park	City of Garland	City park with a playground, picnic tables and trail
Eastern Hills Park	City of Garland	City park with picnic areas, playground and trail
Freedom Park	City of Garland	City park with picnic areas and playground
Gatewood Pavilion	City of Garland	City park located along Duck Creek Greenbelt and has rental facilities, picnic areas, and bike trails
Groves Park	City of Garland	City park, Patterson Field - Baseball
John Paul Jones Park	City of Garland	City park along the shores of Lake Ray Hubbard
Holford Park	City of Garland	City park with the Holford Recreation Center
Hollabaugh Park	City of Garland	City park with the Hollabaugh Recreation Center
James Park	City of Garland	City park with picnic areas, playground and trail
Lake Ray Hubbard Greenbelt	City of Garland	City park and greenbelt along the shores of Lake Ray Hubbard
Lou Huff Park	City of Garland	City park with athletic fields
Meadowcreek Branch	City of Garland	City park with picnic areas, playground and trail

Name	Location	Ownership/Uses
Montgomery Park	City of Garland	City park with picnic areas and playground
Oaks Branch Greenbelt	City of Garland	City greenbelt
One Eleven Ranch Park	City of Garland	City park with picnic areas, playground and trail
Peavy Park	City of Garland	City park with a playground
Quail Creek Parkway Park	City of Garland	City park with picnic areas, playground and trail
Rick Oden Park	City of Garland	City park with athletic fields
Rivercrest Branch Park	City of Garland	City park with picnic areas and playground
Rowlett Creek Preserve	City of Garland	City park with bike trails and picnic areas
Spring Creek Forest Preserve	City of Garland	City park with trails
Tinsley Park	City of Garland	City park with picnic areas
Watson Park	City of Garland	City park with picnic areas and playground
White Park	City of Garland	City park with athletic courts
Windsurf Bay Park	City of Garland	City park on Lake Ray Hubbard
Winters Park	City of Garland	City park with picnic areas and playground
Woodland Basin Nature Area	City of Garland	City park on Lake Ray Hubbard
Woodland Park	City of Garland	City park with picnic areas and playground
Wynn Joyce	City of Garland	City park with fishing pier on Lake Ray Hubbard
Wynne Park	City of Garland	City park with picnic areas, playground, and pool
Yarborough Park	City of Garland	City park with a playground

Name	Location	Ownership/Uses
Josephine City Park	Josephine	City park
Kenneth R Lewis Park	Lucas	City park
City Park Land	City of McKinney	Open space and recreation area
Nature Preserve	City of McKinney	City conservation land
Soccer Fields	City of McKinney	Open space/athletic fields
Wilson Creek	City of McKinney	City park and greenbelt
Brentwood Park	City of Murphy	City neighborhood park
Murphy Central Park	City of Murphy	City neighborhood park, amphitheater, and athletic fields
Murphy City Park	City of Murphy	City neighborhood park, City Hall, recreation areas and athletic fields
North Hill Park	City of Murphy	City neighborhood park and recreation area – large picnic pavilion and athletic fields
Park	City of Murphy	Unnamed city park
Travis Farm Park	City of Murphy	City neighborhood park with picnic area and playground
Waters Edge Park	City of Murphy	City neighborhood athletic fields
Park	Princeton	Unnamed city park
J.M. Caldwell Sr. Community Park / WWII P.O.W. Camp	Princeton	City park and recreation area – historic site
Veterans Memorial Park	Princeton	City park with picnic areas
Alma Williams Park	City of Rockwall	City neighborhood park
Breezy Hill HOA Park	City of Rockwall	Community park
Caruth Lakes HOA Park	City of Rockwall	Community park
Caruth Ridge HOA Pool	City of Rockwall	Community park and pool
Clark Street Park	City of Rockwall	City park

Name	Location	Ownership/Uses
Dalton Ranch Park	City of Rockwall	City park associated with Celia Hays Elementary
Emerald Bay Park	City of Rockwall	City park with swimming areas/beaches, picnic areas, trails, and open space
Gloria Williams Park	City of Rockwall	City park with basketball courts, pool, playgrounds and picnic areas
Harry Myers Park	City of Rockwall	City park with a dog park, pool, playgrounds, picnic areas, athletic fields, amphitheater, and open space
Jewel Park	City of Rockwall	City park with playgrounds, athletic fields, picnic areas, and open space
Lakeview Summit	City of Rockwall	Neighborhood park
Lakeview Summit HOA Pool	City of Rockwall	Neighborhood pool
Leon Tuttle Athletic Complex	City of Rockwall	City athletic complex
Lofland Park	City of Rockwall	City park with playgrounds and picnic areas
Northshore Park	City of Rockwall	City park associated with Virginia Reinhardt Elementary
Park Place HOA Park	City of Rockwall	Neighborhood park
Pettinger Nature Preserve	City of Rockwall	City conservation land with trails and open space
PPW HOA Park	City of Rockwall	Neighborhood park
Rockwall High School Training Field	City of Rockwall	Rockwall ISD athletic field
SH-66 Boat Ramp Park	City of Rockwall	City boat ramp with access to Lake Ray Hubbard
Shores Park	City of Rockwall	City park adjacent to Lake Ray Hubbard

Name	Location	Ownership/Uses
Spring Sports Complex	City of Rockwall	Rockwall ISD athletic complex and fields
Squabble Creek Mountain Bike Trail	City of Rockwall	City mountain bike trails maintained by the Dallas Off Road Bicycle Association
Stone Creek HOA Park	City of Rockwall	Neighborhood park
The Lakes of Squabble Creek Park	City of Rockwall	Complex of two city parks: Phelps Lake Park with a fishing pier, picnic areas and trails. And Raymond Cameron Lake park with the same amenities.
The Park at Breezy Hill	City of Rockwall	City park with playgrounds, athletic fields, picnic areas, and open space
The Park at Stone Creek	City of Rockwall	City park with playgrounds, picnic areas, and open space
Turtle Cove HOA Park	City of Rockwall	Neighborhood park
Waterstone	City of Rockwall	Neighborhood park
Yellow Jacket Park	City of Rockwall	City park with large playground areas and athletic fields
Lakeside Park	City of Rockwall	Future city park
Columbia Park	City of Rowlett	City park along the shores of Lake Ray Hubbard. Open space.
Environmental Learning Center	City of Rowlett	City designated land for a hands-on environmental learning experience for area school children
Highland Meadows Greenbelt	City of Rowlett	Community greenbelt/trails
Isaac Scruggs Park	City of Rowlett	City park with a playground and picnic area
Lake Highlands-LRH Greenbelt	City of Rowlett	Community greenbelt/trails

Name	Location	Ownership/Uses
Lakeside Park	City of Rowlett	City park along the shores of Lake Ray Hubbard. Picnic areas, fishing pier, open space
Lakeview Meadow Estates Park	City of Rowlett	Community park
Mayors Park	City of Rowlett	Future city park with open space
Muddy Creek Park	City of Rowlett	Future city park with open space
Paddle Point/N Lakeside	City of Rowlett	City park with access to Lake Ray Hubbard
Pecan Grove Park	City of Rowlett	City park with a community center, playground, pool, and an athletic field
Peninsula Greenbelt	City of Rowlett	Community greenbelt/trails
Rowlett Community Park	City of Rowlett	City park with access to Lake Ray Hubbard, picnic areas, trails, athletic field, fishing piers
Scenic Point Park	City of Rowlett	City park with access to Lake Ray Hubbard, picnic areas, trails, fishing piers
Schrade Bluebonnet Park	City of Rowlett	City park with open space
Shorewood Park	City of Rowlett	City park with numerous amenities
Sunset Park	City of Rowlett	City park along the shores of Lake Ray Hubbard. Open space
Twin Star Park	City of Rowlett	City park with open space, picnic areas, and playgrounds
City Lake Park	City of Royse City	City park with open space and playgrounds
Walker-Hawk Splash Park	City of Royse City	City waterpark
Walker Hawk Sports Complex	City of Royse City	City athletic fields

Name	Location	Ownership/Uses
Cornwall Lane Park	City of Sachse	City park with playgrounds and picnic areas
Heritage Park	City of Sachse	City park with playgrounds and picnic areas, and open space
Joe J and Patricia D Stone Park	City of Sachse	City park with playgrounds and picnic areas, and open space
Muddy Creek Preserve	City of Sachse	Conservation lands with a trail system paid for with a TPWD grant
Park Lake Estates Park	City of Sachse	Community park
Sachse On The Creek Park	City of Sachse	City park with open space and trails
Salmon Park	City of Sachse	City park with large playground areas and athletic fields
Avalon Addition Phase 1 and Phase 2 Parks	City of Wylie	City day-use park on the southern end of Lake Lavon with swim beach areas and picnic areas
Birmingham Farms Phase 14A and 14 B Parks	City of Wylie	Community parks with open space, playgrounds and picnic areas
Bozman Farms Estates Park	City of Wylie	Community parks with open space, playgrounds and picnic areas
Braddock Place Phase 1 and 2 Parks	City of Wylie	Community parks with open space, playgrounds and picnic areas
Clear Lake Park	City of Wylie	City multi-use park located on the northern end of Lake Lavon
Collin Park	City of Wylie	City park on the west side of Lake Lavon. Has a marina, restaurant, large beach area, and a camping area.
Community Park	City of Wylie	City park with open space and trails
Creek Hollow HOA Park	City of Wylie	Community Park
Creekside Estates HOA Common Area	City of Wylie	Community Park

Name	Location	Ownership/Uses
Creekside Estates HOA North Park	City of Wylie	Community Park
Creekside Estates HOA South Park	City of Wylie	Community Park
Elementary School Park	City of Wylie	Wylie Elementary School park
Emerald Vista Park	City of Wylie	Community park
Eureka Park	City of Wylie	City park with a playground, trail, basketball court, and open space
Founders Park	City of Wylie	City park with a playground, trail, athletic field, and open space
Friendship Park	City of Wylie	City park with a playground, trail, basketball court, and open space
Grayhawk Park	City of Wylie	City park with a pavilion, trail, and open space
Joel Scott Memorial Park	City of Wylie	City park with an athletic field, playground, trail, skatepark, and open space
Kingsbridge Park	City of Wylie	City park with a trail, and open space
Kirby Park	City of Wylie	City park with a playground and open space
Kreymer Estates Park	City of Wylie	Community park
Lake Lavon Camp and Conference Center	City of Wylie	Community church sponsored camp
Lakeside Estates Park	City of Wylie	City park with a playground, trail, basketball court, and open space
Lewis Ranch Park	City of Wylie	Community park
Meadows of Birmingham Park	City of Wylie	Community park
Meadowview Estates Park	City of Wylie	Community park
Olde City Park	City of Wylie	City park

Name	Location	Ownership/Uses
Oncor Park	City of Wylie	City park with a playground, pavilion and open space
Parkside Park	City of Wylie	Community park with open space
Pheasant Creek HOA Park	City of Wylie	Community park with playground and open space
Rita Allen Park	City of Wylie	
Riverchase HOA Park	City of Wylie	Community park
Riverway Park	City of Wylie	City park with a playground, pavilion and open space
Sage Creek HOA Amenity Center	City of Wylie	Community park
Sage Creek HOA Park	City of Wylie	Community park
Southbrook HOA Park	City of Wylie	Community park
Stone Ranch HOA Park	City of Wylie	Community park
Trinity Trailhead - Trinity Trail Preservation Association	City of Wylie	Open space and trails along the south shores of Lake Lavon
Twin Lakes Park	City of Wylie	City park with trails and a playground
Valentine HOA Park	City of Wylie	Community park
Woodbridge HOA Park	City of Wylie	Community park
Wooded Creek HOA Park	City of Wylie	Community park
Wylie Lakes HOA Park	City of Wylie	Community park
Public Land, Parks and Recreation Areas - County		
Bratonia Park	Collin County	This park is for the radio-controlled airplane enthusiasts and is adjacent to Lake Lavon.
Parkhill Prairie	Collin County	436-acre County preserve

Name	Location	Ownership/Uses
Sister Grove Park	Collin County	County park mainly used by hikers and bikers for its native trail routes
Muddy Creek Preserve Park	Dallas County	Heavily-wooded County preserve
Public Land, Parks and Recreation Areas – Federal		
Avalon (Lavon Lake) Park	Lake Lavon	USACE
Brockdale Park	Lake Lavon	USACE
East Fork Park	Lake Lavon	USACE
Little Ridge Park	Lake Lavon	USACE
Lavonia Park	Lake Lavon	USACE
Mallard Park	Lake Lavon	USACE
Caddo Park	Lake Lavon	USACE
Elm Creek Park	Lake Lavon	USACE
Highland Park	Lake Lavon	USACE
Lakeland Park	Lake Lavon	USACE
Pebble Beach Park	Lake Lavon	USACE
Twin Groves Park	Lake Lavon	USACE

APPENDIX C: STUDY AREA FEDERAL THREATENED AND ENDANGERED SPECIES

County(s)	Common Name	Scientific Name	Federal Status*	Habitat	Suitable Habitat Present?
Dallas	Golden-cheeked Warbler	*Setophaga* (=*Dendroica*) *chrysoparia*	LE	This migratory species breeds in central Texas along the Balcones Escarpment on the eastern edge of the Edwards Plateau and ranges from southwest of Fort Worth to northeast of Del Rio. Breeding habitat consists of juniper-oak woodlands dominated by Ashe juniper (*Juniperus ashei*) and various oak (*Quercus sp.*) species and deciduous trees found in areas with steep slopes, canyon heads, draws, and adjacent ridgetops. The species is dependent on Ashe juniper for long fine bark strips, only available from mature trees, used in nest construction; nests are generally placed in upright forks of mature Ashe junipers or various deciduous species. Occupied sites usually contain junipers at least 40 years old.	No. The Study Area lies outside of the species known breeding range and would not be expected due to a lack of suitable habitat.
Collin, Dallas, Rockwall	Least Tern	*Sternula* (=*Sterna*) *antillarum*	LE	The interior population (subspecies athalassos) of the Least Tern nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with inland rivers and reservoirs. It occasionally nests on man-made structures such as sand and gravel pits or gravel rooftops. Preferred habitat includes sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs. Colony sites can move annually, depending on landscape disturbance and vegetation growth at established colonies. It is known to nest at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, and along the Red River.	Yes -suitable habitat is present at Lake Lavon and Lake Ray Hubbard.
Collin, Dallas, Rockwall	Piping Plover	*Charadrius melodus*	LT	This migratory species overwinters in Texas, where it occurs on beaches, ephemeral sand flats, barrier islands, sand, mud, algal flats, washover	No - this species may traverse the Study Area during migration or as a

County(s)	Common Name	Scientific Name	Federal Status*	Habitat	Suitable Habitat Present?
				passes, salt marshes, lagoons, and dunes along the Gulf Coast and adjacent offshore islands, including spoil islands in the Intracoastal Waterway. Algal flats appear to be the highest quality habitat because of their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low or very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast.	vagrant; however, it is very unlikely that the species regularly occurs within the Study Area due to a lack of suitable habitat and that the Study Area lies outside of its breeding and wintering range.
Collin, Dallas, Rockwall	Red Knot	*Calidris canutus rufa*	LT	The species is a winter resident and migrant in Texas. It is primarily found in marine habitats such as sandy beaches, salt marshes, lagoons, mudflats of estuaries and bays, and mangrove swamps during winter months. It primarily occurs along the Gulf coast on tidal flats and beaches and less frequently in marshes and flooded fields. It has occasionally been observed along shorelines of large lakes and freshwater marshes.	No - this species may traverse the Study Area during migration or as a vagrant; however, it is very unlikely that the species regularly occurs within the Study Area due to a lack of suitable habitat and that the Study Area lies outside of its breeding and wintering range.
Collin, Dallas, Rockwall	Whopping Crane	*Grus americana*	LE	The species breeds in Canada and winters on the Texas coast at Aransas National Wildlife Refuge. During migration it typically stops to rest and feed in open bottomlands of large rivers and marshes but, like other waterbirds, it may also utilize flooded croplands, playas, large wetlands associated with lakes, small ponds, and various other aquatic	Yes - the Study Area lies along the edge of the zone that encompasses 95 percent of known sightings during migration; however, it is very unlikely that the species regularly occurs

County(s)	Common Name	Scientific Name	Federal Status*	Habitat	Suitable Habitat Present?
				features. Typical migration habitat includes sites with good horizontal visibility, water depth of 30 centimeters or less, and minimum wetland size of 0.04 hectare for roosting.	within the Study Area due to a lack of suitable habitat.

**Listed Endangered (LE); Listed Threatened (LT)*

APPENDIX D: iPAC STUDY AREA REPORT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Texas

Local office

Arlington Ecological Services Field Office

(817) 277-1100
(817) 277-1129

2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247

http://www.fws.gov/southwest/es/arlingtontexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Golden-cheeked Warbler (=wood) Dendroica chrysoparia — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/33

Least Tern Sterna antillarum — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8505

Piping Plover Charadrius melodus — Threatened
This species only needs to be considered if the following condition applies:
- Wind Energy Projects

There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/6039

Red Knot Calidris canutus rufa — Threatened
This species only needs to be considered if the following condition applies:
- Wind Energy Projects

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1864

Whooping Crane Grus americana — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/758

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
American Golden-plover Pluvialis dominica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

Bald Eagle Haliaeetus leucocephalus — Breeds Sep 1 to Jul 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Buff-breasted Sandpiper Calidris subruficollis — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9488

Harris's Sparrow Zonotrichia querula — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Long-billed Curlew Numenius americanus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Sprague's Pipit Anthus spragueii — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8964

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

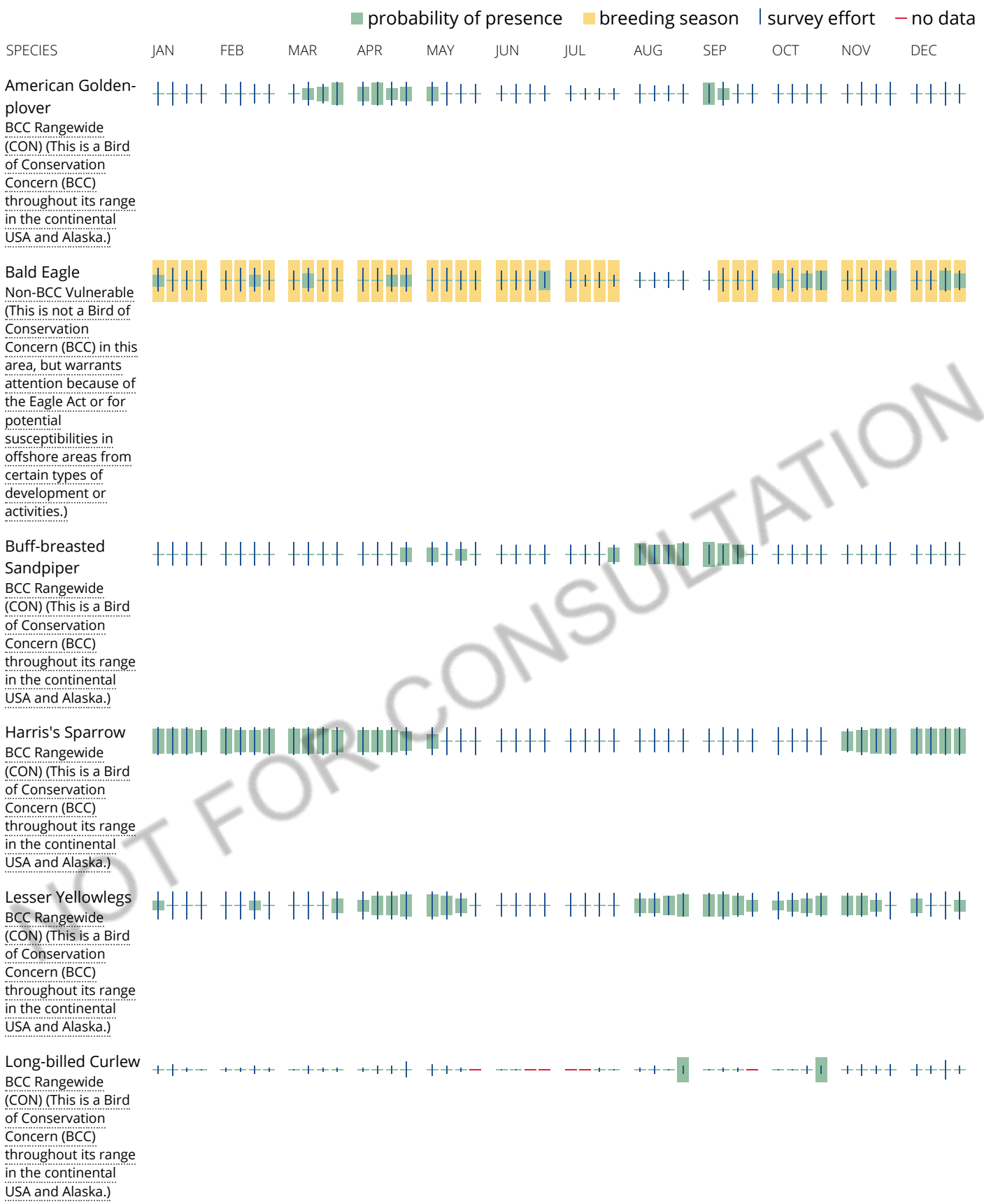
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

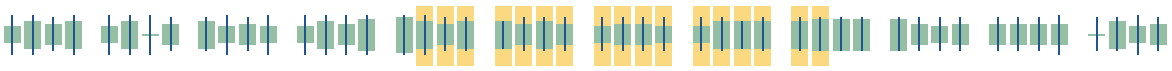
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Sprague's Pipit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project

intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES

Little River National Wildlife Refuge 13,558.65 acres

(580) 584-6211
(580) 584-2034

MAILING ADDRESS
P.O. Box 340
Broken Bow, OK 74728-0340

PHYSICAL ADDRESS
635 South Park Drive
Broken Bow, OK 74728-0340

https://www.fws.gov/refuges/profiles/index.cfm?id=21680

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME
This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX E: TPWD ANNOTATED LISTS OF RARE SPECIES – COLLIN, DALLAS AND ROCKWALL COUNTIES

Last Update: 8/25/2020

COLLIN COUNTY

AMPHIBIANS

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

Black Rail *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: PT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

COLLIN COUNTY

BIRDS

interior least tern *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G4T3Q	State Rank: S1B

piping plover *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

Rufa Red Knot *Calidris canutus rufa*

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T2	State Rank: S2N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

COLLIN COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1N

wood stork *Mycteria americana*

Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

CRUSTACEANS

a cave obligate isopod *Caecidotea bilineata*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: N
Endemic: Y	Global Rank: G2G3	State Rank: S1

Parkhill Prairie crayfish *Procambarus steigmani*

Burrower in long-grass prairie; all animals were collected with traps, thus there is no knowledge of depths of burrows; herbivore; crepuscular, nocturnal

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1S2

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

MAMMALS

American badger *Taxidea taxus*

COLLIN COUNTY

MAMMALS

Generalist. Prefers areas with soft soils that sustain ground squirrels for food. When inactive, occupies underground burrow. Young are born in underground burrows.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

eastern red bat *Lasiurus borealis*

Found in a variety of habitats in Texas. Usually associated with wooded areas. Found in towns especially during migration.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Known from montane and riparian woodland in Trans-Pecos, forests and woods in east and central Texas.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

Mexican free-tailed bat *Tadarida brasiliensis*

Roosts in buildings in east Texas. Largest maternity roosts are in limestone caves on the Edwards Plateau. Found in all habitats, forest to desert.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

COLLIN COUNTY

MAMMALS

mink *Neovison vison*

Intimately associated with water; coastal swamps & marshes, wooded riparian zones, edges of lakes. Prefer floodplains.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

plains spotted skunk *Spilogale putorius interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G4T4	State Rank: S1S3

southern short-tailed shrew *Blarina carolinensis*

Found in East Texas pine forests and agricultural land. May favor areas with abundant leaf litter and fallen logs (Baumgardner et al. 1992). Nest sites are probably under logs, stumps and other debris.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

thirteen-lined ground squirrel *Ictidomys tridecemlineatus*

Prefers short grass prairies with deep soils for burrowing. Frequently found in grazed ranchland, mowed pastures, and golf courses.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S3S4

COLLIN COUNTY

MAMMALS

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

woodland vole *Microtus pinetorum*

Include grassy marshes, swamp edges, old-field/pine woodland ecotones, tallgrass fields; generally sandy soils.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

MOLLUSKS

Louisiana Pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

Texas Heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G3	State Rank: S1

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

common garter snake *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G5	State Rank: S2

COLLIN COUNTY

REPTILES

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G5T4	State Rank: S1

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

COLLIN COUNTY

PLANTS

Engelmann's bladderpod *Physaria engelmannii*

Grasslands and calcareous rock outcrops in a band along the eastern edge of the Edwards Plateau, ranging as far north as the Red River (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

glandular gay-feather *Liatris glandulosa*

Occurs in herbaceous vegetation on limestone outcrops (Carr 2015)

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

red yucca *Hesperaloe parviflora*

Shrublands on dry limestone slopes; Perennial; Flowering April-May; Fruiting May-June

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Last Update: 8/25/2020

DALLAS COUNTY

AMPHIBIANS

southern dusky salamander *Desmognathus conanti*

Aquatic and terrestrial: The vegetated riparian and aquatic zones of spring-fed, sandy bottom streams and baygalls in forested areas. Eggs are laid on land under rocks and logs close to the stream edge.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G5	State Rank: S1

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

Black Rail *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: PT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

black-capped vireo *Vireo atricapilla*

Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3B

DALLAS COUNTY

BIRDS

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

golden-cheeked warbler *Setophaga chrysoparia*

Ashe juniper in mixed stands with various oaks (Quercus spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S2S3B

interior least tern *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G4T3Q	State Rank: S1B

piping plover *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

DALLAS COUNTY

BIRDS

Rufa Red Knot *Calidris canutus rufa*

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T2	State Rank: S2N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1N

wood stork *Mycteria americana*

Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

DALLAS COUNTY

CRUSTACEANS

a cave obligate isopod *Caecidotea bilineata*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: N
Endemic: Y Global Rank: G2G3 State Rank: S1

FISH

american eel *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G4 State Rank: S4

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: Y
Endemic: Global Rank: G3G4 State Rank: SNR

Comanche harvester ant *Pogonomyrmex comanche*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: Y
Endemic: Y Global Rank: G2G3 State Rank: S2

No accepted common name *Arethaea ambulator*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: Y
Endemic: Global Rank: GNR State Rank: SNR

MAMMALS

American badger *Taxidea taxus*

Generalist. Prefers areas with soft soils that sustain ground squirrels for food. When inactive, occupies underground burrow. Young are born in underground burrows.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S5

DALLAS COUNTY

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

cave myotis bat *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S4

eastern red bat *Lasiurus borealis*

Found in a variety of habitats in Texas. Usually associated with wooded areas. Found in towns especially during migration.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Known from montane and riparian woodland in Trans-Pecos, forests and woods in east and central Texas.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

Mexican free-tailed bat *Tadarida brasiliensis*

Roosts in buildings in east Texas. Largest maternity roosts are in limestone caves on the Edwards Plateau. Found in all habitats, forest to desert.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

mink *Neovison vison*

Intimately associated with water; coastal swamps & marshes, wooded riparian zones, edges of lakes. Prefer floodplains.

DALLAS COUNTY

MAMMALS

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S4

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S2S3

plains spotted skunk *Spilogale putorius interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Federal Status: | State Status: | SGCN: N
Endemic: N | Global Rank: G4T4 | State Rank: S1S3

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G4 | State Rank: S3

southern short-tailed shrew *Blarina carolinensis*

Found in East Texas pine forests and agricultural land. May favor areas with abundant leaf litter and fallen logs (Baumgardner et al. 1992). Nest sites are probably under logs, stumps and other debris.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S4

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S5

thirteen-lined ground squirrel *Ictidomys tridecemlineatus*

Prefers short grass prairies with deep soils for burrowing. Frequently found in grazed ranchland, mowed pastures, and golf courses.

Federal Status: | State Status: | SGCN: Y
Endemic: N | Global Rank: G5 | State Rank: S5

DALLAS COUNTY

MAMMALS

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G2G3 State Rank: S3S4

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G4 State Rank: S4

woodland vole *Microtus pinetorum*

Include grassy marshes, swamp edges, old-field/pine woodland ecotones, tallgrass fields; generally sandy soils.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S3

MOLLUSKS

Louisiana Pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y
Endemic: N Global Rank: G1G2 State Rank: S1

Sandbank Pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y
Endemic: Global Rank: G2? State Rank: S1

Texas Heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y
Endemic: N Global Rank: G1G3 State Rank: S1

DALLAS COUNTY

MOLLUSKS

Trinity Pigtoe *Fusconaia chunii*

Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (species was recently split from Texas Pigtoe and occurs in similar habitats; Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: N
Endemic: Y	Global Rank: GNR	State Rank: S1

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

common garter snake *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G5	State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

massasauga *Sistrurus tergeminus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3S4

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

DALLAS COUNTY

REPTILES

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G5T4	State Rank: S1

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

PLANTS

Engelmann's bladderpod *Physaria engelmannii*

Grasslands and calcareous rock outcrops in a band along the eastern edge of the Edwards Plateau, ranging as far north as the Red River (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

glandular gay-feather *Liatris glandulosa*

Occurs in herbaceous vegetation on limestone outcrops (Carr 2015)

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

DALLAS COUNTY

PLANTS

Glass Mountains coral-root *Hexalectris nitida*

Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Glen Rose yucca *Yucca necopina*

Grasslands on sandy soils and limestone outcrops; flowering April-June

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S3

Hall's prairie clover *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

Oklahoma phlox *Phlox oklahomensis*

Known from a 1958 collection from an oak woodland four miles east of Garland, Texas (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: SH

Osage Plains false foxglove *Agalinis densiflora*

Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

plateau milkvine *Matelea edwardsensis*

Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

Texas milk vetch *Astragalus reflexus*

Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

DALLAS COUNTY

PLANTS

tree dodder *Cuscuta exaltata*

Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Warnock's coral-root *Hexalectris warnockii*

In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

Last Update: 8/25/2020

ROCKWALL COUNTY

AMPHIBIANS

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

Black Rail *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: PT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

ROCKWALL COUNTY

BIRDS

interior least tern *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G4T3Q	State Rank: S1B

piping plover *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

Rufa Red Knot *Calidris canutus rufa*

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T2	State Rank: S2N

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

ROCKWALL COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

whooping crane *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1N

wood stork *Mycteria americana*

Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

MAMMALS

American badger *Taxidea taxus*

Generalist. Prefers areas with soft soils that sustain ground squirrels for food. When inactive, occupies underground burrow. Young are born in underground burrows.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

ROCKWALL COUNTY

MAMMALS

eastern red bat *Lasiurus borealis*

Found in a variety of habitats in Texas. Usually associated with wooded areas. Found in towns especially during migration.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Known from montane and riparian woodland in Trans-Pecos, forests and woods in east and central Texas.

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G3G4	State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

Mexican free-tailed bat *Tadarida brasiliensis*

Roosts in buildings in east Texas. Largest maternity roosts are in limestone caves on the Edwards Plateau. Found in all habitats, forest to desert.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

mink *Neovison vison*

Intimately associated with water; coastal swamps & marshes, wooded riparian zones, edges of lakes. Prefer floodplains.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

ROCKWALL COUNTY

MAMMALS

plains spotted skunk *Spilogale putorius interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G4T4	State Rank: S1S3

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

southern short-tailed shrew *Blarina carolinensis*

Found in East Texas pine forests and agricultural land. May favor areas with abundant leaf litter and fallen logs (Baumgardner et al. 1992). Nest sites are probably under logs, stumps and other debris.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

thirteen-lined ground squirrel *Ictidomys tridecemlineatus*

Prefers short grass prairies with deep soils for burrowing. Frequently found in grazed ranchland, mowed pastures, and golf courses.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S3S4

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

ROCKWALL COUNTY

MAMMALS

woodland vole *Microtus pinetorum*

Include grassy marshes, swamp edges, old-field/pine woodland ecotones, tallgrass fields; generally sandy soils.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

MOLLUSKS

Louisiana Pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

Texas Heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G3	State Rank: S1

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

common garter snake *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G5	State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

ROCKWALL COUNTY

REPTILES

massasauga *Sistrurus tergeminus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3S4

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Texas garter snake *Thamnophis sirtalis annectens*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G5T4	State Rank: S1

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

PLANTS

Topeka purple-coneflower *Echinacea atrorubens*

Occurring mostly in tallgrass prairie of the southern Great Plains, in blackland prairies but also in a variety of other sites like limestone hillsides; Perennial; Flowering Jan-June; Fruiting Jan-May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

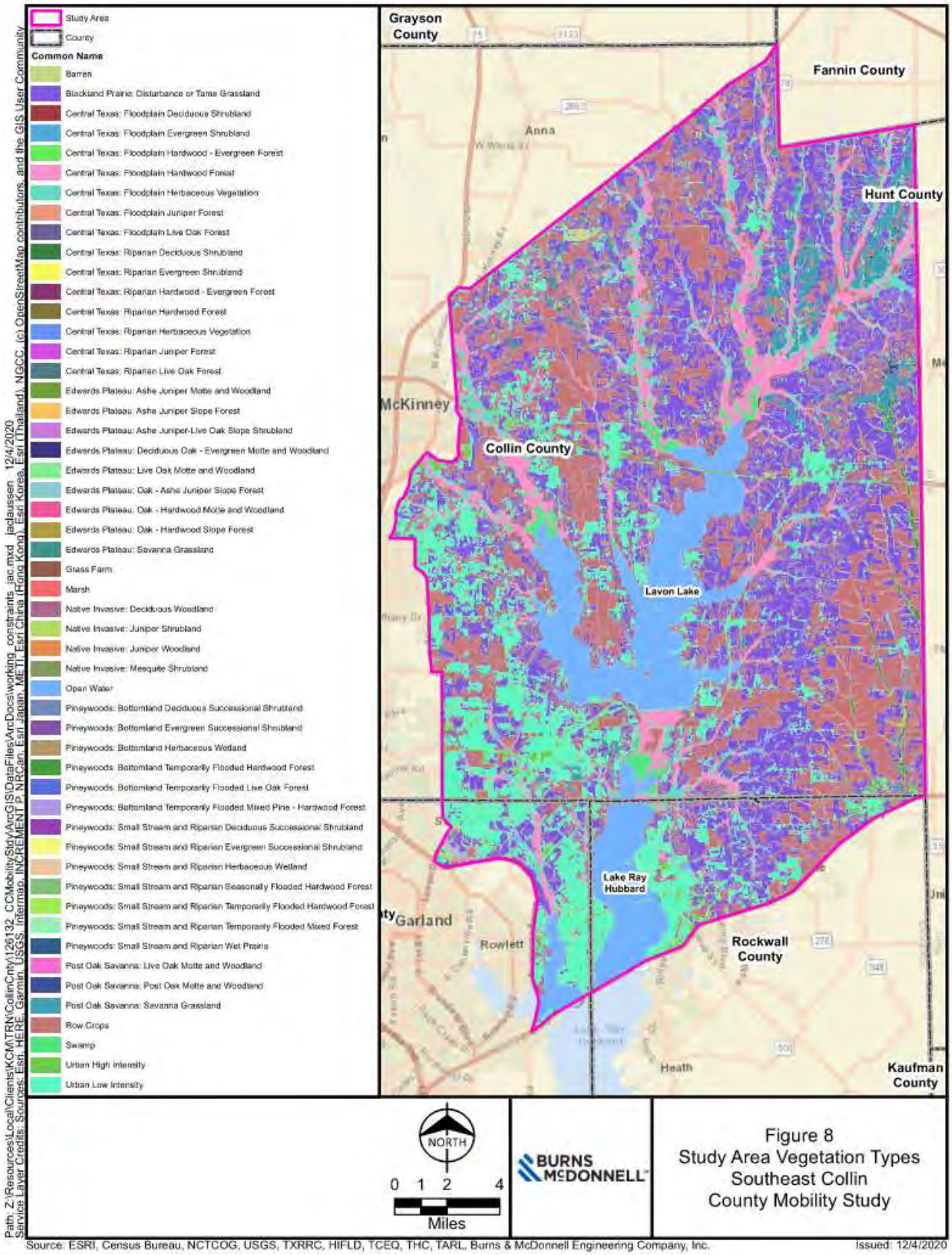
APPENDIX F: STUDY AREA EMST VEGETATION BY MAP UNIT AND LAND COVER TYPE

EMST Map Unit	Land Cover Type	Acres
Barren	Devoid of Vegetation	956
Blackland Prairie: Disturbance or Tame Grassland	Disturbed Prairie	107,623
Central Texas: Floodplain Deciduous Shrubland	Floodplain	71
Central Texas: Floodplain Evergreen Shrubland	Floodplain	66
Central Texas: Floodplain Hardwood - Evergreen Forest	Floodplain	360
Central Texas: Floodplain Hardwood Forest	Floodplain	19,495
Central Texas: Floodplain Herbaceous Vegetation	Floodplain	9,278
Central Texas: Floodplain Juniper Forest	Floodplain	13
Central Texas: Floodplain Live Oak Forest	Floodplain	258
Central Texas: Riparian Deciduous Shrubland	Riparian	20
Central Texas: Riparian Evergreen Shrubland	Riparian	49
Central Texas: Riparian Hardwood - Evergreen Forest	Riparian	168
Central Texas: Riparian Hardwood Forest	Riparian	4,656
Central Texas: Riparian Herbaceous Vegetation	Riparian	2,242
Central Texas: Riparian Juniper Forest	Riparian	4
Central Texas: Riparian Live Oak Forest	Riparian	21
Edwards Plateau: Ashe Juniper Motte and Woodland	Edwards Plateau Savannah, Woodland, Shrubland	17

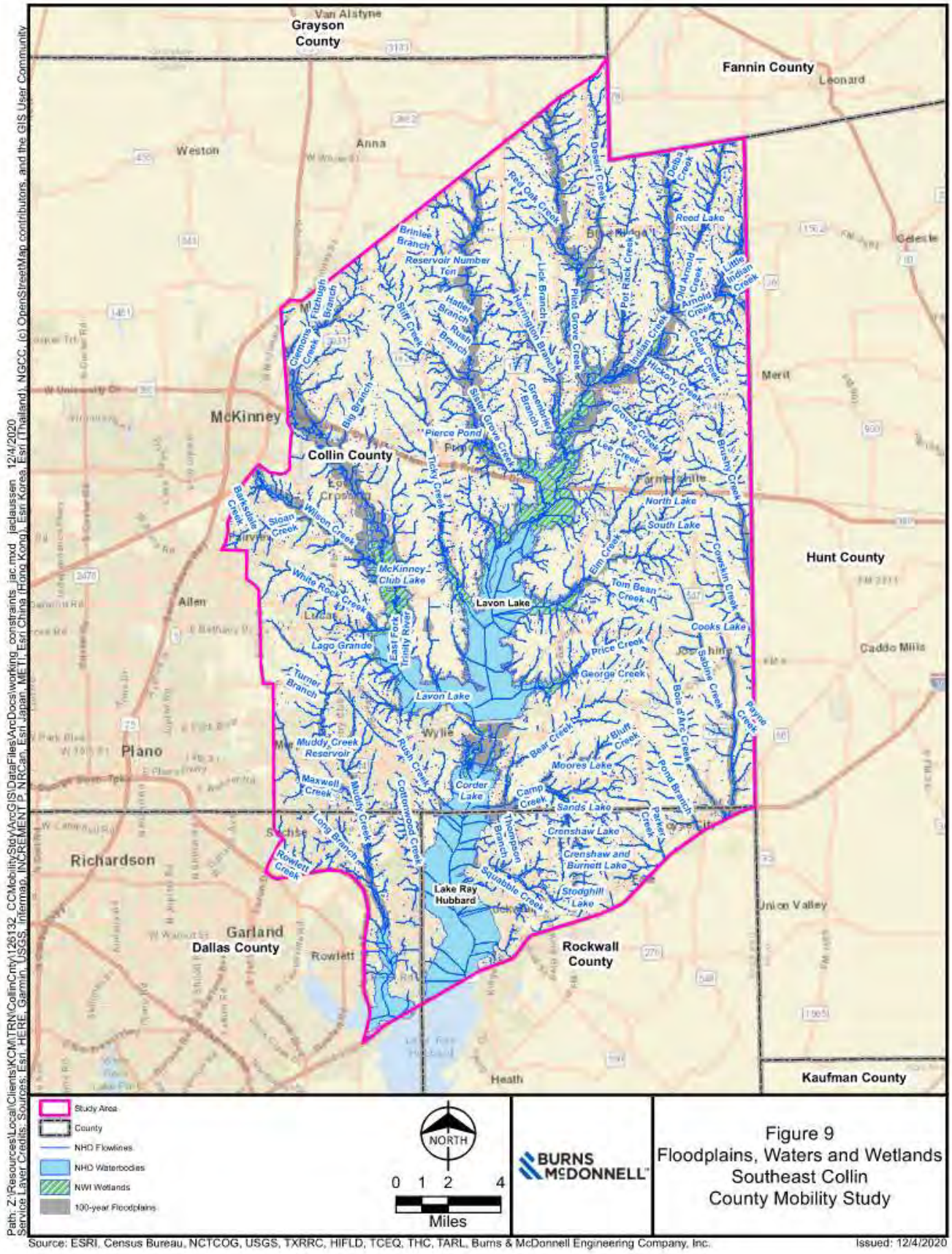
EMST Map Unit	Land Cover Type	Acres
Edwards Plateau: Ashe Juniper Slope Forest	Edwards Plateau Savannah, Woodland, Shrubland	1
Edwards Plateau: Ashe Juniper-Live Oak Slope Shrubland	Edwards Plateau Savannah, Woodland, Shrubland	1
Edwards Plateau: Deciduous Oak - Evergreen Motte and Woodland	Edwards Plateau Savannah, Woodland, Shrubland	98
Edwards Plateau: Live Oak Motte and Woodland	Edwards Plateau Savannah, Woodland, Shrubland	495
Edwards Plateau: Oak - Ashe Juniper Slope Forest	Edwards Plateau Savannah, Woodland, Shrubland	5
Edwards Plateau: Oak - Hardwood Motte and Woodland	Edwards Plateau Savannah, Woodland, Shrubland	1,798
Edwards Plateau: Oak - Hardwood Slope Forest	Edwards Plateau Savannah, Woodland, Shrubland	105
Edwards Plateau: Savanna Grassland	Edwards Plateau Savannah, Woodland, Shrubland	2,049
Grass Farm	Agriculture	32
Marsh	Marsh	3
Native Invasive: Deciduous Woodland	Disturbed Prairie	33,779
Native Invasive: Juniper Shrubland	Disturbed Prairie	1,137
Native Invasive: Juniper Woodland	Disturbed Prairie	377
Native Invasive: Mesquite Shrubland	Disturbed Prairie	1,058
Open Water	Water	32,379
Pineywoods: Bottomland Evergreen Successional Shrubland	Pine Woodland	13
Pineywoods: Small Stream and Riparian Herbaceous Wetland	Riparian	560
Pineywoods: Small Stream and Riparian Seasonally Flooded Hardwood Forest	Riparian	45
Pineywoods: Small Stream and Riparian Temporarily Flooded Hardwood Forest	Riparian	525

EMST Map Unit	Land Cover Type	Acres
Pineywoods: Small Stream and Riparian Temporarily Flooded Mixed Forest	Riparian	23
Pineywoods: Small Stream and Riparian Wet Prairie	Riparian	123
Post Oak Savanna: Post Oak Motte and Woodland	Post Oak Woodland	1,158
Post Oak Savanna: Savanna Grassland	Post Oak Savanah	7,841
Row Crops	Agriculture	50,145
Swamp	Riparian	3,105
Urban High Intensity	Urban	3,998
Urban Low Intensity	Urban	42,649

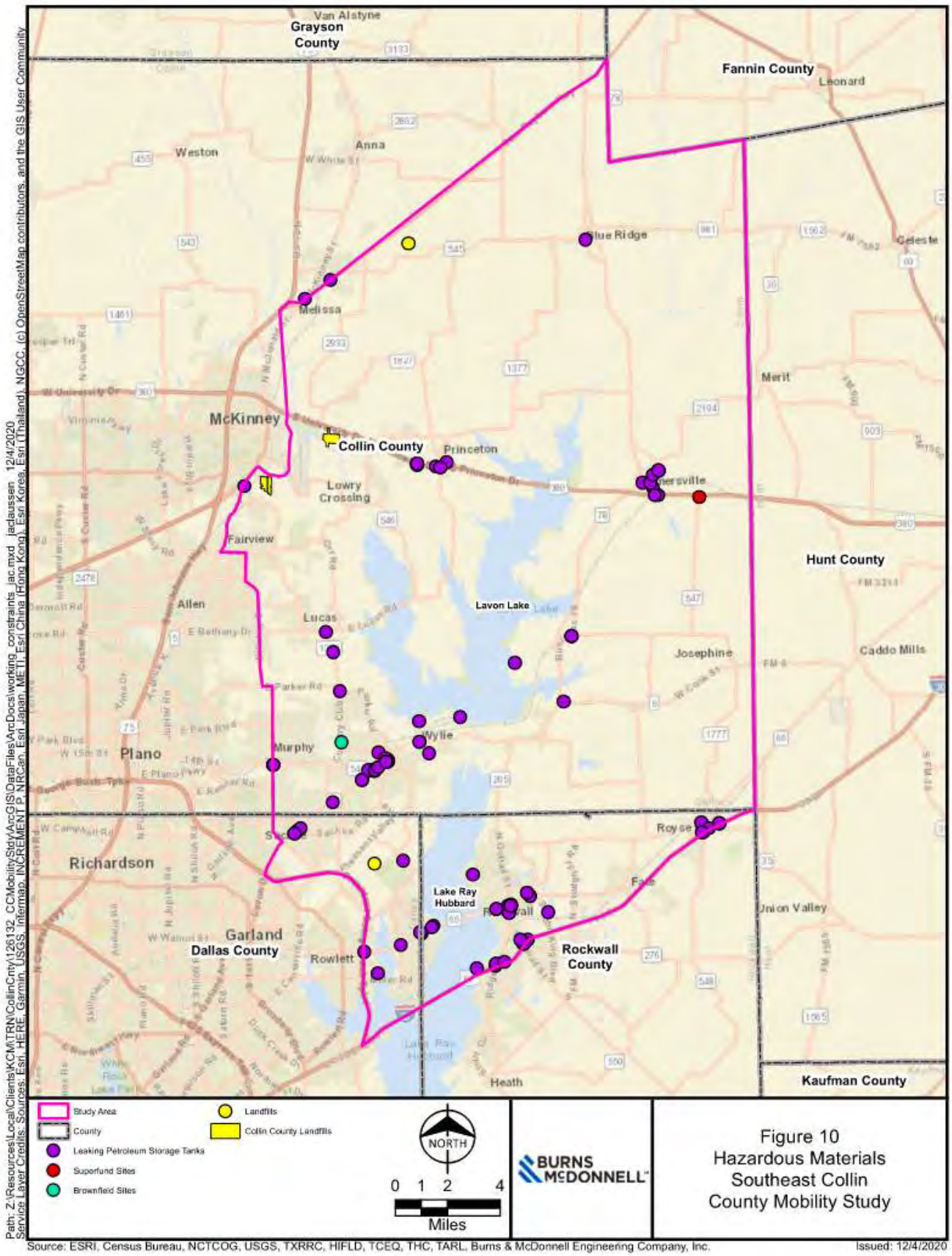
APPENDIX G: STUDY AREA VEGETATION (EMST)



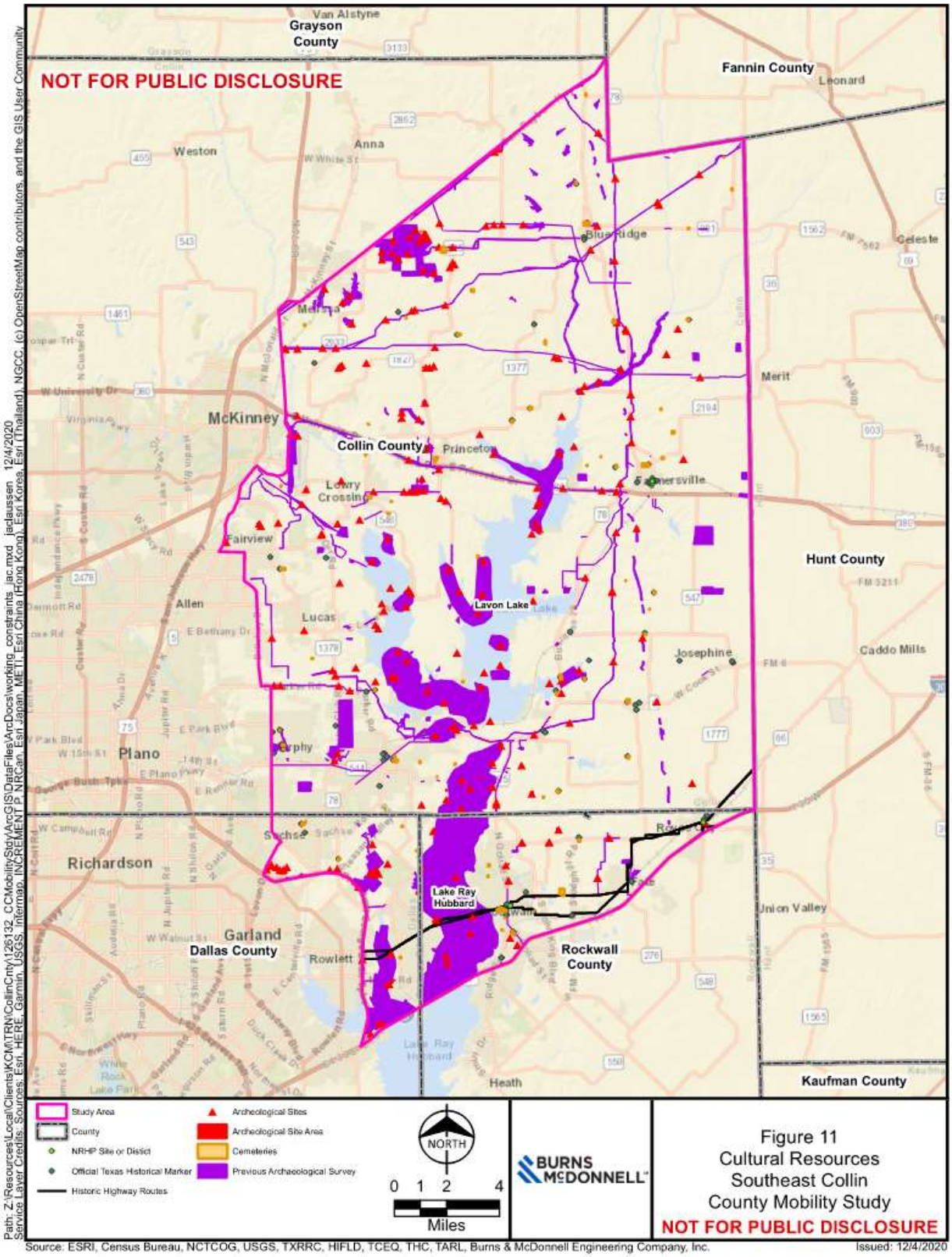
APPENDIX H: 100-YEAR FLOODPLAIN



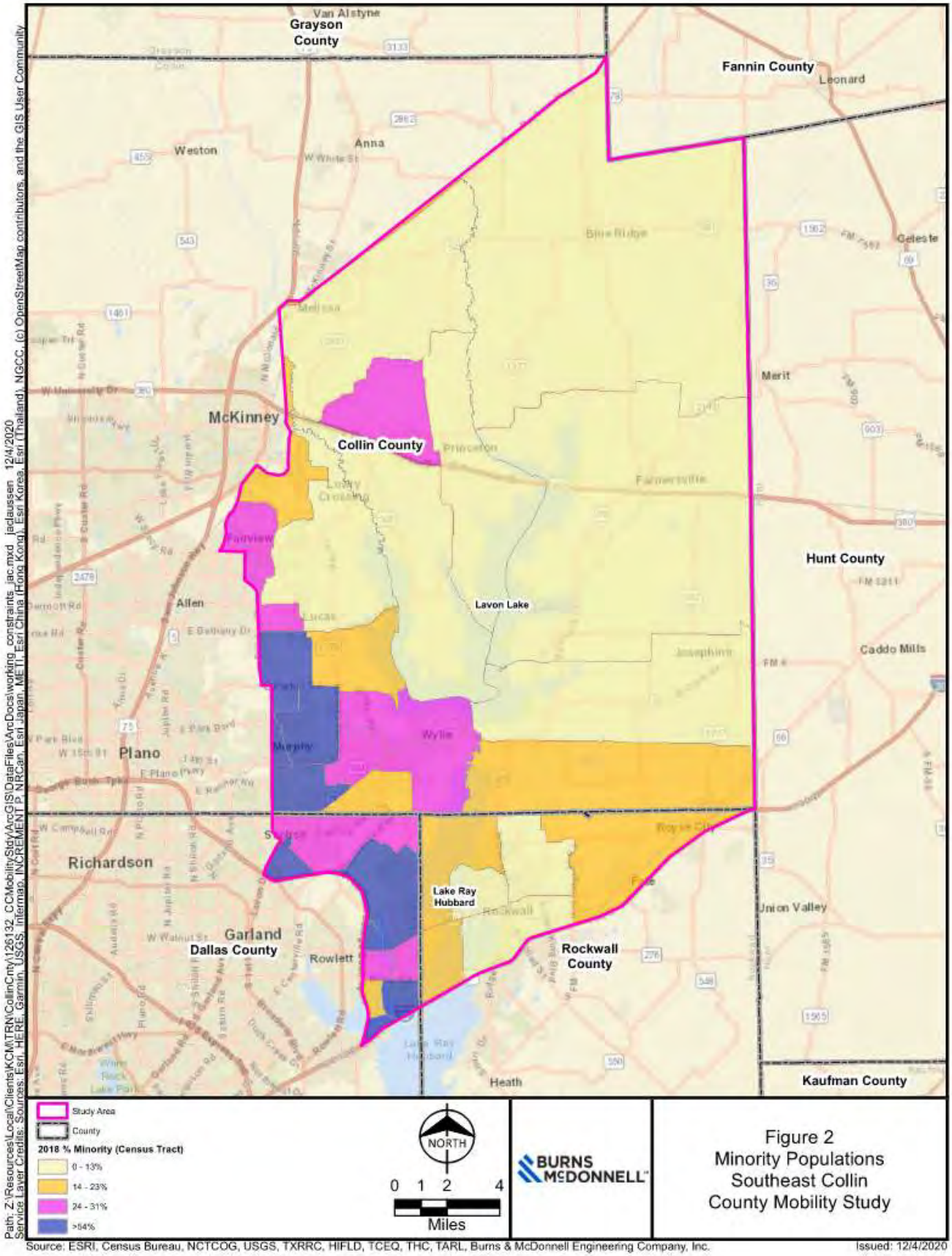
APPENDIX I: STUDY AREA KNOWN HAZARDOUS MATERIAL



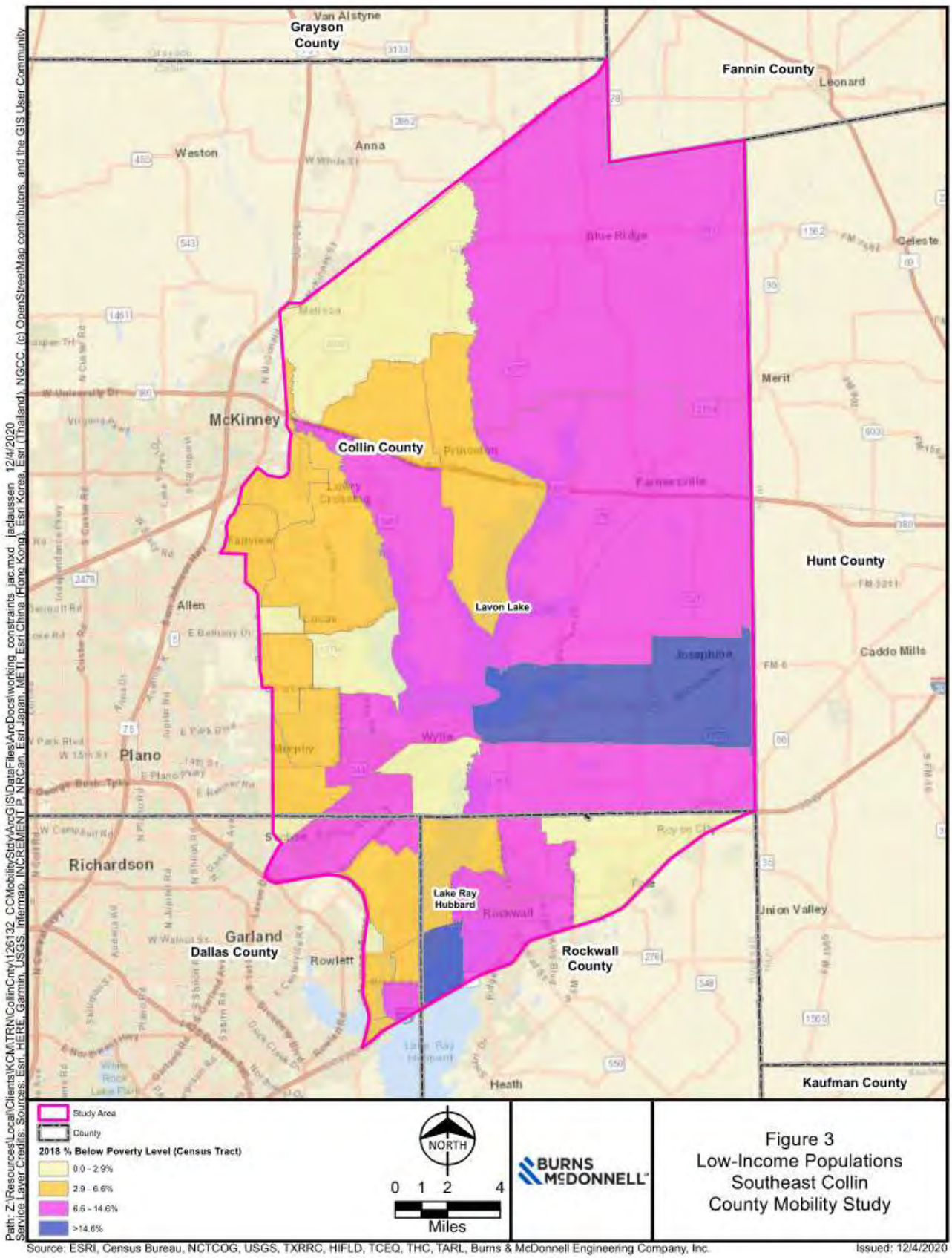
APPENDIX J: STUDY AREA CULTURAL RESOURCES



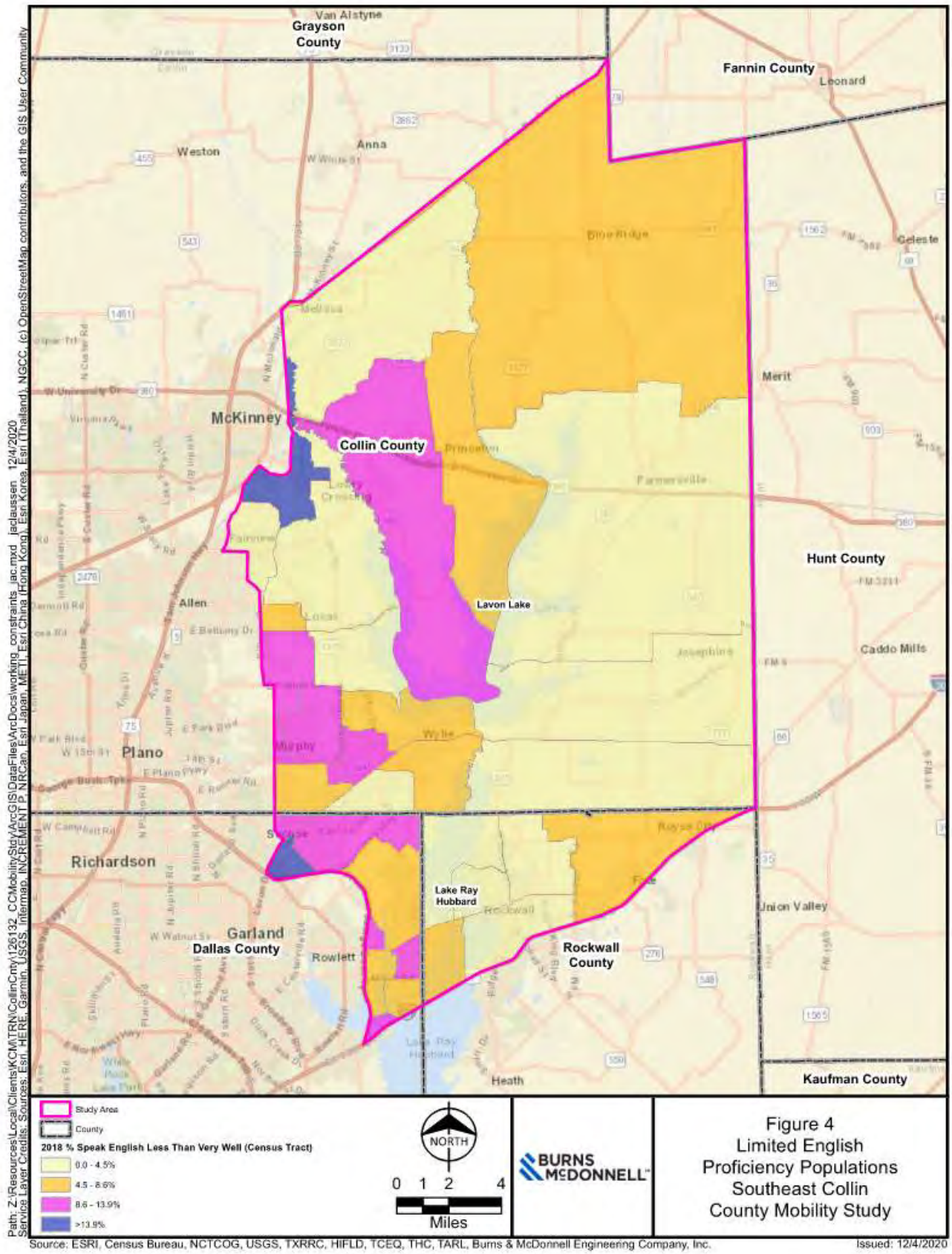
APPENDIX K: STUDY AREA MINORITY POPULATIONS



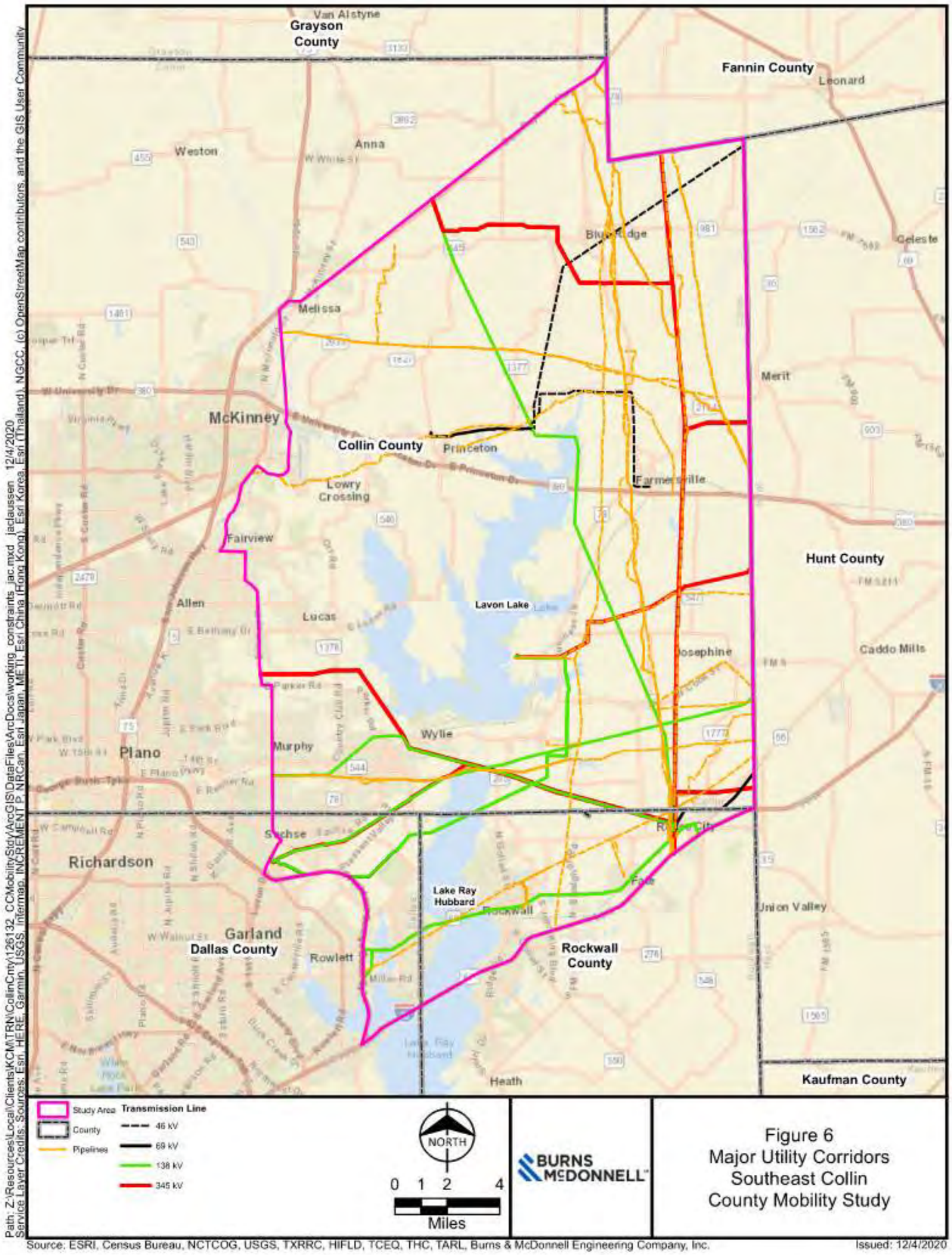
APPENDIX L: STUDY AREA LOW-INCOME POPULATIONS



APPENDIX M: STUDY AREA LIMITED ENGLISH PROFICIENCY POPULATIONS

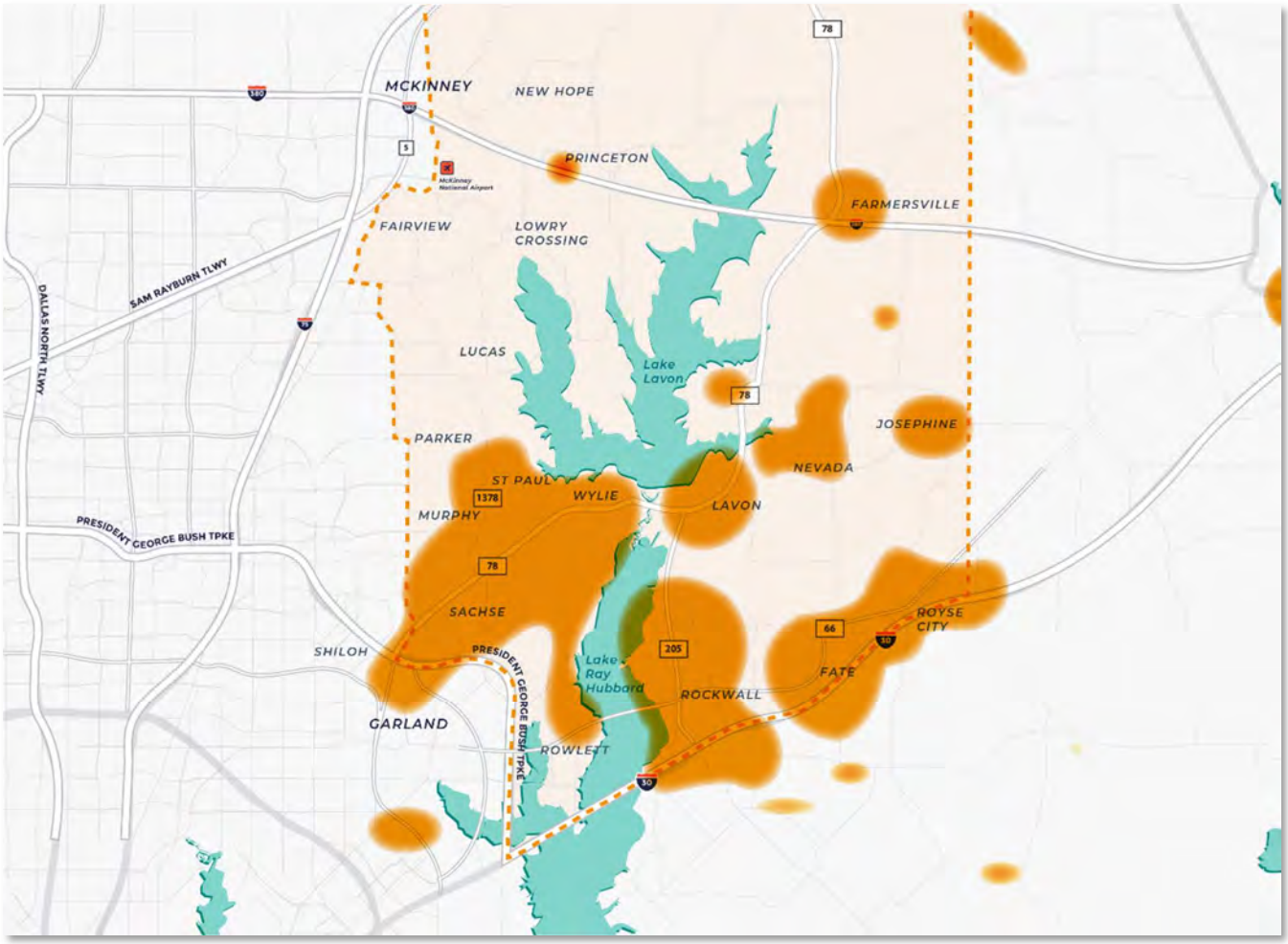


APPENDIX N: STUDY AREA MAJOR UTILITY CORRIDORS

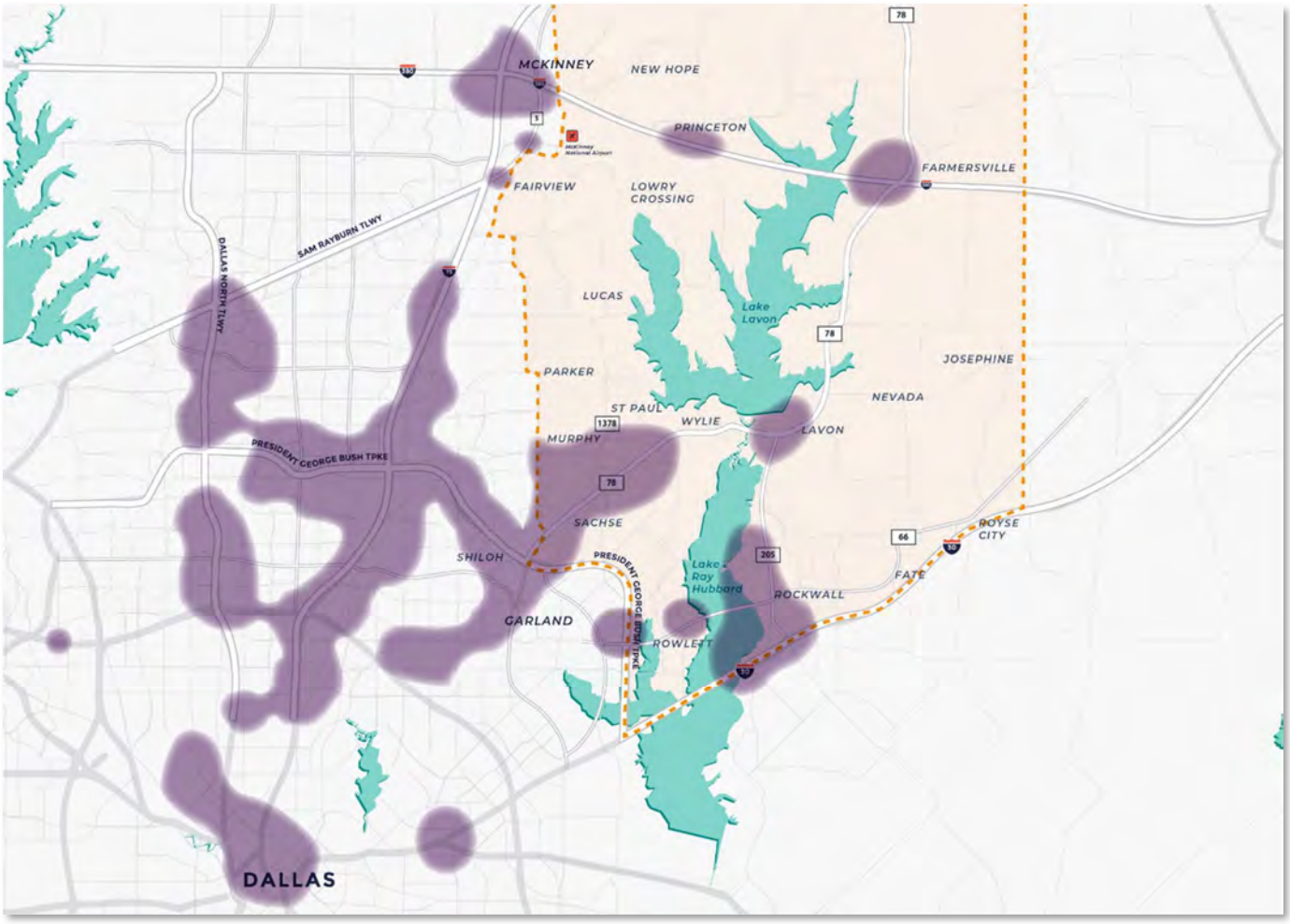


APPENDIX O: O&D STUDY – LONG LENGTH TRIPS COMPARISON FOR AM PEAK

The orange and purple clusters show concentrations of trip origins and destinations. The orange clusters represent popular trip origins and purple clusters represent popular trip destinations.



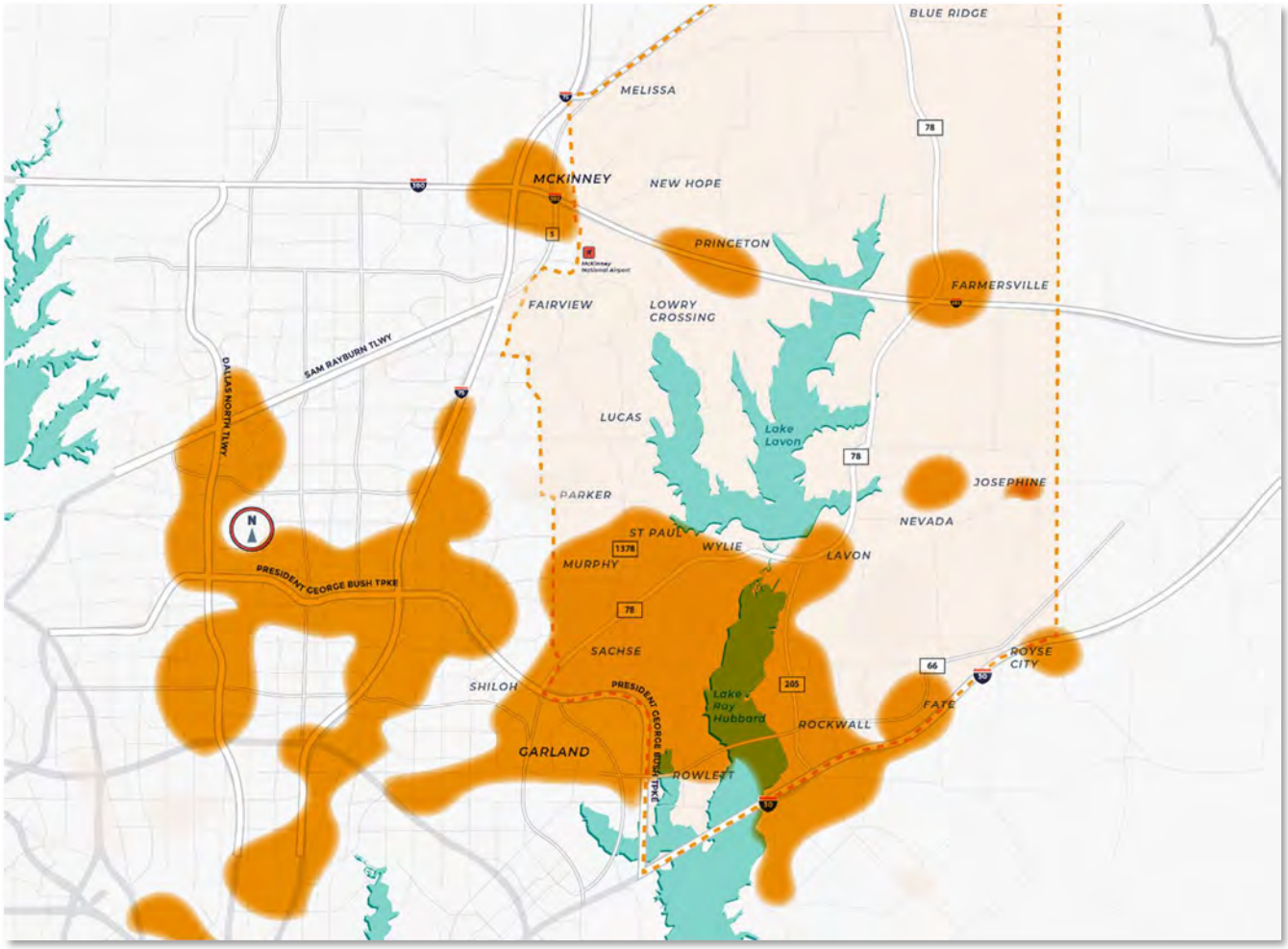
ABOVE: ORIGIN POINTS – AM PEAK LONG LENGTH TRIPS



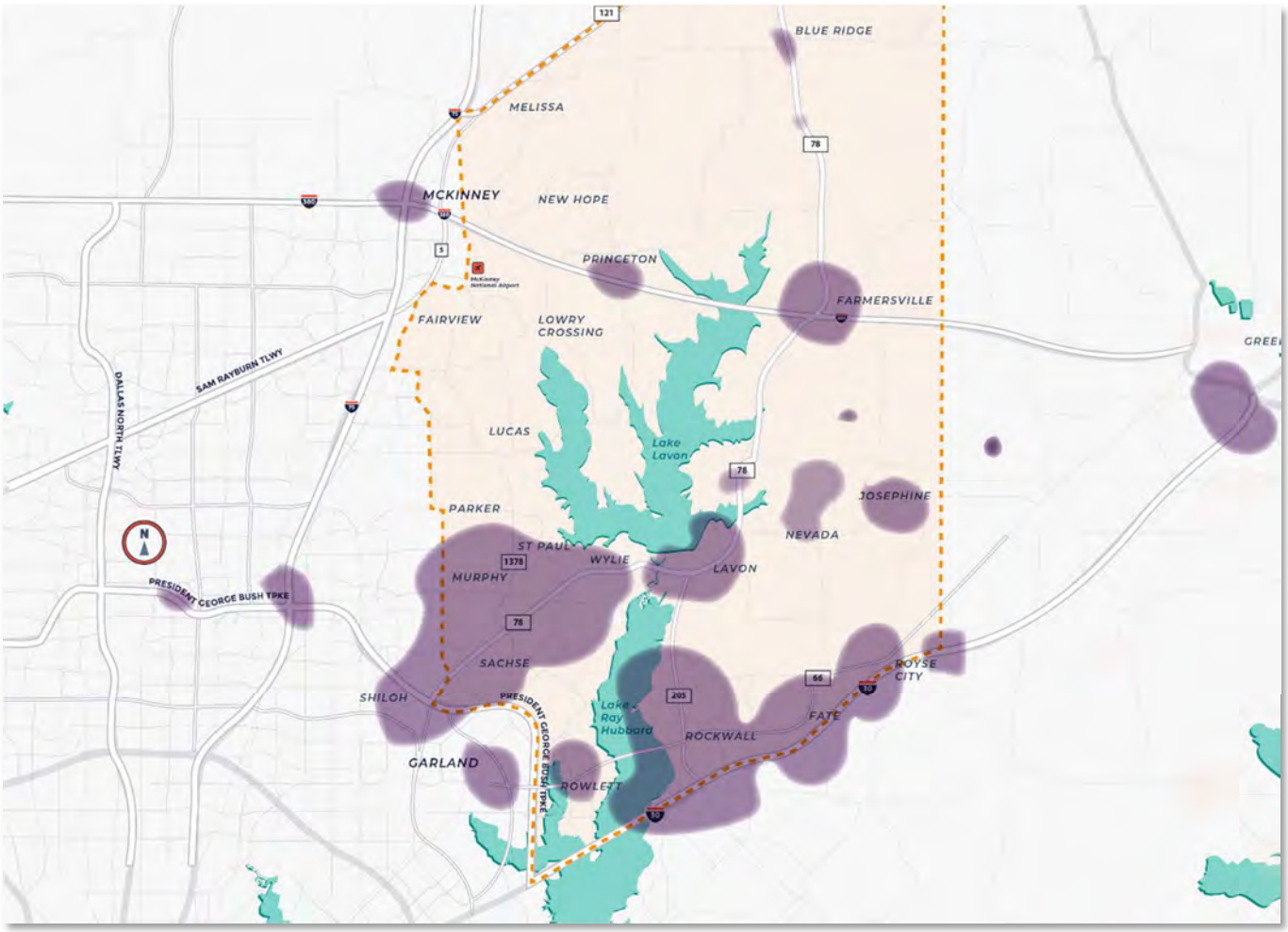
ABOVE: DESTINATION POINTS – AM PEAK LONG LENGTH TRIPS

APPENDIX P: O&D STUDY – LONG LENGTH TRIPS COMPARISON FOR PM PEAK

The orange and purple clusters show concentrations of trip origins and destinations. The orange clusters represent popular trip origins and purple clusters represent popular trip destinations.



ABOVE: ORIGIN POINTS – PM PEAK LONG LENGTH TRIPS



ABOVE: DESTINATION POINTS – PM PEAK LONG LENGTH TRIPS

APPENDIX Q: STAKEHOLDER MEETINGS

Organization	Attendees	Meeting Date
Collin County	Commissioner Cheryl Williams, Precinct 2	October 15, 2020
Collin County	Commissioner Duncan Webb, Precinct 4	October 20, 2020
Collin County	Commissioner Darrell Hale, Precinct 3	October 21, 2020
TxDOT Dallas District	District Engineer Mo Bur Deputy District Engineer Ceason Clemens TP&D Director John Hudspeth Supervisor Project Delivery Travis Campbell Assistant APD Engineer Dan Perge Area Engineer Jennifer Vorster	October 27, 2020
NCTCOG	Principal Transportation Planner Berrien Barks Senior Program Manager Jeff Neal Principal Transportation Planner Chris Reed Transportation Planner III David Tidwell Senior Transportation Planner Samuel Simmons	October 29, 2020
City of Wylie	City Manager Chris Holsted Public Works Director Tim Porter	November 4, 2020
Rockwall County	Commissioner David Magness John Polster, Innovative Transportation Solutions	November 5, 2020
Hunt County	County Judge Bobby W. Stovall W.D. “Dee” Hilton	November 12, 2020
Dallas County	Commissioner J.J. Koch, Precinct 2	November 13, 2020

Organization	Attendees	Meeting Date
City of Lavon	City Administrator Kim Dobbs Jody Short, Lee Engineering Abra Nusser, Kimley Horn Mark Hill, FMI Dallas	November 19, 2020
City of Princeton	City Manager Derek Borg Kimley Horn Project Manager Joe Helmberger	December 15, 2020
City of Farmersville	City Manager Ben White	December 16, 2020
City of Nevada	Mayor Trace Kinnard City Secretary Judy Hill City Clerk Misty Hooker City Attorney Jim Shepherd Chris Donnan, Hayter Engineering	December 21, 2020
US Army Corps of Engineers (USACE)	Lavon Lake Manager Michael Kinard	January 6, 2021
City of Josephine	Mayor Joe Holt Public Works Director Kirk Peters Eddy Daniel, DBI Engineers	January 6, 2021
City of Lucas	City Manager Joni Clarke Public Works Director/City Engineer Stanton Foerster	January 13, 2021
Town of St. Paul	Town Administrator Robert “Bob” London	January 14, 2021
North Texas Municipal Water District (NTMWD)	Assistant Deputy Director CIP RJ Muraski Deputy Director of Engineering & CIP Cesar Baptista	January 15, 2021
City of Sachse	City Manager Gina Nash Director of CIP and Public Works Corey Nesbit	January 28, 2021

Organization	Attendees	Meeting Date
Royse City	City Engineer Lacey Rodgers Fire Marshal Tanner Dietz	February 2, 2021
City of Rockwall	Interim City Manager Mary Smith Assistant City Manager Joey Boyd Director of Public Works/City Engineer Amy Williams Director of Planning & Zoning Ryan Miller	February 3, 2021
City of Rowlett	Director of Public Works Gary Enna Director of Community Development Munal Mauladad	February 12, 2021

APPENDIX R: STAKEHOLDER DATABASE

Organization	Title	Name	Address 1	Address 2	City	State	Zip
City of Farmersville	City Council, Place Five	Dwain Mathers	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Council, Place Four	Mike Henry	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Council, Place One	Craig Overstreet	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Council, Place Three	Jim Hemby	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Council, Place Two	Terry Williams	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Manager	Ben White	205 S Main St		Farmersville	TX	75442
City of Farmersville	City Secretary	Sandra Green	205 S Main St		Farmersville	TX	75442
City of Farmersville	Fire Chief	Kim Morris	205 S Main St		Farmersville	TX	75442
City of Farmersville	Mayor	Bryon Wiebold	205 S Main St		Farmersville	TX	75442
City of Farmersville	Police Chief	Michael P. Sullivan	134 N Washington St		Farmersville	TX	75442
City of Fate	City Council, Place Five	Heather Buegeler	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Council, Place Four	Allen Robbins	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Council, Place One	Lance Megyesi	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Council, Place Six	John Hamilton	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Council, Place Three	Christopher Ash	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Council, Place Two	John Brandt	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Manager	Michael Kovacs	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	City Secretary	Vickey Raduechel	1900 CD Boren Parkway		Fate	TX	75087
City of Fate	Director of Department of Public Safety	Lyle Lombard	105 E Fate Main Place		Fate	TX	75087
City of Fate	Mayor	David Billings	1900 CD Boren Parkway		Fate	TX	75087
City of Josephine	City Council, Place Five	Jason Turney	201 S Main St		Josephine	TX	75173
City of Josephine	City Council, Place Four	Cedric Powell	201 S Main St		Josephine	TX	75173

Organization	Title	Name	Address 1	Address 2	City	State	Zip
City of Josephine	City Council, Place One	Doug Ewing	201 S Main St		Josephine	TX	75173
City of Josephine	City Council, Place Three	Brad Ahlfinger	201 S Main St		Josephine	TX	75173
City of Josephine	City Council, Place Two	Katrina Heifner-Donihoo	201 S Main St		Josephine	TX	75173
City of Josephine	City Secretary	Patti Brooks	201 S Main St		Josephine	TX	75173
City of Josephine	Director of Public Works	Kirk Peters	201 S Main St		Josephine	TX	75164
City of Josephine	Fire Chief	Dan Tripp	201 W Hubbard Rd		Josephine	TX	75164
City of Josephine	Mayor	Joe Holt	201 S Main St		Josephine	TX	75173
City of Josephine	Police Chief	Matthew A. Briggs	PO Box 99		Josephine	TX	75164
City of Lavon	City Administrator	Kim Dobbs	120 School Rd		Lavon	TX	75166
City of Lavon	City Council, Place Five	Mindi Serkland	120 School Rd		Lavon	TX	75166
City of Lavon	City Council, Place Four	Ted Dill	120 School Rd		Lavon	TX	75166
City of Lavon	City Council, Place One	John Kell	120 School Rd		Lavon	TX	75166
City of Lavon	City Council, Place Three	Kay Wright	120 School Rd		Lavon	TX	75166
City of Lavon	City Council, Place Two	Mike Cook	120 School Rd		Lavon	TX	75166
City of Lavon	Fire Chief	Danny Anthony	501 A Lincoln Ave		Lavon	TX	75166
City of Lavon	Mayor	Vicki Sanson	120 School Rd		Lavon	TX	75166
City of Lavon	Police Chief	Michael Jones	501 Lincoln Ave	#B	Lavon	TX	75166
City of Lucas	City Manager	Joni Clarke	665 Country Club Road		Lucas	TX	75002
City of Lucas	Councilmember	Debbie Fisher	665 Country Club Road		Lucas	TX	75002
City of Lucas	Councilmember	Philip Lawrence	665 Country Club Road		Lucas	TX	75002
City of Lucas	Councilmember	Tim Johnson	665 Country Club Road		Lucas	TX	75002
City of Lucas	Councilmember	Steve Duke	665 Country Club Road		Lucas	TX	75002
City of Lucas	Councilmember	Tim Baney	665 Country Club Road		Lucas	TX	75002
City of Lucas	Fire Chief	Ted Stephens	165 Country Club Road		Lucas	TX	75002
City of Lucas	Mayor	Jim Olk	665 Country Club Road		Lucas	TX	75002

Organization	Title	Name	Address 1	Address 2	City	State	Zip
City of Lucas	Mayor Pro Tem	Kathleen Peele	665 Country Club Road		Lucas	TX	75002
City of Lucas	Public Works Director/City Engineer	Stanton Foerster	665 Country Club Road		Lucas	TX	75002
City of Nevada	City Council, Place Five	Michael Brinton	424 E FM 6		Nevada	TX	75173
City of Nevada	City Council, Place Four	Karl Fisher	424 E FM 6		Nevada	TX	75173
City of Nevada	City Council, Place One	Kerri Longoria	424 E FM 6		Nevada	TX	75173
City of Nevada	City Council, Place Three	Travis Waddell	424 E FM 6		Nevada	TX	75173
City of Nevada	City Council, Place Two	Gwen Garlington	424 E FM 6		Nevada	TX	75173
City of Nevada	City Secretary	Judy Hill	424 E FM 6		Nevada	TX	75173
City of Nevada	Fire Chief	Greg Cortez	424 E FM 6		Nevada	TX	75173
City of Nevada	Mayor	Trace Kinnard	424 E FM 6		Nevada	TX	75173
City of Princeton	City Council, Place Four	Keven Underwood	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	City Council, Place One	David Kleiber	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	City Council, Place Three	Bryan Washington	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	City Council, Place Two	Mike Robertson	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	City Manager	Derek Borg	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	City Secretary	Tabatha Monk	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	Fire Chief	Tom Harvey	510 Woody Drive		Princeton	TX	75407
City of Princeton	Mayor	Brianna Chacon	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	Mayor Pro Tem/City Council, Place Five	Steve Deffibaugh	123 W Princeton Drive		Princeton	TX	75407
City of Princeton	Police Chief	Mark Moyle	306 Main Street		Princeton	TX	75407
City of Rockwall	City Council, Place Five	Dana Macalik	385 South Goliad		Rockwall	TX	75087
City of Rockwall	City Council, Place Four	Trace Johannesen	385 South Goliad		Rockwall	TX	75087
City of Rockwall	City Council, Place One	Bennie Daniels	385 South Goliad		Rockwall	TX	75087
City of Rockwall	City Council, Place Six	Anna Campbell	385 South Goliad		Rockwall	TX	75087
City of Rockwall	City Council, Place Three	Kevin Fowler	385 South Goliad		Rockwall	TX	75087

Organization	Title	Name	Address 1	Address 2	City	State	Zip
City of Rockwall	City Council, Place Two	John Hohenshelt	385 South Goliad		Rockwall	TX	75087
City of Rockwall	Director of Planning	Ryan Miller	385 South Goliad		Rockwall	TX	75087
City of Rockwall	Director of Public Works City Engineer	Amy Williams	385 South Goliad		Rockwall	TX	75087
City of Rockwall	Fire Chief	Kenneth Cullins	305 East Boydstun		Rockwall	TX	75087
City of Rockwall	Interim City Manager	Mary Smith	385 South Goliad		Rockwall	TX	75087
City of Rockwall	Mayor	Jim Pruitt	385 South Goliad		Rockwall	TX	75087
City of Rockwall	Police Chief	Max Geron	385 South Goliad		Rockwall	TX	75087
City of Rowlett	City Council, Place Five	Pamela Bell	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Council, Place Four	Whitney P. Laning	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Council, Place One	Robert Blake Margolis	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Council, Place Six	Martha Brown	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Council, Place Three	Matt Grubisich	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Council, Place Two	Brownie Sherrill	4000 Main Street		Rowlett	TX	75088
City of Rowlett	City Manager	Brian Funderburk	4000 Main Street		Rowlett	TX	75088
City of Rowlett	Director of Community Development	Munal Mauladad	5702 Rowlett Road		Rowlett	TX	75089
City of Rowlett	Director of Public Works	Gary Enna	4000 Main Street		Rowlett	TX	75088
City of Rowlett	Fire Chief	Neil Howard	4701 Rowlett Road		Rowlett	TX	75088
City of Rowlett	Mayor	Tammy Dana-Bashian	4000 Main Street		Rowlett	TX	75088
City of Rowlett	Police Chief	Michael Godfrey	4401 Rowlett Road		Rowlett	TX	75088
City of Sachse	City Council, Place Five	Cullen King	3815 Sachse Road		Sachse	TX	75048
City of Sachse	City Council, Place Four	Chance Lindsey	3815 Sachse Road		Sachse	TX	75048
City of Sachse	City Council, Place One	Brett Franks	3815 Sachse Road		Sachse	TX	75048
City of Sachse	City Council, Place Six	Jeff Bickerstaff	3815 Sachse Road		Sachse	TX	75048
City of Sachse	City Council, Place Three	Frank Milsap	3815 Sachse Road		Sachse	TX	75048
City of Sachse	City Council, Place Two	Michelle Howarth	3815 Sachse Road		Sachse	TX	75048

Organization	Title	Name	Address 1	Address 2	City	State	Zip
City of Sachse	City Manager	Gina Nash	3815 Sachse Road		Sachse	TX	75048
City of Sachse	Director of CIP and Public Works	Corey Nesbit	3815 Sachse Road	Building B	Sachse	TX	75048
City of Sachse	Fire Chief	Marty Wade	3815 Sachse Road	Building D	Sachse	TX	75048
City of Sachse	Mayor	Mike Felix	3815 Sachse Road		Sachse	TX	75048
City of Sachse	Police Chief	Bryan Sylvester	3815 Sachse Road	Building D	Sachse	TX	75048
City of Wylie	City Council, Place Five	Timothy T. Wallis	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	City Council, Place Four	Candy Arrington	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	City Council, Place One	David R. Duke	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	City Council, Place Six	Garrett Mize	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	City Council, Place Two	Dave Strang	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	City Manager	Chris Holsted	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	Fire Chief	Brent Parker	2000 N HWY 78		Wylie	TX	75098
City of Wylie	Mayor	Matthew Porter	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	Mayor Pro Tem/City Council, Place Three	Jeff Forrester	300 Country Club Road	Building 100	Wylie	TX	75098
City of Wylie	Public Works Director	Tim Porter	300 Country Club Road	Building 100	Wylie	TX	75098
Collin County Business Alliance	Chairman of the Board	Sanjiv Yajnik	Not Available				
Community ISD	Superintendent	Dr. Roosevelt Nivens	611 FM 1138 North		Nevada	TX	75173
Community ISD	Transportation Administrator	John Hickman	611 FM 1138 North		Nevada	TX	75173
Dallas County	County Commissioner, District 2	J.J. Koch	411 Elm Street	2nd Floor	Dallas	TX	75202
Dallas County	Director of Public Works	Alberta Blair	411 Elm Street	4th Floor	Dallas	TX	75202
Dallas County	Transportation Planner	Minesha Reese	411 Elm Street	4th Floor	Dallas	TX	75202
Farmersville Chamber of Commerce	Director	Lisa Eastman	201 S Main St		Farmersville	TX	75442
Farmersville ISD	Superintendent	Michael French	501A Hwy 78 N		Farmersville	TX	75442
Fate Development Corporation	Assistant City Manager	Justin Weiss	1900 CD Boren Parkway		Fate	TX	75087
Hunt County	Judge	Bobby W. Stovall	2507 Lee St	2nd Floor	Greenville	TX	75401

Organization	Title	Name	Address 1	Address 2	City	State	Zip
Hunt County	Transportation Lead	W.D. Hilton					
Lavon Area Chamber of Commerce	President	Mike Powell	P.O. Box 356		Lavon	TX	75166
Lavon Economic Development Corporation	Executive Director	Pam Mundo	120 School Road	P.O. Box 340	Lavon	TX	75166
Lovejoy ISD	Superintendent	Dr. Michael Goddard	259 County Club Road		Allen	TX	75002
NCTCOG	Principal Transportation Planner	Berrien Barks	616 Six Flags Dr		Arlington	TX	76011
NCTCOG	Principal Transportation Planner	Chris Reed	616 Six Flags Dr		Arlington	TX	76011
NCTCOG	Program Manager	Jeffrey Neal	616 Six Flags Dr		Arlington	TX	76011
NCTCOG	Transportation Planner III	David Tidwell	616 Six Flags Dr		Arlington	TX	76011
Princeton Chamber of Commerce	President	John Waskow	200 S Beauchamp Blvd	Suite 106	Princeton	TX	75407
Princeton ISD	Superintendent	Donald McIntyre	321 Panther Parkway		Princeton	TX	75407
Rockwall Area Chamber of Commerce	President/CEO	Darby Burkey	697 E I-30		Rockwall	TX	75087
Rockwall City Community Development Board	Executive Director	Charles Houk	216 North Arch Street	Suite A	Royse City	TX	75189
Rockwall County	County Commissioner, Precinct 4	Janet Nichol	101 E Rusk St	Suite 202	Rockwall	TX	75087
Rockwall Economic Development Corporation	President	Phil Wagner	2610 Observation Trail	Suite 104	Rockwall	TX	75032
Rockwall ISD	Director of Transportation	Terry Penn	1050 Williams St		Rockwall	TX	75087
Rockwall ISD	Superintendent	Dr. John "JJ' Villarreal	1050 Williams St		Rockwall	TX	75087
Rowlett Chamber of Commerce	President/CEO	Michael Gallops	4418 Main St		Rowlett	TX	75088
Rowlett Economic Development	Director of Economic Development	Jim Grabenhorst	5702 Rowlett Road		Rowlett	TX	75089
Royse City	City Council, Place Four	Matt Wheatley	305 N Arch Street		Royse City	TX	75189
Royse City	City Council, Place One	Mike Holder	305 N Arch Street		Royse City	TX	75189
Royse City	City Council, Place Six	Tom Crowley	305 N Arch Street		Royse City	TX	75189
Royse City	City Council, Place Three	Bruce Bradley	305 N Arch Street		Royse City	TX	75189
Royse City	City Council, Place Two	Ed Nichol	305 N Arch Street		Royse City	TX	75189
Royse City	City Engineer	Lacey Rodgers	305 N Arch Street	P.O. Box 638	Royse City	TX	75189
Royse City	City Manager	Carl Alsabrook	305 N Arch Street		Royse City	TX	75189

Organization	Title	Name	Address 1	Address 2	City	State	Zip
Royse City	Fire Marshal	Tanner Dietz	305 N Arch Street		Royse City	TX	75189
Royse City	Mayor	Clay Ellis	305 N Arch Street		Royse City	TX	75189
Royse City	Mayor Pro Tem/City Council, Place Five	James Branch	305 N Arch Street		Royse City	TX	75189
Royse City	Police Chief	Kirk Aldridge	100 West Main Street		Royse City	TX	75189
Royse City	Fire Chief	Richard Bell	305 N Arch Street		Royse City	TX	75189
Royse City Chamber of Commerce	Chief Financial Operations Officer	Vanessa Stahl	102 W Old Greenville Road		Royse City	TX	75189
Royse City ISD	Superintendent	Kevin Worthy	810 Old Greenville Rd	PO Box 479	Royse City	TX	75189
Royse City ISD	Transportation Director	Tammy Loveless	810 Old Greenville Rd		Royse City	TX	75189
Sachse Chamber of Commerce	Chairman of the Board	Teddy Kinzer	7214 Highway 78	Suite 16	Sachse	TX	75048
Sachse Economic Development Corporation	CEO	Leslyn Blake	3815 Sachse Road	Building B	Sachse	TX	75048
Town of St. Paul	Mayor	David Gensler	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Mayor Pro Tem/Town Council, Seat 4	Sherry Betts	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Town Council, Seat 1	Marvin Blakey	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Town Council, Seat 2	Andy Bonnot	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Town Council, Seat 3	John Crowe	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Town Council, Seat 5	Robert Simmons	2505 Butschers Block		St. Paul	TX	75098
Town of St. Paul	Town Secretary/Administrator	Robert A. London	2505 Butschers Block		St. Paul	TX	75098
USACE	Lake Lavon Manager	Michael Kinard	3375 Skyview Drive		Wylie	TX	75098
Wylie Chamber of Commerce	President	Mike Agnew	307 N Ballard Ave		Wylie	TX	75098
Wylie Community Development Corporation	Executive Director	Jason Greiner	250 South Hwy 78		Wylie	TX	75098
Wylie ISD	Superintendent	Dr. David Vinson	951 South Ballard Avenue		Wylie	TX	75098
Wylie ISD	Director of Transportation	Jessie Murphy	670 Country Club Road		Wylie	TX	75098