

Environmental Assessment

Final Report

Kalamazoo/Battle Creek International Airport
Kalamazoo, Michigan



Report prepared by



April 2024


FINAL
ENVIRONMENTAL ASSESSMENT
for
RUNWAY 17/35 EXTENSION
and
TAXIWAY C REALIGNMENT
at
KALAMAZOO/BATTLE CREEK
INTERNATIONAL AIRPORT
KALAMAZOO, MICHIGAN

Prepared for
FEDERAL AVIATION ADMINISTRATION

April 2024

This Environmental Assessment becomes a Federal document when evaluated and signed by the responsible FAA official and their representative.

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Responsible FAA Official

Date

Preface

The National Environmental Policy Act (NEPA) of 1969 requires that federal agencies or their representatives identify and consider the social, economic, and environmental impacts of proposed actions as part of their decision-making process. NEPA also requires that federal agencies provide information to the public and regulatory agencies and consider their input when reaching decisions. This Environmental Assessment (EA) has been prepared to satisfy these obligations, as well as all applicable state requirements.

The proposed action is needed because the existing length of the primary runway (Runway 17/35) constrains the operations of commercial and private aircraft and limits the Airport's ability to serve the air transportation needs of the region. Also, the intersection of Taxiway C and Runway 17 has a history of runway incursions and needs to be reconfigured to provide taxiway geometry that meets FAA design criteria.

This EA has been prepared in accordance with the requirements of NEPA (42 U.S.C. §§ 4321 *et seq.*), Title V of the Public Law 97-248 of the Airport and Airway Improvement Act of 1982, FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The intent of the EA is to serve as a decision-making tool to be used by the public and local, state, and federal officials in evaluating the proposed runway extension at Kalamazoo/Battle Creek International Airport.

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Chapter 1.0 Purpose and Need

1.1 Introduction

The Kalamazoo/Battle Creek International Airport (AZO or Airport) is classified by the Federal Aviation Administration (FAA) as a non-hub, commercial service airport that serves the areas of Kalamazoo and Battle Creek and surrounding communities in southwest Michigan. Kalamazoo County owns and operates the Airport. There are three airlines that currently serve the Airport: American (offering flights to Chicago-O'Hare) Avelo (offering flights to Orlando), and Delta (offering flights to Detroit and Minneapolis).

The Airport is included in the FAA's National Plan of Integrated Airport Systems (NPIAS). This designation is indicative of its significance in the national air transportation system. At the state level, the Michigan Department of Transportation Office of Aeronautics (MDOT AERO) classifies the Airport as a Tier-I, commercial service airport. Tier-I airports support essential and critical state airport system goals and should be developed to their full and appropriate extent.¹

The Airport has three paved runways; Runway 17/35, Runway 5/23, and Runway 9/27. Runway 17/35 is oriented in a north-south direction, is 6,502 feet long and 150 feet wide, and is the primary runway. Runway 5/23 is 3,438 feet long and 100 feet wide, oriented in a northeast-southwest direction, and is the primary crosswind runway. Runway 9/27 is 2,800 feet long and 60 feet wide, oriented in an east-west direction, and serves as an additional crosswind runway. See **Figure 1.1 Airport Property Map** for the airfield layout.

In addition to the three runways, the Airport has many airside and landside assets that include parallel taxiways, connector taxiways, aprons, navigational aids (NAVAIDs), hangars, a passenger terminal building, an air traffic control tower (ATCT), and four fixed based operators (FBOs). FBOs provide fueling, aircraft maintenance, and other important aircraft support services. The terminal building and the ATCT provide enhanced passenger services and increased airfield visibility for air traffic controllers, respectively. For more information on existing Airport facilities and services, see **Chapter 3.0 Affected Environment & Environmental Consequences**.

The proposed project is to extend Runway 17/35 to meet the takeoff and landing length requirements of existing and future aircraft. Currently, the primary runway (Runway 17/35) does not provide enough runway length to meet the needs of existing and future users of the Airport. The proposed project also aims to improve aircraft movement by correcting airfield geometry deficiencies associated with the intersection of Taxiway C and Runway 17.

¹ Michigan Department of Transportation Office of Aeronautics. 2017. *2017 Michigan Aviation System Plan*. Michigan Department of Transportation Office of Aeronautics, Page 2-9.

Figure 1.1 Airport Property Map

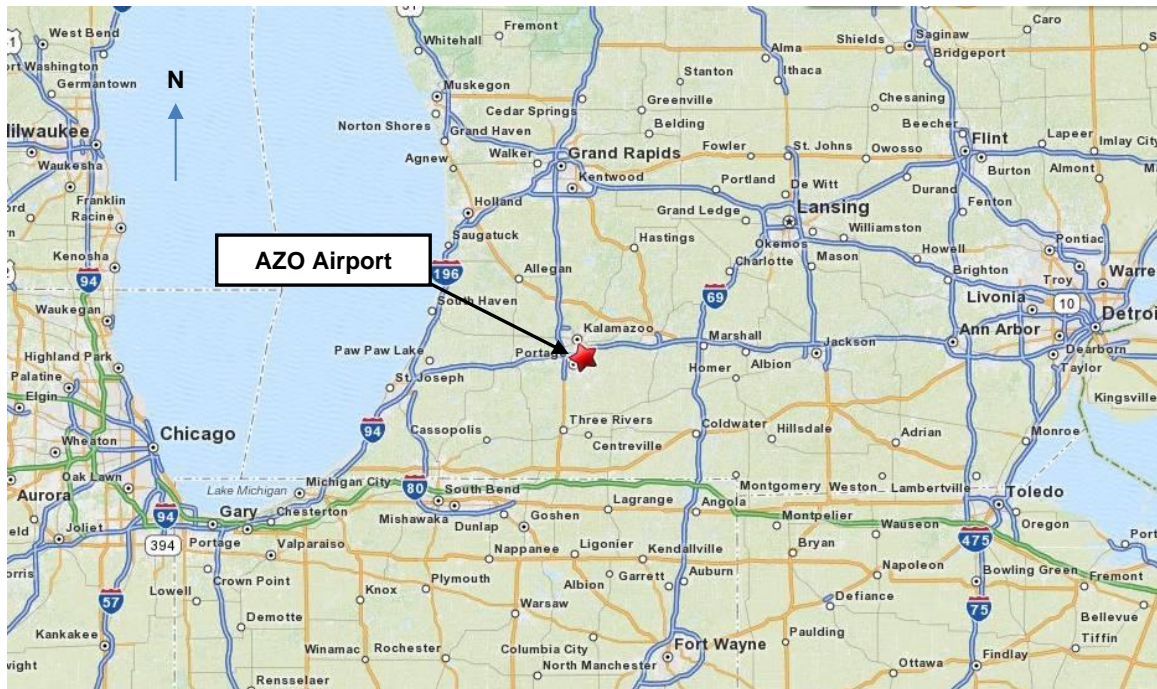


Source: Mead & Hunt

1.2 Project Location and History

The City of Kalamazoo is located approximately 50 miles south of Grand Rapids, 130 miles west of Detroit, and 100 miles northeast of Chicago. The Airport is located within the city limits of Kalamazoo in Kalamazoo County, Michigan. Although the Airport is located within the city limits, the boundary between the City of Kalamazoo (City) and the City of Portage runs adjacent to its southern border. **Figure 1.2 Regional Airport Location Map** depicts the Airport's location regionally, while **Figure 1.3 Airport Vicinity Map** highlights the Airport's location relative to surrounding general land uses and areas of interest.

Figure 1.2 Regional Airport Location Map



Source: MapQuest.com

Figure 1.3 Airport Vicinity Map



Source: Google

The City's location between other major metropolitan centers in the Midwest has allowed growth and economic prosperity throughout its history. The City is considered a crossroads between these population centers, since Interstate 94 (which connects Detroit to the east and Chicago/Northern Indiana to the west) passes through Kalamazoo. US-131 also passes through the area, providing access to Grand Rapids to the north and Indiana to the south. Additionally, a major east-west Amtrak rail line passes through the City providing daily rail passenger service.

Plans to build an airport to serve the Kalamazoo area were realized in 1926 when the City purchased 383 acres of land near Portage Road and Kilgore Road. In 1928, regular airmail service started at the Airport, leading the facility to become the first licensed municipal airport in Michigan in 1929. During this time, the Airport was named Lindbergh Field in honor of famous aviator Charles Lindbergh.

General airline service began at the Airport in May 1944. In 1955, North Central Airlines began daily service to Detroit and Chicago. In 1958, the City constructed a new terminal to replace the original building that had served the Airport since the 1920s. In 1961, the City built an ATCT, and Runway 17/35 was lengthened to 5,300 feet. Due to consistent growth in the number of passengers, an expansion of the existing terminal building increased its size from 12,000 to 30,000 square feet in 1979.

In the 1970s, a current noise curfew / noise abatement program was established at the Airport to restrict aviation night-time activity. The existing noise curfew restricts activity from 11:00 PM to 6:30 AM on Runway 17/35 for aircraft over 75,000 pounds maximum weight. The original intent was to help lessen noise impacts to adjacent residential communities. For details on the existing noise abatement program and flight restrictions, see **Appendix A - Noise Curfew**.

In 1982, the City, who had owned and operated the Airport since its inception, transferred ownership to the County of Kalamazoo (County). Increased passenger levels at the Airport called for another terminal expansion that the County completed in 1989. Also, to promote the Airport's ability to service the Battle Creek market, the Airport changed its name in 1982 from the Kalamazoo County Airport to its current name – Kalamazoo/Battle Creek International Airport.

In 1994, the County expanded Airport automobile parking to accommodate passenger levels that had grown to over 500,000 per year. Because of the continued growth in passengers and air operations, the County completed a new terminal building in 2011 followed by an FAA constructed ATCT in 2014.

In 2013, the Airport, in cooperation with the FAA and MDOT AERO, published an *Airport Master Plan Update* to determine the Airport's current and future needs and to establish a practical plan for future development. A major objective of the 2013 Master Plan Update was to examine the length and utility of Runway 17/35 and recommend improvements to meet identified needs of current and future users. A key finding of the report was the need to add length to Runway 17/35. The *2013 Master Plan Update* is available from the Airport upon request.

In 2017, the Airport completed a planning study that identified Runway Incursion Mitigation (RIM) and "Hot Spot" locations. The FAA supports two airport safety initiatives relative to airfield geometry – the RIM

program and the Hot Spot program. The RIM program was initiated in 2015 after the FAA analyzed six years of national data at airports where risk factors might contribute to a runway incursion. Based on this analysis, the FAA developed an initial list of RIM locations released in July 2015. This list identified a RIM location at AZO, the intersection of Runway 17 and Taxiway C.

The second program, the Hot Spot program, is a defined area of an airport movement area with a history or potential risk of collision or runway incursion. The Hot Spot is called out in airport diagrams to draw heightened attention to pilots and drivers. AZO has one identified Hot Spot on the airfield.

The 2017 RIM Study evaluated alternatives for two FAA-identified intersections in which the geometry of the intersections had a history of five (5) runway incursions over two years. Runway incursions occur when an aircraft or vehicle erroneously enters a runway. The study proposed infrastructure improvements to address the identified intersections. One of those areas Hot Spot areas, the intersection of Taxiway C and Runway 17/35 located at the north end of the airfield (**Figure 1.1 Airport Property Map**), will be evaluated as part of this Environmental Assessment (EA). The other location will be addressed later under a separate project. The 2017 RIM Study is available from the Airport upon request.

1.3 Description of the Proposed Project

The key components of the Airport's proposed project are:

- Extending Runway 17 end by 150 feet
- Extending Runway 35 end by 1,000 feet
- Realigning Taxiway C at the approach end of Runway 17
- Extending parallel Taxiway B to match Runway 17/35 extensions
- Relocating an existing railroad spur (owned by Norfolk Southern Railroad) on the south end of the Airport, including land acquisition
- Acquiring avigation easements/land acquisition in both Runway 17 and Runway 35 approaches for obstruction clearing
- Clearing obstruction(s) in Runway 17/35 approaches
- Relocating existing airfield NAVAIDs
- Developing new aircraft approach and departure procedures for Runway 17/35

1.4 Proposed Federal Actions

The following proposed federal actions of the FAA are subject to NEPA review:

- Unconditional approval of the Airport Layout Plan (ALP) that depicts the proposed project pursuant to 49 USC 47107(a)(16)(B).
- Design and implementation of the relocation/replacement of FAA facilities as a result of the proposed project.
- Determinations under 49 U.S.C §§ 47106 and 47107 of the proposed project's eligibility to obtain federal funding assistance under the Airport Improvement Program (AIP).
- Amendments to existing instrument approach and departure procedures including:

- Instrument Landing System (ILS) approach to Runway 35
- Area Navigation (RNAV / GPS) approach to Runway 17
- Area Navigation (RNAV / GPS) approach to Runway 35

1.5 Purpose of the Proposed Action

The purpose of the project is to meet the runway takeoff and landing length requirements of aircraft that currently operate at AZO, which are projected to gradually increase operations over time, and to enhance safety and improve aircraft movement by correcting airfield geometry deficiencies associated with the intersection of Taxiway C and Runway 17.

1.6 Need for the Proposed Action

The proposed action is needed because the existing length of the primary runway (Runway 17/35) constrains the operations of commercial and private aircraft and limits the Airport's ability to serve the air transportation needs of the region. Also, the intersection of Taxiway C and Runway 17 has a history of runway incursions and needs to be reconfigured to provide taxiway geometry that meets FAA design criteria.

1.6.1 The Need to Extend Runway 17/35

The existing 6,502-foot primary runway is inadequate for many commercial service and business jet aircraft to operate at their maximum gross takeoff weight and needs to be extended. Additional runway length would allow aircraft to operate at full capacity and eliminate the need to make cargo concessions and reduced passengers to decrease aircraft operating weight. Some narrow-bodied and regional jet aircraft make weight concessions in reduced passenger, cargo, and fuel loads to safely takeoff and land within the length available on Runway 17/35.

These concessions impact the level of service that can be offered and limit the markets that can be profitably served by air carriers. Additional runway length will allow aircraft to operate with greater passenger and fuel loads resulting in improved service and increased market opportunities. The existing length of Runway 17/35 negatively impacts the economic vitality of the businesses operating at the Airport as well as the surrounding community and limits the range of destinations that can be reached non-stop from the Airport.

The existing length of Runway 17/35 was evaluated in the *2013 Master Plan Update* to determine its adequacy to meet the takeoff and landing distance requirements of existing and projected aircraft expected to operate at the Airport over the next 20 years. It was determined that the existing runway length restricts the operations of current and future aircraft and limits the Airport's ability to serve the commercial air transportation needs of the region. The *2013 Master Plan Update*, which the FAA accepted, recommended alternatives that provided additional runway length to meet the operational demands of both existing aircraft and aircraft projected to use the Airport in the future.

Existing and future aircraft types and expected number of operations were updated in 2020 through the completion of a *Forecast Projections of Aviation Demand* report found in **Appendix B - Projections of Aviation Demand**.

1.6.1.1 Air Carrier Runway Length Needs

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* also states: “The design objective for the main primary runway is to provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions.” Air carrier aircraft depart from AZO at the maximum gross takeoff weight (MTOW) due to full or near-full passenger loads and air carrier operating policies that require departure with a full fuel load. The use of MTOW in calculating runway length needs was also driven by conversations between AZO and air carriers regarding direct flights to leisure destinations in Florida should Runway 17/35 be extended.

As **Table 1-1 Runway Length Needs** shows, to operate at MTOW on a hot day, most current commercial turbojet aircraft operating at the Airport require more length than the existing 6,502 feet available on Runway 17/35. At its current length, the runway does not meet the design objective of providing a runway length for all aircraft that regularly use the Airport without causing operational weight restrictions.

Most forecasted commercial turbojet aircraft for takeoff operations also require more runway length than the 6,502 feet currently available. See the *Forecast Projections of Aviation Demand* report found in **Appendix B - Projections of Aviation Demand** for additional information on existing and projected operations and fleet mix at the Airport through the year 2039.

When evaluating the runway length needs of current air carrier aircraft operating at the Airport, the CRJ-200, CRJ-900, and ERJ-145 have the most demanding runway length needs. These aircraft require 7,500 feet of runway for takeoff on an 85-degree Fahrenheit (°F) day. This runway length need was calculated using airport planning manuals published by the aircraft manufacturers in accordance with FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Likewise, as the industry transitions away from the use of 50-seat regional jet aircraft like the CRJ-200 and ERJ-145, operations by larger regional jet aircraft like the ERJ-175, CRJ-900 and ERJ-190 that require between 7,000 and 8,000 feet of runway length are expected to increase. Likewise, non-stop long-haul flights are also conducted by narrowbody aircraft like the Boeing 737-800 (currently operating at the Airport) to provide direct service to Orlando International Airport (MCO) in Florida that require 8,000 feet of runway length to takeoff at MTOW on a warm day.

Given that the Traffic Flow Management System Counts (TFMSC) data indicates that aircraft represented by the CRJ-200, conducts more than 500 annual operations at the Airport, and it requires 7,500 feet of runway length to takeoff, it is the representative type of critical aircraft justifying the runway length needs of air carriers.

Table 1-1 Runway Length Needs			
Aircraft Type	MTOW²	2020 TFMSC³ Ops / Future Projected Aircraft Type	Approximate Takeoff Distance¹ (MTOW², Hot Day)
Current Fleet			
CRJ-200	53,000 lbs.	2,943	7,500 ft.
CRJ-700	75,000 lbs.	154	6,400 ft.
CRJ-900	82,500 lbs.	47	7,500 ft.
ERJ-145	48,502 lbs.	912	7,500 ft.
Projected Future Fleet			
ERJ-140 ⁴	46,517 lbs.	130	6,500 ft.
ERJ-170	82,012 lbs.	Future	6,400 ft.
ERJ-175	85,517 lbs.	Future	7,000 ft.
ERJ-190	110,893 lbs.	Future	7,400 ft.
ERJ-195	111,973 lbs.	Future	8,100 ft.
A220-100	121,100 lbs.	Future	6,200 ft.
A220-100 (ER)	128,200 lbs.	Future	6,200 ft.
A220-300	131,800 lbs.	Future	7,700 ft.
A220-300 (XT)	131,800 lbs.	Future	6,800 ft.
A220-300 (ER)	139,600 lbs.	Future	7,700 ft.
A319	162,921 lbs.	Future	7,000 ft.
B737-800	174,200 lbs.	Future	8,000 ft.

¹ Takeoff length requirements based upon 874 MSL airport elevation, 85°F temperature, 9-foot runway gradient

² MTOW = Maximum Takeoff Weight

³ TFMSC = Traffic Flow Management System Counts

⁴ ERJ-140 calculations represented by ERJ-135KL

Bold distances = Distances longer than 6,502 feet (existing runway length)

Source: Aircraft Manufacturer Performance Manuals

1.6.1.2 Business Jet Runway Length Needs

AZO also has significant business jet aircraft activity from general aviation and passenger/air cargo charters with demanding runway length needs that exceed the current runway length of 6,502 feet.

Table 1-2 Instrument Flight Rules Operations by General Aviation Jet Aircraft - 2020 presents the general aviation jet aircraft types that conducted instrument flight rules (IFR) operations at AZO in 2020 according to the FAA's TFMSC database. These jet aircraft types include small jets such as the Embraer Phenom 300 and the Eclipse 500 to mid-size jets such as the Raytheon Hawker 800, Learjet aircraft, and the Cessna Citation series. Larger types conducting operations at AZO included the Gulfstream IV, Bombardier Global 5000, and the Dassault Falcon 2000.

Table 1-2 Instrument Flight Rules Operations by General Aviation Jet Aircraft - 2020				
Aircraft	MTOW (lbs.)	Departures	Arrivals	Total
C650 - Cessna III/VI/VII	22,000	129	122	251
C510 - Cessna Citation Mustang	8,645	111	109	220
F2TH - Dassault Falcon 2000	36,500	93	93	186
H25B - BAe HS 125/700-800/Hawker 800	28,000	82	82	164
C750 - Cessna Citation X	36,100	77	78	155
C700 - Cessna Citation Longitude	39,500	58	57	115
C56X - Cessna Excel/XLS	20,200	55	57	112
BE40 - Raytheon/Beech Beechjet 400/T-1	16,300	55	54	109
F900 - Dassault Falcon 900	49,000	46	46	92
E55P - Embraer Phenom 300	17,968	41	39	80
C25B - Cessna Citation CJ3	13,870	39	39	78
C68A - Cessna Citation Latitude	30,800	34	35	69
PRM1 - Raytheon Premier 1/390 Premier 1	12,500	31	31	62
CL60 - Bombardier Challenger 600/601/604	47,600	27	25	52
C550 - Cessna Citation II/Bravo	14,800	25	25	50
C560 - Cessna Citation V/Ultra/Encore	16,300	25	25	50
CL35 - Bombardier Challenger 300	38,850	22	21	43
CL30 - Bombardier (Canadair) Challenger 300	40,600	19	19	38
GL5T - Bombardier BD-700 Global 5000	92,500	19	17	36
LJ35 - Bombardier Learjet 35/36	18,000	14	14	28
LJ45 - Bombardier Learjet 45	21,500	11	11	22
SF50 - Cirrus Vision SF50	6,000	10	10	20
C680 - Cessna Citation Sovereign	30,300	8	8	16
LJ60 - Bombardier Learjet 60	22,750	8	8	16
LJ55 - Bombardier Learjet 55	19,500	7	8	15
C525 - Cessna CitationJet/CJ1	10,600	7	7	14
EA50 - Eclipse 500	5,950	7	7	14
GLF4 - Gulfstream IV/G400	74,600	7	7	14
C25A - Cessna Citation CJ2	12,300	6	6	12
FA20 - Dassault Falcon/Mystère 20	28,660	6	6	12
GLF6 - Gulfstream	91,600	6	6	12
C25M - Cessna Citation M2	10,700	4	4	8
G280 - Gulfstream G280	39,600	4	4	8
LJ31 - Bombardier Learjet 31/A/B	15,500	4	4	8
FA50 - Dassault Falcon/Mystère 50	40,780	2	3	5
E50P - Embraer Phenom 100	10,582	2	2	4
GLEX - Bombardier BD-700 Global Express	106,250	2	2	4
GLF5 - Gulfstream V/G500	79,600	2	2	4
HDJT - HONDA HA-420 HondaJet	9,963	2	2	4
LJ75 - Learjet 75	21,500	2	2	4
G150 - Gulfstream G150	26,100	1	2	3
ASTR - IAI Astra 1125	23,500	1	1	2
C25C - Cessna Citation CJ4	17,110	1	1	2

Table 1-2 Instrument Flight Rules Operations by General Aviation Jet Aircraft - 2020
(Continued)

Table 1-2 Instrument Flight Rules Operations by General Aviation Jet Aircraft - 2020				
Aircraft	MTOW (lbs.)	Departures	Arrivals	Total
C501 - Cessna I/SP	11,850	1	1	2
FA7X - Dassault Falcon F7X	70,000	1	1	2
GA5C - G-7 Gulfstream G500	79,600	1	1	2
GALX - IAI 1126 Galaxy/Gulfstream G200	35,650	1	1	2
HA4T - Hawker 4000	37,500	1	1	2
LJ40 - Learjet 40; Gates Learjet	21,000	1	1	2
LJ70 - Learjet 70	21,500	1	1	2
TOTAL		1,119	1,108	2,227

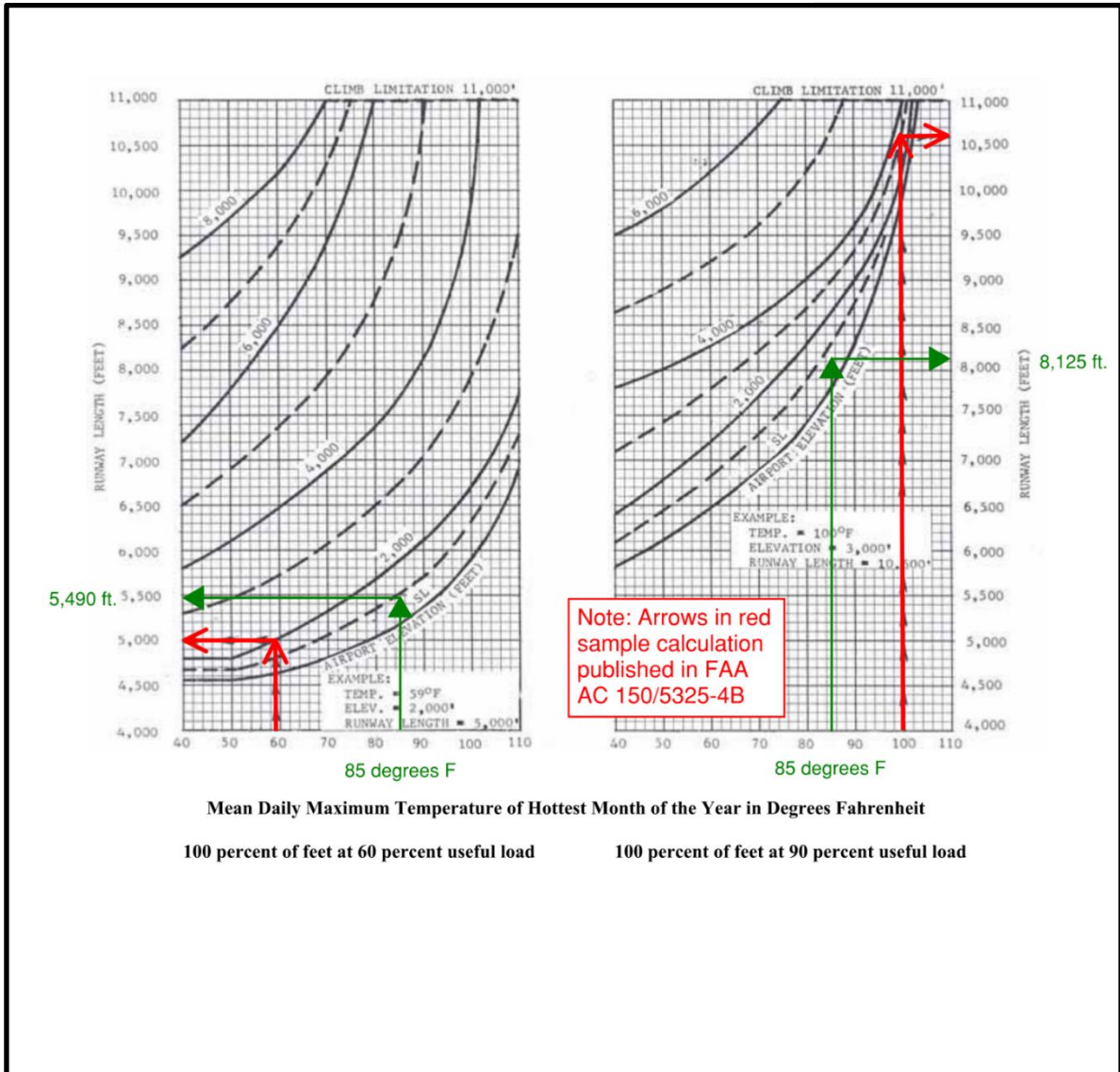
Sources: FAA Traffic Flow Management System Count database (2020), FAA Aircraft Characteristics database, Aircraft Manufacturers Performance Manuals

Most of the jet aircraft used for general aviation purposes have a MTOW of more than 12,500 pounds and up to and including 60,000 pounds. To determine the runway length needed for these jet aircraft that had 2,227 operations in 2020, the performance curves found within AC 150/5325-4B were used. Factors to consider when using the performance curves to determine required runway length include takeoff weight, the average high temperature in the warmest month, and the percentage of the total fleet of aircraft within this weight classification that conduct operations at an airport.

Figure 1.4 Runway Length Needs of General Aviation Jet Aircraft presents the runway length performance curves from AC 150/5325-4B for aircraft with a MTOW greater than 12,500 pounds and up to and including 60,000 pounds for both 60 percent and 90 percent useful load. At 60 percent useful load, a runway length of 5,490 feet meets the runway length demands of these aircraft types while a runway length of 8,125 feet meets demands at 90 percent useful load. Note that arrows colored in green represent the calculations performed for this runway length analysis, and arrows in red represent a sample runway calculation published in the table from AC 150/5325-4B.

When evaluating the runway length needs of general aviation jet aircraft that currently operate at the Airport, a runway length of 8,125 feet for takeoff on an 85°F day is more appropriate based on the 90 percent useful load performance curve from AC 150/5325-4B and aircraft types that operate at AZO.

Figure 1.4 Runway Length Needs of General Aviation Jet Aircraft



Note: Airport elevation 874 feet, mean max daily temperature 85 degrees Fahrenheit (July)
 Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

With consideration of the runway length needs for both air carrier operations and general aviation business jet operations, the proposed extension of Runway 17/35 to 7,650 feet best meets the runway length demands for both classifications of users. Review of runway length needs for air carrier operations found that existing aircraft types operating at AZO require at least 7,500 feet of runway length to depart at MTOW on a warm day. Future air carrier aircraft types projected to conduct operations at AZO will require up to 8,000 feet of runway length to depart under the same conditions.

Likewise, a review of general aviation activity at AZO found that most business jet aircraft types that conducted operations in 2020 had non-stop flights to long-range destinations across the country. In accordance with the 90 percent performance curve presented in AC 150/5325-4B, 8,125 feet of runway length should be made available for these aircraft types. Understanding that it is not the intent of this

project to provide 8,125 feet of runway length, an extension of Runway 17/35 to 7,650 feet provides acceptable runway length to meet the demands of air carrier and most general aviation business jet users requiring only limited or no concessions be made to passenger and fuel loads. With the expectation that operations will continue to grow by these aircraft types in the future, providing 7,650 feet of runway length allows AZO to provide a more efficient and better accommodating runway length for the demands of current and future jet users.

1.6.2 The Need to Improve Airfield Geometry

The existing airfield geometry at the intersection of Taxiway C and Runway 17/35 must be reconfigured to minimize additional runway incursions and to allow more efficient movement of aircraft. Five runway incursions have been documented since 2008 at the intersection of Taxiway C with Runway 17/35 (incursion events are detailed in the 2017 RIM Study available from the Airport). While unclear taxiway markings and airport signage, as well as pilot unfamiliarity, can be factors in runway incursions, the geometry of runway and taxiway intersections is usually the primary contributing factor. The 2017 RIM Study identified the existing intersection of Taxiway C and Runway 17/35 as deficient and recommended corrective action.

Taxiway C also needs to be realigned to standardize its intersection with Runway 17/35 to comply with FAA AC 150/5300-13B, Section 4.3.5. FAA design standards discourage direct access to a runway without requiring a turn by aircraft prior to reaching the runway. FAA guidance focuses on geometric design of taxiway intersections to enable safe and efficient taxiing while minimizing excess pavement. To comply with FAA guidance, the configuration of taxiway intersections should provide 75- to 90-degree turns wherever possible. To meet the requirements of FAA design guidance and accomplish the goals of the 2017 RIM Study, reconfiguration of the intersection of Taxiway C and Runway 17/35 is needed.

1.7 Summary of Existing and Projected Operations

A *Projections of Aviation Demand* report evaluating historical trends of aviation activity was completed for the Airport in 2020. The report analyzed past, current, and projected operations from 2009 through the year 2039 and found that passenger and aircraft activity at the Airport have fluctuated in recent history. This is not uncommon in comparison to many U.S. airports as economic uncertainty and increased travel costs have impacted travel behavior. Despite fluctuations in fuel cost, airline mergers, system-wide route restructuring, aircraft fleet overhauls, and the effects of the COVID-19 pandemic, the report suggests passenger enplanements and total aircraft operations will grow at the Airport over the next 20 years. See **Appendix B - Projections of Aviation Demand** for the FAA-approved forecast report for AZO.

The economy of the United States and the aviation industry had a near complete shutdown in 2020 due to the COVID-19 pandemic. As with all airports around the country, the pandemic greatly impacted operations at AZO. However, operations are rebounding quickly and are expected to nearly match the operational numbers of 2018 and 2019 by 2023. Therefore, it is anticipated given industry trends, that operations at AZO will nearly recover to pre-COVID numbers by 2023. See *Appendix A Impacts of COVID-19 on Projections* found in **Appendix B - Projections of Aviation Demand** for a detailed analysis of the impact the pandemic had on aviation in general and specifically on AZO.

A summary of the current and projected operations at AZO is presented in **Table 1-3 Projections Summary** and **Table 1-4 Forecast Levels and Growth Rates**. This data was taken from the *Projections of Aviation* report dated September 2020 and was approved by the FAA on December 7, 2020. For additional details on approved operations and forecasts including the FAA approval letter, see **Appendix B - Projections of Aviation Demand**.

Table 1-3 Projections Summary									
Summary of Growth 2009 - 2039									
Year	Enplanements	Itinerant Operations				Local Operations		Total Operations	Based Aircraft
		Air Carrier	Air Taxi	General Aviation	Military	General Aviation	Military		
Historical:									
2009	141,572	868	9,190	21,522	80	18,858	8	50,526	143
2010	116,148	390	10,223	19,833	121	20,775	86	51,428	143
2011	147,361	495	10,219	17,398	165	17,428	28	45,733	143
2012	134,299	193	9,216	18,014	281	17,641	26	45,371	111
2013	127,802	34	8,717	17,445	127	17,620	8	43,951	109
2014	135,576	96	8,224	15,935	111	17,474	20	41,860	110
2015	123,487	942	6,051	17,524	204	16,181	30	40,932	110
2016	145,909	940	8,014	16,716	132	13,163	1	38,966	111
2017	146,314	1,023	7,459	17,547	134	14,184	0	40,347	111
2018	152,845	1,032	7,309	17,889	141	15,690	2	42,063	111
2019	151,254	1,537	6,842	17,985	155	12,762	5	39,286	111
CAGR (2009-2019)	0.66%	5.88%	-2.91%	-1.78%	6.84%	-3.83%	-4.59%	-2.48%	-2.50%
Projected:									
2024	160,671	4,202	3,553	18,175	155	15,370	5	41,460	111
2029	169,554	5,016	1,379	18,419	155	15,287	5	40,261	110
2034	176,667	5,096	1,464	18,671	155	15,245	5	40,636	110
2039	183,068	5,142	982	18,930	155	15,308	5	40,521	110
CAGR (2019-2039)	0.96%	6.22%	-9.25%	0.26%	0.00%	0.91%	0.00%	0.15%	-0.04%

Source: Historical Operations - FAA OPSNET
Historical Based Aircraft - FAA TAF
Projections - Mead & Hunt, Inc.

Source: 2020 Projections of Aviation Report

Table 1-4 Forecast Levels and Growth Rates

Growth Rates 2009 - 2038									
A. Forecast Levels and Growth Rates									
	Specify base year: 2019					Average CAGR			
	2019	2024	2029	2034	2039	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.
	Base Yr. + Level	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.				
Passenger Enplanements									
TOTAL Air Carrier & Commuter	151,254	160,671	169,554	176,667	183,068	1.2%	1.1%	1.0%	1.0%
Operations									
<u>Itinerant</u>									
Air carrier	1,537	4,202	5,016	5,096	5,142	22.3%	12.6%	8.3%	6.2%
Commuter/air taxi	6,842	3,553	1,379	1,464	982	-12.3%	-14.8%	-9.8%	-9.3%
Total Commercial Operations	8,379	7,755	6,395	6,560	6,124	-1.5%	-2.7%	-1.6%	-1.6%
General aviation	17,985	18,175	18,419	18,671	18,930	0.2%	0.2%	0.2%	0.3%
Military	155	155	155	155	155	0.0%	0.0%	0.0%	0.0%
<u>Local</u>									
General aviation	12,762	15,370	15,287	15,245	15,308	3.8%	1.8%	1.2%	0.9%
Military	5	5	5	5	5	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	39,286	41,460	40,261	40,636	40,521	1.1%	0.2%	0.2%	0.2%
Instrument Operations	17,059	16,780	16,062	16,330	16,216	-0.3%	-0.6%	-0.3%	-0.3%
Based Aircraft									
Single Engine (Nonjet)	90	87	86	86	85	-0.6%	-0.5%	-0.3%	-0.3%
Multi Engine (Nonjet)	13	14	14	14	14	2.0%	1.0%	0.6%	0.5%
Jet Engine	8	9	10	10	11	2.0%	2.2%	1.4%	1.6%
Helicopter	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL	111	111	110	110	110	-0.1%	-0.1%	-0.1%	0.0%
B. Operational Factors									
	2019	2024	2029	2034	2039				
	Base Yr. + Level	Base Yr. + 5yr.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Base Yr. + 20yrs.				
Average aircraft size (seats)									
Air carrier & Commuter	54.1	62.0	78.0	78.0	89.0				
Average enplaning load factor									
Air carrier & Commuter	72.7%	74.0%	78.0%	80.0%	80.0%				
GA operations per based aircraft									
	277	303	306	309	311				

CAGR = Compound Annual Growth Rate

Source: 2020 Projections of Aviation Report

1.8 Required Environmental Review

The National Environmental Policy Act (NEPA) of 1969 dictates that after airport improvements are identified through the planning process, but prior to moving into design and construction of the proposed project, the completion of an environmental study to evaluate the potential environmental impacts of the proposed action is required. Evaluating potential environmental impacts of the proposed improvements to meet the project's Purpose and Need is the catalyst for the current EA.

Federal financial participation in projects through the Airport and Airway Improvement Act of 1982, requires the FAA to engage in an environmental review of those projects under NEPA. In addition, the proposed changes to the ALP associated with the proposed action require FAA approval and, thus, require the proposed action be evaluated under NEPA. An EA is a document prepared under NEPA that evaluates the effects of a proposed action on the quality of the human environment.

This EA is prepared under the requirements of Title V of Public Law 97-248 of the Airport and Airway Improvement Act of 1982, NEPA, and FAA Order 5050.4B, *National Environmental Policy Act Implementing Instructions for Airport Actions* (April 2006). This EA also meets the requirements of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, dated July 2015.

The results of this EA, including input from regulatory agencies and the public, will guide decisions the FAA will make concerning the proposed project. At the conclusion of the EA, the FAA will either approve the issuance of a Finding of No Significant Impact (FONSI) or the proposed project will be further evaluated in an Environmental Impact Statement (EIS). If the FAA issues a FONSI and approves the federal actions required by the proposed project, the Airport Sponsor may proceed to full design and construction.

Chapter 2.0 Alternatives Considered

2.1 Introduction

As the lead federal agency, the Federal Aviation Administration (FAA) is responsible for complying with the policies and procedures of the National Environmental Policy Act (NEPA) of 1969; Council on Environmental Quality (CEQ) regulations; FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*; and other related environmental laws, regulations, and orders applicable to federal actions.

In accordance with the CEQ regulations found in Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508 (2020), an environmental review process requires that reasonable alternatives for the proposed action be identified and evaluated, although there is no requirement for the inclusion of any specific number or range of alternatives. This also aids the FAA in fulfilling its additional duty to identify the agency's preferred alternative as defined in 40 CFR § 1502.14(d).

For alternatives that were considered but eliminated from further study, an explanation of why such alternatives were eliminated from further consideration in accordance with 40 CFR § 1502.14(a) is required. Additionally, pursuant to Section 1502.14(c), the environmental document must include an analysis of the No Action Alternative as a baseline against which to compare the impacts of the Proposed Action and any alternatives being considered.

FAA Order 1050.1F requires a discussion of alternatives that are reasonable and meet the purpose and need of the proposed action. The alternatives discussion should include:

- A list of alternatives considered, including the Proposed Action and the No Action alternatives.
- A concise statement explaining why any initial alternative considered was eliminated from further study because they were not considered reasonable or did not meet the purpose and need.
- A statement identifying a Preferred Alternative if one has been identified.
- Any other applicable laws, regulations, executive orders and associated permits, licenses, approvals, and reviews required to implement a project alternative.

This chapter was prepared to determine different options that may reasonably meet the needs of the proposed project at Kalamazoo/Battle Creek International Airport (AZO or Airport), as outlined in **Chapter 1.0 Purpose and Need**.

Alternatives discussed in this chapter were the result of FAA accepted planning studies including:

- *Master Plan Update* completed in March 2013
- *Runway Incursion Mitigation (RIM) Study* completed in December 2017
- *Projections of Aviation Demand* completed in 2020
- *Runway Protection Zone (RPZ) Analysis for Runway 17/35* completed in September 2021.

The 2021 RPZ Analysis (**Appendix C - RPZ Analysis**) and the 2020 *Projections of Aviation Demand* report (**Appendix B - Projections of Aviation Demand**) are included in the Environmental Assessment (EA). The other studies are available upon request from the Airport.

Three preliminary alternatives were selected from the *2013 Master Plan Update* for further evaluation during the EA. They were selected because they proposed a 1,000-foot extension of Runway 17/35, which would allow most existing and projected commercial aircraft expected to use the Airport in the future to operate with greater passenger and fuel loads than they do under the current runway length.

The 2017 *RIM Study* included alternatives that would correct geometry deficiencies and mitigate runway incursions at the intersection of Taxiway C and Runway 17. One alternative, identified as the recommended course of action for correcting taxiway geometric deficiencies, from the 2017 *RIM Study* is evaluated in this EA.

The 2021 *RPZ Analysis* for Runway 17/35 analyzed the potential impacts of shifting the approach and departure RPZs at both runway ends to accommodate various extensions to Runway 17/35 as described in the *2013 Master Plan Update* and *2017 RIM Study*. Potential RPZ impacts are included in the analysis of each build alternative described below.

Lastly, see **Appendix B - Projections of Aviation Demand** for the current and future aircraft fleet mix that currently operates at AZO and the number of current and projected operations the Airport can expect over a 20-year planning horizon. The study also helped in developing the build alternatives to meet the project's purpose and need for greater runway length on Runway 17/35, and associated actions, to meet the operating needs of the critical aircraft at Airport.

The following alternatives are presented and discussed in this chapter:

Administrative Options:

- No Action Alternative
- Build a New Airport at a Different Location
- Use Another Airport in the Vicinity

Build Alternatives:

- Alternative 1 – 1,000-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17
- Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17
- Alternative 3 – 1,000-Foot Extension of Runway 35
- Alternative 4 – 1,000-Foot Extension of Runway 17 with a Reconfigured Intersection of Taxiway C and Runway 17

Section 2.11 Summary of Alternatives summarizes potential impacts of each build alternative. **Table 2-1 Summary of Alternatives** compares the anticipated impacts from each build alternative using a ranking system and a side-by-side comparison.

2.2 Safety Area Definitions and FAA Design Standards

To help evaluate the proposed alternatives being considered in this chapter, it is valuable to understand the requirements of safety areas and design standards associated with Runway 17/35. Safety areas and design standards, as defined by the FAA in Advisory Circular (AC) 150/5300-13B, *Airport Design*, are important in evaluating potential alternatives because they are a controlling factor for each runway end and for determining potential impacts. No alternative will be considered technically feasible and therefore reasonable if it does not meet the safety area standards and design requirements outlined in this section, per 40 CFR § 1508.1(z). This section includes a definition of the different safety areas important to this project required by FAA design standards.

Runway Safety Area (RSA): The RSA is a two-dimensional graded area surrounding the runway surface constructed to enhance the safety of airplanes in the event of an unintended excursion from the runway's paved surface. This area must be:

- Cleared and graded with no potentially hazardous humps, ruts, depressions, or other surface variations
- Adequately drained to prevent water accumulation
- Capable, under normal (dry) conditions of supporting snow removal equipment, rescue and firefighting equipment, and occasional aircraft passage without causing structural damage to the aircraft
- Free of objects, except for those that need to be in the RSA because of their function, and then, to the extent practical, mounted on low impact (frangible) structures.

The existing RSA for Runway 17/35 extends 1,000 feet beyond each runway end at a width of 500 feet.

Runway Object Free Area (ROFA): A ROFA is a two-dimensional ground surface surrounding a runway. The ROFA clearing standards preclude above-ground objects protruding above the

elevation of the nearest point of the RSA, except those required to be within the ROFA for navigation, ground maneuvering, aircraft taxi, and aircraft holding purposes. No other objects are permitted.

Runway Protection Zone (RPZ): A RPZ is a trapezoidal surface that extends outward from the approach end of the runway that is designed to protect aircraft, people, and property on the ground by clearing this area of incompatible land uses. The FAA requires airport operators to have sufficient interest in the control of activities in this area through property interest or aviation easements to prevent incompatible uses. Some land uses (such as agricultural activities) are allowed in this area while other uses (such as residential developments, churches, schools) and objects of height (such as trees, towers, and tall buildings) are prohibited.

The existing RPZ for each end of Runway 17/35 varies due to the differences in approach visibility minimums. For Runway 17, the RPZ is 1,700 feet long, 500 feet wide at the inner width, and 1,010 feet wide at the outer width. For Runway 35, the RPZ is 2,500 feet long, 1,000 feet wide at the inner width, and 1,750 feet at the outer width.

As previously mentioned, to determine potential RPZ impacts of the proposed project, a separate technical report was completed for Runway 17/35 and is found in **Appendix C - RPZ Analysis**. The RPZ Analysis evaluated land uses within the RPZs of each build alternative to determine incompatible land uses. The findings of each build alternative are summarized and explained below.

Approach Surface: The approach surface is centered longitudinally on a runway and extends outward and upward from each end of the primary surface. The dimensions of the approach surface at each end of a runway are based on the type of runway and the approach for that runway end. For other than utility runways, the approach surface extends horizontally based upon the approach slope (**Figure 2.1 Approach Surface Example**).

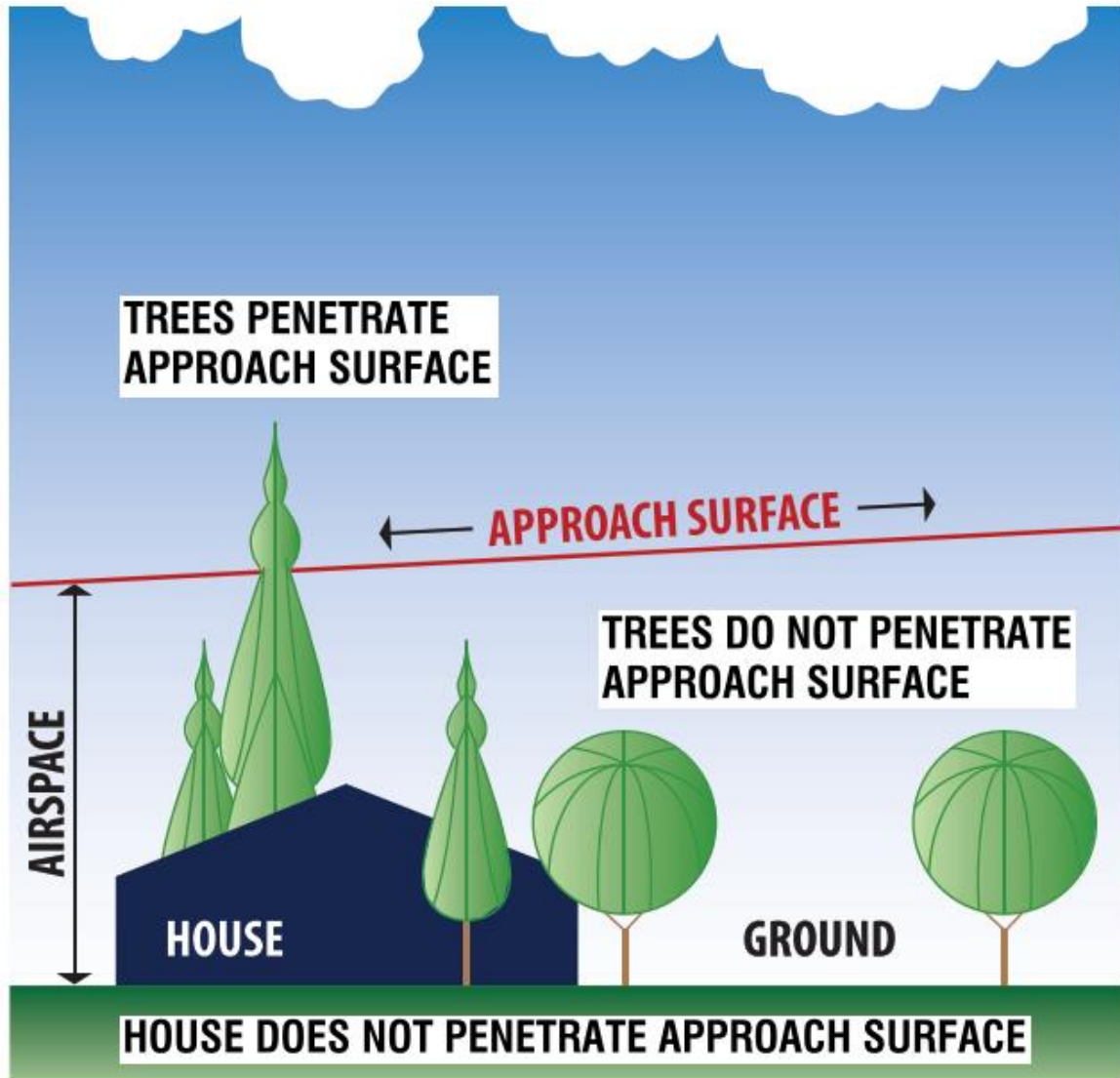
2.3 No Action Alternative

The No Action Alternative assumes that no action would be taken to extend Runway 17/35 or to correct taxiway geometric deficiencies at the intersection of Taxiway C and Runway 17 as identified in **Chapter 1.0 Purpose and Need**. Under this alternative, the Airport would remain in its current state with no plans to provide additional runway length as requested by existing users or comply with FAA guidance for geometric design of taxiway intersections that enables safe and efficient taxiing while minimizing excess pavement. This alternative would, however, remove trees in the Runway 17 approach as they are current obstructions to the existing approach.

As such, the No Action Alternative does not fully meet the project's purpose and need of providing a compliant air transportation facility with enhanced takeoff lengths for improved service at the Airport.

Although the No Action Alternative does not meet the purpose and need of the proposed project, it is included as required by 40 CFR § 1502.14(c) to serve as a baseline of comparison to the environmental impacts associated with the other alternatives and is, therefore, retained for analysis and carried forward for review.

Figure 2.1 Approach Surface Example



Source: Mead & Hunt

2.4 Build a New Airport at a Different Location

Generally, the development and construction of a new airport is considered when an existing airport is approaching or has exceeded operational capacity, and it is not feasible to expand at its current location. This is not the case at AZO, which is projected to have adequate capacity for the near future and can practicably expand at its current location.

Substantial improvements and investments have been made at the current site with future improvement projects currently planned. Closing the existing Airport to relocate to a different location would create a significant loss of public and private investment and would be fiscally irresponsible considering past federal, state, and local investments.

The benefits of developing another airport facility are limited. Development of a new site to replace the functions of AZO would likely require considerable land acquisitions and have private property impacts, have unacceptable environmental impacts, and may cause severe residential and commercial relocations. Site preparation and construction of new facilities to provide equivalent services at AZO would take years to accomplish, and the cost of such actions would be substantial.

Although constructing a new airport would accomplish the project's purpose and need of additional primary runway length and improved airfield geometry, this can be met at the existing location more feasibly with minimal social, environmental, or economic (SEE) impacts when compared to the construction of a new airport. Construction of a new airport is not a prudent or reasonable alternative given the existing infrastructure and past public investments. As a result, this alternative has been removed from further consideration.

2.5 Use Another Airport in the Vicinity

Two comparable commercial service airports in the vicinity of AZO were considered as replacement facilities for the Airport. These are Gerald R. Ford International Airport (GRR) in Grand Rapids, Michigan, and South Bend International Airport (SBN) in South Bend, Indiana. Both airports meet the project's purpose and need of providing a primary runway that is at least 7,650 feet in length and airfield geometry that minimizes the potential for runway incursions. However, these airports are a considerable distance from AZO (GRR and SBN are approximately 45 miles and 54 miles from AZO, respectively). Additionally, AZO is part of the National Plan of Integrated Airport Systems (NPIAS) and is considered important to the success of the national air transportation system and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). Requiring existing users of AZO to relocate 45 miles or more from a functioning facility as well as expecting the FAA to surrender an asset considered a national resource is unreasonable.

Relocating Airport operations to another facility and abandoning the existing infrastructure is not a viable or reasonable alternative since there is a demonstrated need to provide an airport in the Kalamazoo region. This option would cause the FAA and Kalamazoo County to lose their public and private investment in the facility. This alternative would also be limited by FAA's Grant Assurances that require airports to commit to maintaining a safe and operational facility for 20 years in response to receiving federal money for projects. This alternative would also have an unacceptable negative impact on the regional economy. This alternative does not represent a prudent or reasonable option and therefore is removed from further consideration.

2.6 Alternative 1 – 1,000-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17

Alternative 1 proposes an extension of Runway 17/35 by 150 feet to the north at the approach end of Runway 17 and 850 feet to the south at the approach end of Runway 35. To implement the recommended 2017 *RIM Study* improvements that address the design issues of Taxiway C's access to Runway 17/35, this alternative also proposes to shift and reconstruct Taxiway C so that it intersects Runway 17/35 at a 90-degree angle. This alternative would result in Runway 17/35 having a usable runway length of 7,502 feet, as shown in **Figure 2.2 Alternative 1 – 1,000-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17**.

Alternative 1 provides 7,502 feet of runway length, thus failing to meet the runway length requirements described in **Chapter 1.0 Purpose and Need**, but it does correct the Taxiway C intersection geometry deficiency, as described in FAA AC 150/5300-13B, Section 4.3.5.

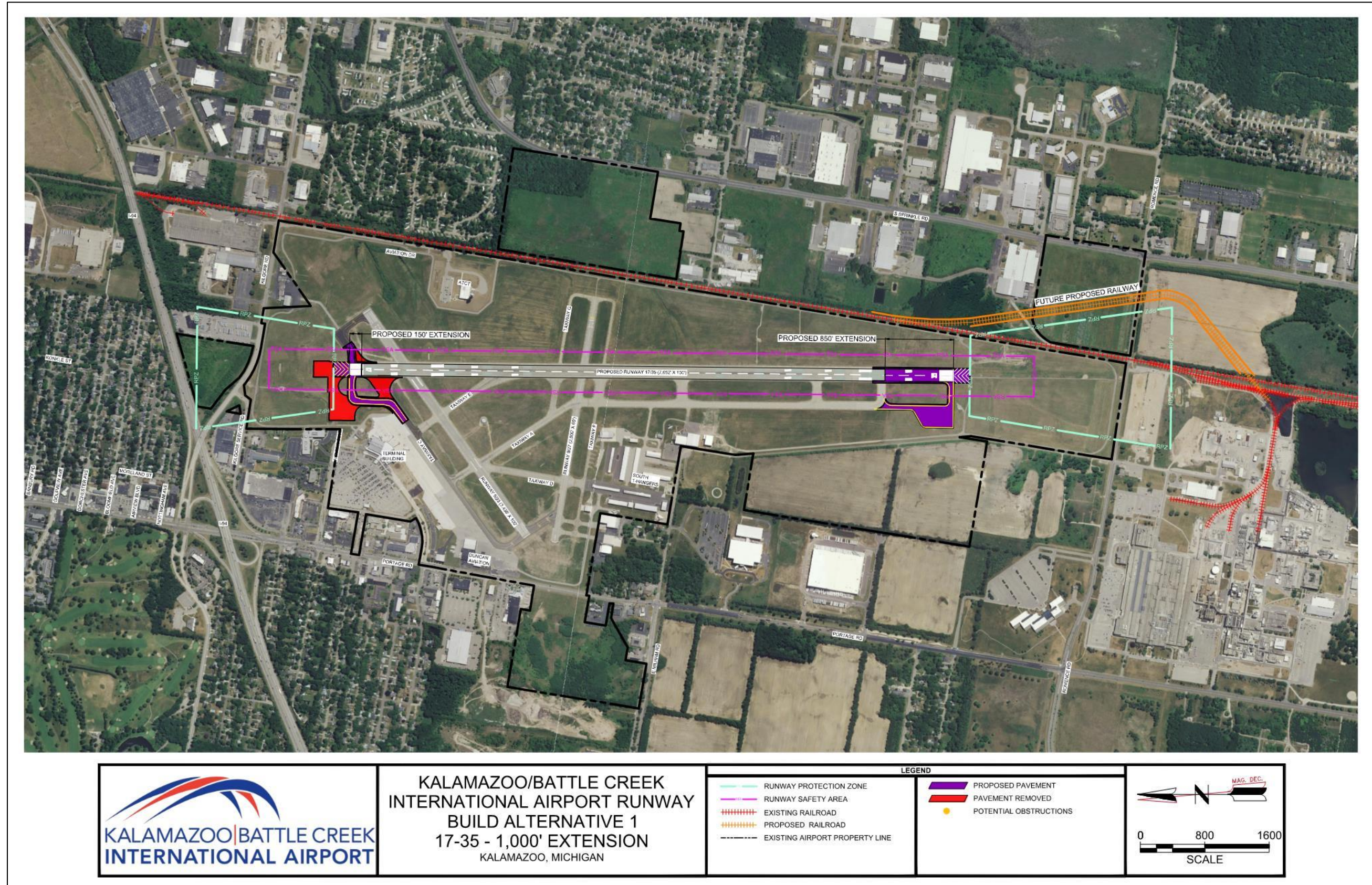
The shifting of the Runway 17 threshold by 150 feet to the north introduces additional tree obstructions within the approach of Runway 17 in the Milwood neighborhood north of Interstate 94 (I-94). The need to acquire additional easements to mitigate for these obstructions adds to the cost of this alternative.

Shifting of the runway thresholds also requires changes to approach procedures and the location of Navigational Aids (NAVAIDs). This includes the Runway End Identifier Lights (REILs) and Precision Approach Path Indicator (PAPI) for Runway 17 as well as relocation of the Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR), glide slope antenna, and PAPI at the approach end of Runway 35.

Shifting the location of the Runway 17 RPZ 150 feet to the north introduces few new incompatible land uses. Kilgore Road, Kilgore Service Road, on-airport service and perimeter access roads, and a portion of the parking lot and building for a Ryder Truck Rental facility located north of Kilgore Road are currently located within the existing RPZ. Further, AZO has existing easements over these properties. A new incompatible land use that would be introduced would be a small section of the right-of-way associated with I-94. While a small portion of the right-of-way would be located within the relocated RPZ, the expressway itself would not be.

On the Runway 35 end, the shift of the RPZ to the south from the proposed 850-foot runway extension moves the RPZ off airport property and introduces new incompatible land uses. The relocated RPZ encroaches on Pfizer-owned land and Romence Road so that the primary incompatible land use within the shifted RPZ is Romence Road, with a contractor vehicle parking lot for the Pfizer manufacturing facility to the south of Romence Road also located within the shifted RPZ. An on-airport perimeter access road and future service road for the Runway 35 approach lighting system would also be within the relocated RPZ. This alternative would necessitate the acquisition of easements over these land uses. The existing Norfolk Southern rail line would also fall within the shifted RPZ, as a result requiring relocation outside the new RPZ, adding to the cost

Figure 2.2 Alternative 1 – 1,000-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17



Source: Mead & Hunt

of this alternative. See **Appendix C - RPZ Analysis** for a detailed evaluation of potential RPZ impacts of this alternative.

Potential environmental impacts of implementing Alternative 1 include impacts to farmland, wetlands, and habitat for threatened and endangered species. No prime, unique, state, or locally important farmland is located at the Runway 17 end of the project area; however, prime farmland and farmland of local importance is found at the Runway 35 end. It is anticipated that up to 6.42 acres of protected farmland may be impacted primarily because of the relocation of the Norfolk Southern railroad.

A wetland delineation identified a total of 4.0 acres of regulated wetland in the vicinity of Alternative 1 (3.779 acres at the Runway 17 end and 0.227 acres at the Runway 35 end). It is anticipated that 0.40 acres will be impacted with the construction of Alternative 1.

Wooded areas found near both runway ends provide potential forested habitat for the Northern Long-eared Bat (federally endangered) and Indiana Bat (federally endangered). Any tree removal deemed necessary to implement Alternative 1 would be accomplished by selective tree removal completed during time periods that the resource agency recommends appropriate for minimizing impacts to any potential bat populations. See **Table 2-1 Summary of Alternatives** found at the end of this chapter for a comparison of impacts of each alternative.

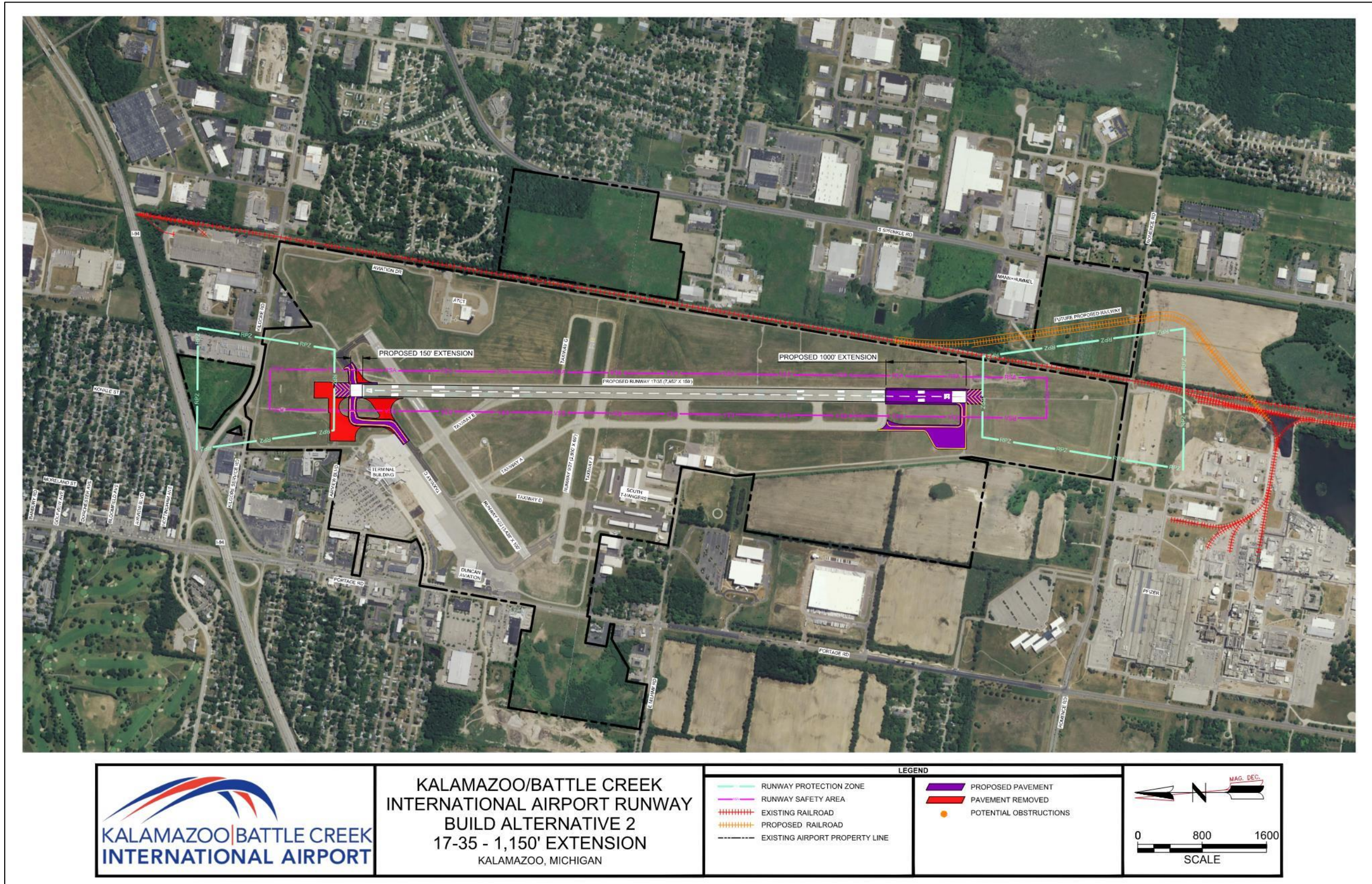
Although Alternative 1 partially meets the project's purpose and need by reconstructing the intersection of Taxiway C and Runway 17/35, it is removed from further consideration since it does not provide 7,650 feet of runway length needed by aircraft that currently use the Airport and are projected to use the Airport in the future.

2.7 Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17 (Preferred Alternative)

Alternative 2 proposes to extend Runway 17/35 by 150 feet to the north at the approach end of Runway 17 and 1,000 feet to the south at the approach end of Runway 35. As with Alternative 1, this alternative addresses the design deficiencies of the Taxiway C and Runway 17/35 intersection by shifting and reconstructing Taxiway C so that it intersects Runway 17/35 at a 90-degree angle. With this alternative, the total usable length of Runway 17/35 would be 7,652 feet (**Figure 2.3 Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17**).

As with Alternative 1, shifting of the Runway 17 threshold by 150 feet to the north introduces additional tree obstructions in the Milwood neighborhood north of I-94. This would also add to the cost of this alternative and require new easements to clear obstructions.

Figure 2.3 Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17



Source: Mead & Hunt

Shifting of the runway thresholds requires changes to approach procedures and the relocation of NAVAIDs. This includes the REILs and PAPI for Runway 17 as well as relocation of the MALSR, glide slope antenna, and PAPI at the approach end of Runway 35.

The relocated Runway 17 RPZ would introduce few new incompatible land uses, since Kilgore Road, Kilgore Service Road, on-airport service and perimeter access roads, and a portion of the parking lot and building for a Ryder Truck Rental facility located north of Kilgore Road are currently located within the existing RPZ. AZO has existing easements over these properties. A new incompatible land use associated with this alternative is a portion of the I-94 right-of-way located within the southern corner of the outer edge of the relocated RPZ to Runway 17. As with Alternative 1, the existing I-94 right-of-way is located within the relocated RPZ; however, the expressway itself is outside the new RPZ.

With the 1,000-foot extension of Runway 35, the new RPZ extends off airport property and onto Romence Road and Pfizer-owned property. The primary incompatible land use within the new RPZ is existing Romence Road. On-airport perimeter access and future service roads for the Runway 35 approach lighting system would be located within the shifted RPZ as would a contractor vehicle parking lot for the Pfizer manufacturing facility. Alternative 2 would require the acquisition of new easements over these land uses. The existing Norfolk Southern rail line would also be within the relocated RPZ and would need to be relocated, adding to the cost of this alternative. See **Appendix C - RPZ Analysis** for a detailed evaluation of potential RPZ impacts with this alternative.

Expected environmental impacts implementing Alternative 2 include impacts to farmland, wetlands, and habitat for threatened and endangered species. No federally protected farmland is located at the Runway 17 end of the project area; however, prime farmland and farmland of local importance is found at the Runway 35 end. It is anticipated that up to 5.96 acres of protected farmland may be impacted with the relocation of the Norfolk Southern railroad outside of the shifted Runway 35 RPZ.

A wetland delineation identified a total of 4.0 acres of wetland complexes in the vicinity of Alternative 2 (3.779 acres at the Runway 17 end and 0.227 acres at the Runway 35 end). It is anticipated that 0.40 acres will be impacted with the construction of Alternative 2.

Wooded areas found near both runway ends provide potential forested habitat for the Northern Long-eared Bat and Indiana Bat (both federally endangered). Any required tree removals would be completed during appropriate seasonal time periods as directed by resource agencies for mitigating impacts to any protected bat populations. See **Table 2-1 Summary of Alternatives** found at the end of this chapter for a comparison of impacts of each alternative.

Alternative 2 is the only alternative that provides a 7650-foot runway extension and corrects the geometry of the Taxiway C and Runway 17 intersection, thus fully meeting the purpose and need of the project and meeting the goals and planning objectives from both the *2013 Master Plan Update* and the *2017 RIM Study*.

Extending the runway to a length of 7,650 feet also provides an additional margin of safety for landing distance assessments when the runway is contaminated with water, snow, or ice, which is frequently experienced during the winter season. This would help to maintain airfield capacity since the number of flight delays and cancellations that result from contaminated airfield conditions would decrease due to increased aircraft braking distances available.

Alternative 2 is considered a reasonable alternative because it fully meets the project's primary purpose and need of providing a 7,650-foot runway length to accommodate the operational demands of current and future commercial and business jet aircraft at AZO. This alternative also corrects the nonstandard airfield geometry at the intersection of Taxiway C and Runway 17.

2.8 Alternative 3 – 1,000-Foot Extension of Runway 35

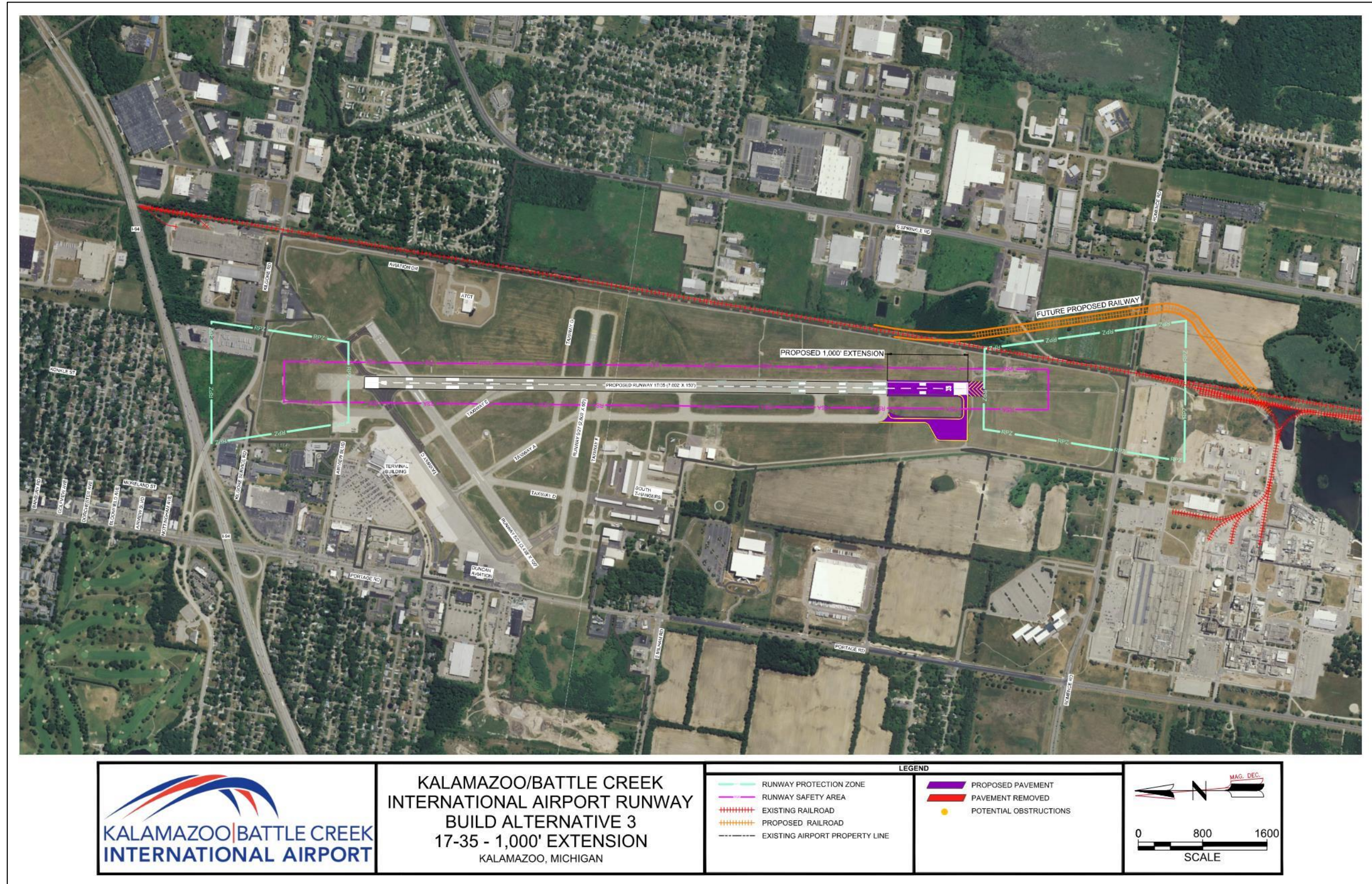
Alternative 3 proposes to extend Runway 17/35 by 1,000 feet to the south at the approach end of Runway 35. This alternative would not shift and reconstruct the Taxiway C and Runway 17/35 intersection but results in Runway 17/35 having a usable length of 7,502 feet, (**Figure 2.4 Alternative 3 – 1,000-Foot Extension of Runway 35**).

This alternative avoids the potential impacts from the 150-foot extension of Runway 17 to the north associated with the implementation of Alternatives 1, 2, and 4. Tree obstructions and acquisitions of easements in the Milwood neighborhood, incompatible land use impacts, the relocation of the REILs and PAPI for Runway 17, and the relocation of the localizer antenna for Runway 35 would not be required by this alternative.

Potential incompatible land use impacts at the Runway 35 end are the same as with Alternative 2. This alternative relocates the RPZ beyond Airport property and onto Romence Road and Pfizer-owned property. The primary incompatible land use is Romence Road. An on-airport perimeter access road and future service road for the Runway 35 approach lighting system would be located within the shifted RPZ, as would a Pfizer contractor vehicle parking lot. This alternative would require the acquisition of easements over these land uses. The existing Norfolk Southern rail line would also fall within the shifted RPZ and would need to be relocated as a result, adding to the cost of this alternative. See **Appendix C - RPZ Analysis** for a detailed evaluation of potential RPZ impacts with this alternative.

Impacts to farmland, wetlands, and habitat for threatened and endangered species are expected with the implementation of Alternative 3. However, anticipated environmental impacts of Alternative 3 are expected to be slightly less as this alternative does not propose to shift and reconstruct the intersection of Taxiway C and Runway 17/35.

Figure 2.4 Alternative 3 – 1,000-Foot Extension of Runway 35



Source: Mead & Hunt

Up to 5.96 acres of protected farmland may be impacted with the relocation of the Norfolk Southern railroad. It is expected that 0.17 acres of wetlands will be impacted with the construction of Alternative 3. This is less than Alternative 1 and Alternative 2.

Wooded areas found near the Runway 35 end provide potential forested habitat for the Northern Long-eared Bat and Indiana Bat, both federally endangered. To reduce potential impacts on bat population, tree removals necessary to implement Alternative 3 would be accomplished during recommended tree removal restriction periods as directed by appropriate resource agencies. See **Table 2-1 Summary of Alternatives** at the end of this chapter for a comparison of impacts of each alternative.

Based on the advantages and disadvantages of Alternative 3 detailed above, this alternative is removed from further consideration because it does not fully meet the project's purpose and need. Specifically, Alternative 3 does not address the Taxiway C and Runway 17 intersection in accordance with FAA design guidance described in FAA AC 150/5300-13B, Section 4.3.5. Alternative 3 also does not provide a usable runway length of 7,652 feet, thus failing to meet the needs of existing and future users.

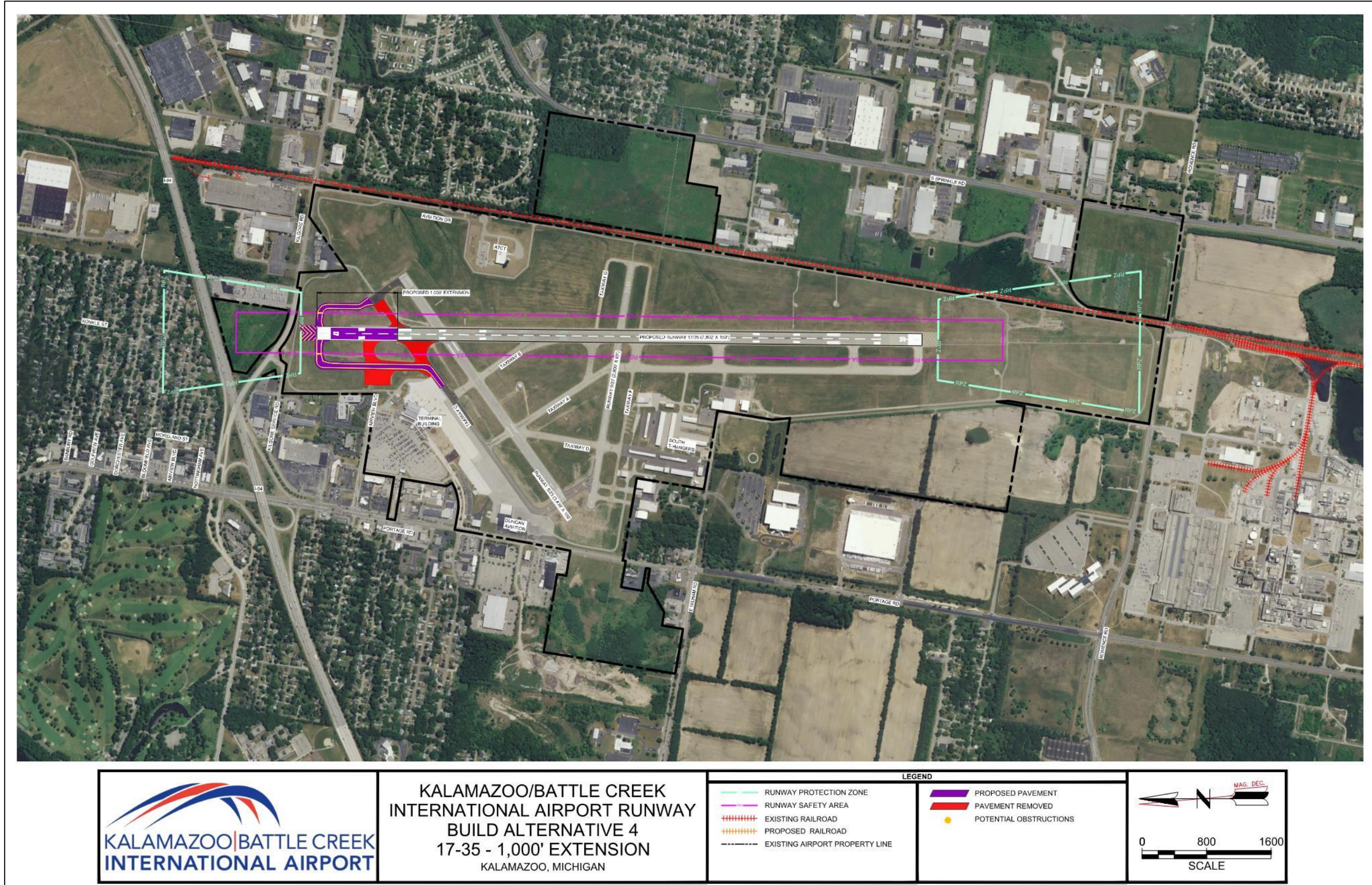
2.9 Alternative 4 – 1,000-Foot Extension of Runway 17 with a Reconfigured Intersection of Taxiway C and Runway 17

Alternative 4 proposes to extend Runway 17/35 1,000 feet to the north at the approach end of Runway 17. This alternative also proposes to reconstruct the intersection of Taxiway C and Runway 17/35 to connect at a 90-degree angle at the relocated threshold. No extension is proposed at the Runway 35 end. With this alternative, Runway 17/35 would have a usable length of 7,502 feet, as shown in **Figure 2.5 Alternative 4 – 1,000-Foot Extension of Runway 17 with a Reconfigured Intersection of Taxiway C and Runway 17**.

While Alternative 4 avoids impacts associated with extending the runway to the south at the approach end of Runway 35, namely the rerouting of the Norfolk Southern rail line and the various incompatible land uses and required easements within the relocated RPZ, this alternative would cause substantial impacts to the north. Moving the threshold of Runway 17 1,000 feet closer to I-94 and introducing more of the interstate inside the relocated RPZ would cause many new incompatible land uses not experienced with the other build alternatives. A major disadvantage with this alternative would be the requirement to relocate and reconstruct Kilgore Road outside the new RSA, as roads are not allowed within RSA areas.

This alternative would also have the most tree obstructions in the Milwood neighborhood of any build alternative. Moving the Runway 17 threshold 1,000 feet closer to the Milwood neighborhood would require new acquisitions and/or easements of many residential and commercial properties to clear obstructions within the relocated Runway 17 RPZ and approach surface.

Figure 2.5 Alternative 4 – 1,000-Foot Extension of Runway 17 with a Reconfigured Intersection of Taxiway C and Runway 17



Source: Mead & Hunt

Significant public controversy would be anticipated with this alternative because of the expected amount of required easements / acquisitions and the high likelihood that there would be an unacceptable increase in aircraft noise levels because the Runway 17 threshold is 1,000 feet closer to residential homes.

The shifting of the runway threshold would also require the relocation of the REILs and PAPI for Runway 17 as well as the localizer antenna for Runway 35.

There would be no impacts to farmland, but 0.22 acres of wetlands would be impacted, as well as potential forested habitat for the Northern Long-eared Bat and Indiana Bat at the end of Runway 17.

Although Alternative 4 partially meets the project's purpose and need of correcting the geometric deficiencies of the Taxiway C and Runway 17/35 intersection, it fails to provide 7,650 feet of usable runway length. This alternative would have considerable socioeconomic impacts, a high probability of increased noise exposure to residents, and a greater likelihood of considerable public controversy. Due to the availability of alternatives that have considerably fewer expected impacts and would likely be more acceptable to the surrounding community, Alternative 4 is removed from further consideration.

2.10 Selection of Preferred Alternative

After analysis of the advantages and disadvantages of each alternative, the alternative that best meets the project's purpose and need, while minimizing impacts to the built and natural environment, is Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17 (see **Figure 2.3 Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17**).

Alternative 2 is considered the most reasonable alternative when compared to the other alternatives. Alternative 2 best meets the project's purpose and need of providing a runway that accommodates the needs of existing and projected users of the Airport as well as reconfiguring the intersection of Taxiway C and Runway 17 to minimize additional runway incursions. Lastly, Alternative 2 is the only build alternative that proposes a total usable runway length of 7,652 feet for Runway 17/35.

The Airport has selected Alternative 2 as their Preferred Alternative. Alternative 2 will be carried forward in the EA for additional analysis, public comment, and agency review.

2.11 Summary of Alternatives

Table 2-1 Summary of Alternatives provides an overview of the expected impacts of each build alternative. Potential impacts are colored coded either in "red" or "green" to aid in a visual understanding of the advantages and disadvantages of each alternative. Red represents the alternative with the highest impact in a specific category while green indicates the least impact in a particular category. The same criteria was used for each build alternative as to allow an "apples-to-apples" comparison to better evaluate the alternatives.

Table 2-1 Summary of Alternatives

Category	Criterion	No Action Alternative	Alternative 1	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Project Purpose and Need	Provides runway length needed for current and forecasted air carriers	No	No	Yes	No	No
	Corrects Taxiway C Geometric Deficiencies	No	Yes	Yes	No	Yes
Implementation Factors	Requires Norfolk Southern Railroad Relocation	No	Yes	Yes	Yes	No
	Requires NAVAIDs Relocation	No	Yes	Yes	Yes	Yes
	Amount of New Incompatible Land Uses within Runway 17 RPZ	No	Low	Low	None	High
	Amount of New Incompatible Land Uses within Runway 35 RPZ	No	Med	High	High	None
	Intensity of New 40:1 Obstruction Removals in Milwood Neighborhood	Med	Med	Med	Low	High
	Requires New Easements to Remove Obstructions in Runway 17 40:1 Approaches	Yes	Yes	Yes	Yes	Yes
	Requires New Easements to Remove Obstructions in Runway 35 40:1 Approaches	No	Yes	Yes	Yes	No
	Level of Expected Public Opposition	None	Low	Low	Low	High
	Requires Kilgore Rd. Relocation	No	No	No	No	Yes
Environmental Impacts	Potential Impacts to Wetlands (acres)	0	0.40	0.40	0.17	0.22
	Impacts to Bloomfield Subdivision Historic District	Low	Med	Med	Low	High
	Presence of Potential Forested Habitat for Northern Long-eared Bat and Indiana Bat	No	Yes	Yes	Yes	Yes
	Likelihood of Increased Noise Exposure to Noise Sensitive Land Uses	None	None	None	None	High
Green and red shading represent the highest or lowest intensity of impact when compared to the other build alternatives within a specific category.						

Source: Mead & Hunt

Chapter 3.0 Affected Environment & Environmental Consequences

3.1 Introduction

This chapter of the Environmental Assessment (EA) describes the resources that may be affected by the Preferred Alternative and the No Action Alternative. This chapter also presents an analysis of the reasonably foreseeable direct, indirect, and cumulative impacts of the Preferred Alternative when compared with those of the No Action Alternative, as well as mitigation measures to avoid or minimize such impacts. Each resource category listed below includes first a summary of the regulatory setting and then an analysis of the topic relative to the Preferred Alternative and the No Action Alternative, as well as any suggested mitigation plans.

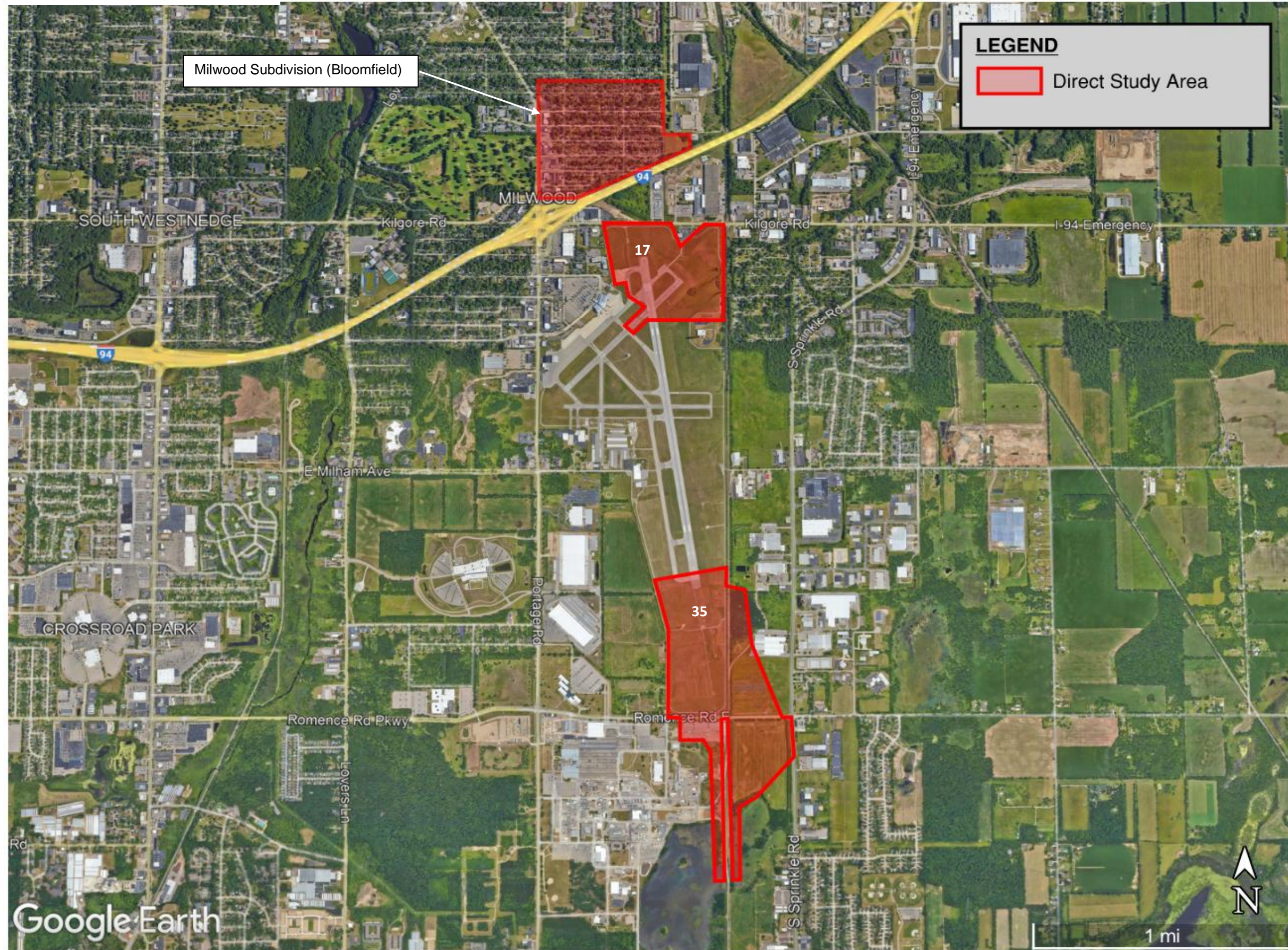
To help identify measures to first avoid, then minimize, and lastly mitigate impacts of the Preferred Alternative, organizations and agencies providing assistance included the Kalamazoo/Battle Creek International Airport (Airport or AZO), the Michigan Department of Transportation Office of Aeronautics (MDOT AERO), the Federal Aviation Administration (FAA) and various other regulatory agencies with jurisdiction or permitting authority over a particular resource category in the project area. The EA contains the received information where appropriate. **Table 3-8 Avoidance, Minimization, and Mitigation Summary of the Preferred Alternative** at the end of this chapter provides a summary of impacts and mitigation associated with the Preferred Alternative.

Figure 3.1 Direct Study Area provides a map of the study area used to determine the direct impacts from the construction of the Preferred Alternative. Direct impacts are defined as effects occurring at the same place and time. Direct impacts can be caused by activities such as earth moving, runway and taxiway construction, and obstruction removals.

Figure 3.2 Indirect Study Area provides a map of the study area used to determine indirect impacts from the construction of the Preferred Alternative. Indirect effects are caused by actions that occur later in time or are farther removed in distance but are still reasonably foreseeable. Stormwater runoff over time degrading local water resources is an example of indirect impacts. The Indirect Study Area was based on the Preferred Alternative's 65 Day-Night Average Sound Level (DNL) noise contour as described in **3.13 Noise and Noise Compatible Land Use**.

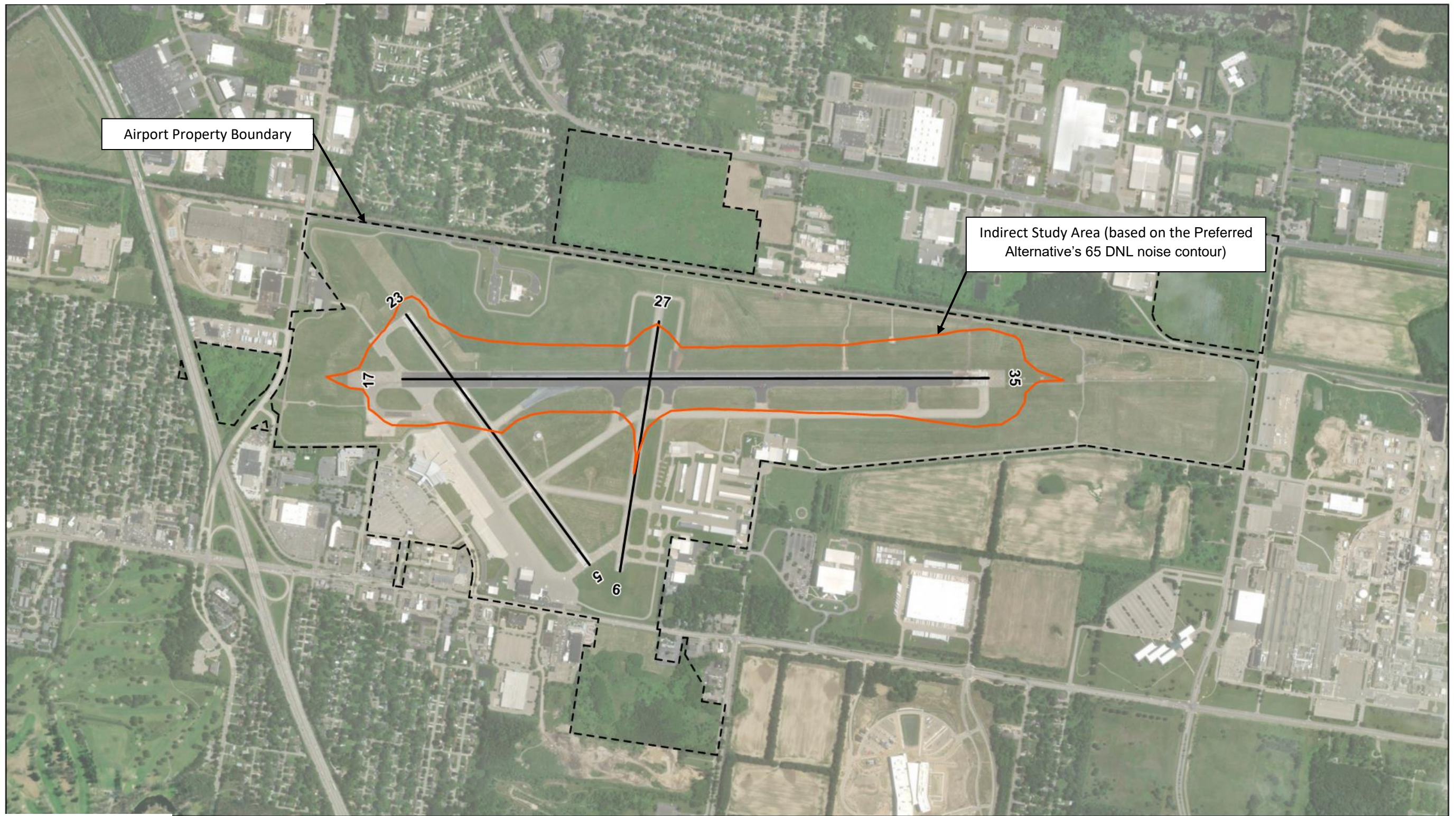
As described in previous chapters, the Airport proposes to extend Runway 17/35 to meet the runway takeoff and landing length requirements of existing and future aircraft operating at AZO. Currently, the primary runway (Runway 17/35) does not provide enough runway length to meet the needs of existing and future Airport users. The Airport also proposes to enhance safety and improve aircraft movement by correcting airfield geometry deficiencies associated with the intersection of Taxiway C and Runway 17. For detailed discussion of the Preferred Alternative, see **Chapter 2.0 Alternatives Considered**. For additional details and justification of why the project is needed, see **Chapter 1.0 Purpose and Need**.

Figure 3.1 Direct Study Area



Source: Google Earth

Figure 3.2 Indirect Study Area



Source: Mead & Hunt, Inc.

As described in **Chapter 1.0 Purpose and Need**, the Airport's proposed project includes the following components:

- Extending Runway 17 end by 150 feet
- Extending Runway 35 end by 1,000 feet
- Realigning Taxiway C at the approach end of Runway 17
- Extending parallel Taxiway B to match Runway 17/35 extensions
- Relocating an existing railroad spur (owned by Norfolk Southern Railroad) on the south end of the Airport, including land acquisition
- Acquiring aviation easements/land acquisition in both Runway 17 and Runway 35 approaches for obstruction clearing
- Clearing obstructions in Runway 17/35 approaches
- Relocating existing airfield navigational aids (NAVAIDs)
- Developing new aircraft approach and departure procedures for Runway 17/35

3.2 Early Agency and Public Coordination

Resource agencies and Native American tribes with potential jurisdiction over, or interest in, the proposed action were contacted at the beginning of the project and given the opportunity to comment on the proposed action. A copy of the distribution list, early coordination letters and maps sent to each agency and organization, and documentation received including response letters is found in **Appendix D - Early Agency & Tribal Coordination**. The resource sections below note, and address, as appropriate, specific information and direction received from responding agencies.

An onsite agency scoping meeting with 13 attendees occurred on June 26, 2019. Its purpose was to discuss the project's Purpose and Need, preliminary alternatives, anticipated impacts, agency concerns, and mitigation requirements. The attending agencies also toured the airfield and project area.

Two public meetings have been conducted to date. Their focus was to keep the public informed regarding project details and to receive public comments on the proposed action. The first meeting occurred on February 26, 2020, and the second meeting occurred on October 19, 2022. Both meetings were held at the Air Zoo Aerospace & Science Museum (approximately 1.2 miles from the Airport) and were "drop in" events, allowing attendees to arrive any time between 5:30 PM and 7:30 PM. The meetings were informal, walk-through events where individuals had the opportunity to review maps and displays, ask questions, give feedback, and discuss the project with Airport staff and consultant team members. An opportunity to provide written comments was also available. Public comments have been incorporated into this EA where appropriate. See **Appendix O – Past Public Meetings** for records of the public meetings including copies of the public notices and public comments received during both meetings.

Upon issuance of the Draft EA, the document was made available for public and agency review and comment for a minimum of 30 days. Following the public review period, a Public Hearing was advertised and held with a court reporter in attendance to record public comments. Written comments from the regulatory agencies and the public were considered and incorporated into the Final EA where applicable.

See **Appendix P – Public and Agency Review of the Draft EA** for details of the Public Hearing, public and agency comments received, and Airport responses.

3.3 Current Airport Environment and Existing Facilities

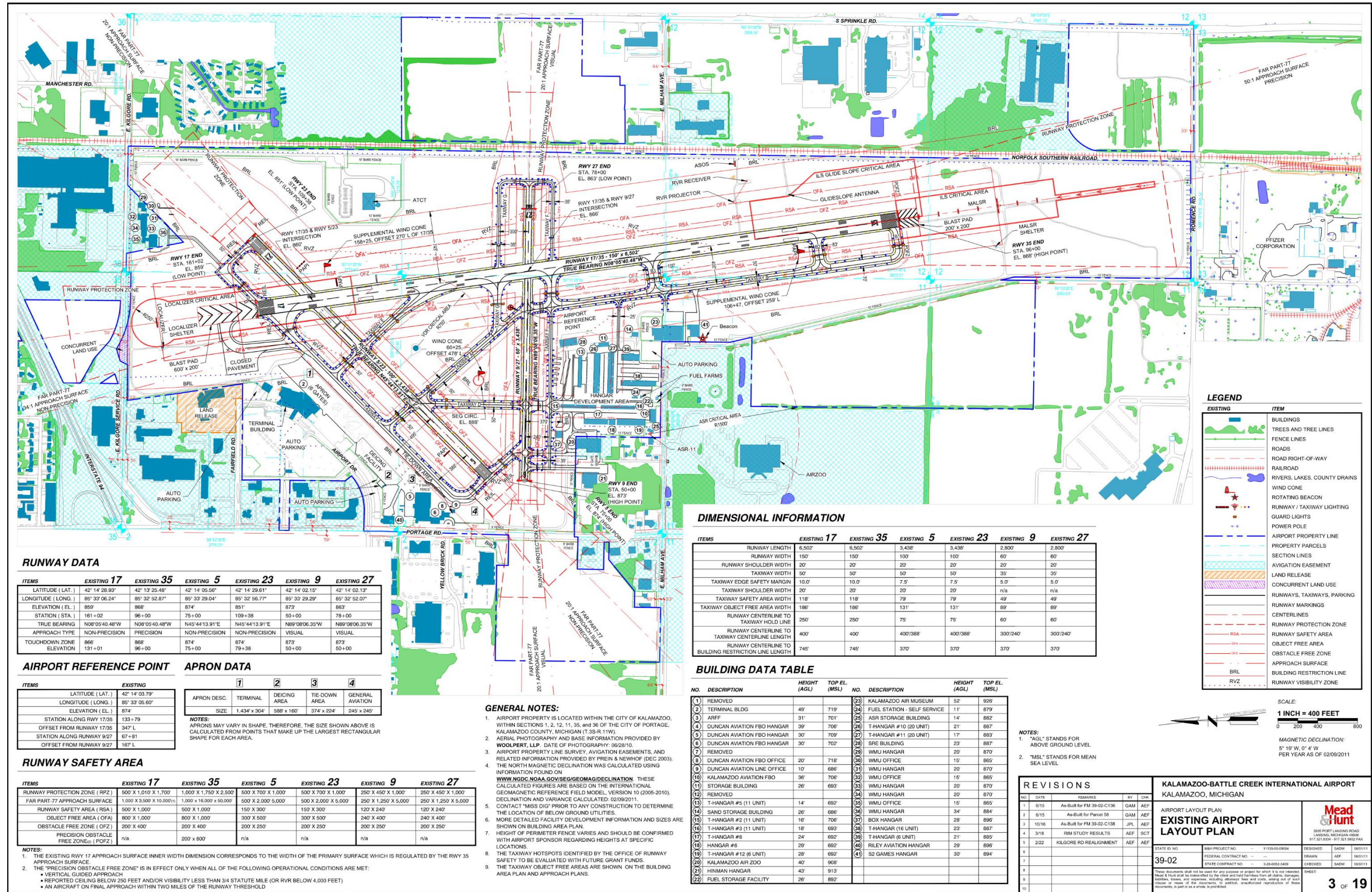
AZO is a non-hub, commercial service airport in Kalamazoo County in southwest Michigan, approximately three miles southeast of the city center of Kalamazoo. Owned and operated by Kalamazoo County, AZO is within the limits of the City of Kalamazoo, with the City of Portage bordering the Airport to the east, south, and west. AZO is situated on 832 acres of property adjacent to Portage Road, less than a half mile from I-94 and less than five miles from U.S. 131. See **Figure 1.2 Regional Airport Location Map** and **Figure 1.3 Airport Vicinity Map** found in **Chapter 1.0 Purpose and Need** for a depiction of the Airport's location regionally, while highlighting the Airport's location relative to surrounding general land uses and areas of interest.

The Airport's existing facilities are comprised of both airside and landside infrastructure that is critical to supporting aviation activity at AZO. Major facilities at the Airport include runways, taxiways, aprons, hangars, NAVAIDs, a commercial passenger terminal building, four organizations offering fixed base operator (FBO) services for general aviation users, an Airport Traffic Control Tower (ATCT), and other miscellaneous support facilities. See **Figure 3.3 Existing Airport Layout Plan**, for a graphic representation of airport facilities and their locations on Airport property.

As shown on **Figure 1.1 Airport Property Map** found in **Chapter 1.0 Purpose and Need**, AZO is equipped with three asphalt runways: Runway 17/35, the primary runway; Runway 5/23, the primary crosswind runway; and Runway 9/27, a secondary crosswind runway. Runway 17/35 is oriented in a north-south direction and measures 6,502 feet long and 150 feet wide. Runway 5/23 measures 3,438 feet long and 100 feet wide and is oriented in a northeast-southwest direction. Lastly, Runway 9/27 is oriented east-west and measures 2,800 feet long and 60 feet wide.

A network of taxiways provides access between the runways and apron areas. Taxiway C is a full parallel taxiway for Runway 5/23 and provides access to all runways from the Terminal Apron and FBO Apron. Taxiways A, D, E, G, and H are located in the middle of the airfield and connect AZO's three runways. Taxiway B serves as a partial parallel taxiway for Runway 17/35, and Taxiway F is a full-length parallel taxiway supporting operations on Runway 9/27. Several connector taxiways connect the runways to the parallel taxiways.

Figure 3.3 Existing Airport Layout Plan



Source: Mead & Hunt, Inc.

Visual NAVAIDs at AZO include:

- Rotating beacon
- Wind indicators
- Segmented circle
- High Intensity Runway Lights (HIRL) for Runway 17/35
- Medium Intensity Runway Lights (MIRL) for Runway 5/23 and Runway 9/27
- A 4-light Precision Approach Path Indicator (PAPI) at both ends of Runway 17/35 and Runway 9/27
- A Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) at the approach end of Runway 35
- Runway End Identifier Lights (REILs) at both ends of Runway 5/23 and at the approach end of Runway 17

In addition to visual NAVAIDs, the Airport is also equipped with electronic NAVAIDs to help pilots navigate in inclement weather. Existing electronic NAVAIDs include an Instrument Landing System (ILS) approach for the approach end of Runway 35 and Global Positioning Satellite (GPS) approaches for both ends of Runway 17/35 and Runway 5/23.

Located on Airport Drive off Portage Road, the Airport's existing commercial passenger terminal building opened in 2011 and offers approximately 59,000 square feet of space, including multiple security checkpoint lanes, two baggage claim carousels, rental car and airline ticketing counters, a lobby, passenger waiting areas, and five boarding gates, all of which are equipped with covered jet bridges. The associated Terminal Apron provides parking for commercial service aircraft.

Four FBOs located on the airfield provide an assortment of aviation services for general aviation users. Duncan Aviation, the Airport's sole full-service FBO, is on the FBO Apron southwest of the commercial passenger terminal building. Duncan Aviation offers aircraft parking, hangar storage, fueling, de-icing, a customer shuttle, aircraft maintenance, and a pilot lounge. Duncan's facility also serves as the general aviation terminal at AZO. Kalamazoo Pilots Association is located within the Airport's hangar complex south of Runway 9/27 to provide convenient, self-serve fuel services to hangar tenants. RAI Jets, immediately south of the approach end of Runway 9, provides private jet charters. Lastly, Kalamazoo Aircraft, Inc. is also located within the Airport's hangar complex and provides a variety of aircraft maintenance services, including inspections, repairs, modifications, and engine overhauls.

The Airport's ATCT opened in 2013 on the east side of the airfield between the approach ends of Runway 23 and Runway 27. The ATCT operates between the hours of 6:00 a.m. and 11:00 p.m. daily.



AZO Airport Traffic Control Tower

Source: WileyWilson

Various support facilities sustain the day-to-day operations at AZO. The primary support facilities include aircraft rescue and firefighting (ARFF) and airport maintenance. The ARFF facility is just north of the commercial passenger terminal building and has three bays for firefighting equipment, living and sleeping quarters for fire fighters on duty, and room for additional storage for other necessary equipment. The Airport also contains three buildings dedicated for maintenance equipment. A large building with bays for snow removal and other maintenance equipment is located on the east side of the hangar complex on the west side of the airfield, south of Runway 9/27 and west of Runway 17/35. This building also consists of workspaces for maintenance personnel to complete various tasks. Two other smaller maintenance buildings, each located south of the larger building, provide alternative locations for storage of maintenance equipment such as plows and mowing tractors, and supplies necessary for the operation of the Airport.

Several hangar buildings for storage of general aviation aircraft are found in the hangar complex. These buildings can be accessed on the landside through a secured vehicle entrance off Milham Avenue. The buildings range from traditional T-hangars for individual aircraft to standard box style buildings capable of housing more than one aircraft.

3.4 Air Quality

An air quality analysis is the measure of the air's composition in terms of pollutant concentrations. Air quality is regulated out of concern for human health (especially the health of children, the elderly, and those with certain health conditions). Poor air quality can also affect crops and vegetation, as well as buildings and other facilities. Air quality is regulated by the United States Environmental Protection Agency (EPA) under the Clean Air Act (CAA) described in 42 U.S.C. §§ 7401- 7671q. The EPA regulates six common air pollutants under the CAA, referred to as criteria pollutants, to permissible levels via standards called National Ambient Air Quality Standards (NAAQS).

In addition to the EPA, several other agencies address air quality in the project area: the Michigan Department of Environment, Great Lakes, and Energy (EGLE), the Kalamazoo Area Transportation Study (KATS), and the Battle Creek Area Transportation Study (BCATS). KATS and BCATS are the metropolitan planning organizations (MPOs) responsible for tracking requirements under the state and federal transportation conformity regulations.

Areas that have ambient concentrations of criteria pollutants below the NAAQS are designated as "attainment areas." Areas with ambient criteria pollutant concentrations above the NAAQS are designated as "nonattainment areas." Nonattainment areas must have an applicable State Implementation Plan (SIP) that establishes mitigation measures and timelines required to lower pollutant levels below the NAAQS. In addition, aviation-related federal projects planned for nonattainment areas must conform to the applicable SIP, known as "General Conformity."

3.4.1 Affected Environment

The Airport is in Kalamazoo County, which is part of the EPA's Kalamazoo-Battle Creek airshed. Kalamazoo County is in attainment for all criteria pollutants; therefore, the General Conformity rule does not apply to the proposed project. The study area for reasonably foreseeable direct and indirect air quality

impacts potentially resulting from the No Action Alternative and Preferred Alternative is defined in **Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**.

3.4.2 Environmental Consequences

An air quality emissions inventory for aviation sources was prepared for AZO using the FAA’s current Aviation Environmental Design Tool (AEDT) Version 3e. Emissions are separated into construction (emissions by vehicles necessary to construct the Preferred Alternative) and operational emissions (emissions from ongoing operations once the proposed construction is completed). For details on the air quality analysis, see **Appendix E - Air Quality**.

Construction Emissions: No construction emissions would be expected with the No Action Alternative, as the proposed development would not occur.

Construction emissions were calculated for the Preferred Alternative using the EPA MOVES3 model¹ emission factors and construction equipment use estimates from the Airport Cooperative Research Program (ACRP) Report 102 *Guidance for Estimating Airport Construction Emissions* (available upon request or online at <https://crp.trb.org/acrpwebresource4/acrp-report-102-guidance-for-estimating-airport-construction-emissions/>). It is assumed that obstruction removals and rail line relocation construction would occur during 2024, with the runway extension being completed in 2025.

As shown in **Table 3-1 Construction Emissions**, air quality modeling found that construction emissions from the Preferred Alternative would be de minimis, i.e., "of minimum impact." This qualification for de minimis (less than 100 tons per year) means there will be no significant air contamination when compared to the CAA thresholds. Construction emissions would not be significant nor require mitigation.

Table 3-1 Construction Emissions (tons per year)							
Construction Year	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)	Nitrogen Oxides (NOx)	Sulfur Oxides (SOX)	PM ₁₀	PM _{2.5}	Lead (Pb)
2024	7.4	1.6	11.2	<0.1	1.1	1.1	NA
2025	8.6	1.7	11.9	<0.1	1.1	1.0	NA

Note: Construction emissions capture on-road and off-road vehicles as well as fugitive emissions. NA=Not applicable.

Source: Synergy, February 2022.

Operational Emissions: The operational emissions inventory represents the sources of equipment operating based upon the activity occurring at the Airport in 2019 and future years (activity levels in 2024 and 2029) under the No Action Alternative and the Preferred Alternative. Operational data from 2019 was used

¹ United States Environmental Protection Agency (USEPA). 2023. "Latest Version of Motor Vehicle Emission Simulator (MOVES) MOVES4: Latest Version of Motor Vehicle Emission Simulator." <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>.

because it was the most recent calendar year in which a full 12 months of historical data was available at the time when the air quality analysis was initiated.

To validate assumptions and data of the original air quality analysis, a review was conducted of the trend in actual operations between 2019 and 2023 with the growth rate projected by the forecasts used to develop the air quality analysis. This review found that the trend in actual operations between 2019 through 2023 has not yet matched the trend in projected operations. Since actual operations have not exceeded forecasted operations, the existing air quality analysis was found to still be valid since actual air quality emissions have not yet matched what was modeled. Thus, a reevaluation of the air quality analysis was not needed.

Aircraft, auxiliary power units (APU), and ground support equipment emissions were estimated for both the No Action Alternative and the Preferred Alternative. Also estimated for the No Action Alternative and Preferred Alternative were emissions that would be generated as a result of the relocation of the Norfolk Southern rail spur at the approach end of Runway 35.

When comparing the No Action Alternative to the Preferred Alternative, project related emissions are expected to slightly increase. This is primarily because the runway extension would alter aircraft taxi distances, and thus time traveled. The relocation of the Norfolk Southern Railroad would cause a slight increase in the distance travelled by rail cars.

Analysis found that implementation of the Preferred Alternative would increase Carbon Monoxide (CO) emissions by 9.5 tons in 2024 and 9.3 tons in 2029 when compared to No Action Alternative's estimated 2024 and 2029 CO emissions. Ozone precursors such as Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx), as well as other criteria pollutants, would increase by less than 1.0 ton per year with the Preferred Alternative in 2024 and 2029. See **Appendix E - Air Quality** for pollutant emissions inventory tables comparing the Preferred Alternative with the No Action Alternative.

Per the CAA General Conformity rule, the de minimis threshold is 100 tons per year. When contrasting the project-related emissions in 2024 and 2029 with the General Conformity de minimis thresholds for a maintenance area, the project-related emissions would not be significant as they would all be below the de minimis. No further analysis is required, and no mitigation is proposed.

To further reduce the potential for temporary air quality impacts for both workers and the surrounding area, The *Construction Emission Control Checklist* provided by the EPA (found in **Appendix E - Air Quality**) should be considered where feasible. Although the Airport will strongly encourage the use of the EPA checklist, the Airport must follow FAA advisory circulars and construction guidelines. Construction contracts will identify any applicable requirements that contractors must follow.

In addition, the following supplementary recommendations will also be considered during the construction of the Preferred Alternative. These recommendations may be implemented and incorporated by the Airport during construction where feasible:

- Use low-sulfur diesel fuel (less than 0.05 percent sulfur).
- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Position the exhaust pipe so that the diesel fumes are directed away from the operator and nearby workers, thereby reducing the fume concentration to which personnel are exposed.
- Use catalytic converters to reduce carbon monoxide, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels.
- Use climate-controlled cabs that are pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operator's exposure to diesel fumes. Pressurization ensures that air is moved from the inside to the outside. HEPA filters ensure that any incoming air is filtered first.
- Regularly maintain diesel engines, which is essential to keeping exhaust emissions low, and follow the manufacturer's recommended maintenance schedule. For example, blue/black smoke indicates that an engine requires servicing or tuning.
- Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel operators to perform routine inspections, and maintaining filtration devices.
- Purchase new vehicles that are equipped with the most advanced emission control systems available.
- With older vehicles, use electric starting aids as block heaters to warm the engine to reduce diesel emissions.

For these reasons, the Preferred Alternative would not result in a significant impact on air quality.

3.5 Biological Resources

Biological resources include plants (vegetation), animals (wildlife), and the habitats where they are located. Habitats are the resources and conditions that support the continuous existence of plants or animals in any particular area. Together, biological resources form ecosystems, which are dynamic and respond over time to changes in the environment, whether natural or human induced. Biological resources provide aesthetic, recreational, and socioeconomic values to society, as well as being valuable in their own right. Accordingly, federal and state laws and statutes exist to protect certain species and habitats of special importance.

Early agency coordination was conducted at project onset with federal and state regulatory agencies with interest or jurisdiction over biological resources in the project area. Agency response letters are found in **Appendix D - Early Agency & Tribal Coordination**. For details on the biological resources in the project area, including U.S. Fish and Wildlife Service (USFWS) and EGLE consultation and additional analysis of each listed species, see **Appendix F - Biological Resources**.

3.5.1 Endangered & Threatened Species

The Endangered Species Act (Act) of 1973 (16 U.S.C. §1531-1544) and subsequent amendments, require the conservation of federally listed threatened and endangered plant and animal species, and critical habitats in which they are found. A species is considered endangered if it is in danger of extinction throughout all or a significant amount of its range. Threatened species are defined as those that are likely

to become endangered in the foreseeable future. The USFWS administers the Act primarily for land and freshwater species and designates critical habitat for species protected under the Act. Section 7 of the Act requires all federal agencies to consult with the USFWS, as applicable, before initiating any action that may affect a listed species or designated critical habitat. Candidate species, which may be listed as threatened or endangered in the future, are not provided any statutory protection under the Act, but conservation efforts are encouraged.

At the state level, EGLE protects threatened and endangered species from being taken or harmed during project activities under Part 365 of the Natural Resources and Environmental Protection Act (1994, as amended) (NREPA). An environmental review must be completed for the project area to identify whether any threatened and endangered species may be affected by project actions. Permits may be required by EGLE if impacts are identified.

3.5.1.1 Affected Environment

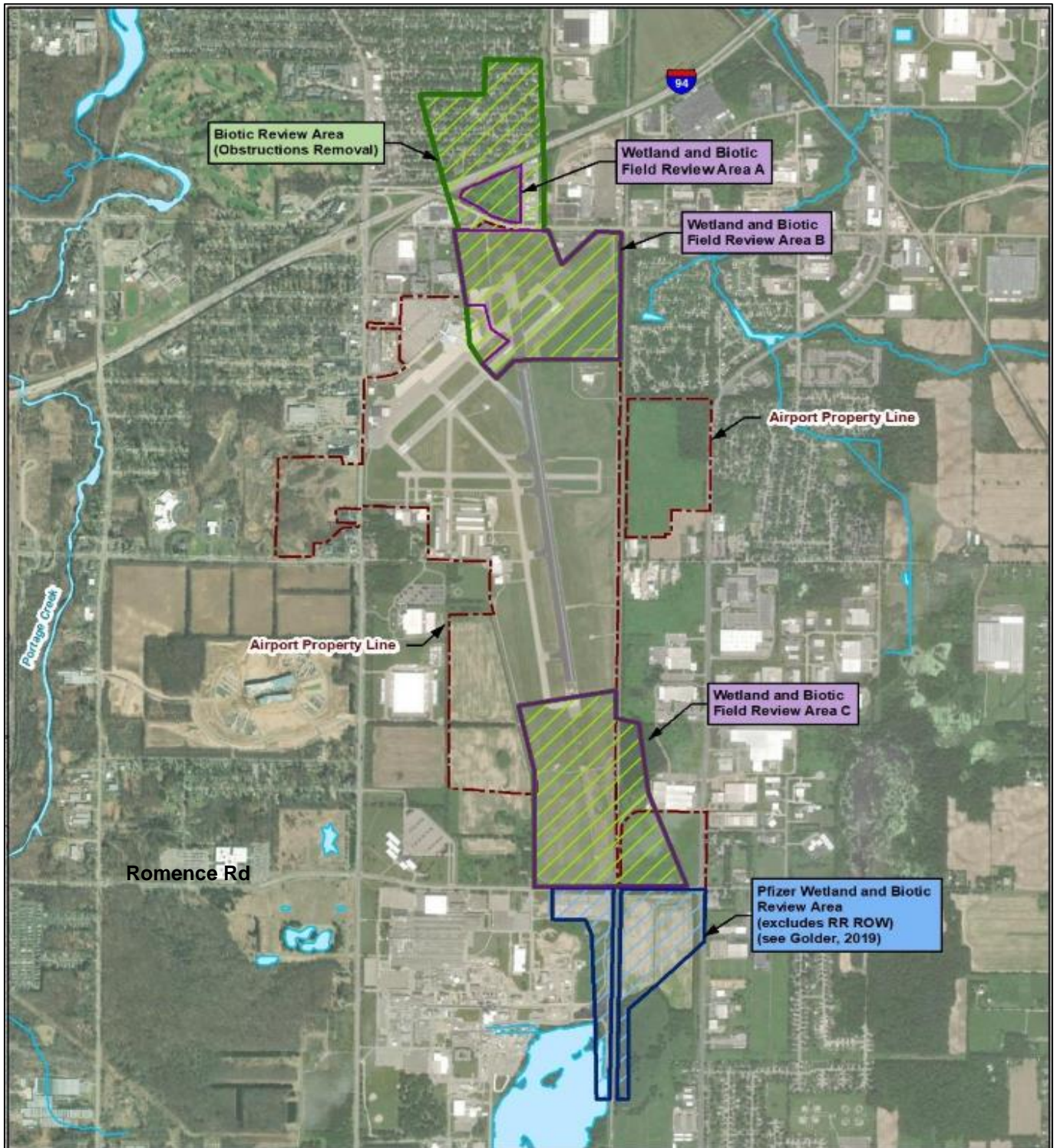
To determine the presence of threatened and endangered species and evaluate the potential impacts from the proposed project at the federal and state level, qualified biologists conducted field reviews within an Area of Interest (AOI) primarily on Airport property north of Romence Road on June 6 – 7 and August 19 – 21, 2019 and a separate AOI on property owned by Pfizer Pharmaceutical south of Romence Road on April 15, 2019. The AOI north of Romence Road was comprised of three separate areas totaling approximately 246 acres, while the AOI on Pfizer property comprised approximately 77 acres.

In addition, an obstructions survey conducted in August 2020 identified potential tree obstructions in the approaches for the proposed extension of Runway 17/35. Potential obstructions, especially at the end of Runway 17, extend into a residential area (Milwood Subdivision) north of Interstate 94 (I-94) within the proposed approach surface. Many individual and dispersed trees are found in this area. Fewer trees were identified as potential obstructions at the approach end of Runway 35. The biological resources review area, therefore, extended to the north of I-94. No field surveys of the area north of I-94 occurred, however. **Figure 3.4 Biological Resources Study Area** shows the areas reviewed for biological resources. This study area is included within the direct study area defined in **Figure 3.1 Direct Study Area**.

Site Description – North of Romence Road

The AOI for the field review north of Romence Road was split into three sections. Area A comprises approximately 12 acres north of East Kilgore Road. Areas B and C are situated at the runway ends: approximately 104 acres at the approach end of Runway 17 end and 130 acres at the approach end of Runway 35.

Figure 3.4 Biological Resources Study Area



Biological Resources Review Areas

Kalamazoo/Battle Creek International Airport

Source: *Biological Resources Report, Kalamazoo-Battle Creek International Airport, Runway 17/35 Extension and Taxiway Improvements*, prepared by Mead & Hunt, November 2021



Legend

- Mead & Hunt Area of Interest
- Pfizer Area of Interest
- Wetlands Review Area
- Approximate Airport Property Boundary

A watershed divide occurs along the western side of the Airport with most of Airport property falling within the Davis Creek-Kalamazoo River subwatershed. Drainage from the northern end of the Airport is directed to the east toward the Davis-Olmstead Drain.

The airfield is relatively flat with little elevation change over the active airside areas. Topography within the active airfield varies from a high of approximately 870 feet near the terminal and associated parking lot to approximately 840 feet at the eastern boundary of Airport property.

North of East Kilgore Road is an airport-owned triangular-shaped parcel (Area A) underlying the Runway 17 Runway Protection Zone (RPZ). A large berm parallels East Kilgore Road, the southern boundary of this parcel and rises 15-20 feet from the surrounding flatter areas on either side. The berm is dominated by mature box elder. Areas north of the berm contain scattered copses of trees intermixed with old field vegetation.

Nearly all infield areas consist of grasses and forbs and are mown regularly. Upland areas at the approach end of Runway 17 (Area B) are dominated by a mix of grasses and forbs consisting of Kentucky blue grass, orchard grass, white and red clover, English plantain, Bird's-foot trefoil, chickweed, dandelion, Canada thistle, and yarrow. The dominant upland species found at the approach end of Runway 35 (Area C) include a similar turf grass and forb assemblage: orchard grass, Kentucky blue grass, spotted knapweed, dandelion, white and red clover, Canada thistle, Bird's-foot trefoil, and English plantain. Several areas of wetlands are also found in Area B and Area C.

A north-south oriented railroad forms the eastern boundary of the airfield. Part of Area C extends to the east of the railroad at the southeast corner of the airfield. Area C contains parts of three parcels: a large vacant County-owned parcel covered by old field vegetation, the Mann+Hummel south commercial property containing a large warehouse and parking area, and a vacant parcel owned by the City of Portage. The County-owned parcel is fairly flat and is a former tree plantation consisting of scattered spruce and white pine. The western half of the City of Portage parcel is tree-covered while the eastern half is vacant and covered by old field vegetation. To the north of the City of Portage parcel is another parcel owned by Mann+Hummel. An access road spans the City of Portage parcel and connects the two Mann+Hummel properties, splitting the City of Portage parcel in half.

Site Description – Pfizer Property South of Romence Road

Most lands within the AOI south of Romence Road are either developed or farmed and comprise 56.4 acres. Small areas of wetland total 10.4 acres and two small woodland areas cover 6.2 acres.

The developed area consists of nearly level to gently sloping land that has been historically graded and developed as part of the current Pfizer facility. Parts of this area are paved (concrete, asphalt, and compacted gravel) and used for parking and access drives. There is part of a small, constructed stormwater detention pond in this area. Areas that are not paved are typically covered by lawn and meadow periodically maintained by mowing.

Farmland on the property was in active agricultural production during the site visit. Aerial imagery shows the area has been actively farmed since at least 1950.

Three wetland areas are found on the Pfizer property. An emergent wetland area consists of seasonally inundated and/or saturated emergent (wet meadow) habitat with some trees and shrubs along the edges. Another area consists of shallow water habitat less than three feet deep associated with Upjohn Pond. Upjohn Pond is a permanent waterbody that was created sometime between 1950 and 1960 by impounding water and flooding a historic wetland complex. There is a water level control structure near the south end of the AOI that can be used to lower the water level in the lake. A third wetland area is comprised of seasonally inundated and/or saturated emergent (wet meadow) and scrub-shrub habitat along and near the edge of Upjohn Pond.

Finally, woodland areas within the AOI consist of a disturbed woodland and a mature woodland. The disturbed woodland area is comprised of land adjacent to Upjohn Pond that has been historically filled and graded as evidenced by abrupt changes in topography and the presence of foreign materials in the soil such as brick, concrete, and metal fragments. Vegetation is characterized by non-native and/or invasive species typically occurring on and adapted to disturbed conditions. The mature woodland area consists of wooded habitat characterized by relatively mature trees, including red maple (*Acer rubra*), black cherry (*Prunus serotina*), box elder, and pin oak with a relatively sparse understory.

3.5.1.2 Environmental Consequences

A review of threatened and endangered species information provided in the USFWS Information for Planning and Consultation (IPaC) database for the project area identified five threatened or endangered species and one candidate species (**Table 3-2 USFWS Endangered and Threatened Species List**). No critical habitat under USFWS jurisdiction was found in the project area. In addition, no rare or unique biotic communities were observed in uplands, wetlands, or woodland areas within the AOI during the field reviews.

Table 3-2 USFWS Endangered and Threatened Species List		
Species Name	Common Name	Status
<i>Myotis sodalis</i>	Indiana Bat	Endangered
<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Threatened
<i>Sistrurus catenatus</i>	Eastern Massasauga Rattlesnake	Threatened
<i>Neonympha mitchellii mitchellii</i>	Mitchell's Satyr Butterfly	Endangered
<i>Epioblasma triquetra</i>	Snuffbox Mussel	Endangered
<i>Danaus plexippus</i>	Monarch Butterfly	Candidate
<i>Bomus affinis</i>	Rusty Patched Bumble Bee	Special Concern

Source: USFWS Information for Planning and Consultation (IPaC) Database

The review of the IPaC database was coupled with use of the Michigan Endangered Species Determination Key (DKey), which provided USFWS recommended effect determinations for species within the project area based on information provided by the user through an interview process. **Table 3-3 Recommended**

Effect Determinations from the Michigan Endangered Species Determination Key (DKey) presents the USFWS recommended determinations. The USFWS concurred with these findings through email correspondence found in **Appendix F - Biological Resources**.

Table 3-3 Recommended Effect Determinations from the Michigan Endangered Species Determination Key (DKey)		
Common Name / Species Name	Status	DKey Determination
Indiana Bat (<i>Myotis sodalis</i>)	Endangered	NLAA*
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Threatened	NLAA*
Eastern Massasauga Rattlesnake (<i>Sistrurus catenatus</i>)	Threatened	NLAA*
Mitchell's Satyr Butterfly (<i>Neonympha mitchellii mitchellii</i>)	Endangered	No effect
Snuffbox Mussel (<i>Epioblasma triquetra</i>)	Endangered	No effect
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	
Rusty Patched Bumble Bee (<i>Bomus affinis</i>)	Special Concern	

*NLAA=May affect, but not likely to adversely affect
Source: Michigan Endangered Species Determination Key (DKey), USFWS

At the state level, EGLE provided the results of a Transportation Preliminary Database Search. This search did not indicate any occurrences for state-listed threatened and endangered species, Eastern Massasauga Rattlesnake (EMR) habitat, mussels, contaminated sites, or Section 10 waterways. While no known occurrences of the Indiana bat or Northern Long-eared bat (NLEB) were noted, the project location is within the range of the Indiana bat.

The small, wooded areas within Areas A and C and wooded areas on the Pfizer property contain potential forested habitat for both the NLEB and the Indiana bat (**Figure 3.4 Biological Resources Study Area**). The Michigan DKey results indicated a “may affect, not likely to adversely affect” (NLAA) determination for the NLEB and the Indiana bat.

Since many areas identified for tree removals as part of the runway extension project are small and/or individual isolated trees, removals will be accomplished by selective tree cutting. Tree removals will be completed during recommended time periods appropriate for minimizing impacts to any potential bat populations. Specifically, any potential tree removal activities will be accomplished outside the summer roosting season (removals allowed after October 31 and before April 1) to minimize impacts to any potential NLEB and Indiana bat populations.

Because the Michigan State Historic Preservation Office (SHPO) has determined that tree removals within the Bloomfield Subdivision Historic District constitutes an adverse effect to historic properties, a one-time replacement with a low-growing species to help mitigate tree impacts is proposed. This replacement option will help offset the required tree removals and may reduce potential impacts on protected bat species. Specific mitigation and tree species will be determined during final design in coordination with individual property owners, the FAA, and the Airport. See **Section 3.10 Historical, Architectural, Archeological,**

and Cultural Resources and **Appendix G - Historic Resources** for additional details on impacts to the Bloomfield Subdivision Historic District and required mitigation.

Prior to any tree removals, a permit is needed from the City of Kalamazoo. The permit will require compliance with their Natural Features Protection Overlay standards, Subsection F (found in **Appendix H - Tree Removal Ordinance**). However, additional coordination between the Airport and the City of Kalamazoo is required in the selection of replacement trees because tree varieties that have the potential to grow tall and become obstructions in the future are not allowed in the runway approaches.

Due to the historic agricultural practices associated with these areas and the conversion to residential and commercial land uses, the AOI provides limited habitat potential for other wildlife including the EMR. With upland and wetland areas actively maintained by mowing, regular disturbance does not provide attractive habitat to the EMR. Other less actively maintained uplands outside of the airfield have significant impediments to access for the EMR across road corridors as well as a lack of wetland habitat in close proximity to these uplands.

The Michigan DKey indicated a NLAA determination for the EMR. Construction activities on the airfield occur in mostly upland areas and could span a full season, potentially affecting movement of the snake between wetland and upland habitats if present. Use of recommended erosion control and site restoration materials (“wildlife safe materials”) can be incorporated into construction plans; any sightings of the snake will be immediately reported to USFWS.

No high-quality fens attractive to the Mitchell’s Satyr Butterfly were identified within the AOI. Therefore, the project area provides limited potential habitat for the butterfly. The project will have no effect on this species.

The project area is within the historical range of the Rusty Patched Bumble Bee (RPBB), but suitable foraging and nesting habitat is limited within the AOI due to the long history of land alteration both on and in close proximity to the Airport. Section 7 Consultation and incidental take permits are not needed in the historical range of the RPBB where none have been observed since before the year 2000. The project will have no effect on the RPBB.

Riverine habitat is not present within the AOI. Therefore, the project area provides no potential habitat for the Snuffbox Mussel and will have no effect on the mussel.

The Monarch Butterfly is a migratory species utilizing grassland and prairie habitats in the Midwest for foraging in all life stages. Currently, the butterfly is a candidate species and is not listed or proposed for listing. There are no Section 7 Consultation requirements for candidate species.

For these reasons, the Preferred Alternative would not result in a significant impact on biological resources. For details on the biological resources in the project area including USFWS and EGLE consultation and additional analysis of each listed species, see **Appendix F - Biological Resources**.

3.5.2 Migratory Birds

The *Migratory Bird Treaty Act of 1918* (MBTA) described in 16 U.S.C. § 703 et seq and its amendments are the main driver for the protection of migratory birds in the United States. Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, also obligates all federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitats.

In a biological sense, a migratory bird is an avian that has a seasonal and somewhat predictable pattern of movement. Generally, migratory birds are defined as all native birds in the United States, except those non-migratory species such as quail and turkey that are managed by individual states.

3.5.2.1 Affected Environment

The USFWS identified nine migratory birds with the potential to exist in the vicinity of the project area. These species include:

- Bald Eagle (*Haliaeetus leucocephalus*)
- Bobolink (*Dolichonyx oryzivorus*)
- Cerulean Warbler (*Dendroica cerulea*)
- Henslow's Sparrow (*Ammodramus henslowii*)
- Lesser Yellowlegs (*Tringa flavipes*)
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- Rusty Blackbird *Euphagus carolinus*
- Wood Thrush *Hylocichla mustelina*

3.5.2.2 Environmental Consequences

Potential impacts to migratory birds are limited due to the historical agricultural practices associated with the project area, the conversion to residential and commercial land uses, and active vegetation maintenance in upland areas. It is reasonable to assume that during construction and land grading activities, any migratory birds that may be present will relocate out of the project area and into adjacent habitat with minimal disturbance.

To mitigate potential impacts to migratory birds, vegetation clearing will only be allowed to occur after October 31 and before April 1. This restriction period satisfies the “breeding season” for all listed migratory birds except for the Bald Eagle and Rusty Blackbird.

Bald eagles typically live within two and a half miles of a coast, bays, rivers, lakes, or other bodies of water, reflecting the availability of their main food source. They typically nest in large, mature, accessible trees, as well as cliffs and man-made structures in isolated areas. The Rusty Blackbird is commonly found in wet areas, including flooded woods, swamps, marshes, and the edges of ponds. The Rusty Blackbird prefers wetland habitats for foraging in the winter and during migration. During the breeding season, it favors bogs,

beaver ponds, and wet woods in boreal forests. Since the preferred habitat for either species is not found in the project area, it is unlikely they would experience impacts from the Preferred Alternative.

To avoid direct or indirect impacts to migratory birds, habitat disturbance will only be allowed from October 31 to April 1. Disturbance restrictions include no mowing of open grassy fields, no removal of shrubs or other potential nesting structures, and no cutting of trees during the specified time period. The above disturbance restrictions are in place to avoid unintentionally taking migratory birds, eggs, young, or active nests.

Migratory bird impacts are not expected from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative. For a list of migratory birds in the project area and USFWS correspondence, see **Appendix F - Biological Resources**.

3.6 Climate

Climate change and greenhouse gases (GHG) are a growing concern for the aviation industry. The primary source of greenhouse gas emissions at an airport is associated with aircraft operations and the short-term emissions from construction equipment activity.

Research has shown that an increase in GHG emissions is significantly affecting the Earth's climate. These conclusions are based on scientific record that includes substantial contributions from the United States Global Change Research Program (USGCRP), mandated by congress in the Global Change Research Act to "assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change" (USG, 1990).

In 2009, based primarily on scientific assessments of the USGCRP, the National Research Council, the Intergovernmental Panel on Climate Change (IPCC), and the EPA issued a finding deeming it reasonable to assume that changes in climate caused by elevated concentrations of GHG in the atmosphere endanger the health and welfare of current and future generations.² By summer 2016, the EPA acknowledged that scientific assessments by that time "highlight the urgency of addressing the rising concentration of carbon dioxide (CO₂) in the atmosphere" and formally announced that GHG emissions from certain classes of aircraft engines contribute to climate change.^{3,4}

² Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the clean Air Act, 74 Fed. Reg. 66496 (December 15, 2009).

³ USEPA, Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units, 80 Fed. Reg. 64661, 64677 (October 23, 2015).

⁴ USEPA finalized findings that GHG emissions from certain classes of engines used in aircraft contribute to air pollution that causes climate change endangering public health and welfare under section 231(a) of the Clean Air Act.

3.6.1 Affected Environment

The most prevalent GHG from aviation are CO₂, and very small amounts of methane (CH₄), and nitrous oxide (N₂O).⁵ GHG emissions are typically reported in units of metric tons (MT) of carbon dioxide equivalents (CO₂e).⁶

Worldwide emissions of GHG in 2021 were 54.6 billion metric tons of CO₂e per year (Ritchie et al., 2023). In 2016, the United States emitted about 6,340 million metric tons of CO₂e. Total U.S. emissions have decreased by 2.3 percent from 1990 to 2021, and emissions increased from 2020 to 2021 by 5.2 percent (314.3 million metric tons of CO₂e). Between 2020 and 2021, the increase in total greenhouse gas emissions was driven largely by an increase in CO₂ emissions from fossil fuel combustion due to economic activity rebounding after the height of the COVID-19 pandemic (US EPA, 2023).

Of the five major sectors nationwide - residential and commercial, industrial, agriculture, transportation and electricity – transportation accounts for the highest fraction of GHG emissions (approximately 29 percent), closely followed by electricity (approximately 25 percent) and by industry (approximately 24 percent). The most recent EPA data indicate that in 2021, aircraft accounted for 8.6 percent of U.S. transportation GHG emissions (US EPA, 2023).

Although there are no federal standards for aviation related GHG emissions, it is well established that GHG emissions affect climate (FAA, 2007). Following procedures detailed in FAA's 1050.1F Desk Reference, FAA's policy is that GHG emissions should be quantified in a NEPA document when there is reason to quantify emissions for air quality purposes or when changes in the amount of aircraft fuel used are computed/reported.

The study area for reasonably foreseeable direct and indirect climate change impacts potentially resulting from the No Action Alternative and Preferred Alternative is defined in **Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**.

3.6.2 Environmental Consequences

The Council on Environmental Quality (CEQ) has issued interim guidance directing agencies to quantify, disclose and contextualize climate impacts, as well as address the potential climate change effects of the Proposed Action (CEQ, 2023). Since the FAA has not established a significance threshold for Climate impacts, as such, this section quantifies and discloses the potential GHG emissions from the Proposed Action.

⁵ Six GHGs are identified in the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). The later three primary GHGs do occur at airports, but to a far lesser extent, and therefore are not included in the analysis

⁶ CO₂e are calculated as the product of the mass emitted of a given GHG and its specific Global Warming Potential (GWP) While methane (CH₄) and nitric oxides (N₂O) have much higher GWP than CO₂, CO₂ is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO₂e. One ton of CO₂ is equivalent to one ton of CO₂e.

The FAA's AEDT model was used to quantify aircraft CO₂ emissions for years 2019, 2024, and 2029 from implementation of the Preferred Alternative. Analysis found aircraft emissions from construction and operations at AZO would rise to 12,271.4 metric tons in 2024 but decrease after construction to 6,357.5 metric tons of CO₂ per year. In the context of total U.S. emissions, construction and operational emissions in both the direct and indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**) are less than 0.02 percent of the total U.S. emissions.

As previously discussed, to validate the assumptions and data used in evaluating climate impacts, a review was conducted of the trend in actual operations between 2019 and 2023 with the growth rate projected by the forecasts used to develop the climate modeling. This review found that the trend in actual operations between 2019 through 2023 has not yet matched the trend in projected operations. Since actual operations have not exceeded projected operations used in the climate modeling, the climate analysis was found to still be valid.

Construction of the Preferred Alternative and subsequent operational activity in future years at the Airport, relative to aviation throughout the United States, is negligible when compared to overall national aviation activity. Greenhouse gas emissions associated with existing and future aviation activity at the Airport are expected to be an inconsequential contributor of greenhouse gases nationwide.

Climate impacts are expected to be negligible from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative. No mitigation is proposed.

3.7 Department of Transportation Act, Section 4(f)

Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303) requires that the Secretary of Transportation not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction unless there is no feasible and prudent alternative to the use of such land and the program or project includes all possible planning to minimize harm resulting from the use.

3.7.1 Affected Environment

Located north of AZO across I-94 is the Bloomfield Subdivision Historic District, which is a residential neighborhood comprised of 296 single-family residences, 14 commercial buildings, and seven multi-family residential properties. The Bloomfield Subdivision Historic District is eligible for listing in the National Register of Historic Places (National Register) under Criterion A for Community Planning and Development. See **Figure 3.5 Section 4(f) Evaluation Study Area** for an overview of project area including the Bloomfield Subdivision Historic District. This study area is included within the direct study area defined in **Figure 3.1. Direct Study Area**.

The Bloomfield subdivision reflects an important historic trend in Community Planning and Development associated with the southward growth of the Kalamazoo area's residential and industrial areas during the post-World War II (postwar) era. The subdivision was developed as a response to immediate housing shortages following the war, providing housing and a large commercial strip near the new industrial facilities located south of Kalamazoo's central core in the Kalamazoo and Portage Townships, including the

Figure 3.5 Section 4(f) Evaluation Study Area



Source: Google Earth, 2023

Sutherland Paper Company and the Upjohn Company. As one of the earliest postwar subdivisions in this area, the platting and development of the Bloomfield subdivision influenced the platting of other subdivisions nearby, transforming the agricultural landscape between Kalamazoo and Portage into postwar subdivisions. As the largest postwar development—and one of the earliest—constructed as part of the Kalamazoo/Portage area’s significant pattern of development southward from the Kalamazoo central core, the Bloomfield subdivision serves as the best representative subdivision reflecting this important local trend in Community Planning and Development.

3.7.2 Environmental Consequences

The SHPO determined the proposed project will have an adverse effect on the Bloomfield Subdivision Historic District. The proposed action meets the criteria of adverse effect because the undertaking will result in a change of the character of the resource’s use or of physical features that contribute to its historic significance. More specifically, the large-scale removal of mature trees proposed in this area under the Preferred Alternative will result in a drastic alteration that will diminish the integrity of the District’s setting. See **Section 3.10 Historical, Architectural, Archeological, and Cultural Resources** for additional information on historic resources in the project area.

Given that Section 4(f) resources include historic properties listed or eligible for listing in the National Register under the National Historic Preservation Act (NHPA), a Section 4(f) Evaluation and coordination with the U.S. Department of the Interior (DOI) was completed as part of this EA (**Appendix I - Section 4(f) Evaluation**).

Figure 3.5 Section 4(f) Evaluation Study Area shows the location of the Bloomfield Subdivision Historic District, which served as the study area for the Section 4(f) Evaluation. The Section 4(f) Evaluation included an alternatives analysis to determine if there were any feasible and prudent alternatives that avoided the use of the Section 4(f) property. Section 4(f) alternatives included the following:

- No Action Alternative – No Extension of Runway 17/35 or Correction of Taxiway Geometric Deficiencies
- New Location – Build a New Airport at a Different Location
- Alternative Airport – Use Another Airport in the Vicinity
- Alternative 1 – 1,000-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17
- Alternative 2 – 1,150-Foot Extension of Runway 17/35 with a Reconfigured Intersection of Taxiway C and Runway 17 (Preferred Alternative)
- Alternative 3 – 1,000-Foot Extension of Runway 35
- Alternative 4 – 1,000-Foot Extension of Runway 17 with a Reconfigured Intersection of Taxiway C and Runway 17

Based on the Section 4(f) alternatives analysis there were no prudent and feasible alternatives that avoided the use of Section 4(f) property (**Appendix I - Section 4(f) Evaluation**). When there is no prudent and feasible avoidance alternative, the FAA will then analyze the alternatives and select the alternative that

causes the least overall harm in light of Section 4(f)'s preservationist purpose. This is known as "least overall harm analysis."

The least overall harm analysis determined Alternative 2 fully meets the project's purpose and need. The DOI responded to this determination on October 13, 2023, with several recommendations. The recommendations have been incorporated in this EA where appropriate. See **Appendix I - Section 4(f) Evaluation** for the DOI concurrence letter.

To mitigate Section 4(f) impacts, a Memorandum of Agreement (MOA) between the FAA, SHPO, and the Airport is currently being developed (**Appendix G - Historic Resources**). It stipulates that the FAA will ensure the following measures are carried out in order to mitigate harm to the Bloomfield Subdivision Historic District. Mitigation measures include:

- Tree replanting
- Bloomfield Subdivision Historic District research
- Bloomfield Subdivision Historic District history report

See **Section 3.10 Historical, Architectural, Archeological, and Cultural Resources** for details of the mitigation measures included in the MOA document.

Significant impacts to Section 4(f) resources are not expected from implementation of the No Action Alternative.

3.8 Farmlands

The Farmland Protection Policy Act of 1981 (FPPA) described in (7 U.S.C. §§ 4201-4209) was enacted to minimize the extent to which federal actions and programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. Per FPPA, "farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land."

Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Unique farmland is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Any federal action that may result in conversion of farmland to a non-agricultural use requires coordination with the U.S. Department of Agriculture's (USDA) Natural Resource Conservation Services (NRCS).

3.8.1 Affected Environment

A review of protected farmland within the direct and indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**) obtained from the NRCS indicated the presence of farmland classified as "farmland of local importance" at the approach end of Runway 17 and "farmland of local importance"

and “all areas are prime farmland” at the approach end of Runway 35. The U.S. Census Bureau’s Urbanized Area Reference Map for Kalamazoo, Michigan, also shows that AZO is entirely located within the City of Kalamazoo’s “Urbanized Area.”

3.8.2 Environmental Consequences

According to the FPPA, farmland resources located in Urbanized Areas that may be impacted by development projects are exempt from regulatory protection. Specifically, the FPPA exempts farmlands “already in or committed to urban development... [including] lands identified as ‘urbanized area’ on the Census Bureau Map.” Under Part 523, Subpart B of the FPPA, “Lands identified as ‘urbanized area’ on the Census Bureau maps” are not covered by the act.

Farmland within the project study areas is exempt from protection. No mitigation is proposed. See **Appendix J - Farmland** for farmland classification maps and the Urbanized Area Reference Map.

3.9 Hazardous Materials, Solid Waste, and Pollution Prevention

Hazardous materials are substances or materials that have been determined to present an unreasonable risk to health, safety, and property when transported in commerce. Hazardous materials are regulated under several statutes, including the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. §§ 9601-9675), the Resource Conservation and Recovery Act (RCRA) described in 42 U.S.C. §§ 6901-6992k, and the Toxic Substance Control Act (15 U.S.C. §§ 2601-2697). Solid waste is discarded material that falls into specific regulatory definitions; solid waste is regulated under RCRA. Pollution prevention refers to efforts to avoid, prevent, or reduce discharges and emissions of pollutants.

3.9.1 Affected Environment

Several Environmental Site Assessments were conducted as part of this EA to determine the presence of hazardous materials in the both the direct and the indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). These are summarized in the sections below.

Two Phase I Environmental Site Assessments (ESAs)

A Phase I ESA was completed in May 2020 and December 2022 to determine the presence of hazardous materials in the project area. The Phase I ESA focused on areas of potential ground disturbance associated with the Preferred Alternative (i.e., runway extensions, taxiway extension, taxiway realignment, rail spur relocation, and Pfizer property) and consisted of an on-site visual inspection, a driving tour of the vicinity, a review of government agency databases, and a review of historical data. The assessments were completed in conformance with the scope and limitations of ASTM Designation: E 1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, with the purpose being the identification of recognized environmental conditions in connection with AZO property.

The term recognized environmental condition (REC) is defined in ASTM E 1527-13 as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

Additionally, the terms controlled recognized environmental condition (CREC), historical recognized environmental condition (HREC), and de minimis condition are utilized in ASTM E 1527-13 to clarify the determination of recognized environmental conditions. These terms are defined as follows:

- A CREC is “a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.”
- A HREC is “a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.” A historical environmental condition is not currently a recognized environmental condition.
- A de minimis condition is “a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis conditions are not recognized environmental conditions nor controlled recognized environmental conditions.”

Findings and opinions relative to the potential for environmental impact on the subject property by the conditions identified during the assessment were as follows:

- The subject property and surrounding areas historical agricultural use is not anticipated to negatively impact the subject property. Although the historic agricultural utilization of property can result in application of pesticides that do not degrade over time, it is reasonable to assume that pesticides, when applied for their intended purpose in accordance with label directions, have a low potential for environmental impact and do not represent RECs. Additionally, in row-crop productions, application rates are typically smaller, and periodic plowing would increase soil contact with pesticide residues, therefore accelerating the decomposition of pesticide residues.
- Based on their regulatory status, distance from the subject property, and/or their hydrogeologic relationship, the adjacent properties and facilities identified in the regulatory database report have a low potential for environmental impact to the subject property and do not represent RECs.
- Surficial staining observed in parking areas is considered to be a de minimis condition.
- During the site reconnaissance, concrete debris was observed on Pfizer property intermixed with soil near the east edge of the Upjohn Pond. The nature, extent and location of the various construction projects is undocumented, the miscellaneous concrete and soil mixture represents a REC.
- A portion of a coal pile is located on the west side of the Pfizer property near the train spur. The coal pile is located on both concrete (small portion of the pile) and bare soil (majority of the pile), and coal has been stored in this area for over 50 years. The operation of the coal pile in this location represents a REC.
- The D&A Autobody property is located outside and upgradient of Pfizer property. This Autobody property is listed as being in Interim Response in progress, which means initial actions have been

taken to reduce risks from the release, but the site has not been remediated. This type of operation uses petroleum products and solvents, which are mobile in groundwater. Based on the nature of the materials used in daily operations, the site being located upgradient, and that the site has not been closed, D&A Autobody represents a REC.

The two Phase I ESAs identified three RECs and no HRECs or CRECs in connection with the subject property. The Phase I ESA reports are found **Appendix K - Hazardous Materials**.

Limited Asbestos Containing Materials and Lead Paint Survey

A qualified environmental consultant conducted a Limited Asbestos Containing Materials and Lead Based Paint Survey in October 2019. The purpose of the inspection was to determine the presence of asbestos containing materials (ACMs) and lead based paint at existing FAA-owned NAVAIDs structures that are proposed for demolition under the Preferred Alternative. The report conforms to the requirements of the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP). The hazardous materials identified during the survey, as well as conclusions and recommendations, are summarized below.

Asbestos Containing Materials

Laboratory analyses of all the surveyed materials were reported as "No Asbestos Detected."

Lead Based Paint

Three FAA-owned NAVAIDs structures/components were identified as coated with paint containing lead at concentrations greater than 0.5 percent lead by weight. The EPA and U.S. Department of Housing and Urban Development (HUD) define lead-based paint as that which contains equal to or in excess of 0.5 percent lead by weight.

For details on the Limited Asbestos Containing Materials and Lead Based Paint Survey, see **Appendix K - Hazardous Materials**.

Limited Phase II Site Investigation

In October 2019, a Limited Phase II ESA, in conformance with the American Society for Testing and Materials (ASTM) International E 1903-11 Standard Guide for Environmental Site Assessments: Phase II Environmental Assessment Process, was completed. The report focused on the southeast portion of the project area where the Norfolk Southern rail spur is proposed for realignment as well as for several FAA-owned NAVAIDs structures/components proposed for demolition. The scope of work included the completion of five (5) soil borings and two (2) temporary well points on land where the rail spur is to be relocated and surface soil sampling at four (4) FAA structures and one (1) transformer.

The soil samples collected were analyzed for volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by Method 8270, total petroleum hydrocarbons – gasoline and diesel range organics by Method 8015, organochlorine pesticides, polychlorinated biphenyls (PCBs), and RCRA 8 metals by Method 6010B/7470. Ground water samples were analyzed for VOCs, SVOCs, PCBs, and RCRA 8 metals. Soil samples near the FAA structures and transformer were analyzed for VOCs and PCBs.

When analytical results were compared with applicable standards under EGLE, these were the conclusions of the Phase II ESA:

- All chemicals of concern are below applicable EGLE Generic Cleanup Criteria and Screening Levels (GCCSL) Non-residential Soil Direct Contact Criteria in all soil borings.
- No VOCs or PCBs were above laboratory detection limits in the soil samples near the FAA structures and transformer.
- All chemicals of concern are below the potentially applicable EGLE GCCSL Drinking Water Criteria for non-residential areas.

Based on the findings of the investigation, no further investigation or plan notes for construction or excavation activities were recommended. See **Appendix K - Hazardous Materials** for the full Phase II ESA report.

Environmental Monitoring Wells on Airport Property

The Airport also has various existing and proposed ground water monitor wells on their property to assess and evaluate the presence of Per- and polyfluoroalkyl substances (PFAS) and other contaminants (**Figure 3.6 Monitoring Wells**). In addition to PFAS the following substances are being continually monitored:

- | | | |
|--------------------------|----------------------|-------------------------|
| • Tetrachloroethene | • 1,1-Dichloroethene | • Chloromethane |
| • Trichloroethene | • 1,1-Dichloroethane | • Vinyl chloride |
| • cis-1,2-Dichloroethene | • Chloroethane | • 1,1,1-Trichloroethane |

3.9.2 Environmental Consequences

The FAA has not established a significance threshold for hazardous waste, solid waste, or pollution prevention. However, the FAA 1050.1F Desk Reference offers guidance to consider whether the proposed project could:

- Violate any laws or regulation regarding hazardous waste
- Involve a contaminated site
- Produce an appreciable amount or type of hazardous waste
- Generate an appreciably different quantity or type of solid waste that could exceed local capacity or use different methods of collection and disposal and/or would exceed local capacity
- Adversely affect human health and the environment

Best Management Practices (BMPs) during construction are required for any removal or clearing of the identified RECs within the project area. A Phase II ESA for the RECs was not recommended.

Figure 3.6 Monitoring Wells



Source: ERM, 2022

While there is no known hazardous waste contamination within the project area, construction activities associated with the Preferred Alternative have the potential to create solid waste material (excavated soil, remnant concrete, etc.). The contractor will be required to have a Spill Prevention, Control, and Countermeasure (SPCC) plan in place to be implemented if a spill occurs during construction operations. An approved erosion control plan is also required to provide a collection area for non-recyclable waste. Any waste generated through proposed project improvements will be disposed of in compliance with all federal, state, and local regulations.

All work procedures impacting or disturbing the structures/components coated with lead-based paint need to be performed by all contractors/workers in accordance with Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulations (CFR) 1926.62 lead exposure in construction. It is recommended that all contractors that impact painted building materials perform personal air monitoring on their employees to ensure that they are not being exposed to lead above the Action Level (AL) or Permissible Exposure Limit (PEL) or maintain a negative exposure assessment.

Although monitoring wells are found on Airport property, initial findings indicate they are outside the limits of construction and will not be impacted by the proposed project. If during final design a well is determined to require relocation, coordination with the Airport and EGLE will determine if relocation or closure is the appropriate course of action.

Hazardous material impacts are not expected from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative.

3.10 Historical, Architectural, Archeological, and Cultural Resources

Historical, architectural, archeological, and cultural resources include a variety of sites, properties, and facilities related to activities and societal and cultural institutions. Such resources express past and present elements of human culture and are important to a community. Section 106 of the National Historic Preservation Act (NHPA, 54 U.S.C. § 300101) requires federal agencies to consider the effects proposed federal actions may have on these properties.

According to FAA Order 1050.1F Desk Reference, Section 106 of the National Historic Preservation Act of 1966, as amended, focuses on a specific subset of historical, architectural, archeological, and cultural resources: those properties that are listed on or meet the eligibility criteria for the National Register. Under Section 106, an agency is responsible for taking into account the effects of undertakings on historic properties and affording the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on such undertakings. See FAA Order 1050.1F Desk Reference, Para. 8.1.1., p. 8-5 – 8-6.

3.10.1 Affected Environment

A Section 106 Report was completed for the Area of Potential Effect (APE), which included areas that could potentially be impacted by the proposed extension of Runway 17/35 and Taxiway C realignment project at the Airport. The APE (found in **Appendix G - Historic Resources**) included the Bloomfield Subdivision Historic District (District), 24 parcels north and south of the Airport, areas directly impacted by proposed

tree removals, the rail spur realignment, and installation of new lighting for the runway extension, including Pfizer property. Consideration was also given to indirect effects where the project may have physical, visual, and auditory impacts off Airport property. The evaluation of noise impacts on cultural resources were limited to changes in noise levels within the 65 DNL noise contour.

Field survey and research efforts determined the District was the only historic property located within the APE (**Figure 3.7 Historic District Area of Potential Effect**). For a description of the District, see **Section 3.7 Department of Transportation Act, Section 4(f)**. See **Appendix G - Historic Resources** for the full Section 106 Report.

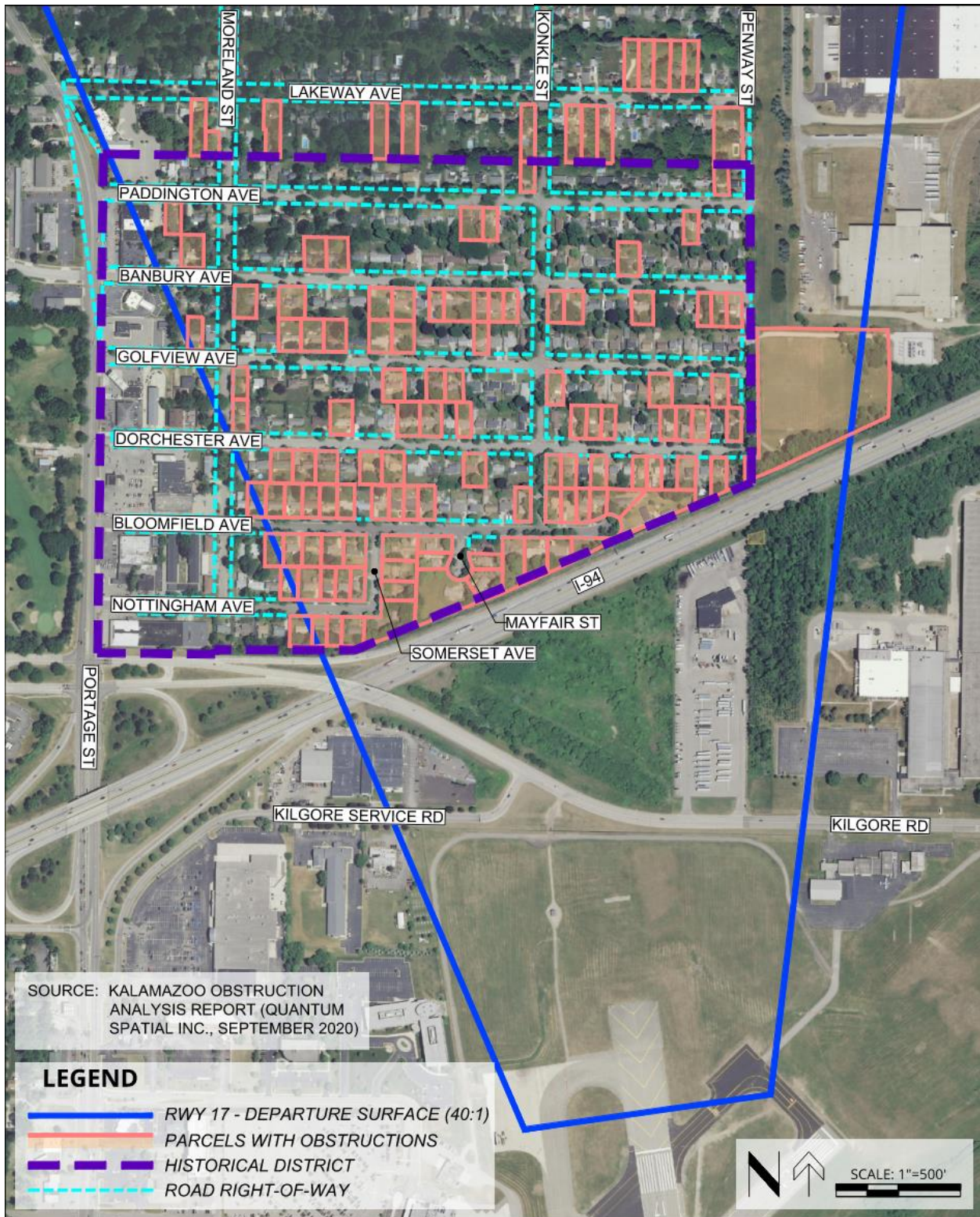
3.10.2 Environmental Consequences

The Section 106 Report recommended one historic property located within the APE: the District, A post-World War II (postwar) residential subdivision located in the Milwood neighborhood north of the Airport property eligible for listing in the National Register. The District was found to be significant under National Register Criterion A as the best representation of a planned subdivision reflective of the important southward growth trend in the Kalamazoo/Portage area during the postwar era. On January 26, 2022, the SHPO concurred with Section 106 findings that the District is eligible for individual listing in the National Register and determined that project activities would result in an adverse effect to the historic property.

Under Section 106 regulation—36 CFR Section 800.5(a)(1)—“adverse effects” occur when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the National Register. The proposed project includes the removal or partial removal (tree trimming) of select trees within the District. These trees are located within tree lawns, within front yards where some blocks have trees planted in rows behind the sidewalk, or within private residential backyards. An analysis of the project activities under the Criteria of Adverse Effects determined the proposed tree removals will alter the historic setting of the District and result in an adverse effect. The applicable example of adverse effect is example (iv): *Change of the character of the property’s use or physical features within the property’s setting that contribute to its historic significance*. More specifically, the large-scale removal of mature trees will result in a change that will diminish the integrity of the property’s setting.

In order to resolve adverse effects under 36 CFR 800.6, consultation was required with interested parties to develop a MOA that will mitigate adverse effects to the proposed historic District. A Section 106 Case Study (Study) was prepared that outlined the adverse effect to the District and provided a history of consultation with SHPO, the Advisory Council on Historic Preservation (ACHP), and project stakeholders. Interested parties were invited to participate in the development of alternatives to avoid adverse effects and identify mitigation measures to include in a MOA. The Study and the MOA are found in **Appendix G - Historic Resources**.

Figure 3.7 Historic District Area of Potential Effect



Source: Mead & Hunt

The Study identified the following measures to mitigate impacts to the Historic District, which served as the basis for the MOA. The MOA is between the FAA, SHPO, and the Airport and stipulates that the FAA will ensure the following are carried out in order to mitigate for impacts to the District:

- **Tree Replanting:** This measure would mitigate adverse effects to the District through a tree-for-tree replacement program proposed for removal, replacing them with a lower-growing species.
- **Research Sharing:** This consists of packaging and sharing digital copies of research materials on the local development history of the Bloomfield Subdivision with the City of Kalamazoo and the Kalamazoo County Historical Society, to benefit each entity's respective historic preservation mission.
- **Local History Report:** Some project stakeholders responded favorably to a narrative history of the District. This report would be distributed to property owners and the City of Kalamazoo to assist with the Kalamazoo County Historical Society historic preservation efforts.

Based on the information above, it is concluded that the Preferred Alternative will have an adverse effect on the District due to the proposed tree removals. The impacts will be mitigated through the measures outlined in the MOA. No impacts to the District will result from the implementation of the No Action Alternative.

3.11 Land Use

As described in 1050.1F Desk Reference, "Section 1502.16(c) of the CEQ regulations requires the discussion of possible conflicts between the proposed action and the objectives of federal, state, regional, and local land use plans, policies, and controls for the area concerned. Where an inconsistency exists, the EA document should describe the extent to which the agency would reconcile its proposed action with the existing land use plan." The FAA also requires airport operators to ensure that actions are taken to establish and maintain compatible land uses around their airports.

3.11.1 Affected Environment

AZO has worked diligently to protect both its users and those who live and work in the surrounding region through a variety of land use and zoning controls. Planning and zoning around AZO falls under the jurisdiction of both the City of Kalamazoo and the City of Portage, both of which have their own planning commissions that regulate zoning and land use.

Along its northern boundary, AZO is bordered by Kilgore Road and I-94, with dense residential and commercial development north of Kilgore Road and I-94. To the east, AZO is bordered by a Norfolk Southern Railroad line, which separates AZO property from areas to the east that are zoned Light Industry, Mobile Home Community, and Residential – Multi-Dwelling. The Norfolk Southern Railroad line passes a Mann+Hummel automobile air filtration manufacturing facility located near the southeast corner of AZO property and then terminates at a Pfizer Pharmaceutical manufacturing facility that, along with Romence Road, borders AZO to the south. Undeveloped land owned by Kalamazoo County and Pfizer is located southwest of AZO property adjacent to East Mastenbrook Drive. To the west of Kalamazoo County's undeveloped parcel are the Air Zoo and a Kenco Logistic Services distribution and assembly plant. Portage Road runs in a north-south direction along AZO's western boundary, with commercial development located

on both sides of the road. Residential neighborhoods are located to the west of the commercial parcels along Portage Road.

As shown on the future land use maps for the City of Kalamazoo (**Figure 3.8 City of Kalamazoo Future Land Use**) and City of Portage (**Figure 3.9 City of Portage Future Land Use**), the future land uses surrounding AZO in both jurisdictions are predominantly industrial, commercial, and business and compatible with the proposed project. Although some residential land uses are adjacent to the Airport, they are not anticipated to change because of the Preferred Alternative.

The FAA also provides specific guidance related to land uses within a RPZ of a runway end. A RPZ is a trapezoidal shaped area beyond a runway end with the purpose of protecting pilots as well as individuals and property on the ground. The FAA encourages airports to control the land within an RPZ and clear the areas of incompatible objects and activities if possible. FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, states that, *It is desirable to clear the entire RPZ of all above-ground objects. Where this is impractical, airport owners, at a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities.* Consultation with the FAA was completed to evaluate potential RPZ impacts from the proposed project. For more details, see **Appendix C - RPZ Analysis**).

3.11.2 Environmental Consequences

The FAA has not established a significance threshold for land use, or factors to consider when determining significance of a project's effect on land use; however, to determine the potential for land use impacts caused by the Preferred Alternative and No Action Alternative, an evaluation of the proposed action and its compatibility with local land use controls and plans was completed.

No land use classification changes would occur with the Preferred Alternative or the No Action Alternative. No noise sensitive areas (residential, educational, health, religious, park or recreational, wildlife refuges, or cultural and historical) will be introduced or impacted.

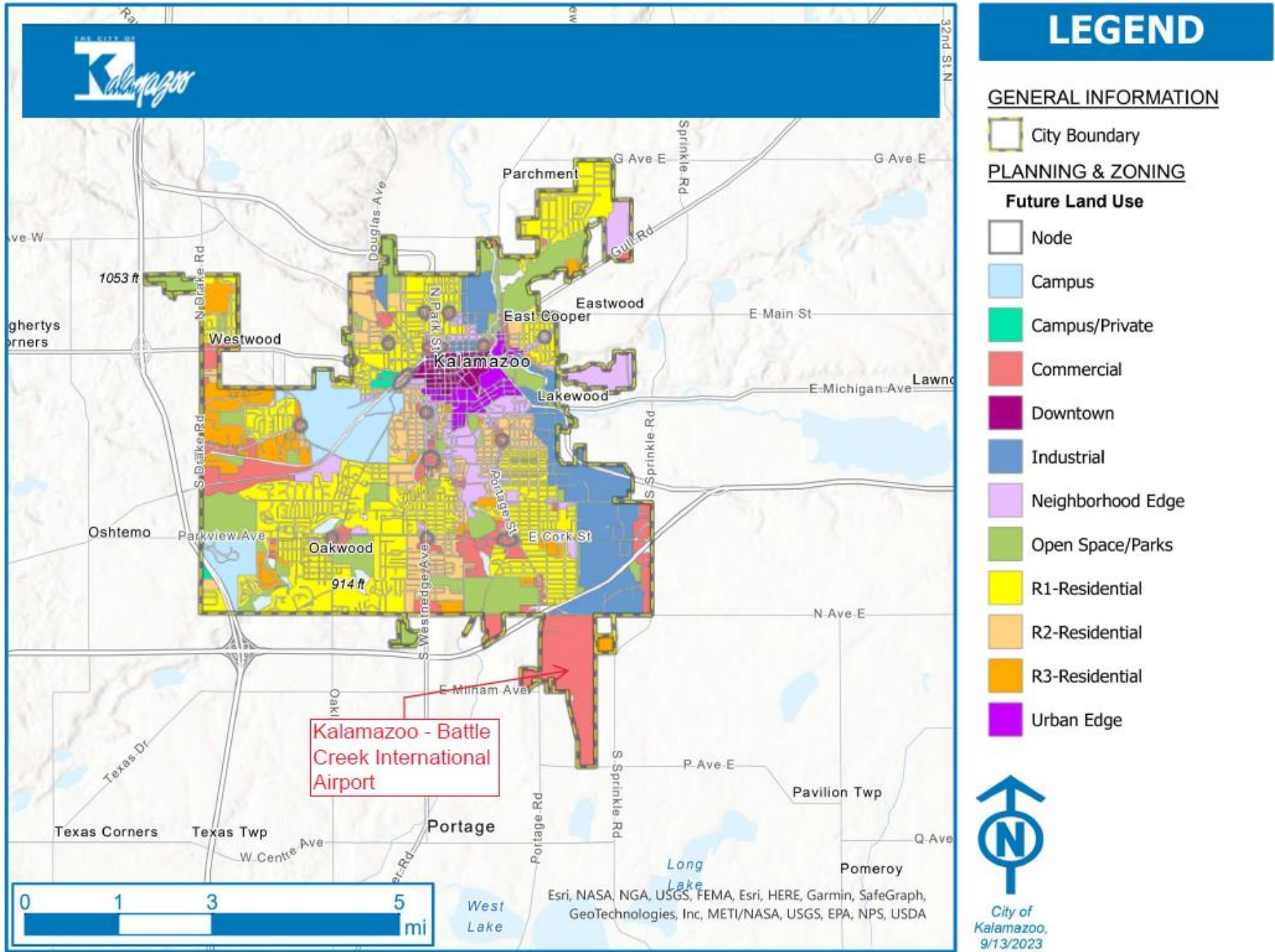
The relocated Runway 17 RPZ would introduce a new incompatible land use as a portion of the I-94 right-of-way (ROW) is located within the outer edge of the relocated RPZ. Although the existing I-94 ROW is within the relocated RPZ, the expressway itself is outside the new RPZ.

With the 1,000-foot extension of Runway 35, the new RPZ extends off airport property and onto Romence Road and Pfizer-owned property. The primary incompatible land use within the new RPZ is existing Romence Road. On-airport perimeter access and future service roads for the Runway 35 approach lighting system would be located within the shifted RPZ as would a contractor vehicle parking lot for the Pfizer manufacturing facility. The Preferred Alternative requires the acquisition of new easements over these land uses. See **Appendix L - Property Impacts** for a map of expected easements in the project area.

The existing Norfolk Southern rail line would also be within the relocated Runway 35 RPZ and would need to be relocated outside the new RPZ.

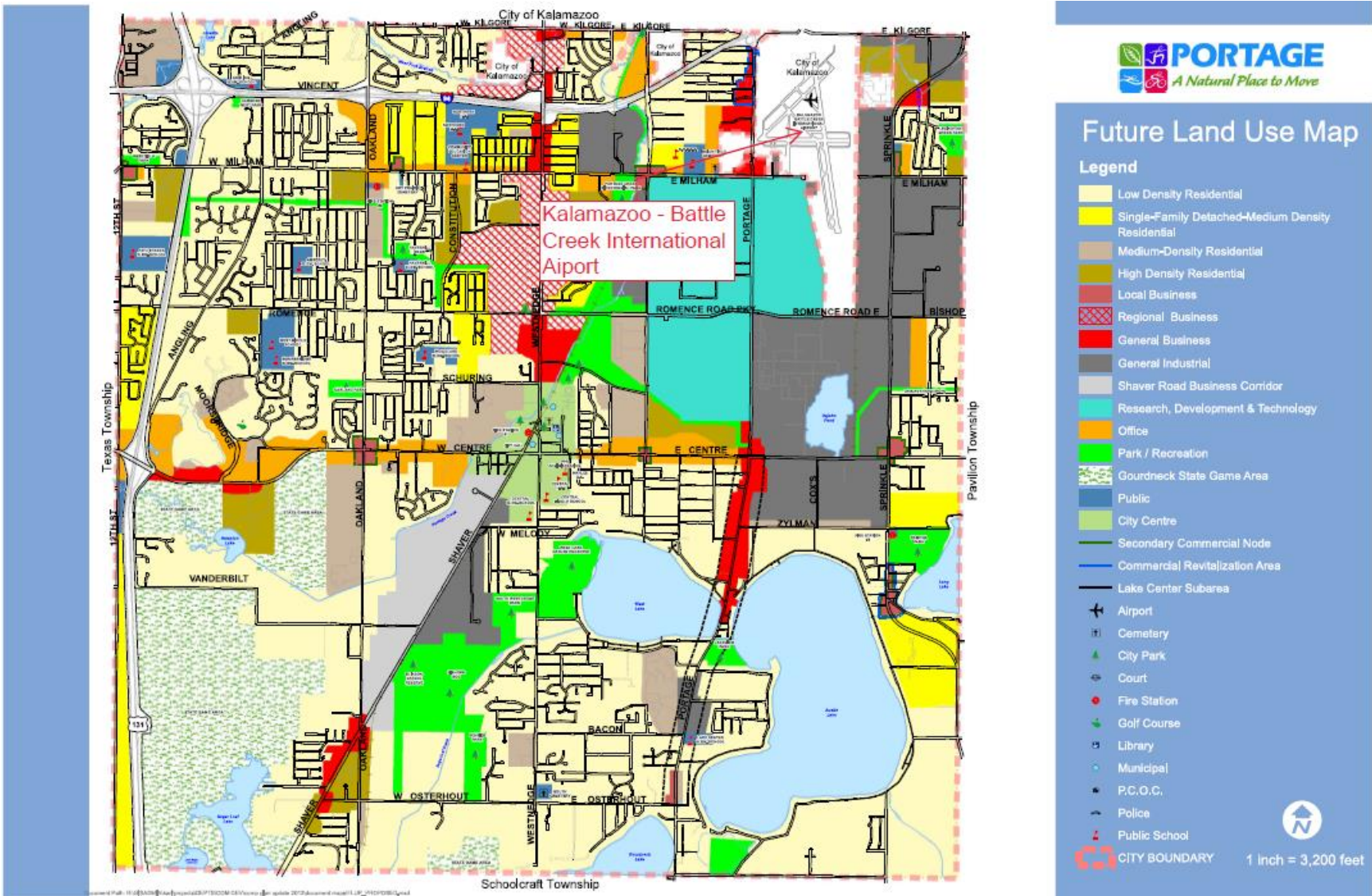
Significant land use and RPZ impacts are not expected from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative.

Figure 3.8 City of Kalamazoo Future Land Use



Source: City of Kalamazoo

Figure 3.9 City of Portage Future Land Use



Source: City of Portage

3.12 Natural Resources and Energy Supply

Executive Order 13834, Efficient Federal Operations directs projects to examine the potential changes in the demand for energy or natural resources that would have a significant measurable effect on local supplies due to the implementation of the Preferred Alternative or the No Action Alternative. Energy requirements associated with an airport usually fall into two categories: (1) those which relate to changed demands for stationary facilities and (2) those which involve the movement of air and ground vehicles. Examples of these include airfield lighting, terminal building heating and cooling systems, and aircraft and passenger vehicles.

As described in 1050.1F Desk Reference, 40 CFR § 1502.16(e)(f) of the CEQ regulations, federal agencies require energy requirements, natural depletable resource requirements, and the conservation potential of alternatives and mitigation measures to be evaluated in National Environmental Policy Act (NEPA) documents. Though specific significance thresholds for natural resource consumption and energy supply have not been established by the FAA, the proposed action should be examined for the potential to cause demand to exceed available or future supplies of these resources.

FAA guidance typically states that airport improvement projects do not generally increase the consumption of energy or natural resources to the point that significant impacts would occur unless it is found that implementation of a proposed project would cause demand to exceed supply.

3.12.1 Affected Environment

The facilities at the Airport require electricity and natural gas for lighting, cooling/heating, and operations. The area around the Airport as shown in **Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area** is considered a suburban area with adequate access to natural resources for aircraft operations and construction projects as well as meeting the needs of the surrounding community.

3.12.2 Environmental Consequences

Electric or gas use required to operate AZO facilities is not expected to substantially increase because of the proposed project. A small amount of increased energy consumption may result from additional runway and taxiway lighting to support the extensions of Runway 17/35 and Taxiway B and the realignment of Taxiway C; however, the amount is expected to be negligible since light-emitting diode (LED) runway and taxiway lights will be installed along the runway extensions and taxiway realignment. Aircraft will be required to taxi a slightly longer distance to and from the Runway 17/35 ends due to the runway extensions and taxiway realignment, but a substantial increase in fuel consumption is not anticipated.

The Preferred Alternative will not require the consumption of petroleum-based fuels or other natural resources in quantities that would surpass available supply. BMPs to reduce energy consumption during construction will be employed, where applicable. To reduce energy consumption associated with the temporary use of excavators and vehicles for the Preferred Alternative, construction equipment should be in good working order to ensure the most efficient use of fuel. All vehicles and equipment should be checked for leaks and repaired immediately.

The nature of the project does not lend itself to significant increases in energy or natural resources beyond temporary energy consumption associated with construction of the Preferred Alternative. A slight increase in energy use can be expected with the additional runway and taxiway lighting fixtures and longer aircraft taxiing distance, but the increase is negligible.

Natural resources and energy supply impacts are not expected from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative.

3.13 Noise and Noise Compatible Land Use

FAA Order 1050.1F Desk Reference states “compatibility of existing and planned land uses with proposed aviation actions is usually determined in relation to the level of aircraft noise,” which is the definition of compatible land use applied to this analysis. See FAA Order 1050.1F Desk Reference, Ch. 11, p. 11-1. An FAA noise analysis primarily focuses on how proposed airport actions would change the cumulative noise exposure of individuals to aircraft noise in areas surrounding an airport.

Noise is considered unwanted sound that disturbs or interrupts routine activities. Aviation noise includes sounds made by aircraft during departure, arrival, flight, taxiing, and other activities. The compatibility of land use around an airport is typically determined based on the level of aircraft noise. The degree of annoyance to which people suffer from aircraft noise varies depending upon their activities at any given time.

The FAA uses the DNL as its primary noise metric to determine the cumulative noise energy exposure of individuals to noise resulting from aviation activities. DNL accounts for the levels of aircraft events, the number of times those events take place, and the timeframe in which they occur (day or night). An action’s noise impacts are considered significant under FAA Order 1050.1F if they result in a noise increase of “DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.” See FAA Order 1050.1F Desk Reference, Ch. 11, p. 11-10.

Noise sensitive areas typically include residential, educational, health, religious structures and sites, parks, recreational areas, wilderness areas, wildlife refuges, and cultural and historical sites. In the context of airport noise, such facilities, or areas within the 65 DNL contour, may be considered a noise sensitive land use.

The AEDT is the FAA-approved software system that dynamically models aircraft performance in space and time to produce noise estimates. AEDT is designed to estimate the long-term effects of noise using average annual input conditions. The AEDT model requires a variety of operational related inputs to model the noise environment around an airport. Common noise modeling inputs include:

- Aircraft Activity Levels
- Aircraft Fleet Mix
- Runway Utilization

- Time of Day
- Surrounding Terrain
- Flight Tracks

3.13.1 Affected Environment

To evaluate potential noise impacts from the proposed project, noise modeling was developed for the base year (2019) and for future years 2024 (5-year) and 2029 (10-year) for the No Action Alternative and the Preferred Alternative. See **Appendix M - Noise and Vibration Analyses** for details of the noise modeling including the 65 DNL contour map for all modeling years.

As previously mentioned, 2019 data was used because it was the most recent calendar year in which a full 12 months of historical data was available at the time the EA was initiated. Specific modeling scenarios included:

- Baseline (2019)
- 5 Year (2024) – No Project (No Action Alternative)
- 5 Year (2024) – With Project (Preferred Alternative)
- 10 Year (2029) – No Project (No Action Alternative)
- 10 Year (2029) – With Project (Preferred Alternative)

As with the air quality analysis, to validate the assumptions and data used as part of the original noise modeling, a review was conducted of the trend in actual operations between 2019 and 2023 with the growth rate projected by the forecasts used to develop the noise analysis. This review found that the trend in actual operations between 2019 through 2023 has not yet matched the trend in projected operations. Since actual operations have not exceeded forecasted operations and are not expected to through 2029, the noise analysis was found to still be valid. Thus, a reevaluation of the noise analysis was not needed.

Noise sensitive land uses (residential neighborhoods) exist near the project study area, predominantly to the north, west, and east of the Airport (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). However, no noise sensitive land uses were found within the 65 DNL.

Other land uses adjacent to the Airport (commercial, industrial, and office/research facilities) are not considered noise-sensitive and were not considered for noise impacts. See **Section 3.11 Land Use** for maps of the land uses surrounding the Airport.

In addition to the aircraft noise analysis, a railroad relocation noise and vibration impact assessment was prepared in accordance with Title 49 Code of Federal Regulations (CFR) 1105 and with the Federal Transit Administration (FTA) guidance manual Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, September 2018 (FTA Manual). The assessment examined the potential for noise and vibration impacts from the relocation of the existing Norfolk Southern rail spur. The noise and vibration assessment described the existing noise environment and evaluated the potential impacts the railroad relocation might have on noise sensitive land uses within 100 feet of the centerline of the relocated railroad.

3.13.2 Environmental Consequences

The aircraft noise analysis found that the 65 DNL contour remains completely within AZO owned property or property owned by Norfolk Southern Railroad under all noise scenarios (2019, 2024, 2029). Under the 2024 and 2029 noise scenarios, the 65 DNL extends slightly off Airport property onto railroad ROW at the southern end of the project area. However, railroad ROW is not considered a noise sensitive land use. No noise sensitive land uses including residential areas are located within the 65 DNL.

Noise impacts on noise sensitive land uses within the 65 DNL are not expected. See **Appendix M - Noise and Vibration Analyses** for details on the noise modeling including inputs, methodology, and noise contour maps under different modeling scenarios.

In addition to the 65 DNL noise contour, a 60 DNL contour was also included in the analysis to determine potential noise impacts from the proposed project even though the 65 DNL is the standard metric used for determining impacts. Analysis found that the 60 DNL improved with the construction of the Preferred Alternative under all modeling scenarios when compared to the No Action Alternative. The reasoning for this is the Preferred Alternative extends Runway 17/35 an additional 1,000 feet to the south. Aircraft will begin their departures farther south away from residential areas and will be at higher elevations when flying over residential neighborhoods; thus, noise will be reduced on noise sensitive locations with the Preferred Alternative.

The noise and vibration assessment did not identify any sensitive land uses within the 100-foot screening distance of the centerline of the proposed railroad relocation, which meant no additional analysis was necessary.

Temporary noise impacts may occur due to operations of heavy equipment during construction. Construction staging areas are not allowed near sensitive land uses. Minimal noise increases from construction may occur but are temporary in nature and will be eliminated once construction is complete. The closest noise sensitive land use (residential) is approximately 2,000 feet from where any construction is proposed.

Based on these findings, significant noise and vibration impacts are not expected from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative. No mitigation is proposed. See **Appendix M - Noise and Vibration Analyses** for details on the aircraft noise modeling and the railroad noise and vibration assessment.

3.14 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

Statutes related to socioeconomic impacts include the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (42 U.S.C. § 61 et seq.). Environmental justice (EJ), as defined by the EPA, is the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation." Title VI

of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d-2000d-7), Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, and other federal guidance have been issued to address EJ and children’s environmental health and safety risks.

Airport development projects can impact the socioeconomic conditions of the surrounding community (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). Such projects have the potential to impact neighboring populations, including children. The proposed project was evaluated for socioeconomic and EJ impacts as well as health and safety risks to children.

3.14.1 Socioeconomic Impacts

The types of socioeconomic impacts that can arise from airport development projects include:

- Relocation of residences, businesses, or farms
- Alteration of surface transportation patterns that may restrict community access
- Disruption of established communities
- Disruption of orderly, planned development
- Creation of appreciable changes in employment

3.14.1.1 Affected Environment

Table 3-4 Major Employers lists important employers in Kalamazoo County and the approximate number of people employed. The County’s major employers and industry are not expected to be adversely impacted by the proposed action and may benefit from access to an improved airport facility and additional development opportunities in the area. In addition, no appreciable changes in employment in the County are anticipated.

Table 3-4 Major Employers		
Company/Organization	Principal Product or Service	Approximate Number of Employees
Bronson Healthcare Group	Health Care	5,900
Western Michigan University	Education	4,237
Stryker Corporation	Medical Equipment	3,300
Pfizer Corporation	Pharmaceuticals	2,200
Kalamazoo Public Schools	Education	1,800
Borgess Medical Center	Pharmaceuticals	1,400
Meijer, Inc.	Retail Goods	1,200
Kalamazoo Valley Community College	Education	1,100
Portage Public Schools	Education	1,000
Parker Hannifin Corporation	Aerospace and Aircraft Components	1,000

Source: City of Kalamazoo, *Michigan Annual Comprehensive Financial Report, Year Ended December 31, 2022*

As previously noted, the Airport is approximately three miles southeast of downtown Kalamazoo. An estimated 28 percent of the total population of Kalamazoo County lived in the City of Kalamazoo in 2020, while an estimated 19 percent lived in the City of Portage. **Table 3-5 Surrounding Area Population 2010-2020** presents a summary of the population in the City of Kalamazoo, the City of Portage, and Kalamazoo County from 2010 to 2020.

Table 3-5			
Surrounding Area Population, 2010-2020			
Geographic Area	2010	2020	Percentage Change
City of Kalamazoo	74,262	73,598	-0.9%
City of Portage	46,292	48,891	5.6%
Kalamazoo County	250,331	261,670	4.5%

Source: U.S. Census Bureau

According to data from the U.S. Bureau of Economic Analysis, total employment in Kalamazoo County in 2021 was 154,941 jobs and per capita personal income was \$58,524. Gross domestic product for the County in 2021 was \$1,594,645,500. The three largest industries were health care and social assistance (22,700 individuals employed); manufacturing (20,500 individuals employed); and retail trade (15,800 individuals employed).

Kalamazoo County had approximately 114,800 housing units in 2022 with 63.7 percent of those units being owner occupied. According to data from Zillow.com, the average home value grew from \$196,200 in 2020 to \$243,900 in 2022, representing a 24.3 percent increase. Property values in Kalamazoo County have been following the national trend and increasing sharply over the past few years.

3.14.1.2 Environmental Consequences

No residential, business, or farm relocations will be required as part of this proposed project. Most development will take place on existing AZO property, except for the relocation of the Norfolk Southern rail spur on Mann+Hummel and Pfizer property. Coordination has occurred with both entities and no objections have been received. No other alteration of surface transportation patterns, community disruptions, or disruptions of orderly, planned development is expected.

Obstruction removals and new avigation easements for properties in the 40:1 approaches of both runway ends are proposed. Avigation easements purchase the right to control the height of objects on the property and include the right to remove objects that penetrate various approach surfaces and can limit certain incompatible land uses. In the example of a tree, it is usually most desirable to remove the tree to ground level to avoid any future growth.

Where avigation easements are not currently in place, they will be obtained prior to tree clearing activities. It should be noted that current obstruction/tree data is based on 2020 aerial surveys. Obstruction data will be reverified before the easement acquisition process begins and may include additional tree removals. See **Appendix L - Property Impacts** for a map of expected easements in the project area including descriptions of obstructions and the easement process.

Property owners within the Bloomfield Subdivision Historic District with trees on their property that are considered obstructions to the Runway 17 40:1 approach will receive a one-time replacement with a low-growing species to help mitigate tree impacts to their property. Specific mitigation and tree species will be determined during final design in coordination with the property owner, the FAA, and the Airport. See **Section 3.10 Historical, Architectural, Archeological, and Cultural Resources** and **Appendix G - Historic Resources** for additional information on impacts and proposed mitigation for the Bloomfield Subdivision Historic District.

No significant socioeconomic impacts from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative are expected.

3.14.2 Environmental Justice

The purpose of Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, is to identify, address, and avoid disproportionately high and adverse human or environmental effects on minority and/or low-income populations. EJ is defined as the right to a safe, healthy, productive, and sustainable environment for all, where “environment” is considered in its totality to include the ecological, physical, social, political, aesthetic, and economic environments.

EO 14096, "Revitalizing Our Nation's Commitment to Environmental Justice for All," was enacted on April 21, 2023. EO 14096 on EJ does not rescind EO 12898, which has been in effect since February 11, 1994, and is currently implemented through DOT Order 5610.2C. This implementation will continue until further guidance is provided regarding the implementation of the new EO 14096 on EJ.

The FAA 1050.1F, Desk Reference also suggests the following factors as an example of the magnitude to consider when analyzing typical EJ impacts. The factors to consider that may be applicable to EJ include, but are not limited, to a situation in which the proposed action or alternative(s) would have the potential to lead to a disproportionately high and adverse impact to an EJ population, i.e., a low-income or minority population, due to:

- Significant impacts in other environmental impact categories; or
- Impacts on the physical or natural environment that affect an EJ population in a way that the FAA determines is unique to the EJ population and significant to that population.

3.14.2.1 Affected Environment

In compliance with Executive Order 12898, U.S. Census data was reviewed to determine the characteristics of people living in the direct and indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). Based on 2020 Census data, the racial composition of the state of Michigan, Kalamazoo County, City of Kalamazoo, and City of Portage is predominantly White/Caucasian. Black/African American residents account for the second largest racial group in the state, county, and City of Kalamazoo, while residents of races other than White/Caucasian, Black/African American, and Asian comprise the second largest racial group in the City of Portage (**Table 3-6 Racial Diversity**).

Table 3-6 Racial Diversity		
Geographic Area	2020 Population	Percent
State of Michigan		
Asian	334,300	3.3%
Black/African American	1,376,579	13.7%
White/Caucasian	7,444,974	73.9%
All Other	921,478	9.1%
Total	10,077,331	100.0%
Kalamazoo County		
Asian	7,042	2.7%
Black/African American	30,352	11.6%
White/Caucasian	197,010	75.3%
All Other	27,266	10.4%
Total	261,670	100.0%
City of Kalamazoo		
Asian	1,617	2.2%
Black/African American	17,102	23.2%
White/Caucasian	44,382	60.3%
All Other	10,497	14.3%
Total	73,598	100.0%
City of Portage		
Asian	2,244	4.6%
Black/African American	2,549	5.2%
White/Caucasian	39,775	81.4%
All Other	4,323	8.8%
Total	48,891	100.0%

Source: U.S. Census Bureau – 2020 Census

As shown in **Table 3-7 2021 Median Household Income**, the annual median household income (in 2021 dollars) of the state of Michigan (\$63,202) is higher than Kalamazoo County (\$61,739) and the City of Kalamazoo (\$44,296) but lower than the City of Portage (\$68,755). According to data available from the EPA's Environmental Justice Screening and Mapping Tool (EJScreen), the percentage of low-income population within the Milwood Subdivision located immediately north of AZO is 27 percent.

Table 3-7 2021 Median Household Income	
Geographic Area	Median Income
State of Michigan	\$63,202
Kalamazoo County	\$61,739
City of Kalamazoo	\$44,296
City of Portage	\$68,755

Source: U.S. Census Bureau QuickFact

3.14.2.2 Environmental Consequences

For a proposed action to be considered an EJ impact, the action must demonstrate that minority or low-income populations will be impacted disproportionately when compared to other populations affected by the action. There is no potential for disproportionately high and adverse impacts to an EJ population because FAA has found:

- There are no significant impacts in other environmental categories; and
- There are no impacts on the physical or natural environment that affects an environmental justice population in a way that is unique to the environmental justice population and significant to that population.

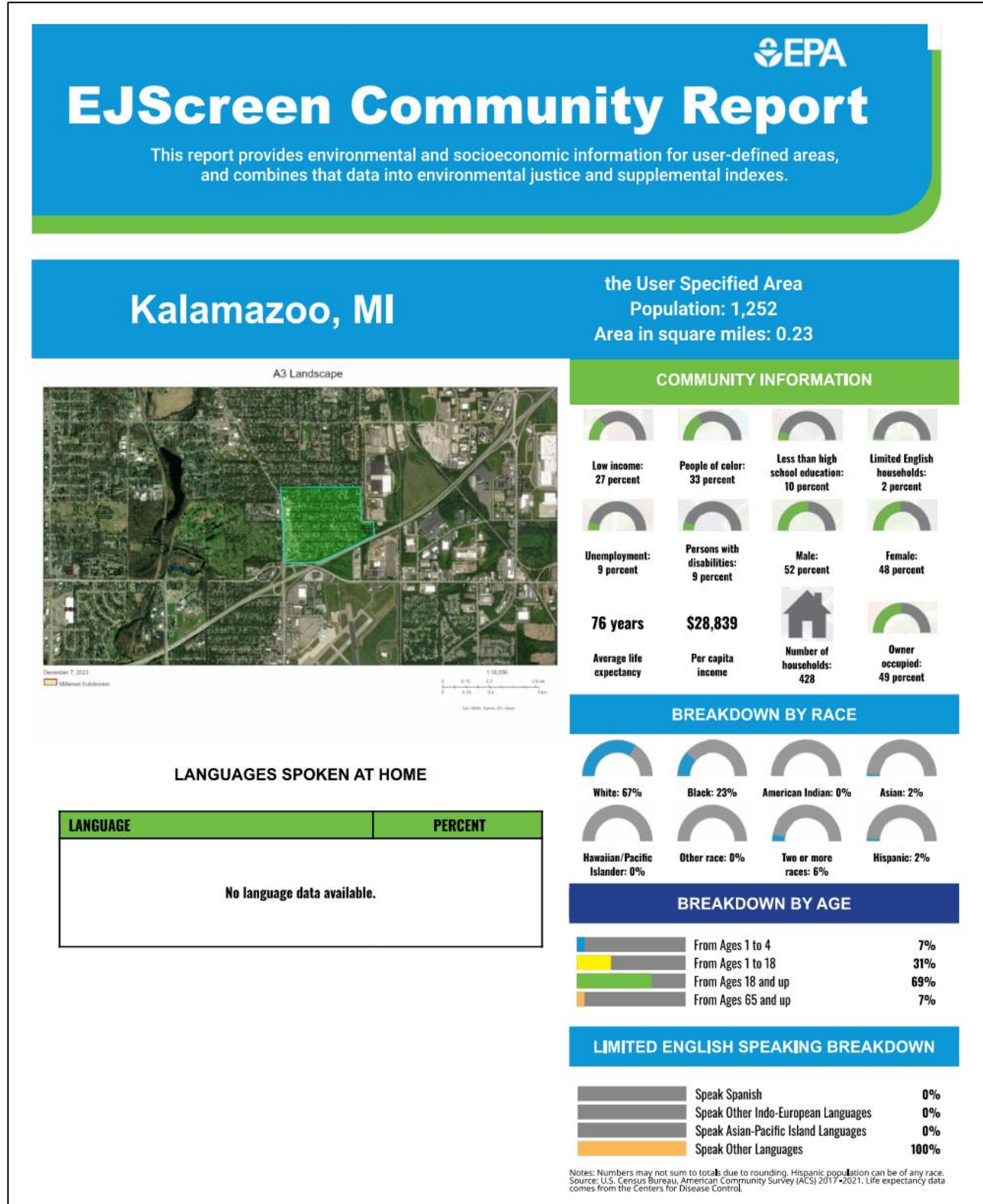
The EPA's EJScreen was also used to assess the potential for EJ impacts from the proposed project. The analysis focused on the Milwood Subdivision since it is the only residential area within the project area. Other land uses within the project area consist of commercial and industrial properties. As shown in **Figure 3.10 EJScreen Community Report – Milwood Subdivision** obtained from the EJScreen, 33 percent of the population in the Milwood Subdivision is comprised of people of color, who are assumed to be minorities. In addition, 27 percent of the population is low income. Based on this data, minority or low-income populations will not be disproportionately impacted by the proposed action.

3.14.3 Children's Environmental Health and Safety Risks Impacts

FAA Order 1050.1F requires the identification of any potential environmental health risks to children as stated, "Environmental health risks and safety risks include risks to health and safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to."

The FAA has not established a significance threshold for impacts to children's environmental health and safety; however, an analysis should include determining a proposed action's potential to cause disproportionate health or safety risks to children.

Figure 3.10 EJScreen Community Report – Milwood Subdivision



Source: USEPA Environmental Justice Screening and Mapping Tool

3.14.3.1 Affected Environment

Although all construction under the proposed action would occur on AZO-owned property or property zoned commercial or industrial, tree removals are proposed in the Milwood Subdivision (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). The Milwood Subdivision contains residential populations including children. According to EPA EJScreen, 31 percent of the Milwood Subdivision is under the age of 18 (**Figure 3.10 EJScreen Community Report – Milwood Subdivision**).

3.14.3.2 Environmental Consequences

In most cases, the significance of impacts to children's environmental health and safety is dependent on the significance of impacts in other environmental categories. Impacts from the proposed action to other resource categories are not considered significant. Areas affected by the Preferred Alternative do not include schools or other facilities that would otherwise be primarily accessed by children. Under the Preferred Alternative, there are no significant impacts to air quality or noise that may influence the health of the surrounding population, including children. No disproportionate health or safety risks to children are expected.

Children's Environmental Health and Safety Risks impacts from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative are not anticipated. No mitigation is proposed.

3.15 Visual Effects

Airport lighting is required for security, obstruction identification, and navigation. The essential lighting systems required to safely operate an airport and its components can contribute to light emissions. When projects introduce new or relocated existing airport lighting facilities that may affect residential or other light-sensitive areas in proximity to an airport, an analysis of these impacts is necessary.

A project can also have impacts on the surrounding area's visual resources and character. These impacts are typically related to a decrease in the aesthetic quality of an area resulting from development, construction, or demolition. FAA guidance states that an analysis of visual impacts is necessary when the proposed action would affect, obstruct, substantially alter, or remove visual resources including buildings, historic sites, or other landscape features, such as topography, water bodies, or vegetation, that are visually important or have unique characteristics.

3.15.1 Affected Environment

The Preferred Alternative will require some additional runway and taxiway lighting fixtures and the relocation of existing NAVAIDs (PAPIs, REILs, and MALSR) as part of construction. New or relocated lighting infrastructure includes:

- Relocation of PAPI lights
- Relocation of REILs
- Relocation of the MALSR

- Taxiway lights for a realigned Taxiway C
- Runway and taxiway lights to match the Runway 17/35 and Taxiway B extensions

The Milwood neighborhood located approximately 0.3 miles north of the Airport is the only light-sensitive resource in the direct or indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). All other areas are considered commercial or industrial and are not subject to light-sensitive emission impacts.

3.15.2 Environmental Consequences

Although the proposed action would extend Runway 17 approximately 150 feet closer to the Milwood neighborhood, the end of Runway 17 would still be approximately 0.3 miles from any residential properties or light-sensitive resources. Located between the end of Runway 17 and the Milwood neighborhood is I-94, a major six-lane freeway with an annual average daily traffic volume of approximately 63,000 vehicles, according to data from the Michigan Department of Transportation. Immediately south of I-94 is an unmaintained vacant area (approximately 12 acres) with scattered clusters of trees and bushes, which act as a visual shield for residential homes. In addition, evening and nighttime runway lights are controlled by pilots and normally turned off unless needed by operating aircraft. No light sensitive land uses were identified in the Runway 35 viewshed.

Although the proposed project will remove existing trees, primarily at the approach end of Runway 17, impacts on resources that are visually important or have unique characteristics are not anticipated.

Visual effects from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative are not anticipated. No mitigation is proposed.

3.16 Water Resources

FAA Order 1050.1F references the Clean Water Act (CWA) described in 33 U.S.C. §§ 1251-1387, which provides the federal government with the authority to regulate activities related to water quality, including controlling discharges, preventing or minimizing loss of wetlands, and protecting local aquifers or sensitive ecological areas. In essence, the quality of surface water and groundwater should not be degraded by the planned construction or operations associated with a proposed development.

Water resources are surface waters and groundwater that are important to the ecosystem and the human environment. Analysis of water resources includes checking for disruption as well as changes in quality. Because wetlands, floodplains, surface waters, groundwater, and other water resources are all connected within the overall system, this section encompasses an analysis of each.

3.16.1 Wetlands

Wetlands are areas that support specific vegetation due to inundation or saturation by ground water. Sometimes these are called swamps, marshes, or bogs. Wetlands provide benefits to the natural and human environments that include habitat, water filtration, storage, and recreation. There are several statutes, regulations, orders, and other requirements related to wetlands. The CWA regulates the discharge

of pollutants into Waters of the U.S. (including wetlands) and establishes a program to regulate discharge of fill material into such waters as well as requires projects not to violate water quality standards.

Surface waters or wetlands considered jurisdictional are regulated under the CWA; however, not all surface waters are under the authority of the CWA. The United States Army Corps of Engineers (USACE) makes jurisdictional determination case by case. Non-jurisdictional wetlands are protected under Presidential Executive Order 11990, Protection of Wetlands, commonly known as the “No Net Loss” Executive Order. This Executive Order directs any project that uses federal funds or is federally approved to mitigate for all wetland impacts that it causes regardless of size or regulatory status. Therefore, any wetland impacts as a result of the Preferred Alternative will require mitigation.

3.16.1.1 Affected Environment

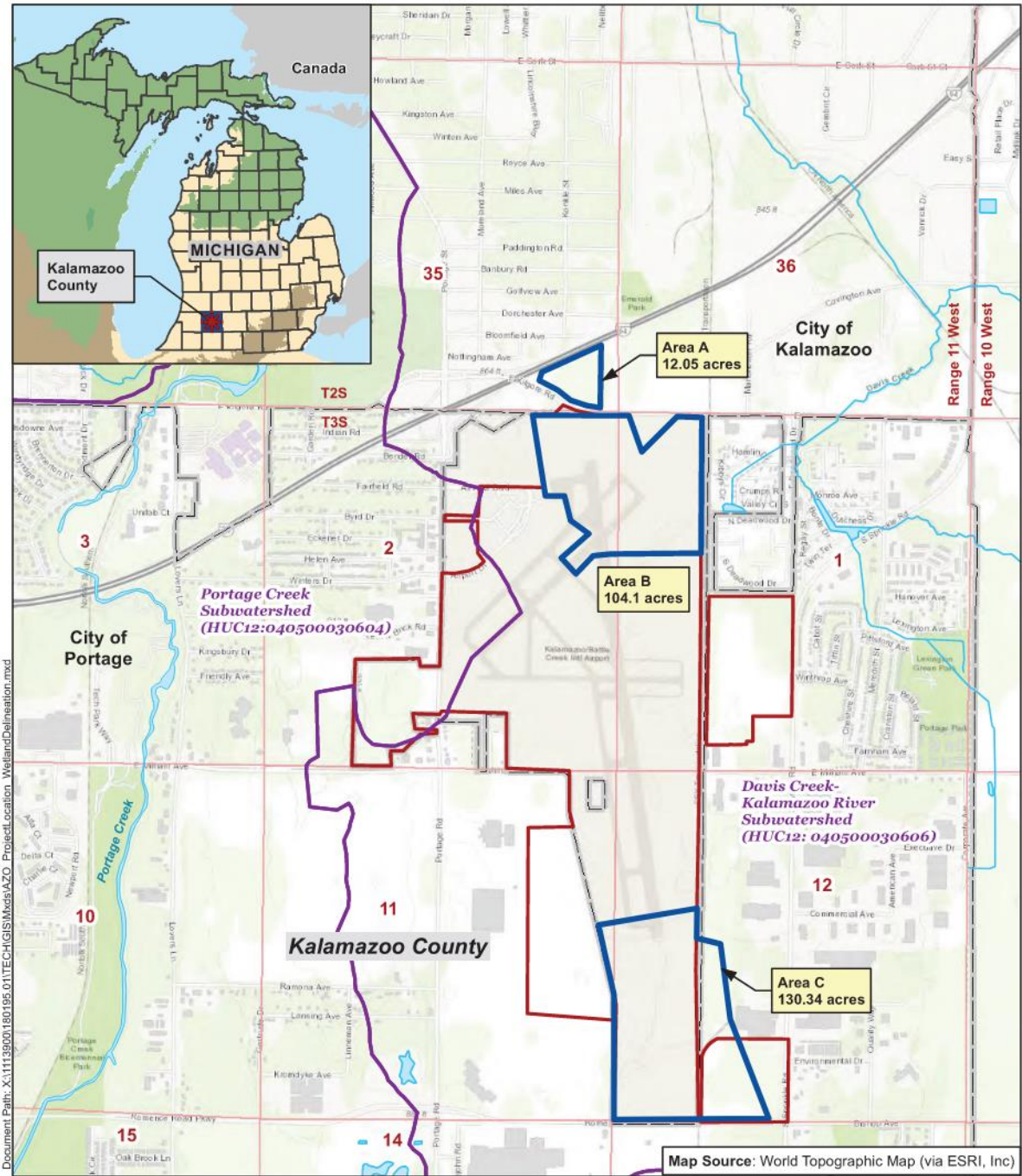
To meet regulatory requirements, two separate wetland delineations to determine the locations and limits of area wetlands, appraise their types and functions, and evaluate potential impacts from the proposed project were completed for the direct and indirect study areas (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**).

The first delineation was completed by Mead & Hunt and evaluated the project area north of Romence Road. Golder Associates completed the second delineation and assessed the project area south of Romence Road on Pfizer property. Both delineations were USACE compliant and performed by qualified wetland biologists within a total 323.38-acre Area of Interest (AOI) in April, June, and August 2019. All wetland delineations conformed to the Routine Onsite Method of the *1987 U.S. Army Corps of Engineers’ (USACE) Wetland Delineation Manual*, as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*. Both wetland delineation reports are in **Appendix N - Water Resources**.

The AOI north of Romence Road was split into three sections situated at the runway ends: Area A is 12.05 acres, Area B is 104.1 acres, and Area C is 130.34 acres (**Figure 3.11 Area of Interest North of Romence Road**). Seven wetlands totaling 4.006 acres were identified within the northern AOI. The AOI south of Romence Road was 76.98 acres and included three wetland complexes totaling 6.563 acres (**Figure 3.12 Area of Interest South of Romence Road**).

At the time of field work, many areas within both AOIs had been mowed, with adequate regrowth observed, making vegetation identifiable in most cases. A total of 10 separate jurisdictional wetland complexes totaling 10.569 acres were delineated within the overall project area (north and south of Romence Road) as shown on **Figure 3.13 Wetland Resources Map North of Romence Road** and **Figure 3.14 Wetland Resources Map South of Romence Road**.

Figure 3.11 Area of Interest North of Romence Road



Project Location
 Kalamazoo/Battle Creek
 International Airport

0 500 1,000 2,000 Feet

Legend

- Area of Interest (AOI)
- Approximate Airport Property Boundary
- HUC 12 Watershed
- Section Line
- City Boundary

LRR SUBREGION

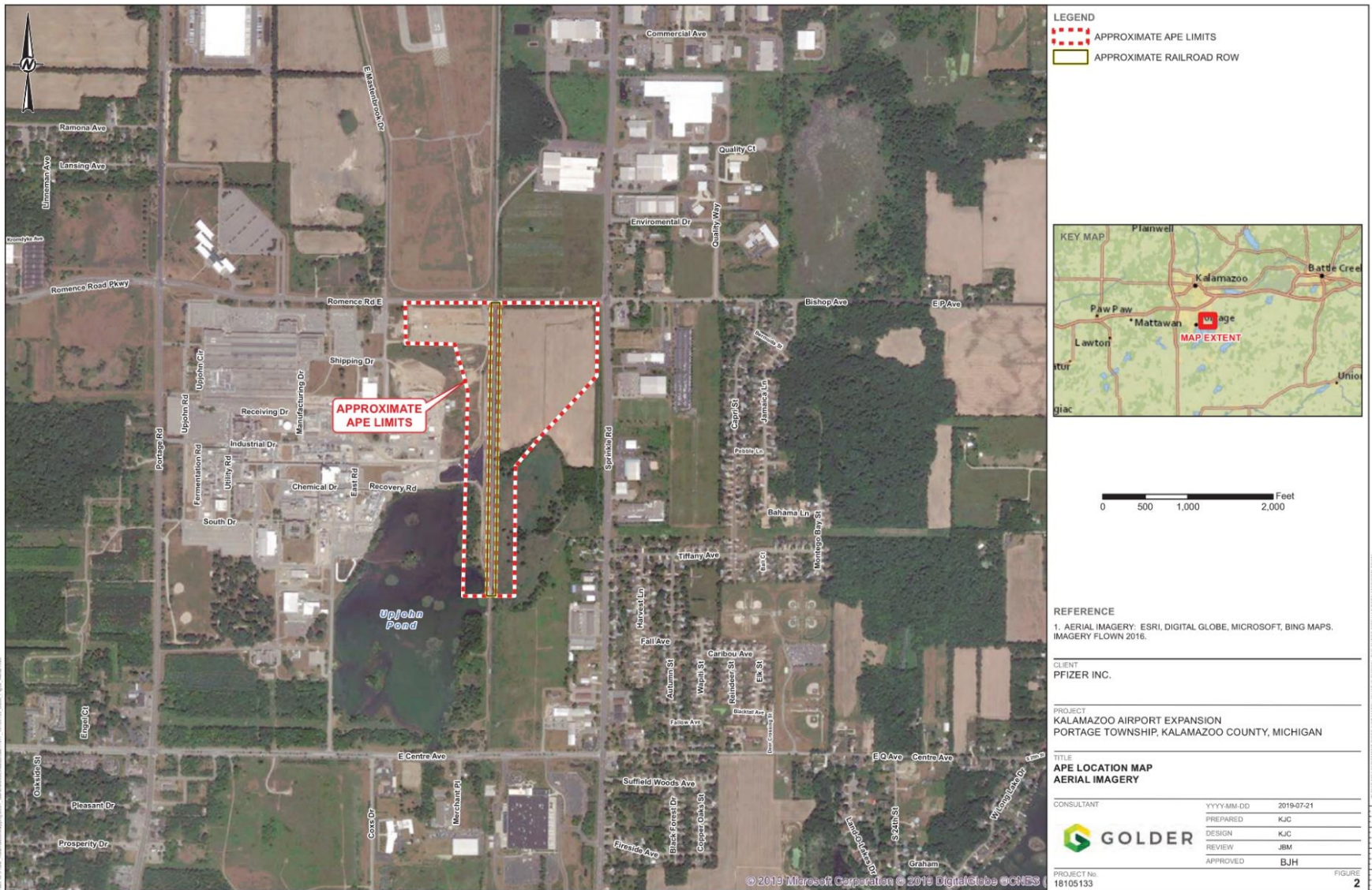
- K
- L
- M

Project Information

T3S, R11W, Sections 1, 2, 11, and 12
 T2S, R11W, Section 35
 City of Kalamazoo
 Kalamazoo County, MI
 LRR subregion: L
 USACE Regional Supplement: NC/NE
 Area of Interest = 246.4 acres
 Field work conducted: June 6 - 7, 2019
 and August 19 - 21, 2019

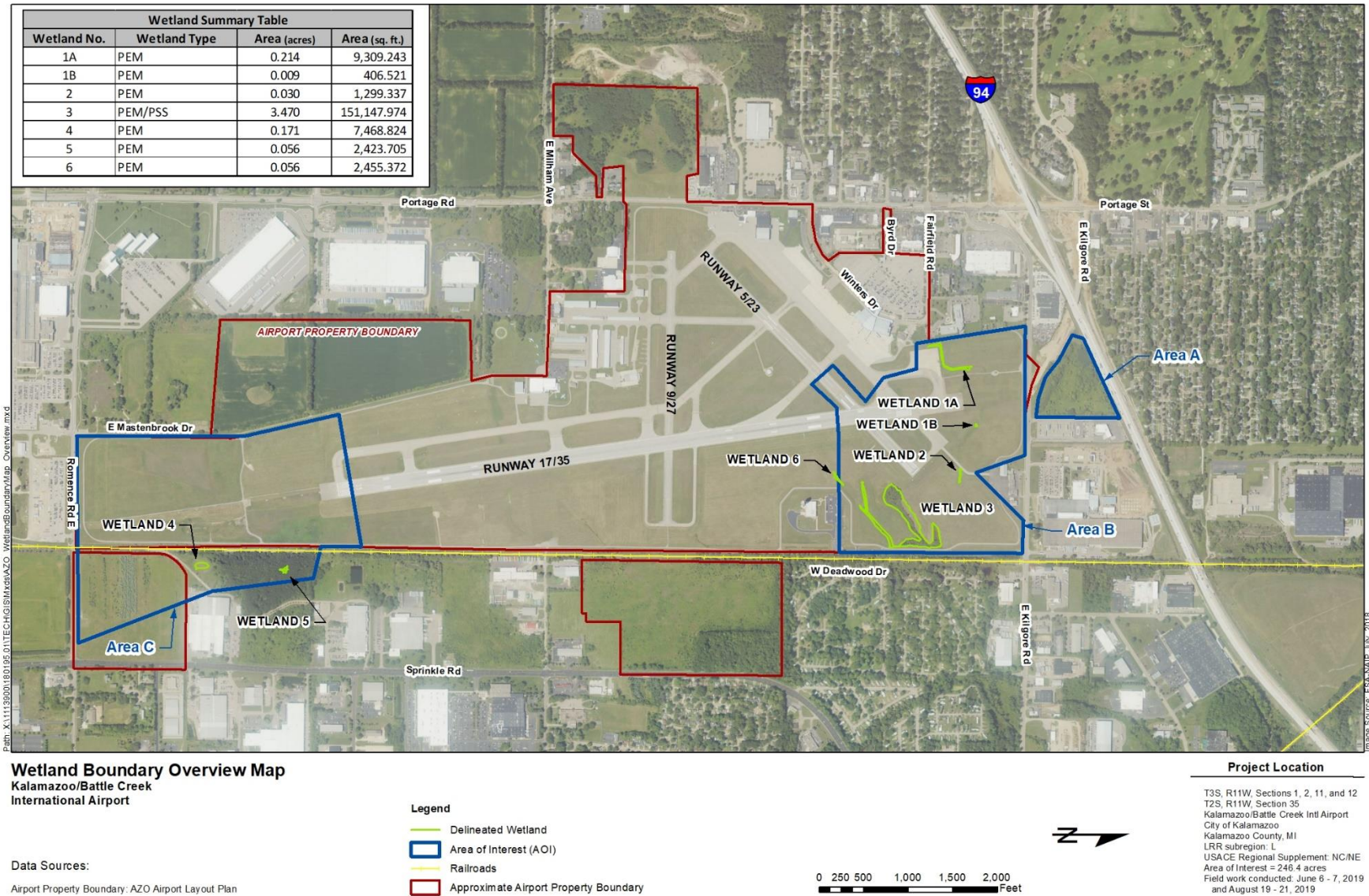
Source: Mead & Hunt Wetland Delineation Report, June 2020

Figure 3.12 Area of Interest South of Romence Road



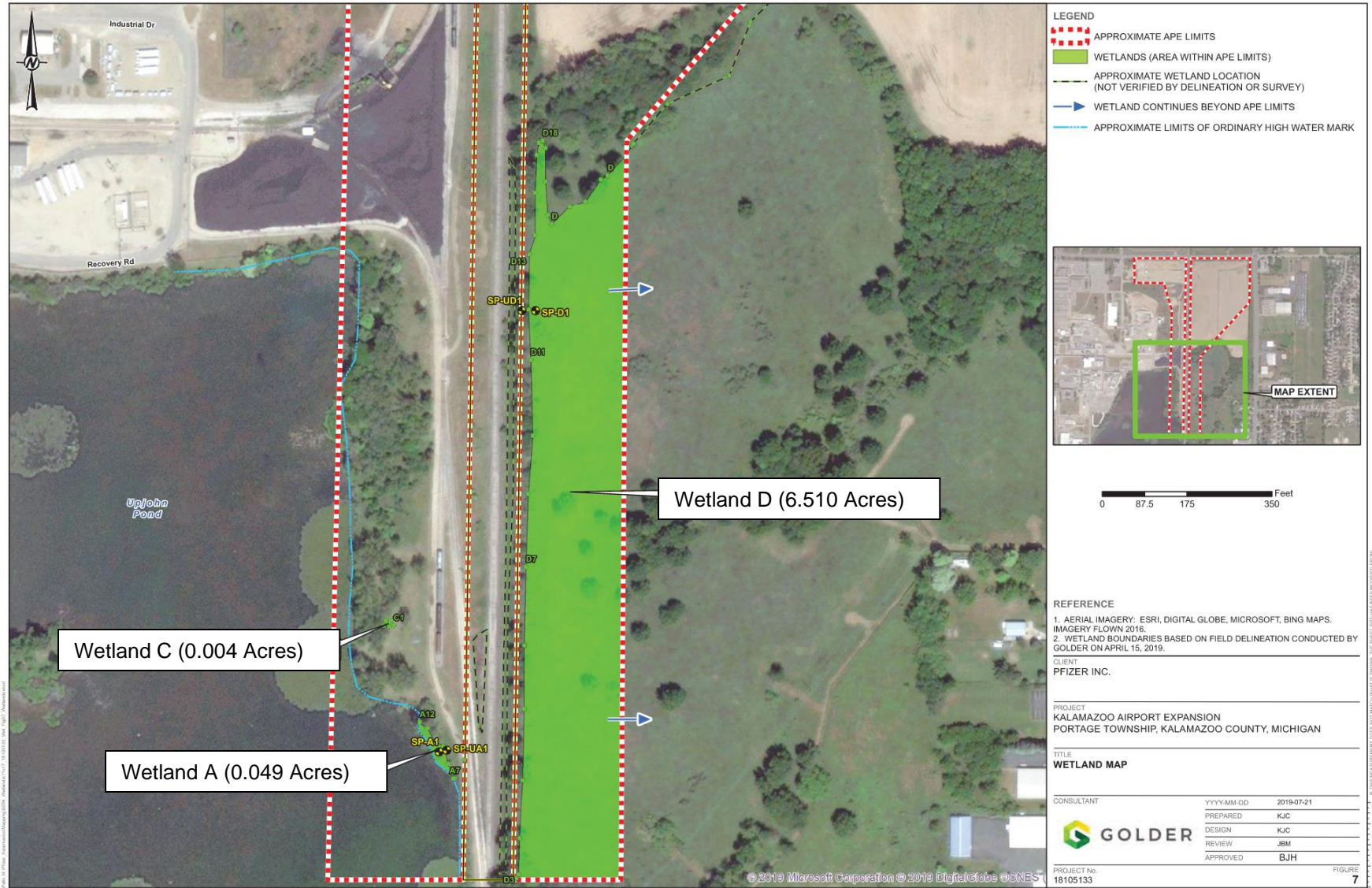
Source: Golder Associates General Biotic Resources Evaluation, October 2019

Figure 3.13 Wetland Resources Map North of Romence Road



Source: Mead & Hunt Wetland Delineation Report, June 2020

Figure 3.14 Wetland Resources Map South of Romence Road



Source: Golder Associates General Biotic Resources Evaluation, October 2019

Wetland Descriptions North of Romence Road

As shown on **Figure 3.13 Wetland Resources Map North of Romence Road**, Wetland 1A (0.214 acres) is a long swale adjacent to a section of closed pavement near the Runway 17 end. Saturation and drift deposits were noted at the wetland sampling point. The swale topography continues further north to a vacated culvert. This area was dry and appeared to be inactive.

Wetland 1B (0.009 acres) appears to be connected to Wetland 1A via a culvert that runs under the Runway 17 runway safety area. The end of the culvert is rip-rapped and dominated by reed canary grass and purple-stem aster.

Wetland 2 (0.030 acres) is a narrow, steep-sided (3- to 4-foot deep) ditch with culverts at either end. The double 24-inch culverts on the west side drain under the taxilane; the eastern culvert likely connects to the culvert draining to the area of Wetland 3. Hydric soils were verified, and saturation was present at the surface.

Wetland 3 (0.3.470 acres) is a large wetland complex with multiple drainageways carrying flows from the airfield under the perimeter road and off Airport property to the east. Standing water was observed throughout the wetland. The North drainage was dominated by blunt spike rush and woolgrass. The larger central drainage was covered by shrubs and black willow trees with some mature cottonwoods. Standing water was seen through this part of the wetland. The Southern drainage is a narrow swale fed by a large culvert at the western end that contained standing water throughout and a diverse mix of herbaceous wetland vegetation.

Wetland 4 (0.171 acres) is a detention area located west of the Mann+Hummel building. A culvert feeds this area from the southeast. Slopes were quite steep on grades as much as 30 percent on the east, south, and west sides. The north side was somewhat flatter. Vegetation was dominated by cattails, common spike rush, and sandbar willow. Standing water was seen throughout the wetland.

Wetland 5 (0.056 acres) is a small depression within a large, wooded expanse located between the railroad and the Mann+Hummel building. The area is now covered by cherry, pokeweed, and burnweed. Within Wetland 5, dead and stressed cherry trees were observed. No evidence of hydrological inputs from culverts was found and no wetland hydrology was observed or indicated in other parts of the wetland.

Wetland 6 (0.056 acres) is a shallow swale in the lowest topographic area of a depressional landform just east of a culvert exiting from the airfield. No hydrological connection to this culvert was observed due to the fairly steep topography. Flows from the culvert eventually reach the South drainage of Wetland 3. This area also collects surface runoff from the surrounding landform. The wetland vegetation was dominated by reed canary grass, spotted lady's-thumb, and straw-color flat sedge. The area is regularly mowed.

Wetland Descriptions South of Romence Road:

As shown on **Figure 3.14 Wetland Resources Map South of Romence Road**, Wetland A (0.49 acres) consisted of seasonally inundated and saturated emergent (wet meadow) and scrub-shrub habitat along the edge of Upjohn Lake. Vegetation was characterized by black willow, sandbar willow, and other willows, common reed, blue joint grass, and sedges. Soil in the wetland was saturated to the surface with a water table present at about 3 to 6 inches below the ground surface. Wetland A receives surface water runoff

from adjacent uplands and overflow from Upjohn Pond during periods of high water. Excess water from Wetland A flows into Upjohn Pond when water levels in the pond are lower than the wetland.

Wetland C (0.004 acres) consisted of seasonally saturated, emergent habitat formed in a small basin in historically filled ground. There was no appreciable vegetation in the wetland (a small, sparsely vegetated concave surface). Soil in the wetland was saturated to the surface or inundated with up to about six inches of water. Wetland C receives surface water runoff from adjacent uplands. There was no readily apparent location from which surface water flows out of Wetland C, although it appeared that excess surface water from Wetland C would flow into Upjohn Pond during periods of unusually heavy rainfall.

Wetland D (6.510 acres) consisted of seasonally inundated and saturated emergent (wet meadow) habitat with some trees and shrubs along the edges. Vegetation was characterized by willows and common reed. Soil in the wetland was saturated to the surface or inundated with one or more inches of water. Some parts of the wetland were inundated with 12 or more inches of water. Wetland D receives surface water runoff from adjacent uplands and Upjohn Pond, as evidenced by a culvert and sluice gate near the south end of the AOI. Based on visual observations, it appeared that the water level in Upjohn Pond is higher than the water level in Wetland D and that the sluice gate is periodically opened to flood parts of Wetland D with one or more feet of water.

There was no readily apparent location from which surface water flows out of Wetland D. Wetland D is part of a larger wetland complex greater than five acres in size (historically part of Upjohn Pond and adjacent wetlands) that extends beyond the AOI limits. Wetland areas that are separated by man-made features, such as roads, railroads, dikes, and levees are considered part of the same wetland complex when determining overall wetland size and connectivity.

3.16.1.2 Environmental Consequences

Of the 10.569 acres delineated within the overall project area (north and south of Romence Road), a total of 0.40 acres are expected to be impacted by the construction of the Preferred Alternative (Wetlands 1A, 4, and 5 found north of Romence Road).

Proposed mitigation for wetland impacts is expected to include an EGLE Part 303 Wetland Protection permit and mitigation of 0.60 acres (1:1.5 ratio). Mitigation will include the purchase of wetland credits at an EGLE approved mitigation bank. Final mitigation requirements are at the discretion of EGLE and USACE and will be incorporated into the required wetland permit. No wetland impacts are expected south of Romence Road on Pfizer property.

During final design of the Preferred Alternative, modifications will be considered to lessen the impacts on regulated wetlands. All delineated wetlands will be shown on construction plans to protect them from any possible direct or indirect impacts and construction documents will require avoidance and erosion control measures.

The Preferred Alternative is expected to have adverse wetland impacts; however, impacts can be mitigated through the permitting process. The No-Build Alternative will have no impacts to wetlands.

3.16.2 Floodplains

Executive Order 11988, Floodplain Management, defines floodplains as “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.” Executive Order 11988 discourages federal actions in a floodplain unless no practicable alternative exists and requires measures to minimize unavoidable short-term and long-term impacts if the proposed action occurs in a floodplain.

A floodplain is a flat, low area adjacent to a stream, river, or creek which may be flooded during high water flow conditions. A 100-year floodplain includes the area that has a one percent (1%) chance of flooding in any given year. Projects within a 100-year floodplain are discouraged.

3.16.2.1 Affected Environment

The study area for floodplains is the project boundary as shown on the direct and indirect study area maps (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**). As part of the National Flood Insurance Program, the Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate Maps (FIRM) that serve as official flood maps depicting Special Flood Hazard Areas.

The Airport property is mapped entirely within Zone X (Area of Minimal Flood Hazard). To the west of the Airport, the Portage Creek floodplain flows to the south. To the east, the floodplain of the Davis-Olmsted drain receives drainage flows from the Airport via culverts under the railroad.

3.16.2.2 Environmental Consequences

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were reviewed for the project area to evaluate potential floodplain impacts. FIRMs indicate that no regulated floodplains are found throughout the project area. Floodplain maps are presented in **Appendix N - Water Resources**.

The Preferred Alternative is not expected to have any adverse floodplain impacts. The No-Build Alternative will have no impacts to floodplains.

3.16.3 Surface Water

The CWA, in conjunction with the Fish and Wildlife Coordination Act (16 U.S.C. §§ 661-667d), Rivers and Harbors Act (33 U.S.C. § 401 and 403), the Safe Drinking Water Act (SDWA) found in 42 U.S.C. §§ 300(f)-300(j)(26), and other local statutes, establishes regulations that protect the nation's water resources. Surface waters are typically lakes, rivers, streams, creeks, and wetlands. Surface waters collect the water from precipitation that does not infiltrate the soil and instead flows across the land. Surface waters can be hydrologically connected to groundwater.

3.16.3.1 Affected Environment

In conjunction with the above-described wetland delineations completed for the project-wide AOI, as shown on **Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**, regulated water resources were also evaluated to determine potential surface water impacts from construction of the Preferred Alternative.

Most of the AZO property drains into the Davis-Olmstead drain, which feeds into the Davis Creek-Kalamazoo River subwatershed. A small portion of the western edge of the Airport drains into the Portage Creek subwatershed.

The EPA's NEPAAssist database was also reviewed to determine the presence of other surface water resources in proximity to the Airport and the AOI. These water resources included:

- The Upjohn Pond 0.5 miles directly south of the Airport
- The Portage Creek 0.75 miles west of the Airport
- The Davis Creek less than 0.1 miles east of the Airport

3.16.3.2 Environmental Consequences

The field evaluation concluded there were no regulated waters within in the AOI other than the wetlands previously described. However, soil erosion is a source of concern due to possible adverse impacts to surface waters from construction projects. Since the Airport site is generally flat, there is not expected to be a high risk of soil erosion during excavation and other ground disturbing activities. Any erosion that occurs during construction will be minimized using appropriate BMPs. The following list of BMPs represents erosion control measures to protect water resources in the project area and specifically Davis Creek located less than 0.1 miles east of the Airport. BMPs that should be considered during construction and applied where applicable include:

- Sediment traps
- Temporary cement ponds
- Temporary grassing of disturbed areas
- Vegetation cover replaced as soon as possible
- Erosion mats and mulch
- Silt fencing and drainage check dams
- Settling basins for storm water treatment

All excavated soils and staging areas for construction equipment will be placed in non-sensitive upland areas with disturbed areas replanted as soon as possible to reduce the likelihood of erosion.

Minimization measures prepared under an erosion control plan, in accordance with FAA AC 150/5370-10H, *Standards for Specifying Construction of Airports*, will help minimize long-term impacts to area water quality and to the existing drainage system.

In accordance with Part 91, Michigan Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended, a soil erosion permit and a storm water runoff control permit are required from Pittsfield Charter Township.

The Airport is also required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction activity disturbing one acre or more of soil. Permittees are required to control runoff from construction sites and develop a construction Stormwater Pollution Prevention Plan (SWPPP) that includes erosion prevention and sediment control BMPs.

Surface water impacts from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative are not anticipated.

3.16.4 Ground Water

Ground water is water that is below the surface of the ground within the spaces between soil and rock formations. Ground water quality is primarily governed under the SDWA administered by the EPA. The study area for ground water includes all areas where the ground could be disturbed by construction of the Preferred Alternative, where impervious surfaces could change rates of ground water infiltration, where airport operations could increase spills or leaks, and where construction vehicles and other equipment could potentially impact ground water due to staging, machinery, storage, and spills.

3.16.4.1 Affected Environment

In evaluating ground water resources in the project area (**Figure 3.1 Direct Study Area** and **Figure 3.2 Indirect Study Area**), the following databases were reviewed:

- EPA Sole Source Aquifer for Drinking Water Database and Mapping Tool
- EGLE Open Data GIS dataset for water wells in Michigan
- EGLE Open Data GIS dataset for wellhead protection areas in Michigan

3.16.4.2 Environmental Consequences

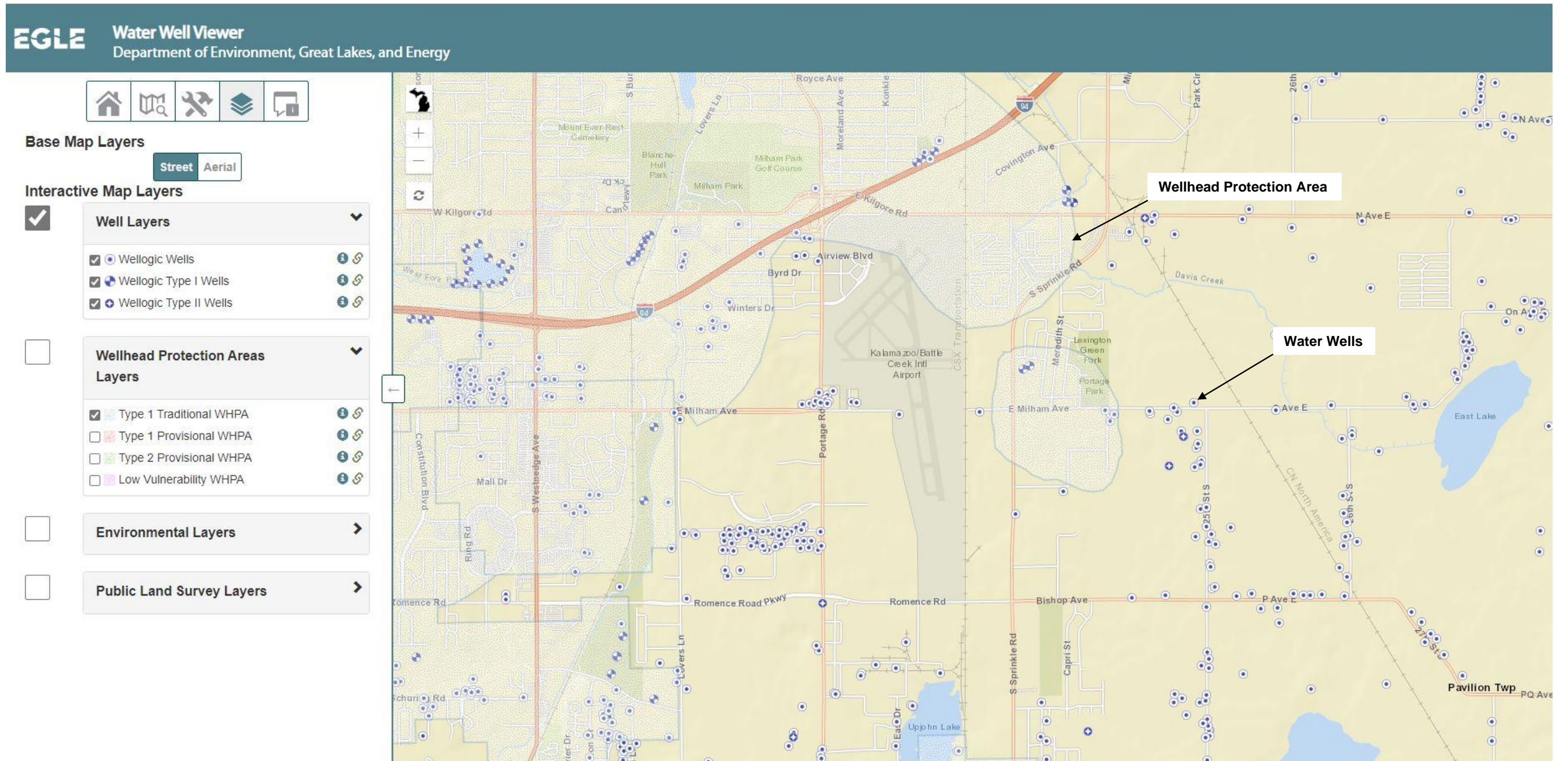
The proposed construction of the Preferred Alternative will increase impervious surfaces and likely increase storm water runoff. New impervious surfaces are estimated to be 5.30 acres (230,867 square feet). The proposed action will decrease groundwater infiltration within the project area due to the additional impervious surfaces; however, this is not expected to tangibly impact ground water recharge rates or impact public water supply.

To protect surface and ground water resources, runoff will be directed into the Airport's existing storm water management system. Storm water runoff will drain into the Airport's existing drainage system in accordance with its SWPPP. The SWPPP will also be updated to include BMPs to reduce erosion and discharge of pollutants from construction activities.

The EPA maintains a database of ground water sources that serve as the sole source of drinking water for a population. According to EPA, the proposed project is not within a Sole Source Aquifer for Drinking Water.

There are several drinking water wells in the vicinity of AZO property but not within the limits of proposed construction of the Preferred Alternative. However, the northern part of the project area near Runway 17 is within a designated wellhead protection area. Wellhead protection areas represent the land surface area that contributes ground water to wells serving public water supply systems throughout Michigan. Wellhead protection areas define a landscape in which management strategies are employed to protect public water supply from ground water contamination. See **Figure 3.15 Water Wells and Wellhead Protection Areas** for the location of area drinking water wells and the wellhead protection area.

Figure 3.15 Water Wells and Wellhead Protection Areas



Source: Michigan EGLE Wellhead Protection Areas

Since AZO is located within a wellhead protection area, FAA AC 150/5320-15A, *Management of Airport Industrial Waste* will be implemented and the following ground water BMPs will be considered to prevent and minimize impacts to ground water in the project area:

- Schedule construction activities for dry weather periods, if possible.
- Designate a contained area for equipment storage, short-term maintenance, and refueling at least 100 feet from wetland areas.
- Routinely inspect vehicles and equipment for leaks and repair immediately.
- Clean up leaks, drips, and other spills immediately to avoid soil or surface water contamination.
- Ensure that all spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries are collected, stored, and recycled as hazardous waste off site.
- Ensure that all construction debris is taken to appropriate landfills and all sediment disposed of in upland areas or off-site.

No significant ground water impacts from the construction or operation of the Preferred Alternative or implementation of the No Action Alternative are anticipated.

3.17 Cumulative Impacts

Cumulative impacts on the environment commonly result from the incremental change of an action when added to past, present, and reasonably foreseeable development in the area that is not directly associated with the Preferred Alternative, regardless of what agency or person undertakes such actions. According to FAA Order 1050.1F, reasonably foreseeable actions include those “that may affect projected impacts of a proposal and are not remote or speculative... Future actions not grounded in planning documents, projected development trends, or regional or local plans would typically be considered remote and speculative, and thus need not be analyzed.” In some cases, the individually minor impact of separate projects can have substantial effects when considered together over time.

3.17.1 Affected Environment

The Capital Improvements Plans (CIP) for the Cities of Kalamazoo and Portage outline a schedule of public expenditures over the ensuing six-year period (fiscal years 2023–2029). These projects are for reconstruction and rehabilitation of transportation and utility infrastructure in the vicinity of the Airport. The projects planned for the 2023-2029 period and the expected years of construction are listed below:

Kalamazoo CIP:

- Kalamazoo Airport Water Main Looping FY2023

Portage CIP:

- Portage Rd Water Main Installation (Helen Ave - Byrd Dr) – FY2023
- Portage Rd Sanitation Sewer Extension – FY 2023
- Road Reconstruction – Portage Rd FY2023-2024

- Road Reconstruction – Romence Rd E FY2023-2027
- Road Reconstruction – Winters Dr FY2026-2027

Other federal or federally assisted improvement activities in Kalamazoo County are conducted by MDOT. AZO exists in MDOT's Southwest Region and serves as the region's only commercial service airport. According to the 2023-2027 Five-Year Transportation Program, MDOT does not currently have any developing projects within a five-mile radius of the Airport.

The airport has had several projects completed over the past five years and intends to carry out more over the next five. The past and future projects at AZO include the following:

Past Projects:

- Rehabilitate Runway 17/35 (2019)
- Watermain Bypass (2020)
- Reconstruct of Entrance Road (2022)
- Construction of New Apron (2023)
- Construct SRE building (2023)

Future Projects:

- Rehabilitate Runway 5/23 (2030)
- Rehabilitate Taxiways A, D, E & G (2032)

The Airport is also considering removing their existing noise curfew. In the 1970s, a noise curfew/noise abatement program was established at the Airport to restrict night-time activity. The existing noise curfew restricts aviation activity from 11:00 PM to 6:30 AM on Runway 17/35 for aircraft over 75,000 pounds maximum weight and for any aircraft not certified or meeting current FAR Part 36 Standards. For details on the existing noise abatement program and flight restrictions, see **Appendix A - Noise Curfew**.

As with the noise analysis found in **Section 3.13 Noise and Noise Compatible Land Use**, the assumptions and data used as part of the original noise curfew modeling were reviewed. The review found that the trend in actual operations between 2019 through 2023 have not yet matched the trend in projected operations used in developing the noise curfew modeling. Since actual operations have not exceeded forecasted operations and are not expect to in through 2029, the noise curfew analysis was found to still be valid.

The curfew was originally implemented to protect residential communities and other noise sensitive land uses in the approaches of Runway 17/35. The existing noise curfew was implemented over 40 years ago based on aircraft models and conditions that no longer exist. The current noise curfew limits service into and out of the Airport. Given the increasing demand for passenger service and the projected growth at the Airport, eliminating the noise curfew will provide airline and business passengers with more options and allow the commercial air carriers an opportunity to operate at full capacity. Today's aircraft are much quieter given the same weight class and operating conditions and the reasons for implementing the noise curfew

are no longer applicable. Removal of the existing noise curfew will provide a facility that allows current and future users to operate with the flexibility needed to serve passengers and corporate customers.

3.17.2 Environmental Consequences

A review of potential future Airport projects and projects listed in Kalamazoo and Portage CIPs suggests that all planned projects will be constructed in existing built and developed environments. When viewed in context with the Preferred Alternative, it is unlikely they will cause a permanent adverse cumulative impact. However, coordination between the Airport and the Cities of Kalamazoo and Portage is recommended as part of any future project. No single impact, even when considered with past, present, or future actions, represents a significant impact that cannot be avoided, minimized, or mitigated.

To evaluate the potential of cumulative impacts of removing the noise curfew, a curfew removal noise analysis was conducted for modeling years 2024 and 2029 with and without the noise curfew and the proposed runway extension in place. The analysis found that existing noise levels improve for most areas when the Preferred Alternative is constructed, and the curfew is removed. The 65 DNL remains entirely on airport property under all modeling years and the 60 DNL improves for most Milwood neighborhood residences.

In areas where the 60 DNL leaves Airport property and falls on noise sensitive locations (residential homes), a grid point analysis was completed. This included the Milwood neighborhood area in the Runway 17 approach. All other areas where the 60 DNL left AZO property are industrial, commercial, or open land and not considered noise sensitive land uses. The Airport, in full disclosure, included the 60 DNL in their analysis to determine potential noise impacts from the proposed project even though the 65 DNL is predominantly used for determining impacts.

Potential noise impacts between the 60 DNL and the 65 DNL are defined as an increase of 3.0 dB or more due to the implementation of a project (removal of the noise curfew). Analysis found that the greatest change between the 65 DNL and the 60 DNL under any scenario was 0.27 dB. Given that no increase above 3.0 dB occurs between the 60 DNL and the 65 DNL on noise sensitive locations under any future year, cumulative noise impacts from the removal of the existing noise curfew are not expected. See **Appendix A - Noise Curfew** for maps illustrating the grid point analysis and the noise curfew contours within the project area.

Although cumulative impacts are not expected with any future project or the removal of the existing noise curfew, all future actions will be subject to avoidance and minimization analysis and will undergo rigorous agency permitting to avoid or reduce potential impacts.

Cumulative impacts are not anticipated with the construction or operation of the Preferred Alternative or implementation of the No Action Alternative. No mitigation is proposed.

3.18 Other Project Considerations

This section discusses other items that, while not specifically covered in previous sections, are important to the understanding of the project's potential impacts on the social, environmental, and economic surroundings.

Conformance with Plans, Policies, and Controls: An airport development project plays an important role in the local and regional economy. Often, a project influences the type and location of specific land uses, the ground transportation network, and the general direction of community growth. When evaluating an action's conformance with plans and policies, there are usually two levels of planning involved. The first level addresses policy plans, which are goals and objectives for the area or jurisdiction. The second addresses specific physical plans that direct development of the physical infrastructure.

Coordination with the Airport does not indicate any conflicts with local, county, or state planning efforts. As discussed in **Chapter 1.0 Purpose and Need**, the need for a runway extension has been included in several planning projects including a 2013 Master Plan Update and a 2017 Runway Incursion Mitigation report. Various federal, state, and local agencies and jurisdictions were involved in the development of these planning studies.

The project is also shown on the Airport's Future ALP and AZO is included in the FAA's National Plan of Integrated Airport Systems (NPIAS). This designation is indicative of its significance in the national air transportation system.

At the state level, MDOT AERO classifies the Airport as a Tier-I, commercial service airport. Tier-I airports support essential and critical state airport system goals and should be developed to their full and appropriate extent.

The proposed project aligns with local and regional plans, and no impacts are expected.

Conformance with Laws and Administrative Rules: In preparing this EA, various federal, state, regional, and local agencies were contacted to solicit their comments on the proposed project as it related to their specific area of expertise or regulatory jurisdiction including permitting and mitigation requirements (**Appendix D - Early Agency & Tribal Coordination**). Based on this coordination, inconsistency with known federal, state, or local laws or administrative rules is not expected. All phases of the proposed action will adhere to appropriate regulations and permitting requirements including any necessary mitigation measures.

Means to Avoid, Minimize, and Mitigate Adverse Environmental Impacts: Projects should take care to avoid permanent adverse impacts on the environment. It is important that all adverse environmental impacts be minimized or mitigated if avoidance is not possible. The various impacts of the Preferred Alternative and the potential means to avoid, minimize, and mitigate them to the greatest extent possible are summarized in **Table 3-8 Avoidance, Minimization, and Mitigation Summary of the Preferred Alternative**, found at the end of this chapter. Implementation of the mitigation measures in this table are at the discretion of FAA in light of their individual rules, recommendations, and advisory circulars. While some measures are required by state or federal regulations, other recommendations, such as BMPs, are to be applied where feasible. Implementation of **Table 3-8 Avoidance, Minimization, and Mitigation Summary of the Preferred Alternative** will be encouraged but is not mandatory unless required by law.

Degree of Controversy on Environmental Grounds: The Preferred Alternative is consistent with all federal, state, regional, and local plans and laws. According to conversations and correspondence with various federal and state agencies and the Airport, there is no significant controversy concerning the proposed action.

Table 3-8	
Avoidance, Minimization, and Mitigation Summary of Preferred Alternative	
Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
Air Quality	<ul style="list-style-type: none"> • To further reduce the potential for temporary air quality impacts for both workers and the surrounding area, The <i>Construction Emission Control Checklist</i> provided by the EPA (found in Appendix E - Air Quality) should be considered where feasible. Although the Airport will strongly encourage the use of the EPA checklist, the Airport must follow FAA advisory circulars and construction guidelines. Construction contracts will identify any applicable requirements that contractors must follow. • To minimize air emissions from construction equipment the following recommendations may be implemented and incorporated by the Airport during construction, where feasible: <ul style="list-style-type: none"> ○ Use low-sulfur diesel fuel (less than 0.05% sulfur). ○ Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site. ○ Position the exhaust pipe so that the diesel fumes are directed away from the operator and nearby workers, thereby reducing the fume concentration to which personnel are exposed. ○ Use catalytic convertors to reduce carbon monoxide, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels. ○ Use climate-controlled cabs that are pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operator's exposure to diesel fumes. ○ Regularly maintain diesel engines, which is essential to keeping exhaust emissions low, and follow the manufacturer's recommended maintenance schedule. ○ Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel operators to perform routine inspections, and maintaining filtration devices. ○ Purchase new vehicles that are equipped with the most advanced emission control systems available.

Table 3-8

Avoidance, Minimization, and Mitigation Summary of Preferred Alternative

Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
	With older vehicles, use electric starting aids as block heaters to warm the engine to reduce diesel emissions
Biotic Resources	<ul style="list-style-type: none"> • Tree clearing only allowed between October 1 – April 1 to minimize impacts to any potential bat populations. • Vegetation/brush clearing only allowed between October 1 – April 1 to minimize impacts to protected migratory birds. • Prior to any tree removals, a permit is needed from the City of Kalamazoo. The permit will require compliance with their Natural Features Protection Overlay standards, Subsection F (found in Appendix H - Tree Removal Ordinance). Additional coordination between the Airport and the City of Kalamazoo is required in the selection of replacement trees because tree varieties that have the potential to grow tall and become obstructions in the future are not allowed in the runway approaches. • Use of recommended erosion control and site restoration materials (“wildlife safe materials”) be incorporated into construction plans; any sightings of the Eastern Massasauga Rattlesnake will be immediately reported to USFWS. • If during construction a threatened or endangered species or species of special concern is discovered, the USFWS or EGLE should be contacted for guidance and permitting requirements.
Climate	None Implemented
Dept. of Transportation Act, Section 4(f)	<ul style="list-style-type: none"> • A MOA between the Airport, FAA, SHPO, and the Michigan Strategic Fund to ensure the following measures are carried out to mitigate for adverse effects to the historic District. Mitigation measures include: <ul style="list-style-type: none"> ○ Tree replanting ○ Bloomfield Subdivision Historic District research ○ Bloomfield Subdivision Historic District history report
Farmlands	None Implemented
Hazardous Materials	<ul style="list-style-type: none"> • BMPs during construction are required for any removal or clearing of the identified RECs within the project area. • The contractor is required to have a Spill Prevention, Control, and Countermeasure (SPCC) plan in place to be implemented if a spill occurs during construction operations. • An approved erosion control plan is required.

Table 3-8

Avoidance, Minimization, and Mitigation Summary of Preferred Alternative

Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
	<ul style="list-style-type: none"> • Any waste generated through proposed project improvements will be disposed of in compliance with all federal, state, and local regulations. • All work procedures impacting or disturbing structures/components coated with lead-based paint need to be performed by all contractors/workers in accordance with Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulations (CFR) 1926.62 lead exposure in construction. It is recommended that all contractors that impact painted building materials perform personal air monitoring on their employees to ensure that they are not being exposed to lead above the Action Level (AL) or Permissible Exposure Limit (PEL) or maintain a negative exposure assessment. • Although monitoring wells are found on Airport property, initial findings indicate they are outside the limits of construction and will not be impacted by the proposed project. If during final design it is determined that a well requires relocation, coordination with the Airport and EGLE will determine if relocation or closure is the appropriate course of action.
<p>Historical, Architectural, Archeological, and Cultural Resources</p>	<ul style="list-style-type: none"> • A MOA between the Airport, FAA, SHPO, and Michigan Strategic Fund that stipulates the FAA will ensure the following mitigation measures are implemented: <ul style="list-style-type: none"> ○ Tree Replanting: This measure would mitigate adverse effects to the District through a tree-for-tree replacement program proposed for removal, replacing them with a lower-growing species. ○ Research Sharing: This consists of packaging and sharing digital copies of research materials on the local development history of the Bloomfield Subdivision with the City of Kalamazoo and the Kalamazoo County Historical Society, to benefit each entity’s respective historic preservation mission. ○ Local History Report: Some project stakeholders responded favorably to a narrative history of the District. This report would be distributed to property owners and the City of Kalamazoo to assist with the Kalamazoo County Historical Society historic preservation efforts.
<p>Land Use</p>	<ul style="list-style-type: none"> • The relocated Runway 17/35 RPZ would introduce new incompatible land uses. The Preferred Alternative requires the acquisition of new easements over these land uses.

Table 3-8	
Avoidance, Minimization, and Mitigation Summary of Preferred Alternative	
Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
	<ul style="list-style-type: none"> The existing Norfolk Southern rail line would also be within the relocated Runway 35 RPZ and would need to be relocated outside the new RPZ.
Natural Resources and Energy Supply	<ul style="list-style-type: none"> Consider using LED lights to reduce energy consumption. BMPs to reduce energy consumption during construction will be employed, where applicable. To reduce energy consumption associated with the temporary use of excavators and construction vehicles, equipment should be in good working order to ensure the most efficient use of fuel. All vehicles and equipment should be checked for leaks and repaired immediately.
Noise and Noise Compatible Land Use	None Implemented
Socioeconomics, Environmental Justice, or Children’s Environmental Health and Safety Risks	<ul style="list-style-type: none"> Obstruction removals and new aviation easements for properties in the 40:1 approaches of both runway ends are proposed. Property owners within the Bloomfield Subdivision Historic District with trees on their property considered obstructions to the Runway 17 40:1 approach will receive a one-time replacement with a low-growing species to help mitigate tree impacts to their property. Specific mitigation and tree species will be determined during final design in coordination with the property owner, the FAA, and the Airport.
Visual Effects	None Implemented
Water Resources	<p><u>Wetlands:</u></p> <ul style="list-style-type: none"> Proposed mitigation for wetland impacts is expected to include an EGLE Part 303 Wetland Protection permit and mitigation of 0.60 acres (1:1.5 ratio). Mitigation will include the purchase of wetland credits at an EGLE approved mitigation bank. Final mitigation requirements are at the discretion of EGLE and USACE and will be incorporated into the required wetland permit. During final design of the Preferred Alternative, modifications will be considered to lessen the impacts on regulated wetlands. All delineated wetlands will be shown on construction plans to protect them from any possible direct or indirect impacts and construction documents will require avoidance and erosion control measures.

Table 3-8

Avoidance, Minimization, and Mitigation Summary of Preferred Alternative

Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
	<p><u>Surface Water:</u></p> <ul style="list-style-type: none"> • Erosion will be minimized using appropriate BMPs. The following list of BMPs represents common erosion control measures that should be considered during construction and applied where applicable: <ul style="list-style-type: none"> ○ Sediment traps ○ Temporary cement ponds ○ Temporary grassing of disturbed areas ○ Vegetation cover replaced as soon as possible ○ Erosion mats and mulch ○ Silt fencing and drainage check dams ○ Settling basins for storm water treatment • All excavated soils and staging areas for construction equipment will be placed in non-sensitive upland areas with disturbed areas replanted as soon as possible to reduce the likelihood of erosion. • Mitigation measures prepared under an erosion control plan, in accordance with FAA AC 150/5370-10H, Standards for Specifying Construction of Airports, will help minimize long-term impacts to area water quality and to the existing drainage system. • In accordance with Part 91, Michigan Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended, a soil erosion permit and a storm water runoff control permit are required from Pittsfield Charter Township. • The Airport is also required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction activity disturbing one acre or more of soil. Permittees are required to control runoff from construction sites and develop a construction Stormwater Pollution Prevention Plan (SWPPP) that includes erosion prevention and sediment control BMPs. <p><u>Ground Water:</u></p> <ul style="list-style-type: none"> • To protect surface and ground water resources, runoff will be directed into the Airport's existing storm water management system. Storm water runoff will drain into the Airport's existing drainage system in accordance with its SWPPP. The SWPPP will also be updated to include BMPs to reduce erosion and discharge of pollutants from construction activities.

Table 3-8

Avoidance, Minimization, and Mitigation Summary of Preferred Alternative

Environmental Factor	Proposed Avoidance, Minimization, Mitigation and Permits
	<ul style="list-style-type: none"> • Since AZO is located within a wellhead protection area, FAA AC 150/5320-15A, Management of Airport Industrial Waste will be implemented and the following ground water BMPs will be considered to prevent and minimize impacts to ground water in the project area: <ul style="list-style-type: none"> ○ Schedule construction activities for dry weather periods, if possible. ○ Designate a contained area for equipment storage, short-term maintenance, and refueling at least 100 feet from wetland areas. ○ Routinely inspect vehicles and equipment for leaks and repair immediately. ○ Clean up leaks, drips, and other spills immediately to avoid soil or surface water contamination. ○ Ensure that all spent fluids including motor oil, radiator coolant, or other fluids and used vehicle batteries are collected, stored, and recycled as hazardous waste off site. ○ Ensure that all construction debris is taken to appropriate landfills and all sediment disposed of in upland areas or off-site.
Cumulative Impacts	It is unlikely the Preferred Alternative will cause a permanent adverse cumulative impact. However, coordination between the Airport and the Cities of Kalamazoo and Portage is recommended as part of any future project.

Chapter 4.0 List of Preparers

The chapter lists the names and qualifications of the principal Mead & Hunt participants that assisted in the preparation of the Environmental Assessment, as well as representatives from the Airport and the FAA.

Mead & Hunt, Inc.

Stephanie Ward, AICP, Project Principal / Quality Control - Has more than 20 years of experience in preparing airport master plans, ALPs, environmental overviews, airport site selection studies, airport feasibility studies, and developing community support and understanding of airports and their importance to a community. Has prepared more than 60 planning studies for air carrier and general aviation facilities.

William Ballard, AICP, Project Manager - More than 18 years of experience evaluating environmental impacts associated with transportation projects and preparing National Environmental Policy Act (NEPA) documents. Has served as project manager for various environmental assessments and environmental impact statements.

Brauna Hartzell, Wetlands and Biological Resources Scientist - More than 20 years of experience in the execution of National Environmental Policy Act (NEPA) environmental compliance documents including state and federal wetland delineations, biological surveys, and regulatory permitting. Has served as project manager for wetland and biological analysis, permitting and mitigation design.

David Clawson, Airport Planner - Serves as an airport planner for Mead & Hunt and is responsible for developing planning and environmental documents. Has assisted with several environmental assessments and has a strong understanding of the National Environmental Policy Act (NEPA), environmental management systems, system plans, and economic analysis.

Emily Pettis, Cultural Resources Department Manager – 15 years of experience in cultural resources management. National resource for Section 106 and Section 4(f) regulatory coordination, historic resource requirements for NEPA documentation, as well as environmental document review. Conducts architectural surveys and preservation planning across the country and serves as project manager for historic preservation projects.

Kalamazoo/Battle Creek International Airport

Craig Williams, AAE, Airport Director

Eric Anton Bjorkman, CM, ACE, Deputy Director, Operations and Maintenance

Federal Aviation Administration - Misty Peavler, Environmental Protection Specialist

Chapter 5.0 References and Sources

Aircraft Manufacturer Performance Manuals

All-Species Michigan Determination Key

American Society for Testing and Materials (ASTM). <http://www.astm.org/>.

City of Kalamazoo, *Michigan Annual Comprehensive Financial Report, Year Ended December 31, 2022*.

City of Portage, Michigan.

Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3 (2009), available at <http://USEPA.gov/climatechange/endangerment.html>.

Department of Environment, Great Lakes, and Energy.

Executive Order 13834, *Efficient Federal Operations*.

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

Executive Order 11990, *Protection of Wetlands*.

FAA. (2022). *Airport Design (A/C 150/5300-13B)* (FAA). Washington, D.C.: FAA.

FAA. (2020). Memorandum: *Actions Subject to NEPA Review Instructions to Airports District Offices and Regional Office of Airports Employees Regarding Airport Layout Plan Reviews and Projects Potentially Affected by Section 163 of the FAA*. Washington, D.C.: FAA.

FAA. (2018). *Standards for Specifying Construction of Airports (AC 150/5370-10H)* (FAA). Washington, D.C.: FAA.

FAA. (2017). *Critical Aircraft and Regular Use Determination (A/C 150/5000-17)* (FAA). Washington, D.C.: FAA.

FAA. (2015b). *Environmental Impacts: Policies and Procedures (FAA Order 1050.1F)* (FAA). Washington, D.C.: FAA.

FAA. (2014, October 10). *National Plan of Integrated Airport Systems (NPIAS)*. Retrieved from https://www.faa.gov/airports/planning_capacity/npias

FAA. (2008). *Management of Airport Industrial Waste (AC 150/5320-15A)*(FAA). Washington, D.C.: FAA.

FAA, *An Environmental Desk Reference for Airport Actions*, October 2007. https://www.faa.gov/airports/environmental/environmental_desk_ref/.

FAA. (2006). *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* (FAA Order 5050.4B) (FAA). Washington DC: FAA.

FAA. (2005). *Runway Length Requirements for Airport Design (A/C 150/5325-4B)* (FAA). Washington, D.C.: FAA.

FAA Traffic Flow Management System Count database (2020).

Golder Associates. *General Biotic Resources Evaluation, October 2019*.

Google Earth, 2023.

IPCC Report as referenced in U.S. General Accounting Office (GAO) Environment: Aviation's Effects on the Global Atmosphere Are Potentially Significant and Expected to Grow; GAO/RCED-00-57, February 2000, p. 14; GAO cites available USEPA data from 1997.

MapQuest.com

Mead & Hunt Wetland Delineation Report, June 2020.

Michigan Department of Transportation Office of Aeronautics. 2017. *2017 Michigan Aviation System Plan*. Michigan Department of Transportation Office of Aeronautics, Page 2-9.

Michigan Legislature. (1994). *Natural Resources and Environmental Protection Act, Act 451 of 1994*.

Title 14 CFR Part 156 - State Block Grant Pilot Program.

Title 14 CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation.

Title 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace.

Title 40 CFR Part 1500 – Purpose and Policy

Title V of Public Law 97-248 of the Airport and Airway Improvement Act of 1982.

Transportation Research Board. Airport Cooperative Research Program Report 102 *Guidance for Estimating Airport Construction Emissions*.

U.S. Army Corps of Engineers (USACE). *1987 Wetland Delineation Manual*.

USACE. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region.*

United States Census, 2020.

U.S. Census Bureau State & County QuickFacts, 2022.

United States Code, 2. *E.-T. State Block Grant Program.*

U.S. Code. 15 U.S.C. §§ 2601-2697 - *Toxic Substance Control Act.*

U.S. Code. 16 U.S.C. § 703 et seq - *The Migratory Bird Treaty Act of 1918.*

U.S. Code. 16 U.S.C. §§ 1271-1287 - *Wild and Scenic Rivers Act.*

U.S. Code. 16 U.S.C. §§ 1451-1466 - *The Coastal Zone Management Act of 1972.*

U.S. Code. 16 U.S.C. §§ 661-667d - *Fish and Wildlife Coordination Act.*

U.S. Code. 16 U.S.C. §1531-1544 - *The Endangered Species Act.*

U.S. Code. 33 U.S.C. § 401 and 403 - *Rivers and Harbors Act.*

U.S. Code. 33 U.S.C. §§ 1251-1387 - *Clean Water Act.*

U.S. Code. 42 U.S.C. § 61 et seq. - *Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970.*

U.S. Code. 42 U.S.C. §§ 2000d2000d-7 - *Title VI of the Civil Rights Act of 1964.*

U.S. Code. 42 U.S.C. §§ 300(f)-300j26 - *Safe Drinking Water Act.*

U.S. Code. 42 U.S.C. §§ 6901-6992k - *Comprehensive Environmental Response, Compensation, and Liability Act.*

U.S. Code. 42 U.S.C. §§ 6901-6992k - *Resource Conservation and Recovery Act.*

U.S. Code. 42 U.S.C. §§ 7401- 7671q - *The Clean Air Act.*

U.S. Code. 49 U.S.C. § 303 - *Section 4(f).*

U.S. Code. 54 U.S.C. § 300101 - *Section 106 of the National Historic Preservation Act.*

U.S. Code. 7 U.S.C. §§ 4201-4209 - *The Farmland Policy Protection Act of 1981.*

USEPA NEPAassist. <https://www.epa.gov/nepa/nepassist>.

USEPA. Latest Version of Motor Vehicle Emission Simulator. Retrieved from United States Environmental Protection Agency: <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>

United States Fish and Wildlife Service.