Federal Aviation Administration

Final Environmental Assessment for Zipline International Inc. Proposed Drone Package Delivery Operations in Dallas–Fort Worth, Texas

December 2025

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Washington, D.C.

Notice of Availability of the Final Environmental Assessment for Zipline International Inc. Proposed Drone Package Delivery Operations in Dallas–Fort Worth, Texas

The Federal Aviation Administration (FAA) provides notice that a Final Environmental Assessment (EA), prepared pursuant to the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Sections 4321–4355), to assess Zipline International Inc. proposed commercial drone delivery service in Dallas–Fort Worth, Texas is available.

Zipline International Inc. is seeking to amend its air carrier Operations Specifications (OpSpecs) and other FAA approvals necessary to expand commercial drone package delivery operations in Dallas–Fort Worth, Texas. The FAA's approval of the amended OpSpecs is considered a major federal action under NEPA and requires a NEPA review. This Final EA has been prepared pursuant to NEPA, FAA Order 1050.1G, FAA National Environmental Policy Acy Implementing Procedures, Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303), and Section 106 of the National Historic Preservation Act (16 U.S.C. § 470).

The Final EA is available for online review at
https://www.faa.gov/uas/advanced_operations/nepa_and_drones

Responsible FAA Official:

Joseph K. Hemler Jr Digitally signed by Joseph K. Hemler Jr
Date: 2025.12.31 11:10:42 -05'00'

_____ Date: _____

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Acronyms and Abbreviations

AGL	above ground level
APE	Area of Potential Effects
BVLOS	beyond visual line of sight
CFR	Code of Federal Regulations
dB	decibel
dBA	A-weighted decibel
DFW	Dallas–Fort Worth
DNL	day-night average sound level
DOT	U.S. Department of Transportation
EA	Environmental Assessment
ESA	Endangered Species Act
FAA	Federal Aviation Administration
MBTA	Migratory Bird Treaty Act
metro	metropolitan
mph	miles per hour
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NRHP	National Register of Historic Places
OpSpecs	Operations Specifications
P2	Platform 2
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
U.S.C.	United States Code
UA	unmanned aircraft
UAS	Unmanned Aircraft System
USFWS	U.S. Fish and Wildlife Service
Zipline	Zipline International Inc.

Chapter 1
Purpose and Need

1.1 Introduction

Zipline International Inc. (Zipline) holds a Federal Aviation Administration (FAA) standard air carrier certificate under 14 Code of Federal Regulations (CFR) Part 135 (Part 135),[1] which allows holders to conduct on-demand or scheduled (commuter), and a 49 United States Code (U.S.C.) Section 44807 exemption,[2] which allows Zipline to carry the property of another for compensation or hire beyond visual line of sight (BVLOS) using its Platform 2 (P2) Unmanned Aircraft System (UAS). Zipline's Part 135 certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in its Operations Specifications (OpSpecs).[3,4]

Zipline is seeking to amend its OpSpecs and other FAA approvals necessary to begin unmanned aircraft (UA, also referred to as a drone) commercial package delivery operations in the Dallas–Fort Worth (DFW) metropolitan (metro) area (see Figure 2.2-1).

Zipline is proposing to conduct operations 24 hours a day, seven days per week, including holidays, from up to 75 sites in the DFW area using its 55-pound P2 "Zip" UA.[5] Each site would contain individual "docks" (i.e., ground infrastructure) with charging or loading capability depending on the purpose of the site. Zipline would construct up to 500 docks[6] to support delivery operations, with a maximum of 20 docks per site, though many sites would have far fewer. Zipline's sites would be located in commercial areas, such as shopping centers, large individual retailers, and shopping malls, as well as laboratories and warehouses. Sites can include partner sites where packages are loaded or received, charging sites, or maintenance sites. Further description of site installations is provided in Section 2.2. Zipline projects operating a maximum of 400 delivery flights per operating day from each site, with approximately 95% of the flights occurring during the day (from 7:00 a.m. to 10:00 p.m.) and 5% at night (from 10:00 p.m. to 7:00 a.m.), depending on operational demand. As noted in Section 2.2, Zipline plans to gradually scale operations over an 18-month period and would begin their operational program at five sites operating from 6:00 a.m. – 11:00 p.m. with 20 daily flights per site.

[1] See https://www.faa.gov/uas/advanced_operations/package_delivery_drone.

[2] 49 United States Code (U.S.C.) Section 44807 provides the Secretary of Transportation with authority to determine whether a certificate of waiver, certificate of authorization, or a certificate under 49 U.S.C. Section 44703 or 44704 is required for the operation of certain unmanned aircraft system (UAS).

[3] An Operations Specification is a document that defines the scope of aircraft operations that the Federal Aviation Administration (FAA) has authorized.

[4] This is different than a concept of operations, or ConOps, which is generally a description of how a set of capabilities may be employed to achieve desired objectives.

[5] The P2 Zip weighs approximately 55 pounds and has a maximum payload weight of 8 pounds.

[6] Zipline docks will be constructed primarily on previously disturbed land, such as a paved parking lot. When required, Zipline may construct docks on undisturbed land adjacent to a developed area, such as an empty field next to a shopping center.

The FAA's approval of the amended OpSpecs is considered a major federal action under the National Environmental Policy Act (NEPA)[7] and requires NEPA review. Zipline prepared this Final Environmental Assessment (Final EA) under the supervision of the FAA[8] to evaluate the potential environmental impacts that might result from the FAA's proposed action.

Under NEPA, federal agencies are required to consider the environmental effects of proposed major federal actions and to disclose to decision-makers and the interested public a clear and accurate description of the potential environmental impacts of proposed major federal actions. Additionally, under NEPA, federal agencies are required to consider the environmental effects of a proposed major action, the reasonable alternatives to the proposed action, and a no action alternative (assessing the potential environmental effects of not implementing the proposed action). The FAA has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures* (FAA 2025)[9].

1.2 FAA Role for Proposed Action

In general, Congress has charged the FAA with the safety of air commerce in the United States and to encourage the development of civil aeronautics. The FAA provides multiple approvals associated with package delivery proposals, such as an exemption from 14 CFR Section 91.113(b) to enable BVLOS operations, and a Certificate of Waiver or Authorization; however, the FAA's issuance of an OpSpecs (or amended OpSpecs) to include package delivery flights in a specified operating area is the approval that ultimately enables UA operations under Part 135.

The FAA has specific statutory and regulatory obligations related to its issuance of a Part 135 certificate and the related OpSpecs. The FAA is required to issue an operating certificate to an air carrier when it "finds, after investigation, that the person properly and adequately is equipped and able to operate safely under this part and regulations and standards prescribed under this part." An operating certificate also specifies "terms necessary to ensure safety in air transportation; and (2)…the places to and from which, and the airways of the United States over which, a person may operate as an air carrier." Also included in air carrier certificates is a stipulation that the air carrier's operations must be conducted in accordance with the provisions and limitations specified in the OpSpecs. The regulations also specify that a Part 135 certificate holder may not operate in a geographical area unless its OpSpecs specifically authorize the certificate holder to operate in that area. The regulations implementing 49 U.S.C. Section 44705 specify that an air carrier's approved OpSpecs must include, among other things, "authorization and limitations for routes and areas of operations." An air carrier's OpSpecs may be amended at the request of an operator if the FAA "determines that safety in air commerce and the public interest allows

[7] 42 U.S.C. Section 4321 et seq.

[8] See 40 CFR Section 1506.5(a).

[9] On January 20, 2025, President Trump issued Executive Order (EO) Number (No.) 14154, *Unleashing American Energy*, which revoked EO 11991, *Relating to Protection and Enhancement of Environmental Quality* (May 24, 1977), and instructed the Chair of the Council on Environmental Quality (CEQ) to rescind its NEPA-implementing regulations. The CEQ published an interim final rule on February 25, 2025, announcing the removal of its NEPA-implementing regulations effective April 11, 2025. On June 30, 2025, the FAA rescinded its NEPA implementation procedures in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and issued new NEPA implementing procedures in FAA Order 1050.1G*, FAA National Environmental Policy Act Implementing Procedures*. 90 Fed. Reg. 29,615 (July 3, 2025). The Draft and Final Environmental Assessment were prepared under and in compliance with the now-rescinded NEPA-implementing regulations and FAA Order 1050.1F.

the amendment." After making this determination, the FAA must take an action on the OpSpecs amendment.

1.3 Purpose and Need

The Federal action subject to review under the National Environmental Policy Act (NEPA) is the Federal Aviation Administration's (FAA) decision whether to approve a modification to Zipline's Operations Specifications (OpSpecs) under 14 CFR Part 135. The modification would authorize Zipline to expand its commercial package delivery operations using unmanned aircraft systems (UAS) in the Dallas-Fort Worth metro area.

The purpose of the proposed FAA action is to enable the agency to carry out its statutory responsibilities to ensure the safety and efficiency of the National Airspace System (NAS), while considering potential environmental effects consistent with NEPA and FAA Order 1050.1G. Consistent with Order 1050.1G §2.2, when the FAA is acting on an application for authorization, the purpose and need for the federal action is informed both by FAA's statutory mission and the applicant's goals.

The need for the proposed action arises from Zipline's application for expanded operating authority to extend its current commercial unmanned aircraft delivery service to the Dallas–Fort Worth metro area. Zipline, in its business judgment, has determined that the Dallas–Fort Worth region is an appropriate market for expansion. Zipline's proposal is to begin full-scale commercial UAS delivery operations in this region utilizing its P2 UAS (also known as the P2 ZIP). Site locations would be selected based on a combination of business case considerations, operational feasibility, installation feasibility, and proximity to other sites within Zipline's existing network. Without FAA approval of the requested OpSpecs modification, Zipline would be unable to implement this expansion of its delivery service.

Accordingly, the FAA must determine whether approving the modification to Zipline's OpSpecs is consistent with applicable safety and regulatory requirements, while also fulfilling the agency's obligation under NEPA to evaluate the reasonably foreseeable environmental effects of the decision.

1.4 Public Involvement

The FAA created a Notice of Availability (NOA) with information about the Draft EA and provided it to local, state, and federal officials, interest groups, and federally recognized tribes. The NOA was provided in English and Spanish. The FAA also announced availability of the Draft EA for public review via the FAA's social media and an advertisement in the *Dallas Morning News* and *Fort Worth Star-Telegram* newspapers. The NOA provided information about the proposed action and requested public review and comments on the Draft EA, which was published on the FAA's website[10] for a 30-day- comment period from June 18, 2025, to July 18, 2025. Interested parties were invited to submit comments on any environmental concerns related to the proposed action. The FAA received one comment. Public comments and FAA responses are provided in Appendix I, Public *Comments and FAA Responses*.

[10] See https://www.faa.gov/uas/advanced_operations/nepa_and_drones.

Chapter 2
Proposed Action and Alternatives

FAA Order 1050.1F, Paragraph 6-2.1(d) states that, "[a]n EA may limit the range of alternatives to the proposed action and no action alternative when there are no unresolved conflicts concerning alternative uses of available resources." The FAA has not identified any unresolved conflicts concerning alternative uses of available resources associated with Zipline's proposal. Therefore, this EA only considers the proposed action and the no action alternative.

2.1 No Action Alternative

FAA Order 1050.1F, Paragraph 6-1.a(1) requires the FAA to consider a no action alternative in their NEPA reviews to compare the environmental effects of not taking action with the effects of the action alternative(s). Thus, the no action alternative serves as a baseline to compare the impacts of the proposed action. Under the no action alternative, Zipline would not implement commercial UA package delivery operations in DFW and would continue to conduct package delivery operations under Part 135 in locations currently authorized by its OpSpecs such as Pea Ridge, Arkansas. Consumers in the areas not served by UA would be expected to continue to use personal ground transportation to retrieve small goods. The no action alternative does not fulfill the stated purpose and need.

2.2 Proposed Action

The proposed action is the FAA's amendment of an OpSpec to allow expansion of Zipline's current area of operations for UA commercial delivery service to include the DFW metro area. Zipline's proposed DFW operating area boundaries are shown in Figure 2.2-1. Under the proposed action, Zipline would establish up to 75 site locations and construct up to a total of 500 docks with a maximum of twenty docks at a single site. Operations would occur 24 hours a day, seven days per week, including holidays. Zipline would conduct up to 400 deliveries over a 24-hour day in a 10-mile radius around each site. Approximately 95% of flights would take place during 7:00 a.m. to 10:00 p.m. and 5% of flights would take place during 10:00 pm to 7:00 am. Zipline is projecting to establish operations in the DFW operating area under the scope of the proposed action over the course of 18 months. The exact timing and pace of dock installation is dependent on prevailing market conditions, operational feasibility, and physical installation feasibility. If, in the future, Zipline wanted to exceed their allocated site, docks, or daily flights in the operating area, additional safety and NEPA reviews would be required. Operations, including site placement and all UA flights, would be confined to the operating area depicted in Figure 2.2-1.[11] The operating area would be approximately 118 miles long east and west and 91 miles long north and south, with an area of approximately 10,904 square miles.[12]

Sites would be distributed throughout the DFW metro area following a plan to be developed with Zipline's partners and through outreach to local communities (including local officials and wildlife groups,

[11] Modification of Zipline's operations plan requires approval in accordance with 14 CFR Part 135.

[12] The operating area boundary latitude/longitude would be bounded by the following four corner geocoordinates: 33.502972/-97.976603, 32.178781/-97.976692, 32.179006/-95.923964, 33.502911/-95924358.

schools, and community groups) and airspace users. Zipline's sites would be located in established commercial areas whose use is consistent with local zoning and land use requirements, such as retail stores, warehouses, laboratories, and other locations operated by customers.

Each site would serve an area within a 10-mile radius, with the exclusion of areas with high densities of air traffic or population. Month one (1) of operations would serve an area within a 2.5-mile radius, increasing to a 10-mile radius by Month three (3). Initially, Zipline expects to fly considerably less than 100 deliveries per day from each site and then gradually increase to up to 400 deliveries per day at high volume sites as consumer demand rises. Proposed operations would occur 24 hours a day, 7 days of the week, with approximately 95% of flights expected to take place during acoustic daytime (7:00 a.m. to 10:00 p.m.) and 5% of flights at acoustic nighttime (10:00 p.m. to 7:00 a.m.).[13] Zipline's expected operational phasing is summarized in Table 2.2-1.

Table 2.2-1. Expected Operational Phasing

Component	Month 1	Month 3	Month 12	Month 18
Sites	5	30	50	75
Docks	25	180	300	500
Average Daily Flights per Site	20	50	75	400 (expected 100 per site)
Operating hours	17 hours (6:00 a.m. – 11:00 p.m.)			24 hours
Operating Radius	2.5 miles		10 miles	

To avoid the potential for significant noise impacts, Zipline would place its sites at least 325 feet away from a noise-sensitive area[14] when the site is located within the controlled surface area of Class B and Class D airspace[15] (refer to Figure 3.6-1) and at least 150 feet away from a noise-sensitive area in all other areas within the study area, which is defined as Zipline's proposed operating area (see Figure 2.2-1). Flight operations would not occur in Zipline identified keep out zones, including zones around airports, military facilities, and open-air assemblies of people.

[13] Exact days of operation would depend on the operating partner, but generally Zipline would operate every day, including holidays.

[14] A *noise-sensitive area* is an area where noise interferes with normal activities associated with its use. Normally, noise-sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife and waterfowl refuges, and cultural and historical sites. (FAA Order 105.1F, Paragraph 11-5.b(10).)

[15] Class B airspace is generally airspace from the surface to 10,000 feet mean sea level surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. Class D airspace is generally airspace from the surface to 2,500 feet above the airport elevation (charted in mean sea level) surrounding those airports that have an operational control tower. For more information. See: https://www.faa.gov/regulationspolicies/handbooksmanuals/aviation/phak/chapter-15-airspace.

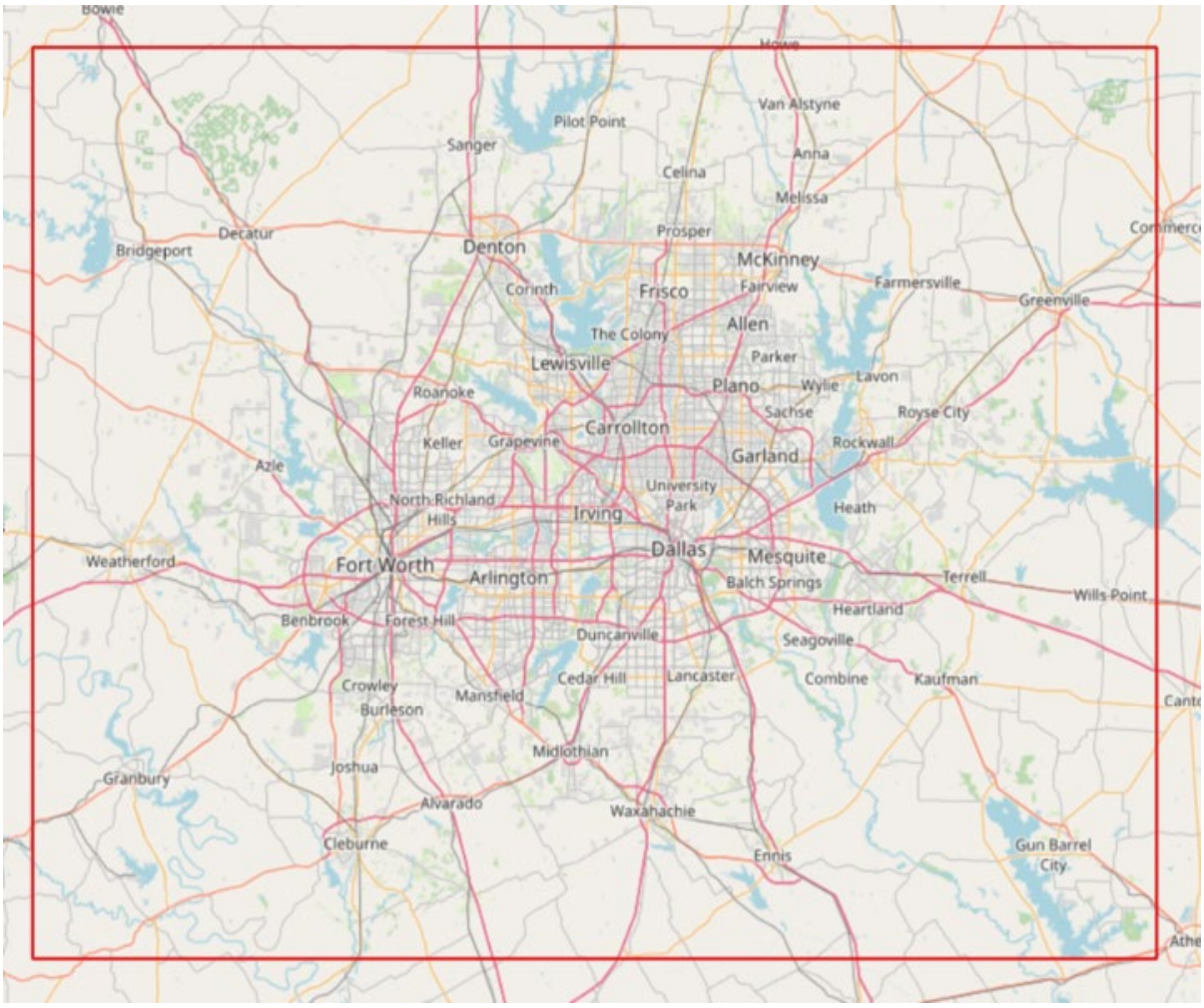

Figure 2.2-1. Zipline's Proposed DFW Operating Area

Each site would consist of 1 to 20 docks. On average, each site will contain approximately 7 docks; however, the exact number of docks established at each site will be determined based on market demand in the service area and logistic feasibility and efficiency. Docks are housed on vertical docking towers. Each docking tower would initially serve a single partner but may eventually serve multiple partners. Each individual dock provides the structural interface to house stationary Zips, charge Zips and provide thermal management, transfer data from Zips to and from the cloud, provide visual fiducials for Zip docking maneuvers, and provide weather protection. Zipline docks would be constructed primarily on previously disturbed land, such as a paved parking lot. When required, Zipline may construct on undisturbed land adjacent to a developed area, such as an empty field next to a shopping center. Figure 2.2-2 illustrates potential docking tower configurations and Figure 2.2-3 illustrates conceptual site locations.

Figure 2.2-2. Zipline Instamount (freestanding) Loading Docking Tower.[16]

[16] Illustrations are not to scale.

Figure 2.2-3. Zipline Conceptual Site configurations at medical laboratory (top left), restaurant (bottom left), and warehouse (right).

Zipline would have 75 site locations with a total of 500 docks and conduct up to 400 flights daily with a 10-mile radius from each site operating 24 hours per day. The estimated total distance flown for deliveries would vary depending upon the pickup and drop-off locations in the operating area. Each flight would take a package to a customer delivery address before returning to a given dock. There would be variability in the number of flights per day based on customer demand and weather conditions. Site locations are determined through partner agreements and market demand; deliveries would likely be distributed throughout the service area of an individual site. In the event that sites are installed with overlapping service areas, Zipline would not exceed 400 total deliveries or overflights in the area of overlap.

Zips would primarily be transporting consumer goods, food & beverage, and pharmaceuticals in partnership with merchants (including pharmacies) in the communities they already serve and would provide an alternative to in-store pickup. Deliveries would be conducted at the time of the customer's choosing and directly to the customer's home in the operating area. Zips would also transport lab samples from health care facilities and hospitals to laboratories as an alternative to a courier service or other ground-based transportation service. Deliveries would also be conducted at the time of the healthcare partner’s choosing.

Zips fly pre-planned routes developed immediately prior to flight. Routes are generated by software that takes into consideration environmental factors including weather risk, wind direction, and population density. Routes are carefully planned to avoid terrain and obstructions, known areas with high volume of other aircraft traffic, airspace restrictions, and known venues for open-air assemblies of people, and can be regenerated, if needed. Zips automatically deconflict with each other using a combination of strategic and tactical avoidance measures including generation of predetermined flight paths following specific rules to reduce the overlap of flight paths in different modes and phases of flight. Each Zip communicates

directly to other Zips over radio and cellular networks to share position, velocity, and intent information which is used for each to automatically modify flight plans to maintain separation. Deconfliction of flight plans would occur even if the Remote Pilot in Command (RPIC) loses communication with Zips.

To deconflict with other aircraft, including other UAS, Zipline takes a multi-pronged approach using a third-party solution to notate Zipline areas of operation to ensure that other operators are aware of Zipline's operations; using Notice to Air Missions to notify traditional and UA operators of Zipline's flight areas; participating in FAA's Unmanned Aircraft System Traffic Management efforts; and proactively building relationships with other local commercial UA operators to identify areas of operational overlap and develop deconfliction procedures as necessary.

The software designs and carefully checks flight paths to ensure Zips stay safely within the predetermined operational area. The Zip has onboard checks evaluating its position and ensuring the Zip remains within the allowed operational area. If a Zip departs from the predetermined operational area, the Zip would automatically take action to terminate the flight immediately and return to the most appropriate location – either docking at the closest available dock or using the hover or paraland[17] function to safely exit the airspace. Additionally, the RPIC has the ability to command flight termination if a Zip flies outside of this predetermined operational area.

2.2.1 Unmanned Aircraft Specifications

Zipline's P2 Zip platform is a highly automated, electrically powered vertical takeoff and landing aircraft capable of hover and forward flight. The Zip features a multi-rotor design with 5 propellers and weighs under 63 pounds when combined with its maximum payload weight of 8 pounds.

Zipline locates Zips and their associated docks at Zipline partner sites. Once an order is placed, a package is loaded into a "droid."[18] The droid is stored in the Zips' payload bay and the Zip undocks and flies to the delivery site where it lowers the droid via winch line to a pre-selected delivery site. The Zip has a wingspan of approximately 7.8 feet, a height of approximately 1.8 feet, and a length of approximately 8 feet. Zips are equipped with high-visibility red (left wingtip) and green (right wingtip) lights, and aft-directed strobe lights (white) on each wingtip. These lights run while Zips are in flight and are visible for at least 3 statute miles. Figure 2.2-4 illustrates the P2 Zip platform.

Zipline's P2 Zip platform builds upon the success of Zipline's first generation vehicle, the P1. The P2 platform offers hyper-precise delivery and a larger allowable payload size and introduces the ability of Zips to take off and dock automatically. All Zipline aircraft use electric power from rechargeable lithium-ion batteries.

[17] The paraland function involves deployment of a parachute to safely land the Zip.

[18] The droid is illustrated at the bottom of Figure 2.2-4

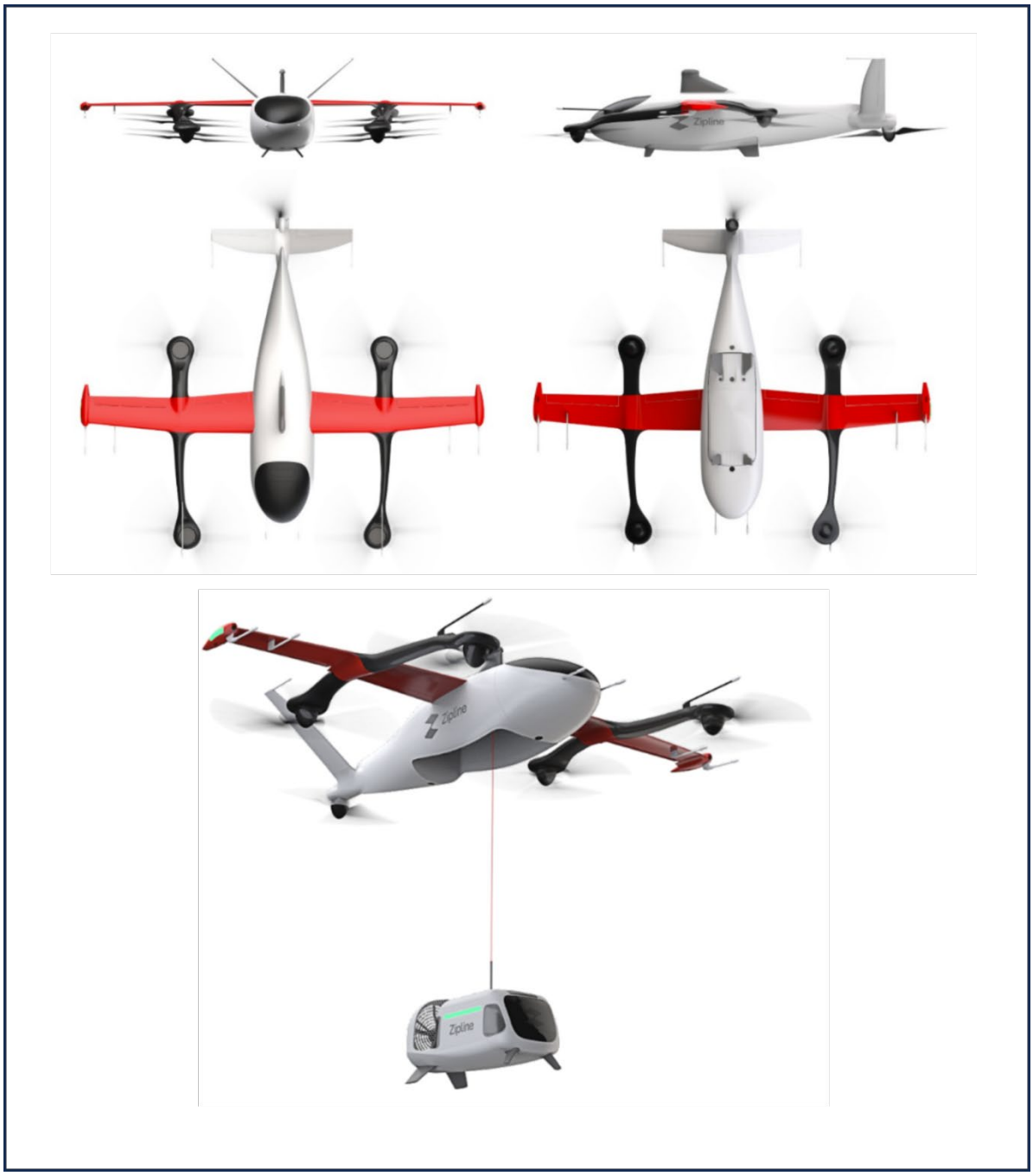

Figure 2.2-4. Zipline P2 Zip Profile Views (above) and droid (below)

2.2.2 Flight Operations

Zips would generally be operated at an altitude of 330 feet above ground level (AGL) and always below an altitude of 400 feet AGL while en route to and from delivery locations. Approaching the delivery location, the Zip would decelerate before stopping and maintaining its altitude at 330 feet AGL at the delivery location. The Zip would lower the droid to the ground for delivery of the payload through bay doors. Once the payload has been released, the UA would then retract the droid and depart the delivery area, accelerating to full en route speed as it returns back to a site.[19]

The UA would fly a predefined flight path that is set prior to takeoff. Flight missions are automatically planned by Zipline's flight planning software. A mission originates from a dock, and Zipline's software automatically assigns, deconflicts, and routes each flight to the delivery location and back to a dock. Exclusion zones are designed to keep operations clear from nearby non-participating people and vehicles. Pedestrians or vehicles are not permitted in these areas when Zips are docking or undocking.

As part of normal operations, the Zip may be assigned one of the following missions:

- Delivery. Requires a droid to deliver a payload to a prescribed location.
- Reposition. A Zip moving from one dock to another.

Zipline operations begin with order processing followed by flight phases. A typical flight profile can be broken into the following general flight phases: undocking, en route outbound, delivery, en route inbound, and docking. Figure 2.2-5 depicts these stages, each of which is explained in the following sections.

Figure 2.2-5. Zipline P2 Zip Mission Profile

2.2.2.1 Order Processing

During order processing, Zipline's partner loads the package into the droid.

[19] See www.flyzipline.com for videos and photographs of Zipline operations.

2.2.2.2 Pre-Departure

During the pre-takeoff process, Zipline's system would complete automated preflight checks of the UAS to ensure no unsafe conditions exist. If on a delivery operation,[20] the shipping partner would then load a package (Figure 2.2-6 through 2.2-8).

Figure 2.2-6. Partner site where shipper loads the droid

[20] In addition to delivery operations, Zipline would conduct repositioning missions (i.e., relocating Zips to a different site) and survey missions.

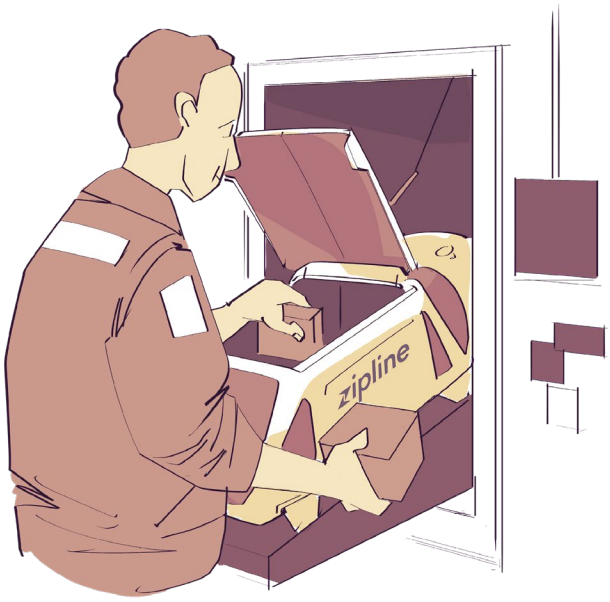

Figure 2.2-7. Payload is loaded into the droid

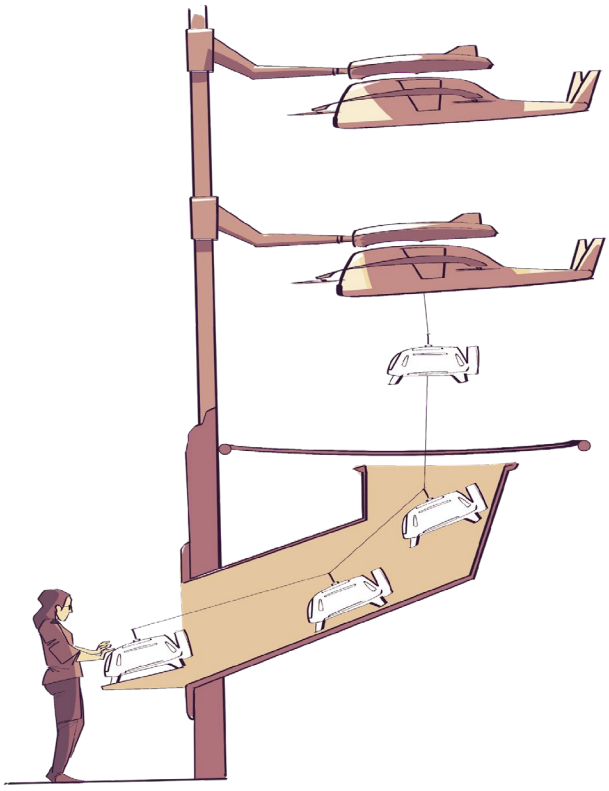

Figure 2.2-8. Once loaded with its payload, the droid is transferred to the payload bay of the P2 Zip

2.2.2.3 Undocking

Once cleared for takeoff from a dock, the Zip undocks and then maneuvers away from the dock and climbs vertically to the en route altitude (330 feet AGL) on its pre-planned flight path (Figure 2.2-9 and Figure 2.2-10).

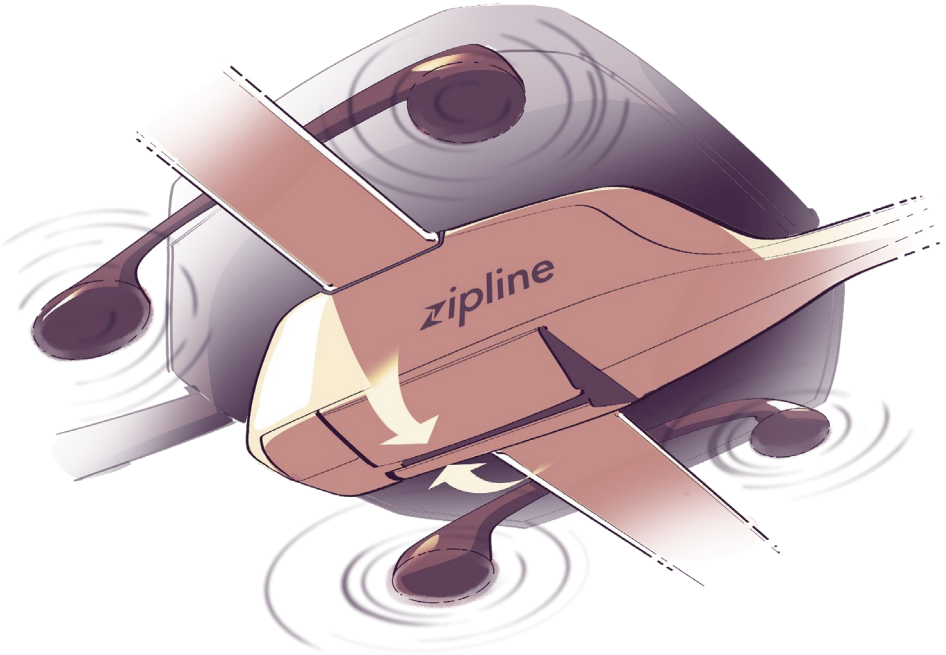

Figure 2.2-9. P2 Zip detaches from dock

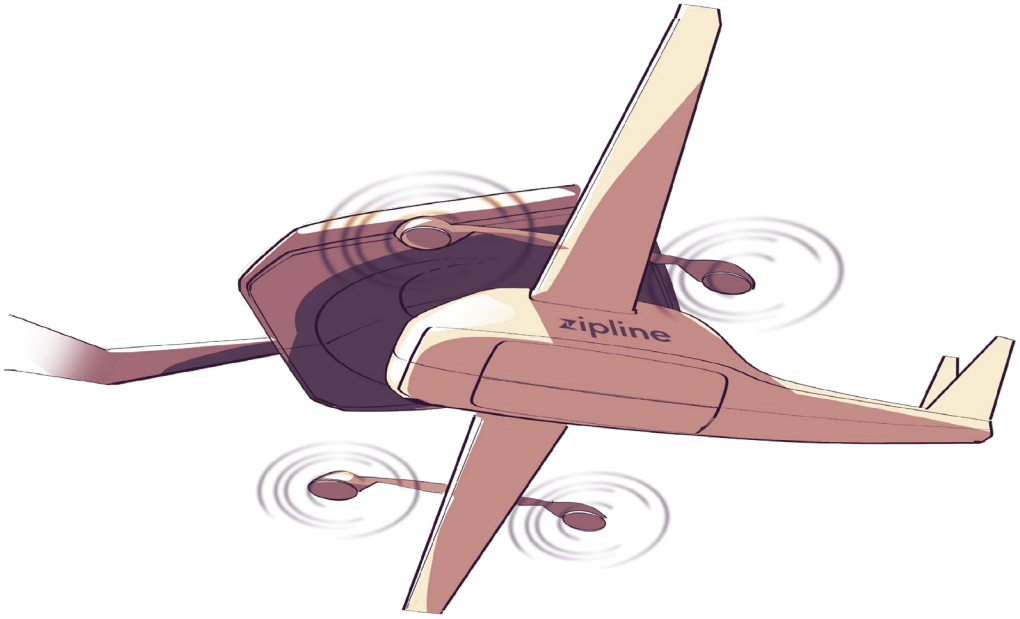

Figure 2.2-10. P2 Zip hovers to flight position

2.2.2.4 En Route Outbound

The en route outbound phase is the part of flight in which the fully loaded Zip transits from the dock to a delivery point on a predefined flight path. During this flight phase, the Zip would typically operate using horizontal flight at an altitude of 330 feet AGL and an airspeed of 47 miles per hour (mph) (Figure 2.2-11).

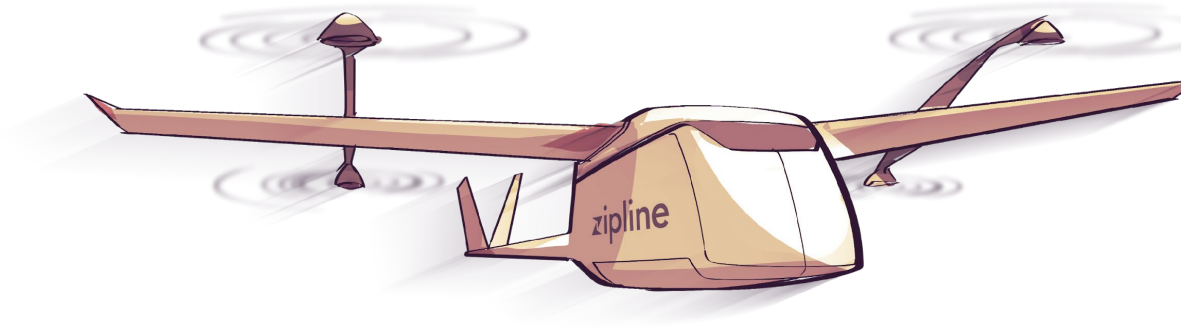

Figure 2.2-11. P2 Zip in active, forward flight

2.2.2.5 Delivery

The delivery phase consists of deceleration and hovering over a delivery point, such as a residential yard, driveway, parking lot, or common area. The Zip maintains its altitude at 330 feet AGL and its position over the delivery point (Figure 2.2-12). The droid is released from the Zip and lowered to the ground via the winch line (Figure 2.2-13). During droid descent, the droid automatically controls its position laterally and evaluates the delivery site. If the delivery site is clear, the droid would continue to descend and deliver the payload at the delivery target. The droid would then be retracted back into the Zip. The Zip would then proceed to accelerate as it exits the delivery area and begins en route transit back to the site. The total hover time for delivery operations would be approximately 75 seconds.

Figure 2.2-12. Low altitude automatic flight to intended delivery location

Figure 2.2-13. Droid softly delivers payload on intended surface and retracts back into P2 Zip

2.2.2.6 En Route Inbound

The P2 Zip continues to fly horizontally at an altitude of 330 feet AGL and a speed of 47 mph toward the dock.

2.2.2.7 Docking

Upon reaching the dock, the Zip decelerates and descends vertically before maneuvering into the dock area. The Zip then attaches to the dock from below using its docking fin. Hover motors are disengaged after the Zip has registered secure connection with the dock. Figure 2.2-14 illustrates a typical docking operation.

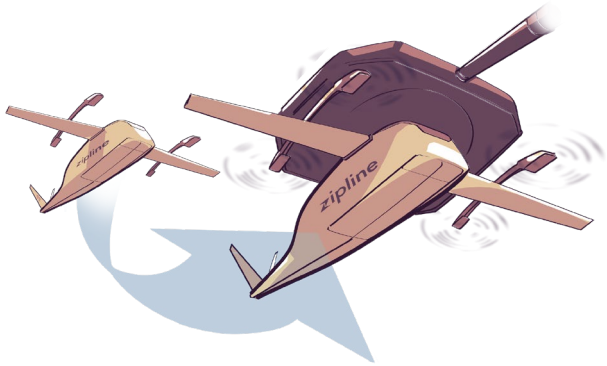

Figure 2.2-14. P2 Zip either docks to prepare for next delivery or to recharge batteries/run diagnostics, based on aircraft needs and mission

Chapter 3
Affected Environment and Environmental Consequences

3.1 Introduction

This chapter provides a description of the affected environment and potential environmental consequences for the environmental impact categories that have the potential to be affected by the no action alternative and proposed action, as required by FAA Order 1050.1F, *Environmental Policies and Procedures* (FAA 2015). As required by FAA Order 1050.1F, this EA presents an evaluation of impacts for the environmental impact categories listed below.

- Aviation Emissions and Air quality
- Biological resources (including fish, wildlife, and plants)
- Coastal resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous materials, solid waste, and pollution prevention
- Historical, architectural, archaeological, and cultural resources
- Land use
- Natural resources and energy supply
- Noise and noise-compatible land use
- Socioeconomics, and children's environmental health and safety risks
- Visual effects (including light emissions)
- Water resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)

The study area evaluated for potential impacts is defined as Zipline's proposed operating area shown in Figure 2.2-1. The level of detail provided in this chapter is commensurate with the importance of the potential impacts (FAA Order 1050.1F, Paragraph 6-2.1). EAs are intended to be concise documents that focus on aspects of the human environment that may be affected by the proposed action.

3.2 Environmental Impact Categories Not Analyzed in Detail

This EA did not analyze potential impacts on the following environmental impact categories in detail because the proposed action would not affect the resources included in the category (see FAA Order 1050.1F, Paragraph 4-2.c).

- **Air Emission and Air Quality:** The UA is battery powered and does not generate emissions that could result in air quality impacts or climate impacts. Electricity consumed for battery charging at the docks would be minimal. Electricity consumed for the proposed action would come from the power grid with backup generators on site in the event of an emergency. These emissions would be minimal and are not expected to contribute to any exceedance of National Ambient Air Quality Standards. Based on a 2020 study of drone delivery operations, by year 5 of operations drones were projected to replace between 11.2 percent and 18.7 percent of total delivery miles previously made by automobiles, or between 11.3 million miles and 96 million miles (Lyon-Hill et al. 2020). The proposed action is expected to decrease emissions from delivery services that contribute to greenhouse gases emissions. The decreased emissions would have positive effects on climate change as the proposed action would replace vehicle miles traveled by greenhouse-gas emitting vehicles. UA operations are not expected to be impacted by climate change impacts (e.g., rising sea levels, increasing temperatures).

- **Coastal Resources:** The proposed action would not directly affect any shorelines or change the use of shoreline zones and be inconsistent with any National Oceanic and Atmospheric Administration–approved state Coastal Zone Management Plan as there are no shorelines in the area of operations. The study area is approximately 250 miles from the nearest shoreline. The Texas Coastal Zone was reviewed from the Texas Coastal Management Program on August 12, 2024 (Texas Coastal Management Program 2024).

- **Farmlands:** The proposed action would not involve or have the potential to convert any farmland to non-agricultural uses. Docks would be installed within existing zoned commercial areas and would primarily occur on previously disturbed land. The proposed action would not affect designated prime or unique farmlands.

- **Hazardous Materials, Solid Waste, and Pollution Prevention:** The proposed action would result in limited construction or development primarily in previously disturbed areas. Therefore, the potential for impact in relation to hazardous materials, pollution prevention, and solid waste is not anticipated. Additionally, each Zipline UA is primarily made from recyclable materials and the only hazardous materials used in its manufacture and operation are lithium-ion batteries. Each Zipline UA will be properly managed at the end of its operating life in accordance with 14 CFR Part 43. Any hazardous materials would be disposed of in accordance with all federal, tribal, state, and local laws, including 40 CFR Part 273, *Standards for Universal Waste Management*.

- **Land Use:** The proposed action does not involve any changes to existing, planned, or future land uses within the area of operations. Zipline would primarily construct on existing infrastructure, such as parking lots or the sides of buildings. Land use and zoning are typically governed by local and state laws. Zipline is responsible for complying with any such applicable laws relevant to establishing its operations (e.g., siting docks and related infrastructure). All docks would be sited in accordance with

all local land use ordinances and zoning requirements. Local jurisdictions in the DFW metro area may vary in the scope of their review and approval of commercial operations. Further, Section 2.2, *Proposed Action,* identifies the standoff distances from noise-sensitive areas.

- **Natural Resources and Energy Supply:** The proposed action would not require the need for unusual natural resources and materials, or those in scarce supply. Zipline's aircraft would be battery powered and would not consume fossil fuel (e.g., gasoline or aviation fuel) resources. The fuel for operation of generators is expected to be in relatively low quantities that are available from the local supply. Zipline would use a charging dock to charge the batteries of the UA. In addition, Zipline's electrically powered aircraft is most often used to replace individual personal automobile trips to retrieve small goods and would therefore be expected to reduce consumption of fuel resources; a 2020 study found that by year 5 of drone operations in a single U.S. metropolitan area, drone delivery could avoid up to 294 million miles per year in road use (Lyon-Hill et al. 2020).

- **Socioeconomics** and **Children's Environmental Health and Safety Risks:** The proposed action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to ensure that children do not suffer disproportionately from environmental or safety risks. The proposed action would not affect products or substances a child would be likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that could disproportionately affect children. It is not anticipated that the proposed action would pose a greater health and safety risk to children than package delivery by other means (truck, mail, personal automobile trips, etc.). Additionally, Zipline's proposal includes avoiding fly less areas during operational hours, which could help avoid or reduce any potential environmental health or safety impacts on children. Zipline's electrically powered aircraft is most often used to replace individual personal automobile trips to retrieve small goods and would therefore reduce noxious emissions and improve road safety, which are both appreciable concerns for children.

- **Visual Effects (Light Emissions Only):** The proposed action would not result in significant light emission impacts because the majority of flights are expected to be conducted during the daytime. Light emissions would not noticeably affect the visual character or ambient light conditions of the study area. The small proportion of flights that do occur at night would likely be infrequent and of short duration, although flight cadence would vary depending on the location and partners served by an individual dock. Because of the overall small number of operations likely to be conducted between civil dawn and dusk, the proposed action would not result in significant light emission impacts due to nighttime operations. Night is defined by 14 CFR Section 1.1 as the time between the end of evening civil twilight[21] and the beginning of morning civil twilight, as published in the *Air Almanac*, converted to local time (U.S. Department of the Navy 2022).

[21] According to the National Oceanic and Atmospheric Administration National Weather Service, civil twilight begins in the morning, or ends in the evening, when the geometric center of the sun is 6 degrees below the horizon. Therefore, morning civil twilight begins when the geometric center of the sun is 6 degrees below the horizon, and ends at sunrise. Evening civil twilight begins at sunset, and ends when the geometric center of the sun is 6 degrees below the horizon (National Oceanic and Atmospheric Administration National Weather Service n.d.).

- **Water Resources (Wetlands, Floodplains, Surface Water, Groundwater, and Wild and Scenic Rivers):** The proposed action would not result in substantial new ground disturbance and would therefore not encroach upon areas designated as navigable waters, wetlands, or floodplains. Dock construction would at most involve the installation of 500 square feet of impermeable surface and site-specific standoff measures would be initiated to avoid potential affects to navigable waters, wetlands, and floodplains. The proposed action would not affect any waters of the U.S. The proposed action would not result in any substantial changes to existing discharges to water bodies or modify a water body. The proposed action would not degrade water quality or contaminate public drinking water supplies. The proposed action does not involve activities that would withdraw groundwater from underground aquifers or reduce infiltration or recharge to groundwater resources through the introduction of new impervious surfaces. The closest wild and scenic river to the study area is the Cassatot River in Arkansas, approximately 150 miles northeast of the study area (National Park Service 2024b). The closest Nationwide Rivers Inventory river segment is the Brazos River approximately 22 miles west of the study area (National Park Service 2024c). Therefore, dock establishment and operations would not affect a wild and scenic river or river on the Nationwide Rivers Inventory. The proposed action does not have the potential to disrupt the free-flowing character of any designated wild and scenic river. Therefore, the proposed action would not affect wetlands, floodplains, surface water, groundwater, or wild and scenic rivers.

3.3 Biological Resources (Including Fish, Wildlife, and Plants)

3.3.1 Definition of Resource and Regulatory Setting

Biological resources include plant and animal species and their habitats, including special-status species (federally listed or state-listed threatened or endangered species, species proposed for listing, species that are candidates for federal listing, marine mammals, and migratory birds) and environmentally sensitive or critical habitat. Biological resources provide aesthetic, recreational, and economic benefits to society.

3.3.1.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires all federal agencies to seek to conserve threatened and endangered species. Section 7(a)(2) of the ESA requires that each federal agency—in consultation with the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS)—ensures that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The FAA is required to consult the USFWS or NMFS if an action may affect a federally listed species or critical habitat. If the FAA determines the action would have *no effect* on listed species or critical habitat, consultation is not required.

3.3.1.2 Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. Sections 703–712) protects migratory birds by prohibiting the taking, killing, or possessing of migratory birds (including their eggs, nests, and feathers). The MBTA applies to migratory birds identified in 50 CFR Section 10.13 (defined hereafter as “migratory

birds"). The USFWS is the federal agency responsible for the management of migratory birds when they occupy habitat in the United States. Zipline is responsible for compliance with the MBTA.

The Bald and Golden Eagle Protection Act prohibits anyone from "taking" a bald or golden eagle, including their parts, nests, or eggs, without a permit issued by the USFWS. Implementing regulations (50 CFR Part 22), and USFWS guidelines as published in the *National Bald Eagle Management Guidelines*, provide for additional protections against "disturbances." Similar to *take*, *disturb* means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or causes either a decrease in its productivity or nest abandonment due to a substantial interference with breeding, feeding, or sheltering. A permitting process provides limited exceptions to the Bald and Golden Eagle Protection Act's prohibitions. Permits are only needed when avoidance of incidental take is not possible. According to the National Bald Eagle Management Guidelines, if conservation measures can be implemented such that no aircraft are flown within 1,000 feet of an eagle nest, incidental take of bald eagles is unlikely to occur, and no permit is needed. Zipline is responsible for compliance with the Bald and Golden Eagle Protection Act.

3.3.2 Affected Environment

According to the Texas Parks and Wildlife Department Ecoregions of Texas, the study area overlaps both the Blackland Prairies Ecoregion 29 on the east near Dallas and the Cross Timbers Ecoregion 32 in the western Fort Worth portion of the study area (Texas Parks and Wildlife n.d.-f). Blackland Prairie is known for its productive, rich soils, gentle topography, and lush native grasslands. It is a true prairie grassland community, dominated by a diverse assortment of grasses. The Cross Timbers and Prairies Ecoregions are characterized by high density linear stands of trees with irregular plains and prairies, a vast mosaic of grasslands, and woodlands. The Cross Timbers are the primary ecological region in Northcentral Texas. Post oak and blackjack oak woodlands interspersed with grassland and prairie habitats characterize this community (Cross Timbers Urban Forestry Council 2019).

The majority of the land surface within the study area features urban and suburban development. Therefore, wildlife habitats within the study area predominantly include parks and open spaces, lakes, waterways, riparian buffers, and vacant lands. Urban flora and fauna thrive in such environments and typically are well established and populated.

The DFW metro area is one of the fastest growing areas in the United States (Lee 2021). Development is rapidly encroaching upon existing vacant lands both within and surrounding the project. The urban environment in the DFW area includes agricultural areas; commercial areas (i.e., business parks, airports, landfills); communities; downtown areas; a military base; recreational areas (i.e., public parks, golf courses); residential areas; thoroughfare (i.e., highways, railroads, public roads); undeveloped areas (i.e., open fields, vacant lots, wooded areas); and waterbodies, wetlands, and floodplains (Chris Jackson's DFW Urban Wildlife n.d.). These areas provide habitat for the smaller and more common bird and mammal species of the southern United States, including mammals such as white-tailed deer (*Odocoileus virginianus*), raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), and gray squirrels (*Scirius carlinensis*).

3.3.2.1 Special-Status Species

Federally Listed Species

The potential for impacts on federally listed species was assessed using the USFWS Information for Planning and Consultation online system (January 24, 2024). The official species list for the study area is included within Appendix E, *Biological Resources*. Table 3.3-1 lists the federally threatened and endangered species that could be present in the study area. The study area also contains designated critical habitat for one species, the Texas fawnsfoot (*Truncilla macrodon*).

Table 3.3-1. ESA-Listed, Proposed, and Candidate Species Potentially Present Within the Study Area

Species	Common Name	Scientific Name	ESA Status	Critical Habitat
Mammals	Tricolored bat	*Perimyotis subflavus*	Proposed Endangered	N
Birds	Golden-cheeked warbler	*Setophaga chrysoparia*	Endangered	N
	Piping plover	*Charadrius melodus*	Threatened	N
	Red knot	*Calidris canutus rufa*	Threatened	N
	Whooping crane	*Grus americana*	Endangered	N
Reptiles	Alligator snapping turtle	*Macrochelys temminckii*	Proposed Threatened	N
Clams	Louisiana Pigtoe	*Pleurobema riddellii*	Proposed Threatened	N
	Texas fawnsfoot	*Truncilla macrodon*	Proposed Threatened	Y
	Texas heelsplitter	*Potamilus amphichaenus*	Proposed Endangered	N
Insects	Monarch butterfly	*Danaus plexippus*	Candidate	N

ESA = Endangered Species Act.

There are four ESA-listed bird species that could be present in the study area: golden-cheeked warbler (*Setophaga chrysoparia*), an endangered species; piping plover (*Charadrius melodus*), a threatened species; red knot (*Calidris canutus rufa*), a threatened species; and whooping crane (*Grus americana*), an endangered species (USFWS 2024). Within this portion of their range, impacts on Piping Plover and Red Knot are only considered for wind energy projects. Therefore, no further analysis was conducted for those two species.

The golden-cheeked warbler nests exclusively in Texas from March to July in dense woodlands with ashe juniper, oaks, and other hardwood trees that provide them with habitat. However, urban and agricultural development have replaced the majority ashe juniper and oak woodlands in the DFW area (Texas Parks and Wildlife n.d.-a), and there is scant remaining preferred habitat for this species within the study area. The golden-cheeked warbler prefers and is mostly restricted to the Texas Hill Country to the south and west and is not common to the Cross Timbers and Blackland Prairie. The USFWS has not designated critical habitat for this species.

The whooping crane nests much farther north in Canada and there is no risk of nesting disturbance within the study area. However, whooping cranes often migrate through the DFW area to Texas' coastal plains in and around the Aransas National Wildlife Refuge. It is possible that whooping cranes could use wetlands and/or waterbodies within the study area as stopover habitat on their way to wintering grounds along the Gulf Coast. Within the study area, Lake Ray Roberts, Lewisville Lake, Lavon Lake, and Benbrook Lake all have at least partial suitable habitat (McConnell 2021). According to iNaturalist, there

have been seven separate observations of the whooping crane from 2013–2023 in the proposed study area (iNaturalist 2023). Three of the most recent observations occurred in 2022, just southwest of Fort Worth. In 2013, seven wandering whooping cranes from the non-migratory Louisiana population spent a few months living at Lewisville Lake (Chris Jackson's DFW Urban Wildlife n.d.). One of these cranes returned in 2014 but has not returned since. Whooping Cranes have not been observed at Lewisville Lake since 2014 and are considered rare in the area of the lake. Two whooping cranes were documented at Lake Ray Hubbard in 2014 (Chris Jackson's DFW Urban Wildlife n.d.) but have not been known to return to the area.

Additionally, the tricolored bat (*Perimyotis subflavus),* a proposed endangered species, may potentially occur within the study area (USFWS 2024). In non-hibernating seasons (spring through fall), tricolored bats primarily roost among live or recently dead deciduous hardwood trees and forage along forest edges and over ponds and other waterbodies (USFWS n.d.-b). Hibernation is typically 6–9 months per year, occurring in the winter months, where they typically dwell in caves and mines but are also known to occur in abandoned manmade structures (Texas Parks and Wildlife 2023).

The sole ESA-listed reptile in the study area, the alligator snapping turtle (*Macrochelys temminckii*), is confined to river systems that flow into the Gulf of Mexico, extending from the Suwannee River in Florida to the San Antonio River in Texas. In the Gulf Coastal Plain, its range extends from eastern Texas to southern Georgia and northern Florida. Alligator snapping turtles are generally found in deeper water of large rivers and their major tributaries; however, they are also found in a wide variety of habitats, including small streams, bayous, canals, swamps, lakes, reservoirs, ponds, and oxbows (a lake that forms when a meander of a river is cut off).

The Louisiana pigtoe (*Pleurobema riddellii*), Texas fawnfoot (*Truncilla macrodonI*), and Texas heelsplitter (*Potamilus amphichaenus*) are the only ESA-listed mussel species that potentially occur within the study area. The Texas fawnfoot is a freshwater mussel that is endemic to Texas and found in three river basins; Colorado, Brazos, and Trinity. The Texas heelsplitter is also endemic to Texas and is only found in the Trinity, Neches, and Sabine River drainages. The Louisiana pigtoe is a freshwater mussel that occurs in multiple river drainages throughout portions of east Texas, Louisiana, southeast Oklahoma, and southwest Arkansas. In Texas, the species has been observed in the Big Cypress-Sulphur, Neches-Angelina, Sabine, San Jacinto, and Trinity river basins.

The monarch butterfly potentially occurs within milkweed patches located in open areas throughout the study area (USFWS 2024). Monarchs occur throughout the United States during summer months and is a candidate species for federal listing. The preferred habitat for monarchs is open meadows, fields, and wetland edges with the presence of milkweed and flowering plants. Monarchs migrate through Texas in the fall and the spring through two major flyways. Monarchs enter the first flyway during the last days of September and travel from Wichita Falls to Eagle Pass. The second flyway is along the Texas coast and lasts roughly from the third week of October to the middle of November (Texas Parks and Wildlife n.d.-g).

State Species of Greatest Conservation Need

In Texas, native animals or plants designated as a Species of Greatest Conservation Need (SGCN) are generally those that are declining or rare and in need of attention to recover, or to prevent the need to list under state federal regulation (Texas Parks and Wildlife 2020). The counties identified in the study area that have been evaluated for SGCN include Bosque, Collin, Cooke, Dallas, Denton, Ellis, Erath, Fannin, Grayson, Henderson, Hill, Hood, Hunt, Jack, Johnson, Kaufman, Montague, Navarro, Parker, Rockwall, Somervell, Tarrant, Van Zandt, and Wise Counties. The Texas Parks and Wildlife Department's

database of Rare, Threatened, and Endangered Species of Texas lists 152 species of amphibians, birds, fish, mammals, reptiles, insects, crustaceans, mollusks, and plants in these counties considered as SGCN as defined in the 2023 Texas Wildlife Action Plan. Table E-1 in Appendix E provides information on the SGCN in these counties.

Migratory Birds

Migratory bird species found within the study area vary throughout the year. The study area is a part of the Central Migratory Flyway where millions of birds, including songbirds, grassland birds, waterfowl, shorebirds, and raptors migrate north and south during spring and fall migration (Texas Parks and Wildlife n.d.-e).

Bird behavior, in particular mobbing and territorial defense behaviors, on flying and hovering UA is the most important risk consideration for analysis, as these behaviors are the most pertinent to the proposed action. Mobbing behavior includes birds emitting alarm calls, flying at the predator, diverting its attention, and harassing it. Mobbing and aerial attack behaviors typically occur when a raptor, crow, or other aerial predator enters the airspace of breeding habitat or territorial males (Royal Society for the Protection of Birds 2023). Certain species of birds harass, mob, and attack aerial predators that fly into or near their territory, especially during the breeding season when birds are actively nesting. The defending birds will chase, dive bomb, attack the backside, and vocalize to harass the aerial predator until the offender is far enough from the territory that the defending birds cease attacking and return to their nests and foraging activities (Kalb and Randler 2019). Not all bird species exhibit mobbing and territorial defensive behaviors. Some bird species are more aggressive, defensive, and cued on aerial predators, while other species may show no aggression or interest toward an overflying hawk in its territory. Species of birds that exhibit mobbing and territorial defense behaviors that are known to occur in the DFW area are shown in Table 3.3-2.

Table 3.3-2. Dallas–Fort Worth Metro Songbird Species with Mobbing and Territorial Behaviors

Common Name (scientific name)	Habitat Preferences	Notes
Northern Mockingbird (*Mimus polyglottos*)	Habitat generalist occurring in nearly all types of urban development settings.	The most aggressive territorial bird species in North America, the mockingbird is a potential mobbing species during hovering at the nest and delivery location. Mockingbirds are known to nest in parking lot landscaping and areas with high density development. Birds will attack any moving object in territory, including humans and pets.
Red-winged Blackbird (*Agelaius phoeniceus*) and Common Grackle (*Cyanocitta cristata*)	Both species have a strong affinity for wetland habitats and lake shorelines for breeding and nesting.	Relatively aggressive territorial defender known to mob a wide variety of animals who fly over or perch within a male blackbird or grackle's harem territory. Both males and females exhibit mob behaviors during the breeding season but do not mob during the nonbreeding season during the fall and winter months when blackbirds and grackles tend to form in flocks.

Common Name (scientific name)	Habitat Preferences	Notes
American Crow (*Corvus brachyrhynchos*)	The American crow is less of a nest defending bird and is more prone to territorial defense and inquisitive behaviors as the bird species with the highest intelligence in the DFW metro area.	Little to no concern over mobbing UA vehicles; greater concern over territorial defense and curiosity behaviors. Crows can also attack larger prey items cooperatively.
Blue Jay (*Cyanocitta cristata*)	Known for nest defensive mobbing but can also discern predator from non-predator more easily than other species.	Hovering will be the greatest risk point blue jay mobbing attack. Blue jays require mature tree cover and some degree of pervious surfaces in urban areas, making them a less likely risk than mockingbirds.
Small Songbirds	Include several species that exhibit breeding habitat and nest defense behaviors. Typically tree-nesting species.	Smaller bird species like the diminutive blue-grey gnatcatcher (*Polioptila caerulea*) do not defend territories as large as the above-mentioned species, making them unlikely mobbing birds for conflicts with UAs.

Source: Texas Parks and Wildlife n.d.
DFW = Dallas–Fort Worth; UA = unmanned aircraft.

The bald eagle (*Haliaeetus leucocephalus*) is not a Bird of Conservation Concern in the study area but warrants attention under the Eagle Act. Bald eagles may be present year-round throughout Texas as spring and fall migrants, breeders, or winter residents (Cornell Lab of Ornithology n.d.). Bald Eagles typically nest in forested areas adjacent to large bodies of water (Cornell Lab of Ornithology n.d.) and nests have been previously documented in the DFW area around Benbrook Lake, Joe Pool Lake, Lake Arlington, Lake Worth, Lewisville Lake, and Mountain Creek Lake (iNaturalist 2023). Bald eagles and other raptors may exhibit territorial behavior when nesting (USFWS n.d.-c).

3.3.3 Environmental Consequences

Potential impacts on biological resources associated with the proposed action were considered in the area where drones may operate (launch, fly, and drop packages). Zipline's docks and sites would primarily be located in previously disturbed areas such as building sides and parking lots or occasionally minimally areas directly adjacent to commercial sites; any disturbance associated with the program would be minimal and would not affect high-quality habitat availability for any species. Drones fly at lower speeds and elevations and are smaller than conventional aircraft. Zipline's deliveries would initiate from the dock and approach at an en route altitude of 330 feet AGL. The UA would maintain altitude at 330 feet AGL and hover for approximately 75 seconds to make a delivery. Then, the UA accelerate and transition back to en route flight mode for a return to the dock. At a potential maximum of 30,000 flights per day across the entire DFW metro area, the distribution and altitude of the flights are not expected to significantly affect wildlife in the study area. Furthermore, the Zipline UA would only briefly hover in fixed positions at the dock, site, and delivery locations, leaving them only temporarily exposed to a mobbing and attacking bird defending its breeding territory.

A significant impact on federally listed threatened and endangered species would occur when the USFWS or NMFS determines the proposed action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would be likely to result in the destruction or

adverse modification of federally designated critical habitat. An action need not involve a threat of extinction to federally listed species to meet the NEPA standard of significance. Lesser impacts, including impacts on non-listed or special-status species, could also constitute a significant impact.[22]

3.3.3.1 No Action Alternative

Under the no action alternative, Zipline would not implement commercial UA package delivery operations in the DFW metro area and would continue to conduct UA package delivery operations under Part 135 in locations currently authorized by its OpSpecs. The no action alternative is not expected to result in significant impacts on biological resources

3.3.3.2 Proposed Action

There would be limited ground construction or habitat modification associated with the proposed action, as the docks would primarily be located in lots that are already developed with commercial uses. Zipline's aircraft would not touch the ground in any place because it remains aerial while conducting deliveries and docks are stationed above ground. Zipline's deliveries would initiate from the dock, approach an en route altitude of 330 feet AGL, and would generally occur between 330 feet AGL. The UA would hover for a brief time at 330 feet AGL to make a delivery. Then, the UA would accelerate and transition back to en route flight mode for a return to a dock.

Because operations would occur mostly in an urban environment, typically well above the tree line and away from sensitive habitats and given the short duration of increased ambient sound levels, flights are not expected to significantly influence wildlife in the area. Zipline plans to coordinate with the managing entities of state parks and natural areas within the DFW area on the thoughtful placement and use of delivery sites within these areas as necessary.

Special-Status Species

Federally Listed, Proposed, and Candidate Species

The proposed action does not involve ground-disturbing activity outside of existing commercial areas and does not include extensive operations over water and Zips would only briefly transit across water bodies during delivery and repositioning operations. No indirect or direct effects would occur to aquatic environments or high-quality terrestrial habitats as a result of the proposed action.

As there is no plausible route of effects on aquatic environments or taxa, the FAA has determined that the proposed action would have *"no effect"* on alligator snapping turtle, Louisiana pigtoe, Texas fawnfoot, Texas Heelsplitter, and to the proposed Texas fawnfoot's critical habitat.

Federally endangered whooping cranes could pass through the study area during their annual fall migration in mid-September to wintering grounds along the Gulf Coast, and during their annual spring migration to Canada in late March to early April. Potential suitable habitat has been identified for whooping cranes at several lakes within the DFW area as discussed in detail in Section 3.4.2.1, *Special-Status Species*. However, whooping crane migration flights are usually between 1,000 and 6,000 feet (USFWS n.d.-b); therefore, it is not expected that occasional drone flights at 330 feet AGL would impact transitory whooping cranes at these altitudes. Additionally, the USFWS has used drones to survey

[22] See FAA Order 1050.1F, Exhibit 4-1, Biological Resources, Factors to Consider, p. 4-4.

sandhill cranes, a surrogate species for whooping crane behavior, and reported "no discernible effect" observed on the animals (USFWS n.d.-b). If whooping cranes are observed using habitat in the study area in future, Zipline would coordinate with the Arlington Ecological Services Field Office of the USFWS, as well as the Texas Parks and Wildlife Department, to determine pertinent avoidance zones or any other best management practices needed to avoid adversely affecting the species.

Therefore, based on operations occurring mostly in an urban environment, the altitude at which the UA flies in the en route phase, the expected low sound levels experienced by whooping cranes, short duration of increased ambient sound levels, the low probability of a whooping crane occurring in the study area, and the low likelihood of a UA striking a whooping crane, the FAA has determined that the proposed action *"may affect, but is not likely to adversely affect,"* the whooping crane.

The federally endangered golden-cheeked warbler nests in the study area; however, their habitat is limited strictly to dense woodlands with ashe juniper, oaks, and other hardwood trees (Texas Parks and Wildlife n.d.-a). The drones would only transit over this habitat type to reach customers. The proposed action is not expected to frequently encounter the golden-cheeked warbler. Therefore, based on operations occurring mostly in an urban environment, the altitude at which the UA flies in the en route phase, the expected low sound levels experienced by Golden-cheeked Warblers, the short duration of increased ambient sound levels, the low probability of a golden-cheeked warbler occurring in the study area, and the low likelihood of a UA striking a golden-cheeked warbler, the FAA determined the proposed action *"may affect, but is not likely to adversely affect,"* the golden-cheeked warbler.

The tricolored bat and monarch butterfly are listed as proposed endangered and threatened species respectively and are therefore not protected under the Act; however, conferencing is only necessary if it is determined a federal action is likely to jeopardize the continued existence of a proposed species. Therefore, the FAA determined that conferencing is *not necessary* for the proposed action.

On July 16, 2025, the FAA submitted an informal consultation request to the USFWS in accordance with Section 7 of the ESA and requested concurrence with the FAA's effect determination for the proposed project. On August 13, 2025, the USFWS issued a letter in response concurring with the FAA's determination that the project, as proposed "*may affect, but is not likely to adversely affect"* the whooping crane and golden-cheeked warbler.

Species of Greatest Conservation Need[23]

The southeastern myotis bat, cave myotis bat, tricolored bat, big brown bat, eastern red bat, hoary bat, and big free-tailed bat are SGCN that could be present in the study area. Although these bat species may occur within the study area, they are unlikely to encounter operating UA as Zipline's proposed operations occur predominantly in the urban environment where bat densities are lower. Bat activity increases as night approaches, and they are most active between dusk and dawn. Drone flights that occur between civil dawn and dusk would overlap with peak periods of activities.

Bats may exhibit disturbance behaviors and change their flight paths to avoid drones in the event that flights overlap with bat activity areas (Ednie et al. 2021). Research suggests that drones have "minimal impact on bat behavior" (Fu et al. 2018) primarily from noise emissions. However, drone disturbance is

[23] Species of Greatest Conservation Need are lists of species designated in the 56 State Wildlife Action Plans, which identify the species most in need of conservation action in that state or U.S. territory. See https://www.usgs.gov/tools/species-greatest-conservation-need-analysis-tool.

temporary and bats are expected to return to normal foraging and flight activities shortly after the exposure to drone noise ends (Kuhlmann et al. 2022; Ednie et al. 2021). These temporary disturbance events would not reduce habitat suitability or increase energy expenditure of bats outside the range of natural variability. ***As a result, the FAA has determined that the proposed action is not expected to have significant impacts on bats.***

The American bumblebee (*Bombus pensylvanicus*) is also considered a state SGCN and may be present in the study area. Insects, such as the bumblebee, could be struck by drones en route to or during delivery. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in the scientific literature. ***Therefore, based on the information available, the action is not expected to have significant impacts on insect populations.***

Migratory Birds

While there is a well-established repository of literature on bird mobbing and attack behaviors, and on bird strikes with large aircraft, information on drone interactions with birds is not as well documented. Without a baseline of data or pre-existing research on drone interactions with birds, creation of an effective and sensible predictive model is not possible. Therefore, this analysis focused on bird behavior and identified the northern mockingbird, red-winged blackbird, and common grackle as potential species that could mob or attack a drone while defending territory, especially during the early spring to mid-summer breeding period.

Limited instances of birds making contact with drones have been recorded in the United States by hobbyists (Connecticut Audubon Society n.d.). In these cases, ravens made a brief touch to the backside of the drone in flight as a curiosity behavior before flying away from the moving object.

To avoid impacts on nesting bald eagles, Zipline would implement a monitoring plan for bald eagle nests that integrates multiple strategies and resources. This includes periodically checking online tools such as iNaturalist[24] to identify eagle nests that may occur in the operating area, as well as communication with the bird watching community to identify nests. If Zipline identifies a bald eagle nest or is notified of the presence of a nest, Zipline would establish an avoidance area such that there is a 1,000 feet vertical and horizontal separation distance between the vehicle's flight path and the nest. Zipline would maintain this avoidance area until the end of the breeding season or until a qualified biologist indicates the nest has been vacated. Zipline would report monitoring and avoidance measures to Texas Parks and Wildlife and the USFWS Region 2 Migratory Bird Permit Office.

Based on the information available regarding the interaction between drones and birds, the FAA concludes that mobbing and attacking behaviors would be the most relevant interaction to occur. As detailed in Table 3.4-2, some bird species are more likely to exhibit this type of behavior, and these are the species that would potentially interact with the drones, if any.

The proposed action would not be expected to result in significant impacts on migratory birds because it would not result in long-term or permanent loss of wildlife species, would not result in substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or populations, and would not have adverse impacts on reproductive success rates, natural mortality rates, non-natural mortality, or ability to sustain the minimum population levels.

[24] See https://www.inaturalist.org.

3.4 Department of Transportation Act, Section 4(f) Resources

3.4.1 Definition of Resource and Regulatory Setting

Section 4(f) of the U.S. Department of Transportation (DOT) Act (codified at 49 U.S.C. Section 303) protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) states that, subject to exceptions for de minimis impacts[25] "[t]he Secretary may approve a transportation program or project requiring the use of [4(f) resources] … only if—(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

The term *use* includes both direct or physical and indirect or "constructive" impacts on Section 4(f) resources. *Direct use* is the physical occupation or alteration of a Section 4(f) property or any portion of a Section 4(f) property. *Constructive use* does not require direct physical impacts or occupation of a Section 4(f) resource. A constructive use would occur when a proposed action would result in substantial impairment of a resource to the degree that the protected activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.[26]

Another type of physical use, known as *temporary occupancy,* results when a transportation project results in activities that require a temporary easement, right-of-entry, project construction, or another short-term arrangement involving a Section 4(f) property. A temporary occupancy is considered a Section 4(f) use unless all the conditions listed in Appendix B, Paragraph 2.2.1 of FAA Order 1050.1F and the Section 4(f) regulations at 23 CFR 773.13(d) are satisfied.

A physical *use* may be considered de minimis if, after considering avoidance, minimization, mitigation, and enhancement measures, the result is either (1) a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or (2) a Section 106 *finding of no adverse effect* or *no historic properties affected*. Before the FAA may finalize a determination that a physical use is de minimis, the official(s) with jurisdiction must concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection.

The concept of *constructive use* is that a project that involves no actual physical use of a Section 4(f) property via permanent incorporation or *temporary occupancy*, but may still, by means of noise, air pollution, water pollution, or other proximity-related impacts, substantially impair important features, activities, or attributes associated with the Section 4(f) property. Substantial impairment occurs only

[25] The FAA may make a de minimis impact determination with respect to a physical use of Section 4(f) property if, after taking into account any measures to minimize harm, the result is either (1) a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or (2) a Section 106 finding of no adverse effect or no historic properties affected. See 1050.1F Desk Reference, Paragraph 5.3.3.

[26] Federal Highway Administration Section 4(f) Policy Paper (https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf). (Note: Federal Highway Administration regulations are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to aviation projects.)

when the protected activities, features, or attributes of the Section 4(f) property that contribute to its purpose and significance are substantially diminished. This means that the value of the Section 4(f) property, in terms of its prior purpose and significance, is substantially reduced or lost.

Procedural requirements for complying with Section 4(f) are set forth in 5610.1D, *Procedures for Considering Environmental Impacts* and 49 U.S.C. § 303. The NOA process was used to notify Section 4(f) jurisdictional agencies of potential impacts on public parks, recreation areas, wildlife refuges, and historic properties. The FAA also uses Federal Highway Administration regulations (23 CFR Part 774) and Federal Highway Administration guidance (e.g., Section 4(f) Policy Paper) when assessing potential impacts on Section 4(f) properties. These requirements are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to FAA projects. More information about DOT Act, Section 4(f) can be found in Chapter 5 of the FAA Order 1050.1F Desk Reference (FAA 2023) and 1050.1F Desk Reference: Federal Aviation Administration Office of Environment and Energy; Version 2 (February 2020).

3.4.2 Affected Environment

The FAA used data from federal, state, and other public-access sources to identify potential Section 4(f) resources within the study area (Appendix B, *Section 4(f)*). The FAA identified many properties that meet the definition of a Section 4(f) resource, including public parks administered by state, city, and county authorities, and historic properties identified on the Texas State Historic Preservation Officer (SHPO) website. By count, most of the Section 4(f) resources are local public parks, trails, and ballfields. Appendix B provides an inventory list of local parks in the study area (Texas Parks and Wildlife 2024). There are no wildlife refuges within the study area. Wildlife refuges and parks are not currently included in Zipline's fly less restrictions.

There may be instances where the delivery would be to a customer located within a Section 4(f) resource. For example, public delivery zones could be set up for events and community engagement in collaboration with the city parks and recreation department.

As discussed in Section 3.6, *Historical, Architectural, Archaeological, and Cultural Resources*, there are numerous historic properties within the study area as listed on the Texas SHPO website, although most of these are considered for architectural or other purposes that would not typically be affected by UA operations. The FAA is currently consulting with the Texas SHPO to determine whether historic and traditional cultural properties would be affected by the proposed action (see Section 3.6.2, *Affected Environment*).

3.4.3 Environmental Consequences

3.4.3.1 No Action Alternative

Under the no action alternative, Zipline would not implement commercial UA package delivery operations in the DFW metro area and would continue to conduct UA package delivery operations under Part 135 in locations currently authorized by its OpSpecs and at other locations under 14 CFR Part 107,[27] which limits operations to UA weighing less than 55 pounds and within visual line of sight. Market

[27] The *Operation of Small Unmanned Aircraft Systems Over People* rule (codified in 14 CFR Part 107) permits routine operation of small UAS (UAs weighing less than 55 pounds) within visual line of sight at night and over people without a waiver or exemption under certain conditions.

demand would not be met, and consumers would continue to use personal ground transportation to retrieve small goods. This alternative does not support the stated purpose and need.

3.4.3.2 Proposed Action

Under the proposed action, there would be no physical use of Section 4(f) resources because occasional flyovers in the study area would not result in substantial impairment of Section 4(f) properties. As discussed in Section 3.7, *Noise and Noise-Compatible Land Use*, and Appendix D, *Noise*, the proposed action would not result in significant noise levels at any location within the study area. As further described in Section 3.9, *Visual Effects*, the short duration of en route flights (approximately 15 seconds) would minimize any potential for significant visual impacts. In addition, Zipline's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location; with the diversification of flight paths, the frequency of overflights would inversely scale as the distance from a site increases. As discussed in Table J-1 of the 2023 EA, Zipline will communicate directly with Texas Parks and Wildlife to discuss any concerns regarding parkland noise and will carefully coordinate any parkland delivery operations with managing entities as necessary.

The FAA has determined that UA overflights as described in the proposed action would not cause substantial impairment to any of the Section 4(f) resources in the study area and are therefore not considered a constructive use of any Section 4(f) resource.

Therefore, the proposed action is not expected to cause significant impacts on Section 4(f) resources.

3.5 Historical, Architectural, Archaeological, and Cultural Resources

3.5.1 Definition of Resource and Regulatory Setting

Cultural resources encompass a range of sites, properties, and physical resources relating to human activities, society, and cultural institutions. Such resources include past and present expressions of human culture and history in the physical environment, such as prehistoric and historic archaeological sites, structures, objects, and districts that are considered important to a culture or community. Cultural resources also include aspects of the physical environment, namely natural features and biota that are a part of traditional ways of life and practices and are associated with community values and institutions.

The major law that protects cultural resources is the National Historic Preservation Act of 1966. Section 106 of the National Historic Preservation Act (54 U.S.C. Section 306108) requires federal agencies to consider the effects of their undertakings on properties listed or eligible for listing in the National Register of Historic Places (NRHP). This includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meets the NRHP criteria. Regulations related to this process are contained in 36 CFR Part 800, Protection of Historic Properties. Compliance with Section 106 requires consultation with the SHPO and applicable other parties, including Indian tribes.

Major steps in the Section 106 process include identifying the Area of Potential Effects (APE), identifying historic and cultural resources within the APE, consulting with the SHPO and Tribal Historic Preservation

Officers for tribes that are identified as potentially having traditional cultural interests in the area, and determining the potential effects on historic properties as a result of the action.

The FAA has not established a significance threshold for this impact category; however, the FAA has identified a factor to consider when evaluating the context and intensity of potential environmental impacts for historical, architectural, archaeological, and cultural resources. A factor to consider in assessing a significant impact is when an action would result in a finding of adverse effect through the Section 106 process. However, an adverse effect finding does not automatically trigger preparation of an Environmental Impact Statement (i.e., a significant impact). If an adverse effect is determined, the Section 106 process will be resolved through a Memorandum of Agreement or Programmatic Agreement to record resolution measures to mitigate or minimize adverse effects.

3.5.2 Affected Environment

The operating area for the proposed action is the entire study area where Zipline is planning to conduct UA package deliveries, as shown in Figure 2.2-1. According to the National Park Service's online database of the NRHP, a total of 445 historic properties and 76 historic districts occur within the operating area (National Park Service 2024a). These historic properties and districts are listed in Appendix G, *SHPO Consultation*.

3.5.2.1 No Action Alternative

Under the no action alternative, Zipline would not implement commercial UA package delivery operations in DFW and would continue to conduct package delivery operations under Part 135 in locations currently authorized by its OpSpecs. Consumers in the areas not served by UA would be expected to continue to use personal ground transportation to retrieve small goods. The no action alternative does not fulfill the stated purpose and need. Because there would be no change to the existing environment, the no action alternative is not expected to result in significant impacts related to historical, architectural, archaeological, and cultural resources.

3.5.2.2 Proposed Action

Sites and docks would be located in commercially zoned areas primarily pre-disturbed areas. Infrastructure for this project would consist almost entirely of pre-existing hardstand and would involve limited ground disturbance. Therefore, the nature of UA effects on historic properties would be limited to non-physical, reversible impacts (i.e., the introduction of audible and/or visual elements). Aboveground dock structures could incur a minor visual effect on historic properties if those properties are within the viewshed of the autoloaders. However, required standoff distances of 150 to 325 feet, depending on airspace classification as described in Appendix G, would minimize these impacts.

Zipline projects up to 400 delivery flights per operating day per site, meaning any historic or cultural resource would experience few overflights per day, if any. All takeoff and loading operations would occur at least 55 feet away from any historic properties, adhering to standoff requirements for noise-sensitive areas. Deliveries at or near historic properties would involve the UA hovering at 330 feet AGL for about 75 seconds. In flight, the UA would appear as a small object moving at twice the speed of bird flight. These rapid and intermittent flight operations would result in minimal visual effects. Additionally, Zipline's flight planning software minimizes overflights of any specific location by varying flight paths (Section 2.2, *Proposed Action*).

Noise levels for takeoff and delivery would remain below 85 dB SEL for 30 seconds. In-flight noise for the P2 Zip at 330 feet AGL is 69.1 dBA SEL. The FAA's noise exposure analysis (Section 3.6, Noise and Noise-Compatible Land Use, and Appendix G) confirms that noise levels would be below significance thresholds, even in areas of highest exposure. The small size of the UA ensures no vibrations that could affect historic structures or contents within the APE.

In accordance with 36 CFR Section 800.4(a)(1), the FAA transmitted a letter on July 3, 2025, to the Texas SHPO and local government stakeholders that there would be no adverse effect on historic properties by the proposed action based on the minimal infrastructure required for the project, consideration of historic properties in the OpSpecs as noise-sensitive areas, and the temporary nature of potential audible and visual effects (Appendix G).

The FAA also consulted with eleven tribes that may potentially attach religious or cultural significance to resources in the APE: (1) Absentee-Shawnee Tribe of Indians of Oklahoma; (2) Apache Tribe of Oklahoma; (3) Caddo Nation of Oklahoma; (4) Cherokee Nation; (5) Comanche Nation; (6) Coushatta Tribe of Louisiana; (7) Delaware Nation; (8) Muscogee (Creek) Nation; (9) The Choctaw Nation of Oklahoma; (10) Tonkawa Tribe of Indians of Oklahoma; and (11) Wichita and Affiliated Tribes (Wichita, Keechi, Waco, and Tawakonie).[28] The FAA sent consultation letters to the eleven tribes listed above on April 30, 2024, regarding the entire APE and did not receive any responses or objections.

The FAA received concurrence from the Texas SHPO on July 21, 2025, of its determination of *no adverse* effect by the proposed action. ***As currently analyzed, the proposed action would not result in significant impacts on historical, architectural, archaeological, or cultural resources.*** The FAA's historic and tribal outreach letters are included as Appendices F and G, respectively.

3.6 Noise and Noise-Compatible Land Use

3.6.1 Definition of Resource and Regulatory Setting

Noise is considered any unwanted sound that interferes with normal activities (such as sleep, conversation, student learning) and can cause annoyance. Aircraft noise is often the most noticeable environmental effect associated with any aviation project. Several federal laws, including the Aviation Safety and Noise Abatement Act of 1979, as amended (49 U.S.C. Sections 47501–47507) regulate aircraft noise and noise-compatible land use. Through 14 CFR Part 36, the FAA regulates noise from most certificated aircraft. FAA Order 1050.1F, Appendix B, Paragraph B-1.3 requires the FAA to identify the location and number of noise-sensitive areas that could be significantly impacted by noise. As defined in Paragraph 11-5b of Order 1050.1F, page 11-3, a noise-sensitive area is "an area where noise interferes with normal activities associated with its use. Normally, noise-sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historical sites."

Sound is measured in terms of the decibel (dB), which is the ratio between the sound pressure of the sound source and 20 micropascals, which is nominally the threshold of human hearing. Various weighting

[28] Nine of these nine tribes have Tribal Historic Preservation Officers: Absentee-Shawnee Tribe of Indians of Oklahoma; Caddo Nation of Oklahoma; Cherokee Nation; Comanche Nation; Coushatta Tribe of Louisiana; Delaware Nation; Muscogee (Creek) Nation; The Choctaw Nation of Oklahoma; and Wichita and Affiliated Tribes (Wichita, Keechi, Waco, and Tawakonie).

schemes have been developed to collapse a frequency spectrum into a single dB value. The A-weighted decibel, or dBA, corresponds to human hearing accounting for the higher sensitivity in the mid-range frequencies. To comply with NEPA requirements, the FAA has issued requirements for assessing aircraft noise in FAA Order 1050.1F, Appendix B. The FAA's required noise metric for aviation noise analysis is the yearly day-night average sound level (DNL) metric. The DNL metric is a single value representing the logarithmically averaged aircraft sound level at a location over a 24-hour period, with a 10 dB adjustment added to those noise events occurring from 10:00 p.m. to 7:00 a.m. the following morning. A significant noise impact is defined in FAA Order 1050.1F as an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure or a noise exposure at or above the DNL 65 dB due to a DNL 1.5 dB or greater increase.

3.6.2 Affected Environment

The approximate land area within the study area is 10,000 square miles, the approximate water area is 800 square miles, and the estimated population within the counties included in the study area is 6,574,000 per 2022 American Community Survey estimates (U.S. Census Bureau 2022).

The ambient (or background) sound level in the operating area varies and depends on the uses in the immediate vicinity. For example, the ambient sound level along a major highway is higher than the ambient sound level within a residential neighborhood. Existing sound sources in the operating area are primarily those from anthropogenic sources associated with commercial, industrial, transportation (e.g., highways, rail, and air travel), and residential land uses in an urban and city environment (e.g., vehicles, construction equipment, aircraft). Except for areas proximate to airports, existing aviation noise levels in the DFW study area are expected to be well below the FAA's threshold for significant noise exposure to residential land use (DNL 65 dB).

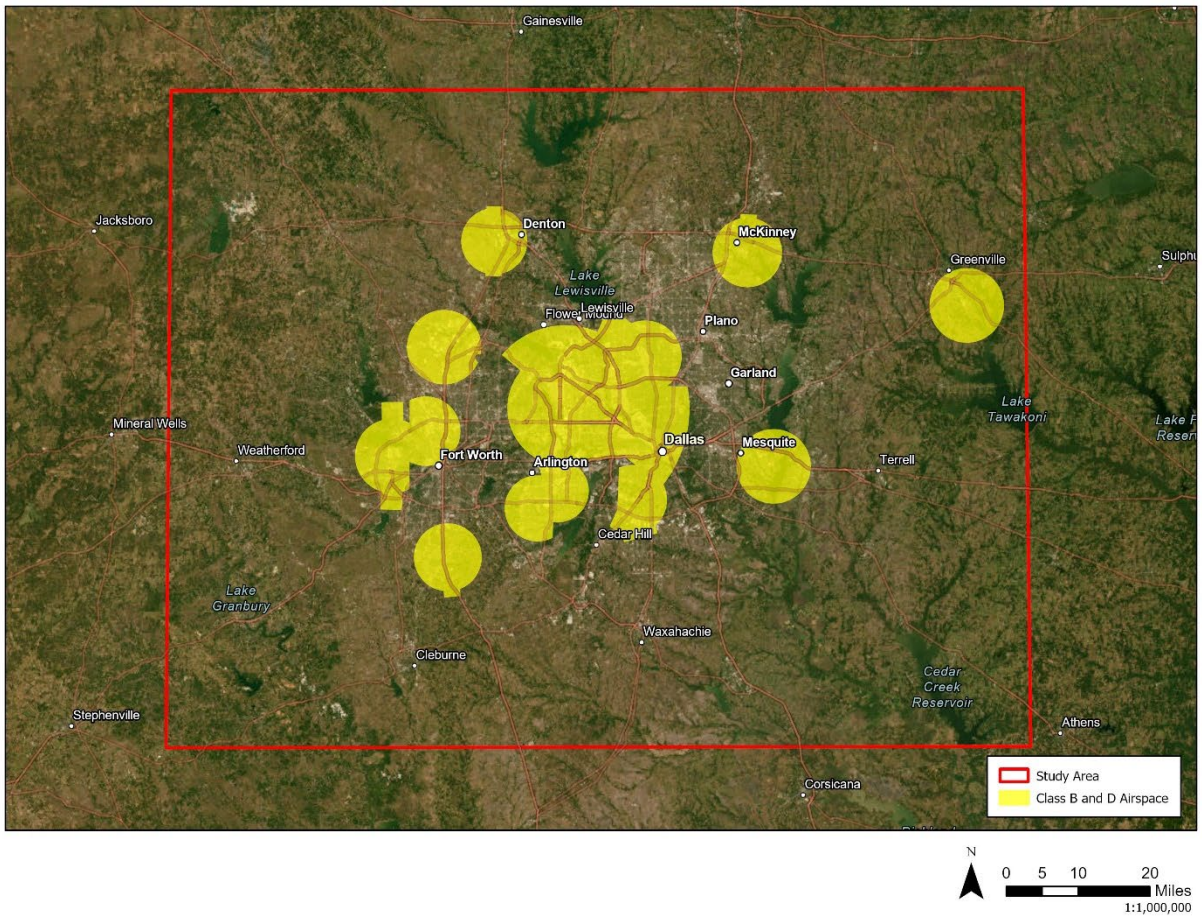

Figure 3.6-1. Class B and Class D Surface Areas

3.6.3 Environmental Consequences

3.6.3.1 No Action Alternative

Under the no action alternative, Zipline would not implement commercial UA package delivery operations in the DFW metro area. Zipline would continue to conduct UA package delivery operations under Part 135 in locations currently authorized by its OpSpecs and at other locations under 14 CFR Part 107. Therefore, the no action alternative is not expected to cause a significant impact on any noise-sensitive resources within the study area.

3.6.3.2 Proposed Action

Operations would include up to 400 daily deliveries from each site and would occur up to 365 days per year. The FAA developed a methodology to evaluate the potential noise exposure in the proposed study area that could result from implementation of the proposed action (Appendix D). The noise assessment evaluated noise emissions data for the P2 Zip. Only 5% of total operations would occur during acoustic night (10:00 p.m.–7:00 a.m.).

Due to the operational profile(s) that would be this analysis assumes the most conservative scenario with the farthest setback distances presented in Tables 10 to 12 of Appendix D. This analysis was used to define the potential significant impacts due to the proposed action. Noise assessments were performed for each of the flight phases as discussed in detail in the following sections.

Noise Exposure for Dock Operations

Based on a daily total maximum of 400 operations per dock, 20 total nighttime operations, and 365 operating days per year, Table 3.6-1 provides the most conservative extent of daily noise exposure for dock operations.

Table 3.6-1. Estimated Extent of Daily Noise Exposure from Dock

DNL Equivalent Day Delivery Cycles	DNL Equivalent Night Delivery Cycles	DNL 65 dB	DNL 60 dB	DNL 55 dB	DNL 50 dB
380	200	70 feet	150 feet	325 feet	En Route

Source: ICF 2025.
Note: Distances are the worst-case noise scenario (longest set back distances) based on Tables 10 through 12 of Appendix D. Noise exposure would exceed 50 DNL along the flight path for a site with 400 daily operations.
dB = decibel; DNL = day-night average sound level

As described in Section 2.2, *Proposed Action*, docks would be placed at least 325 feet away from noise-sensitive areas within the controlled surface areas of Class B and Class D airspace. In addition, docks would be placed at least 150 feet away from noise-sensitive areas when they are outside of the controlled surface areas of Class B and Class D airspace. Based on the above distances, the increase in noise would not be expected to exceed DNL 1.5 dB within areas with an existing noise exposure of DNL 65 dB or result in a noise exposure of DNL 65 dB because DNL 60 and 65 dB contours would not exceed the controlled surface areas of Class B and Class D airspace. Therefore, there would be no significant impact due to the dock operations.

Noise Exposure for En Route Operations

Based on the information provided by Zipline, it is expected that UA would generally cruise at or above an altitude of 330 feet AGL and travel at a ground speed of 47 mph during en route flight. The en route noise exposure for a single point exposed to 400 delivery and return flights (800 flights total) would not exceed DNL 50.3 dBA. Considering that en route UA noise would not exceed DNL 50.3 dBA under any delivery scenarios, this was not quantified further.

Noise Exposure for Delivery Operations

The noise exposure for delivery operations includes the noise exposure for the delivery point itself, based on maximum daily deliveries to any one location. The DNL delivery exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 2,000 feet. The noise exposure for any one delivery point is provided in Table 11 of Appendix D and summarized in Table 3.6-2 for various DNL levels. At the level of 400 daily DNL equivalent deliveries, significant noise effects would not be expected anywhere beyond the immediate point of delivery.

Table 3.6-2. DNL for Delivery Locations Based on Maximum Deliveries per Location

Average Daily Deliveries	DNL 65 Distance (feet)	DNL 60 Distance (feet)	DNL 55 Distance (feet)	DNL 50 Distance (feet)	DNL 45 Distance (feet)
1	<50	<50	<50	<50	<50
5	<50	<50	<50	<50	<50
10	<50	<50	<50	<50	<50
15	<50	<50	<50	<50	<50
20	<50	<50	<50	<50	<50
25	<50	<50	<50	<50	65
50	<50	<50	<50	<50	160
75	<50	<50	<50	55	310
100	<50	<50	<50	70	600
150	<50	<50	<50	120	En Route
200	<50	<50	<50	235	En Route
300	<50	<50	65	500	En Route
400	<50	<50	90	En Route	En Route

Source: ICF 2025.
Note: The proposed action assumes 95% of UA operations would occur between the hours of 7:00 a.m. and 10:00 p.m. and 5% would occur between 10:00 p.m. and 7:00 a.m. Noise exposure would exceed 50 DNL along the flight path for an operation with 400 or more deliveries per day, and 45 DNL along the flight path for an operation with 150 or more deliveries per day. Distances are the worst-case noise scenario (longest set back distances) based on Table 11 of Appendix D.
DNL = day-night average sound level.

Overall Noise Exposure Results

The maximum noise exposure levels are associated with dock operations, where DNL 65 dB occurs within 70 feet of a dock perimeter and DNL 60 dB occurs within 150 feet.

- As described in Section 2.2, docks would be located at least 150 feet away from noise-sensitive areas.
- In addition, when docks are planned to be within the controlled surface areas of Class B and Class D airspaces, docks would be placed at least 325 feet away from noise-sensitive areas.

Based on the noise analysis, and the above project restrictions, the proposed action would not have a significant noise impact.

3.7 Visual Effects (Visual Resources and Visual Character)

3.7.1 Definition of Resource and Regulatory Setting

Visual resources and visual character impacts deal broadly with the extent to which the project would either (1) produce light emissions that create annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Visual

effects can be difficult to define and assess because they involve subjectivity. In this case, visual effects would be limited to the introduction of a visual intrusion—a UA in flight—which could be out of character with the suburban or natural landscapes.

The FAA has not developed a visual effects significance threshold. Factors the FAA considers in assessing significant impacts include the degree to which the action would have the potential to (1) affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; (2) contrast with the visual resources and/or visual character in the study area; or (3) block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

3.7.2 Affected Environment

The proposed action would take place over mostly suburban and commercially developed properties. As noted in Section 3.5, *Department of Transportation Act, Section 4(f) Resources*, there are some publicly owned resources that could be valued for aesthetic attributes within the study area. However, Zips automatically deconflict with each other using a combination of strategic and tactical avoidance measures including generation of predetermined flight paths following specific rules to reduce the overlap of flight paths in different modes and phases of flight. During takeoff, en route outbound, delivery, en route inbound, and landing, the UA would depart from a dock and travel en route at an altitude less than 400 feet AGL (en route travel would generally occur at an altitude of 330 feet AGL). Deliveries would mostly take place at residences, and, in some cases, there may be instances where the delivery would be to a customer located within a Section 4(f) resource (see Section 3.5.2, *Affected Environment*, for more information on 4(f) properties). The delivery phase consists of descent from the en route altitude to a delivery point, such as a residential yard, driveway, parking lot, or common area. If the droid is unable to automatically identify the delivery target and evaluate its suitability, an image is sent to an operator for real-time evaluation. If the delivery site does not meet Zipline's evaluation criteria[29], delivery would not continue, and the droid is retracted back into the Zip. If the delivery site is identified and clear, the droid would continue to descend and deliver the payload at the delivery target. The total hover time for delivery operations would be approximately 75 seconds. The FAA estimates at typical operating altitude and speeds, the UA en route would be observable for approximately 6 seconds by an observer on the ground.

3.7.3 Environmental Consequences

3.7.3.1 No Action Alternative

Under the no action alternative, Zipline would not implement commercial UA package delivery operations in DFW and would continue to conduct package delivery operations under Part 135 in locations currently authorized by its OpSpecs. Consumers in the areas not served by UA would be expected to continue to use personal ground transportation to retrieve small goods. The no action alternative does not fulfill the stated purpose and need. Therefore, the no action alternative is not expected to result in significant visual effects.

[29] Zipline's evaluation criteria includes visual clearance for obstacles. It may also include additional checks such as droid position tracking errors.

3.7.3.2 Proposed Action

The proposed action would make no changes to any landforms or land uses; thus, there would be no effect on the visual character of the area, as the docks would be located in established commercial areas as further described in Section 2.2, *Proposed Action*. The proposed action involves airspace operations that could result in visual impacts on sensitive areas such as Section 4(f) properties where the visual setting is an important resource of the property. The short duration when each UA flight could be seen from any resource in the study area and the low number of overflights within any given location would minimize any potential for significant visual impacts.

The proposed action does not have the potential to do the following:

- Create annoyance or interfere with normal activities from light emissions;
- Affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- Contrast with the visual resources and/or visual character in the study area; and
- Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

Therefore, the proposed action is not expected to cause significant impacts on visual resources.

Chapter 4
Reasonably Foreseeable Effects

As most of the impacts discussed in Chapter 3, Affected Environment and Environmental Consequences, were found to be minimal and given that the drone flight is limited in its ability to interact with other outside actions due to its short duration, the proposed action's contribution to reasonably foreseeable impacts in conjunction with past, present and future actions under the FAA's jurisdiction within the study area would largely be from noise. Thus, this section will focus on the proposed action's potential impact on the noise environment.

Under the proposed action, Zipline would establish up to 75 site locations and construct up to a total of 500 docks with a maximum of twenty docks at a single site.

Because UA operations would occur in areas subject to other aviation noise sources, it is necessary to evaluate the noise exposure that would result from the proposed action and the other aviation noise sources present. Examples of such scenarios are Zipline operations occurring in the vicinity of an airport where Zipline flight activity may overlap with those other UA package delivery operators. Aviation noise sources are most likely to be the dominant contribution to noise impacts near airports. By comparison, other sources of noise would not appreciably contribute to overall noise levels at these locations.

There are 35 airports in the DFW metro area within the study area (see Appendix H, *Dallas–Fort Worth Area Airports*). The potential for reasonably foreseeable effects associated with noise and compatible land use effects would result from UA and manned aircraft operating within an airport DNL 60 dB contour. However, the potential for such effects would be minimized because Zipline has elected to require that all docks be placed at least 325 feet away from noise-sensitive areas within the controlled surface areas of Class B and Class D airspace. In addition, docks would be placed at least 150 feet away from noise-sensitive areas when they are outside of the controlled surface areas of Class B and Class D airspace. The expansion of Zipline's commercial delivery service is not expected to result in cumulative effects with other existing Part 135 UAS operations, such as the Causey Aviation Unmanned, Inc., Wing Aviation, LLC, DroneUp, Inc., or other Part 107 operations. Additionally, Part 135 operators would be required to complete an environmental review before beginning operations, ensuring that any potential additional effects are properly analyzed and disclosed.

Zipline will communicate and coordinate with other operators to limit operations occurring concurrently in the same area to avoid any significant impacts. When considering new dock locations, Zipline will confirm a new dock does not cause a significant impact due to another operator's site by verifying approved locations through NEPA documents and avoiding potential projects and additional impacts by geofencing and proactively sharing airspace. Given the market economics of operation siting, it is extremely unlikely that any significant effects would occur from site-related noise.

Zipline's flight planning software is designed to increase variability in flight paths to minimize overflights of any given location, thereby reducing the potential for effects when combined with other operations in the study area. Additionally, Part 135 operators would be required to complete an environmental review before beginning operations, ensuring that any potential additional effects are properly analyzed and disclosed. Given the dispersion of delivery sites and operators throughout the operating area and the expected transit noise of existing operators, it is extremely unlikely that en-route noise from multiple operators would ever reach the threshold of significance.

Zipline acknowledges that future operators may propose locating operations within this proposed action's study area. Should that occur, Zipline understands the potential for impacts may increase due to a future operator's project and would work with that operator and the FAA to mitigate potential impacts. Zipline also understands that any future operators would be required to perform their own NEPA analysis to identify the potential for any noise impacts due to their operations.

Ziplines' docks and sites would be in areas zoned for commercial activities and away from noise-sensitive areas. Docks would be powered using available electric outlets for recharging batteries. No reasonably foreseeable effects are expected on the power grid or from energy sources.

As discussed in Chapter 3, the proposed action is not expected to significantly impact the environmental impact categories (see Section 3.2, *Environmental Impact Categories Not Analyzed in Detail*). Areas of existing aviation noise sources within the study area would be avoided; thus, the proposed action would not contribute to significant noise impacts. No other actions are anticipated to interact with the proposed action to result in additional effects; therefore, the proposed action is not expected to result in significant effects.

The FAA's analysis of prospective hub siting areas concluded that siting 100 percent of the existing and proposed site locations is not feasible without overlap in the land area accessible from the site locations (i.e., the delivery ranges of the proposed UA). It should be noted that overlap does not necessarily mean that there will be adverse impacts on environmental resource categories. Greater effects are expected to occur where site locations and delivery routes overlap. The level of total impact would vary depending on the amount of overlap, but FAA's analysis has determined that the combined impacts are not expected to exceed thresholds for significance in any environmental resource categories.

The degree to which all of the different operators would operate within areas of shared airspace is dependent on the operators, their specific business use cases, and their ability to deconflict with one another in those overlapping areas. Each operator is responsible for coordinating with other operators in the same geographic area to avoid significant cumulative impacts. Zipline will communicate and coordinate with other operators to limit operations occurring concurrently in the same area to avoid any significant impacts. When considering new dock locations, Zipline will confirm a new site would not cause a significant cumulative impact due to another operator's dock[30] by verifying approved locations through NEPA documents and avoiding potential projects and cumulative impacts by geofencing and proactively sharing airspace.

[30] Zipline's operations are conducted from a dock, but other operators may use differing terminologies.

Appendix A
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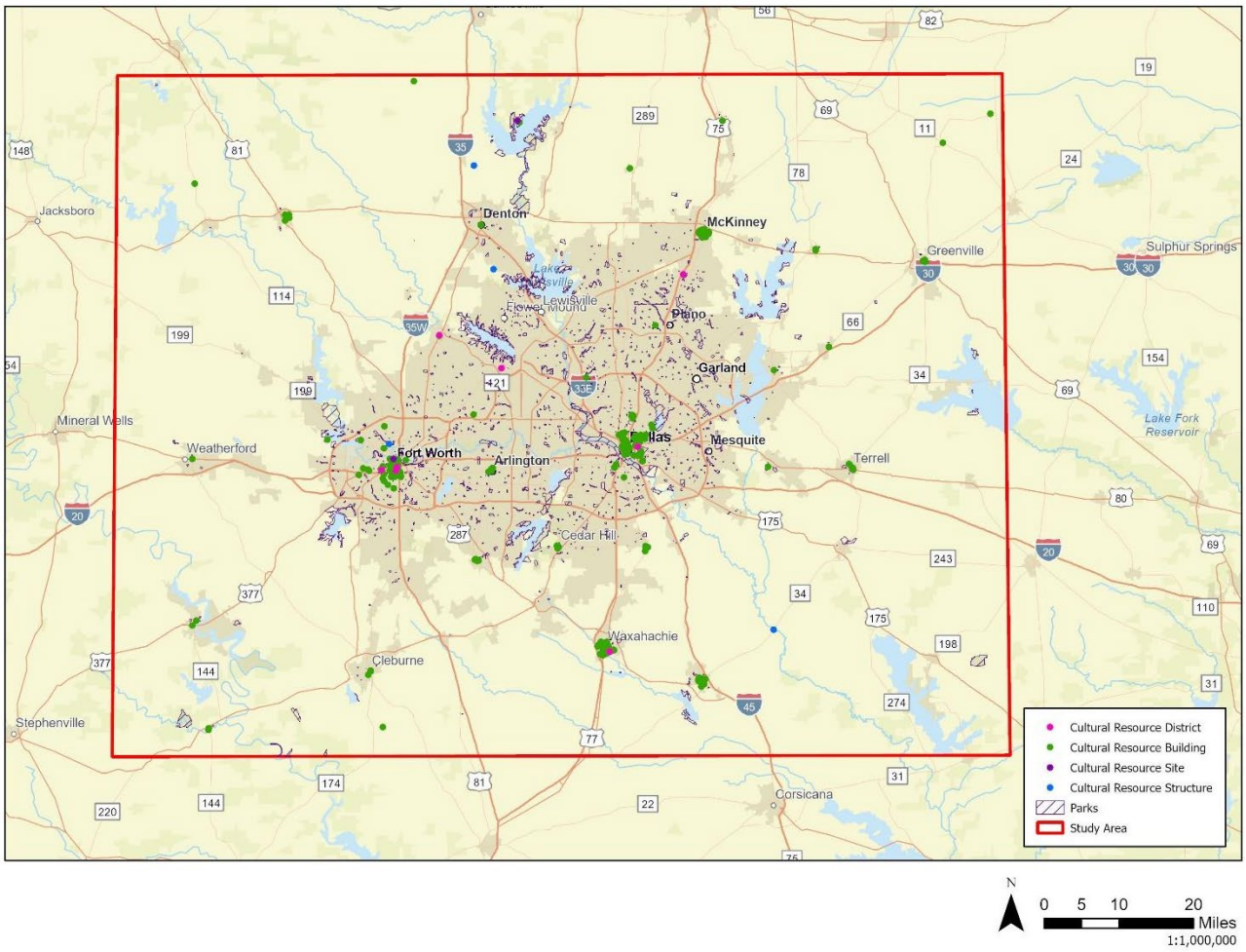
Appendix B
Section 4(f)



Appendix C
List of Agencies Consulted, Preparers, and Reviewers

Consulting Agency / Tribal Government	Representative
U.S. Fish and Wildlife Service	Omar Bocanegra, Field Supervisor
Texas Historical Commission	Bradford Patterson, Chief Deputy State Historic Preservation Officer
Absentee-Shawnee Tribe of Indians of Oklahoma	John Johnson, Governor
Apache Tribe of Oklahoma	Durell Cooper, Chairman
Caddo Nation of Oklahoma	Bobby Gonzalez, Chairman
Choctaw Nation of Oklahoma	Gary Batton, Chief
Cherokee Nation	Chuck Hoskin, Chairman
Comanche Nation, Oklahoma	Mark Woommavovah, Chairman
Coushatta Tribe of Louisiana	Jonathan Cernek, Chairman
Delaware Nation, Oklahoma	Deborah Dotson, President
Muscogee Nation	David Hill, Principal Chief
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Name and Affiliation	Years of Industry Experience	EA Responsibility
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Megan O'Donnell	10	NEPA SME, Biologist, Research, and Document Preparation
Robbie Baldwin, ICF	6	Biologist, Research, and Document Preparation
Jimmy Zaccagnino, ICF	5	Research and Document Preparation
Elisabeth Mahoney, ICF	6	Research and Document Preparation

Appendix D
Noise

TECHNICAL NOISE STUDY REPORT: ZIPLINE PLATFORM 2 UNMANNED AIRCRAFT PACKAGE DELIVERY OPERATIONS

REPORT NO. 021925

PREPARED FOR:

Federal Aviation Administration
Unmanned Aircraft Systems Integration Office (AUS)
950 L'Enfant Plaza SW, Suite 500
Washington, D.C. 20024

PREPARED BY:

ICF

May 2025

ICF. 2025. *Technical Noise Study Report: Zipline P2 Zip Unmanned Aircraft Package Delivery Operations.* Report No. 021925. May. Seatle, WA. Prepared for the Federal Aviation Administration. Washington, DC.

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Acronyms and Abbreviations

Acronyms and Abbreviations

AGL	above ground level
CONOPS	Concept of Operations
dB	decibel
dBA	A-weighted decibel
DNL	day night average sound level
FAA	Federal Aviation Administration
Lmax	maximum sound level
MTOW	maximum takeoff weight
SEL	sound exposure level
UA	unmanned aircraft

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Chapter 1
Introduction

1.1 Purpose

The purpose of this report is to provide calculations of noise exposure for package delivery operations by unmanned aircraft (UA) developed by Zipline International, Inc. Noise exposure estimates are provided for the Platform 2 UA (P2 Zip) based on sound level testing data collected by Zipline (2025).

The analysis in this report provides a methodology of estimating noise levels from UA operation that is specific to the Zipline P2 Zip. Because the methods used in this report are based on collected measurements, they should not be applied to other UA models. The analysis accounts for source levels only and does not include a site-specific geographic component, nor does it account for the presence of structures in urban areas.

The sound level measurements presented in this report are based closely on the concept of operations (CONOPS) for all modes of UA package delivery and associated operations. Passby exposure levels at different distances from an origination or delivery point are based on as-tested conditions, which were intended to simulate all operation types in the P2 Zip. Testing simulations consisted of the following operations:

- Undocking and departure from an origination point (dock)
- Package offloading via Droid at a delivery point using the P2 Zip and departure back to dock
- Returning and landing at a dock
- Hovering in place
- En route (with a package)

Total DNL noise exposures are calculated based on various scales of package delivery and associated activities using passby exposure levels for the types of operation applicable to docks, delivery points and en route locations.

1.2 Fundamental Concepts

Various noise descriptors or metrics have been developed to describe time-varying noise levels. The following metrics are used in this evaluation.

- Sound Exposure Level (SEL): SEL represents the total sound energy occurring over a specified period compressed into a one-second time interval. The SEL metric has broad utility in noise prediction and is a primary metric calculated from Leq values collected from sound level testing of UAs.
- Day Night Average Sound Level (DNL): DNL is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 decibel (dB) penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m. The DNL is used in this

analysis to describe noise exposure for daily operations from a dock, en route, or a delivery point.

- Maximum Sound Level (Lmax): Lmax is the highest sound level measured during a specified period.
- Community Noise Equivalent Level (CNEL): Similar to DNL, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

1.3 Regulatory Context

The noise exposure estimates in this document are intended to be used for environmental assessments of operations involving the Zipline P2 Zip, for compliance with the National Environmental Policy Act, and operational requirements for a commercial carrier under 14 Code of Federal Regulations Part 135. The analysis method used in this report does not apply standard models such as the Aviation Environmental Design Tool but instead applies an estimation method based on collected noise measurements. As such the application of this method is only applicable to the Zipline P2 Zip. The nonstandard methodology, equivalent to Federal Aviation Administration (FAA) Order 1050.1F, was approved by the FAA to inform the environmental decision-making regarding drone noise exposure from the proposed Zipline P2 Zip package delivery operations.

Chapter 2
Methods

2.1 Sound Level Testing of the P2 Zip

The analysis in this report used sound level testing data described in the *P2 Zip Noise Assessment Test Plan and Report Revision D* prepared by Zipline (2025).

Sound level testing was conducted at the Zipline test facility in Esparto, California in November 2024. The testing protocol followed FAA direction given in the document, *Measuring Drone Noise for Environmental Review Process*, dated October 2023 (FAA 2023).

The typical operational profile of the UA can be broken into Undocking, En route (outbound), Delivery, En route (inbound) and Docking. The following subsections provide a narrative description of these flight phases.

2.1.1 Undocking

Typical sequence of undocking operation from the dock:

1. Load package into the Droid and stow the Droid into the P2 Zip prior to undocking.
2. Complete Automated and visual pre-flight checks.
3. Conduct pre-flight motor start (approximately 25 seconds).
4. Conduct an undocking maneuver and ascend vertically from dock until reaching approximately 330 feet above ground level (AGL) (approximately 75 seconds).
5. Begin horizontal flight at constant acceleration until a speed of 41 knots is reached (approximately 10 seconds).
6. Maintain horizontal flight at constant velocity of 41 knots.

2.1.2 En route (Outbound)

Typical sequence of en route operation:

1. Cruise at a typical speed of approximately 41 knots towards the delivery location, at approximately 330 ft AGL.

2.1.3 Delivery

Typical sequence of delivery operation:

1. P2 Zip with package approaches at 330 feet AGL.
2. Decelerate from 41 knots to zero speed (approximately 20 seconds).
3. Maintain hover at 330 feet AGL as Droid is un-stowed from the P2 Zip, Droid is winched down to the ground at the delivery point, and Droid is re-stowed once delivery is complete (approximately 75 seconds).

4. Begin return horizontal flight at constant acceleration until a speed of 41 knots is reached. (approximately 10 seconds).

2.1.4 Enroute (Inbound)

Typical sequence of en route operation:

1. Cruise at a typical speed of approximately 41 knots to the dock, at approximately 330 ft AGL.

2.1.5 Docking

Sequence of docking operation:

1. P2 Zip approaches at approximately 330 feet AGL.
2. Decelerate from approximately 41 knots to zero (approximately 20 seconds).
3. Descend to the dock and complete the docking maneuver (approximately 75 seconds).
4. Shutdown propellers and aircraft systems.

2.2 Sound Exposure Levels from Sound Level Measurements

A brief summary of sound exposure levels from test results is shown in Table 1. The test results that include en route operation assume a nominal cruise speed of 41 knots (Zipline 2025). All tests were conducted with payload at maximum takeoff weight (MTOW). The total weight of the P2 Zip with payload was 63 pounds (55 pounds of aircraft weight and 8 pounds of payload). No flights without payload were conducted. The test flights were conducted at altitude and speed of planned takeoff and delivery operations. As such, no adjustments for speed or altitude were added to SEL values. Durations of test flights used for calculating SEL are shown in Table 2.

Table 1. Summary of Sound Exposure Levels, P2 Zip

Test Series	Altitude	Microphone Position	Average SEL at the 50-foot undertrack microphone (dBA)
Leaving dock with payload at MTOW and takeoff	Ascend to 330 feet AGL, then forward flight at 330 feet AGL	Under flight path, 50 feet away from dock	85.0
Arrival with payload at MTOW and landing at dock	Arrive at 330 feet AGL and descend to dock	Under flight path, 50 feet away from dock	86.2
Delivery hover with payload at MTOW	Hover at 330 feet AGL	Under flight path, 50 feet away from delivery point	74.1
En Route with Payload at MTOW	330 feet AGL at a forward flight speed of 41 knots	50 feet perpendicular distance from undertrack line of flight[1]	69.1

Source: Zipline 2025.

AGL = above ground level

MTOW = maximum takeoff weight

dBA = A-weighted decibel

[1] The maximum SEL was measured at a 50-foot offset position during the en route tests. This should be used to represent the undertrack SEL value for en route overflights.

Table 2. Durations from Sound Level Testing used to Derive Sound Exposure Levels, P2 Zip

Operation	Test series	Test #	Start time (seconds)	End time (seconds)	Duration (seconds)
Depart from dock	Docking/Docking A	1	46	180	134
Depart from dock	Docking/Docking A	2	44	168	124
Depart from dock	Docking/Docking A	3	45	171	126
Depart from dock	Docking/Docking A	4	44	170	126
Depart from dock	Docking/Docking A	5	47	174	127
Depart from dock	Docking/Docking A	6	45	171	126
Depart from dock	Docking/Docking B	1	47	171	124
Depart from dock	Docking/Docking B	2	43	167	124
Depart from dock	Docking/Docking B	3	48	172	124
Depart from dock	Docking/Docking B	4	47	171	124
Depart from dock	Docking/Docking B	5	51	175	124
Depart from dock	Docking/Docking B	6	49	172	123
Depart from dock	Docking/Docking C	1	48	171	123
Depart from dock	Docking/Docking C	2	44	169	125
Depart from dock	Docking/Docking C	3	45	168	123
Depart from dock	Docking/Docking C	4	48	172	124
Depart from dock	Docking/Docking C	5	44	168	124
Depart from dock	Docking/Docking C	6	43	169	126

Operation	Test series	Test #	Start time (seconds)	End time (seconds)	Duration (seconds)
Arrive at dock	Docking/Docking A	1	238	359	121
Arrive at dock	Docking/Docking A	2	230	350	120
Arrive at dock	Docking/Docking A	3	229	351	122
Arrive at dock	Docking/Docking A	4	228	350	122
Arrive at dock	Docking/Docking A	5	232	354	122
Arrive at dock	Docking/Docking A	6	230	350	120
Arrive at dock	Docking/Docking B	1	236	352	116
Arrive at dock	Docking/Docking B	2	228	349	121
Arrive at dock	Docking/Docking B	3	232	355	123
Arrive at dock	Docking/Docking B	4	232	355	123
Arrive at dock	Docking/Docking B	5	235	358	123
Arrive at dock	Docking/Docking B	6	233	353	120
Arrive at dock	Docking/Docking C	1	234	353	119
Arrive at dock	Docking/Docking C	2	230	351	121
Arrive at dock	Docking/Docking C	3	231	350	119
Arrive at dock	Docking/Docking C	4	234	354	120
Arrive at dock	Docking/Docking C	5	230	351	121
Arrive at dock	Docking/Docking C	6	231	350	119
Transition/Deceleration	Docking/Docking A	1	253	274	21
Transition/Deceleration	Docking/Docking A	2	246	266	20
Transition/Deceleration	Docking/Docking A	3	245	266	21
Transition/Deceleration	Docking/Docking A	4	235	265	30
Transition/Deceleration	Docking/Docking A	5	249	269	20
Transition/Deceleration	Docking/Docking A	6	245	266	21
Transition/Deceleration	Docking/Docking B	1	246	267	21
Transition/Deceleration	Docking/Docking B	2	245	265	20
Transition/Deceleration	Docking/Docking B	3	251	270	19
Transition/Deceleration	Docking/Docking B	4	254	271	17
Transition/Deceleration	Docking/Docking B	5	254	273	19
Transition/Deceleration	Docking/Docking B	6	249	268	19
Transition/Deceleration	Docking/Docking C	1	248	268	20
Transition/Deceleration	Docking/Docking C	2	244	265	21
Transition/Deceleration	Docking/Docking C	3	244	265	21
Transition/Deceleration	Docking/Docking C	4	248	268	20
Transition/Deceleration	Docking/Docking C	5	245	266	21
Transition/Deceleration	Docking/Docking C	6	246	266	20
Transition/Acceleration	Docking/Docking A	1	152	162	10
Transition/Acceleration	Docking/Docking A	2	143	153	10
Transition/Acceleration	Docking/Docking A	3	141	154	13
Transition/Acceleration	Docking/Docking A	4	139	153	14

Operation	Test series	Test #	Start time (seconds)	End time (seconds)	Duration (seconds)
Transition/Acceleration	Docking/Docking A	5	144	158	14
Transition/Acceleration	Docking/Docking A	6	141	154	13
Transition/Acceleration	Docking/Docking B	1	143	156	13
Transition/Acceleration	Docking/Docking B	2	138	151	13
Transition/Acceleration	Docking/Docking B	3	143	157	14
Transition/Acceleration	Docking/Docking B	4	143	156	13
Transition/Acceleration	Docking/Docking B	5	146	159	13
Transition/Acceleration	Docking/Docking B	6	142	156	14
Transition/Acceleration	Docking/Docking C	1	143	156	13
Transition/Acceleration	Docking/Docking C	2	140	153	13
Transition/Acceleration	Docking/Docking C	3	141	154	13
Transition/Acceleration	Docking/Docking C	4	143	157	14
Transition/Acceleration	Docking/Docking C	5	140	154	14
Transition/Acceleration	Docking/Docking C	6	139	153	14
Transit southbound	En Route	1	259	351	92
Transit southbound	En Route	2	245	329	84
Transit southbound	En Route	3	243	326	83
Transit northbound	En Route	1	420	473	53
Transit northbound	En Route	2	397	451	54
Transit northbound	En Route	3	393	449	56
Delivery Fading away	Delivery	1	185	215	30
Delivery Fading away	Delivery	2	185	215	30
Delivery Fading away	Delivery	3	185	215	30
Delivery Fading away	Delivery	4	180	210	30
Delivery Fading away	Delivery	5	180	210	30
Delivery Fading away	Delivery	6	185	215	30
Delivery Starboard side	Delivery	1	230	260	30
Delivery Starboard side	Delivery	2	230	260	30
Delivery Starboard side	Delivery	3	235	265	30
Delivery Starboard side	Delivery	4	225	255	30
Delivery Starboard side	Delivery	5	225	255	30
Delivery Starboard side	Delivery	6	235	265	30
Delivery Fading toward	Delivery	1	280	310	30
Delivery Fading toward	Delivery	2	280	310	30
Delivery Fading toward	Delivery	3	280	310	30
Delivery Fading toward	Delivery	4	275	305	30
Delivery Fading toward	Delivery	5	275	305	30
Delivery Fading toward	Delivery	6	280	310	30
Delivery Port side	Delivery	1	325	355	30
Delivery Port side	Delivery	2	325	355	30

Operation	Test series	Test #	Start time (seconds)	End time (seconds)	Duration (seconds)
Delivery Port side	Delivery	3	325	355	30
Delivery Port side	Delivery	4	315	345	30
Delivery Port side	Delivery	5	315	345	30
Delivery Port side	Delivery	6	325	355	30
Depart from dock	Docking/Docking A	1	46	180	134
Depart from dock	Docking/Docking A	2	44	168	124
Depart from dock	Docking/Docking A	3	45	171	126
Depart from dock	Docking/Docking A	4	44	170	126
Depart from dock	Docking/Docking A	5	47	174	127
Depart from dock	Docking/Docking A	6	45	171	126

Source: Zipline 2025, ICF 2025.
Note: Time stamp values are rounded to whole numbers.

2.2.1 Dock Sound Exposure Levels

During testing, sound levels were measured continuously for a simulated delivery cycle from the dock. The tests were conducted for three microphone array orientations, each using five microphones on a linear track. The microphones were set at distances of zero, 50, 100, 200 and 400 feet from the dock. The zero-foot position was located under the docking cradle. Microphone array A was oriented directly below the flight track for departure and arrival. Microphone array B was oriented perpendicularly from the dock at a 90-degree angle from the flight track, and Microphone array C was oriented opposite the direction of flight (Zipline 2025). Six (6) tests were conducted for each of the microphone orientations. Sound exposure level (SEL) values were then calculated from measured time history data for each of the arrays.

Undocking SEL calculations include all phases of departure from a dock, including undocking, ascent to cruising altitude, acceleration and transition to cruising speed. All SEL values include payload at MTOW. The results of SEL calculations for each test are shown in Table 3. A plot of SEL values for the three microphone arrays is shown in Figure 1. The adjusted undocking SEL is based on the maximum sound exposure level among the three tested microphone arrays at each distance. The aircraft had to start decelerating almost immediately after reaching its cruise speed over the Microphone Array A 400-foot microphone due to testing site limitations. To account for this test limitation and transition noise to cruising speed at en route altitude, the deceleration noise data was included in the SEL, and additionally one half of en route noise emission was added to the SEL. This method represents the SEL value of the full undocking operation.

Table 3. Sound Exposure Levels for Undocking at MTOW, P2 Zip

Microphone Position, Distance from Dock (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Microphone Array A – Under flight track							
0	97.1	96.6	95.8	95.2	97.6	95.1	96.2
50	86.3	85.2	85.0	83.7	85.5	84.4	85.0
100	79.7	78.7	78.7	77.6	79.6	78.2	78.8
200	74.0	73.9	73.7	73.0	73.9	74.1	73.8
400	71.9	71.2	71.4	70.5	71.4	70.8	71.2
Microphone Array B – Perpendicular to flight track							
0	99.0	98.2	97.4	98.6	98.7	97.7	98.3
50	83.4	83.2	81.9	84.2	83.7	83.2	83.3
100	80.8	80.9	79.1	81.5	80.9	80.5	80.6
200	73.8	74.3	73.3	74.9	74.1	74.1	74.1
400	68.8	69.1	69.3	71.0	69.7	68.7	69.4
Microphone Array C – Behind dock relative to flight track							
0	94.4	95.4	96.1	96.4	95.9	95.8	95.7
50	83.7	84.0	84.6	84.6	84.7	84.9	84.4
100	80.0	80.7	81.0	81.0	81.2	81.5	80.9
200	75.7	76.0	76.0	76.0	75.6	75.8	75.8
400	71.4	71.5	71.6	71.9	71.3	71.6	71.5
Maximum Adjusted SEL from Microphone Arrays A, B, and C (dBA)[1]							
0	98.3						
50	85.1						
100	81.0						
200	76.3						
400	72.6						

Source: Zipline 2025, ICF 2025.

dBA = A-weighted decibel

[1] The undocking SEL is adjusted to include one half of the en route SEL (i.e. 66.1 dBA) to include sound energy for transition from acceleration away from the dock to cruise speed.

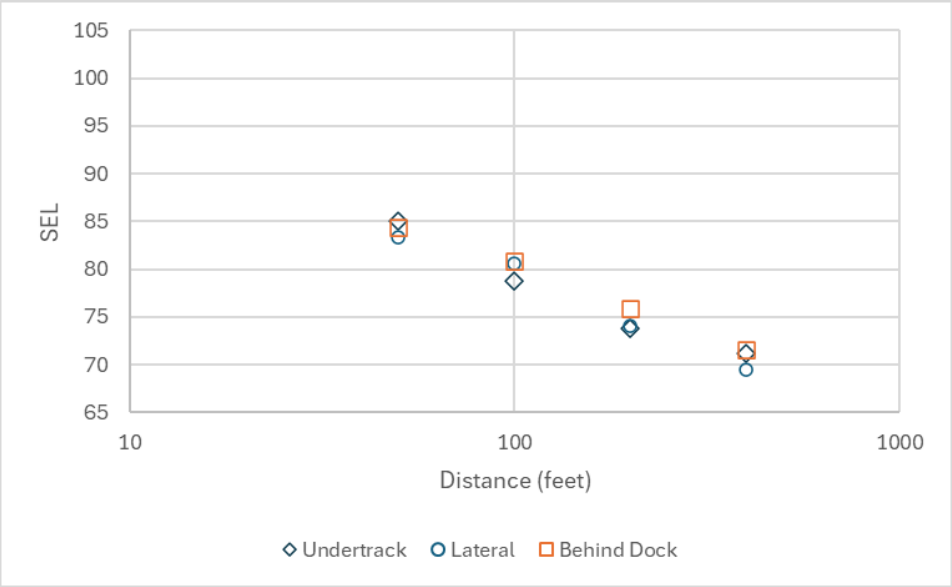

Figure 1. Plot of Average Measured SEL Values at the Three Microphone Arrays for UA Undocking

Docking SEL calculations include all phases of arrival including approach at cruise speed, deceleration, descent, and docking. The results of SEL calculations for each test are shown in Table 4. A plot of SEL values for the three microphone arrays is shown in Figure 2. Similar to the undocking SEL, the adjusted docking SEL is based on the maximum sound exposure level among the three tested microphone arrays. To account for transition noise from cruising speed at altitude to stationary flight, one half of en route noise emission was added to the SEL. This was added due to testing site constraints that only allowed a limited amount of time for the UA to travel at cruise speed when returning to the dock and the aircraft beginning to decelerate shortly after passing over the Microphone Array A 400-foot microphone.

Table 4. Sound Exposure Levels for Docking at MTOW, P2 Zip

Microphone Position, Distance from Dock (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Microphone Array A – Under flight track							
0	97.3	95.3	95.5	96.9	96.9	95.3	96.2
50	87.3	84.6	86.1	86.7	86.8	85.9	86.2
100	80.9	79.1	80.3	81.1	81.3	80.2	80.5
200	76.0	73.8	74.6	75.2	76.3	74.5	75.1
400	72.7	70.9	71.8	71.9	73.0	71.4	71.9
Microphone Array B – Perpendicular to flight track							
0	97.4	98.3	98.7	99.7	99.0	98.8	98.6
50	83.6	85.8	85.8	86.1	86.3	85.4	85.5
100	81.0	82.8	82.8	83.3	83.5	81.8	82.5
200	74.3	75.4	75.9	76.1	76.0	74.5	75.4
400	71.3	70.4	70.7	70.8	70.5	69.3	70.5

Microphone Position, Distance from Dock (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Microphone Array C – Behind dock relative to flight track							
0	94.8	95.5	95.4	95.7	95.4	96.6	95.6
50	84.9	84.9	86.0	86.6	85.3	85.8	85.6
100	81.6	81.0	83.1	83.1	82.0	82.1	82.1
200	76.4	76.2	77.2	77.1	76.2	75.9	76.5
400	71.1	71.1	71.8	71.7	71.3	71.1	71.3
Maximum Adjusted SEL from Microphone Arrays A, B, and C (dBA)[1]							
0	98.7						
50	86.3						
100	82.7						
200	76.9						
400	73.0						

Source: Zipline 2025, ICF 2025.
dBA = A-weighted decibel
[1] The docking SEL is adjusted to include one half of the en route SEL (i.e. 66.1 dBA) to include sound energy for transition from cruise speed to deceleration toward the dock.

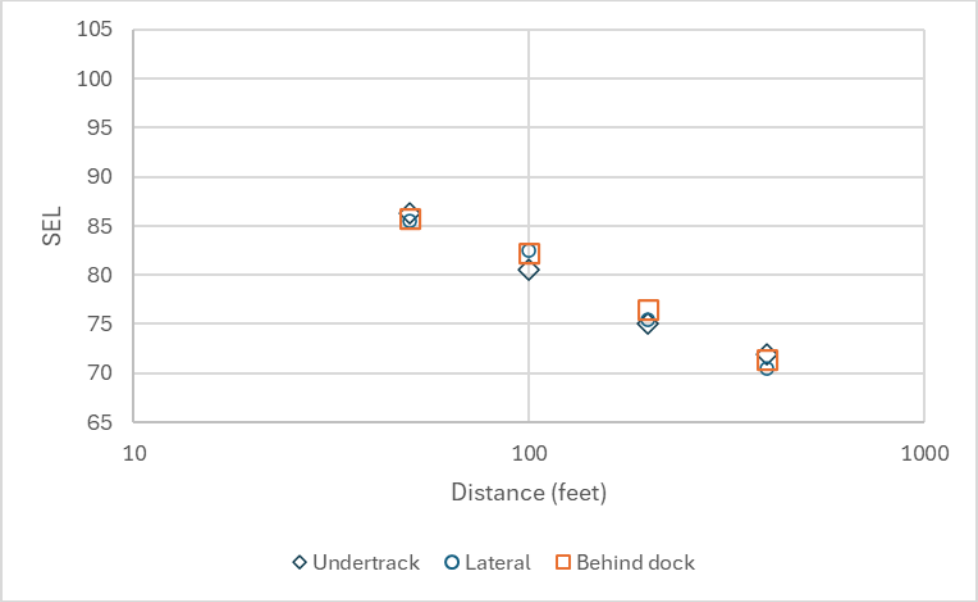

Figure 2. Plot of Average Measured SEL Values at the Three Microphone Arrays for UA docking

2.2.2 Delivery Sound Exposure Levels

During testing, sound levels were measured during hover at a simulated delivery point. The tests were conducted for one microphone array using five microphones on a linear track. The microphones were set at distances of zero, 50, 100, 200 and 400 feet from the delivery point (Zipline 2025). Six (6) tests were conducted for four (4) different hover orientations to measure different acoustic directivities from the UA during delivery hover. Hover was tested at 330 feet AGL. Sound

exposure level (SEL) values were then calculated from measured time history data for each of the UA orientations. The results of SEL calculations for each hover test are shown in Table 5. According to the data, the loudest average SEL occurs at the 50-foot microphone position for all hover orientations. Among the hover orientations, the port side of the P2 yielded the highest SEL values. A plot of SEL values from measurements for port side hover is shown in Figure 3.

The adjusted delivery SEL shown in Table 4 accounts for hover time during delivery operations, which would occur for a longer time than as-tested conditions. A time correction factor is added to scale up the sound energy to time required for delivery. The correction factor is given by:

$$K_{hover} = 10 * \text{Log}\ (75\ \text{seconds}/30\ \text{seconds}) \quad (1)$$

Sound energy for deceleration upon arrival to the delivery site and acceleration away upon completion of a delivery is included from docking and undocking time history test data. This is discussed further in Section 3.2.

Table 5. Sound Exposure Levels from Sound Level Testing for Delivery Hover at MTOW, P2 Zip

Microphone Position, Distance from Delivery Point (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Delivery Hover Oriented Toward Microphone Array							
0	72.0	72.4	71.4	71.1	72.0	71.7	71.8
50	74.2	74.6	73.4	73.2	73.8	73.4	73.8
100	70.5	70.1	69.4	68.8	69.2	69.0	69.5
200	68.6	68.2	68.0	67.4	67.2	67.8	67.9
400	61.1	62.1	62.4	62.1	62.2	62.2	62.0
Delivery Hover Oriented Away from Microphone Array							
0	71.5	71.3	72.2	71.0	69.2	69.8	70.8
50	74.0	72.2	72.5	71.2	68.9	70.5	71.5
100	68.3	68.3	69.3	68.1	65.2	67.0	67.7
200	66.9	66.7	67.7	67.0	64.7	66.1	66.5
400	61.4	61.3	62.4	61.8	61.3	61.7	61.7
Delivery Hover Oriented Starboard Toward Microphone Array							
0	72.0	69.4	69.7	69.1	68.8	70.5	69.9
50	74.6	71.4	72.3	70.8	70.7	71.8	71.9
100	70.1	67.4	68.1	66.9	66.8	67.2	67.7
200	68.5	66.6	67.0	66.2	66.0	65.6	66.7
400	62.8	61.0	62.2	61.6	62.0	63.5	62.2
Delivery Hover Oriented Port Toward Microphone Array							
0	73.3	72.6	72.3	71.2	72.1	72.1	72.3
50	75.5	74.5	74.5	72.5	73.4	74.3	74.1
100	70.8	70.7	70.1	68.6	69.0	70.3	69.9
200	69.0	69.5	68.7	67.0	67.9	68.6	68.4
400	62.8	62.8	63.6	63.8	63.1	64.1	63.4

Microphone Position, Distance from Delivery Point (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Maximum Adjusted SEL from Microphone Array (dBA)[1]							
0	77.3						
50	79.0						
100	76.3						
200	75.3						
400	73.4						

Source: Zipline 2025, ICF 2025.

dBA = A-weighted decibel

[1] The delivery hover is adjusted to include deceleration from en route to a delivery site, a time correction for delivery operations (75 seconds) to scale sound energy from as-tested conditions (30 seconds), and acceleration away from a delivery site. Acceleration and deceleration sound energy is from portions of docking and undocking tests at cruising altitude. This is shown in Section 3.2, Table 7.

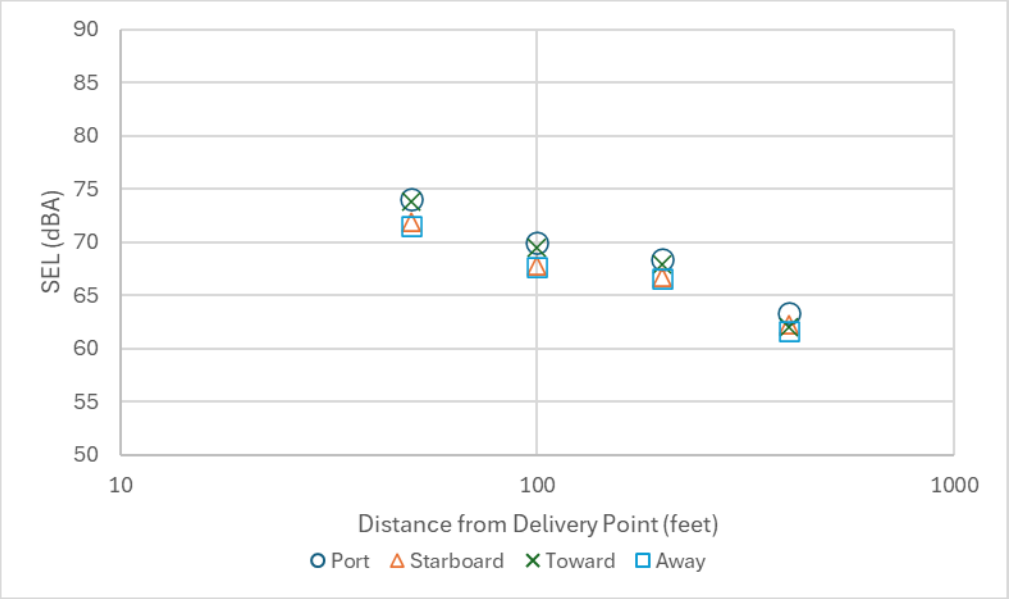

Figure 3. Plot of Average Measured SEL Values for Delivery Hover

2.2.3 En Route Sound Exposure Levels

During testing, sound levels were measured to simulate noise exposure at undertrack locations between dock and delivery points while the UA is at cruising speed. The tests were conducted for one microphone array using five microphones perpendicular to the flight track. The microphones were set at distances of zero, 50, 100, 200 and 400 feet perpendicular to the flight trajectory (Zipline 2025). Six (6) tests were conducted for en route operations, three downwind (Tests 1, 2 and 3) and three upwind (Test 4, 5, and 6). Sound exposure level (SEL) values were then calculated from measured time history data for each en route event. The results of SEL calculations for each test are shown in Table 6. According to the data, the loudest average SEL of 69.1 dBA during en route occurs at the 50-foot microphone position perpendicular to the flight track.

Table 6. Sound Exposure Levels from Sound Level Testing for En Route Test Series, P2 Zip

Microphone Position, Perpendicular Distance from flight track (feet)	Test 1 SEL (dBA)	Test 2 SEL (dBA)	Test 3 SEL (dBA)	Test 4 SEL (dBA)	Test 5 SEL (dBA)	Test 6 SEL (dBA)	Average SEL (dBA)
Microphone Array A – Under flight track							
0	68.5	68.4	68.1	66.4	66.3	66.9	67.4
50	70.4	70.1	69.7	67.9	68.2	68.2	69.1
100	68.3	68.7	67.9	65.8	67.3	66.3	67.4
200	68.0	67.7	67.2	64.7	65.4	65.8	66.5
400	66.3	65.0	64.9	63.3	62.6	62.4	64.1

Source: Zipline 2025, ICF 2025.
dBA = A-weighted decibel

2.3 Analysis Procedure Methodology

To calculate SEL for receptors located near a dock or delivery point, a combination of actions are evaluated to define different types of operations as a UA transitions between different operating modes. The types of operations evaluated are the following:

- Docking
- Undocking
- Package delivery at a delivery point
- En Route inbound and outbound from delivery point

The SEL calculation for each of these operation types involves the use of sound level data as measured by an array of microphones during simulation testing of each operation, as described in the noise measurement test report (Zipline 2025). Microphones placed on a linear path relative to the dock collected sound level data at distances of 0 feet, 50 feet, 100 feet, 200 feet, and 400 feet. The incident SEL values were used to determine attenuation rates between microphone positions, which were influenced by different degrees of en route and vertical or hover portions of the flight profile depending on the type of operation tested. For distances greater than 400 feet from the dock, the falloff rate from the 200-foot to 400-foot microphone position is used to determine the distance at which UA sound emission values are equal to en route conditions. This is described further in the data presentation in the next chapter.

DNL values are calculated for three categories of locations: 1) a dock, 2) a delivery point, and 3) the en route inbound and outbound path. The DNL values at a dock are calculated by summing the sound energy for undocking and departure from the dock with a return to the dock. The DNL value for a single delivery cycle at each of the three types of locations is scaled for multiple UA operations using a logarithmic multiplier (i.e., log of the number of events multiplied by 10) adjusted by a factor of 49.4 to convert from SEL to DNL. The equation to calculate DNL from SEL is:

$$DNL = 10*\log(10^{(SEL/10)} * [\text{deliveries per day}]) - 49.4 \quad (2)$$

Chapter 3
Sound Levels of UA Operations

3.1 Undocking and Docking Sound Levels

Calculated sound levels for P2 Zip undocking and docking at the dock are shown in Table 6. Undocking and docking SEL values also include the portions of the en route cycle as the UA departs from and arrives back at the dock. Once the UA has traveled far enough away from the dock, the undertrack sound level is equal to en route conditions as measured during testing. The SEL values are based on the maximum value measured among the undertrack, lateral and behind-dock microphone arrays. As shown in Table 1, the average measured level for en route conditions is 69.1 dBA SEL. This occurs at different distances for departure and arrival. For undocking, the SEL is equal to the en route sound level of 69.1 dBA SEL at 1,600 feet from the dock, while for docking this occurs at 1,425 feet, as shown in Table 7. The flights include the maximum payload on board. The docking and undocking SEL values are given by Equation 3, which includes one-half en route SEL in each direction, i.e. equivalent to one full en route SEL:

$$SEL_{dock} = 10 * Log\ (10^{(SEL_{departure}/10)} + 10^{(SEL_{en\ route}/10)} + 10^{(SEL_{arrival}/10)}) \quad (3)$$

which is the logarithmic sum of departure and arrival sound energy, and sound energy from inbound/outbound portions of the flight profile equivalent to one half of en route SEL in each direction. Note that Equation 3 includes one-half en route SEL in each direction to adjust for testing site limitations, as described in Section 2.2.1. Since this is included for a roundtrip from the dock for one delivery cycle, this is equivalent to one full en route SEL.

Table 7. Calculated SEL values for Undocking and Docking at Dock

Distance between Dock and Receiver	Undocking and Departure, dBA SEL	Arrival and Docking, dBA SEL	Docking and Undocking Cycle, dBA SEL
0	98.3	98.7	101.5
50	85.1	86.3	88.7
75	82.4	83.9	86.2
100	81.0	82.7	84.9
125	79.5	80.6	83.1
150	78.2	79.1	81.7
175	77.2	77.9	80.6
200	76.3	76.9	79.6
225	75.6	76.1	78.9
250	75.1	75.4	78.3
275	74.5	74.8	77.7
300	74.1	74.2	77.2
325	73.7	73.7	76.7
350	73.3	73.4	76.4
375	72.9	73.2	76.1
400	72.6	73.0	75.8

Distance between Dock and Receiver	Undocking and Departure, dBA SEL	Arrival and Docking, dBA SEL	Docking and Undocking Cycle, dBA SEL
425	72.3	72.7	75.5
450	72.1	72.5	75.3
475	71.9	72.3	75.1
500	71.8	72.2	75.0
525	71.6	72.0	74.8
550	71.5	71.8	74.7
575	71.4	71.7	74.6
600	71.3	71.6	74.4
625	71.2	71.4	74.3
650	71.1	71.3	74.2
675	71.0	71.2	74.1
700	70.9	71.1	74.0
725	70.8	71.0	73.9
750	70.7	70.8	73.8
775	70.7	70.7	73.7
800	70.6	70.7	73.6
825	70.5	70.6	73.6
850	70.4	70.5	73.5
875	70.4	70.4	73.4
900	70.3	70.3	73.3
925	70.3	70.2	73.3
950	70.2	70.2	73.2
975	70.1	70.1	73.1
1,000	70.1	70.0	73.1
1,025	70.0	70.0	73.0
1,050	70.0	69.9	72.9
1,075	69.9	69.8	72.9
1,100	69.9	69.8	72.8
1,125	69.8	69.7	72.8
1,150	69.8	69.7	72.7
1,175	69.7	69.6	72.7
1,200	69.7	69.5	72.6
1,225	69.6	69.5	72.6
1,250	69.6	69.4	72.5
1,275	69.6	69.4	72.5
1,300	69.5	69.4	72.5
1,325	69.5	69.3	72.4
1,350	69.5	69.3	72.4
1,375	69.4	69.2	72.3
1,400	69.4	69.2	72.3
1,425	69.3	69.1	72.3
1,450	69.3	69.1	72.2

Distance between Dock and Receiver	Undocking and Departure, dBA SEL	Arrival and Docking, dBA SEL	Docking and Undocking Cycle, dBA SEL
1,475	69.3	69.1	72.2
1,500	69.2	69.1	72.2
1,525	69.2	69.1	72.2
1,550	69.2	69.1	72.1
1,575	69.2	69.1	72.1
1,600	69.1	69.1	72.1
Greater than 1,600	69.1	69.1	72.1

Source: Zipline 2025, ICF 2025.
dBA = A-weighted decibel; SEL = sound exposure level

3.2 Delivery

During a delivery, the P2 Zip hovers in place above the delivery point at its cruising altitude. The onboard delivery service, referred to as a Droid carrying a payload is lowered to the delivery point via a winch line (Zipline 2025). The noise exposure at a delivery point consists of deceleration on arrival, hover in place, and departure acceleration. As discussed in Chapter 2, a time correction was added to hover sound levels to account for hover time during a delivery (75 seconds) vs. the as-tested condition (30 seconds). The hover SEL levels are based on measurements from hover orientation to the port side, which yielded the highest SEL values from the four orientations tested. SEL values for each of these segments of a delivery cycle are shown in Table 8, with a total SEL exposure for a delivery point cycle in the rightmost column of values. The arrival deceleration and departure acceleration have a minimum value equivalent to the en route SEL value of 69.1 dBA. This occurs at distances of 50 feet and greater from the delivery point for deceleration toward the delivery point, and at distances of 125 feet or greater for acceleration away from the delivery point.

The delivery SEL values are given by Equation 4:

$$SEL_{delivery} = 10 * Log\ (10\text{^}(SEL_{deceleration}/10) + 10\text{^}(SEL_{hover,port}/10) + K_{hover} + 10\text{^}(SEL_{acceleration}/10)) \quad (4)$$

which is the logarithmic sum of sound energy from deceleration to the delivery point, hover above the delivery point, hover time correction given by K_{hover} in Equation 1, and acceleration away from the delivery point.

Table 8. Calculated SEL Values for Delivery Operations

Distance between Delivery Point and Receiver	Arrival Deceleration, dBA SEL	Hover, dBA SEL[1]	Departure Acceleration, dBA SEL	Delivery Cycle, dBA SEL
0	67.0	76.3	67.8	77.3
50	69.1	78.1	68.4	79.0
75	69.1	75.6	69.3	77.3
100	69.1	73.9	69.9	76.3
125	69.1	73.4	69.1	75.8
150	69.1	73.0	69.1	75.6

Distance between Delivery Point and Receiver	Arrival Deceleration, dBA SEL	Hover, dBA SEL[1]	Departure Acceleration, dBA SEL	Delivery Cycle, dBA SEL
175	69.1	72.7	69.1	75.4
200	69.1	72.4	69.1	75.3
225	69.1	71.6	69.1	74.8
250	69.1	70.8	69.1	74.5
275	69.1	70.1	69.1	74.2
300	69.1	69.5	69.1	74.0
325	69.1	68.9	69.1	73.8
350	69.1	68.3	69.1	73.6
375	69.1	67.8	69.1	73.5
400	69.1	67.4	69.1	73.4
425	69.1	66.9	69.1	73.2
450	69.1	66.5	69.1	73.2
475	69.1	66.1	69.1	73.1
500	69.1	65.7	69.1	73.0
525	69.1	65.4	69.1	72.9
550	69.1	65.0	69.1	72.9
575	69.1	64.7	69.1	72.8
600	69.1	64.4	69.1	72.8
625	69.1	64.1	69.1	72.7
650	69.1	63.8	69.1	72.7
675	69.1	63.5	69.1	72.7
700	69.1	63.3	69.1	72.6
725	69.1	63.0	69.1	72.6
750	69.1	62.8	69.1	72.6
775	69.1	62.5	69.1	72.6
800	69.1	62.3	69.1	72.5
825	69.1	62.1	69.1	72.5
850	69.1	61.9	69.1	72.5
875	69.1	61.6	69.1	72.5
900	69.1	61.4	69.1	72.5
925	69.1	61.2	69.1	72.4
950	69.1	61.0	69.1	72.4
975	69.1	60.9	69.1	72.4
1,000	69.1	60.7	69.1	72.4
1,025	69.1	60.5	69.1	72.4
1,050	69.1	60.3	69.1	72.4
1,075	69.1	60.1	69.1	72.4
1,100	69.1	60.0	69.1	72.4
1,125	69.1	59.8	69.1	72.3
1,150	69.1	59.7	69.1	72.3
1,175	69.1	59.5	69.1	72.3
1,200	69.1	59.3	69.1	72.3

Distance between Delivery Point and Receiver	Arrival Deceleration, dBA SEL	Hover, dBA SEL[1]	Departure Acceleration, dBA SEL	Delivery Cycle, dBA SEL
1,225	69.1	59.2	69.1	72.3
1,250	69.1	59.0	69.1	72.3
1,275	69.1	58.9	69.1	72.3
1,300	69.1	58.8	69.1	72.3
1,325	69.1	58.6	69.1	72.3
1,350	69.1	58.5	69.1	72.3
1,375	69.1	58.3	69.1	72.3
1,400	69.1	58.2	69.1	72.3
1,425	69.1	58.1	69.1	72.3
1,450	69.1	58.0	69.1	72.3
1,475	69.1	57.8	69.1	72.3
1,500	69.1	57.7	69.1	72.3
1,525	69.1	57.6	69.1	72.3
1,550	69.1	57.5	69.1	72.2
1,575	69.1	57.4	69.1	72.2
1,600	69.1	57.2	69.1	72.2
1,625	69.1	57.1	69.1	72.2
1,650	69.1	57.0	69.1	72.2
1,675	69.1	56.9	69.1	72.2
1,700	69.1	56.8	69.1	72.2
1,725	69.1	56.7	69.1	72.2
1,750	69.1	56.6	69.1	72.2
1,775	69.1	56.5	69.1	72.2
1,800	69.1	56.4	69.1	72.2
1,825	69.1	56.3	69.1	72.2
1,850	69.1	56.3	69.1	72.2
1,875	69.1	56.2	69.1	72.2
1,900	69.1	56.1	69.1	72.2
1,925	69.1	56.0	69.1	72.2
1,950	69.1	55.9	69.1	72.2
1,975	69.1	55.8	69.1	72.2
2,000	69.1	55.8	69.1	72.2

Source: Zipline 2025, ICF 2025.

dBA = A-weighted decibel; SEL = sound exposure level

[1] Hover sound levels are corrected to a 75 second duration from the as-tested duration of 30 seconds. The 75 second duration is the estimated time required for the droid to deliver a package. Noise from the droid is negligible and as such is not included in the delivery cycle SEL (see Section 5.3 of *P2 Zip Noise Assessment Test Plan and Report* (Zipline 2025).

3.3 En Route

As shown in Table 1, the average en route sound level was calculated to be 69.1 dBA SEL. For inbound and outbound flights occurring along the same trajectory, a single round trip en route SEL would be 72.1 dBA SEL. For a single flight, this level represents the loudest case for areas within 50 feet of an undertrack location relative to a P2 Zip in flight between a dock and a delivery point.

Chapter 4
Noise Exposure from UA Operations

This chapter presents estimated DNL values for package delivery operations for various daily rates of delivery for a P2 Zip operation. This analysis assumes 95% of package deliveries would occur during daytime hours only (7:00 a.m. to 10:00 p.m.), and 5% would be done during night hours (10:00 p.m. to 7:00 a.m.) Night operations include a 10 dB penalty for the purpose of calculating DNL. The analysis assumes there would be at least one night delivery for all scenarios. The number of daytime and nighttime deliveries for different delivery scenarios is shown in Table 9.

Table 9. Number of Daytime and Nighttime Deliveries for Different Delivery Scenarios

Average Daily Deliveries per Dock	Number of Daytime Deliveries	Number of Nighttime Deliveries	Number of Daytime Equivalent Deliveries
1	0	1	10
5	4	1	14
10	9	1	19
15	14	1	24
20	19	1	29
25	23	2	43
50	47	3	77
75	71	4	111
100	95	5	145
150	142	8	222
200	190	10	290
300	285	15	435
400	380	20	580

4.1 Noise Exposure from a Dock Location

A single delivery operation consists of undocking, departure, return to dock and landing phases, and the full cycle of these actions are accounted for in noise exposure at a dock location, as discussed in Section 3.1.

Estimated DNL noise exposure distances at a dock operating P2 Zip UAs are shown in Table 10. Noise exposure DNL values are shown at different operational scales: from 1 delivery per day up to 400 deliveries per day. The noise exposure values assume a departure and return flight path restricted to a single trajectory over a receiver array with distances of 50 to 2,000 feet from the dock. According to the calculations, undocking and docking operations would equal or exceed 65 DNL at less than 50 feet from a dock location up to a rate of 200 package loading operations per day. At a rate of 400 deliveries per day including up to 20 nighttime deliveries, package loading operations would equal or exceed 65 DNL up to 70 feet from a dock location.

Table 10. DNL Noise Exposure Distances at a Dock for P2 Zip for Different Scales of Operation

Average Daily Deliveries per Dock[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<50	<50	<50	<50	110
5	<50	<50	<50	60	130
10	<50	<50	<50	75	155
15	<50	<50	<50	90	175
20	<50	<50	<50	105	200
25	<50	<50	60	125	260
50	<50	<50	90	180	430
75	<50	<50	115	225	715
100	<50	60	135	275	1,125
150	<50	85	170	390	En Route[2]
200	<50	105	200	535	En Route
300	60	130	265	1,020	En Route
400	70	150	325	En Route[2]	En Route

Note: [1] The CONOPS assumes 95% of UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. and 5% would be done between 10:00 p.m. and 7:00 a.m. The number of average daily deliveries per dock in this table include 5% of deliveries occurring between 10:00 p.m. and 7:00 a.m. consistent with the CONOPS and Table 9.
[2] Noise exposure would exceed 50 DNL along the flight path for an operation with 400 or more deliveries per day, and 45 DNL along the flight path for an operation with 150 or more deliveries per day.
DNL = day/night average sound level

4.2 Noise Exposure from a Delivery Site

Estimated DNL noise exposure distances at a delivery point for the P2 Zip are shown in Table 11. The DNL exposures assume an arrival and departure flight path restricted to a single trajectory over a receiver array with distances of 25 to 2,000 feet. A single delivery operation consists of arrival, package delivery, and departure phases, as described in Section 3.2. According to the calculations, package loading operations would equal or exceed 65 DNL at less than 50 feet from a dock location up to a rate of 400 package loading operations per day.

Table 11. DNL Noise Exposure Distances at a Delivery Point for P2 Zip for Different Scales of Operation

Average Daily Deliveries at Delivery Point[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
1	<50	<50	<50	<50	<50
5	<50	<50	<50	<50	<50
10	<50	<50	<50	<50	<50
15	<50	<50	<50	<50	<50
20	<50	<50	<50	<50	<50
25	<50	<50	<50	<50	65
50	<50	<50	<50	<50	160

Average Daily Deliveries at Delivery Point[1]	65 DNL Distance, feet	60 DNL Distance, feet	55 DNL Distance, feet	50 DNL Distance, feet	45 DNL Distance, feet
75	<50	<50	<50	55	310
100	<50	<50	<50	70	600
150	<50	<50	<50	120	En Route[2]
200	<50	<50	<50	235	En Route
300	<50	<50	65	500	En Route
400	<50	<50	90	En Route[2]	En Route

Note: [1] The CONOPS assumes 95% of UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. and 5% would be done between 10:00 p.m. and 7:00 a.m. The number of average daily deliveries per dock in this table include 5% of deliveries occurring between 10:00 p.m. and 7:00 a.m. consistent with the CONOPS and Table 9.
[2] Noise exposure would exceed 50 DNL along the flight path for an operation with 400 or more deliveries per day, and 45 DNL along the flight path for an operation with 150 or more deliveries per day.
DNL = day/night average sound level

4.3 En Route Noise Exposure

Noise exposure from UA en route trajectories would be loudest within 50 feet of the flight path, as described in Chapter 2. In practice, UAs would serve many delivery points from a point of origin, however in areas where there is a high demand for deliveries, en route UA noise may be intermittently noticeable depending on the level of existing ambient noise. In addition, an undertrack location would receive noise exposure from two en route events representing both outbound and inbound portions of a round trip for a delivery cycle. Along a single flight trajectory, en route noise levels would exceed 45 DNL at 150 or more deliveries per day, as shown in Table 12. Since test flights were conducted at the operating altitude of 330 feet AGL with MTOW, no altitude correction factors were used.

Table 12. En Route DNL Exposure for P2 Zip for Different Scales of Operation

Average Daily Deliveries per Dock[1]	En Route DNL
1	32.7
5	34.2
10	35.5
15	36.5
20	37.3
25	39.0
50	41.6
75	43.2
100	44.3
150	46.2
200	47.3
300	49.1
400	50.3

Note: [1] The CONOPS assumes 95% of UA operations would be done between the hours of 7:00 a.m. and 10:00 p.m. and 5% would be done between 10:00 p.m. and 7:00 a.m. The number of average daily deliveries per dock in this table include 5% of deliveries occurring between 10:00 p.m. and 7:00 a.m. consistent with the CONOPS and Table 9.
DNL = day/night average sound level

4.4 Cumulative Noise Exposure

Criteria for significance of impacts and changes in noise exposure are defined in FAA Order 1050.1F *Environmental Impacts: Policies and Procedures* (FAA 2015). Order 1050.1F Exhibit 4-1 states the following with respect to threshold of significance for a proposed action:

> *The action would increase noise by 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. For example, an increase from DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB.*

A cumulative increase in noise from a proposed action can be calculated using the difference between the additional noise exposure introduced by a proposed action and the no action alternative. The cumulative DNL increase associated with different values of the proposed action is shown in Table 13.

Table 13. Cumulative Increase in DNL due to a Proposed Action

Proposed Action minus No Action (x)	Cumulative Increase in DNL (Δ)
x < -3.8 dB	Δ < 1.5 dB
-3.8 dB < x < 0.0 dB	1.5 dB < Δ < 3 dB
0.0 dB < x < 3.3 dB	3 dB < Δ < 5 dB
3.3 dB < x	5 dB < Δ

For air traffic airspace and procedure actions where the study area is larger than the immediate vicinity of an airport, Order 1050.1F specifies the following change-of-exposure criteria to identify locations where noise exposure levels will increase by a magnitude considered reportable. An action that would increase noise exposure by 3 dB where no action is between 60 and 65 DNL, or by 5 dB where no action is between 45 and 60 DNL would be considered reportable.

Chapter 5
References

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Appendix E
Biological Resources

Table E-1. State Species of Greatest Conservation Need in Bosque, Collin, Cooke, Dallas, Denton, Ellis, Erath, Fannin, Grayson, Henderson, Hill, Hood, Hunt, Jack, Johnson, Kaufman, Montague, Navarro, Parker, Rockwall, Somervell, Tarrant, Van Zandt, and Wise Counties, Texas

Taxon	Scientific Name	Common Name	ESA Status	State Status
Amphibians				
	Ambystoma tigrinum	Eastern tiger salamander	—	—
	Desmognathus conanti	Spotted dusky salamander	—	—
	Anaxyrus woodhousii	Woodhouse's toad	—	—
	Pseudacris streckeri	Strecker's chorus frog	—	—
	Lithobates areolatus	Southern crawfish frog	—	—
Birds				
	Plegadis chihi	White-faced ibis	—	T
	Mycteria americana	Wood stork	—	T
	Haliaeetus leucocephalus	Bald eagle	—	—
	Laterallus jamaicensis	Black rail	LT	T
	Grus americana	Whooping crane	LE	E
	Charadrius melodus	Piping plover	LT	T
	Charadrius montanus	Mountain plover	—	—
	Calidris canutus rufa	Rufa red knot	LT	T
	Leucophaeus pipixcan	Franklin's gull	—	—
	Athene cunicularia hypugaea	Western burrowing owl	—	—
	Anthus spragueii	Sprague's pipit	—	—
	Vireo atricapilla	Black-capped vireo	—	—
	Setophaga chrysoparia	Golden-cheeked warbler	LE	E
	Calamospiza melanocorys	Lark bunting	—	—
	Calcarius ornatus	Chestnut-collared longspur	—	—
	Anas fulvigula	Mottled duck	—	—
	Elanoides forficatus	Swallow-tailed kite	—	T
	Colinus virginianus	Northern bobwhite	—	—
	Coturnicops noveboracensis	Yellow rail	—	—
	Charadrius nivosus	Snowy plover	—	—
	Tringa semipalmata	Willett	—	—
	Calidris alba	Sanderling	—	—
	Sternula antillarum	Least tern	—	—
	Chordeiles minor	Common nighthawk	—	—
	Coccyzus americanus	Yellow-billed cuckoo	LT	—
	Riparia riparia	Bank swallow	—	—

Taxon	Scientific Name	Common Name	ESA Status	State Status
	Campylorhynchus brunneica	Cactus wren	—	—
	Lanius ludovicanius	Loggerhead shrike	—	—
	Cardellina pusilla	Wilson's warbler	—	—
	Cardinalis sinuatus	Pyrrhuloxia	—	—
	Peucaea aestivalis	Bachman's sparrow	—	T
	Calamospiza melanocorys	Lark bunting	—	—
	Centronyx henslowii	Henslow's sparrow	—	—
	Calcarius ornaus	Chestnut-collared longspur	—	—
	Euphagus cyanocephalus	Brewer's blackbird	—	—
	Quiscalus quiscula	Common grackle	—	—
Fish				
	Scaphirhynchus platorynchus	Shovelnose sturgeon	—	T
	Polyodon spathula	Paddlefish	—	T
	Anguilla rostrata	American eel	—	—
	Hiodon alosoides	Goldeye	—	—
	Hybognathus nuchalis	Mississippi silvery minnow	—	—
	Notropis bairdi	Red River shiner	—	—
	Notropis buccula	Smalleye shiner	LE	E
	Notropis chalybaeus	Ironcolor shiner	—	—
	Notropis potteri	Chub shiner	—	T
	Notropis shumardi	Silverband shiner	—	—
	Macrhybopsis storeriana	Silver chub	—	—
	Macrhybopsis australis	Prairie chub	—	T
	Cycleptus elongatus	Blue sucker	—	T
	Minytrema melanops	Spotted sucker	—	—
	Cyprinodon rubrofluviatilis	Red River pupfish	—	T
	Micropterus treculii	Guadalupe bass	—	—
	Etheostoma radiosum	Orangebelly darter	—	—
Mammals				
	Blarina hylphaga hylophaga	Elliot's short-tailed shrew	—	—
	Myotis austroriparius	Southeastern myotis bat	—	—
	Myotis velifer	Cave myotis bat	—	—
	Perimyotis subflavus	Tricolored bat	PE	—
	Lasiurus seminolus	Seminole bat	—	—
	Lasiurus cinereus	Hoary bat	—	—
	Nyctinomops macrotis	Big free-tailed bat	—	—
	Dipodomos elator	Texas kangaroo rat	PE	T
	Cynomys ludovicianus	Black-tailed prairie dog	—	—
	Ondatra zibethicus	Muskrat	—	—

Taxon	Scientific Name	Common Name	ESA Status	State Status
	Ursus americanus	Black bear	—	T
	Spilogale putorius	Eastern spotted skunk	—	—
	Spilogale interrupta	Plains spotted skunk	—	—
	Puma concolor	Mountain lion	—	—
Reptiles				
	Macrochelys temminckii	Alligator snapping turtle	PT	T
	Deirochelys reticularia miaria	Western chicken turtle	—	—
	Terrapene carolina	Eastern box turtle	—	—
	Terrapene ornata	Western box turtle	—	—
	Apalone mutica	Smooth softshell	—	—
	Ophisaurus attenuatus	Slender glass lizard	—	—
	Phrynosoma cornutum	Texas horned lizard	—	T
	Plestiodon septentrionalis	Prairie skink	—	—
	Nerodia harteri	Brazos water snake	—	T
	Thamnophis sirtalis annectens	Texas garter snake	—	—
	Sistrurus tergeminus	Western massasauga	—	—
	Sistrurus miliarius	Pygmy rattlesnake	—	—
Crustaceans				
	Caecidotea bilineata	None	—	—
	Procambarus regalis	Regal burrowing crayfish	—	—
	Procambarus nigrocinctus	Blackbelted crayfish	—	—
	Procambarus steigmani	Parkhill Prairie crayfish	—	—
Insects				
	Tortopus circumfluus	None	—	—
	Bombus pensylvanicus	American bumblebee	—	—
	Bombus variabilis	None	—	—
	Pogonomyrmex comanche	Comanche harvester ant	—	—
	Lintneria eremitoides	Sage sphinx moth	—	—
	Neotrichia juani	None	—	—
Mollusks				
	Cyrtonaias tampicoensis	Tampico Pearlymussel	—	—
	Fusconaia askewi	Texas pigtoe	—	T
	Lampsilis satura	sandbank pocketbook	—	T
	Lampsilis hydiana	Louisiana Fatmucket	—	—
	Sagittunio subrostratus	Pondmussel	—	—
	Obovaria arkansasensis	southern hickorynut	—	T
	Pleurobema riddellii	Louisiana pigtoe	PT	T
	Potamilus amphichaenus	Texas heelsplitter	PE	T
	Potamilus streckersoni	Brazos heelsplitter	—	T

Taxon	Scientific Name	Common Name	ESA Status	State Status
	Tritogonia nobilis	Gulf Mapleleaf	—	—
	Cyclonaias pustulosa	Pimpleback	—	—
	Quadrula quadrula	Mapleleaf	—	—
	Fusconaia chunii	Trinity pigtoe	—	T
	Toxolasma parvum	Lilliput	—	—
	Tritogonia verrucosa	Pistolgrip	—	—
	Truncilla donaciformis	Fawnsfoot	—	—
	Truncilla macrodon	Texas fawnsfoot	LT	T
	Truncilla truncata	Deertoe	—	—
	Uniomerus declivis	Tapered Pondhorn	—	—
Plants				
	Matelea edwardsensis	Plateau milkvine	—	—
	Coreopsis intermedia	Goldenwave tickseed	—	—
	Echinacea atrorubens	Topeka purple-coneflower	—	—
	Liatris glandulosa	Glandular gay-feather	—	—
	Senecio quaylei	Quayle's butterweed	—	—
	Symphyotrichum puniceum var. scabricaule	Rough-stem aster	—	—
	Geocarpon minimum	Earth fruit	LT	T
	Ipomoea shumardiana	Shumard's morning glory	—	—
	Cuscuta attenuata	Marsh-elder dodder	—	—
	Cuscuta exaltata	Tree dodder	—	—
	Amorpha paniculata	Panicled indigobush	—	—
	Astragalus reflexus	Texas milk vetch	—	—
	Astragalus soxmaniorum	Soxman's milkvetch	—	—
	Dalea hallii	Hall's prairie clover	—	—
	Dalea reverchonii	Comanche Peak prairie clover	—	—
	Pediomelum cyphocalyx	Turnip-root scurfpea	—	—
	Pediomelum reverchonii	Reverchon's scurfpea	—	—
	Brazoria truncata var. pulcherrima	Centerville Brazos-mint	—	—
	Rhododon ciliatus	Texas sandmint	—	—
	Oenothera triangulata	Prairie butterfly-weed	—	—
	Phlox oklahomensis	Oklahoma phlox	—	—
	Clematis texensis	Scarlet leather-flower	—	—
	Clematis carrizoensis	Carrizo Sands leather-flower	—	—
	Crataegus viridis var. glabriuscula	Green hawthorn	—	—
	Agalinis auriculata	Earleaf false foxglove	—	—
	Agalinis densiflora	Osage Plains false foxglove	—	—
	Valerianella stenocarpa	Bigflower cornsalad	—	—

Taxon	Scientific Name	Common Name	ESA Status	State Status
	Yucca necopina	Glen Rose yucca	—	—
	Carex shinnersii	Shinner's sedge	—	—
	Cyperus grayoides	Mohlenbrock's sedge	—	—
	Rhynchospora macra	Large beakrush	—	—
	Schoenoplectus hallii	Hall's baby bulrush	—	—
	Eriocaulon koernickianum	Small-headed pipewort	—	T
	Calopogon oklahomensis	Oklahoma grass pink	—	—
	Hexalectris nitida	Glass Mountains coral-root	—	—
	Hexalectris warnockii	Warnock's coral-root	—	—
	Xyris chapmanii	Chapman's yellow-eyed grass	—	—

Source: Texas Parks and Wildlife 2020.
E: Endangered; LE: Federally endangered; LT: Federally threatened; PE: Proposed endangered; PT: Proposed threatened; T: Threatened.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Texas Coastal and Central Plains Ecological Services Field Office
Fort Worth Sub-office
3233 Curtis Drive
Fort Worth, Texas 76116
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In Reply Refer To:
2025-0047063

August 13, 2025

Derek Hufty
Manager, General Aviation and Commercial Branch (AFS-750)
Federal Aviation Administration
800 Independence Ave., SW.
Washington, DC 20591

RE: Endangered Species Act Section 7 Consultation for Unmanned Aircraft Commercial Package Delivery Operations in Dallas-Fort Worth, Texas Area

Dear Mr. Hufty,

This responds to the Federal Aviation Administration's (FAA) July 1, 2025, letter requesting consultation pursuant to Section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1544) (Act). Your letter includes an evaluation of the proposed action authorizing Zipline International Inc. (Zipline) to begin unmanned aircraft package delivery operations in the Dallas-Fort Worth (DFW) metropolitan area. Your letter concluded that the action may affect, but is not likely to adversely affect, the proposed endangered tricolored bat, and endangered golden-cheeked warbler and whooping crane.

The purpose of the proposed action is to "conduct commercial drone package delivery operations with its Platform 2 UA (P2 Zip) under 14 CFR Part 135 in the DFW metropolitan area." Zipline projects establishing up to 75 single purpose sites located in commercial areas throughout the metroplex (Figure 1). Operations would occur 24 hours a day, seven days per week, including holidays. Zipline would conduct up to 400 flights over a 24-hour day in a 10-mile radius around each site. Approximately 95% of flights would take place from 7:00 AM to 10:00 PM and 5% of flights would take place from 10:00 PM to 7:00 AM.

Each of the 75 single-purpose sites in the DFW area would contain up to 20 charging or loading docks. These docks would be constructed primarily on previously disturbed land, such as paved parking lots in commercial areas (e.g., shopping centers, large individual retailers, shopping malls, laboratories, or warehouses).

Your letter also included a noise analysis using sound level measurement data for the P2 Zip. The highest estimated average sound exposure level associated with Zipline's proposed operations is 86.3 A-weighted decibels (dBAs), which would occur during landing operations. The analysis provided context that the sound level of a diesel truck at 50 feet or a noisy urban environment during the day is approximately 80 to 90 dBA.

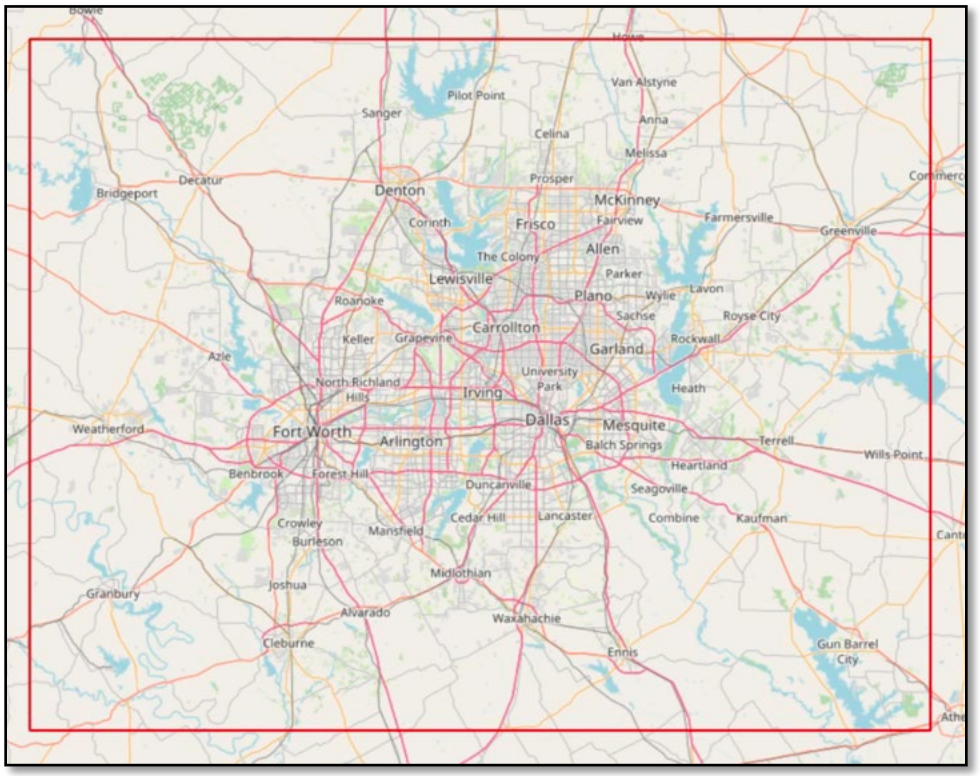

Figure 1. Action area.

According to the Service's Information for Planning and Consultation online project planning tool and the FAA's evaluation, there are 10 threatened, endangered, or proposed species that may potentially be affected by the proposed project and occur within the action area (Figure 1): the endangered golden-cheeked warbler (*Setophaga chrysoparia*) and whooping crane (*Grus americana*), proposed endangered tricolored bat (*Perimyotis subflavus*) and Texas heelsplitter (*Potamilus amphichaenus*), threatened piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa),* and Texas fawnsfoot *(Truncilla macrodon),* and proposed threatened alligator snapping turtle *(Macrochelys temminckii),* Louisiana pigtoe *(Pleurobema riddellii),* and monarch butterfly (*Danaus plexippus).* Currently, the Service recommends the piping plover and red knot be evaluated only for wind energy projects in these counties; therefore, no consultation is necessary regarding those species. Proposed species are not currently protected under the Act; however, conferencing is necessary if it is determined a Federal action is likely to jeopardize the continued existence of a proposed species. Your biological evaluation does not indicate the need for conference on the proposed species.

We should note that there is a lack of information on the potential effects of drone flights on the tricolored bat. While the proposed action is not expected to directly affect roosting habitat for the species and the majority of flight time would occur when bats are roosting, there are times when active/feeding tricolored bats, if present in the action area, could be exposed to drone activity. Should the tricolored bat be listed, you should re-evaluate the project to determine the extent of effects on the species. If that evaluation indicates adverse effects would or are occurring on the species, measures should be implemented to avoid incidental take until consultation can be completed. The following measures should be considered to avoid incidental take:

- Determining the extent of tricolored bat presence in the action through acoustic surveys
- Restricting flight hours to daylight hours during non-hibernating season.

For more information on tricolored bat acoustic surveys, please see the USFWS Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines at https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.

Additionally, we recommend the FAA develop and implement long term procedures for monitoring and reporting potential effects of drone activity on tricolored bats. This would include a process for reporting survey data, detection of collisions, and contingency planning in the event that adverse effects are reported.

The golden-cheeked warbler is a small, insectivorous neo-tropical songbird. The breeding range for the species encompasses all or portions of 47 counties in Texas. Golden-cheeked warblers breed exclusively in mixed Ashe juniper/deciduous woodlands. These songbirds require the shredding bark produced by mature Ashe junipers for nest material. The FAA has determined that the action may affect, but is not likely to adversely affect, the golden-cheeked warbler based on: 1) operations occurring mostly in an urban environment; 2) the altitude at which the UA flies in the en route phase (150–300 feet AGL); 3) the expected low sound levels experienced by a golden-cheeked warbler; 4) any increase in ambient sound levels would be short in duration; 5) the low probability of a golden-cheeked warbler occurring in the action area; and 6) the low likelihood of the UA striking a warbler. Any effects are expected to be discountable (extremely unlikely to occur) or insignificant (not able to be meaningfully measured, detected, or evaluated).

Whooping cranes currently exist in four wild populations in the U.S. There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, and winters in coastal marshes in Texas. The migratory corridor runs in an approximately straight line from northwest Canada through the Great Plains to overwinter on the Gulf Coast. The whooping crane breeds, migrates, winters, and forages in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. Whooping cranes could be encountered at suitable stopover sites within the corridor during spring and fall migration. Although whooping crane migratory flights are generally at altitudes of between 1,000 and 6,000 feet, they fly at lower altitudes when seeking stop-over habitats such as

reservoirs, large ponds, rivers, and wetlands. While cranes generally avoid areas with human activity present (e.g., roads, neighborhoods), suitable stopover habitat for the species may be present in the proposed project area. The FAA has determined that the action may affect, but is not likely to adversely affect, the whooping crane based on: 1) operations occurring mostly in an urban environment; 2) the altitude at which the UA flies in the en route phase (150–300 feet AGL); 3) the expected low sound levels experienced by a whooping crane; 4) any increase in ambient sound levels would be short in duration; 5) the low probability of a whooping crane occurring in the action area; and 6) the low likelihood of the UA striking a whooping crane. Any effects are expected to be discountable (extremely unlikely to occur) or insignificant (not able to be meaningfully measured, detected, or evaluated).

Based on the information provided within your letter, we concur with the determination that the project, as proposed, may affect, but is not likely to adversely affect, the golden-cheeked warbler and whooping crane within the action area. Therefore, no further Section 7 consultation will be required unless: 1) the identified action is subsequently modified in a manner that causes an effect on a listed species or designated critical habitat; 2) new information reveals the identified action may affect federally listed species or designated critical habitat in a manner or to an extent not previously considered; or 3) a new species is listed or a critical habitat is designated under the Act that may be affected by the identified action. If new effects are identified in the future, Section 7 consultation may need to be reinitiated.

Please note that this guidance does not authorize bird mortality for species that are protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. sec.703-712). If you believe migratory birds will be affected by this activity, we recommend you contact our Migratory Bird Permit Office at P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882.

Thank you for the opportunity to review and provide information on the proposed project. If you have any questions, please contact Ms. Sydney Dragon-Moore of my staff at sydney_dragon-moore@fws.gov.

Sincerely,

Omar Bocanegra
Deputy Field Supervisor

Appendix F

Government-to-Government Consultation with Federally Recognized Tribes

Governor John Johnson
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, Oklahoma 74801

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Governor Johnson:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

The primary purpose of government-to-government consultation is to ensure that Federally Recognized Tribes are given the opportunity to provide meaningful and timely input regarding proposed FAA actions that uniquely or significantly affect the Tribes. This policy is provided in Federal Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*; Presidential Memorandum, *Uniform Standards for Tribal Consultation*; DOT Order 5301.1A, *Department of Transportation Tribal Consultation Policy and Procedures*; and FAA Order 1210.20, *American Indian and Alaska Native Tribal Consultation Policy and Procedures*.

Consultation Initiation

With this letter, FAA is seeking input concerning any Tribal lands or sites of religious or cultural significance that may be affected by the proposed operation. Early identification of Tribal concerns, or known properties of traditional, religious, and cultural importance, will allow the FAA to consider ways to avoid or minimize potential impacts to Tribal resources. We are available to discuss the details of the proposed project with you.

Proposed Activity Description

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Area of Potential Effects

In accordance with 36 CFR 800.4(a)(1), the FAA has defined the Area of Potential Effects (APE) in consideration of the undertaking's potential direct and indirect effects. The APE would be approximately 11,000 square miles and is shown in greater detail in the enclosure.

Confidentiality

We understand that you may have concerns about the confidentiality of information on areas or resources of traditional, religious, and cultural importance to your Tribe. We are available to discuss these concerns and develop procedures to ensure the confidentiality of such information is maintained.

FAA Contact Information

Your timely response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation. In addition, we respectfully request your response in the event that your Tribe would like to consult with the FAA in a government-to-government relationship about this proposal. Please contact Shelia Neumann via email at 9-faa-drone-environmental@faa.gov within 30 days of the receipt of this letter to confirm your intent to participate in this government-to-government consultation.

Sincerely,

Derek Hufty

Manager, General Aviation and Commercial Branch (AFS-750)

Emerging Technologies Division

Office of Safety Standards, Flight Standards Service

Attachment 1. Project Description

Zipline is proposing the expansion of their existing commercial drone package delivery operations to include the DFW metro area. Under the proposed action, Zipline would establish up to 75 site locations and construct up to a total of 500 docks with a maximum of twenty docks at a single site. Operations would occur 24 hours a day, seven days per week, including holidays. Zipline would conduct up to 400 flights over a 24-hour day in a 10-mile radius around each site. Approximately 95% of flights would take place during acoustic daytime (7:00 AM to 10:00 PM) and 5% of flights would take place at acoustic nighttime (10:00 PM to 7:00 AM).

Sites would be distributed throughout the DFW metro area following a measured rollout plan to be developed with Zipline's partners and through outreach to local communities (including local officials and wildlife groups, schools, and community groups) and airspace users. Zipline's sites would be located in established commercial areas whose use is consistent with local zoning and land use requirements, such as retail stores, warehouses, laboratories, and other locations operated by customers. Each site would serve an area within a 10-mile radius, with the exclusion of areas with high densities of air traffic or population.

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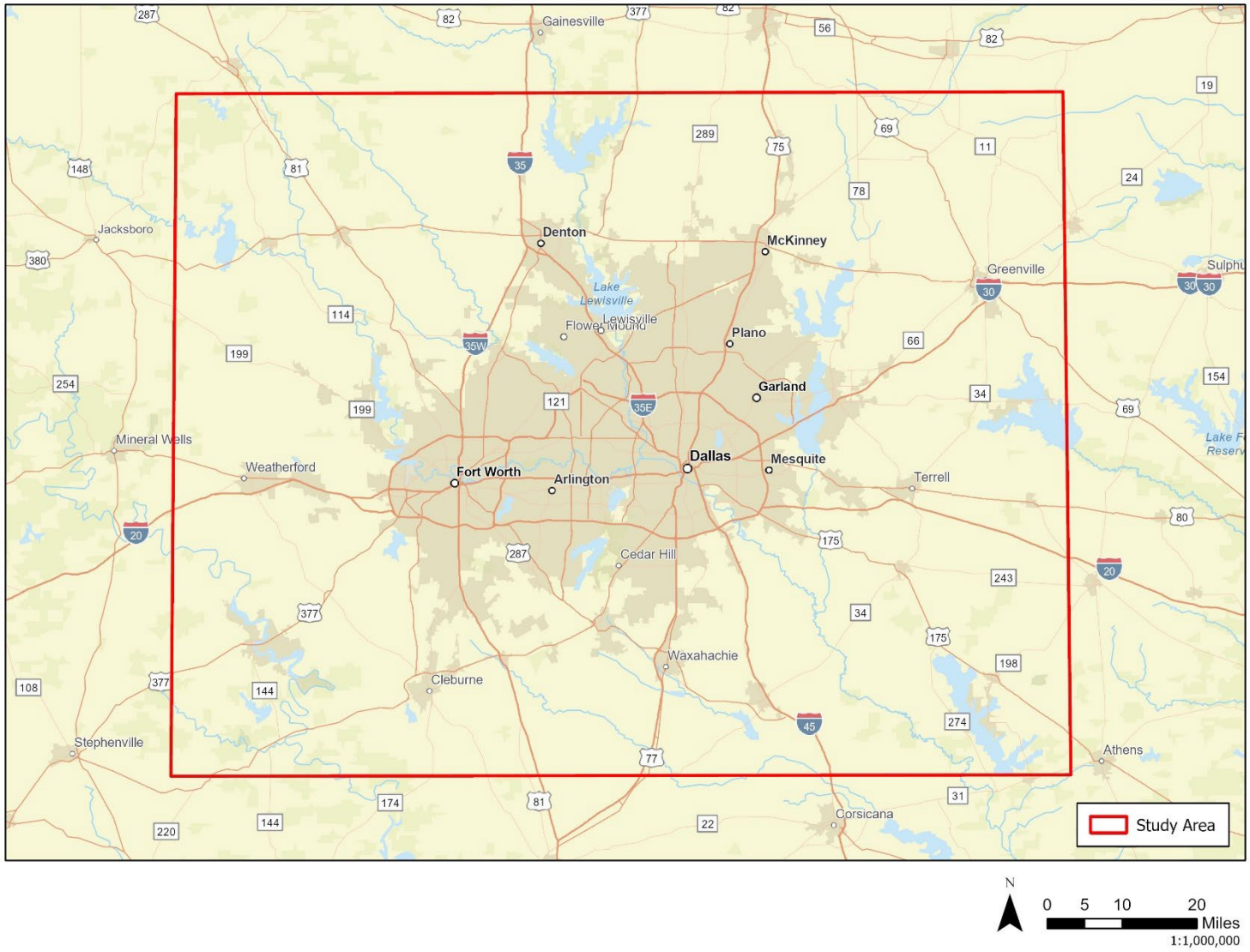

Chairman Durell Cooper
Apache Tribe of Oklahoma
P.O. Box 1330
Anadarko, OK 73005

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chairman Cooper:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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Area of Potential Effects

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Your timely response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation. In addition, we respectfully request your response in the event that your Tribe would like to consult with the FAA in a government-to-government relationship about this proposal. Please contact Shelia Neumann via email at 9-faa-drone-environmental@faa.gov within 30 days of the receipt of this letter to confirm your intent to participate in this government-to-government consultation.

Sincerely,

Derek Hufty

Manager, General Aviation and Commercial Branch (AFS-750)

Emerging Technologies Division

Office of Safety Standards, Flight Standards Service

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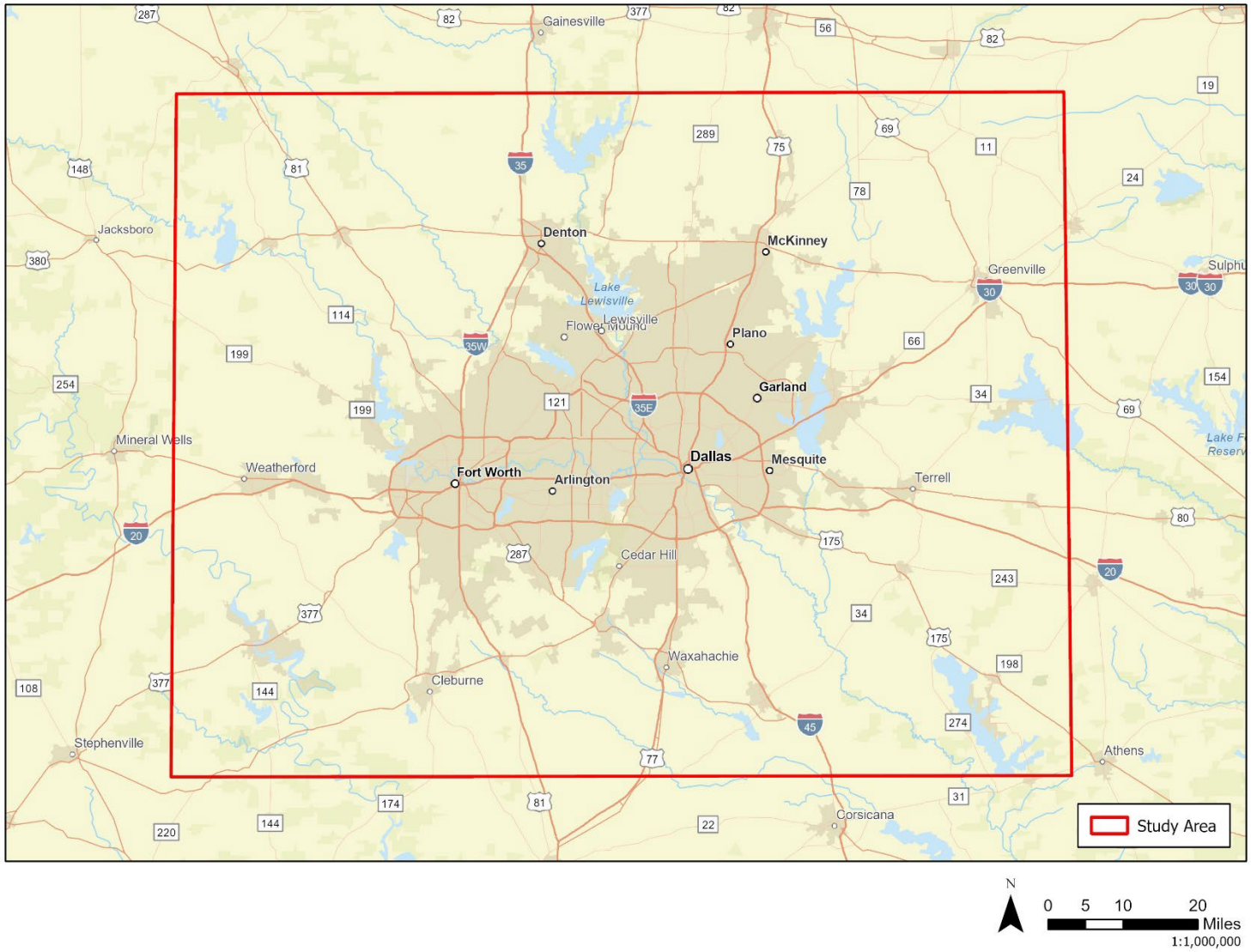

Chairman Bobby Gonzalez
Caddo Nation of Oklahoma
P.O. Box 487
Binger, Oklahoma 73009

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chairman Gonzalez:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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Derek Hufty

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Emerging Technologies Division

Office of Safety Standards, Flight Standards Service

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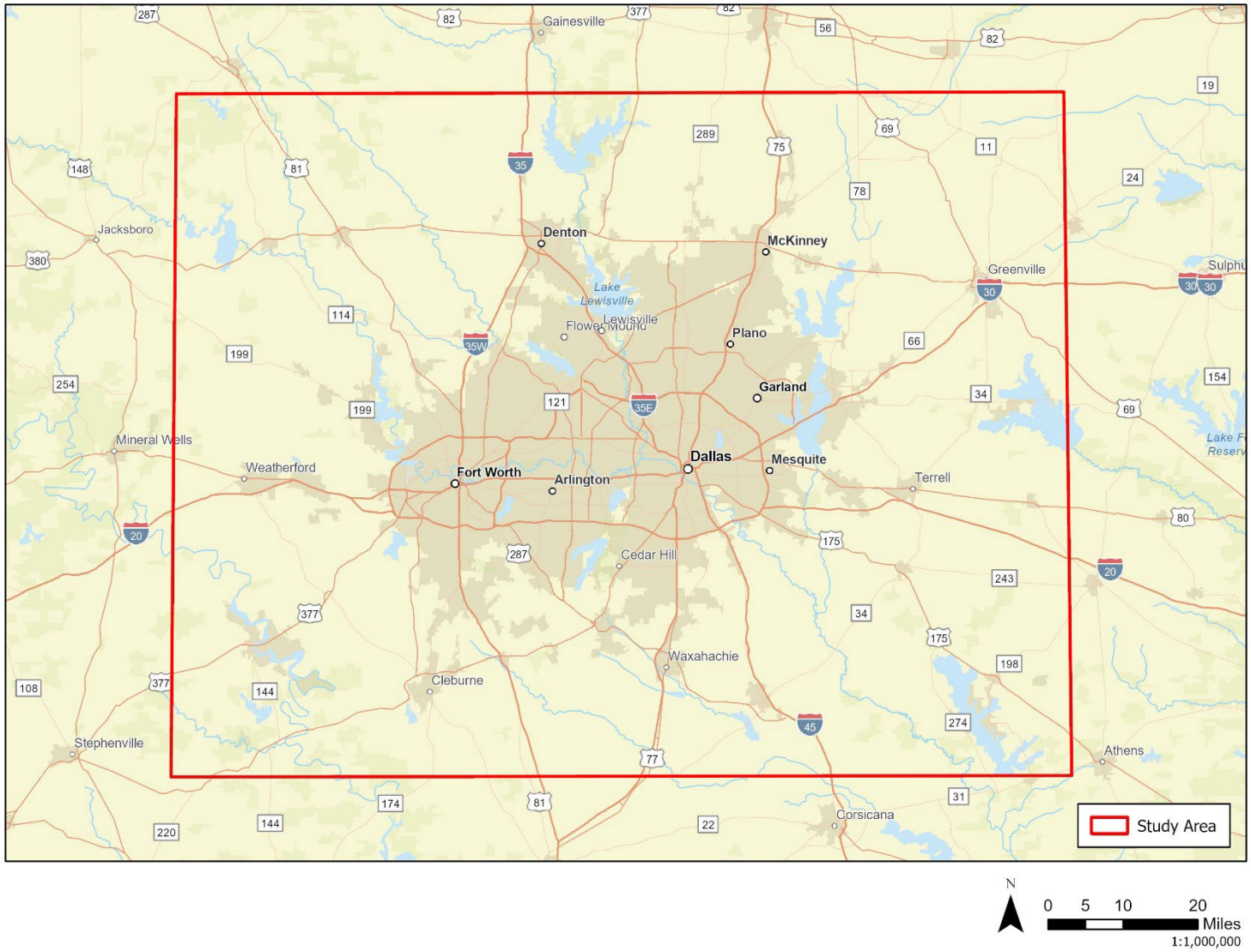

Chairman Chuck Hoskin
Cherokee Nation
P.O. Box 948
Tahlequah, Oklahoma 74464

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chairman Hoskin:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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Derek Hufty

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Emerging Technologies Division

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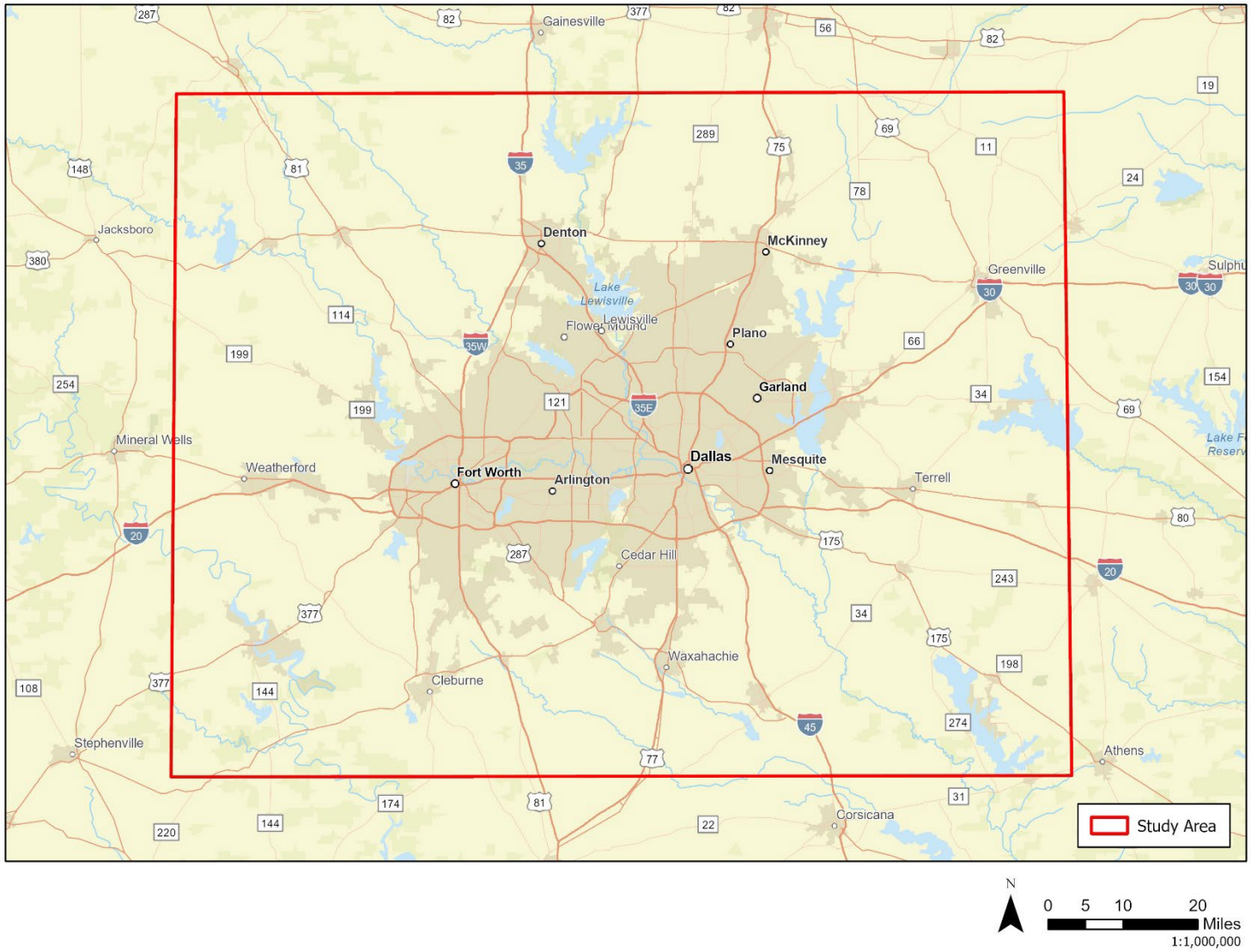

Chief Gary Batton
The Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, Oklahoma 74702

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chief Batton:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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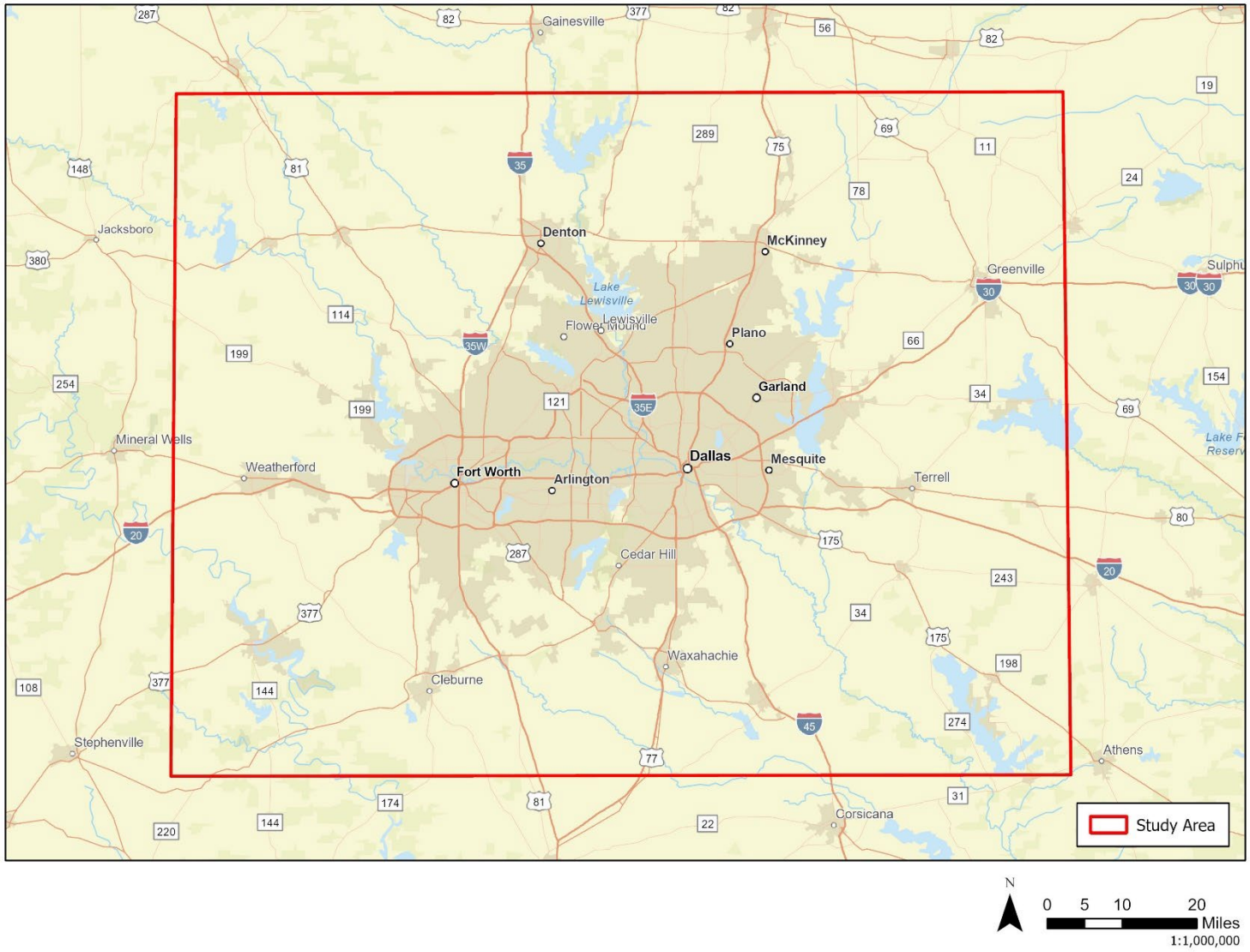

Chairman Mark Woommavovah
Comanche Nation
P.O. Box 908
Lawton, Oklahoma 73507

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chairman Woommavovah:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

The primary purpose of government-to-government consultation is to ensure that Federally Recognized Tribes are given the opportunity to provide meaningful and timely input regarding proposed FAA actions that uniquely or significantly affect the Tribes. This policy is provided in Federal Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*; Presidential Memorandum, *Uniform Standards for Tribal Consultation*; DOT Order 5301.1A, *Department of Transportation Tribal Consultation Policy and Procedures*; and FAA Order 1210.20, *American Indian and Alaska Native Tribal Consultation Policy and Procedures*.

Consultation Initiation

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Proposed Activity Description

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Area of Potential Effects

In accordance with 36 CFR 800.4(a)(1), the FAA has defined the Area of Potential Effects (APE) in consideration of the undertaking's potential direct and indirect effects. The APE would be approximately 11,000 square miles and is shown in greater detail in the enclosure.

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Sincerely,

Derek Hufty

Manager, General Aviation and Commercial Branch (AFS-750)

Emerging Technologies Division

Office of Safety Standards, Flight Standards Service

Attachment 1. Project Description

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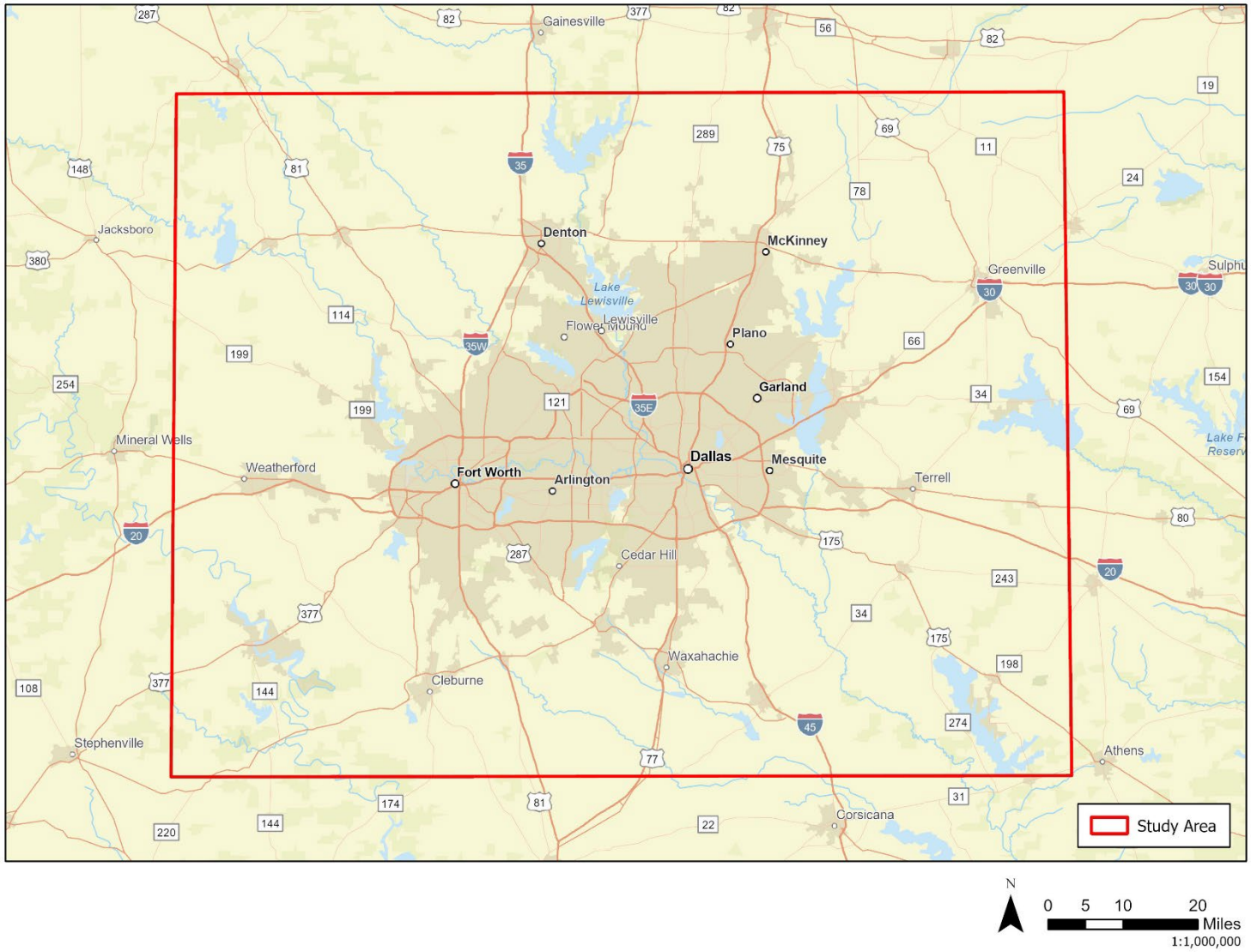

Chairman Jonathan Cernek
Coushatta Tribe of Louisiana
P.O. Box 818
Elton, Louisiana 70532

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Chairman Cernek:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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Emerging Technologies Division

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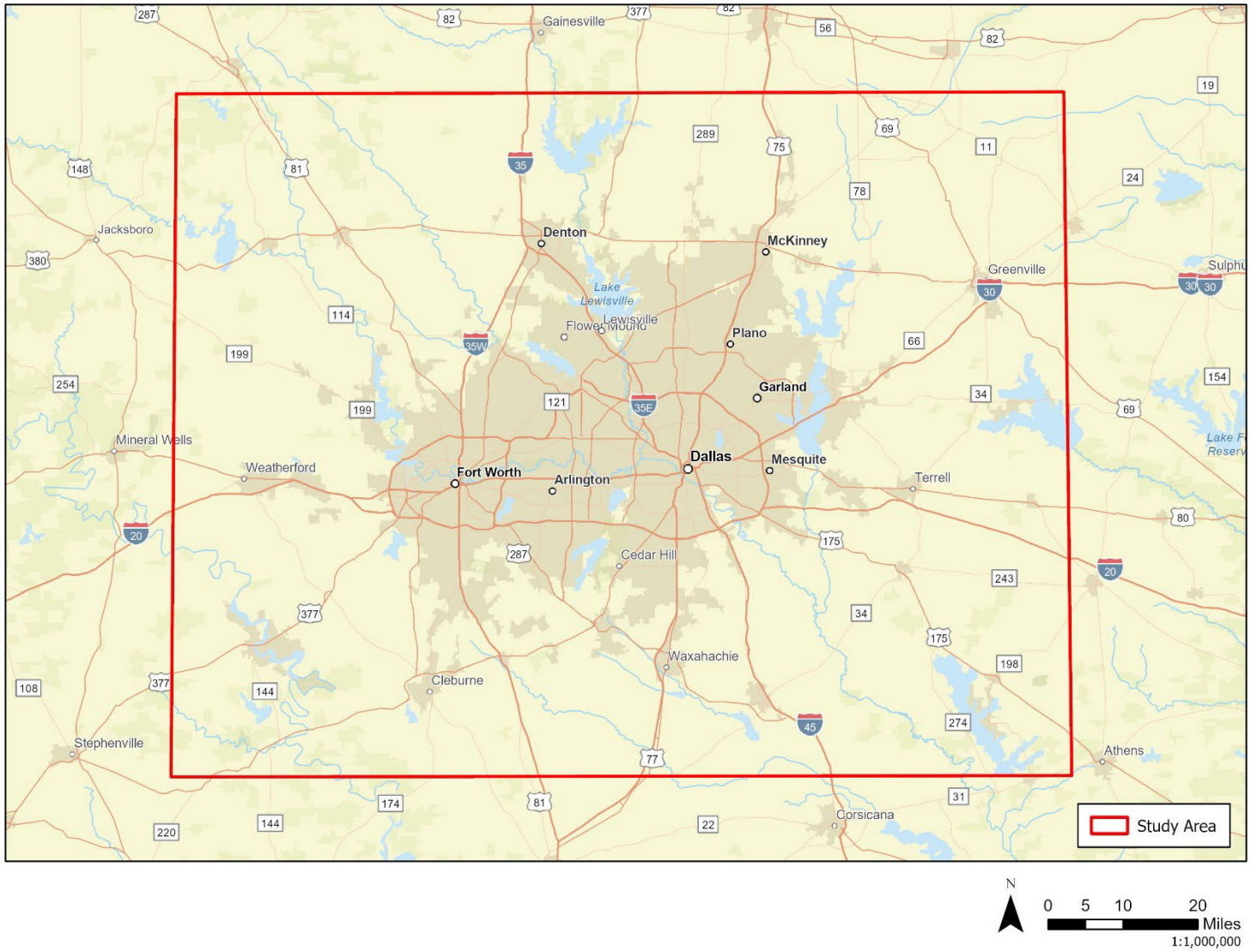

President Deborah Dotson
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Transmitted via mail and email to ddotson@delawarenation-nsn.gov.

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear President Dotson:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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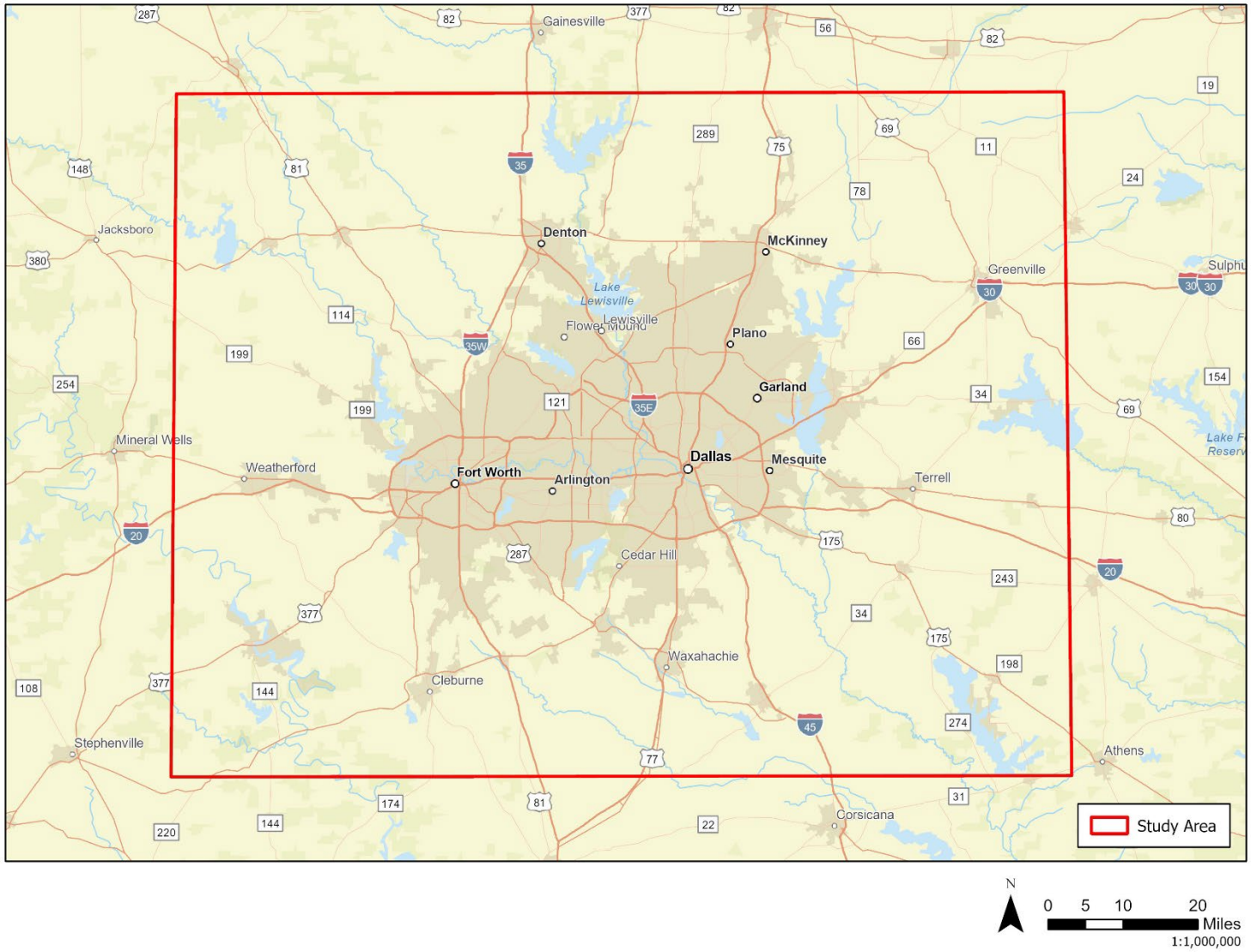
Derek Hufty
Manager, General Aviation and Commercial Branch (AFS-750)
Emerging Technologies Division
Office of Safety Standards, Flight Standards Service

Attachment 1 – Area of Potential Effect

Attachment 1. Area of Potential Effects



Principal Chief David Hill
Muscogee (Creek) Nation
P.O. Box 580
Okmulgee, OK 74447

Transmitted via mail and email to dhill@mcn-nsn.com.

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear Principal Chief Hill:

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Emerging Technologies Division

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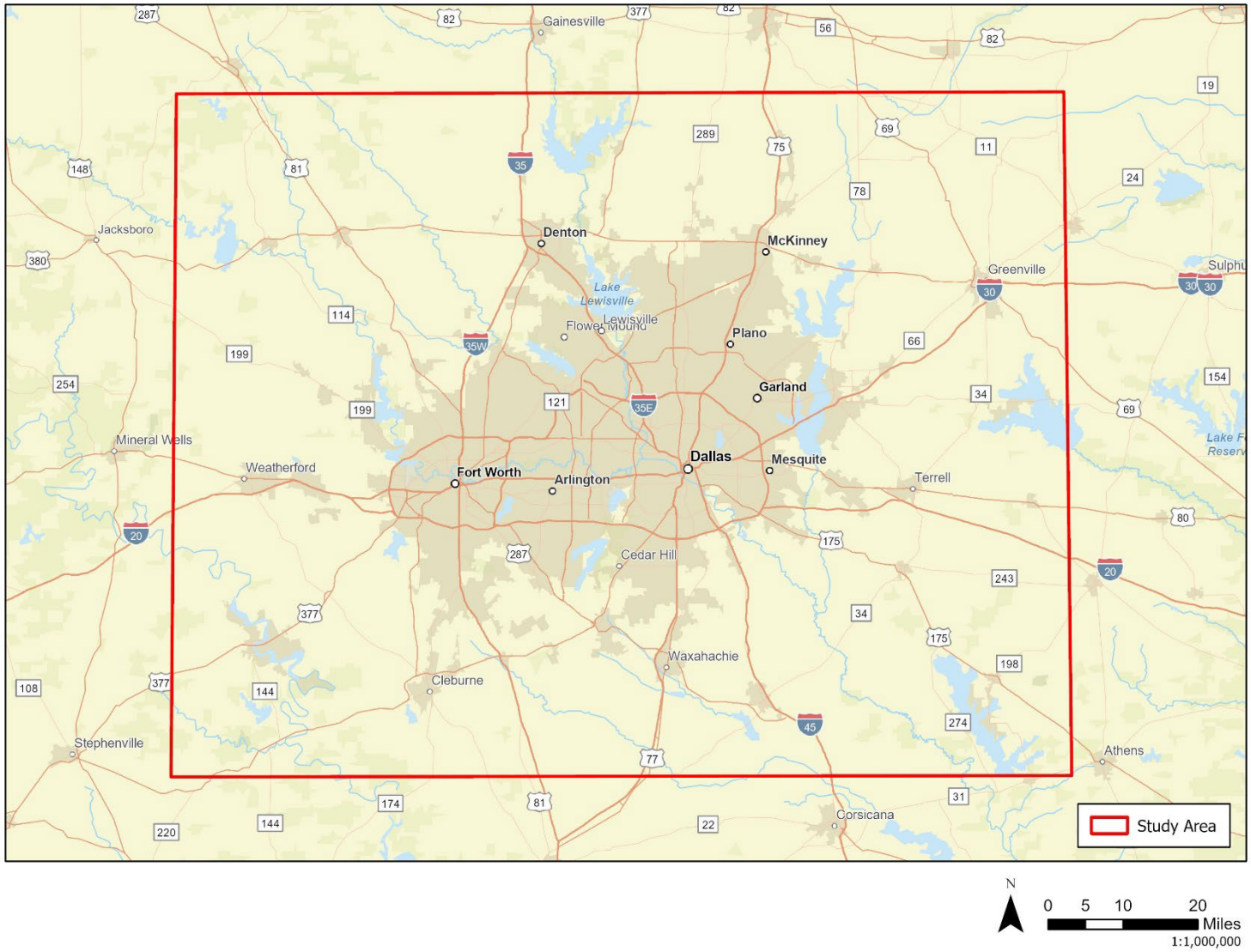

President Russell Martin
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, Oklahoma 74653-4449

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear President Martin:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) to authorize commercial Unmanned Aircraft Systems (UAS) operators to deliver goods to customers (referred to as package delivery) using unmanned aircraft (also referred to as drones) in accordance with 14 Code of Federal Regulations Part 135 (Part 135) in the state of Texas. The FAA is the lead federal agency for government-to-government consultation for the proposed project. Zipline International Inc. (Zipline) is the proponent of the project. We wish to solicit your views regarding potential effects on tribal interests in the area. The FAA has begun an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to analyze the proposed action. FAA intends to complete consultation for Section 106 of the NHPA concurrently with the NEPA process.

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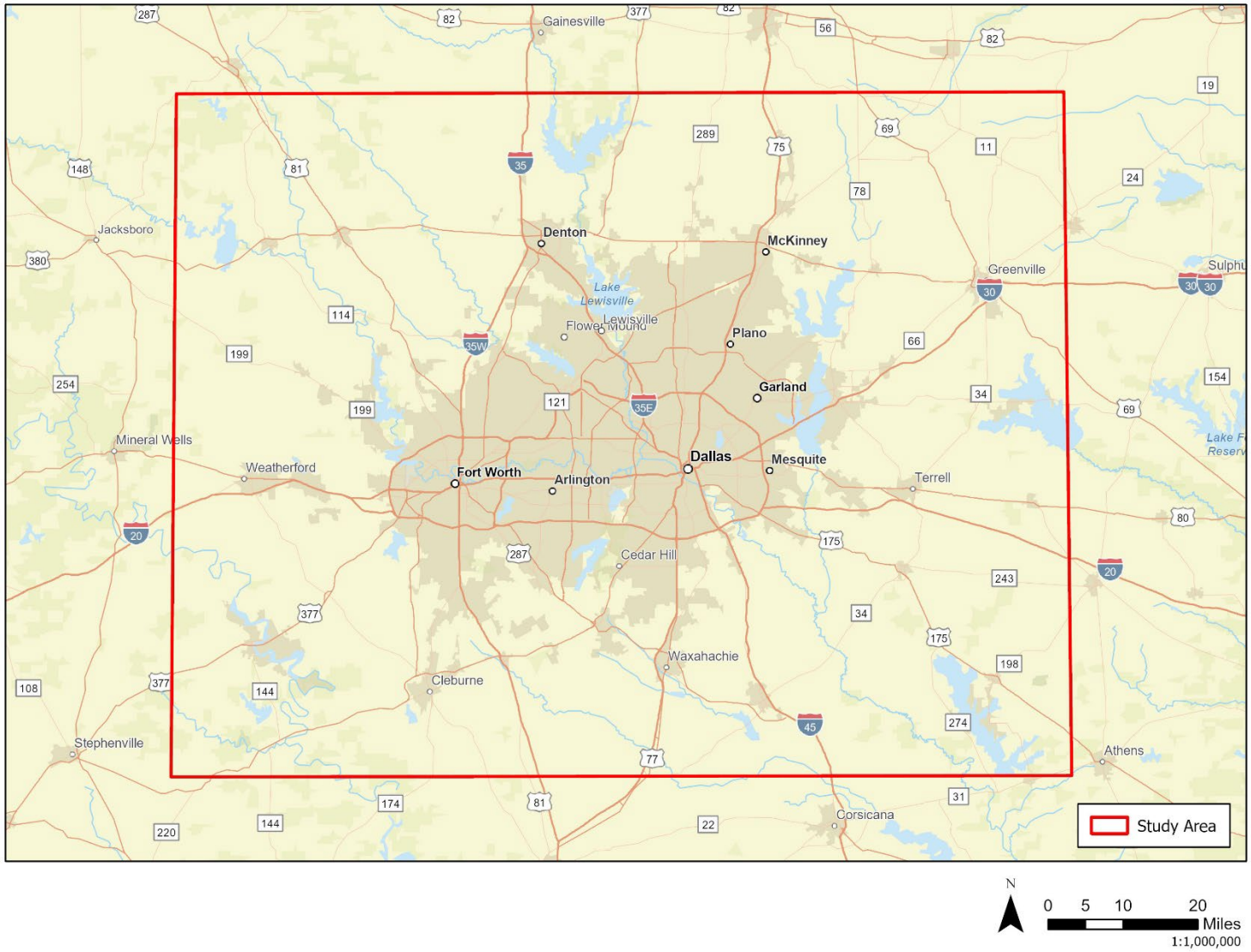

President Terri Parton
Wichita and Affiliated Tribes (Wichita, Keechi, Waco, and Tawakonie)
P.O. Box 729
Anadarko, Oklahoma 73005

RE: Invitation for Government-to-Government Tribal Consultation for Drone Package Delivery Operations in Texas

Dear President Parton:

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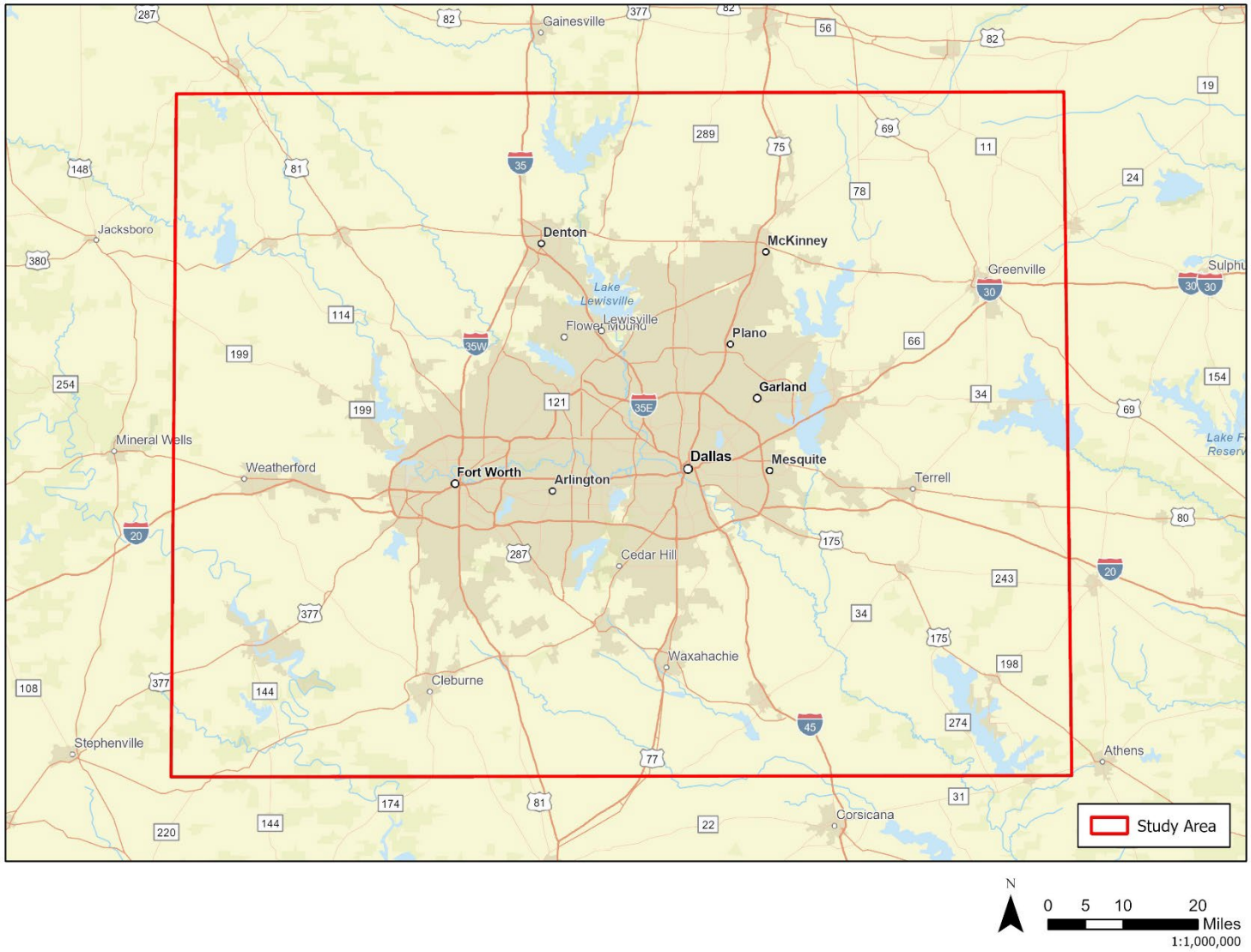


Appendix G
SHPO Consultation

Mr. Joseph Bell
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Via electronic submission to https://xapps.thc.state.tx.us/106Review/

Dear Mr. Bell:

The Federal Aviation Administration (FAA) is currently evaluating a proposal from Zipline International Inc. (Zipline) to expand its unmanned aircraft (UA; also referred to as a drone) package delivery operations in the Dallas-Fort Worth (DFW) metropolitan area. Zipline must obtain approval from the FAA prior to conducting commercial UA delivery operations under 14 CFR Part 135 (Part 135) in DFW. The FAA has determined the proposed action, which would encompass all FAA approvals necessary to enable operations Part 135, is an undertaking as defined under the regulations implementing Section 106 of the National Historic Preservation Act (36 CFR § 800.16(y)).

The purpose of this letter is to coordinate with the State Historic Preservation Officer (SHPO), request concurrence on the definition of the Area of Potential Effects (APE), and to provide the results of the preliminary identification of historic properties and finding of effect for this undertaking.

Project Description

Zipline is proposing to conduct commercial UA delivery services in the DFW metro area. Zipline has a Part 135 Air Carrier Operating Certificate from the FAA and a 49 USC Section 44807 exemption which allows it to carry the property of another for compensation or hire beyond visual line of sight. The certificate contains a stipulation that operations must be conducted in accordance with the provisions and limitations specified in the carrier's Operations Specifications (OpSpecs).[1] Zipline is applying to the FAA to add the DFW metropolitan area to its OpSpecs so it can begin operations in the DFW metropolitan area.

Under the proposed action, Zipline would establish up to 75 site locations and construct up to 500 docks, with a maximum of twenty docks at a single site. Operations would occur 24 hours a day, seven days per week, including holidays. Zipline would conduct up to 400 flights over a 24-hour day within a 10-mile radius around each site. Approximately 95% of flights would take place during acoustic daytime (7:00 AM to 10:00 PM) and 5% of flights would take place at acoustic nighttime (10:00 PM to 7:00 AM). Zipline is projecting to establish operations in the DFW operating area under the scope of the proposed action over the course of 18 months. The UA would be transporting consumer goods, food and beverages, and pharmaceuticals in partnership with merchants, including pharmacies, in the community. There would be variability in the number of flights per day based on customer demand and weather conditions. Initially, Zipline expects to fly considerably less than 100 deliveries per day from each site and then gradually increase to up to 400 deliveries per day at high volume sites as consumer demand rises.

For this consultation the project is divided into two components: installation of Zipline Infrastructure, consisting of dock locations; and Flight Operations, which details UA model, flight, and delivery. The effects of each component are significantly different in degree and scale, with the effects of installation

[1] An Operations Specifications is a document that defines the scope of aircraft operations that the FAA has authorized.

of Zipline Infrastructure being more permanent but impacting a much smaller area, with Flight Operations having only very brief, temporary effects but impacting a much larger area.

Project Component: Zipline Infrastructure

Zipline is proposing to disperse sites throughout the operating area (see **Attachment A**) following a measured rollout plan to be developed with Zipline's partners and through outreach to local communities (including local officials and wildlife groups, schools, and community groups) and airspace users. Zipline's sites would be located within established commercial areas whose use is consistent with local zoning and land use requirements, such as retail stores, warehouses, laboratories, and other locations operated by customers.

Each site would consist of between one and 20 docks, but the exact number of docks will be determined on a site-by-site basis dependent on market demand for the service in the area and logistical feasibility and efficiency. Docks would be housed on vertical docking towers, which will also serve to charge UAs, provide thermal management, and transfer data between UAs and the cloud. These docking towers would be between 21 feet 3 inches and 28 feet 8 inches in height. Docking towers would be erected either as standalone structures on previously disturbed land, such as paved parking lots, or physically attached to warehouses, laboratories, restaurants, or other commercial client buildings (see **Attachment B**).

Project Component: Flight Operations

Unmanned Aircraft

The UA for the proposed operations is Zipline's P2 UA, which features a multi-rotor design with five round diameter propellers (see **Attachment C**). The UA weighs under 63 pounds when combined with its maximum payload weight of 8 pounds. It has a wingspan of approximately 7.8 feet, a height of approximately 1.8 feet, and a length of approximately 8 feet. To avoid the potential for significant noise impacts, Zipline would place its sites at least 325 feet away from a noise-sensitive area when the site is located within the controlled surface area of Class B and Class D airspace and at least 150 feet away from a noise-sensitive area in all other areas within the study area. All Zipline aircraft use electric power from rechargeable lithium-ion batteries.

As part of normal Zipline operations, the UA may be assigned one of the following missions:

- Delivery. Requires a droid to deliver a payload to a prescribed location.
- Reposition. A UA moving from one dock to another.

Zipline operations begin with order processing followed by flight phases. A typical flight profile can be broken into the following general flight phases: undocking, en route outbound, delivery, en route inbound, and docking.

Undocking

Once cleared for takeoff from a dock, the UA undocks and then maneuvers away from the dock and climbs to the en route altitude (330 feet above ground level (AGL)) on its pre-planned flight path.

En Route Outbound

The en route outbound phase is the part of flight in which the fully loaded UA transits from the dock to a delivery point on a predefined flight path. The UA would generally be operated at an altitude of 330 feet AGL while en route to and from delivery locations. The UA would typically operate at an airspeed of 47 miles per hour (mph).

Delivery

The delivery phase consists of descent from the en route altitude to a delivery point, such as a residential yard, driveway, parking lot, or common area. The UA maintains its altitude at 330 feet AGL (while maintaining position over the delivery point. The UA then opens bay doors in its fuselage and deploys a "droid", a payload delivery device nested within the UA. The droid is then lowered to the ground via a winch line. During droid descent, the droid automatically controls its position laterally and evaluates the delivery site. If the delivery site does not meet Zipline's evaluation criteria, delivery would not continue, and the droid is retracted back into the UA. If the delivery site is clear, the droid would continue to descend and deliver the payload at the delivery target. The droid would then be retracted back into the UA. The UA would then proceed to climb vertically back to en route altitude. The total hover time for delivery operations would be approximately 75 seconds.

En Route Inbound

The P2 UA continues to fly at an altitude of 330 feet AGL and a speed of 47 mph towards the dock.

Docking

Upon reaching the dock, the UA slowly descends and maneuvers into the dock area. The UA then attaches to the dock from below using its docking fin. Hover motors are disengaged after the UA has registered secure connection with the dock.

Project Effects

Zipline Infrastructure

As part of this project Zipline would erect docking towers measuring between 21 feet 3 inches and 28 feet 8 inches in height within established commercial areas. These towers would either be standalone structures or would be physically attached to retail stores, warehouses, laboratories, and other locations operated by customers. Construction and ground disturbance would occur only in previously disturbed areas.

A provision in Zipline's OpSpecs will specify that historic properties will be considered noise-sensitive areas requiring a standoff distance of 150 feet between the docking tower and historic properties. This would eliminate the possibility that docking towers would be installed on historic properties and would also avoid or minimize potential visual and audible effects to historic properties from UA operations.

Flight Operations

Zipline UAs would fly at altitudes of 330 AGL at a speed of between 47 mph; for comparison, the usual cruising speed for most birds ranges from 20 to 30 miles per hour. UA flights would therefore be barely visible as small airborne objects flying at more than twice the speed of bird flight. Therefore, visual effects of en route flight operations would be rapid, intermittent, and barely noticeable. Delivery operations would involve UAs hovering at an elevation of 330 feet AGL, lowering a droid on a winchline to deliver the payload, and raising the droid, the total hover time for delivery operations taking approximately one minute.

FAA conducted a noise analysis using sound level measurement data for the Zipline P2 UA to determine potential audible effects from flight operations. Noise levels for takeoff and delivery would remain below 85 dB SEL for 30 seconds. In-flight noise for the P2 Zip at 330 feet AGL is 69.1 dBA SEL., audible effects of flight operations would be intermittent. Most operational noise levels would be non-intrusive

except for takeoff and loading (which would be at least 55-foot distance from historic properties) and deliveries, which may occur at historic properties intermittently for about 60 seconds per operation.

In conclusion, Zipline flight operations would incur only intermittent and minor visual and audible effects on historic properties.

Area of Potential Effects

In accordance with 36 CFR § 800.4(a)(1), the FAA has defined the Area of Potential Effects (APE) in consideration of the undertaking's potential direct and indirect effects. The APE is the operating area outlined in red in **Attachment A**. This area encompasses approximately 10,904 square miles and captures all potential noise and visual effects.

Identification of Historic Properties

The undertaking would include ground disturbance from docking tower installation, but because these docking towers would be installed in previously disturbed areas, the proposed undertaking does not have the potential to affect subsurface archaeological resources. Therefore, the FAA focused its identification efforts on above-ground historic properties.

According to the National Park Service's online database of the National Register of Historic Places (NRHP), a total of 225 historic properties and 145 historic districts are located in the APE (see **Attachments D and E**). Four historic properties are National Historic Landmarks (NHLs): Dealey Plaza Historic District (Reference Number 93001607), Fair Park Texas Centennial Buildings (Reference Number 86003488), Highland Park Shopping Village (Reference Number 97001393), and the Walter C. Porter Farm (Reference Number 66000819).

Most of the historic properties in the APE are residences and businesses, but also include churches, government buildings, schools, and courthouses. Additional historic properties include a steam locomotive, railway, two bridges, and a pump station.

Assessment of Effects

Pursuant to 36 CFR § 800.5(a), FAA applied criteria of adverse effects to historic properties in the APE. Although installation of Zipline docking towers would involve ground disturbance, this would be limited to previously disturbed areas and would have no effect on intact subsurface historic properties. Because historic properties, including NHLs, would be considered noise-sensitive areas, Zipline would not install docking towers on historic properties, and docking tower locations would be at least 55 feet from historic properties. Because of this distance, any visual or audible effects to a historic property would be minor.

Given the small size of the UA and predicted sound levels, UA operations would not produce vibrations that could affect the architectural structure or contents of any structure in the APE. While the UA is not expected to generate significant noise levels at or within any historic property, the FAA considered UA delivery noise and potential visual effects on historic properties where a quiet setting or visually unimpaired sky might be a key attribute of the property's significance. However, any visual or audible effects that may occur within a flight path would be negligible and temporary.

Taking into account the minimal infrastructure required for the project, consideration of historic properties in the OpSpecs as noise-sensitive areas, and the temporary nature of potential audible and visual effects, the FAA determined that the undertaking's effects do not meet the criteria in 36 CFR § 800.5(a)(1). Therefore, FAA has made a finding of ***no adverse effects to historic properties***.

Consultation

In May 2024, the FAA initiated government-to-government consultation regarding the proposed undertaking with the Absentee-Shawnee Tribe of Indians of Oklahoma, the Apache Tribe of Oklahoma, the Caddo Nation of Oklahoma, the Cherokee Nation, the Choctaw Nation of Oklahoma, the Comanche Nation, the Coushatta Tribe of Louisiana, the Delaware Nation, the Muscogee (Creek) Nation, the Tonkawa Tribe of Indians of Oklahoma, and the Wichita and Affiliated Tribes. The FAA invited the Tribes to provide input to inform the NEPA and Section 106 review and consultation processes, including information about any Tribal lands or sites of religious or cultural significance that may be affected by the proposed undertaking. As of June 16, 2025, no responses have been received.

The FAA will utilize the NEPA process to invite comment from both the public and local governments within the APE on the FAA's Section 106 finding of *no adverse effect* for this project. The FAA also welcomes input from the SHPO on additional consulting parties that may be invited to consult under Section 106.

In accordance with 36 CFR § 800.10, should an undertaking incur direct and adverse effects on an NHL, the FAA must notify the National Park Service (NPS) of any consultation regarding an NHL, and request Advisory Council on Historic Preservation (Council) participation in consultation to resolve adverse effects. However, because the FAA has determined that this project will result in no adverse effect to any NHLs, the FAA is not extending consultation invitations to either the NPS or the Council at this time.

Conclusion

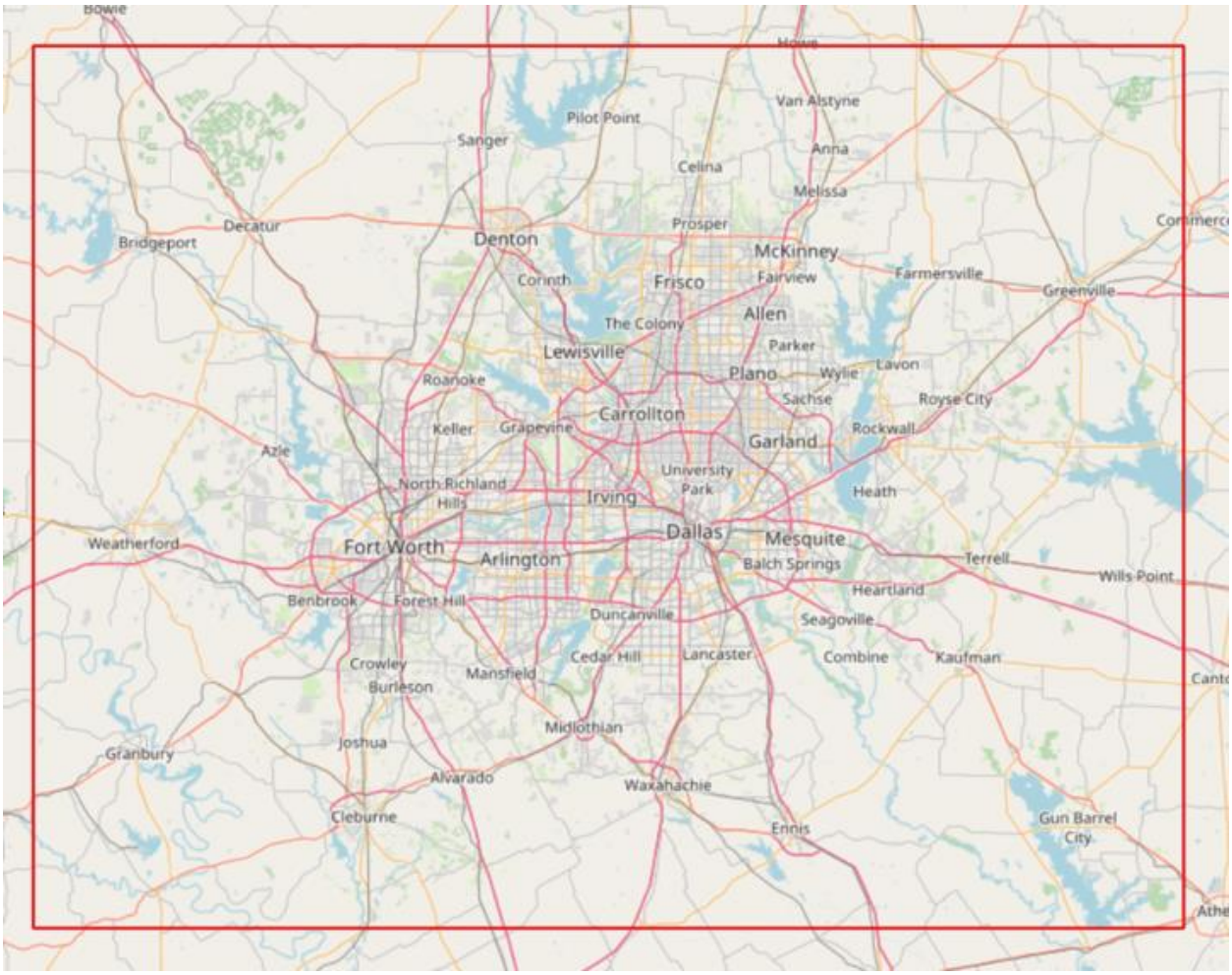
The FAA requests your concurrence on the finding of *no adverse effect to historic properties*. Your response within the next 30 days will greatly assist us in our environmental review process.

If you have any questions or need additional information, please contact Chris Hurst at (240) 210-0264 or via email at 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

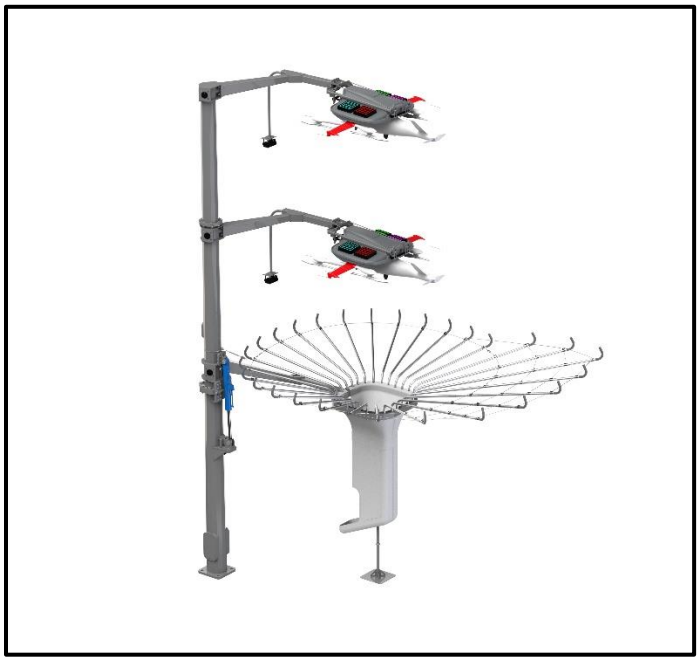
Sincerely,

Derek Hufty
Manager, General Aviation and Commercial Branch (AFS-750)
Emerging Technologies Division
Office of Safety Standards, Flight Standards Service

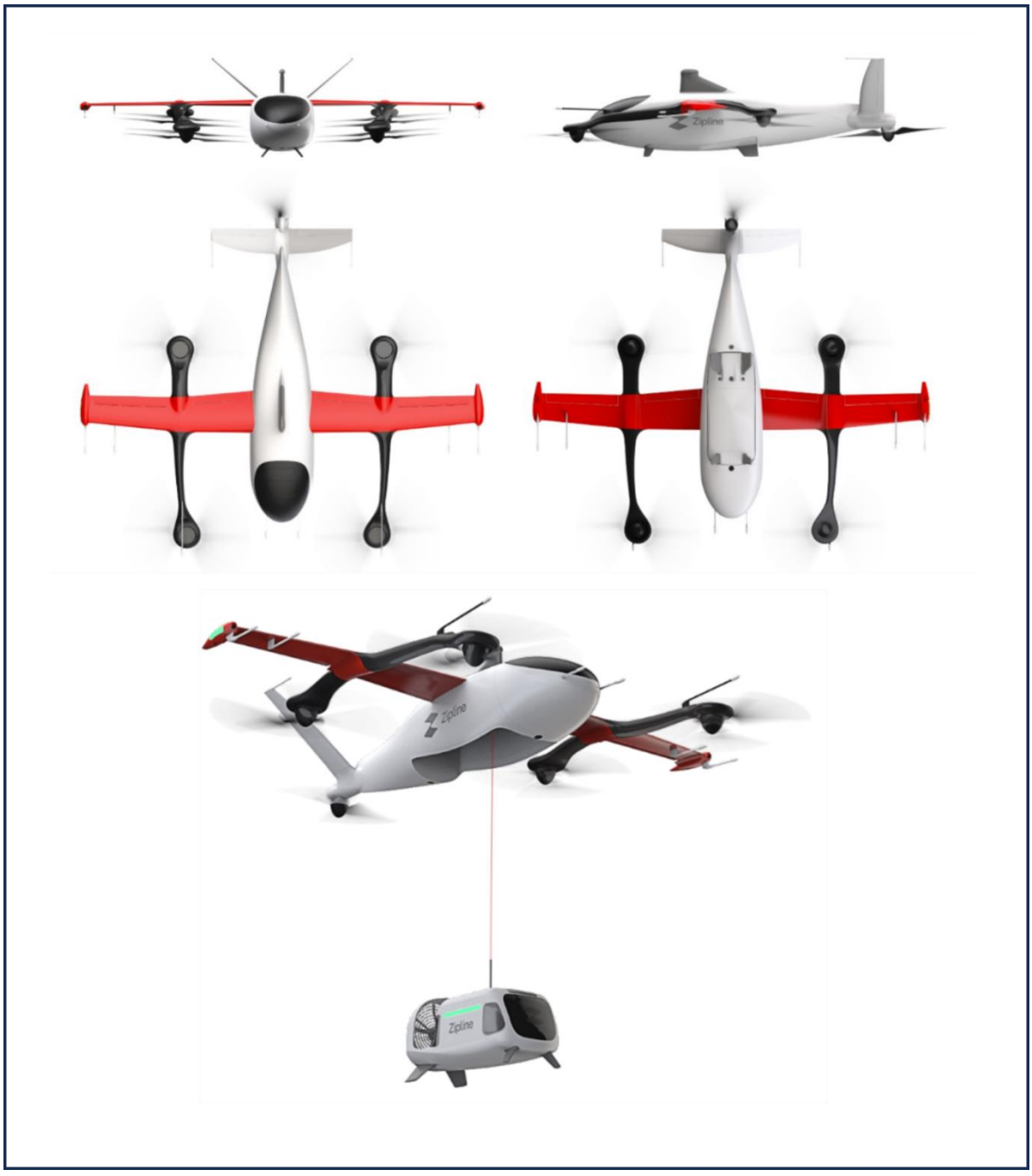
Attachment A. Area of Potential Effects



Attachment B. Zipline freestanding docking tower (above) and conceptual site locations (below)



Attachment C. Zipline P2 UA Profile Views (above) and Droid (below) Unmanned Aircraft with Package Attached



Attachment D. Historic Properties

Reference Number	Name	Address	City	County
100001378	Fountain G. and Mary Oxsheer House	1119 Pennsylvania Avenue	Fort Worth	Tarrant
99001624	Riverside Public School	2629 LaSalle St.	Fort Worth	Tarrant
99001499	Texas Farm and Ranch Building	3300 Main St.	Dallas	Dallas
99001451	Tabernacle Baptist Church	1801 Evans Ave.	Fort Worth	Tarrant
99001292	Dallas Tent and Awning Building	3401 Commerce St.	Dallas	Dallas
99001049	Morning Chapel Colored Methodist Episcopal Church	901 E. 3rd St.	Fort Worth	Tarrant
99000883	Saint James Second Street Baptist Church	210 Harding St.	Fort Worth	Tarrant
99000882	Our Mother of Mercy Catholic Church and Parsonage	1100 and 1104 Evans Ave.	Fort Worth	Tarrant
99000723	Botts--Fowler House	115 N. Fourth Ave.	Mansfield	Tarrant
98001415	Montgomery Ward and Company Building	801 Grove St.	Fort Worth	Tarrant
98000102	Fort Worth Club Building - 1916	608-610 Main St.	Fort Worth	Tarrant
97001187	Stanard-Tilton Flour Mill	2400 S. Ervay St.	Dallas	Dallas
97000851	Bedford School	2400 School Ln.	Bedford	Tarrant
97000478	Santa Fe Terminal Building No. 1 and No. 2	1114 Commerce St. and 1118 Jackson St.	Dallas	Dallas
97000363	Dallas Fire Station No. 16	5501 Columbia Ave.	Dallas	Dallas
96001563	Greer, George C. House	5439 Swiss Ave.	Dallas	Dallas
96001015	Busch--Kirby Building (Boundary Increase)	1501--1509 Main St.	Dallas	Dallas
96000586	Titche--Goettinger Department Store	1901 Main St.	Dallas	Dallas
95001365	Estes House	903 N. College St.	McKinney	Collin
95001029	Shaw, Thomas and Marjorie, House	2404 Medford Ct. E.	Fort Worth	Tarrant
95000325	Silberstein, Ascher, School	2425 Pine St.	Dallas	Dallas
95000323	Ellis, James H. and Molly, House	2426 Pine	Dallas	Dallas
95000321	Rush--Crabb House	2718 Pennsylvania	Dallas	Dallas
95000319	Trinity English Lutheran Church	3100 Martin Luther King, Jr. Blvd.	Dallas	Dallas
95000318	Forest Avenue High school, Old	3000 Martin Luther King, Jr. Blvd.	Dallas	Dallas
95000317	Levi-Topletz House	2603 Martin Luther King, Jr. Blvd.	Dallas	Dallas
95000316	Levi-Moses House	2433 Martin Luther King, Jr. Blvd.	Dallas	Dallas
95000315	Emanuel Lutheran Church	4301 San Jacinto	Dallas	Dallas
95000314	Fannin, James W. Elementary School	4800 Ross Ave.	Dallas	Dallas
95000312	Shiels, Thomas, House	4602 Reiger Ave.	Dallas	Dallas
95000311	Bianchi, Didaco and Ida, House	4503 Reiger Ave.	Dallas	Dallas

Reference Number	Name	Address	City	County
95000310	Mary Apartments	4524 Live Oak	Dallas	Dallas
95000309	Mrs. Baird's Bread Company Building	1401 N. Carroll	Dallas	Dallas
95000307	Central Congregational Church	1530 N. Carroll	Dallas	Dallas
95000048	Electric Building	410 W. 7th St.	Fort Worth	Tarrant
94001627	North Fort Worth High School	600 Park St.	Fort Worth	Tarrant
94001359	Woolworth, F. W., Building	501 Houston St.	Fort Worth	Tarrant
94000542	Sanger Brothers Building	410--412 Houston St.	Fort Worth	Tarrant
93000566	Brooks, William and Blanche, House	500 S. Center St.	Forney	Kaufman
92000021	Interstate Forwarding Company Warehouse	3200 Main St.	Dallas	Dallas
91001913	Sinclair Building	512 Main St.	Fort Worth	Tarrant
91000118	Mitchell, John E., Company Plant	3800 Commerce St.	Dallas	Dallas
88002709	Westover Manor	8 Westover Rd.	Westover Hills	Tarrant
88002063	Gilbert, Samuel and Julia, House	2540 Farmers Branch Ln.	Farmers Branch	Dallas
88000979	Old Alton Bridge	Copper Canyon Rd.	Copper Canyon	Denton
88000176	Oak Lawn Methodist Episcopal Church, South	3014 Oak Lawn Ave.	Dallas	Dallas
87001757	Wilson, A. G., House	417 N. Waddill	McKinney	Collin
87001756	Wiley, Thomas W., House	105 S. Church	McKinney	Collin
87001755	Waddill, R. L., House	302 W. Lamar	McKinney	Collin
87001754	Thompson House	1207 W. Louisiana	McKinney	Collin
87001753	Taylor, J. H., House	211 N. Waddill	McKinney	Collin
87001752	Smith, W. D., House	703 N. College	McKinney	Collin
87001751	Scott, L. A., House	513 W. Louisiana	McKinney	Collin
87001750	Scott, A. M., House	1109 W. Louisiana	McKinney	Collin
87001749	Rhea, John C., House	801 N. College	McKinney	Collin
87001748	Newsome--King House	401 W. Louisiana	McKinney	Collin
87001747	Newsome, R. F., House	609 Tucker	McKinney	Collin
87001746	Nenney, J. P., House	601 N. Church	McKinney	Collin
87001745	Neathery, Sam, House	215 N. Waddill	McKinney	Collin
87001743	McKinney Hospital, Old	700-800 S. College	McKinney	Collin
87001739	McKinney Cotton Compress Plant	300 blk. Throckmorton	McKinney	Collin
87001738	Kirkpatrick, E. W. House and Barn	903 Parker	McKinney	Collin
87001737	King, Mrs. J. C., House	405 W. Louisiana	McKinney	Collin
87001724	Johnson, Thomas, House	312 S. Tennessee	McKinney	Collin
87001723	Johnson, John, House	302 Anthony	McKinney	Collin
87001722	Houses at 406 and 408 Heard	406 & 408 Heard	McKinney	Collin

Reference Number	Name	Address	City	County
87001721	House at 704 Parker	704 Parker	McKinney	Collin
87001717	House at 1303 W. Louisiana	1303 W. Louisiana	McKinney	Collin
87001716	Hill--Webb Grain Elevator	400 E. Louisiana	McKinney	Collin
87001715	Hill, W. R., House	601 N. College	McKinney	Collin
87001714	Hill, Moran, House	203 N. Waddill	McKinney	Collin
87001713	Hill, John B., House	605 N. College	McKinney	Collin
87001712	Hill, Ben, House	509 Tucker	McKinney	Collin
87001711	Heard--Craig House	205 W. Hunt	McKinney	Collin
87001710	Gough--Hughston House	1206 W. Louisiana	McKinney	Collin
87001709	Fox, S. H., House	808 Tucker	McKinney	Collin
87001708	Foote--Crouch House	401 N. Benge	McKinney	Collin
87001707	Ferguson, John H., House	607 N. Church	McKinney	Collin
87001706	Faires--Bell House	S side Chestnut Sq.	McKinney	Collin
87001705	Faires, F. C., House	505 S. Chestnut	McKinney	Collin
87001704	Dulaney, Joe E., House	311 S. Chestnut	McKinney	Collin
87001702	Dulaney, Joseph Field, House	315 S. Chestnut	McKinney	Collin
87001699	Dowell, J. S., House	608 Parker	McKinney	Collin
87001697	Davis--Hill House	710 N. Church	McKinney	Collin
87001695	Davis, H. L., House	705 N. College	McKinney	Collin
87001691	Crouch--Perkins House	205 N. Church	McKinney	Collin
87001688	Goodner, Jim B., House	302 S. Tennessee	McKinney	Collin
87001685	Collin County Mill and Elevator Company	407 E. Louisiana	McKinney	Collin
87001682	Coggins, J. R., House	805 Howell	McKinney	Collin
87001681	Cline--Bass House	804 Tucker	McKinney	Collin
87001679	Clardy, U. P., House	315 Oak	McKinney	Collin
87001671	Burrus--Finch House	405 N. Waddill	McKinney	Collin
87001666	Brown, John R., House	509 N. Church	McKinney	Collin
87001663	Board--Everett House	507 N. Bradley	McKinney	Collin
87001662	Bingham, John H., House	800 S. Chestnut	McKinney	Collin
87001661	Beverly--Harris House	604 Parker	McKinney	Collin
86001939	Old Continental State Bank	312 Oak St.	Roanoke	Denton
85003092	Hilton Hotel	1933 Main St.	Dallas	Dallas
85002912	Spake, Jacob and Eliza, House	2600 State St.	Dallas	Dallas
85001495	Straus House	400 Cedar	Cedar Hill	Dallas
85001484	Rogers-O'Daniel House	2230 Warner Rd.	Fort Worth	Tarrant
85000855	US Post Office	Lancaster and Jennings Ave.	Fort Worth	Tarrant
85000713	Roberts, Dr. Rufus A., House	210 S. Broad St.	Cedar Hill	Dallas
85000712	Hawkes, Z. T. (Tip), House	132 N. Potter St.	Cedar Hill	Dallas
85000711	Bryant, William, Jr., House	S. Broad and Cooper	Cedar Hill	Dallas
85000710	Angle, D. M., House	800 Beltline	Cedar Hill	Dallas
85000074	St. Patrick Cathedral Complex	1206 Throckmorton St.	Fort Worth	Tarrant

Reference Number	Name	Address	City	County
84001998	St. Mary of the Assumption Church	501 W. Magnolia Ave.	Fort Worth	Tarrant
84001996	Johnson-Elliott House	3 Chase Ct.	Fort Worth	Tarrant
84001993	Hutcheson-Smith House	312 N. Oak St.	Arlington	Tarrant
84001981	Fort Worth Public Market	1400 Henderson St.	Fort Worth	Tarrant
84001969	Fort Worth Elks Lodge 124	512 W. 4th St.	Fort Worth	Tarrant
84001965	Bryce, William J., House	4900 Bryce Ave.	Fort Worth	Tarrant
84001963	Bryce Building	909 Throckmorton St.	Fort Worth	Tarrant
84001961	Blackstone Hotel	601 Main St.	Fort Worth	Tarrant
84001643	Viola Courts Apartments	4845 Swiss Ave.	Dallas	Dallas
84000169	Allen Chapel AME Church	116 Elm St.	Fort Worth	Tarrant
83003812	First Christian Church	612 Throckorton St.	Fort Worth	Tarrant
83003162	Sanguinet, Marshall R., House	4729 Collinwood Ave.	Fort Worth	Tarrant
83003160	Austin, Stephen F., Elementary School	319 Lipscomb St.	Fort Worth	Tarrant
83003135	McIntosh, Roger D., House	1518 Abrams Rd.	Dallas	Dallas
83003134	Continental Gin Company	3301-3333 Elm St., 212 and 232 Trunk Ave.	Dallas	Dallas
83003133	Hotel Adolphus	1315 Commerce St.	Dallas	Dallas
82001736	Grace Methodist Episcopal Church	4105 Junius St.	Dallas	Dallas
81000627	Number 4 Hook and Ladder Company	Cedar Springs Rd. and Reagan St.	Dallas	Dallas
80004489	Busch Building	1501--1509 Main St.	Dallas	Dallas
80004151	Burnett, Burk, Building	500--502 Main St.	Fort Worth	Tarrant
80004097	Virginia Hall	3325 Dyer St.	Dallas	Dallas
80004096	Snider Hall	3305 Dyer St.	Dallas	Dallas
80004095	Perkins Hall of Administration	6425 Hillcrest Rd.	Dallas	Dallas
80004094	Patterson, Stanley, Hall	3128 Dyer St.	Dallas	Dallas
80004092	Miller, John Hickman, House	3506 Cedar Springs	Dallas	Dallas
80004091	McFarlin Memorial Auditorium	6405 Hillcrest Rd.	Dallas	Dallas
80004090	Hyer Hall	6424 Hill Lane	Dallas	Dallas
80004089	Florence, Fred, Hall	3330 University Blvd.	Dallas	Dallas
80004088	Dallas Scottish Rite Temple	Harwood and Young Sts.	Dallas	Dallas
80004087	Clements Hall	3200 Dyer St.	Dallas	Dallas
79003012	Waggoner, W. T. Building	810 Houston St.	Fort Worth	Tarrant
79003011	Hotel Texas	815 Main St.	Fort Worth	Tarrant
79003009	Eddleman-McFarland House	1110 Penn St.	Fort Worth	Tarrant
79002931	Wilson Building	1621-1623 Main St.	Dallas	Dallas
78002982	Benton, M. A., House	1730 6th Ave.	Fort Worth	Tarrant
78002981	Anderson, Neil P., Building	411 W. 7th St.	Fort Worth	Tarrant
78002922	Strain, W. A., House	400 E. Pecan St.	Lancaster	Dallas
78002921	Rawlins, Capt. R. A., House	2219 Dowling St.	Lancaster	Dallas

Reference Number	Name	Address	City	County
78002920	Randlett House	401 S. Centre St.	Lancaster	Dallas
78002917	Waples-Platter Buildings	2200--2211 N. Lamar St.	Dallas	Dallas
78002915	Magnolia Building	108 S. Akard St.	Dallas	Dallas
78002913	Dallas Hall	Southern Methodist University campus	Dallas	Dallas
78002906	Wilson, Ammie House	1900 W. 15th St.	Plano	Collin
77001477	Texas & Pacific Steam Locomotive No. 610	Now at Texas State Railroad, Palestine	Fort Worth	Tarrant
77001438	Denton County Courthouse	Public Sq.	Denton	Denton
77001437	Majestic Theatre	1925 Elm St.	Dallas	Dallas
76002068	Paddock Viaduct	Main St.	Fort Worth	Tarrant
76002019	Dallas County Courthouse	Houston and Commerce Sts.	Dallas	Dallas
75002003	Wharton-Scott House	1509 Pennsylvania Ave.	Fort Worth	Tarrant
75001967	Sanger Brothers Complex	Block 32, bounded by Elm, Lamar, Main and Austin Sts.	Dallas	Dallas
75001965	Belo, Alfred Horatio, House	2115 Ross Ave.	Dallas	Dallas
72001372	Pollock-Capps House	1120 Penn St.	Fort Worth	Tarrant
71000964	Flatiron Building	1000 Houston St.	Fort Worth	Tarrant
70000762	Tarrant County Courthouse	Bounded by Houston, Belknap, Weatherford, and Commerce Sts.	Fort Worth	Tarrant
70000761	Knights of Pythias Building	315 Main St.	Fort Worth	Tarrant
70000760	Gulf, Colorado and Sante Fe Railroad Passenger Station	1601 Jones St.	Fort Worth	Tarrant
16000916	St. Paul Methodist Episcopal Church	1816 Routh Street	Dallas	Dallas
14000105	Inspiration Point Shelter House	Roughly 250 yds S. of 2400 blk. Of Roberts Cut Off Rd.	Fort Worth	Tarrant
14000103	511 Akard Building	511 N. Akard St.	Dallas	Dallas
13000612	J. L. Sealy Building	801 South Main Street	Fort Worth	Tarrant
13000126	Fort Worth Warehouse and Transfer Company Building	201 S. Calhoun St.	Fort Worth	Tarrant
12001005	Van Zandt Cottage	2900 Crestline Road	Fort Worth	Tarrant
12001004	Farmers and Mechanics National Bank	714 Main Street	Fort Worth	Tarrant
12000589	Eldred W. Foster House	9608 Heron Drive	Fort Worth	Tarrant
12000350	Dallas Coffin Company	1325 S. Lamar	Dallas	Dallas
11000982	Ridglea Theatre Building	6025-6033 Camp Bowie Blvd. & 3309 Winthrop Ave.	Fort Worth	Tarrant
11000344	Santa Fe Terminal Building No. 4	1033 Young St.	Dallas	Dallas
11000343	Adamson High School	201 East Ninth Street	Dallas	Dallas
11000136	Texas Garden Clubs, Inc., Headquarters	3111 Old Garden Road	Fort Worth	Tarrant
11000128	Henderson Street Bridge	Henderson Street at the Clear Fork of the Trinity River	Fort Worth	Tarrant

Reference Number	Name	Address	City	County
10000865	Miller Manufacturing Company Building	311 Bryan Avenue	Fort Worth	Tarrant
10000500	Vandergriff Building	100 E. Division St.	Arlington	Tarrant
10000249	Parkland Hospital	3819 Maple Avenue	Dallas	Dallas
9000982	Petroleum Building	210 West Sixth Street	Fort Worth	Tarrant
9000981	First National Bank Building	711 Houston Street	Fort Worth	Tarrant
9000839	Celina Public School	205 S. Colorado St.	Celina	Collin
9000306	Fidelity Union Life Insurance Building	1511 Bryan/1507 Pacific Ave.	Dallas	Dallas
8001300	Roy A. and Glady's Westbrook House	2232 Winton Terrace West	Fort Worth	Tarrant
8000658	Alfred and Juanita Bromberg House			
8000539	4928 Bryan Street Apartments	4928 Bryan Street	Dallas	Dallas
8000475	Building @ 3525 Turtle Creek Boulevard	3525 Turtle Creek Boulevard	Dallas	Dallas
8000317	American Airways Hangar and Administration Building	Meacham Airport, 201 Aviation Way, Hangar 11N	Fort Worth	Tarrant
7000989	Stoneleigh Court Hotel	2927 Maple Avenue	Dallas	Dallas
7000691	First Methodist Church of Rockwall	303 East Rusk	Rockwall	Rockwall
7000266	Kress Building	604 Main Street	Fort Worth	Tarrant
7000130	Monroe Shops	2111 South Corinth Street	Dallas	Dallas
66000819	Walter C. Porter Farm (NHL)	2 miles north of Terrell on FR 986	Terrell	Kaufman
6001085	Dr. Arvel and Faye Ponton House	1208 Mistletoe Drive	Fort Worth	Tarrant
6000819	Dallas Times Herald Pasadena Perfect Home	6938 Wildgrove Avenue	Dallas	Dallas
6000651	Bluitt Sanitarium	2036 Commerce Street	Dallas	Dallas
6000513	Mark & Maybelle Lemmon House	3211 Mockingbird Lane	Highland Park	Dallas
6000510	Our Mother of Mercy School	801 Verbena Street	Fort Worth	Tarrant
5001543	1926 Republic National Bank	1309 Main Street1309 Main Street	Dallas	Dallas
5001541	Purvin-Hexter Building	2038 Commerce Street	Dallas	Dallas
5000864	Vaught House	718 West Abram Street	Arlington	Tarrant
5000856	Plano Station/Texas Electric Railway	901 E. 15th Street	Plano	Collin
5000419	Dallas National Bank	1530 Main and 1511 Commerce St.	Dallas	Dallas
5000243	Republic National Bank	300 N. Ervay/325 N. St. Paul St.	Dallas	Dallas
4000886	Our Lady of Victory Academy	801 W. Shaw St.	Fort Worth	Tarrant
4000102	Harlan Building	2018 Cadiz St.	Dallas	Dallas
3001418	Rector Road Bridge at Clear Creek	Moved to Guyer HS from approx. 2.5 mi SE of Sanger	Sangar	Denton

Reference Number	Name	Address	City	County
3000436	Wallace-Hall House	210 S. Main St.	Mansfield	Tarrant
3000435	Ralph Sandiford and Julia Boisseau Man House	604 West Broad Street	Mansfield	Tarrant
3000434	Chorn, Lester H. and Maybel Bryant, House	303 E. Broad St.	Mansfield	Tarrant
3000433	Buchanan-Hayter-Witherspoon House	306 E. Broad St.	Mansfield	Tarrant
3000432	Bratton, Andrew "Cap" and Emma Doughty, House	310 E. Broad St.	Mansfield	Tarrant
3000277	Chevrolet Motor Company Building	3221 Commerce	Dallas	Dallas
3000187	Texas Theatre	231 W. Jefferson Blvd.	Dallas	Dallas
2001515	Fort Worth High School	1015 S. Jennings Ave.	Fort Worth	Tarrant
2001512	Hogg, Alexander, School	900 St. Louis Ave.	Fort Worth	Tarrant
2000992	G & J Manufacturing	3912 Willow St.	Dallas	Dallas
2000730	Lincoln Paint and Color Company Building	3210 Main	Dallas	Dallas
2000009	Goodyear Tire and Rubber Company Building and B.F. Goodrich Building	3809 Parry Ave. & 4140 Commerce St.	Dallas	Dallas
1000470	Markeen Apartments	210--14 St. Louis Ave. and 406--10 W. Daggett Ave.	Fort Worth	Tarrant
1000437	Fort Worth US Courthouse	501 W. 10th St.	Fort Worth	Tarrant
1000103	Turtle Creek Pump Station	3630 Harry Hines Blvd.	Dallas	Dallas
1537	Medical Dental Building	300 Blk. of West Jefferson Blvd.	Dallas	Dallas
188	Arlington Post Office	200 W. Main St.	Arlington	Tarrant

Attachment E. Historic Districts

Reference Number	Name	Address	City	County
100008197	Fort Worth National Bank	115 West 7th Street	Fort Worth	Tarrant
100007423	Gospel Lighthouse Church	1900 South Ewing Avenue	Dallas	Dallas
100007403	Farrington Field and Public Schools Gymnasium	1501 University Drive and 1400 Foch Street	Fort Worth	Tarrant
100006549	Wedgwood Apartments	2511 Wedglea Drive	Dallas	Dallas
100006521	Elizabeth and Jack Knight House	2811 Simondale Drive	Fort Worth	Tarrant
100006219	Braniff International Hostess College	2801 Wycliff Avenue	Dallas	Dallas
100005603	Riverside Baptist Church	3111 Race Street	Fort Worth	Tarrant
100005459	West Denton Residential Historic District	Roughly bounded by West Hickory Street, Panhandle Street, Carroll Boulevard and Ponder Avenue	Denton	Denton
100005350	Fair Building	307 West 7th Street	Fort Worth	Tarrant
100004969	Katy Freight Depot	100 South Jones Street	Fort Worth	Tarrant
100004752	Forest Theatre	1904 Martin Luther King Jr. Boulevard	Dallas	Dallas
100004431	Fairhaven Retirement Home	2400 North Bell Avenue	Denton	Denton
100004371	Bella Villa Apartments	5506 Miller Avenue	Dallas	Dallas
100004249	McGaugh Hosiery Mills / Airmaid Hosiery Mills Building	4408 2nd Avenue	Dallas	Dallas
100003923	Cabana Motel Hotel	899 North Stemmons Freeway	Dallas	Dallas
100003599	Ambassador Hotel	1312 South Ervay	Dallas	Dallas
100003598	Texas Pool	901 Springbrook Drive	Plano	Collin
100002850	Hamilton Apartments	2837 Hemphill Street	Fort Worth	Tarrant
100002699	Shannon's Funeral Home	2717 Avenue B	Fort Worth	Tarrant
100002473	Oakwood Cemetery Historic District	701 Grand Ave.	Fort Worth	Tarrant
100002434	Saigling House	902 East 16th Street	Plano	Collin
100002347	Pioneer Woman Monument	Pioneer Circle, Texas Women's University	Denton	Denton
100001764	First National Bank Tower	1401 Elm Street	Dallas	Dallas
100001373	Garland Downtown Historic District (Boundary Increase for Alston House)	212 North 7th Street	Garland	Dallas
100001372	Plano Downtown Historic District	1000 block & 1112 East 15th Street, 1020 East 15th Place, 1410-1416 J Avenue, & 1416-1430 K Avenue	Plano	Collin
100001227	Masonic Temple	1100 Henderson Street	Fort Worth	Tarrant
100000862	The Woman's Club of Fort Worth	North side 1300 block of Pennsylvania Avenue	Fort Worth	Tarrant

Reference Number	Name	Address	City	County
100000861	Garland Downtown Historic District	Roughly bounded by W. State Street on the north, Santa Fe Rail Line on the east, West Avenue A on the south and Glenbroo	Garland	Dallas
100000674	Jennings-Vickery Historic District	W. Vickery Boulevard, St. Louis Avenue, West Daggett Avenue and Hemphill Street, plus Jennings Avenue Underpass	Fort Worth	Tarrant
100000672	Travis College Hill Historic District	300-400 blocks of South 11th Street	Garland	Dallas
100000671	Grand Lodge of the Colored Knights of Pythias, Texas	2551 Elm Street	Dallas	Dallas
100000504	Lily B. Clayton Elementary School	2000 Park Place Avenue	Fort Worth	Tarrant
99001139	Lawrence, Stephen Decatur, Farmstead	701 E. Kearney St.	Mesquite	Dallas
99000882	Our Mother of Mercy Catholic Church and Parsonage	1100 and 1104 Evans Ave.	Fort Worth	Tarrant
99000565	Fairmount--Southside Historic District (Boundary Increase)	Roughly bounded by Magnolia, Hemphill, Allen, Travis and Morphy St.	Fort Worth	Tarrant
99000565	Fairmount--Southside Historic District (Boundary Increase)	Roughly bounded by Magnolia, Hemphill, Allen, Travis and Morphy St.	Fort Worth	Tarrant
98000736	Original Town Residential Historic District	Roughly bounded by Texas, Austin, Hudgins and Jenkins Sts.	Grapevine	Tarrant
98000429	Guinn, James E., School	1200 South Freeway	Fort Worth	Tarrant
97001393	Highland Park Shopping Village (NHL)	Jct. of Preston Rd. and Mockingbird Ln.	Highland Park	Dallas
97001109	Cotton Belt Railroad Industrial Historic District	Along RR tracks, roughly bounded by Hudgins, Dooley, and Dallas Sts.	Grapevine	Tarrant
97000851	Bedford School	2400 School Ln	Bedford	Tarrant
97000478	Santa Fe Terminal Buildings No.1 and No. 2	1114 Commerce St. and 1118 Jackson St.	Dallas	Dallas
97000444	Grapevine Commercial Historic District (Boundary Increase)	300 and 400 blocks of S. Main St.	Grapevine	Tarrant
96000035	Dallas High School Historic District	2218 Bryan St.	Dallas	Dallas
95001087	Kessler Park Historic District (Boundary Increase)	Bounded by Turner, Colorado, Sylvan and Salmon	Dallas	Dallas
95000334	Colonial Hill Historic District	Bounded by Pennsylvania Ave., I-45, US 75 and Hatcher	Dallas	Dallas
95000333	Romine Avenue Historic District	2300--2400 blocks of Romine Ave., N side	Dallas	Dallas

Reference Number	Name	Address	City	County
95000332	Queen City Heights Historic District	Roughly bounded by Eugene, Cooper, Latimer, Kynard and Dildock	Dallas	Dallas
95000331	Wheatley Place Historic District	Bounded by Warren, Atlanta, McDermott, Meadow, Oakland and Dathe	Dallas	Dallas
95000330	Alcalde Street--Crockett School Historic District	200--500 Alcalde, 421--421A N. Carroll and 4315 Victor	Dallas	Dallas
95000328	Peak's Suburban Addition Historic District	Roughly bounded by Sycamore, Peak, Worth and Fitzhugh	Dallas	Dallas
95000327	Bryan--Peak Commercial Historic District	4214--4311 Bryan Ave. and 1325--1408 N. Peak	Dallas	Dallas
95000314	Fannin, James W., Elementary School	4800 Ross Ave.	Dallas	Dallas
94001627	North Fort Worth High School	600 Park St.	Fort Worth	Tarrant
94001473	Magnolia Petroleum Company City Sales and Warehouse	1607 Lyte St.	Dallas	Dallas
94000611	Miller and Stemmons Historic District	Roughly bounded by W. Davis St., Woodlawn Ave., Neches and Elsbeth	Dallas	Dallas
94000610	Rosemont Crest Historic District	Roughly bounded by 10th St., Oak Cliff Blvd., W. Davis St., N. Brighton Ave., W. 8th St. and Rosemont Ave.	Dallas	Dallas
94000609	Lake Cliff Historic District	Roughly bounded by E. 6th St., Beckley Ave., Zangs Blvd. and Marsalis Ave.	Dallas	Dallas
94000608	North Bishop Avenue Commercial Historic District	Roughly bounded by 9th St., Davis St., Adams and Madison	Dallas	Dallas
94000607	Kessler Park Historic District	Roughly bounded by Kidd Springs, Stewart, Oak Cliff, Plymouth, I-30, Turner, Colorado and Sylvan	Dallas	Dallas
94000606	King's Highway Historic District	900--1500 Blocks of King's Highway between W. Davis St. and Montclair Ave.	Dallas	Dallas
94000605	Lancaster Avenue Commercial Historic District	Roughly bounded by E. Jefferson Blvd., S. Marsalis, E. 10th St., E. 9th St. and N. Lancaster Ave.	Dallas	Dallas
94000604	Tenth Street Historic District	Roughly bounded by E. Clarendon Dr., S. Fleming Ave., I-35E, E. 8th St. and the E end of Church, E. 9th and Plum Sts.	Dallas	Dallas
93001607	Dealey Plaza Historic District (NHL)	Roughly bounded by Pacific Ave., Market St., Jackson St. and right of way of Dallas Right of Way Management Company	Dallas	Dallas

Reference Number	Name	Address	City	County
93001607	Dealey Plaza Historic District	Roughly bounded by Pacific Ave., Market St., Jackson St. and right of way of Dallas Right of Way Management Company	Dallas	Dallas
92000097	Grapevine Commercial Historic District	404--432 S. Main St.	Grapevine	Tarrant
91002022	Masonic Widows and Orphans Home Historic District	Roughly bounded by E. Berry St., Mitchell Blvd., Vaughn St., Wichita St. and Glen Garden Dr.	Fort Worth	Tarrant
91001901	Cedar Springs Place	2531 Lucas Dr.	Dallas	Dallas
90000490	Fairmount--Southside Historic District	Roughly bounded by Magnolia, Hemphill, Eighth, and Jessamine	Fort Worth	Tarrant
90000490	Fairmount--Southside Historic District	Roughly bounded by Magnolia, Hemphill, Eighth, and Jessamine	Fort Worth	Tarrant
90000337	Grand Avenue Historic District	Roughly Grand Ave. from Northside to Park	Fort Worth	Tarrant
87001744	McKinney Residential Historic District	Roughly bounded by W. Lamar, N. Benge, W. Louisiana, & N. Oak	McKinney	Collin
87001743	McKinney Hospital, Old	700--800 S. College	McKinney	Collin
87001740	McKinney Cotton Mill Historic District	Roughly bounded by Elm, RR tracks, Burrus, Fowler, & Amscott	McKinney	Collin
87001739	McKinney Cotton Compress Plant	300 blk. Throckmorton	McKinney	Collin
87001738	Kirkpatrick, E. W., House and Barn	903 Parker	McKinney	Collin
87001716	Hill--Webb Grain Elevator	400 E. Louisiana	McKinney	Collin
87001685	Collin County Mill and Elevator Company	407 E. Louisiana	McKinney	Collin
86003488	Fair Park Texas Centennial Exposition Buildings (1936--1937) (NHL)	Bounded by Texas and Pacific RR, Pennsylvania, Second, and Parry Aves.	Dallas	Dallas
85000074	St. Patrick Cathedral Complex	1206 Throckmorton	Fort Worth	Tarrant
84001641	Houston Street Viaduct	Houston St. roughly between Arlington St. and Lancaster Ave.	Dallas	Dallas
83003758	Winnetka Heights Historic District	Roughly bounded by Davis and 12th Sts., and Rosemont and Willomet Aves.	Dallas	Dallas
83003134	Continental Gin Company	3301-3333 Elm St., 212 and 232 Trunk Ave.	Dallas	Dallas
83003132	McKinney Commercial Historic District	Roughly bounded by Herndon, Wood, Cloyd, Davis, Louisiana, MacDonald, and Virginia Sts.	McKinney	Collin
79003010	Elizabeth Boulevard Historic District	1001--1616 Elizabeth Blvd.	Fort Worth	Tarrant
79002930	South Boulevard-Park Row Historic District	South Blvd. and Park Row from Central	Dallas	Dallas

Reference Number	Name	Address	City	County
78002983	Texas and Pacific Terminal Complex	Lancaster and Throckmorton Sts.	Fort Worth	Tarrant
78002919	Wilson Block	2902, 2906, 2910 and 2922 Swiss Ave.	Dallas	Dallas
78002918	Westend Historic District	Bounded by Lamar, Griffin, Wood, Market, and Commerce Sts.	Dallas	Dallas
78002918	Westend Historic District	Bounded by Lamar, Griffin, Wood, Market, and Commerce Sts.	Dallas	Dallas
78002916	Munger Place Historic District	Roughly bounded by Henderson, Junius, Prairie, and Reiger Sts.	Dallas	Dallas
78002914	DeGolyer Estate	8525 Garland Rd.	Dallas	Dallas
78002906	Wilson, Ammie, House	1900 W. 15th St.	Plano	Collin
76002067	Fort Worth Stockyards Historic District	Roughly bounded by 23rd, Houston, and 28th Sts., and railroad	Fort Worth	Tarrant
75001966	Dallas Union Terminal	400 S. Houston St.	Dallas	Dallas
74002068	Swiss Avenue Historic District	Swiss Ave. between Fitzhugh and LaVista	Dallas	Dallas
16000915	Hughes Brother's Manufacturing Company Building	1401 South Ervay Street	Dallas	Dallas
16000353	Fortune Arms Apartments	601 West 1st Street	Fort Worth	Tarrant
16000122	Will Rogers Memorial Center	3401 West Lancaster Avenue	Fort Worth	Tarrant
15000877	Everard-Sharrock Jr. Farmstead	6900 Grady Niblo Road	Dallas	Dallas
15000708	Lamar-McKinney Bridge	Spanning the Trinity River at Continental Avenue	Dallas	Dallas
15000337	Parker-Browne Company Building	1212 East Lancaster Avenue	Fort Worth	Tarrant
15000245	One Main Place	1201 Main Street	Dallas	Dallas
14001227	Mayflower Building	411 North Akard Street	Dallas	Dallas
14001035	Sanger Brothers Building (1925)	515 Houston Street	Fort Worth	Tarrant
14000966	Hotel Texas (Boundary Increase)	815 Main Street/815 Commerce Street	Fort Worth	Tarrant
14000963	Paine House	2515 West 5th Street	Irving	Dallas
14000962	Johnson Rooming House	1026 North Beckley Avenue	Dallas	Dallas
14000473	Joffre-Gilbert House	309 S. O'Connor Road	Irving	Dallas
14000343	Fort Worth Recreation Building	215 West Vickery Boulevard	Fort Worth	Tarrant
14000105	Inspiration Point	Roughly 250 yards south of 2400 block of Roberts Cut off Road in Marion Sansom Park	Fort Worth	Tarrant
14000103	511 Akard Building	511 North Akard	Dallas	Dallas
13000126	Fort Worth Warehouse & Transfer Company Building	201 South Calhoun Street	Fort Worth	Tarrant

Reference Number	Name	Address	City	County
11000982	Ridglea Theatre and Annex Building	6025-6033 Camp Bowie Boulevard and 3309 Winthrop Avenue	Fort Worth	Tarrant
11000514	Butler Place Historic District	Roughly bounded by Luella St., I.M. Terrell Way Cir. M., 19th St. & I 35W	Fort Worth	Tarrant
11000344	Santa Fe Terminal Building No. 4	1033 Young Street	Dallas	Dallas
10000866	Thomas J. & Elizabeth Nash Farm	626 Ball Street	Grapevine	Tarrant
10000500	Vandergriff Building	100 East Division Street	Arlington	Tarrant
10000253	Heritage Plaza	West Bluff Street at Main Street	Fort Worth	Tarrant
10000247	Fairview H&TC Railroad Historic District	About 1/4 mile west of State Highway 5 on Sloan Creek & the old Houston & Texas Central Railroad tracks	Fairview	Collin
10000144	Gulf Oil Distribution Facility	501 Second Avenue	Dallas	Dallas
10000051	Oakhurst Historic District	Roughly bounded by Yucca Avenue, Sylvania Avenue, Watauga Avenue and Oakhurst Scenic Drive	Fort Worth	Tarrant
9000984	South Main Street Historic District	104, 108, 126 7 200 blocks of South Main Street	Fort Worth	Tarrant
9000980	Allen Water Station	North of Exchange Parkway on Cottonwood Creek	Allen	Collin
9000839	Celina Public School	205 South Colorado Street	Celina	Collin
9000306	Fidelity Union Life Insurance Building	1511 Bryan / 1507 Pacific Avenue	Dallas	Dallas
8001400	Fort Worth Botanic Garden	3220 Botanic Garden Boulevard	Fort Worth	Tarrant
8001299	Dallas Downtown Historic District (Boundary Increase)	Roughly bounded by Jackson, North Harwood, Commerce, north-south line between South Pearl Expressway and South Harwood,	Dallas	Dallas
8000658	Alfred and Juanita Bromberg House	3201 Wendover Road	Dallas	Dallas
8000476	Central Roanoke Historic District	100 and 200 blocks of North Oak Street	Roanoke	Denton
7001383	Greenway Parks Historic District	Bounded by W. Mockingbird Lane, West University Boulevard, Inwood, North Dallas Tollway	Dallas	Dallas
6001065	Eighth Avenue Historic District	Bounded by 8th Ave., Pennsylvania Ave., 9th Ave., and Pruitt St.	Fort Worth	Tarrant
5000240	Leuda-May Historic District	301-311 W. Leuda and 805-807 May Sts.	Fort Worth	Tarrant

Reference Number	Name	Address	City	County
4000894	Dallas Downtown Historic District	Roughly bounded by Federal, N. St. Paul, Pacific, Harwood, S. Pearl, Commerce, S Ervay, Akard, Commerce and Field	Dallas	Dallas
4000886	Our Lady of Victory Academy	801 W. Shaw St.	Fort Worth	Tarrant
3000435	Man, Ralpd Sandiford and Julia Boisseau, House	604 W. Broad St.	Mansfield	Tarrant
3000334	South Center Street Historic District	500-600 blks of S. Center St.	Arlington	Tarrant
2001569	Grapevine Commercial Historic District (Boundary Increase II)	500-530 S. Main St.	Grapevine	Tarrant
2000405	Near Southeast Historic District	Roughly bounded by New York Ave., E. Terrell Ave., former I&GN Railway, Verbena St., and N side of E. Terrell Ave,	Fort Worth	Tarrant
2000009	Goodyear Tire and Rubber Company Building and B.F. Goodrich Building	2809 Parry Ave. and 4136-40 Commerce St.	Dallas	Dallas
1001472	Central Handley Historic District	Roughly bounded by E. Lancaster Ave., Forest Ave., Kerr St., and Handley Dr.	Fort Worth	Tarrant
1001002	Strain Farm--Strain, W.A., House (Boundary Increase)	400 Lancaster-Hutchins Rd.	Lancaster	Dallas
1000102	Marine Commercial Historic District	Roughly defined by N. Main St., bet. N. Side Dr. and N. 14th St.	Fort Worth	Tarrant
1582	Denton County Courthouse Square Historic District	Area bounded by Pecan, Austin, Walnut, and Cedar Sts.	Denton	Denton
247	Old Town Historic District	Roughly bounded by Sanford, Elm, North, Prairie and Oak Sts.	Arlington	Tarrant

From: noreply@thc.state.tx.us
To: DeLaune, Jonathan (FAA); reviews@thc.state.tx.us
Subject: Zipline DFW Drone Delivery
Date: Monday, July 21, 2025 12:00:35 PM

Re: Project Review under Section 106 of the National Historic Preservation Act
THC Tracking #202512062
Date: 07/21/2025
Zipline DFW Drone Delivery
NA
Dallas,TX

Description: The FAA is evaluating a proposal from Zipline International Inc. to conduct unmanned aircraft package delivery operations in the DFW metropolitan area.

Dear Jonathan Zack DeLaune:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act.

The review staff, led by Justin Kockritz and Rebecca Shelton, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- THC/SHPO concurs with information provided.
- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- No historic properties affected. However, if cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: justin.kockritz@thc.texas.gov, rebecca.shelton@thc.texas.gov.

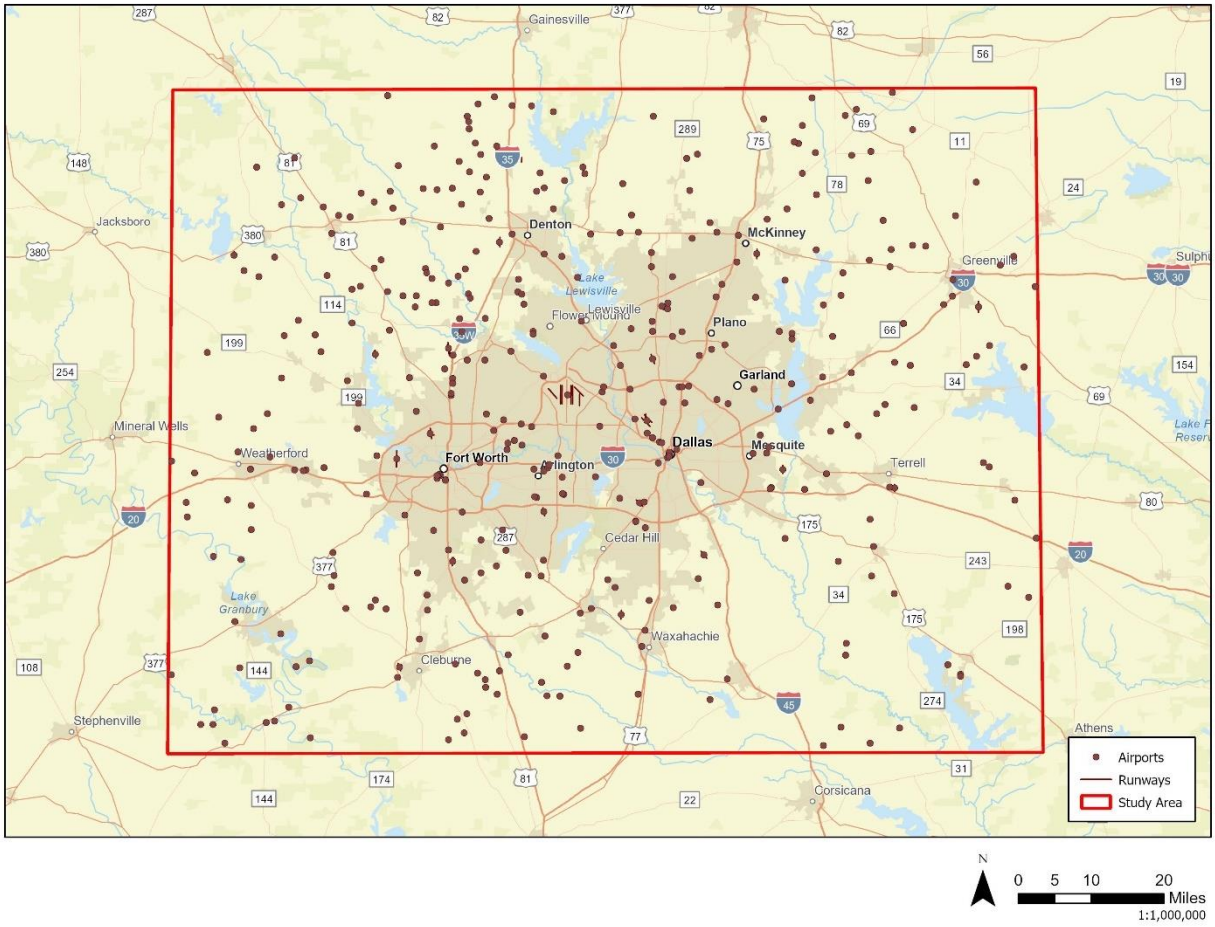
This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,

for Joseph Bell, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

Appendix H
Dallas–Fort Worth Area Airports



Appendix I

Public Comments and FAA Responses

Comment #1

July 17, 2025

Re: Notice of Availability of the Draft Environmental Assessment for Zipline International Inc. Proposed Drone Package Delivery Operations in Dallas–Fort Worth, Texas

Association for Uncrewed Vehicle Systems International Comment

The Association for Uncrewed Vehicle Systems International (AUVSI), the world's largest non-profit devoted exclusively to advancing the uncrewed systems and robotics community, supports the amendment by Zipline International Inc. (Zipline) to its Part 135 Air Carrier Operation Specifications (OpSpec) to expand its drone package delivery operations to additional communities in the Dallas–Fort Worth (DFW) Metropolitan area.

Zipline proposes to gradually scale operations across the DFW region over an 18-month period, ultimately operating 24/7 from up to 75 sites and deploying up to 500 dock locations. Their battery-powered, low-emission aircraft are already providing fast, quiet, and reliable delivery of many items. With this expansion they scale delivery towards medical supplies, consumer goods, and food, helping to reduce roadway congestion and vehicle emissions while increasing community access to essential items.

Thousands of businesses, large and small, are embracing uncrewed technology to enhance efficiency, improve public health and safety, promote sustainability, and build new workforce opportunities. AUVSI and its members, including Zipline, work closely with the U.S. government to ensure these operations remain safe and compliant with federal regulations. We are proud of the strong safety record and responsible innovation that have defined the industry to date.

As outlined in the Notice of Availability (NOA), "the FAA's approval of the amended OpSpecs is considered a major federal action under the National Environmental Policy Act (NEPA) and requires a NEPA review." AUVSI has been deeply engaged with FAA and industry stakeholders to ensure this review process is data-driven, transparent, efficient, and supportive of scalable commercial drone integration in the U.S.

It is noteworthy that the Draft Environmental Assessment concludes Zipline's proposed operations would not result in significant impacts across all evaluated resource areas, including noise, wildlife, cultural sites, and land use. The assessment highlights Zipline's intentional design choices and proactive mitigation strategies, including operating at low noise thresholds, siting infrastructure on previously disturbed land, maintaining standoff distances from sensitive areas, and coordinating with state and federal agencies.

Zipline is a global leader in drone delivery that has demonstrated its operational maturity and commitment to safety through over a million successful commercial deliveries worldwide. Its proposal in DFW is a natural next step in scaling these operations to benefit American communities.

AUVSI encourages the FAA to finalize the EA and approve Zipline's amended Part 135 OpSpecs to expand drone delivery operations within the DFW Metropolitan area. Thank you for the opportunity to comment.

Respectfully,

Scott Shtofman
AVP & Counsel, Regulatory Affairs
AUVSI

FAA RESPONSE

The FAA acknowledges your support for the project.