Draft Environmental Assessment for

Causey Aviation Unmanned, Inc. Drone Package Delivery Operations in Fayetteville, Holly Springs, Raeford, and Pinehurst, North Carolina

August 2022

United States Department of Transportation
Federal Aviation Administration

Washington, D.C.

FAA MISSION STATEMENT

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Cover Image: Causey Aviation Unmanned, Inc.

DEPARTMENT of TRANSPORTATION
Federal Aviation Administration
Washington, D.C.

Notice of Availability, Notice of Public Comment Period, and Request for Comment on the Draft Environmental Assessment for Causey Aviation's Drone Package Delivery Operations in Fayetteville, Holly Springs, Raeford, and Pinehurst, North Carolina

The Federal Aviation Administration (FAA) hereby gives Notice of Availability (NOA) for the Draft Environmental Assessment (EA) evaluating the potential effects of the FAA decision to authorize Causey Aviation Unmanned, Inc. to conduct unmanned aircraft (UA) commercial package delivery operations within two nautical miles of their existing distribution centers in Holly Springs, Fayetteville, Raeford, and Pinehurst, North Carolina.

Causey has applied for its Part 135 Air Carrier Operations Specifications (OpSpecs) that will authorize it to conduct package delivery operations from its distribution centers to approved delivery locations within two nautical miles. The federal action subject to this EA is the requested FAA approval of Causey's OpSpecs to include paragraphs with descriptive language about the four operating area boundaries, which includes the specific locations and operational profile in Causey's request.

The Draft EA has been prepared in accordance with the requirements set forth in the Council on Environmental Quality (CEQ) regulations at Title 40, Code of Federal Regulations (CFR), parts 1500-1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

The public comment period for the Draft EA begins with the issuance of this Notice of Availability and lasts 14 days. The FAA encourages all interested parties to provide comments concerning the scope and content of the Draft EA by September 8, 2022, or 14 days from the date of publication of this Notice of Availability, whichever is later. The Draft EA is available to view/download electronically at https://www.faa.gov/uas/advanced_operations/nepa_and_drones/

Comments may be directed in writing to 9-FAA-Drone-Environmental@faa.gov. Please reference the Causey North Carolina Draft EA in the email subject line when sending comments.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Posted August 25, 2022

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1.0 PURPOSE AND NEED

1.1 Introduction

Causey Aviation Unmanned, Inc. (Causey) is seeking its Part 135 air carrier certificate and the necessary Operations Specifications (OpSpecs) and other Federal Aviation Administration (FAA) approvals necessary to begin unmanned aircraft (UA) commercial package delivery operations in four locations in east-central North Carolina – Fayetteville, Holly Springs, Raeford, and Pinehurst – using the 33-pound Flytrex FTX-M600P UA.[1] The OpSpecs will limit operations to these four locations in North Carolina. In each of the four locations, Causey will operate from its existing Distribution Center (DC) that serves as a central hub of operations. The radius for each of the operating areas will extend for two nautical miles (NM) from each DC, as shown in Figure 1. Causey projects to be operating a maximum of approximately 104 delivery flights per operating day from the Fayetteville DC; 79 delivery flights per operating day from the Holly Springs DC; 60 delivery flights per operating day from the Raeford DC; and 45 delivery flights per operating day from the Pinehurst DC. Previously, Causey started operations at these DC locations under Part 107 operating authorities, with operations beginning first at Fayetteville and Holly Springs in late 2019, then Raeford in 2020, and finally Pinehurst in 2022.[2] These earlier operations were required to fly visual line of sight (VLOS), which effectively limited deliveries to approximately one NM from each DC. Under the proposal the FAA is reviewing in this EA, Causey would build upon its existing route structures and conduct operations as a Part 135 air carrier. The approval of Causey's OpSpecs to include these four operating areas is considered a major federal action subject to National Environmental Policy Act (NEPA) review requirements.

This Draft Environmental Assessment (EA) is being prepared by the FAA to evaluate the potential environmental impacts that may result from the FAA's approval of the proposed action, which would enable UA commercial delivery operations from Causey's four DCs in Fayetteville, Holly Springs, Raeford, and Pinehurst, North Carolina. See Section 1.2 for general information about the locations and Section 1.2.1 for specific information.

The FAA has prepared this EA pursuant to the National Environmental Policy Act of 1969 (NEPA) [42 United States Code (U.S.C.) § 4321 et seq.] and its implementing regulations (40 Code of Federal Regulations (CFR) §§1500-1508)). Under NEPA, federal agencies are required to consider the environmental effects of proposed 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 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 1050.1F, *Environmental Impacts: Policies and Procedures* and the FAA Order 1050.1F Desk Reference.

[1] The terms drone and UA may be used interchangeably.
[2] The FAA completed its environmental review for the initial Part 107 rule through application of the categorical exclusion listed in Paragraph 5-6.6(f) of FAA Order 1050.1F, which was signed on March 9, 2016. The amendments to the Part 107 rule were also reviewed through application of the categorical exclusion listed in Paragraph 5-6.6(f) of FAA Order 1050.1F, which was signed on December 17, 2020.

1.2 Background and Location

In 2012, Congress first charged the FAA with safely integrating unmanned aircraft systems (UAS) into the National Airspace System (NAS).[3] The FAA has engaged in a phased, incremental approach to integrating UAS into the NAS and continues to work toward full integration of UAS into the NAS. Part of that approach involves providing safety review and oversight of proposed operations to begin UA commercial package delivery in the NAS.

Over the past several years Causey has partnered with Flytrex under FAA programs, including the UAS Integration Pilot Program (IPP)[4] and the BEYOND program,[5] as well as the FAA's established processes to bring certificated commercial UA delivery into practice. Participants in these programs are among the first to prove their concepts, including package delivery by UA, through the use of current regulations and exemptions and waivers from some of these regulatory requirements.

Causey has applied to the FAA for a Part 135 air carrier operating certificate, which would allow it to carry the property of another for compensation or hire beyond visual line of sight (BVLOS). Causey anticipates receiving its operating certificate in the second half of 2022. If issued, the certificate will contain a stipulation that operations must be conducted in accordance with the provisions and limitations specified in its OpSpecs. Causey's current request for OpSpecs to specify an area of operations, in conjunction with other related FAA approvals, such as a waiver of 14 CFR 91.113(b) to enable BVLOS operations and a Certificate of Waiver or Authorization (COA), would enable commercial delivery operations in the operating areas.

Causey proposes to conduct consumer package deliveries to vetted delivery locations such as residential properties and healthcare facilities within two NM from each DC.[6] The four operating areas are shown in Figure 1 below, with each area outlined in green. Each operating area, in the shape of a circle with a 2 NM radius centered at the DC, is approximately 16.6 square miles in area. The areas within the four operating area boundaries outlined in green in Figure 1 should also be considered as the four study areas for this Draft EA.

[3] 49 U.S.C. 44802; FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, Sec. 332. 126 Stat. 11, 73 (2012).
[4] The UAS IPP was announced on October 25, 2017 via a Presidential Memorandum, which has the force and effect of law on executive agencies. https://www.faa.gov/uas/programs_partnerships/completed/integration_pilot_program/
[5] https://www.faa.gov/uas/programs_partnerships/beyond/
[6] Each delivery site is pre-approved by Causey to ensure that the site is capable of receiving deliveries.

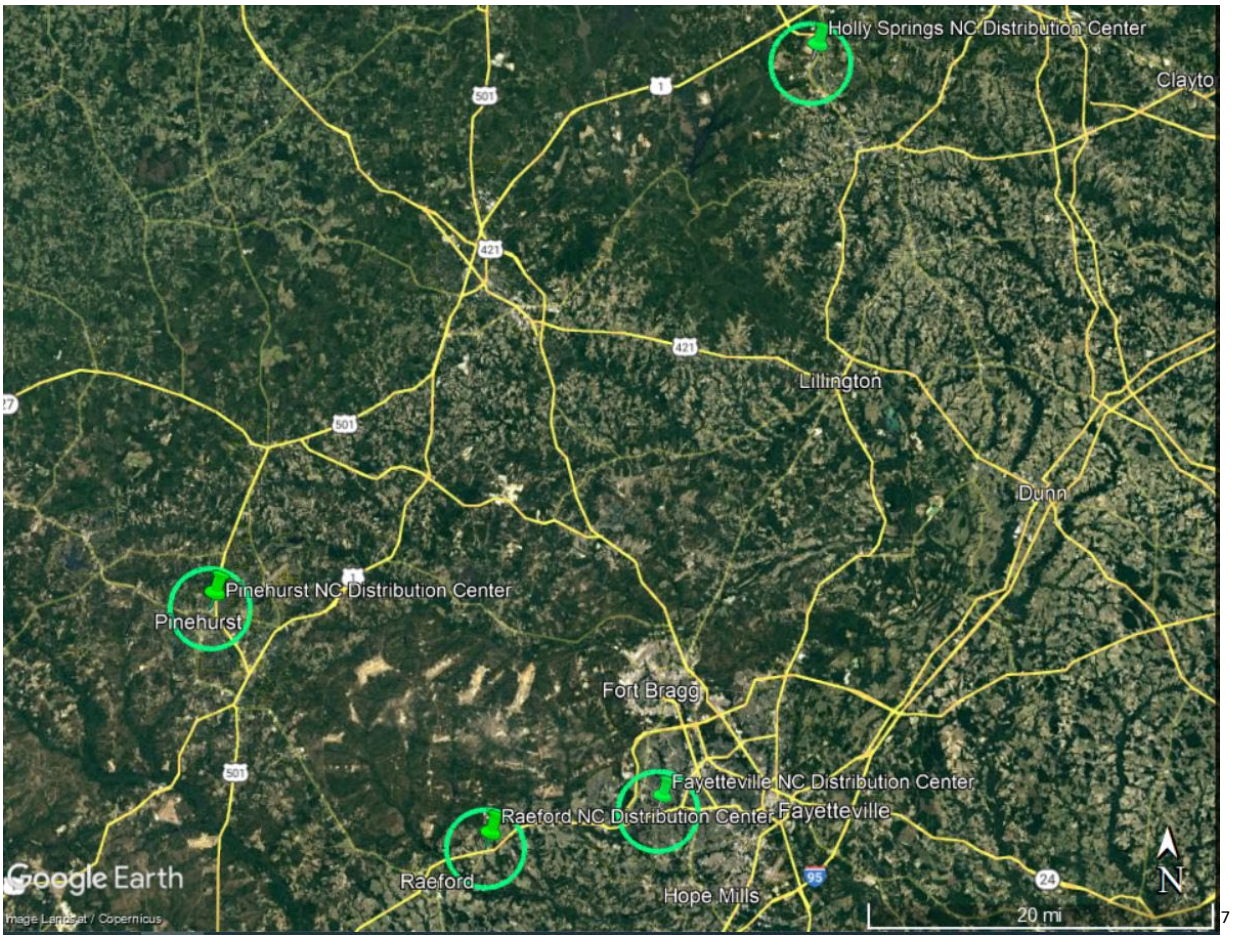


Figure 1 Causey's Four Operating Areas in North Carolina

1.2.1 Operating Area Locations

In each of Causey's four proposed operating areas, Causey has designated delivery zones. Those delivery zones, noted in red in Figures 2 through 5, may not cover the entire operating area.

Fayetteville DC

The Fayetteville DC is located at 970 Strickland Bridge Rd, Fayetteville, NC 28304, immediately adjacent to the Walmart Neighborhood Market at that address. The property is zoned for commercial use. The DC is approximately 6.5 miles from downtown Fayetteville, NC, to the east, and approximately ten miles from the Raeford DC to the west. A closer view of the Fayetteville operating area, including Causey's proposed delivery zones within the operating area, is shown in Figure 2 below. The Fayetteville operating area is outlined in green and Causey's proposed delivery zones are outlined in red.[8]

[7] Image: Google Earth, as modified by the FAA

[8] The letters within the delivery zones are Causey's method of identifying the individual delivery zones.

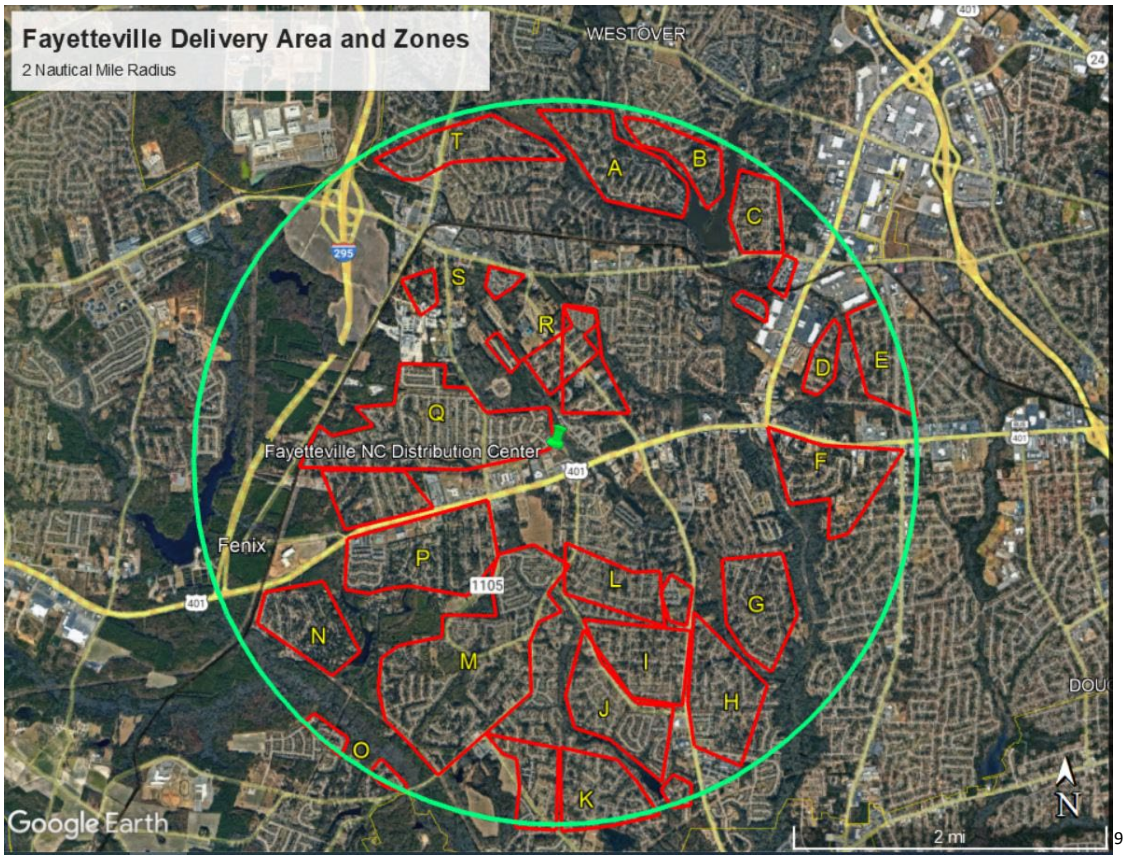


Figure 2 Causey's Operating Area and Delivery Zones in Fayetteville, NC

[9] Image: Google Earth, as modified by the FAA.

Holly Springs DC

The Holly Springs DC is located on the east side of the Holly Springs Towne Center shopping mall, located at NC55 & New Hill Rd. The property is zoned for commercial use. The DC is approximately 4.5 miles from downtown Apex, NC to the north, and approximately 13.5 miles from downtown Raleigh to the northeast. A closer view of the Holly Springs operating area, including Causey's proposed delivery zones within the operating area, is shown in Figure 3 below. The Holly Springs operating area is outlined in green and Causey's proposed delivery zones are outlined in red.

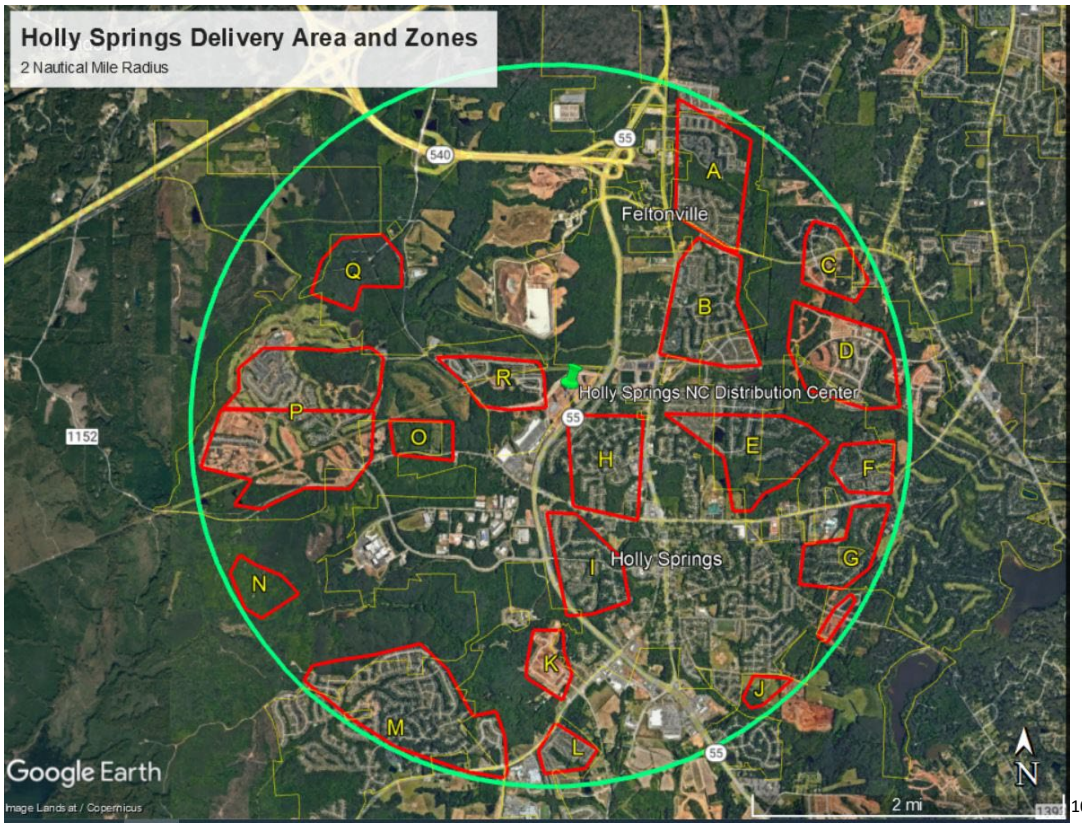


Figure 3 Causey's Operating Area and Delivery Zones in Holly Springs, NC

[10] Image: Google Earth, as modified by the FAA

Raeford DC

The Raeford DC is located at the Walmart Supercenter shopping center at 4545 Fayetteville Rd, Raeford, NC 28376. The property is zoned for commercial use. The Raeford DC is approximately 3.5 miles from downtown Raeford to the southwest. A closer view of the Raeford operating area, including Causey's proposed delivery zones within the operating area, is shown in Figure 4 below. The Raeford operating area is outlined in green and Causey's proposed delivery zones are outlined in red.

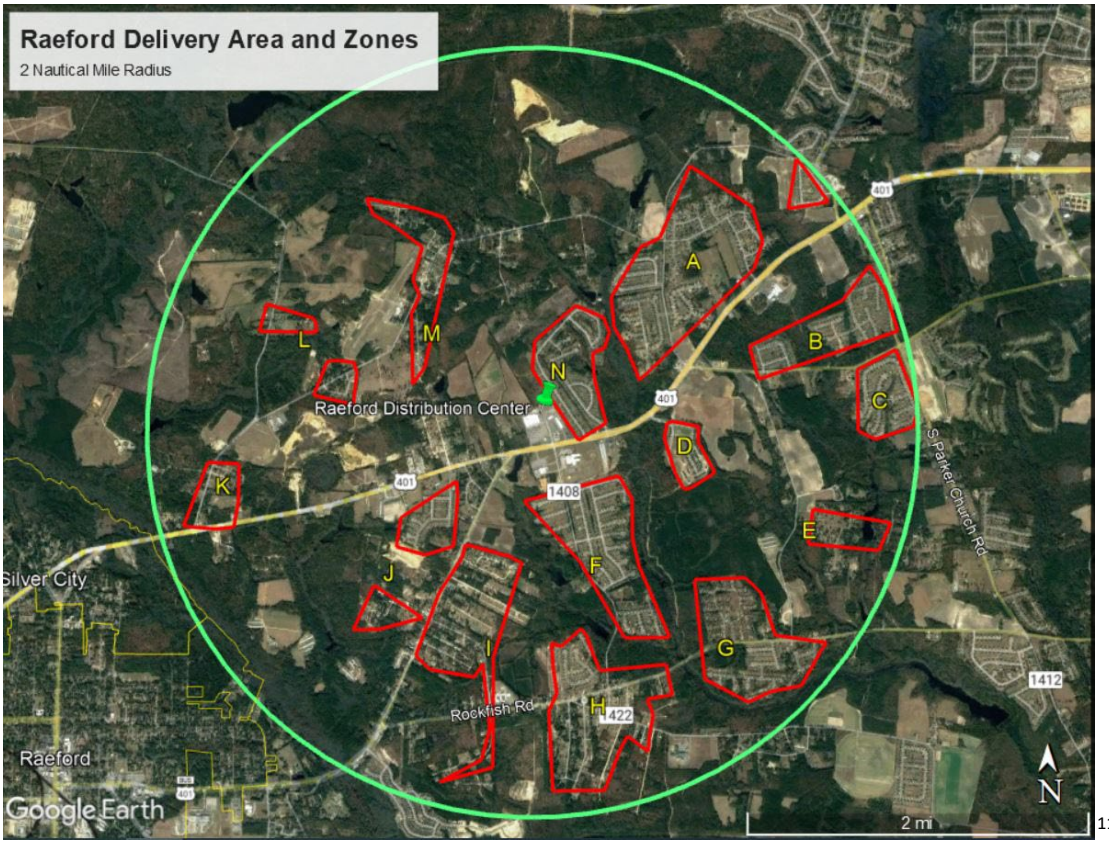
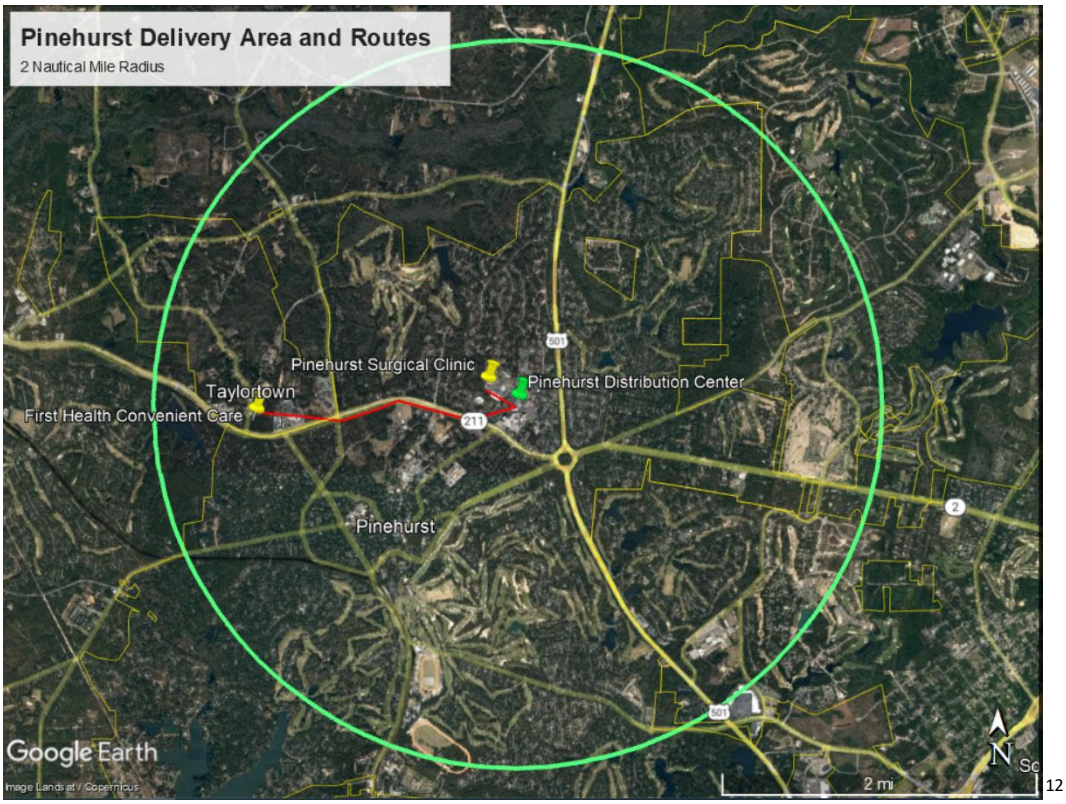


Figure 4 Causey's Operating Area and Delivery Zones in Raeford, NC

[11] Image: Google Earth, as modified by the FAA

Pinehurst DC

The Pinehurst DC is located at FirstHealth Moore Regional Hospital, in the parking lot of the Surgical Clinic located at 5 First Village Dr. Pinehurst, NC 28374. The Pinehurst DC is approximately four miles from downtown Southern Pines to the southeast. Causey will be delivering medical lab samples to this DC from the nearby Surgery Center of Pinehurst and Pinehurst Surgical Clinic, as well as the First Health Convenient Care clinic. These two routes, as well as the Pinehurst DC and operating area, are shown in Figure 5 below. Causey may conduct deliveries to additional delivery points within the operating area described in this EA.



[12]

Figure 5 Causey's Operating Area and Initial Routes in Pinehurst, NC

1.3 Purpose and Need

As described in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, the Purpose and Need section of an EA briefly describes the underlying purpose and need for the proposed federal action. It presents the problem being addressed and describes what the FAA is trying to achieve with the proposed action.

1.3.1 FAA Purpose and Need

Causey is seeking its Part 135 air carrier certificate and the necessary OpSpecs and other FAA approvals necessary to begin UA BVLOS commercial package delivery operations, including a waiver of 14 CFR 91.113(b) to enable BVLOS operations, and a COA, associated with the operations in these four

[12] Image: Google Earth, as modified by the FAA

locations. As part of its certificate, the FAA will issue related OpSpecs. The FAA issuance of the OpSpecs is the approval that will ultimately enable UA BVLOS commercial delivery operations in these areas. Causey's request for OpSpecs to contain areas of operations is an action that requires FAA review and approval. The FAA has a statutory obligation to review Causey's request to issue the OpSpecs and determine whether the approvals would affect safety in air transportation or air commerce and the public interest.[13] 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. 49 U.S.C. §40104.

In addition, 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." 49 U.S.C. §44705. 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." *Id*. 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 OpSpecs. 14 CFR §119.5 (g), (l). 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. 14 CFR 119.5(j). The regulations implementing Section 44705 specify that an air carrier's approved OpSpecs must include, among other things, "authorization and limitations for routes and areas of operations." 14 CFR §119.49(a)(6). In evaluating the Part 135 certificate, the FAA must make a determination on the related OpSpecs.

1.3.2 Causey's Purpose and Need

The purpose of Causey's request is to begin UA BVLOS commercial package delivery service in the four operating areas in North Carolina, which, in its business judgment, Causey has determined are appropriate markets for initial operations. Causey's requested OpSpecs are needed so that Causey can begin limited UA BVLOS commercial delivery operations from the four DC locations discussed above. The approvals will offer Causey an opportunity to assess the viability of the UA BVLOS commercial delivery option under real world conditions and demonstrate that it can conduct operations safely and meet its compliance obligations. The approval could also help Causey gauge public demand for UA commercial delivery services and evaluate whether scalable and cost-effective UA BVLOS delivery expansion is possible in these types of areas. In addition, the approvals could provide an opportunity to assess community response to commercial delivery operations in the areas.

1.4 Public Involvement

The FAA created a Notice of Availability (NOA) with information about the EA to provide to local interest groups, government officials, 4(f) resource authorities, and the State Historic Preservation Office (SHPO) and Tribal Historic Preservation Office (THPO) discussed in this EA. It is intended that local government officials and interest groups can provide the NOA to members of the general public that they represent. The NOA and Draft EA are also available to the public on the FAA website. The NOA provides information about the proposed action and requests public review and comments on the Draft EA during the 14-day public comment period. Interested parties are invited to submit comments on any environmental concerns relating to the proposed action to a specifically assigned email address. Based

[13] See, e.g., 49 U.S.C. §§ 41102 and 41109(a)(2)(A); 49 U.S.C. § 44705.

on the demographics in the four operating areas (discussed in Section 3.6 below), the FAA is not aware of any discrete non-English speaking communities and the NOA was provided in English only.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

In order for Causey to conduct UA BVLOS commercial package deliveries in the four operating areas, it must receive a number of approvals from FAA in addition to its OpSpecs, such as a waiver of 14 CFR 91.113(b) to enable BVLOS operations and a COA. Causey has requested the FAA to approve its OpSpecs so that they can transition to BVLOS commercial delivery operations once they receive their Part 135 air carrier certificate. The OpSpec approvals are the FAA actions that ultimately would enable commercial delivery operations in the four operating areas in North Carolina.

The B050 OpSpec, *Authorized Areas of En Route Operations, Limitations, and Provisions*, includes a reference section titled Limitations, Provisions, and Special Requirements. The inclusion of four paragraphs within this refence section, with descriptive language about the operating area boundaries including the specific locations and operational profiles proposed in Causey's request – is the proposed federal action for this EA. The OpSpecs will restrict Causey to the particular operating locations described in Section 1.2.1; any future expansion beyond the authorization and limitations for the areas of operations described in the B050 OpSpec, or beyond the current 1:1 pilot to aircraft ratio described in Causey's A003 OpSpec, *Airplane/Aircraft Authorization*, will require additional OpSpec amendments from the FAA and will receive appropriate NEPA review at that time.

Causey proposed operations and customers will vary between the four operating areas. At Fayetteville, Causey's DC is located adjacent to a Walmart Neighborhood Market, and most packages will be small consumer products and food delivered to customers in the residential delivery zones shown in Figure 2. At Holly Springs, Causey's DC is located adjacent to the Holly Springs Towne Center, and most deliveries will involve small consumer products and food delivered to customers in the residential delivery zones shown in Figure 3. At Raeford, Causey's DC is located adjacent to Walmart Supercenter, and most packages will be small consumer products and food delivered to customers in the residential delivery zones shown in Figure 4. At Pinehurst, Causey's DC is located in the parking lot at the FirstHealth Moore Regional Hospital, and initial flight operations will deliver medical lab samples to the hospital from the nearby Surgery Center of Pinehurst and Pinehurst Surgical Clinic. Causey may add some additional routes at the Pinehurst DC within the operational volumes discussed below.

Table 1 shows Causey's projections for its maximum number of delivery flights per operating day at each of its four operating areas, including projected daily operations at 12 months and 24 months after the start of commercial delivery operations in each operating area.

Table 1 Causey's Anticipated Operational Volumes

Operating Area	Average Daily Operations: 12 Months	Average Daily Operations: 24 Months
Fayetteville	77	104
Holly Springs	58	79
Pinehurst	25	45
Raeford	44	60

Causey anticipates that operational demand could increase the number of delivery flights per day beyond that shown in Table 1. At the Fayetteville, Holly Springs, and Raeford operating areas, Causey is proposing operations between the hours of 7AM and 10PM up to seven days per week, with no flights

on holidays. At the Pinehurst operating area, Causey is proposing initial operations approximately between the hours of 8AM and 5PM up to seven days per week, with no flights on holidays.

Causey will be using the Flytrex drone delivery system. The Flytrex FTX-M600P UA has a maximum takeoff weight of 33 pounds, including a maximum payload of 6.6 pounds. It is a six-motor multicopter drone that uses electric power from rechargeable lithium ion batteries. The UA includes a parachute safety system that can be deployed in case of emergency.

2.2 No Action Alternative

The alternative to the proposed action is the no action alternative, in which FAA would not issue the approvals necessary, including the amendment to the OpSpecs, to enable Causey to conduct UA commercial package delivery operations in the four operating areas. Under the No Action Alternative, Causey would still be authorized to conduct VLOS commercial package delivery flights under Part 107 operating authorities, as they are already conducting in the four operating areas. This alternative does not support the stated purpose and need. However, it was retained as required by the Council of Environmental Quality (CEQ) regulations (40 CFR 1502.14(c)).

3.0 AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES

This section provides a description of the environmental resources that would be affected by the proposed action, as required by the CEQ regulations and FAA Order 1050.1F. The level of detail provided in this section is commensurate with the importance of the impact on these resources (40 CFR § 1502.15). There are four study areas in this EA, associated with each of the four operating areas described in the previous section. The general study area for each resource is the entire area within the green-lined boundary of each of the four operating areas, as shown in Figures 2 through 5 above. As required by FAA Order 1050.1F, this EA presents an evaluation of impacts for the environmental impact categories listed below.

- Air Quality
- Biological Resources (including Fish, Wildlife, and Plants)
- Climate
- Coastal Resources
- Department of Transportation Act, Section 4(f) Resources
- Farmlands
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Compatible Land Use
- Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks
- Visual Effects (Light Emissions)
- Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

For each of the resources covered in this section, the following information is provided:

- Regulatory Setting
- Affected Environment
- Environmental Consequences

3.1 Resources Not Analyzed in Detail

This EA does not analyze potential impacts on the following environmental impact categories in detail, for the reasons explained below:

- **Air Quality and Climate** – The UA is battery-powered and will not generate emissions that could result in air quality impacts or climate impacts. Electricity consumed for battery charging at the

DCs and for overall DC operations will be minimal, especially for the limited scope of these operations. Electricity consumed for the proposed action will come from the power grid, with an emergency generator at DC locations for backup. Electricity usage is not expected to be significant.

- **Coastal Resources** –The proposed action would not directly affect any shorelines, change the use of shoreline zones, or be inconsistent with any National Oceanic and Atmospheric Administration (NOAA)-approved state Coastal Zone Management Plan (CZMP) since there are no coastal zones or shorelines in the area of operations.

- **Farmlands** –The proposed action will not involve the development or disturbance of any land regardless of use, nor would it have the potential to convert any farmland to non-agricultural uses.

- **Hazardous Materials, Solid Waste, and Pollution Prevention** –The proposed action will not result in any construction or development or any physical disturbances of the ground. Therefore, the potential for impact in relation to hazardous materials, pollution prevention, and solid waste is not anticipated. Additionally, each UA is made from recoverable materials and will be properly managed at the end of its operating life in accordance with 14 CFR Part 43. There are no Environmental Protection Agency (EPA) Superfund sites within any of the operating areas.

- **Land Use** – The proposed action will not involve any changes to existing, planned, or future land uses within the area of operations.

- **Natural Resources and Energy Supply –** The proposed action will not require the need for unusual natural resources and materials, or those in short supply. The Flytrex UA is battery powered and will not consume fuel resources.

- **Socioeconomic Impacts and Children's Environmental Health and Safety Risks** – The proposed action will 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. EO 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 will not affect products or substances that 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. Additionally, Causey's proposal includes avoiding operations near schools during operational hours (Monday – Friday), which could help reduce any potential environmental health or safety impacts to children.

- **Visual Effects (Light Emissions Only)** – The proposed action will not result in significant light emission impacts because most flights will be conducted during the daytime. Because of the overall small number of average daily operations within an operating area and the even smaller number of operations likely to be conducted between twilight and 10PM, the proposed action will not result in significant visual impacts due to light emissions.

- **Water Resources (Wetlands, Floodplains, Groundwater, and Wild and Scenic Rivers)** –The proposed action will not result in the construction of facilities and would therefore not encroach upon areas designated as navigable waters or directly impact wetlands. The proposed operation will not encroach upon areas designated as a 100-year flood event area as described by the

Federal Emergency Management Agency (FEMA). The proposed action will not result in any changes to existing discharges to water bodies, create a new discharge that would result in impacts to surface waters, or modify a water body. The proposed action does not involve land acquisition or ground disturbing activities that would withdraw groundwater from underground aquifers or reduce infiltration or recharge to ground water resources through the introduction of new impervious surfaces. The proposed action would not foreclose or downgrade the Wild, Scenic, or Recreational river status of a river or river segment included in the Wild and Scenic River System. There are no listed river segments within the study areas. The closest Wild and Scenic River segment is the Lumber River, which is approximately nine miles from the Raeford study area boundary at its nearest point.

3.2 Biological Resources (Including Fish, Wildlife and Plants)

3.2.1 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.

Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 [16 U.S.C. § 1531 et seq.] requires the evaluation of all federal actions to determine whether a proposed action is likely to jeopardize any proposed, threatened, or endangered species or proposed or designated critical habitat. Critical habitat includes those geographic areas that are essential to the conservation of a listed species. Federal agencies are responsible for determining if an action "may affect" listed species, which determines whether formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) is needed. If the FAA determines that the action will have no effect on listed species, consultation is not required. If the FAA determines that the action may affect listed species, consultation with the USFWS must be initiated.

A significant impact to federally-listed threatened and endangered species would occur when the USFWS or NMFS determines that 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.

Migratory Birds

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) protects migratory birds, including their nests, eggs, and parts, from possession, sale, purchase, barter, transport, import, export, and take. The USFWS is the federal agency responsible for the management of migratory birds as they spend time in habitats of the U.S. For purposes of the Migratory Bird Treaty Act, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). The Migratory Bird Treaty Act applies to migratory birds identified in 50 CFR § 10.13 (defined hereafter as "migratory birds").

Bald and Golden Eagles

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 § 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. The USFWS has issued regulations for the permitting process in 50 CFR Part 22, which include permits for the incidental take of Bald Eagles. Such permits are only needed when avoidance of incidental take is not possible. According to federal guidelines, if conservation measures can be implemented such that no aircraft are flown within 1,000 feet of a nest, incidental take of Bald Eagles is unlikely to occur and no permit is needed.[14]

3.2.2 Affected Environment

This section describes the existing biological environment of the four operating areas. The operating areas of Fayetteville, Raeford, Pinehurst, and portains of Holly Springs are in the upper Coastal Plains ecoregion of North Carolina, characterized by gently sloping elevations, longleaf pine ecosystems, wetlands and maritime forests.[15] The Holly Springs operating area also encompassess the Piedmont ecoregion, charaterized by old fields, rock outcrops, streams and woodlands.[16]

The proposed action would take place over rural, suburban, and commercially-developed properties. These areas provide habitat for many of the more common and ubiquitous bird and mammal species of the southern U.S., including mammals such as white tailed deer, raccoons, opossums, and squirrels, and many volant organisms including bats, songbirds, waterfowl, and insects.

Special Status Species

Federally Listed Species

The potential for impacts to federally-listed species was assessed using the official species lists obtained through the USFWS Information for Planning and Consultation (IPaC) resource. Each study area covers the entire operating area outlined in green in Figures 2 through 5. The IPaC official species lists are included as Appendix A.

The endangered Red-cockaded Woodpecker (*Picoides borealis*) is the only ESA-listed bird species and is listed in all four operating areas on the IPaC official species lists. The Saint Francis' Satyr Butterfly (*Neonympha mitchellii francisci*), an endangered insect species, is listed as potentially occuring in the Fayetteville and Raeford operating areas. The Monarch Butterfly (*Danaus plexippus*), a candidate for federal listing, is listed as potentially occurring in the Raeford, Pinehurst, and Fayeteville operating areas. There is no critical habitat within the operating areas for any species identified in the IPaC official species lists.

[14] U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management guidelines. Available: https://fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf. Accessed: February 4, 2022.
[15] North Carolina Wildlife Resources Commission: Habitats. Available: https://www.ncwildlife.org/Learning/Habitats#:~:text=The%20upper%20Coastal%20Plain%20encompasses,being%20close%20to%20sea%20level. Accessed: March 4, 2022.
[16] Ibid

State Species of Concern

The North Carolina Wildlife Resources Commission (the Commission) lists 248 species of amphibians, birds, fish, mammals, reptiles, and mollusks as endangered, threatened, or of special concern within the State of North Carolina.[17] The majority of these species do not occur in the operating areas because the operating areas are located outside the species' range and/or suitable habitat is not present in the operating areas. Of the 248 species listed by the Commission, the FAA identified 21 species as having the potential to occur within the operating areas for at least part of the year. These species are identified in Table 2 below.

Table 2 North Carolina State Species of Concern

Status	Species Name
State Endangered (Birds)	American Peregrine Falcon (*Falco peregrinus anatum*)
	Common Tern (Sterna hirundo)
State Threatened (Birds)	Bald Eagle (*Haliaeetus leucocephalus*)
	Caspian Tern (Hydroprogne caspia)
	Northern Saw-whet Owl (*Aegolius acadicus*)
State Special Concern (Birds)	Bachman's Sparrow (*Peucaea aestivalis*)
	Barn Owl (*Tyto alba*)
	Brown Creeper (*Certhia americana nigrescens*)
	Cerulean Warbler (*Setophaga cerulea*)
	Golden-winged Warbler (*Vermivora chrysoptera*)
	Least Bittern (*Ixobrychus exilis*)
	Little Blue Heron (*Egretta caerulea*)
	Loggerhead Shrike (*Lanius ludovicianus*)
	Red Crossbill (Loxia curvirostra)
	Snowy Egret (Egretta thula)
	Vesper Sparrow (*Pooecetes gramineus*)
State Species of Concern (Mammals)	Buxton Woods White-footed Mouse (*Peromyscus leucopus buxtoni*)
	Eastern Big-eared Bat (*Corynorhinus rafinesquii macrotis*)
	Pungo White-footed Mouse (*Peromyscus leucopus easti*)
	Southeastern Bat (*Myotis austroriparius*)
	Star-nosed Mole (Condylura cristata parva)

Migratory Birds

Migratory bird species found within the operating areas will vary throughout the year. During certain weeks in the spring and fall, hundreds of species of songbirds, raptors, and waterfowl may potentially pass through the operating areas. Additionally, several dozen species of birds may potentially nest in the operating areas at certain times of the year.

The IPaC official species lists identified several Birds of Conservation Concern (BCC) that could occur in the operating areas, along with information on the likelihood that they may be nesting in the area. The Bald Eagle (*Haliaeetus leucocephalus)* is not a BCC in the operating areas; however, it could nest in forested areas near rivers and lakes in the area, and, as stated in the National Bald Eagle Management

[17] North Carolina Wildlife Resources Commission. Protected Wildlife Species of North Carolina. Available: https://www.ncwildlife.org/Portals/0/Conserving/documents/Protected-Wildlife-Species-of-NC.pdf. Accessed: January 3, 2022.

Guidelines, [18] aircraft should stay at least 1,000 feet from Bald Eagle nests during its breeding season unless the aircraft is operated by a trained wildlife biologist.

The Red-headed Woodpecker (*Melanerpes erythrocephalus*) is a BCC within the operating areas. Red-headed Woodpeckers typically nest in tall, dead trees near marshes and open bodies of water. It is possible that Red-headed Woodpeckers may be nesting within the operating areas.

3.2.3 Environmental Consequences

The aircraft nests are set up in designated areas located next to commercial or healthcare centers. Causey's aircrafts will only touch the ground at the DC and briefly when it completes deliveries.

The operations will be taking place within airspace, and typically well above the tree line and away from sensitive habitats. At each of the operating areas, the Flytrex UA will fly a network of defined flight paths between the DC and delivery locations that are developed and approved as needed, based on demand. Each delivery point is selected based on customer demand after a suitability survey is completed specific to each candidate location. Typical flights begin with the UA departing from the DC and ascending vertically to approximately 230 feet Above Ground Level (AGL). The UA then flies a pre-assigned route at approximately 230 feet AGL and 29 knots to a selected delivery point.

Upon arrival at the delivery point, the UA descends vertically to the delivery hover altitude of 82 feet AGL and waits for the customer to accept package delivery through a user interface application. If the delivery is not accepted within 15 seconds, the UA will return to the DC with the package. If the delivery is accepted, the UA will lower the package to the ground using a tethered mechanism and subsequently return to the DC. When returning to the DC, the UA climbs vertically back to 230 feet AGL and follows a predefined route from the delivery point back to the DC. Upon arrival at the DC, the UA descends vertically from 230 feet AGL to the ground for landing.

The low number of daily operations and nature of the flights are not expected to significantly influence wildlife in the area.

Special Status Species

The federally endangered Red-cockaded Woodpecker has the potential to occur within all four operating areas.[19] However, the aircraft would complete its ascent and descent outside of forested areas, and with a flight plan of 230 feet AGL would be well above the tree canopy and thus not a threat to nesting, roosting, or foraging habitat.[20] As a result, the FAA has determined that vehicle operations would have no effect on the Red-cockaded Woodpecker.

The federally endangered Saint Francis' Satyr Butterfly has the potential to occur in the Raeford and Fayetteville operating areas. Additionally, the Monarch Butterfly, a candidate for federal listing, has the potential to occur in all four of the operating areas. Insects could be struck by drones en route to delivery. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in the scientific literature. Some research shows that Monarch Butterflies are not commonly observed at higher AGL altitudes, and would not be expected to frequently occur at

[18] U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. Available: https://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf. Accessed: October 19, 2021.
[19] Available: https://www.mdpi.com/2504-446X/6/1/26/htm. Accessed: March 11, 2022.
[20] USFWS Southwest Region: Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis*). Available: https://ecos.fws.gov/docs/recovery_plan/030320_2.pdf. Accessed: April 25, 2022.

the altitudes where Causey is proposing to operate.[21] Therefore, based on the information available and the limited scale of operations, the action is not expected to have significant impacts to insect populations.

State protected bird species may display disturbance behaviors towards drones, such as fleeing or attack maneuvers; however, due to the limited scale of operations and the altitude of overflights, no impacts to state protected bird species are expected.

Migratory Birds

Causey has stated to the FAA that it will monitor the operating area for any active Bald Eagle nests that may occur. Bald Eagle nests are typically very conspicuous, usually five to nine feet in diameter, with a vertical depth up to eight feet, and Causey should be able to visually identify any nests that may be present in the area.[22] Online resources such as iNaturalist may also be used to identify Bald and Golden Eagle nests that may be active in the operating areas. If Causey identifies a Bald Eagle nest or is notified of the presence of a nest by a state regulator or naturalist group, Causey will 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. This avoidance area will be maintained until the end of the breeding season (December 1 through July 15 in North Carolina) or a qualified biologist indicates the nest has been vacated.[23]

Unlike Red-cockaded Woodpeckers, Red-headed Woodpecker nests have the potential to occur in areas that are not under the forest canopy and where the vehicle might be present. As a result, Red-headed Woodpecker nest locations should not be disturbed during the breeding period (May 10 to September 10)[24] so as to avoid any potential impacts to the nest activity, such as nest abandonment. If Causey learns of any active Red-headed Woodpecker nests within the operating areas, it has indicated it would avoid identified nest sites during the breeding season or until a qualified biologist indicates the nest has been vacated.

Due to the limited operating areas and proposed number of daily operations, occasional drone overflights up to 230 feet AGL are not expected to impact critical lifecycles of wildlife species or their ability to survive.

Our analysis finds that the proposed action is not expected to cause any of the following impacts:

- A long-term or permanent loss of unlisted plant or wildlife species, i.e., extirpation of the species from a large project area;
- Adverse impacts to special status species (e.g., state species of concern, species proposed for listing, migratory birds, bald and golden eagles) or their habitats;
- Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or

[21] Altitudes attained by migrating monarch butterflies, *Danaus p. plexippus* (Lepidoptera: Danaidae), as reported by glider pilots. Available: https://cdnsciencepub.com/doi/abs/10.1139/z81-084. Accessed April 25, 2022.
[22] USFWS Midwest Region: Identification of Large Nests. Available: https://www.fws.gov/midwest/eagle/Nhistory/nest_id.html. Accessed: December 13, 2021
[23] Step 6 – Eagle Protection. Raleigh Ecological Services Field Office. Available: https://www.fws.gov/raleigh/PR_16.html. Accessed: January 4, 2022.
[24] See IPaC Official Species Lists in Appendix A of this EA.

- Adverse impacts on a species' reproductive success rates, natural mortality rates, non-natural mortality (e.g., road kills and hunting), or ability to sustain the minimum population levels required.

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

3.3.1 Regulatory Setting

Section 4(f) of the Department of Transportation (DOT) Act [codified at 49 U.S.C. § 303(c)] 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]: "The 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 to 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. A 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. The determination of use must consider the entire property and not simply the portion of the property used for a proposed project.[26]

Section 4(f) resources where a quiet setting is a generally recognized feature or attribute receive special consideration. In assessing constructive use, FAA Order 1050.1F, Appendix B, page B-11, requires that the FAA "…must consult all appropriate federal, state, and local officials having jurisdiction over the affected Section 4(f) properties when determining whether project-related impacts would substantially impair the resources." Parks, recreation areas, and wildlife and waterfowl refuges that are privately owned are not subject to Section 4(f) provisions.

A significant impact would occur pursuant to NEPA when a proposed action either involves more than a minimal physical use of a section 4(f) property or is deemed a "constructive use" based on an FAA determination that the proposed action would substantially impair the 4(f) property, and mitigation measures do not eliminate or reduce the effects of the use below the threshold of significance.

3.3.2 Affected Environment

The FAA identified properties that could meet the definition of a Section 4(f) resource within each of the four study areas. In the Holly Springs operating area, Ting Park, Jones Park, Veterans Park, Parrish Womble Park, and Oak Hill Park could be considered as Section 4(f) resources. In the Fayetteville operating area, Cliffdale Recreation Center could be considered a Section 4(f) resource. In the Raeford

[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 (FHWA) Section 4(f) Policy Paper. (Note: FHWA regulations are not binding on the FAA; however, the FAA may use them as guidance to the extent relevant to aviation projects.) Available: https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf. Accessed: February 2, 2021

operating area, there are no public parks. In the Pinehurst operating area, Cannon Park, Pinehurst Greenways Trails, James W. Tufts Memorial Park, and Rassie Wicker Park could be considered as Section 4(f) resources.

There are no wildlife or waterfowl refuges within any of the study areas. There are several historic sites within each of the study areas, as identified on the North Carolina SHPO website; however, these sites are considered for architectural or other purposes that will not typically be affected by UA operations. Also, as discussed in Section 3.4, Historical, Architectural, Archaeological, and Cultural Resources, the FAA has consulted with the North Carolina SHPO to determine whether historic and traditional cultural properties would be affected by the proposed action.

3.3.3 Environmental Consequences

There will be no physical use of Section 4(f) resources because there will be no construction on any Section 4(f) resource. The FAA has determined that infrequent UAS overflights as described in the proposed action are not considered a constructive use of any Section 4(f) resource, and will not cause substantial impairment to any of the Section 4(f) resources in the operating area. As described in the Section 3.5, Noise and Noise-Compatible Land Use, and the Noise Analysis Report (Appendix C), the proposed operations will not result in significant noise levels at any location in the operating areas. Further, as described in Secton 3.7, Visual Effects (Visual Resources and Visual Character), the proposed operations are not expected to have significant visual impacts in the operating areas. Noise and visual effects from Causey's occasional overflights are not expected to diminish the activities, features, or attributes of the resources that contribute to their significance or enjoyment.

Additionally, Causey identifies properties such as schools and recreation areas in its flight planning system. Areas where open air gatherings of people typically occur, such as stadiums and open transportation terminals, will also be taken into consideration through the use of Causey's route planning software, which prepares an optimized flight path to minimize the risk to people on the ground.

3.4 Historical, Architectural, Archaeological, and Cultural Resources

3.4.1 Regulatory Setting

Section 106 of the National Historic Preservation Act (NHPA) of 1966 [54 U.S.C. § 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 any THPO that is identified as potentially having traditional cultural interests in the area, and determining the potential impacts to 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, archeological, and cultural resources. A factor to consider in assessing significant impact is when an action would result in a finding of adverse effect through the

Section 106 process. However, under 36 CFR § 800.8(a), a finding of adverse effect on a historic property does not necessarily result in a significance finding under NEPA.

3.4.2 Affected Environment

The four APEs cover the four operating areas where Causey is planning to conduct UA package deliveries and occur within a 2 NM radius from the DCs at Fayetteville, Holly Springs, Raeford, and Pinehurst. The four operating areas are shown in Figures 2 through 5 in this EA. In each of the four areas, the FAA identified historic sites that were listed on the North Carolina SHPO website.[27] Two sites are included in the National Register of Historic Places: Pinehurst Historic District and Pinehurst Race Track. Additionally, prior to combining Causey's four operating areas into this one EA and conducting a combined outreach to the SHPO and THPO for the four operating areas, the FAA conducted historic and cultural outreach in an accordance with 36 CFR § 800.4(a)(1) for each location separately.

Fayetteville Outreach

The FAA consulted with the NC SHPO and the Catawba Indian Nation THPO for initial operations in Fayetteville, NC. The FAA sent an initial consultation letter to the NC SHPO and THPO on August 20, 2020 and received a response from the SHPO on October 14, 2020 concurring with FAA's determination that no historic properties would be affected by the proposed project. The FAA conducted additional consultation with the NC SHPO and THPO on January 14, 2021 regarding the expansion of the Fayetteville APE to a 2 NM radius around the nest. The SHPO sent a "No Objection" response letter to the FAA on February 12, 2021, concurring with the FAA that no historic resources would be affected by the proposed action. The FAA did not receive any responses or objections from the THPO.

Holly Springs Outreach

The FAA consulted with the NC SHPO and the Catawba Indian Nation THPO for operations in Holly Springs, NC. The FAA sent an initial consultation letter to the NC SHPO and THPO on October 22, 2020 and received a response from the SHPO on November 16, 2020 concurring with FAA's determination that no historic properties would be affected by the proposed project. The FAA conducted additional outreach to the NC SHPO and THPO on January 27, 2021 regarding the expansion of the Holly Springs APE to a 2 mile radius around the nest. The SHPO responded to the FAA on March 4, 2021 concurring with the FAA that no historic resources would be affected by the proposed action.

Raeford and Pinehurst Outreach

The FAA consulted with the NC SHPO and the Catawba Indian Nation THPO for initial operations in Raeford and Pinehurst. The FAA sent consultation letters to the NC SHPO and THPO on August 19, 2021. The FAA did not receive any responses or objections from the SHPO or THPO for the Raeford initial operations. For the Pinehurst initial operations, the FAA received a response from the NC SHPO on September 16, 2021, stating that they were aware of no historic resources that would be affected by the project.

Combined Outreach

On February 4, 2022, the FAA sent consultation letters to the NC SHPO and THPO for the proposed action covering all four operating areas. On March 8, 2022, the SHPO responded and concurred with the

[27] North Carolina State Historic Preservation Office GIS Web Service. Available: https://nc.maps.arcgis.com/apps/webappviewer/index.html?id=79ea671ebdcc45639f0860257d5f5ed7. Accessed: June 14, 2021.

FAA's determination of no historic properties affected in each of the four APEs. The FAA did not receive any responses or objections from the THPO. The FAA's tribal and historic outreach letters are included as Appendix B.

3.4.2 Environmental Consequences

The nature of UA effects on historic properties is limited to non-physical, reversible impacts (i.e., the introduction of audible and/or visual elements). The limited number of daily flights that Causey is proposing, as identified in Table 1 above, means that any historic or cultural resource would expect to see no more than a few operations per day, even at full operational scale, and each exposure would not be expected last more than eight seconds on average.

Additionally, the FAA's noise exposure analysis for the proposed action concluded that noise levels would not exceed DNL 45 dB in any location within the four study areas other than the DC and its immediate surroundings. Based on a review of the information available, and the FAA's knowledge with respect to the level of environmental impacts from UAS operations, the FAA has determined that this undertaking will have no historic properties affected, in accordance with 36 CFR § 800.4(d)(1). The SHPO concurred with this determination. Additionally, there would be no known effect on known cultural resources from this action. As a result, the action will not have a significant impact on historical, architectural, archaeological, or cultural resources.

3.5 Noise and Noise-Compatible Land Use

3.5.1 Regulatory Setting

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. §§ 47501-47507) regulate aircraft noise. Through 14 CFR Part 36, the FAA regulates noise from 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 "[a]n 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 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. FAA's primary 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 average aircraft sound level at a location over a 24-hour period, with a 10 dB adjustment added to those noise events occuring from 10PM and up to 7AM. the following morning. A significant noise impact is defined in 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 65 dB level due to a DNL 1.5 dB or greater increase.

3.5.2 Affected Environment

The four study areas for this EA cover each of the four noncontiguous operating areas where Causey will operate a DC for its UA delivery operations: Fayetteville, Holly Springs, Raeford, and Pinehurst. Each of the four operating areas are approximately 16.6 square miles. The total estimated population of the combined four study areas is roughly 72,750, while the population density of the combined study area is roughly 1,096 persons per square mile.[28] See Table 3 below for additional details.

Table 3 Population Density of Four Operating Areas

Operating Area	Area (square miles)	Population (estimated)	Population Density (per square mile)
Fayetteville	16.6	35,115	2,115
Holly Springs	16.6	19,657	1,184
Pinehurst	16.6	9,334	562
Raeford	16.6	8,644	521

3.5.3 Environmental Consequences

Human perception of noise depends on a number of factors, including overall noise level, number of noise events, the extent of audibility above the background ambient noise level, and acoustic frequency content (pitch). UA noise generally has high acoustic frequency content, which can often be more discernable from other typical noise sources.

To ensure that noise would not cause a significant impact to any residential land use or noise sensitive resource within the study areas, the FAA initiated an analysis of the potential noise exposure in the four operating areas that could result from implementation of the proposed action.

Noise Exposure

Utilizing the operational projections defined in Sections 1 and 2, the noise analysis methodology detailed in Appendix C was then used to the estimate DNL levels at the proposed operational levels associated to each DC. Noise levels were calculated for each flight phase and are presented in the following three sub-sections:

- Noise Exposure for Operations at the Distribution Centers
- Noise Exposure for En route Operations
- Noise Exposure for Operations at Delivery Zones

Noise Exposure for Distribution Center Operations

Based on the anticipated average daily maximum number of deliveries provided by Causey, the extent of DNL 45 dB associated with DC operations is shown in Figures 6 through 9 below. These DC noise exposure zones were determined for each of the four Causey DC locations using the noise level information presented in Table 6 of Appendix C. The noise exposure levels at each DC is also shown in Table 4 below. The average projected daily operations at 24 months were used to prepare the noise exposure zones in Figures 6 through 9.

[28] Based on the Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJSCREEN). Available: https://www.epa.gov/ejscreen. Accessed: February 25, 2022

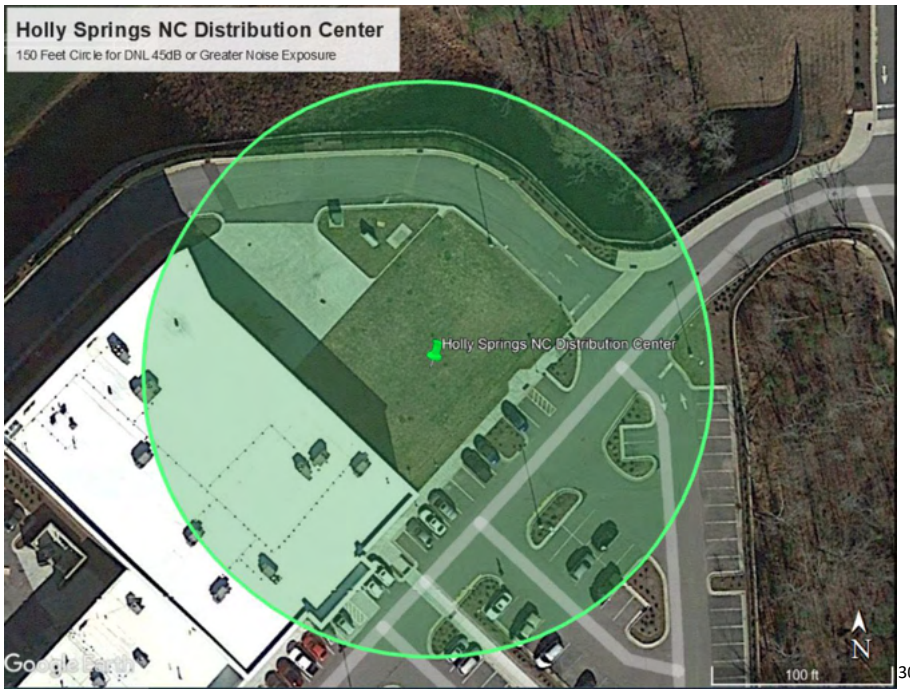
Table 4 Extent of DNL 45 dB Noise Exposure at Each Distribution Center

Operating Area	Average Daily Operations: 12 Months	Average Daily Operations: 24 Months
Fayetteville	77 (150 Feet)	104 (200 Feet)
Holly Springs	58 (150 Feet)	79 (150 Feet)
Pinehurst	25 (100 Feet)	45 (150 Feet)
Raeford	44 (150 Feet)	60 (150 Feet)

[29]

Figure 6 DNL 45 dB or greater noise exposure at the Fayetteville DC location

[29] Image: Google Earth, as modified by the FAA



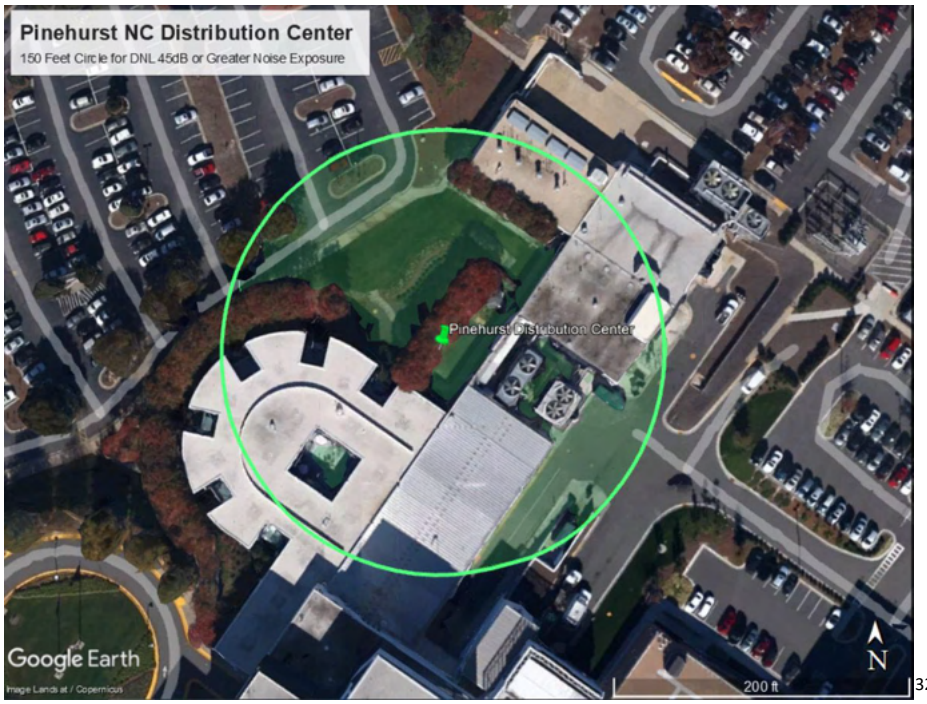
[30]

Figure 7 DNL 45 dB or greater noise exposure at the Holly Springs DC location

[31]

Figure 8 DNL 45 dB or greater noise exposure at Raeford DC location

[30] Image: Google Earth, as modified by the FAA
[31] Image: Google Earth, as modified by the FAA



[32]

Figure 9 DNL 45 dB or greater noise exposure at Pinehurst DC location

Noise Exposure for En route Operations

Based on the information provided by Causey, it is anticipated that the UA will cruise at altitudes of approximately 230 feet AGL at an airspeed of 29 knots during en route flight from each of the four DCs. Assuming this altitude and airspeed, the en route noise exposure can be determined by referencing Table 7 of Appendix C. This analysis shows that en route noise levels would not exceed DNL 45 dB in any location within the study areas.

Noise Exposure for Delivery Operations

Due to the inherent uncertainty of where UA package deliveries will occur, the exact delivery site locations and characteristics for individual deliveries is not known. However, Causey has provided expected operations distributions for the delivery zones within each study area shown in Figures 2 through 5.

The UA delivery noise has therefore been assessed for each of these delivery zones, but uses the conservative assumption that noise from the total number of deliveries to a zone could occur at any single delivery location within each delivery zone. Table 4 below provides a summary of the total number of delivery operations to each delivery zone within the four study areas to determine delivery noise levels based on the information presented in Tables 8 and 9 of Appendix C.

[32] Image: Google Earth, as modified by the FAA

Table 5 Daily UA Delivery Operations per Delivery Zone

Fayetteville				**Holly Springs**			
Delivery Zone	Daily Operations	Delivery Zone	Daily Operations	Delivery Zone	Daily Operations	Delivery Zone	Daily Operations
A	5	K	7	A	6	K	2
B	2	L	3	B	6	L	1
C	3	M	15	C	2	M	10
D	1	N	4	D	6	N	2
E	3	O	1	E	6	O	2
F	5	P	7	F	2	P	15
G	5	Q	14	G	4	Q	3
H	5	R	6	H	5	R	3
I	4	S	2	I	4		
J	6	T	4	J	1		
		Total	102			Total	80

Raeford				**Pinehurst**	
Delivery Zone	Daily Operations	Delivery Zone	Daily Operations	Delivery Zone	Daily Operations
A	11	K	3	Pinehurst Surgical Clinic	30
B	4	L	3	First Health Convenient Care	15
C	3	M	7		
D	2	N	4		
E	2				
F	6				
G	4				
H	4				
I	7				
J	2				
		Total	62	Total	45

Additionally, en route noise from the UA arriving to and departing from the delivery zones is added to the delivery noise. Due to uncertainty in the number of en route overflights that could occur over each delivery zone, the total operations associated with each study area were included in the calculation of delivery noise.

At these operational levels, and assuming that Causey will operate seven days per week except for holidays, the noise analysis determined that total delivery noise levels would not exceed DNL 45 dB in any delivery zone within the Fayetteville, Holly Springs and Raeford study areas. In the Pinehurst study area, the First Heath Convenient Care zone would also not experience delivery noise above DNL 45 dB; however, in the Pinehurst Surgical Clinic zone, delivery noise up to DNL 46.8 dB could occur.

Total Noise Exposure Results

The maximum noise exposure levels within the study area will occur at the DC locations, where noise levels at or above DNL 45 dB could occur as shown in Figures 6 through 9 above. Based on these

dimensions, DNL 45 dB noise exposure would remain almost entirely within the vicinity of the DC infrastructure for the Fayetteville, Raeford and Pinehurst study areas. DNL 45 dB noise exposure could extend to one residential property near the Holly Springs DC.

En route noise would not exceed DNL 45 dB in any study area; and delivery noise would only exceed DNL 45 dB in the Pinehurst Surgical Clinic zone of the Pinehurst DC study area.

In all areas of each of the four study areas, noise levels would be well below the threshold of DNL 65 dB for compatible land use. Based on the FAA's noise analysis, the proposed action will not have a significant impact.

3.6 Environmental Justice

3.6.1 Regulatory Setting

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, Section 1-101 requires all federal agencies to the greatest extent practicable and permitted by law, to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

The DOT Order 5610.2C defines a minority person as a person who is Black; Hispanic or Latino; Asian American; American Indian and Alaskan Native; or Native Hawaiian and other Pacific Islander. A minority population is any readily identifiable group of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

The DOT Order 5610.2C defines a low-income person as a person whose median household income is at or below the Depart of Health and Human Services poverty guidelines. A low-income population is any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

FAA Order 1050.1F provides guidance for the preparation of environmental justice analysis in support of an EA. Section 4-3.3, Exhibit 4-1 of the Order indicates that FAA should consider whether the action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population, i.e., a low-income or minority population, due to: significant impacts in other environmental impact categories; or impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population. If a significant impact would affect low-income or minority populations at a disproportionately higher level than it would other population segments, an environmental justice issue is likely.

A disproportionately high and adverse effect on minority or low-income populations means an adverse effect that:

1. Is predominately borne by a minority population and/or a low-income population; or
2. Will be suffered by the minority population and/or low-income population and is appreciable more severe or greater in magnitude than adverse effects that will be suffered by the non-minority population and/or low-income population.

The FAA has not established a significance threshold for environmental justice. In assessing significance, FAA considers the following factors: (1) significant impacts in other environmental impact categories; or (2) impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.

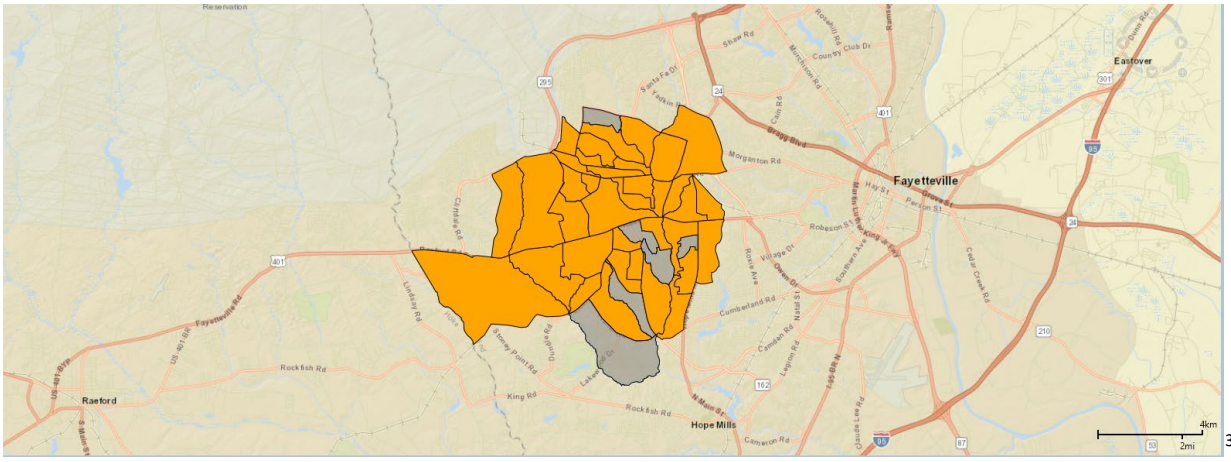
3.6.2 Affected Environment

Minority and low-income populations were mapped at the Census Block Group level using 2020 American Community Survey (ACS) 5-year estimates from the U.S. Census Bureau. The analysis was performed using the Aviation Environmental Design Tool (AEDT). The FAA utilized a combination of the *fifty-percent analysis* and *meaningfully greater analysis*[33] to complete the analysis for the study area. Low-income populations in the study area were identified by using *the low-income threshold criteria* analysis.

Minority Population Fifty-Percent Analysis

Fayetteville

As depicted in Figure 10, there are 35 census block groups out of 41 that have minority populations at or above 50 percent in the Fayetteville study area. The percentage of minority individuals residing within the Fayetteville study area, at the census block level, is approximately 67.12 percent.



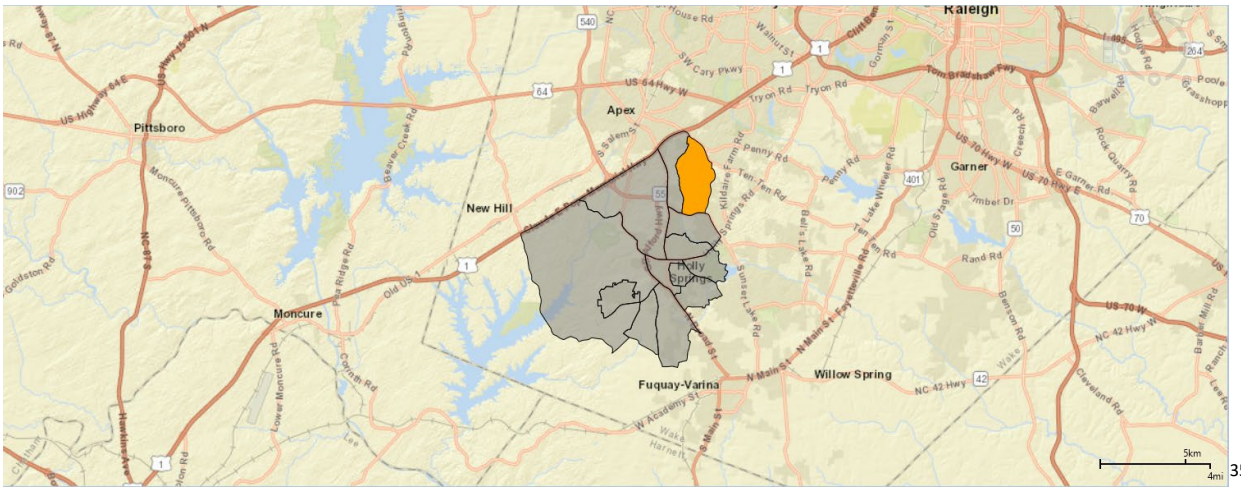
34

Figure 10 Fayetteville Operating Area Census Block Groups with Minority Populations ≥ 50 Percent

Holly Springs

As depicted in Figure 11, there is one census block group out of 13 that has minority populations at or above 50 percent in the Holly Springs study area. The percentage of minority individuals residing within the Holly Springs study area, at the census block level, is approximately 30.66 percent.

[33] As described in CEQ's "Environmental Justice: Guidance under the National Environmental Policy Act" (December 10, 1997) available at: https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf.
[34] Image: AEDT, as modified by the FAA.

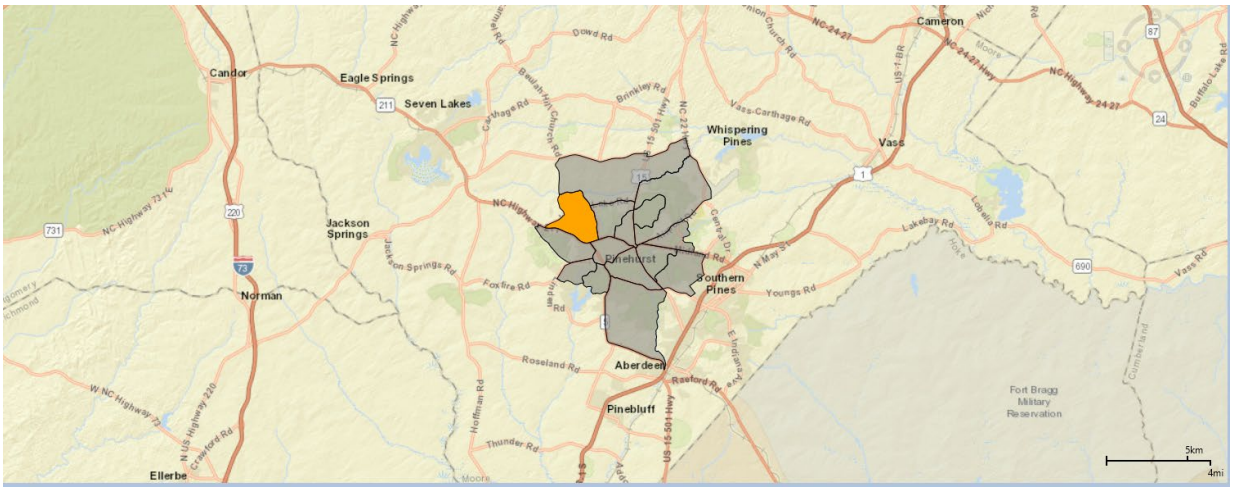


[35]

Figure 11 Holly Springs Operating Area Census Block Groups with Minority Populations ≥ 50 Percent

Pinehurst

As depicted in Figure 12, there is one census block group out of 15 that has a minority population at or above 50 percent in the Pinehurst study area. The percentage of minority individuals residing within the Pinehurst study area, at the census block level, is approximately 16.04 percent.



[36]

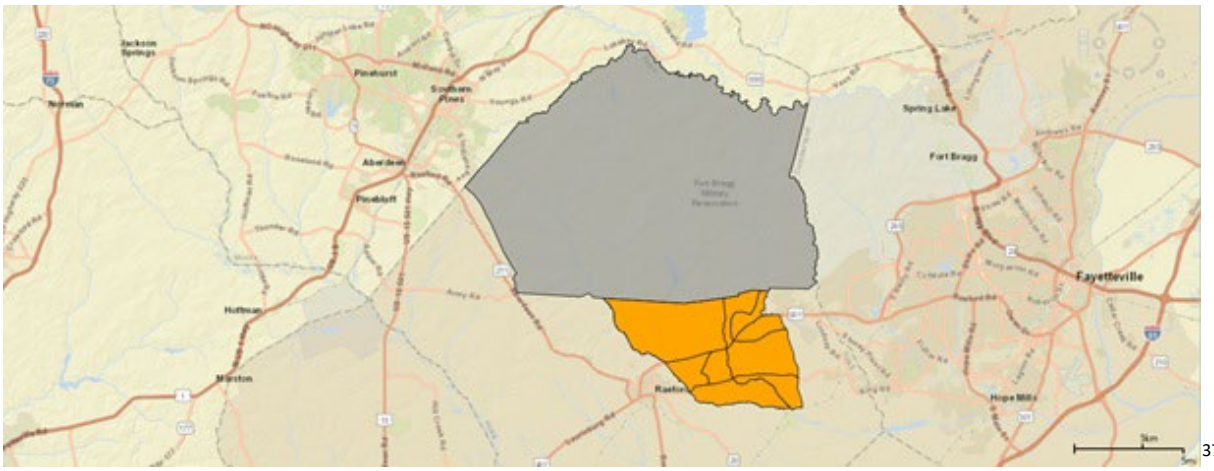
Figure 12 Pinehurst Operating Area Census Block Groups with Minority Populations ≥ 50 Percent

Raeford

As depicted in Figure 13, there are nine census block groups out of 10 that have minority populations at or above 50 percent in the Raeford study area. The percentage of minority individuals residing within the Raeford study area, at the census block level, is approximately 60.19 percent.

[35] Image: AEDT, as modified by the FAA.

[36] Image: AEDT, as modified by the FAA.



[37]

Figure 13 Raeford Operating Area Census Block Groups with Minority Populations ≥ 50 Percent

Minority Population Analysis

Fayetteville

The minority population in the study area at the census block group level was compared to the reference community, which is the percentage of minority individuals residing within Cumberland County. Because the Fayetteville study area is within parts of Cumberland County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of minority individuals residing within the study area at the census block group level, approximately 67.12 percent, is higher than that of the reference community, which is approximately 58.55 percent. Based on the analysis, the FAA determined that the percentage of minority individuals residing within Fayetteville study area is a minority population because the population in the study area exceeds 50 percent.

Holly Springs

The minority population in the study area at the census block group level was compared to the reference community, which is the percentage of minority individuals residing within Wake County. Because the Holly Springs study area is within parts of Wake County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of minority individuals residing within the study area at the census block group level, approximately 30.66 percent, is lower than the reference community, which is approximately 39 percent. Based on the analysis, the FAA determined that the percentage of minorities residing within Holly Springs study area is both less than 50 percent and is not meaningfully greater than the percentage of minorities residing within the reference community.

Pinehurst

The minority population in the study area at the census block group level was compared to the reference community, which is the percentage of minority individuals residing within Moore County.

[37] Image: AEDT, as modified by the FAA.

Because the Pinehurst study area is within parts of Moore County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of minority individuals residing within the study area at the census block group level, approximately 16.04 percent, is lower than the reference community, which is approximately 25 percent. Based on the analysis, the FAA determined that the percentage of minorities residing within study area is both less than 50 percent and is not meaningfully greater than the percentage of minorities residing within the reference community.

Raeford

The minority population in the study area at the census block group level was compared to the reference community, which is the percentage of minority individuals residing within Hoke County. Because the Raeford study area is within parts of Hoke County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of minority individuals residing within the study area at the census block group level, approximately 60.19 percent, is lower than that of the reference community, which is approximately 62.0 percent. Based on the analysis, the FAA determined that the percentage of minorities residing within study area is a minority population because the population in the study area exceeds 50 percent.

Low-Income Threshold Criteria Analysis

Fayetteville

The low-income population in the study area at the census block group level was compared to the reference community, which is the percentage of low-income individuals residing Cumberland County. Because the Fayetteville study area is within parts of Cumberland County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of low-income individuals residing within the study area at the census block group level is approximately 19.77 percent as compared to 20.49 percent in the reference community. The FAA's AEDT analysis data is included in Appendix F.

Holly Springs

The low-income population in the study area at the census block group level was compared to the reference community, which is the percentage of low-income individuals residing Wake County. Because the Holly Springs study area is within parts of Wake County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of low-income individuals residing within the study area at the census block group level is approximately 4.8 percent as compared to 8.77 percent in the reference community. The FAA's AEDT analysis data is included in Appendix F.

Pinehurst

The low-income population in the study area at the census block group level was compared to the reference community, which is the percentage of low-income individuals residing Moore County. Because the Pinehurst study area is within parts of Moore County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of low-income individuals residing within the study area at the census block group level is approximately 6.87 percent as compared to 12 percent in the reference community. The FAA's AEDT analysis data is included in Appendix F.

Raeford

The low-income population in the study area at the census block group level was compared to the reference community, which is the percentage of low-income individuals residing Hoke County. Because the Raeford study area is within parts of Hoke County, the FAA determined that the county would be an appropriate geographical region for comparison.

The percentage of low-income individuals residing within the study area at the census block group level is approximately 17.06 percent as compared to 19 percent in the reference community. The FAA's AEDT analysis data is included in Appendix F.

3.6.3 Environmental Consequences

Since the percentage of low-income individuals was lower in the study areas than in the reference communities, the FAA determined there was not a low-income community present. Further, the FAA is not aware of any pockets of minority or low-income communities that would be affected differently than the general population throughout the study area.

The FAA has determined that the proposed action would not result in adverse effects or significant impacts in any environmental resource category. As noted in Section 3.5, *Noise and Noise-Compatible Land Use*, and the Noise Analysis Report in Appendix C, the drone's noise emissions could be perceptible in areas within the study area, but will stay well below the level determined to constitute a significant impact. As described in Section 3.7, *Visual Effects (Visual Resources and Visual Character)*, there are not expected to be significant adverse visual impacts as the amount of time that a particular operations is visible to point in the study area is very short. Since Causey's operations will be happening throughout the study areas, and due to the size of the areas as well as the low number of daily operations, it is unlikely that any minority or low-income populations would be disparately impacted by the proposed action. Additionally, it is anticipated that any low-income or minority population would have access to the benefits of the drone delivery service. Since the proposed action would not result in effects that would be predominately or uniquely born by a minority or low-income population, the FAA has determined that the proposed action would not result in a disproportionately high and adverse effect on a low-income or a minority population.

3.7 Visual Effects (Visual Resources and Visual Character)

3.7.1 Regulatory Setting

Visual resources and visual character impacts deal with the extent to which the proposed action would result in visual impacts to resources in the operating area. Visual impacts can be difficult to define and evaluate because the analysis is generally subjective, but are normally related to the extent that the proposed action would contrast with, or detract from, the visual resources and/or the visual character of the existing environment. 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 threshold of significance similar to noise impacts. Factors 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 3.3, *DOT Act Section 4(f) Resources*, there are some public parks and historic properties that could be valued for aesthetic attributes within the study areas. However, Causey's proposal is to avoid overflights in highly crowded areas such as stadiums, schools, and open recreational areas during the scope of the proposed action. The four operating areas are on private property and within or adjacent to commercial shopping centers or healthcare facilities. The FAA estimates that at typical operating altitude and speeds the UA en route would be observable for approximately eight seconds by an observer on the ground.

3.7.3 Environmental Consequences

The proposed action makes no changes to any landforms, or land uses, thus there would be no effect to the visual character of the area. 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. However, the short duration that each drone flight could be seen from any resource in the operating areas, approximately eight seconds in total, and the low number of proposed flights per day, would minimize any potential for significant visual impacts. Any visual effects are expected to be similar to existing air traffic in the vicinity of the operating areas.

3.8 Water Resources (Surface Waters)

3.8.1 Regulatory Setting

Surface water resources generally consist of oceans, wetlands, lakes, rivers, and streams. Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community. The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) program, which regulates the discharge of point sources of water pollution into waters of the United States and requires a permit under Section 402 of the Clean Water Act. Waters of the United States are defined by the Clean Water Act and are protected by various regulations and permitting programs administered by the EPA and the U.S. Army Corps of Engineers. An action would be considered significant to surface waters when it would: (1) exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or (2) contaminate public drinking water supply such that public health may be adversely affected.

3.8.2 Affected Environment

Approximately 0.37 square miles of surface waters occur within the Fayetteville operating area; approximately 0.16 square miles of surface waters occur within the Holly Springs operating area; approximately 0.07 square miles of surface waters occur within the Raeford operating area; and approximately 0.17 square miles of surface waters occur within the Pinehurst operating area, based on the EJSCREEN report for this proposed action (Appendix E).

3.8.3 Environmental Consequences

There will be no ground disturbance under the proposed action and there are no NPDES permits or other water-related authorizations under the Clean Water Act that Causey would need for the proposed

action. While it is highly unlikely for one of Causey's aircraft to crash, and even less likely for a crash to happen within a surface water, this EA considers the potential effects of a drone crashing into surface waters covered by the Clean Water Act.

Causey has applied to become a certificated Part 135 air carrier and must comply with all applicable regulatory requirements. This includes compliance with requirements to notify the FAA and/or National Transportation Safety Board (NTSB) in accordance with regulatory requirements in the event of an aircraft accident. Causey's FAA-accepted checklists include procedures to notify local emergency services in the event of an accident or incident. In accordance with 14 CFR Part 135.23(d), Causey is required to locate and secure any downed aircraft pending guidance from the FAA or NTSB.

In the event of an in-flight malfunction or deviation, the Remote Pilot in Command (RPIC) is required to follow steps provided in Causey's Accepted Checklist for Abnormal and Emergency Procedures. In addition, the Lithium polymer batteries are well-secured within the aircraft, and are not expected to detach from the aircraft or become lost in the event of an incident and the battery status is automatically checked prior and during takeoff.

There will be no construction activities associated with the proposed action. The proposed action would not have the potential to adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values, or to adversely affect surface waters such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated. Further, there are no water quality permits or authorizations that would be issued for the proposed action. For all of these reasons, the proposed action would not cause an exceedance of water quality standards established by federal, state, local, and tribal regulatory agencies, and the proposed action would not contaminate public drinking water supply such that public health may be adversely affected. Therefore, the potential for impacts to surface waters is not significant.

3.9 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the proposed action with other actions. CEQ regulations define cumulative impact as "an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." The regulations also state that cumulative impacts can result from individually minor, but collectively significant actions that take place over a period of time.

Because these are the first commercial package delivery operations by drone within the operating areas, and due to airspace safety constraints that will limit the number of package delivery drones operating within the same airspace without further environmental review, the proposed action would not be anticipated to result in cumulative impacts to environmental resources within the operating areas.

4.0 LIST OF PREPARERS and CONTRIBUTORS

Table 5 lists the principal preparers, reviewers, and contributors to this EA.

Table 6 List of Preparers and Contributors

Name and Affiliation	Years of Industry Experience	EA Responsibility
Mike Millard, Flight Standards, FAA Aviation Safety	41	Flight Standards Environmental Specialist and Document Review
Christopher Couture, FAA Aviation Safety	16	Program Management, Environmental Science, and Document Review
Shawna Barry, FAA Office of Environment and Energy	16	NEPA Subject Matter Expert, Biological Resources, and Document Review
Sean Doyle, FAA Office of Environment and Energy	16	Noise Analysis and Document Review
Adam Scholten, FAA Office of Environment and Energy	11	Noise Analysis and Document Review
Contractor Contributors		
Jodi Jones, FAA Aviation Safety, Marton Technologies, Inc.	13	NEPA Subject Matter Expert, Research, and Document Review
Brad Thompson, FAA Aviation Safety, Science Applications International Corporation (SAIC)	7	NEPA Subject Matter Expert, Research, and Document Review

5.0 LIST of AGENCIES CONSULTED

State Agencies

North Carolina Department of Natural and Cultural Resources

Tribes

Catawba Indian Nation

Appendix A

IPaC Official Species Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To:
Project Code: 2022-0013064
Project Name: Fayetteville Operation Area

February 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

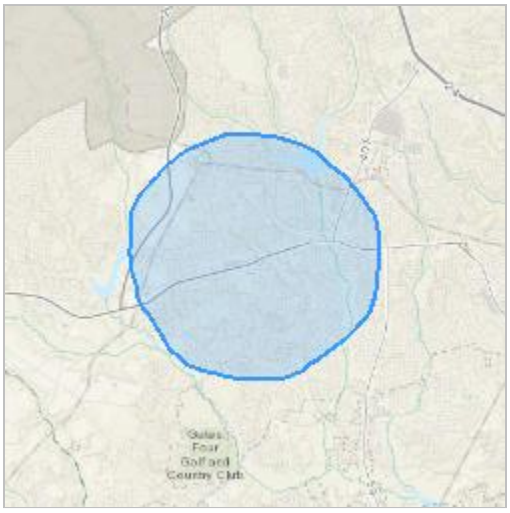
This species list is provided by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Project Summary

Project Code: 2022-0013064
Event Code: None
Project Name: Fayetteville Operation Area
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: Operation area for commercial drone activities
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.04072625,-78.99893114938338,14z



Counties: Cumberland County, North Carolina

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

Reptiles

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Saint Francis' Satyr Butterfly *Neonympha mitchellii francisci* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5419	Endangered

Flowering Plants

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Michaux's Sumac *Rhus michauxii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5217	Endangered
Pondberry *Lindera melissifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1279	Endangered
Rough-leaved Loosestrife *Lysimachia asperulaefolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2747	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Name: Jodi Jones
Address: 800 Independence Ave SW
City: Washington
State: DC
Zip: 20591
Email jodi.a-ctr.jones@faa.gov
Phone: 7204125618

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To:
Project Code: 2022-0013063
Project Name: Holly Springs Operation Area

February 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Project Summary

Project Code: 2022-0013063
Event Code: None
Project Name: Holly Springs Operation Area
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: Operation area for commercial drone activities
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.66609495,-78.84605043094757,14z

Counties: Wake County, North Carolina

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

Amphibians

NAME	STATUS
Neuse River Waterdog *Necturus lewisi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6772	Threatened

Fishes

NAME	STATUS
Cape Fear Shiner *Notropis mekistocholas* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6063	Endangered
Carolina Madtom *Noturus furiosus* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/528	Endangered

Clams

NAME	STATUS
Atlantic Pigtoe *Fusconaia masoni* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5164	Threatened
Dwarf Wedgemussel *Alasmidonta heterodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/784	Endangered
Yellow Lance *Elliptio lanceolata* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4511	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Michaux's Sumac *Rhus michauxii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5217	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Name: Jodi Jones
Address: 800 Independence Ave SW
City: Washington
State: DC
Zip: 20591
Email jodi.a-ctr.jones@faa.gov
Phone: 7204125618

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To:
Project Code: 2022-0013061
Project Name: Pinehurst Operation Area

February 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Project Summary

Project Code: 2022-0013061
Event Code: None
Project Name: Pinehurst Operation Area
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: Operation area for commercial drone activities
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.20778795,-79.46008020712753,14z

Counties: Moore County, North Carolina

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Michaux's Sumac *Rhus michauxii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5217	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Name: Jodi Jones
Address: 800 Independence Ave SW
City: Washington
State: DC
Zip: 20591
Email jodi.a-ctr.jones@faa.gov
Phone: 7204125618

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To:
Project Code: 2022-0013062
Project Name: Raeford Operation Area

February 25, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

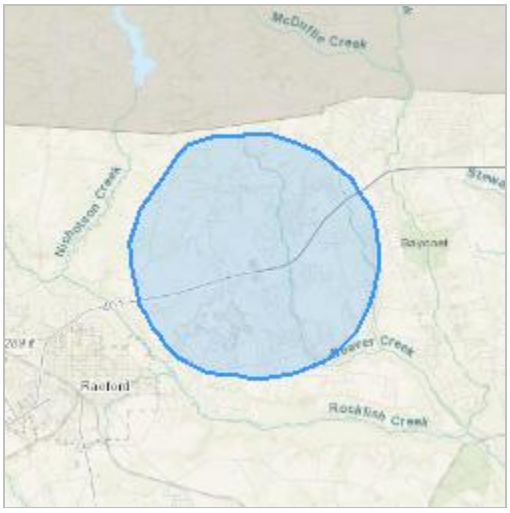
This species list is provided by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Project Summary

Project Code: 2022-0013062
Event Code: None
Project Name: Raeford Operation Area
Project Type: Drones - Use/Operation of Unmanned Aerial Systems
Project Description: Operation area for commercial drone activities
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.01074925,-79.17419659178813,14z



Counties: Hoke County, North Carolina

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

Reptiles

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Saint Francis' Satyr Butterfly *Neonympha mitchellii francisci* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5419	Endangered

Flowering Plants

NAME	STATUS
American Chaffseed *Schwalbea americana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286	Endangered
Michaux's Sumac *Rhus michauxii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5217	Endangered
Rough-leaved Loosestrife *Lysimachia asperulaefolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2747	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Name: Jodi Jones
Address: 800 Independence Ave SW
City: Washington
State: DC
Zip: 20591
Email jodi.a-ctr.jones@faa.gov
Phone: 7204125618

Appendix B

Tribal and Historic Outreach Letters

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

August 20, 2020

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) operation at Fayetteville, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d).

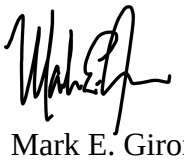
Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Fayetteville, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 11 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Fayetteville, NC (35°02'26.9"N 78°59'59.5"W).

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,



Mark E. Giron
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

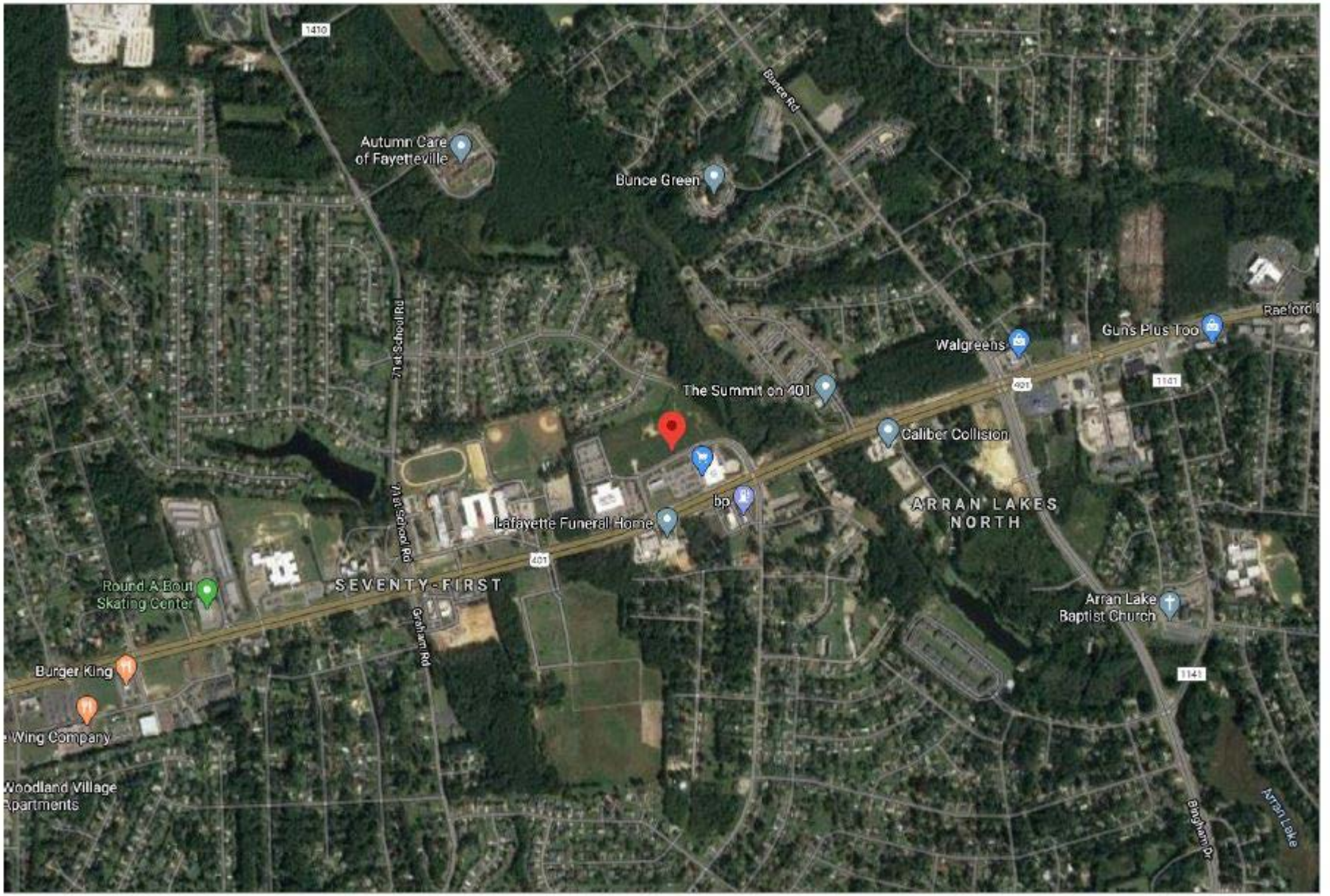


Figure 1. Location of the Distribution Center in Fayetteville

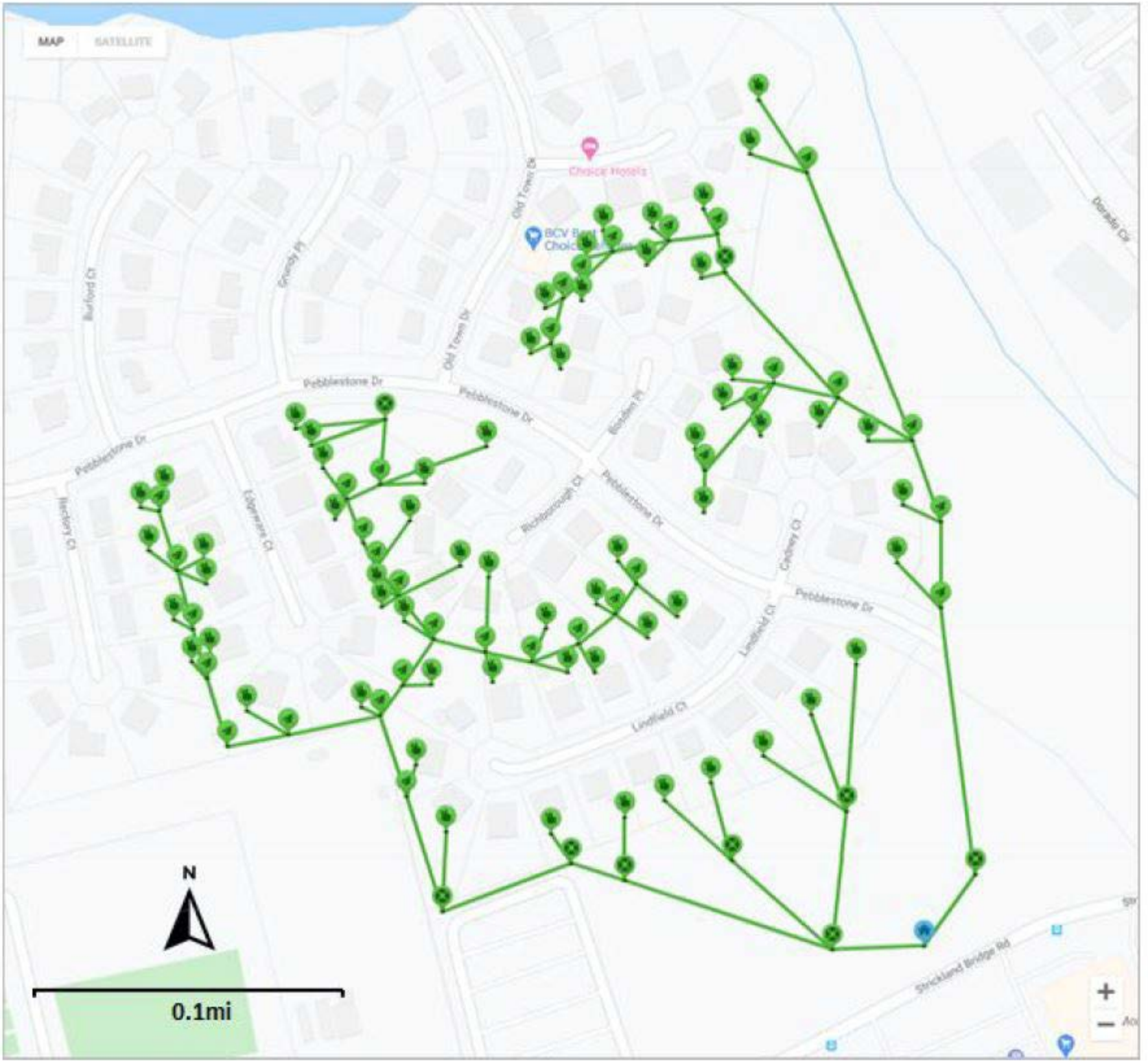


Figure 2. Fayetteville Flight Network. Flytrex GCS display, map view

Figure 3. Fayetteville Flight Network. Flytrex GCS display, satellite view

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

August 20, 2020

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding issuance by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) area of operation in Fayetteville, NC. We wish to solicit your views regarding potential effects on tribal interests in the area.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Fayetteville, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 11 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Fayetteville, NC (35°02'26.9"N 78°59'59.5"W).

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your

response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.
If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

Mark E. Giron
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

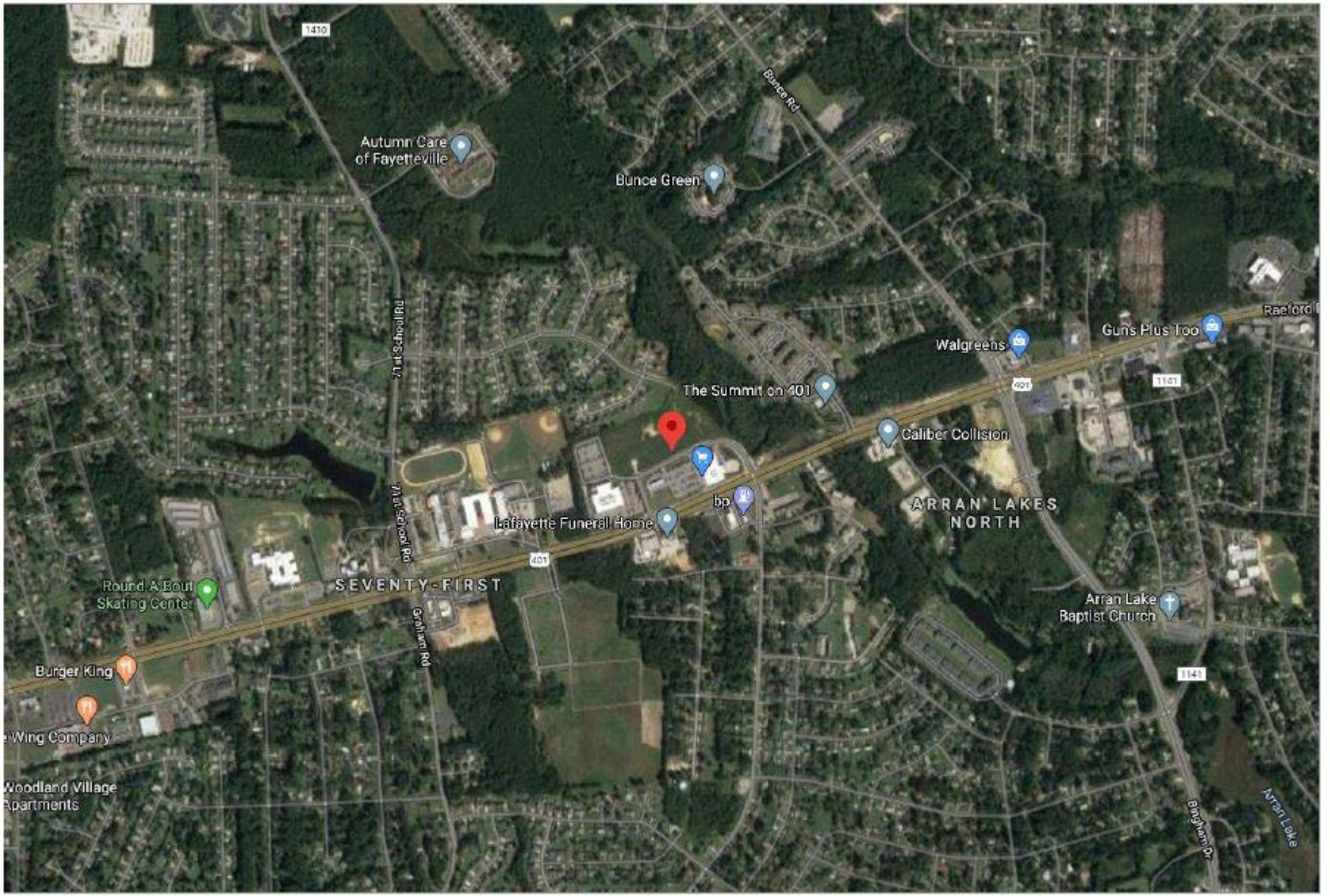


Figure 1. Location of the Distribution Center in Fayetteville

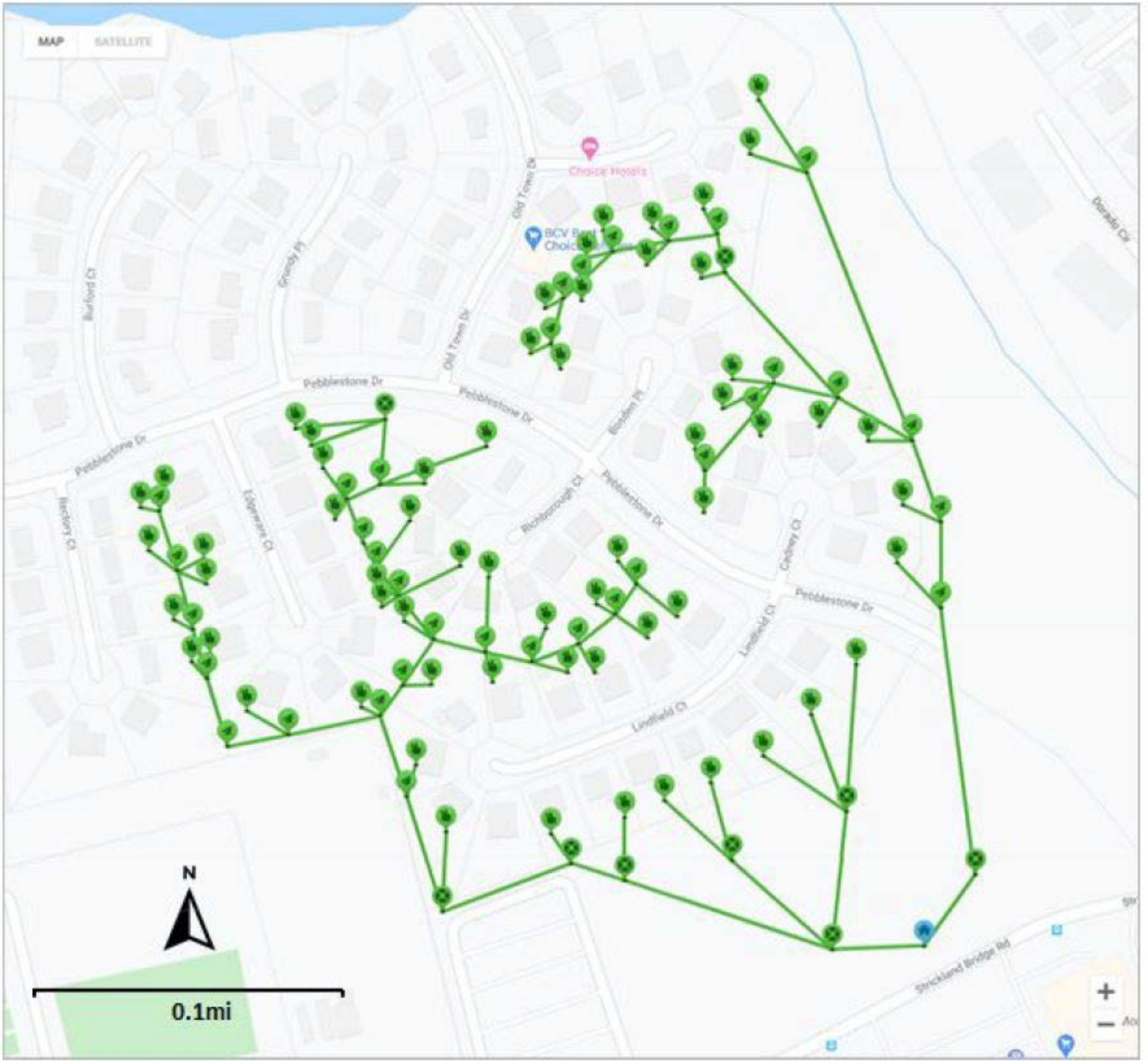


Figure 2. Fayetteville Flight Network. Flytrex GCS display, map view

Figure 3. Fayetteville Flight Network. Flytrex GCS display, satellite view

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

October 14, 2020

Bradley Thompson/ SAIC
Federal Aviation Administration
General Aviation Operations Branch
800 Independence Avenue, S.W.
Washington, DC 20591

bradley.ctr.thompson@faa.gov

Re: Deliver packages using Flytrex Drone Delivery Unmanned Aircraft Systems (UAS), Fayetteville, Cumberland County, ER 20-1865

Dear Mr. Thompson:

Thank you for your email of August 20, 2020, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of an update to a previously reviewed proposal by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) operation at Fayetteville, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d). Previous coordination with the NC SHPO regarding this project occurred and a tracking number of ER 20-1865 had been assigned. The SHPO responded on October 14, 2020 with no objections and had no comment on the project as proposed.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Fayetteville, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 11 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The previous operation that was coordinated with the NC SHPO showed the APE would be limited to a neighborhood .25 miles from the distribution center. The new operation is going to be expanded to a radius of

2 miles centered on the Distribution Center thereby increasing the APE. According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Fayetteville, NC (35°02'26.9"N; 78°59'59.5"W).

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2021.01.14 10:11:00 -08'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding an update to a previously proposed issuance by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) area of operation in Fayetteville, NC. We wish to solicit your views regarding potential effects on tribal interests in the area. A letter was sent to the Catawba Indian Nation on August 20, 2020 describing the previous operations. No response was received.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Fayetteville, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 11 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The previous operation that was described in the letter sent to the Catawba Nation showed the APE would be limited to a neighborhood .25 miles from the distribution center. The new operation is going to be expanded to a radius of 2 miles centered on the Distribution Center thereby increasing the APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Fayetteville, NC (35°02'26.9"N; 78°59'59.5"W).

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2021.01.14 10:09:49 -08'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper | Secretary D. Reid Wilson

February 12, 2021

Bradley Thompson/SAIC bradley.ctr.thompson@faa.gov
U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue Southwest
Washington, DC 20591

Re: Deliver packages using Flytrex Drone Delivery Unmanned Aircraft Systems (UAS), Fayetteville, Cumberland County, ER 20-1865

Dear Mr. Thompson:

Thank you for your email of January 14, 2021, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

March 8, 2022

Mike Millard
FAA, AFS-800, 800
Independence Avenue, Southwest
Washington, D.C. 20591

9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov

Re: Deliver packages using Flytrex Drone Delivery Unmanned Aircraft Systems (UAS), Fayetteville, Cumberland County, ER 20-1865

Dear Mr. Millard:

Thank you for your letter of February 4, 2022, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos
Deputy State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

October 22, 2020

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) operation at Holly Springs, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d).

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 32.5 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Holly Springs, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 115 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. Flights will occur primarily Mon-Sun, with operating hours from sunrise to sunset. The dimension of the UAS area defines the Area of Potential Effect (APE). According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Holly Springs, NC.

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will

greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

Mark E. Giron
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

October 22, 2020

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding issuance by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) area of operation in Holly Springs, NC. We wish to solicit your views regarding potential effects on tribal interests in the area.

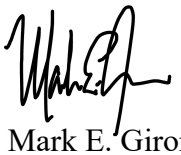
Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 32.5 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Holly Springs, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 115 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. Flights will occur primarily Mon-Sun, with operating hours from sunrise to sunset. The dimension of the UAS area defines the Area of Potential Effect (APE). According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Holly Springs, NC.

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,



Mark E. Giron
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

November 16, 2020

Bradley Thompson
U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, Southwest
Washington, DC 20591

bradley.ctr.thompson@faa.gov

Re: Deliver packages with Flytrex Drone Delivery Unmanned Aircraft System (UAS), Holly Springs, Wake County, ER 20-2313

Dear Mr. Thompson:

Thank you for your letter of October 22, 2020, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of an update to a previously reviewed proposal by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) operation at Holly Springs, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d). Previous coordination with the NC SHPO regarding this project occurred and a tracking number of ER 20-2313 had been assigned. The SHPO responded on November 16, 2020 with no objections and had no comment on the project as proposed.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 32.5 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Holly Springs, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 115 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. Flights will occur primarily Mon-Sun, with operating hours from sunrise to sunset. The dimension of the UAS area defines the Area of Potential Effect (APE). The previous operation that was coordinated with the NC SHPO showed the APE would be limited to a neighborhood .25 miles from the distribution center. The new operation is going to be expanded to a radius of 2 miles centered on the Distribution Center thereby increasing the APE. According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects

to the ground. All flights will takeoff from, and return to a Distribution Center located in Holly Springs, NC (35°39'58.47"N; 78°50'42.35"W).

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2021.01.27 07:16:39 -08'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding an update to a previously proposed issuance by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for a Flytrex Drone Delivery Unmanned Aircraft System (UAS) operation in Holly Springs, NC. We wish to solicit your views regarding potential effects on tribal interests in the area. A letter was sent to the Catawba Indian Nation on October 22, 2020 describing the previous operations. No response was received.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 32.5 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Holly Springs, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 115 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. Flights will occur primarily Mon-Sun, with operating hours from sunrise to sunset. The dimension of the UAS area defines the Area of Potential Effect (APE). The previous operation that was described in the letter sent to the Catawba Nation showed the APE would be limited to a neighborhood .25 miles from the distribution center. The new operation is going to be expanded to a radius of 2 miles centered on the Distribution Center thereby increasing the APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in Holly Springs, NC (35°39'58.47"N; 78°50'42.35"W).

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

DAVID M MENZIMER

Digitally signed by DAVID M MENZIMER
Date: 2021.01.27 07:15:43 -08'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper | Secretary D. Reid Wilson

March 4, 2021

Bradley Thompson
U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue Southwest
Washington, DC 20591

bradley.ctr.thompson@faa.gov

Re: Deliver packages with Flytrex Drone Delivery Unmanned Aircraft System (UAS), Holly Springs, Wake County, ER 20-2313

Dear Mr. Thompson:

Thank you for your email of January 27, 2021, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

March 8, 2022

Mike Millard
FAA, AFS-800, 800
Independence Avenue, Southwest
Washington, D.C. 20591

9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov

Re: Deliver packages with Flytrex Drone Delivery Unmanned Aircraft System (UAS), Holly Springs, Wake County, ER 20-2313

Dear Mr. Millard:

Thank you for your letter of February 4, 2022, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos
Deputy State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) operation in Pinehurst, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d).

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Pinehurst, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Fri, with operating hours from 9 am until 5 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery area will have a radius of 2 nautical miles centered on the First Health Moore Regional Hospital located at 5 First Village Dr., Pinehurst, NC 28374. According to the National Park Service online database of the National Register of Historic Places, two historic places were identified. The places are the Pinehurst Historical District and the Pinehurst Race Track and both are identified on

the enclosed map. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in the parking lot of the Hospital.

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

David M. Menzimer

Digitally signed by David M. Menzimer
Date: 2021.08.19 12:26:02 -07'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) delivery operation in Pinehurst, NC. We wish to solicit your views regarding potential effects on tribal interests in the area.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Pinehurst, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Fri, with operating hours from 9 am until 5 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery area will have a radius of 2 nautical miles centered on the First Health Moore Regional Hospital located at 5 First Village Dr., Pinehurst, NC 28374. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center located in the parking lot of the Hospital.

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your

response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

David M. Menzimer

Digitally signed by David M. Menzimer
Date: 2021.08.19 12:26:54 -07'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

September 16, 2021

Bradley Thompson
General Aviation and Commercial Division
800 Independence Avenue, Southwest
Washington, DC 20591

bradley.ctr.thompson@faa.gov

Re: Deliver packages using Unmanned Aircraft Systems (UAS), First Health Moore Regional Hospital, 5 First Village Drive, Pinehurst, Moore County, ER 21-2058

Dear Mr. Thompson:

Thank you for your letter of August 19, 2021, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

March 8, 2022

Mike Millard
FAA, AFS-800, 800
Independence Avenue, Southwest
Washington, D.C. 20591

9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov

Re: Deliver packages using Unmanned Aircraft Systems (UAS), First Health Moore Regional Hospital, 5 First Village Drive, Pinehurst, Moore County, ER 21-2058

Dear Mr. Millard:

Thank you for your letter of February 4, 2022, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos
Deputy State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) operation in Raeford, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d).

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Raeford, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 8 am until 11 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery area will have a radius of 2 nautical miles centered on a Walmart Supercenter located at 4545 Fayetteville Rd. Raeford, NC 28376. According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center next to the Walmart Supercenter.

Consultation
The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS route. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

David M. Menzimer

Digitally signed by David M. Menzimer
Date: 2021.08.19 11:17:05 -07'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption for an Unmanned Aircraft System (UAS) delivery operation in Raeford, NC. We wish to solicit your views regarding potential effects on tribal interests in the area.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving the UAS operation in the area depicted below. FAA approval of the UAS operations in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Raeford, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, consisting of approximately five to ten flights per day for an estimated one hour of total flying time per day. Flights will occur primarily Mon-Sun, with operating hours from 8 am until 11 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery area will have a radius of 2 nautical miles centered on a Walmart Supercenter located at 4545 Fayetteville Rd. Raeford, NC 28376. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to a Distribution Center next to the Walmart Supercenter.

Consultation
The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your

response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

David M. Menzimer

Digitally signed by David M. Menzimer
Date: 2021.08.19 11:17:58 -07'00'

David Menzimer
Aviation Safety
Manager, General Aviation Operations Branch,
Flight Standards Service

Enclosure

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

March 8, 2022

Mike Millard
FAA, AFS-800, 800
Independence Avenue, Southwest
Washington, D.C. 20591

9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov

Re: Deliver packages with Unmanned Aircraft Systems (UAS), 2-mile radius from Walmart Supercenter, 4545 Fayetteville Road, Raeford, Hoke County, ER 21-2057

Dear Mr. Millard:

Thank you for your letter of February 4, 2022, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos
Deputy State Historic Preservation Officer

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Ms. Renee Gledhill-Early
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Via electronic submission to environmental.review@ncdcr.gov

Dear Ms. Gledhill-Early:

The purpose of this letter is to inform you of a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operation Specifications for Unmanned Aircraft System (UAS) expanded operation areas in Fayetteville, Holly Springs, Pinehurst and Raeford, NC. The FAA has determined that this proposed action is a Federal undertaking as defined in 36 CFR § 800.16 (y). Therefore, the FAA is initializing consultation with the State Historic Preservation Officer (SHPO) pursuant to § 800.11 (d).

In August and October of 2020, and again in January and August of 2021 the Federal Aviation Administration (FAA) contacted the North Carolina State Historic Preservation Office regarding FAA's approval of waivers and operating exemptions and authorities that would permit Causey Aviation Unmanned, Inc. (Causey), to operate Unmanned Aircraft Systems (UAS) commonly called drones to provide delivery service, to deliver supplies in four cities in NC. The four cities are Fayetteville, Holly Springs, Pinehurst and Raeford. In our previous consultation letters, we informed you that the FAA had determined that the initial actions appeared to support a determination of no potential effects of UAS operations on historic properties; however, we invited your views on the potential for impacts to certain types of resources that could be particularly or uniquely sensitive to effects. Your office's responses in October and November of 2020 and again in February, March and September of 2021 agreed with the FAA's determination.

SHPO Response on October 14, 2020 for Fayetteville (ER 20-1865)
SHPO Response on November 16, 2020 for Holly Springs (ER 20-2313)
SHPO Response on February 12, 2021 for Fayetteville (ER 20-1865)
SHPO Response on March 4, 2021 for Holly Springs (ER 20-2313)
SHPO Response on September 16, 2021 for Pinehurst (ER 21-2058)
SHPO Response on September 16, 2021 for Raeford (ER 21-2057)

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving and revising the UAS operation in the area. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

The UAS operation will be flown by an unmanned aircraft weighing 33 lbs., including a 6.6 lb. payload, at approximately 230 feet Above Ground Level (AGL) in Fayetteville, Holly Springs, Pinehurst and Raeford, NC (see attached operations area map). Upon reaching the delivery point, the UAS lowers to a delivery altitude of 65 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the wire/cable is recovered, and the UAS then ascends back to 230 feet AGL. The purpose is for package delivery, with the following expected number of operations per day over the next 24 months at each location.

Estimated number of average daily operations within the next 24 months:

- Raeford - 60
- Holly Springs - 79
- Fayetteville – 104
- Pinehurst – 45 (First Health Moore Regional Hospital)

Flights will occur primarily Mon-Sun, with operating hours from 7 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery areas will have a radius of two nautical miles centered on Distribution Centers in each of the four cities listed, with the exception of the Pinehurst operation that is smaller, and located on the First Health Moore Regional Hospital property. According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to the Distribution Centers in each city.

Consultation

The FAA seeks concurrence from the SHPO of its no historic properties affected [§ 800.11 (d)] determination for the proposed UAS expanded operating areas. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

KEVIN A. RAYMOND

Digitally signed by KEVIN A. RAYMOND
Date: 2022.02.03 14:35:51 -06'00'

Kevin Raymond
Acting Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

800 Independence Ave., S.W.
Washington, DC 20591

Chief William Harris
Catawba Indian Nation
996 Avenue of the Nations
Rock Hill, SC 29730

Dear Chief Harris:

The purpose of this letter is to initiate formal government-to-government consultation regarding a proposal under consideration by the Federal Aviation Administration (FAA) for the approval of a Certificate of Waiver and/or Exemption, or Operations Specifications for an Unmanned Aircraft System (UAS) expanded operation areas in Fayetteville, Holly Springs, Pinehurst and Raeford, NC. We wish to solicit your views regarding potential effects on tribal interests in the area.

In August and October of 2020, and again in January and August of 2021 the Federal Aviation Administration (FAA) contacted the Catawba Indian Nation regarding FAA's approval of waivers and operating exemptions and authorities that would permit Causey Aviation Unmanned, Inc. (Causey), to operate Unmanned Aircraft Systems (UAS) commonly called drones to provide delivery service, to deliver supplies in four cities in NC. The four cities are Fayetteville, Holy Springs, Pinehurst and Raeford. In our previous consultation letters, we invited your views on the potential for impacts to certain types of resources that could be particularly or uniquely sensitive to effects. We did not receive a response from your office.

Proposed Activity Description
The Federal Aviation Administration (FAA) has been asked to approve waivers and/or exemptions to aeronautical regulations, thereby approving and revising the UAS operation in the area. FAA approval of the UAS operation in the area is an undertaking subject to regulations pursuant to the National Historic Preservation Act.

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purpose is for package delivery, with the following expected number of operations per day over the next 24 months at each location.

Estimated number of average daily operations within the next 24 months:

- Raeford - 60
- Holly Springs - 79
- Fayetteville – 104
- Pinehurst – 45 (First Health Moore Regional Hospital)

Flights will occur primarily Mon-Sun, with operating hours from 7 am until 10 pm. The dimension of the UAS area defines the Area of Potential Effect (APE). The UAS delivery areas will have a radius of two nautical miles centered on Distribution Centers in each of the four cities listed, with the exception of the Pinehurst operation that is smaller, and located on the First Health Moore Regional Hospital property. According to the National Park Service online database of the National Register of Historic Places, there are no registered historical places within the proposed APE. The UAS operation will have no affects to the ground. All flights will takeoff from, and return to the Distribution Centers in each city.

Consultation

The FAA is soliciting the opinion of the tribe(s) concerning any tribal lands, or sites of religious or cultural significance that may be affected by the proposed operation area. Your response over the next 30 days will greatly assist us in incorporating your concerns into our environmental review of the operation.

If you have any comments or questions or need additional information regarding the proposed operation, please do not hesitate to contact Mr. Mike Millard, in writing at: FAA, AFS-800, 800 Independence Ave., S.W., Washington, D.C. 20591; by telephone: (202) 267-7906; or by email: 9-AWA-AVS-AFS-ENVIRONMENTAL@faa.gov.

Sincerely,

KEVIN A. RAYMOND

Digitally signed by KEVIN A. RAYMOND
Date: 2022.02.03 14:36:35 -06'00'

Kevin Raymond
Acting Manager, General Aviation Operations Section
General Aviation and Commercial Division
Office of Safety Standards, Flight Standards Service

Enclosure

Appendix C

Noise Analysis Report

Noise Assessment for Causey Proposed Package Delivery Operations with Flytrex FTX-M600P Unmanned Aircraft

In support of U.S. Code of Federal Regulations Title 14, Part 135

Final

HMMH Report No.309990.003-5
February 28, 2022

Prepared for:

JD RoVolus, LLC
121 Pearl Street
Ypsilanti, MI 48197

Federal Aviation Administration
Aviation Safety, Flight Standards Service
Office of Environment and Energy
Policy, Engineering, Analysis, and Research (PEARS II)
693KA9-18-D-00005

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Noise Assessment for Causey Proposed Package Delivery Operations with Flytrex FTX-M600P Unmanned Aircraft

In support of U.S. Code of Federal Regulations Title 14, Part 135

Final

HMMH Report No. 309990.003-5

February 28, 2022

Prepared for:

JD RoVolus, LLC
121 Pearl Street
Ypsilanti, MI 48197

Federal Aviation Administration
Aviation Safety, Flight Standards Service
Office of Environment and Energy
Policy, Engineering, Analysis, and Research (PEARS II)
693KA9-18-D-00005

Prepared by:

David A. Crandall

HMMH
700 District Avenue, Suite 800
Burlington, MA 01803
T 781.229.0707

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Contents

Figures

Tables

1 Introduction and Background

This document presents the methodology and estimation of noise exposure related to proposed Unmanned Aircraft (UA) package delivery operations conducted by Causey Aviation Unmanned, Inc. ("Causey") as a commercial operator under the provisions of 14 CFR Part 135. Causey is proposing to perform package delivery operations at multiple potential locations in the continental United States utilizing an operational model that involves a central distribution center and supporting route network to transport small commercial goods to public delivery points and residential backyards.

The distribution center and delivery points are determined based on partnerships Causey has established with organizations providing products at the distribution center to various end customers, typically at residential locations. Flight paths to and from the distribution center and delivery points use a network of route plans, with a structure of common flight path segments near the distribution center and various branches to deliver to individual locations. Causey selects delivery points after potential customers are identified and their specific locations have been surveyed and satisfy various criteria.

Causey is proposing operations with unmanned aircraft model Flytrex FTX-M600P (referred to throughout as "the Flytrex FTX-M600P UA," or "UA"). The Flytrex FTX -M600P UA is a multi-rotor design featuring six propellers mounted on equally spaced arms extending horizontally from a center frame. The system's computers and package containers are located on the underside of the airframe. The maximum allowable takeoff weight of the UA is 33.4 pounds, and the maximum allowable package weight is 6.6 pounds.

Figure 1 depicts the UA considered in this report.

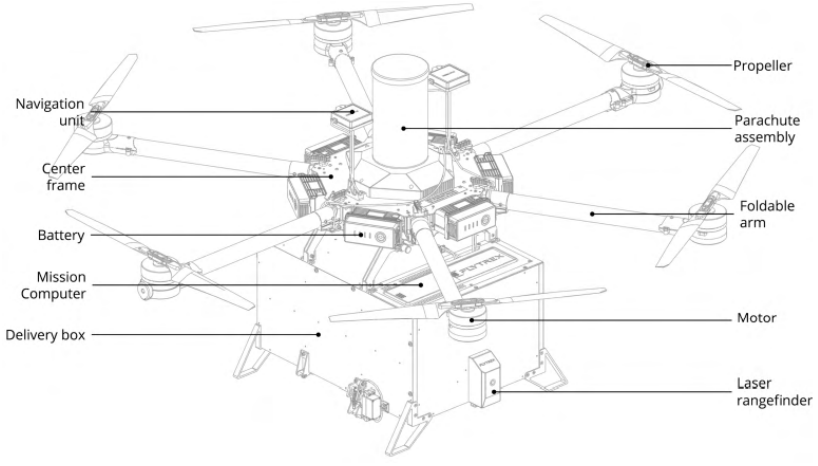

Figure 1: Flytrex FTX-M600P UA

Source: Causey, CONOPS July 19, 2021

The proposed delivery system will be implemented in suburban areas with distribution centers located at commercial or healthcare centers. At distribution centers, a remote pilot in command (RPIC) will load

the Flytrex FTX-M600P UA with the desired package and launch the UA to perform aerial deliveries. The UA will fly a predetermined flight path with supervision from the RPIC and per approved Federal Aviation Administration (FAA) operating authority until it reaches its desired delivery point. Once the UA arrives at the delivery point, it hovers above the ground and lowers the package to the ground on a cable.

With a multirotor design, the UA can take off and descend vertically as well as hover. Airspeeds during normal cruise are expected to be approximately 29 knots. Typical flights begin with the UA departing from a distribution center and ascending vertically to 230 feet Above Ground Level (AGL). The UA then flies a pre-assigned route at 230 feet AGL and 29 knots to a selected delivery point. Upon arrival at the delivery point, the UA descends vertically to the delivery hover altitude of 82 feet AGL and waits for the customer to accept package delivery through a user interface application (sometimes referred to as, an app). If the delivery is not accepted within 15 seconds, the UA will return to the distribution center with the package. If the delivery is accepted, the UA will lower the package to the ground using a tethered mechanism and subsequently return to the distribution center. When returning to the distribution center, the UA climbs vertically back to 230 feet AGL and follows a predefined route from the delivery point back to the distribution center. Upon arrival at the distribution center, the UA descends vertically from 230 feet AGL to the ground for landing.

The methodology proposed in this document provides quantitative guidance to FAA Environmental Specialists to inform environmental decision making on UA noise exposure from proposed Causey package delivery operations. The methods presented here are suitable for review of Federal actions under the requirements of the National Environmental Policy Act (NEPA) and other applicable environmental special purpose laws or other federal environmental review requirements at the discretion and approval of the FAA. In particular, this report is intended to function as a non-standard equivalent methodology under FAA Order 1050.1F, and as such, would require prior written approval from FAA's Office of Environment and Energy (AEE) for each individual project for which a NEPA determination is sought. [1]

The methodology has been developed with data provided by Causey and FAA to date and therefore is limited to Causey operations with the FTX-M600P UA and the flight phases and maneuvers described herein. The noise analysis methodology and estimated noise levels of the proposed activity levels are based upon noise measurement data provided by the FAA.[2] Results of the noise analysis are presented in terms of the Day-Night Average Sound Level (DNL) based on varying levels of operations for areas at ground level below each phase of the flight.[3]

Section 2 of this document describes the relevant noise and operations data made available by Causey and FAA. Section 3 describes the methodology to developing noise exposure estimates for the various UA flight phases associated with typical operations using available data. Section 4 presents the estimated DNL levels for various flight phases based on varying levels of typical operations as described by Causey to date.

---

[1] Discussion of the use of "another equivalent methodology" is discussed in FAA Order 1050.1F, July 16, 2015, Appendix B, Section B-1.2, available online at https://www.faa.gov/documentlibrary/media/order/faa_order_1050_1f.pdf#page=113

[2] Hobbs, Chris, *Estimated Noise Levels for Flytrex FTXM600P UA* (Federal Aviation Administration, February 2, 2022)

[3] Discussion of modification of this process for use of the Community Noise Equivalent Level metric (CNEL) is discussed in Section 3.1.

2 Unmanned Aircraft Delivery Operations and Noise Measurement Data Set Descriptions

Two data sets form the basis of the noise assessment for the proposed Causey delivery operations. The data sets include the Causey Aviation Unmanned, Inc. Part 135 Concept of Operations (CONOPS) dated July 19, 2021 and the FAA's Memorandum, "Estimated Noise Levels for Flytrex MTXM600P UA," dated February 17, 2022, which is provided with this report as Attachment A.[4]

2.1 Operations, Flight Paths, and Flight Profile Data

Operations and flight profile data for the UA provided by Causey and FAA were reviewed to determine the characteristics of typical operations for a proposed operating area. Based on this review, the following subsections describe the assumptions made about the operations and flight profiles that were used to inform the development of the estimated noise exposure and the methodology for the noise analysis.

2.1.1 Operations

The methodology presented in this report can be used to assess UA noise over a range of proposed activity levels; however, FAA review and approval of its use at specified activity levels is required. The activity ranges shown below in Section 4 represent what FAA considers low to moderate activity levels and anticipates as being appropriate for consideration with this methodology. At higher activity levels, this methodology may not be sufficient to inform an environmental determination and further consideration or refinements at the discretion of the FAA may be needed.

Note that DNL noise levels presented in this report are all shown consistent with effective daytime (7 AM to 10 PM) operations levels. For consideration of nighttime (10 PM to 7 AM) noise levels, a ten times operational weighting (equivalent to DNL 10 dB increase) should be applied. Section 3.1 provides techniques to apply the operational weighting necessary to calculate effective operations for analysis with the DNL metric.

2.1.2 Flight Paths and Profiles

The UA will fly a network of defined flight paths between a central distribution center and delivery points that are developed as needed, based on demand. Each delivery point is selected based on customer demand after a suitability survey is completed specific to each candidate location.

Distribution centers may include one or multiple launch pads for both UA takeoffs and landings depending on the frequency of UA operations. Figure 2 presents an example distribution center area plan for supporting only one airborne UA at time. Such facilities have a single launch pad for takeoffs

[4] Most of these documents have various markings indicating that that the contents are "Confidential & Proprietary". Only elements required to support the noise analysis methodology have been disclosed in this report.

and landings. Figure 3 presents an example distribution center area plan supporting two or more simultaneous airborne UAs. This example includes one launch pad that may be used for takeoffs and landings and multiple alternate landing pads. In addition to launch and landing pads, distribution centers include facilities for the crew to monitor and control the UAs, lineup positions where the UA batteries are charged and preparations are made for the next delivery, and areas where packages are accepted and sorted before loading into an UA.

After takeoff from the distribution center, the UA flies a network of defined flight paths from the distribution center to the intended delivery points that are developed on an "as-needed basis." As routes are developed, the UA navigates the same defined paths for both the outbound (distribution center to delivery) and inbound (post-delivery to landing) legs. Figure 4 provides an overview of a representative sample route system, including the distribution center, routes, and delivery points.

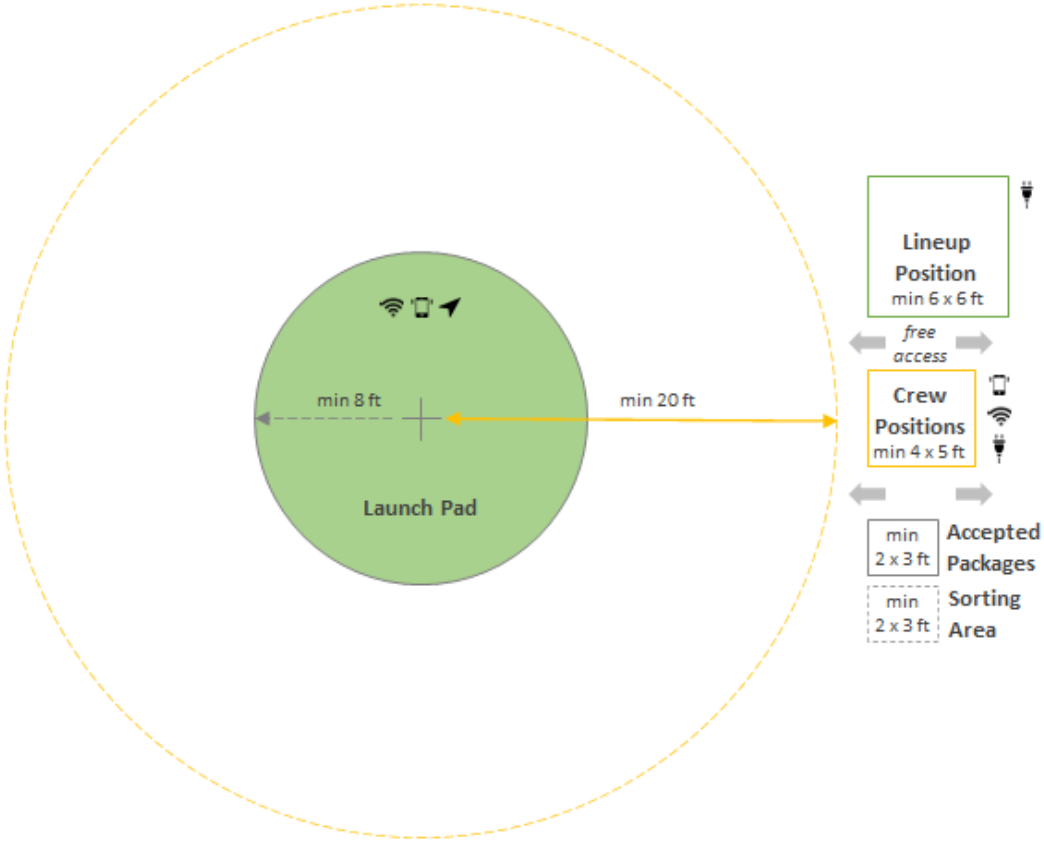

Figure 2: Distribution Center Area Plan for a Single Operating UA

Source: Causey, CONOPS July 19, 2021

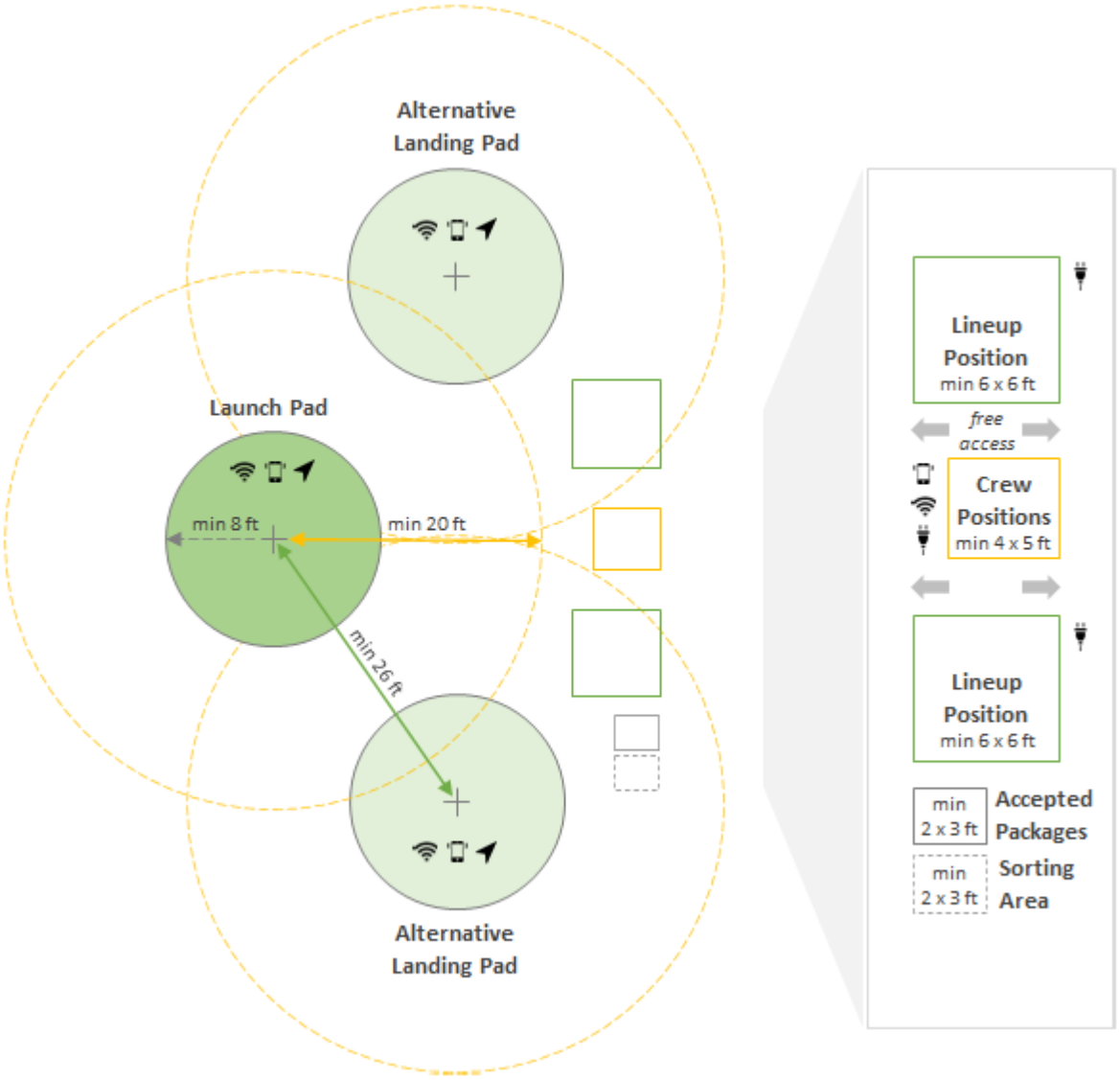

Figure 3: Distribution Center Area Plan with Two Simultaneous UAs Operating

Source: Causey, CONOPS July 19, 2021

Figure 3. Flight Network illustration. Flytrex GCS display, satellite view

-CONFIDENTIAL-

Description of Points 11

Center — Represents the Distribution Center location on the map.

Waypoint — Represents location on the route which the sUA passes through and makes a turn.

Semaphore — Represents points where the sUA can safely hover at lower altitudes and perform emergency landing if needed, without posing a risk to people or property on the ground.

Delivery point — Represents a safe location where the sUA can lower packages to the ground for delivery and delivery requests can be made to this point.

Figure 4: Visualization of a Route System

Source: Causey, CONOPS July 19, 2021

Analysis of flight profile data provided by Causey and the FAA Office of Environment and Energy described that a typical operation profile of the UA can be broken into five discrete flight phases. Table 1 describes the typical flight profile that Causey is expected to use for delivery operations and provides detail of the five flight phases of takeoff and climb; en route outbound; delivery; en route inbound; and descent and landing. The sub sections that follow provide a narrative description of each of the flight phases.

Table 1. Flytrex FTX-M600P Typical Flight Profiles

Source: FAA February 17, 2022 (Attachment A)

Flight Phase (General)	Flight Segment (Detail)	Weight	Altitude at Segment Start (ft)	Altitude at Segment End (ft)	Ground Speed	Duration
Takeoff and Climb	Takeoff	Maximum	0	33	0	5 seconds
	Internal checks	Maximum	33	33	0	3 seconds
	Climb to cruise altitude	Maximum	33	230	0	15 seconds
En route outbound	Cruise to delivery point	Maximum	230	230	29.2 kts	1-5 minutes
Delivery	Descent for delivery	Maximum	230	82	0	22 seconds
	Open doors, Await Customer Response and lower package to ground	Maximum	82	82	0	35 seconds
	Maneuver to Unhook Package	Maximum	82	75	0	4 seconds
	Maneuver to Unhook Package	Empty	75	82		4 seconds
	Climb back to cruise altitude	Empty	82	230	0	13 seconds
En route inbound	Cruise back to distribution center	Empty	230	230	29.2 kts	1-5 minutes
Descent and Landing	Descent	Empty	230	33	0	20 seconds
	Landing	Empty	33	0	0	20 seconds

2.1.2.1 Takeoff and Climb

The Takeoff and Climb phase is defined as the portion of flight in which a fully loaded UA takes off from its launch pad at a distribution center and climbs vertically to 33 feet AGL. The UA is assumed to be carrying a package and at the maximum weight of 33.4 pounds. The UA then conducts various systems checks in a hover at 33 feet AGL over the course of three seconds. If the UA passes its systems checks, the UA then climbs vertically from 33 feet AGL to 230 feet AGL over five seconds.

2.1.2.2 En Route Outbound

The En route Outbound phase is defined as the part of flight in which the fully loaded UA transits from the distribution center to delivery points on a pre-defined network of flight paths. During this flight phase, the UA will typically operate at an altitude of 230 feet AGL and a typical airspeed of 29 knots.[5] However, the UA may operate within a corridor with altitudes as low as 171 feet AGL or as high as 289 feet AGL as needed due to obstructions and operational conditions.[6]

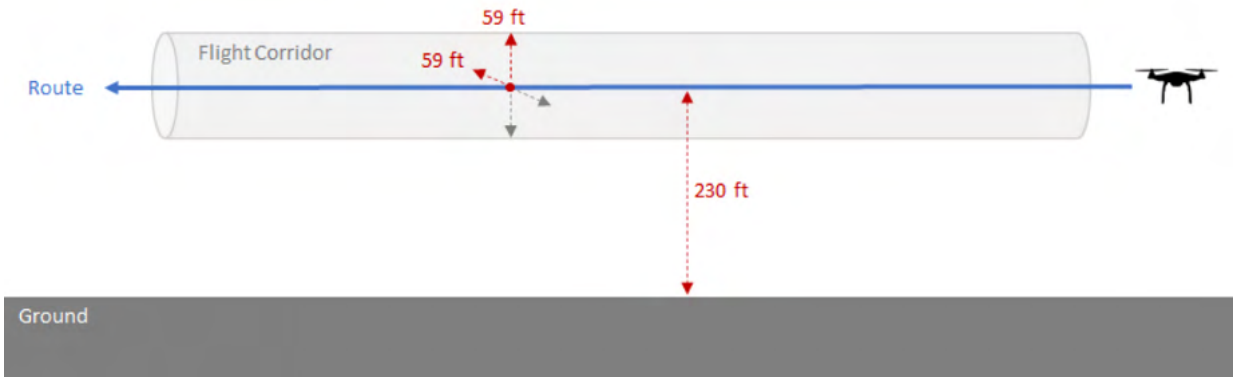

Figure 5: Flight Corridor

Source: Causey, CONOPS July 19, 2021

2.1.2.3 Delivery

The Delivery phase of flight is defined by descent from the En Route Outbound phase to a delivery point to deliver a package. This phase is assumed to start at maximum weight. The delivery point is a minimum 10 by 10-foot square area open to the sky, clear of obstacles, that is coordinated with the property owner and validated by Causey.[7]

During the delivery phase, the aircraft descends vertically from the en route altitude to 82 feet AGL. The UA then hovers at 82 feet AGL and waits for up to 15 seconds for confirmation of the delivery from the recipient. Once the recipient has communicated approval of the delivery, the UA continues to hover while it lowers the package to the ground by a tether (wire). Once the package is on the ground, the UA releases the package using the following maneuver, which takes approximately eight seconds. The UA descends vertically to 75 feet AGL, unhooks the tether from the package, returns to 82 feet AGL, and retracts the tether back into the UA. The UA then climbs at empty weight of 28.6 pounds vertically back to en route altitude at 230 feet AGL. The entire process starting with descent from en route altitude, package release, and returning to en route altitude, takes less than a minute and a half.

[5] Causey materials specify the speed as “33.6 mph (15m/s)" Speed in this memorandum is converted to knots.

[6] Causey, CONOPS July 19, 2021, pg. 15

[7] Causey, CONOPS July 19, 2021, pg. 21

2.1.2.4 En Route Inbound

Upon completion of a delivery, the UA will fly the en route inbound phase (or "return") via the reverse of the respective en route outbound profile (Section 2.1.2.2) from the delivery point back to the distribution center. The UA is assumed to be carrying no packages, and at empty weight, after delivery.

2.1.2.5 Descent and Landing

Upon reaching the distribution center, the UA will commence a vertical descent from 230 feet to 33 feet AGL over 20 seconds. The UA then descends vertically the remaining 33 feet to ground level over 20 seconds. Once on the ground, the UA stops its rotors and is retrieved by the ground crew.

2.2 Acoustical Data

Noise estimates for the UA were provided by the FAA Office of Environment and Energy representative of each phase of flight (takeoff and climb, en route, delivery, and descent and landing) as described in Section 2.1.2. The UA noise measurements were performed at a Causey facility near Liberty, North Carolina in July 2021. FAA analyzed the measurement data and summarized the acoustical data used in this report and included in Attachment A.

The following tables show the Sound Exposure Levels (SELs) used for this analysis as detailed in Attachment A, which can be matched to each flight phase detailed in Table 1.

Table 2 provides the estimated SEL for takeoff and climb associated with the flight phase described in Section 2.1.2.1. SEL in this table represents the aircraft starting from rest at the distribution center on the ground to climbing vertically to en route altitude. It does not include any horizontal/lateral flight.

Table 2. Estimate of SEL for Takeoff and Climb at Maximum Weight

Source: FAA February 17, 2022 (Attachment A)

Distance between Launch Pad and Receiver (ft) [a]	SEL (dB)
50	75.0
100	71.9
150	69.7
200	67.9
250	66.4
300	65.1
350	63.9
400	62.9
450	62.0
500	61.1

Note:
a) Distance is along ground from landing point (launch pad) to receiver.

Table 3 presents the en route sound exposure levels for maximum weight and empty weight. The maximum weight SELs are applicable for the UA carrying a package while flying outbound to a delivery point while the empty weight SEL is applicable for the UA flying inbound to the distribution center after the UA completes a delivery and/or is not carrying cargo, respectively. The estimates are based on measurements of the UA passing 216 feet above the microphone. FAA recommends that while the parameters for en route operation of the UA are typically at a speed of 29 knots and altitude of 230 feet AGL, the estimates derived from measurements at 216 feet AGL suggest that they should be used as is for the basis of any calculations.

Table 3. Estimates of En Route SEL

Source: FAA February 17, 2022 (Attachment A)

Configuration [a]	Applicable Flight Phase	Distance between Source and Microphone (ft)	SEL (dB)
Maximum	En route outbound	216	66.4
Empty	En route inbound	216	62.8
Note: a) Level flight at 29 knots			

Table 4 presents the SEL of the delivery profile discussed in Section 2.1.2.3. The SELs presented in the table are relative to the delivery point and can be applied radially/as a circle with the delivery point in the center. The values in Table 4 do not include the UA transiting to or from the delivery point at en route altitude.

Table 4. Estimate of SEL for Delivery Profile

Source: FAA February 17, 2022 (Attachment A)

Sideline Distance between Delivery Point and Receiver (ft)[a]	SEL [b] (dB)
0	81.0
50	79.7
100	77.3
150	75.1
200	73.3
250	71.7
300	70.3
350	69.1
400	68.1
450	67.1
500	66.2

Notes:
a) Distance is along ground from delivery point to receiver.
The distance of 0 feet represents a receiver directly underneath the UA.
b) Delivery profile as described in Table 1 Flight phases "Delivery – Maximum Weight" and "Delivery – Empty Weight", starting directly over delivery point at an altitude of 230 feet AGL, and remaining over the delivery point through descent, unhooking of the package, and climb back to an altitude of 230 feet AGL.

Table 5 presents the SEL associated with the descent from en route altitude to landing at the distribution center on the ground, as discussed in Section 2.1.2.5.

Table 5. Estimate of SEL for Descent and Landing at Empty Weight

Source: FAA February 17, 2022 (Attachment A)

Distance between Launch Pad and Receiver (ft) [a]	SEL (dB)
50	79.2
100	74.4
150	71.4
200	69.2
250	67.5
300	66.1
350	64.8
400	63.8
450	62.8
500	61.9

Note:
a) Distance is along ground from landing point (launch pad) to receiver.

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3 Methodology for Data Analysis

The previously described data sets were used to develop a method to estimate community noise exposure that could result from Causey delivery operations. These would be operations originating at a single distribution center within a proposed single area of operations, with each distribution center operating up to seven days a week with varying levels of daily and equivalent annual delivery operations. There are currently no standardized tools or processes in place to conduct a noise assessment for the proposed operational scenario and UA. HMMH, with detailed technical guidance from the FAA Office of Environment and Energy, developed a customized noise exposure prediction process based on the available data to conduct this analysis. The process was developed around FAA's understanding of typical use of the UA by Causey. The following subsections describe that noise analysis methodology.

3.1 Application of Operations

The DNL metric applies a 10 dB weighting for operations between 10 PM and 7 AM. The 10 dB weighing is mathematically equivalent to 10 times the number of operations. Therefore, the operations near point i can be weighted to develop a daytime equivalent number of operations ($N_{equiv,i}$). The generalized form is expressed in Equation (1).[8]

$$N_{Equiv,i} = W_{Day} \times N_{Day,i} + W_{Eve} \times N_{Eve,i} + W_{Night} \times N_{Night,i} \quad (1)$$

Where:

- $N_{Day,i}$ is the number of user-specified operations between 7 AM and 7 PM local time
- $N_{Eve,i}$ is the number of user-specified operations between 7 PM and 10 PM local time
- $N_{Night,i}$ is the number of user-specified operations between 10 PM and 7 AM local time
- W_{Day} is the day-time weighting factor, which is 1 operation for DNL
- W_{Eve} is the evening weighting factor, which is 1 operation for DNL
- W_{Night} is the night-time weighting factor, which is 10 operations for DNL

For the DNL metric, the number of DNL daytime equivalent operations, $N_{DNL,i}$ simplifies to

$$N_{DNL,i} = N_{Day,i} + N_{Eve,i} + 10 \times N_{Night,i} \quad (2)$$

In practice, Equation (2) can be further simplified by defining the user-defined operations between 7 AM and 10 PM as a single value, rather than tracking $N_{Day,i}$ and $N_{Eve,i}$ separately.

For the Community Noise Equivalent Level (CNEL) metric, which may be used in California, the number of CNEL daytime equivalent operations, $N_{CNEL,i}$ simplifies to:

[8] Equation (1) includes the three time periods of day, evening, night for consistency with other FAA documents that discuss the development of time averaging metrics such as DNL from individual SELs. Presentation of Equation (1) also allows the practitioner to modify this process for the CNEL metric for use in California.

$$N_{CNEL,i} = N_{Day,i} + 3 \times N_{Evening,i} + 10 \times N_{Night,i} \quad (3)$$

3.2 Distribution Center Infrastructure

As noted in Section 1 and Section 2.1.2, Causey operates UAs from a central distribution center. If the distribution center operates one UA, then it needs a single launch pad and landing pad. This launch pad must be at least sixteen feet wide with a protective radius of at least 20 feet around it. If the distribution center operates multiple UAs simultaneously, then it may need one launch pad and two landing pads. All three pads must be at least sixteen feet wide, with safety radii of at least forty feet between landing pads. The launch pad has a safety radius of twenty feet around it. The launch pad and alternate landing pads may be 10 feet apart from one another. The distribution center include facilities to recharge, pack, monitor, and prepare the UAs. For the purpose of this noise analysis methodology, the distribution center extents depicted in Figure 2 and Figure 3 refer to the portion of the property in which the launch and landing pads could be positioned depending on the frequency of UA operations, as appropriate. The distribution center extents for the noise analysis shall be a rectangle, circle, or other polygon that includes all the possible locations for the launch and landing pads.

3.3 Application of Acoustical Data

The Day-Night Average Sound Levels (DNLs) can be estimated with a summation of the SELs. SEL values for the UA and Causey operations covered in this report are detailed in the FAA's February 17, 2022 Memorandum and provided with this report as Attachment A.

For the purpose of calculating SEL, four specific activities are considered:

- The UA taking off from the distribution center;
- En route travel of the UA between the distribution center, the delivery point, and return;
- Delivery maneuvers of the UA at the delivery point; and
- Landing related activities of the UA at the distribution center.

3.3.1 General Assumptions

This analysis is based on the tables presented in Section 2.2. Table 2, Table 4, and Table 5 present noise exposure values at discrete distances in 50 foot increments relative to the UA's vertical profile from 0 to 500 feet for delivery, and 50 to 500 feet for takeoff and landing, respectively. If additional values between 0 to 500 feet are needed for delivery, or 50 to 500 feet for takeoff or landing, then SEL values at intermediary distances can be approximated by linear interpolation. In most cases, this should yield slightly conservative (higher) values compared to revisiting the FAA's detailed process. SEL values at distances less than 50 feet for takeoff or landing should not be extrapolated from the tables because the deviation of the method of estimation from the linearly extrapolated value increases closer to the source.

3.3.2 Takeoff and Climb

The available sound exposure levels for takeoff and climb are presented in Section 2.2 and specifically in Table 2, for the takeoff and climb profile described in Section 2.1.2.1. It should be noted that the SEL values provided only include climb to altitude and do not include horizontal flight that would occur after climb. As noted in Section 3.3.1, the values in Table 2 should only be used for distances between the launch pad at a distribution center and the receiver for distances of 50 feet to 500 feet.

Application of the SEL should be based on the position of the launch pad at a distribution center. If the exact location of the launch pad is not known, then using an outer boundary of the distribution center would be slightly conservative.

3.3.3 En Route

Flight of the aircraft in still air is anticipated to be typically 29 knots, with a typical altitude of 230 feet AGL. However, the CONOPs indicates that the aircraft could be +/- 59 feet relative to the typical 230 feet AGL. Sound exposure level for a given point i (SEL_i) with the aircraft flying directly overhead at altitude (Alt_i) in feet and a ground speed (V_i) in knots, will be calculated based on the guidance in *14 CFR Part 36 Appendix J, Section J36.205 Detailed Data Correction Procedures*.[9] It should be noted that the equations presented in this Section are only applicable for an aircraft that is moving relative to a stationary receptor.

In particular, the sound exposure level adjustment for the altitude defined in 14 CFR Part 36 for a moving aircraft, is presented here as Equation (4).

$$\Delta J_1 = 12.5 \times log_{10}\left(\frac{H_A}{H_T}\right), dB \quad (4)$$

where ΔJ_1 is the quantity in decibels that must be algebraically added to the measured SEL to adjust for a level flight path at an altitude differing from the measured altitude; H_A is the height, in feet, of the vehicle when directly over the noise measurement point; H_T is the height of the vehicle during the measurement (or reference height), and the constant (12.5) accounts for the effects on spherical spreading and duration from the off-reference altitude.

The sound exposure level adjustment for speed, as defined in 14 CFR Part 36, is presented here as Equation (5).

$$\Delta J_3 = 10 \times log_{10}\left(\frac{V_{RA}}{V_R}\right), dB \quad (5)$$

Where ΔJ_3 is the quantity in decibels that must be algebraically added to the measured SEL noise level to correct for the influence of the adjustment of the reference speed on the duration of the measured flyover event as perceived at the noise measurement station, V_R is the reference speed, and V_{RA} is the adjusted speed.

To estimate the SEL of the UA flying en route the measured SEL made during delivery will be used. As shown in Table 3, the SEL is 66.4 dB when the vehicle is at maximum weight, at 216 feet from the sound

[9] 14 CFR Part 36 Noise Standards: Aircraft Type And Airworthiness Certification available at https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-36

receiver and traveling at approximately 29 knots; therefore, adapting that to the maximum weight (outbound) en route condition when the UA is flying at an altitude of Alt_i feet AGL and ground speed of V_i knots can be made using Equation (6) to arrive at an estimate $SEL_{maximum\ weight}$ dB for that respective phase of flight.

$$SEL_{maximum\ weight} = 66.4 + 12.5 \times log_{10}\left(\frac{216}{Alt_i}\right) + 10 \times log_{10}\left(\frac{29}{V_i}\right), dB \quad (6)$$

The SEL for en route conditions inbound at empty weight can also be calculated using the values in Table 3. Equation (7) presents the calculation for en route conditions at empty weight.

$$SEL_{empty\ weight} = 62.8 + 12.5 \times log_{10}\left(\frac{216}{Alt_i}\right) + 10 \times log_{10}\left(\frac{29}{V_i}\right), dB \quad (7)$$

3.3.4 Delivery

The available SELs for delivery are presented in Section 2.2 and specifically in Table 4, for the delivery profile described in Section 2.1.2.3. It should be noted that the SEL values provided only include descent from en route to delivery altitude, various maneuvers associated with the delivery, and climb back to en route altitude. The SEL values do not include the noise contribution from the horizontal en route portion of the flight connecting the distribution center to the delivery point. As noted in Section 3.3.1, the values in Table 4 should only be used for distances between the launch pad and the receiver for distances between 0 to 500 feet.

3.3.5 Descent and Landing

The available SELs for descent and landing are presented in Section 2.2 and specifically in Table 5, for the descent and landing profile described in Section 2.1.2.5. It should be noted that the SEL values provided only include descent from en route altitude and do not include horizontal flight that would occur as the UA approached the landing at a distribution center. As noted in Section 3.3.1, the values in Table 5 should only be used for distances between the landing site at the distribution center and the receiver for distances of 50 feet to 500 feet.

Application of the SEL should be based on the position of the closest landing pad at the distribution center. If the exact location of the landing pads are not known, then using an outer boundary of the distribution center extents would be slightly conservative.

3.4 Proposed DNL Estimation Methodology

The number of operations overflying a particular receiver's location on the ground will vary based on the proposed operating area and demand. For a given receiver location *i*, and a single instance of sound source *A*, the SEL for that sound source SEL_{iA} is (energy) summed for the average annual daily number of DNL daytime equivalent operations ($N_{DNL,iA}$) to compute the DNL, or equivalently, by Equation (8).

$$DNL_{iA} = SEL_{iA} + 10 \times log_{10}(N_{DNL,iA}) - 49.4, (dB) \quad (8)$$

The above equation applies to an SEL value representing one noise source such as an UA takeoff or an UA landing. For cases where a particular receiver would be exposed to multiple sound sources (A through Z), the complete DNL at that point would be calculated with Equation (9).

$$DNL_i = 10 \times log_{10}\left(10^{\left(\frac{DNL_{iA}}{10}\right)} + 10^{\left(\frac{DNL_{i\,B}}{10}\right)} + \cdots + 10^{\left(\frac{DNL_{iZ}}{10}\right)}\right), (dB) \quad (9)$$

For each of the conditions presented below, results will be presented in tabular format with the estimated DNL.

3.4.1 DNL for Distribution Center

The takeoff and landing operations are anticipated to occur at the same location. Therefore, the results for both will be calculated for a single set of receptors. Operations will be assumed to be "head-to-head" in which case the takeoff and the landing flight paths will be the same.

Takeoff operations will be represented by two sound levels. First, aircraft will take off and climb to en route altitude with the relationship discussed in Section 3.3.2. Second, the UA will begin en route flight at maximum weight towards its first waypoint or semaphore[10] assuming that the UA will pass directly over the representative receiver using the relationship in Section 3.3.3.

Landing operations will be represented by two sound levels. First, the UA will fly to the distribution center from its last waypoint or semaphore at en route altitude and empty weight (Section 3.3.3). Second, the UA will descend from en route altitude to the ground and come to rest, which will be represented by the relationships defined in 3.3.5.

The four noise sources representing the complete takeoff and landing cycle associated with a single delivery departing and returning at the distribution center will be added together with Equation (9).

3.4.2 DNL for En Route

En route includes the UA flying to and from the distribution center to delivery points as discussed in Section 2.1.2.2 and 2.1.2.4 respectively. A representative receiver will be positioned directly under the flight path, and the DNL will be calculated based on the altitude and speed-adjusted delivery SEL calculated in Section 3.3.3. Operations will be based on representative numbers defined in relevant materials and generally assume that a receiver under the flight path will be overflown by the UA while it is traveling both outbound at maximum weight and inbound at empty weight for a single delivery. The en route outbound noise level and the en route inbound noise level will be added together with Equation (9).

3.4.3 DNL for Delivery Points

Delivery operations will be represented by a single sound level consisting of the UA starting at en route altitude, descending vertically over the delivery point at maximum weight and performing the delivery

[10] As presented in Figure 4, a semaphore is defined as a point where the UA can safely hover at lower altitudes and perform an emergency landing on an as needed basis without posing risks to people or property on the ground. A waypoint is defined as a location along a route from which the UA will pass and make a turn.

profile over the delivery point, and then ascending vertically over the delivery point at empty weight and returning to en route altitude (Section 3.3.4).

Use of the DNL Delivery, by itself, does not include the horizontal flight as the UA approaches the delivery point with the package or the horizontal flight as the UA leaves the delivery point after releasing the package. The FAA's envisioned use of this report is that the user will add the DNL Delivery to the appropriate en route DNL values with Equation (9). To assist simple conservative analyses, the results of DNL Delivery will also be presented with conservative en route approach and departure from the delivery point.

4 Noise Exposure Estimate Results

This section presents the estimated noise exposure for Causey's proposed operations for a given set of average annual day (AAD) deliveries. The values presented are in tabular format and use of the table requires estimating the number of DNL Equivalent deliveries associated with the distribution center. One delivery includes the outbound takeoff and inbound landing and is representative of two operations. The DNL Equivalent deliveries, $N_{DNL,i}$ as described in 3.1, is presented below as Equation (10).

$$Deliveries_{DNL,i} = Deliveries_{Day} + 10 \times Deliveries_{Night} \quad (10)$$

$Deliveries_{Day}$ are between 7 AM and 10 PM and $Deliveries_{Night}$ are 10 PM and 7 AM.[11] If a portion of a delivery occurs in the nighttime hours (either takeoff or landing) then it should be counted within $Deliveries_{Night}$.

For estimating noise exposure, the noise levels for each flight phase should be considered separate based on the level of proposed operations for a given location. If a particular location is at the transition of different flight phases, the cumulative noise should then be determined by adding the noise from each phase. For example a typical mission profile will include noise from multiple flight phases:

1. UA departure from and return to a distribution center;
2. En route flight at a defined altitude to and from a distribution center to a delivery point; and
3. Descent from en route flight to complete a delivery at the delivery point and ascent back to en route altitude for return to the distribution center.

The cumulative noise from the UA is then determined by adding the noise from each of these phases.

4.1 Noise Exposure for Operations at the Distribution Center

For operations at the distribution center, the UA-related noises include the takeoff and landing. To provide a conservative view, all operations are assumed to be on the same flight path operating in opposite directions.

Table 6 presents data for a given number of daily average DNL Equivalent deliveries (including the takeoff and climb, en route outbound, en route inbound, and descent and landing as detailed in Section 2.1.2), the estimated extent of DNL 45 dB, 50 dB, 55 dB, 60 dB, and 65 dB contours under the flight path for a distribution center extents as described in Section 3.2. The analyses presented in Table 6 were rounded up conservatively to the nearest 50 ft intervals out to 500 feet using the data from Section 2.2. The actual noise levels, should they be calculated with greater precision or measured, are anticipated to be within the estimated extents depicted.[12]

[11] Discussion of modification of this process for use in California with the CNEL metric is discussed in Section 3.1.

[12] The calculation of the equations presented in Section 3 require that distance is provided. The DNL levels were calculated at 50-foot intervals from 50 to 500 ft as provided in Section 2.2. The interval of 50 feet was selected as it represented the smallest distance for which measurement data was available for the UA.

Table 6. Estimated Extent of Noise Exposure from Distribution Center per Number of Deliveries

Number of DNL Equivalent Deliveries Served by Distribution Center		Estimated Extents, feet, for				
Average Daily	Annual	DNL 45 dB	DNL 50 dB	DNL 55 dB	DNL 60 dB	DNL 65 dB
<= 1	<= 365	50	50	50	50	50
<= 5	<= 1,825	50	50	50	50	50
<= 10	<= 3,650	50	50	50	50	50
<= 15	<= 5,475	50	50	50	50	50
<= 20	<= 7,300	50	50	50	50	50
<= 40	<= 14,600	100	50	50	50	50
<= 60	<= 21,900	150	50	50	50	50
<= 80	<= 29,200	150	100	50	50	50
<= 100	<= 36,500	200	100	50	50	50
<= 120	<= 43,800	200	100	50	50	50
<= 140	<= 51,100	250	100	50	50	50
<= 160	<= 58,400	250	100	50	50	50
<= 180	<= 65,700	300	150	50	50	50
<= 200	<= 73,000	300	150	50	50	50
<= 220	<= 80,300	350	150	50	50	50
<= 240	<= 87,600	400	150	100	50	50
<= 260	<= 94,900	450	150	100	50	50
<= 280	<= 102,200	500	150	100	50	50
<= 300	<= 109,500	Note c	200	100	50	50
<= 340	<= 124,100	Note c	200	100	50	50
<= 360	<= 131,400	Note c	200	100	50	50
<= 380	<= 138,700	Note c	200	100	50	50
<= 400	<= 146,000	Note c	200	100	50	50
<= 420	<= 153,300	Note c	250	100	50	50
<= 440	<= 160,600	Note c	250	100	50	50
<= 460	<= 167,900	Note c	250	100	50	50
<= 480	<= 175,200	Note c	250	100	50	50
<= 500	<= 182,500	Note c	250	100	50	50

Notes:
a) One delivery includes the outbound takeoff and inbound landing and is representative of two operations.
b) If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL Equivalent deliveries, use the entry for 60 average daily DNL Equivalent deliveries.
c) The extents of the 45 dB DNL extents are more than 500 feet based on the level of operations specified as the aircraft continues along its flight path. En route results may be more applicable in these instances for determining noise levels.

4.2 Noise Exposure under En Route Paths

For en route conditions, the UA is expected to fly the same outbound flight path between the distribution center and the delivery point and inbound flight path back to the distribution center (Section 3.4.3). Therefore, each location under the en route path would be overflown twice for each delivery served by the respective overhead en route path.

Table 7 the estimated DNL for a location on the ground directly under an en route path for various counts of daily average DNL Equivalent deliveries. The en route noise calculated for each delivery includes both the inbound and outbound traversal of the en route path.

Table 7. Estimated DNL Directly Under En Route Flight Paths at Various Altitudes

Number of DNL Equivalent Deliveries Served by Route		Estimated DNL for		
Average Daily	Annual	Altitude 171 feet AGL	Altitude 216 feet AGL	Altitude 289 feet AGL
<= 1	<= 365	19.9	18.6	17.0
<= 5	<= 1,825	26.9	25.6	24.0
<= 10	<= 3,650	29.9	28.6	27.0
<= 15	<= 5,475	31.6	30.4	28.8
<= 20	<= 7,300	32.9	31.6	30.0
<= 40	<= 14,600	35.9	34.6	33.0
<= 60	<= 21,900	37.7	36.4	34.8
<= 80	<= 29,200	38.9	37.6	36.1
<= 100	<= 36,500	39.9	38.6	37.0
<= 120	<= 43,800	40.7	39.4	37.8
<= 140	<= 51,100	41.3	40.1	38.5
<= 160	<= 58,400	41.9	40.6	39.1
<= 180	<= 65,700	42.4	41.2	39.6
<= 200	<= 73,000	42.9	41.6	40.0
<= 220	<= 80,300	43.3	42.0	40.5
<= 240	<= 87,600	43.7	42.4	40.8
<= 260	<= 94,900	44.0	42.8	41.2
<= 280	<= 102,200	44.3	43.1	41.5
<= 300	<= 109,500	44.6	43.4	41.8
<= 340	<= 124,100	45.2	43.9	42.3
<= 360	<= 131,400	45.4	44.2	42.6
<= 380	<= 138,700	45.7	44.4	42.8
<= 400	<= 146,000	45.9	44.6	43.0
<= 420	<= 153,300	46.1	44.8	43.3
<= 440	<= 160,600	46.3	45.0	43.5
<= 460	<= 167,900	46.5	45.2	43.7
<= 480	<= 175,200	46.7	45.4	43.8
<= 500	<= 182,500	46.9	45.6	44.0

Notes:
a) One delivery includes an outbound operation and inbound operation along the same flight path, thus two overflights.
b) If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily deliveries, use the entry for 60 average daily deliveries.
c) If a value for altitude is not specifically defined in this table, use the next lowest value. For example, if the UA is anticipated to operate at an altitude of 190 ft AGL use the entry for 171 ft AGL.

In some instances, the UA may overfly locations at operations levels that may differ from both an inbound and outbound traversal of the en route path by the UA as described above and presented in Table 7. For these circumstances, Table 8 presents the equations for calculating the estimated DNL for a receiver directly under a specified given number of DNL Equivalent average daily individual overflights, defined as N_o.

Table 8. Estimated DNL Directly Under Overflights, Maximum and Empty Weight

Altitude, speed and configuration of Overflight and of Delivery		SEL for 1 Overflight (dB)	DNL for 1 Overflight between 7 AM and 10 PM (dB)	DNL equation for the number of DNL Equivalent Overflights
Altitude	Weight			
171 feet AGL	Empty	64.1	14.7	$10 \times \log_{10}(N_o) + 14.7$
171 feet AGL	Maximum	67.7	18.3	$10 \times \log_{10}(N_o) + 18.3$
230 feet AGL	Empty	62.8	13.4	$10 \times \log_{10}(N_o) + 13.4$
230 feet AGL	Maximum	66.4	17.0	$10 \times \log_{10}(N_o) + 17.0$
289 feet AGL	Empty	61.2	11.9	$10 \times \log_{10}(N_o) + 11.9$
289 feet AGL	Maximum	64.8	15.5	$10 \times \log_{10}(N_o) + 15.5$

Notes:
a) The DNL value for a given number of average DNL Equivalent Operations, N_o, can be found by using the equations associated with operation of the UA at a specified altitude and speed interval. In this case, one operation represents a single overflight.
b) If a value for altitude or speed is not specifically defined in this table, use the next lowest value. For example, if the UA is anticipated to operate at an altitude of 190 ft AGL, use the entry for 171 ft AGL.

4.3 Noise Exposure for Operations at Delivery Point

Table 9 presents the estimated DNL values for a range of potential daily average DNL Equivalent delivery counts at a delivery point. Only the partial DNL values associated with the delivery vertical flight maneuvers are presented. Also included in Table 9 is the equation for calculating the estimated DNL for a specific number of daily average DNL Equivalent delivery counts at a delivery point, defined as N_d, for instances where the number of deliveries may fall between the range of presented delivery count intervals.

In anticipated use, the value from Table 9 would be added using Equation (9) to the appropriate values from Table 7 for an UA flying to and from the delivery point at en route altitude, along with any other nearby en route operations.

Table 9. Estimated DNL at Delivery Point for Vertical Maneuvers

Number of DNL Equivalent Deliveries		Partial Estimated Delivery DNL of Vertical Maneuvers
Average Daily	Annual	Estimated DNL (dB)
<= 1	<= 365	31.7
<= 5	<= 1,825	38.7
<= 10	<= 3,650	41.7
<= 15	<= 5,475	43.4
<= 20	<= 7,300	44.7
<= 40	<= 14,600	47.7
<= 60	<= 21,900	49.5
<= 80	<= 29,200	50.7
<= 100	<= 36,500	51.7
<= 120	<= 43,800	52.5
<= 140	<= 51,100	53.1
<= 160	<= 58,400	53.7
<= 180	<= 65,700	54.2
<= 200	<= 73,000	54.7
<= 220	<= 80,300	55.1
<= 240	<= 87,600	55.5
<= 260	<= 94,900	55.8
<= 280	<= 102,200	56.2
<= 300	<= 109,500	56.5
<= 340	<= 124,100	57.0
<= 360	<= 131,400	57.2
<= 380	<= 138,700	57.5
<= 400	<= 146,000	57.7
<= 420	<= 153,300	57.9
<= 440	<= 160,600	58.1
<= 460	<= 167,900	58.3
<= 480	<= 175,200	58.5
<= 500	<= 182,500	58.7
N_d	$N_d \, x \, 365$	$10 \times \log_{10}(N_d) + 31.7$

Notes:
a) The DNL values presented in this table only reflect the UA conducting vertical flight maneuvers associated with a delivery. DNL values associated with en route flight to and from a distribution center to a delivery point associated with a delivery, or nearby en route overflights, should be added to these values utilizing the DNL levels presented in Table 7.
b) If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL Equivalent deliveries, use the entry for 60 average daily DNL Equivalent deliveries.

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Attachment A

Federal Aviation Administration

Memorandum

Date: February 17, 2022

To: Donald Scata, Manager, Noise Division, Office of Environment and Energy (AEE-100)

From: Chris Hobbs, General Engineer, Noise Division, Office of Environment and Energy (AEE-100)

Subject: Estimated Noise Levels for Flytrex FTXM600P UA

This document presents an analysis of noise measurements of the Flytrex FTXM600P Unmanned Aircraft (UA) by the FAA's Office of Environment and Energy (AEE), recorded in July 2021 at Causey Airfield (Causey) near Liberty, North Carolina. The purpose of the analysis is to provide estimates of expected sound exposure levels resulting from typical operations of the FTXM600P UA[1] by Causey Aviation Unmanned and provides the methods used to create the noise estimates.

1. Flight Profile and Segment Noise

The phases of a typical flight profile from takeoff to landing with an included delivery are listed in Table 1 for the FTXM600P UA. Because the noise level of the UA for a given speed varies with weight, the aircraft configuration lists the vehicle weight for each phase of flight. The noise measurements at Causey were made with the UA at its maximum takeoff weight (33.4 lbs/15.1kg) and empty weight (26.8 lbs/12.2 kg). The measurements showed that noise from the vehicle was greatest at maximum takeoff weight for all phases of flight; thus, using the maximum weight for phases of flight where the UA is carrying a package is a conservative estimate of the vehicle noise for that phase of flight as compared to the UA carrying a lighter package.

[1] M. James et al., "Causey UAS Acoustic Measurement," Technical Report 21-05, Blue Ridge Research and Consulting, LLC, 23 September 2021.

Table 1. Phases of Flight for Typical Flight Profile of FTXM600P UA

Phase of Flight	Description	Configuration
Takeoff	Launch from ground to operational altitude (230 ft)	Max weight (carrying package for delivery)
En Route to Delivery	Flying at operational altitude and cruise speed (29 kts)	Max weight
Delivery	Vertical descent from operational altitude to delivery height; Delivery of package; Vertical ascent to operational altitude	Max weight on descent/empty weight on ascent
En Route from Delivery	Flying at operational altitude and cruise speed	Empty weight
Landing	Land by vertical descent from operational altitude	Empty weight

The method used to estimate the noise on the ground during each phase of flight is listed below followed by suggestions on how to combine them for a representative estimate of the entire flight. The methodology presented for estimating the noise for each flight phase was chosen based on a comparison of the calculated noise estimates by AEE against the measurement data for each flight phase and determined to be an appropriate and conservative estimate based on available data received by AEE to date for the of the FTXM600P UA. The information detailing the flight profile was provided to the FAA via letter exchanges[2].

1.1. Takeoff Noise

The profile of the FTXM600P UA climbing to an operational altitude of 230 ft above ground level is detailed in Table 2. Following is the method used to estimate the sound exposure level (L_{AE}) of this part of the flight profile.

Table 2. FTXM600P UA Takeoff Profile Details

Flight Segment	Altitude (ft AGL)	Ground Speed (kts)	Duration (s)
Takeoff	0 ascend to 33	0	5
Internal Checks	Hover at 33	0	3
Climb to Operational Altitude	33 ascend to 230	0	15

Measurements of the noise emissions of the FTXM600P UA were made when it was at maximum weight and hovering 50 feet AGL above the ring of ground microphones shown in Fig. 1. Each recording lasted for 30 seconds and began after the UA was in a steady condition.

[2]Causey Letter Exchange UA_P135_Environmental_Analysis_FAA_AEE_Operational_Data_Needs_Causey_20211130.pdf, 15 December 2021.

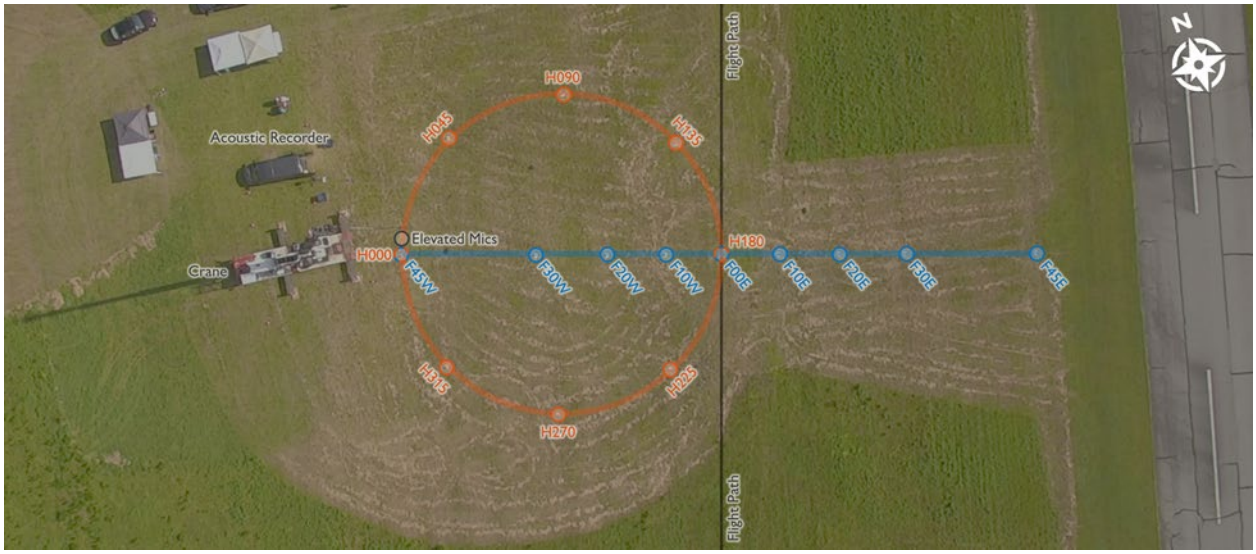


Figure 1. Microphone locations for hover measurements shown in orange when FTXM600P UA hovered above the origin.

The average sound pressure level was calculated at each of the microphones for five separate recordings. The average sound pressure level was normalized to a distance of 70.7 ft using spherical spreading from the actual distance from the FTXM600P UA to each microphone and corrected by 6 dB because all the microphones used were on ground boards. The results from one of the five recordings were discarded and the remaining four were averaged to generate the results as presented in Table 3. It is important to note that these measurements are all at the same relative angle from the bottom of the UA. It is expected that this is a conservative estimate of the noise due to the fact that broadband noise from the rotors is being captured; whereas, the noise emitted closer to the plane of the rotors would be dominated by blade passage frequency which is lower than the broadband frequency range and would consequently have a lower A-weighted sound level.

Table 3. Average Sound Pressure Level of FTXM600P UA while Hovering

Sound Pressure Level (dBA)	Distance (ft)	Aircraft Configuration
64.9	70.7	Maximum Weight
63.1	70.7	Empty Weight

In order to estimate the noise levels from the UA, the following assumptions have been made.

Sound transmission between the noise source and the receiver is solely a function of distance with no additional atmospheric attenuation or ground effects.

In this analysis, the levels in Table 3 represent reference sound pressure levels measured at reference distances for each weight configuration of the UA. Those reference levels will be adjusted for spherical spreading to develop the levels at other distances for each configuration of the aircraft. For a stationary point source, the spherical spreading relationship of the sound pressure level (L_i) at distance D_i from the reference sound pressure level (L_R) measured at a reference distance D_R is given by Eq. 1.

$$L_i = L_R + 20\ \log_{10}\left(\frac{D_R}{D_i}\right), dB \qquad (1)$$

Sound transmits equally in all directions.

The levels in Table 3 are based on the measurement locations depicted in Figure 1 while the UA was hovering at approximately 50 ft AGL. The assumption that the UA is an omnidirectional sound source implies that the same sound levels would have been measured at any point on the surface of a sphere centered on the UA.

To estimate the sound exposure level of the takeoff segment of a flight, the takeoff path from ground to an operational height of 230 ft AGL is evenly divided into stations (blue ovals) as illustrated in Figure 2. The hover noise level noted in Table 3 is spherically spread from each station to a point on the ground a fixed distance from the takeoff point. Using the total takeoff duration of 23 seconds from Table 2, the sound exposure level is calculated assuming the UA spent equal amounts of time at each station. The brief hover time at 33 ft AGL is accounted for in this estimation as the first hover station is set to 33 ft AGL and the duration at each of the seven stations is approximately three seconds. Based on examination of the measured data during simulated takeoffs the duration of the climb from ground to operational height is best represented by a continuous climb with the duration of the entire climb divided into even intervals at each station.

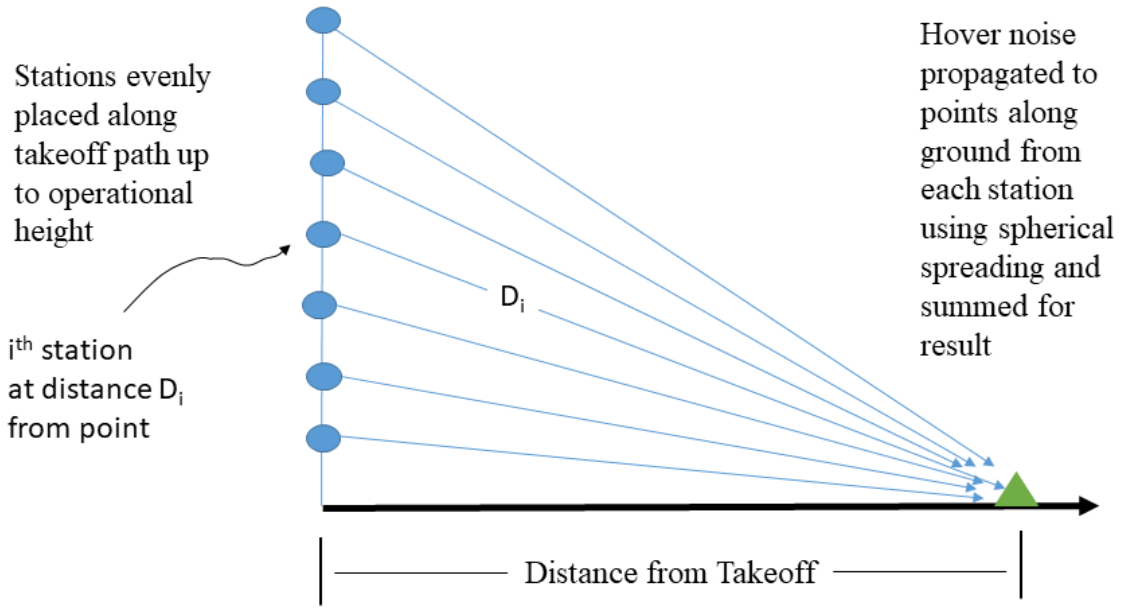


Figure 2. Graphical representation of how hover noise is used to simulate takeoff noise.

The sound exposure level ($L_{AEi}(r)$) as a function of distance from takeoff (r) from the UA at the i^{th} station shown in the figure is the product of the acoustic energy calculated from the Sound Pressure Level (L_i) spherically spread to a distance D_i using Equation 1 and the duration dt (~ 3 s) as given in the following equation:

$$L_{AEi}(r) = 10\log_{10}\left(10^{(.1L_i)}dt\right), \text{dB} \quad (2)$$

To calculate the sound exposure level for the entire takeoff at the distance from takeoff, r, one need only sum the levels calculated from each station according to Equation 3.

$$L_{AE}(r) = 10\log_{10}\left(\sum_{i}^{n} 10^{.1L_{AEi}(r)}\right), dB \quad (3)$$

Where *n* = number of stations used to simulate the takeoff.

The results of the computations using the 7 stations shown in Figure 2 are presented in Table 4.

Table 4. Estimate of Sound Exposure Level for Takeoff of FTXM600P UA at Maximum Weight

Distance from Takeoff (ft)	L_{AE} (dBA)
50	75.0
100	71.9
150	69.7
200	67.9
250	66.4
300	65.1
350	63.9
400	62.9
450	62.0
500	61.1

1.2. En Route Noise at Maximum and Empty Weights

The FTXM600P UA was measured flying at a cruise speed of 29 kts at an average altitude of 216 ft AGL both at max weight and empty weight over the array pictured in Figure 1. The average of the metrics measured for all the passes over the F00E microphone (undertrack) going both upwind and downwind are listed in Table 5. A 6 dB correction was made to the average because the microphone was on a ground board; thus, no attempt is being made to account for ground reflection at an observer's ear above the ground. While the parameters for en route operation of the FTXM600P UA are at a speed of 29 kts and altitude of 230 ft AGL, it is suggested that the measured metrics be used as is for the basis of any calculations.

Table 5. Estimates of En Route Noise of FTXM600P UA

Aircraft Configuration	Ground Speed (kts)	Altitude (ft AGL)	L_{AE} (dBA)
Max Weight	29	216	66.4
Empty Weight	29	216	62.8

1.3. Delivery Noise

The parameters for the delivery portion of a typical flight profile for the FTXM600P UA are included in Table 6. The ground speed is 0 kts for all flight segments. The noise for each segment listed in the table is modeled in similar fashion as the takeoff portion of the flight profile; each ascent and descent was divided into stations along the path; the hover portions of the profile were modeled with the vehicle at one location for the duration of the hover; and the sound pressure level was estimated at points along the ground using the appropriate aircraft configuration as presented in Table 3. The duration for each segment was used to sum the energy to get the sound exposure level for that segment at that point along the ground. All segments were added to get the sound exposure level as a function of distance along the ground from the delivery point as presented in Table 7. The same equations used and methodology applied for the takeoff portion of the profile were applied in this estimate of the delivery noise as a function of distance from the delivery point on the ground. The hover condition was modeled due to the extended time at that part of the profile.

Table 6. FTXM600P UA Delivery Profile Details

Flight Segment	Altitude (ft AGL)	Aircraft Configuration	Duration (s)
Descent for Delivery	230 descend to 82	Max Weight	22
Open Doors, Await Customer Response, and Lower Package	Hover at 82	Max Weight	35
Maneuver to Unhook Package	82 descent to 75 then ascend to 82	Max for Descent/Empty for Ascent	8
Ascend to Operational Height	82 ascend to 230	Empty Weight	13

Table 7. Estimate of Sound Exposure Level for Delivery Profile of FTXM600P UA

Distance from Delivery (ft)	L_{AE} (dBA)
0	81.0
50	79.7
100	77.3
150	75.1
200	73.3
250	71.7
300	70.3
350	69.1
400	68.1
450	67.1
500	66.2
Note: 0 feet represents a receiver directly underneath the UA.	

1.4. Landing Noise

The profile of the FTXM600P UA descending from an operational altitude of 230 ft AGL is detailed in Table 8. Because the UA spends half the descent time between 33 ft AGL and the ground, the modeling of the landing was done in the same manner as the takeoff for both flight segments separately and summed together to generate the final estimated noise level as presented in Table 9.

Table 8. FTXM600P UA Landing Profile Details

Flight Segment	Altitude (ft)	Ground Speed (kts)	Duration (s)
Descent	230 descend to 33	0	20
Landing	33 descend to 0	0	20

Table 9. Estimate of Sound Exposure Level for Landing of FTXM600P UA at Empty Weight

Distance Landing (ft)	L_{AE} (dBA)
50	79.2
100	74.4
150	71.4
200	69.2
250	67.5
300	66.1
350	64.8
400	63.8
450	62.8
500	61.9

2. Conclusion

The information and noise levels presented in this document represent conservative estimates of the noise made by the FTXM600P UA during each segment of a typical flight profile. In order to get the sound exposure level at any point on the ground, a calculation of the contributions from each flight segment should be combined to arrive at a final estimate of cumulative noise exposure. In order to calculate the maximum sound level from the takeoff, delivery, or landing portions of the flight profile, it is recommended that the sound pressure level from the appropriate aircraft configuration be used at the lowest altitude of the flight segment. Due to the directivity of the source and the excessive attenuation of ground to ground propagation this estimate of the sound exposure level will most likely be an over estimate, but this is conservative and appropriate for use in estimating noise exposure. Although further analysis of the measurements of the UA will be forthcoming and may change the estimates as presented in the document; the estimates presented here represent the most appropriate, conservative estimates of the noise based on comparison of the estimates to available measurement data received by AEE to date and can be used with confidence in conjunction with developing a generalized methodology for noise estimates of proposed Causey Unmanned operations using the FTXM600P UA.

Appendix D

Non-Standard Noise Methodology Memos

Federal Aviation Administration

Memorandum

Date: March 24, 2022

To: Don Scata, Noise Division Manager, Office of Environment and Energy (AEE-100)

From: Mike Millard, Flight Standards (AFS), General Aviation Operations Branch, AFS-830
MICHAEL JAY MILLARD Digitally signed by MICHAEL JAY MILLARD Date: 2022.03.24 13:33:51 -04'00'

Subject: Environmental Assessment (EA) Noise Methodology Approval Request for Causey Aviation Unmanned, Inc. Commercial Package Delivery Operations with the Flytrex FTX-M600P UA from Fayetteville, Holy Springs, Pinehurst and Raeford, NC

FAA Office of Flight Standards (AFS) requests FAA Office of Environmental and Energy, Noise Division (AEE-100) approval of the noise methodology to be used for the Environmental Assessment (EA) for Causey Aviation Unmanned, Inc. (Causey) operations using the Flytrex FTX-M600P unmanned aircraft (UA) in Fayetteville, Holy Springs, Pinehurst, and Raeford, NC to provide package delivery services as a 14CFR Part 135 operator as described below.

As required under the National Environmental Policy Act (NEPA), the FAA must consider the potential for environmental impacts in informing the agency's decision to approving Federal actions, including the potential for noise impacts as detailed in FAA Order 1050.1F.

As the FAA does not currently have a standard approved noise model for UA, this memo serves as a request for written approval from AEE-100 to use the methodology proposed in the following sections to support the noise analysis for this EA.

Description of Aircraft and Proposed Operations

AFS is evaluating Causey's proposed commercial package delivery operations using the Flytrex FTX-M600P UA from four central distribution centers located in Fayetteville, Holy Springs, Pinehurst and Raeford, NC. Approval of a Federal Action providing Causey's air carrier Operations Specifications (OpSpecs) is required before these operations can occur.

Causey is proposing to perform package delivery operations from a distribution center located within each of the four proposed operating areas and follow predetermined routes to deliver packages between the distribution center and delivery locations ("delivery points") such as medical centers, health facilities, and private homes. The proposed UA operating areas will have a radius of two nautical miles centered on the distribution center at each of the four sites, with the exception of the Pinehurst location, which is smaller and located on the First Health Moore Regional Hospital property.

The Flytrex FTX-M600P is a six-motor structure (hexacopter) design with a maximum takeoff weight listed as 33.4 lbs., including a 6.6 lb. payload. The UA departs the distribution center from the ground via a vertical climb to enroute altitude, at which point the UA navigates along a defined path from the distribution center to the intended delivery point. The enroute portion of the flight would typically be operated at an altitude of 230 feet Above Ground Level (AGL) and speed of 29 knots. Upon reaching a delivery point,the UA descends vertically to an altitude of 75 feet AGL where it uses a wire/cable to lower the package to the ground. After the package has safely reached the ground, the wire/cable is retracted, and the UA then ascends back to 230 feet AGL for transit and landing back at the distribution center via a vertical descent to the ground.

Causey projects that flights will occur primarily Mon-Sun, with operating hours from 7 am until 10 pm. Causey anticipates maximum daily delivery flight operations will be distributed within delivery zones located within each of the four proposed operating areas as detailed in Table 1 under the scope of this proposed action:

Table 1. Maximum Anticipated Daily UA Delivery Operations per Delivery Zone

Fayetteville			
Delivery Zone	Maximum Daily Operations	Delivery Zone	Maximum Daily Operations
A	5.3	K	6.7
B	2.5	L	3.3
C	3.2	M	14.8
D	1.1	N	4.0
E	3.0	O	0.9
F	5.1	P	7.2
G	5.3	Q	14.1
H	5.3	R	6.0
I	4.4	S	2.3
J	5.6	T	4.2
		Total	104.0

Holly Springs			
Delivery Zone	Maximum Daily Operations	Delivery Zone	Maximum Daily Operations
A	5.8	K	1.6
B	6.1	L	1.2
C	2.5	M	10.4
D	6.0	N	1.8
E	5.6	O	1.6
F	1.9	P	15.3
G	3.5	Q	3.2
H	4.9	R	3.0
I	4.0		
J	0.7		
		Total	79.0

Raeford			
Delivery Zone	Maximum Daily Operations	Delivery Zone	Maximum Daily Operations
A	11.0	K	2.7
B	4.2	L	2.7
C	2.7	M	7.3
D	1.8	N	3.5
E	1.8		
F	6.0		
G	3.7		
H	3.7		
I	6.7		
J	2.3		
		Total	60.0

Pinehurst	
Delivery Zone	Maximum Daily Operations
Pinehurst Surgical Clinic	30
First Health Convenient Care	15
Total	45.0

Noise Analysis Methodology

AFS requests use of the noise analysis methodology described in HMMH Report No. 309990.003-5 for the “Noise Assessment for Causey Proposed Package Delivery Operations with Flytrex FTX-M600P Unmanned Aircraft” dated February 28, 2022.

Federal Aviation Administration

Memorandum

Date: March 24, 2022

To: Mike Millard, Flight Standards (AFS), General Aviation Operations Branch, AFS-830

From: Don Scata, Manager, Noise Division, Office of Environment and Energy (AEE-100)

Digitally signed by DONALD S SCATA
Date: 2022.03.28 09:29:09 -04'00'

Subject: Environmental Assessment (EA) Noise Methodology Approval Request for Causey Aviation Unmanned, Inc. Commercial Package Delivery Operations with the Flytrex FTX-M600P UA from Fayetteville, Holy Springs, Pinehurst, and Raeford, NC

The Office of Environment and Energy, Noise Division (AEE-100), has reviewed the proposed non-standard noise modeling methodology to be used for Causey Aviation Unmanned, Inc. (Causey) operations using the Flytrex FTX-M600P unmanned aircraft (UA) at multiple sites in Raeford, Holly Springs, Fayetteville, and Pinehurst, North Carolina. This request is in support of an Environmental Assessment (EA) for Causey to provide package delivery services as a 14 CFR Part 135 operator in Raeford, Holly Springs, Fayetteville, and Pinehurst and associated operating areas.

The Proposed Action is to use the FTX-M600P UA from a single central distribution center located at each of the four sites connecting to a supporting route network to deliver packages to potential delivery locations ("delivery points") such as medical centers, health facilities, and private homes within each proposed operating area. Typical operations of the UA will consist of departure from the distribution center via a vertical climb to an approximate altitude 230 feet above ground level (AGL). The UA will then navigate en route along a defined path from the distribution center to the intended delivery point at a typical airspeed of 29 knots and 230 feet AGL. Reaching the delivery point, the UA will descend vertically to approximately 75 feet AGL and lower a package via a cable to the ground. Following delivery, the UA will retract the cable, climb back to en route altitude, fly along a defined path back to the distribution center, and then descend vertically to land on the ground upon reaching the distribution center.

Under the scope of this Proposed Action Causey anticipates all delivery flight operations at each of the four sites and associated operating areas would occur Monday through Sunday during daytime hours (7 AM to 10 PM). Causey anticipates daily delivery operations will be distributed among delivery zones located within each of the four sites as presented in Table 1 of the proposed non-standard noise modeling methodology request, "Environmental Assessment (EA) Noise Methodology Approval Request for Causey Aviation Unmanned, Inc. Commercial Package Delivery Operations with the Flytrex FTX- M600P UA from Fayetteville, Holy Springs, Pinehurst and Raeford, NC" dated March 24, 2022.

As the FAA does not currently have a standard approved noise model for assessing UA, and in accordance with FAA Order 1050.1F, all non-standard noise analysis in support of the noise impact analysis for the National Environmental Policy Act (NEPA) must be approved by AEE. This letter serves as AEE's response to the method developed in in HMMH Report No. 309990.003-5 for the "Noise Assessment for Causey Proposed Package Delivery Operations with Flytrex FTX-M600P Unmanned Aircraft" dated February 28, 2022.

The proposed methodology appears to be adequate for this analysis; therefore, AEE concurs with the methodology proposed for this project. Please understand that this approval is limited to this particular Environmental Review, location, vehicle, and circumstances. Any additional projects using this or other methodologies or variations in the vehicle will require separate approval.

Appendix E

EJSCREEN Report

EJScreen Report (Version 2.0)

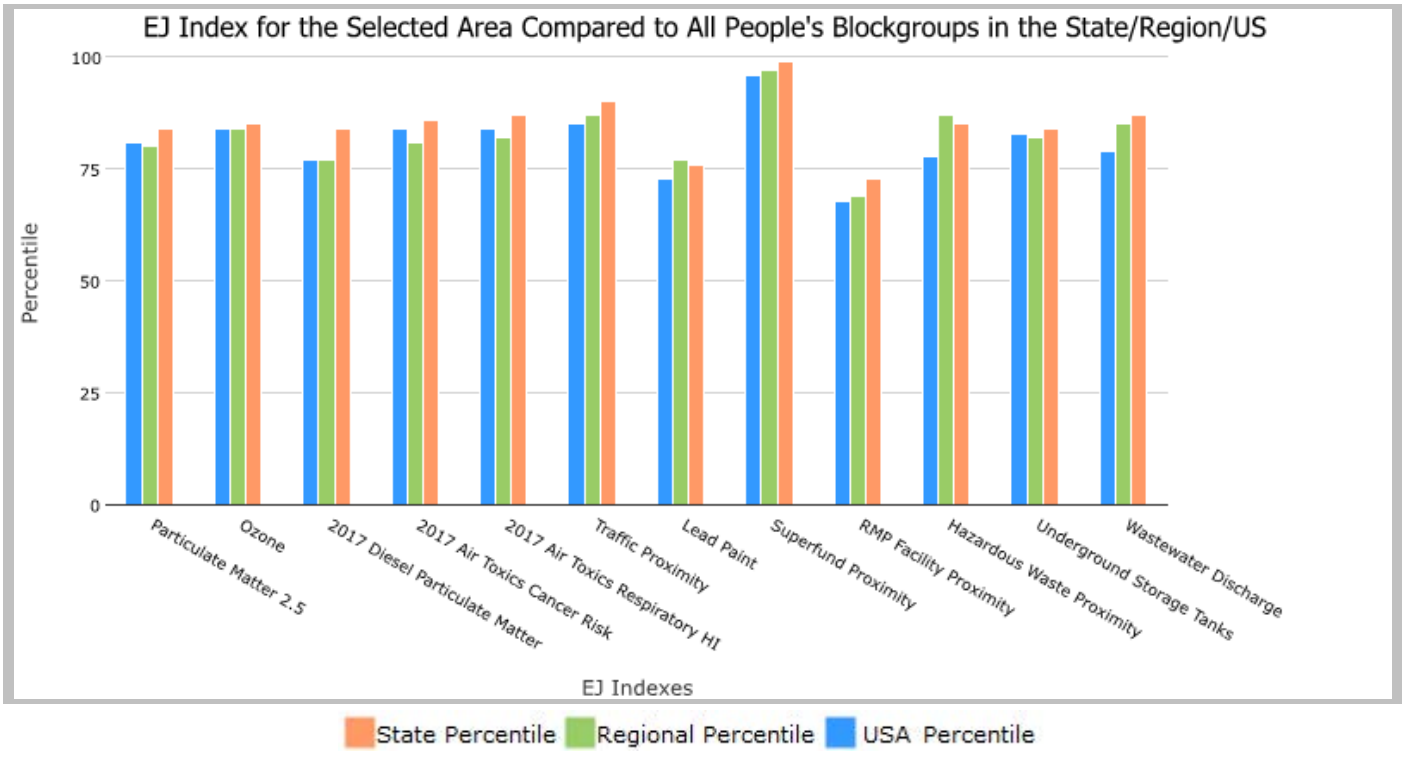
2.3 miles Ring Centered at 35.040810,-78.999842, NORTH CAROLINA, EPA Region 4

Approximate Population: 43,721

Input Area (sq. miles): 16.61

Fayetteville Operating Area

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	84	80	81
EJ Index for Ozone	85	84	84
EJ Index for 2017 Diesel Particulate Matter*	84	77	77
EJ Index for 2017 Air Toxics Cancer Risk*	86	81	84
EJ Index for 2017 Air Toxics Respiratory HI*	87	82	84
EJ Index for Traffic Proximity	90	87	85
EJ Index for Lead Paint	76	77	73
EJ Index for Superfund Proximity	99	97	96
EJ Index for RMP Facility Proximity	73	69	68
EJ Index for Hazardous Waste Proximity	85	87	78
EJ Index for Underground Storage Tanks	84	82	83
EJ Index for Wastewater Discharge	87	85	79



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

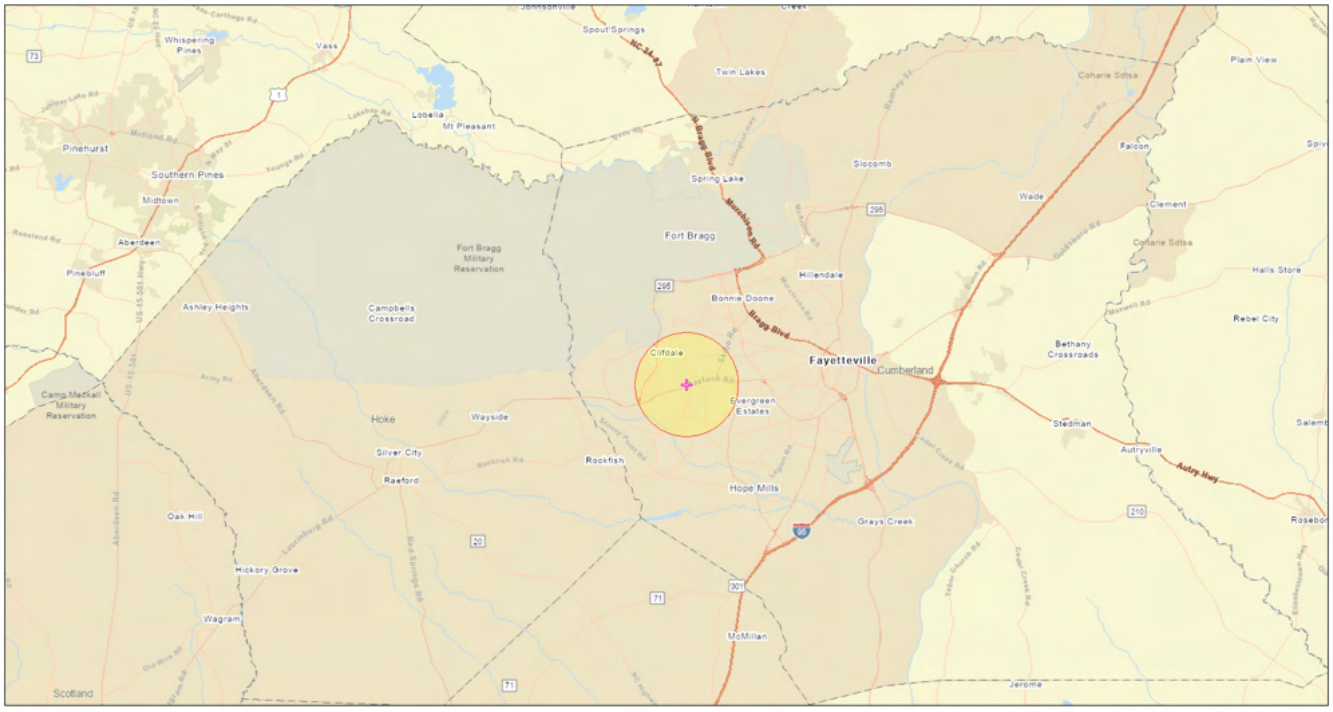
EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.040810,-78.999842, NORTH CAROLINA, EPA Region 4

Approximate Population: 43,721

Input Area (sq. miles): 16.61

Fayetteville Operating Area



Sites reporting to EPA	
Superfund NPL	1
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	2

EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.040810,-78.999842, NORTH CAROLINA, EPA Region 4

Approximate Population: 43,721

Input Area (sq. miles): 16.61

Fayetteville Operating Area

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	7.33	7.74	30	8.18	14	8.74	17
Ozone (ppb)	41.5	41.7	44	37.9	70	42.6	42
2017 Diesel Particulate Matter* (µg/m^3)	0.182	0.182	55	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	30	29	95	31	80-90th	29	80-90th
2017 Air Toxics Respiratory HI*	0.4	0.37	94	0.4	70-80th	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	550	350	81	430	79	710	70
Lead Paint (% Pre-1960 Housing)	0.056	0.16	36	0.15	44	0.28	30
Superfund Proximity (site count/km distance)	0.39	0.082	97	0.083	96	0.13	93
RMP Facility Proximity (facility count/km distance)	0.1	0.39	26	0.6	21	0.75	16
Hazardous Waste Proximity (facility count/km distance)	0.85	0.83	67	0.62	78	2.2	53
Underground Storage Tanks (count/km^2)	2.7	3.4	67	3.5	68	3.9	65
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0017	0.25	69	0.45	67	12	54
Socioeconomic Indicators							
Demographic Index	58%	36%	84	37%	80	36%	80
People of Color	70%	37%	85	39%	80	40%	77
Low Income	46%	34%	72	35%	70	31%	76
Unemployment Rate	10%	6%	84	6%	84	5%	85
Linguistically Isolated	3%	2%	74	3%	69	5%	62
Less Than High School Education	8%	12%	41	13%	39	12%	46
Under Age 5	8%	6%	76	6%	76	6%	74
Over Age 64	11%	16%	31	17%	30	16%	34

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.040810, -78.999842
Ring (buffer): 2.3-miles radius
Description: Fayetteville Operating Area

Summary of ACS Estimates	2015 - 2019
Population	43,721
Population Density (per sq. mile)	2,709
People of Color Population	30,414
% People of Color Population	70%
Households	17,823
Housing Units	20,944
Housing Units Built Before 1950	368
Per Capita Income	23,623
Land Area (sq. miles) (Source: SF1)	16.14
% Land Area	98%
Water Area (sq. miles) (Source: SF1)	0.37
% Water Area	2%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	43,721	100%	495
Population Reporting One Race	41,112	94%	1,452
White	16,751	38%	488
Black	21,306	49%	393
American Indian	477	1%	86
Asian	1,343	3%	150
Pacific Islander	88	0%	49
Some Other Race	1,147	3%	286
Population Reporting Two or More Races	2,609	6%	209
Total Hispanic Population	5,851	13%	236
Total Non-Hispanic Population	37,870		
White Alone	13,307	30%	414
Black Alone	20,592	47%	397
American Indian Alone	389	1%	86
Non-Hispanic Asian Alone	1,333	3%	150
Pacific Islander Alone	88	0%	49
Other Race Alone	185	0%	88
Two or More Races Alone	1,976	5%	199
Population by Sex			
Male	21,078	48%	344
Female	22,643	52%	315
Population by Age			
Age 0-4	3,544	8%	145
Age 0-17	10,978	25%	289
Age 18+	32,743	75%	319
Age 65+	4,891	11%	120

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.040810, -78.999842
Ring (buffer): 2.3-miles radius
Description: Fayetteville Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	27,402	100%	283
Less than 9th Grade	727	3%	53
9th - 12th Grade, No Diploma	1,474	5%	80
High School Graduate	6,756	25%	207
Some College, No Degree	8,611	31%	199
Associate Degree	2,960	11%	101
Bachelor's Degree or more	6,875	25%	193
Population Age 5+ Years by Ability to Speak English			
Total	40,177	100%	446
Speak only English	34,502	86%	393
Non-English at Home[1+2+3+4]	5,675	14%	174
[1]Speak English "very well"	3,863	10%	161
[2]Speak English "well"	1,085	3%	78
[3]Speak English "not well"	649	2%	91
[4]Speak English "not at all"	79	0%	52
[3+4]Speak English "less than well"	727	2%	91
[2+3+4]Speak English "less than very well"	1,813	5%	97
Linguistically Isolated Households*			
Total	501	100%	62
Speak Spanish	271	54%	54
Speak Other Indo-European Languages	68	14%	46
Speak Asian-Pacific Island Languages	143	29%	51
Speak Other Languages	18	4%	16
Households by Household Income			
Household Income Base	17,823	100%	153
< $15,000	2,365	13%	106
$15,000 - $25,000	2,083	12%	98
$25,000 - $50,000	5,493	31%	146
$50,000 - $75,000	3,874	22%	121
$75,000 +	4,008	22%	184
Occupied Housing Units by Tenure			
Total	17,823	100%	153
Owner Occupied	7,442	42%	144
Renter Occupied	10,381	58%	157
Employed Population Age 16+ Years			
Total	33,769	100%	349
In Labor Force	22,609	67%	299
Civilian Unemployed in Labor Force	2,125	6%	112
Not In Labor Force	11,159	33%	220

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.040810, -78.999842
Ring (buffer): 2.3-miles radius
Description: Fayetteville Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	42,517	100%	534
English	36,421	86%	501
Spanish	3,532	8%	259
French	251	1%	44
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	434	1%	93
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	205	0%	68
Chinese	109	0%	42
Japanese	N/A	N/A	N/A
Korean	337	1%	99
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	163	0%	129
Other Asian	340	1%	158
Tagalog	258	1%	115
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	104	0%	52
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	314	1%	83
Total Non-English	6,096	14%	723

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

EJScreen Report (Version 2.0)

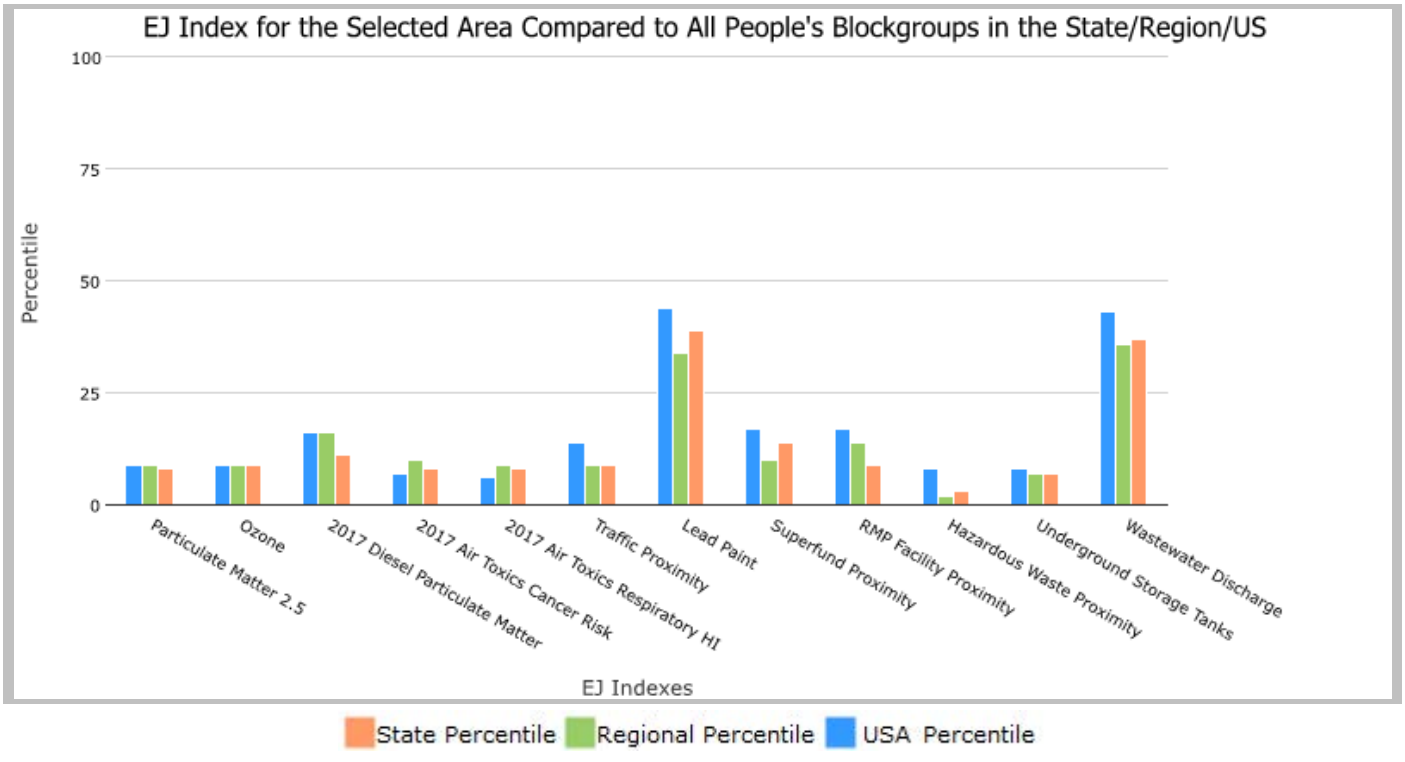
2.3 miles Ring Centered at 35.666222,-78.845122, NORTH CAROLINA, EPA Region 4

Approximate Population: 24,293

Input Area (sq. miles): 16.61

Holly Springs Operating Area

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	8	9	9
EJ Index for Ozone	9	9	9
EJ Index for 2017 Diesel Particulate Matter*	11	16	16
EJ Index for 2017 Air Toxics Cancer Risk*	8	10	7
EJ Index for 2017 Air Toxics Respiratory HI*	8	9	6
EJ Index for Traffic Proximity	9	9	14
EJ Index for Lead Paint	39	34	44
EJ Index for Superfund Proximity	14	10	17
EJ Index for RMP Facility Proximity	9	14	17
EJ Index for Hazardous Waste Proximity	3	2	8
EJ Index for Underground Storage Tanks	7	7	8
EJ Index for Wastewater Discharge	37	36	43



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

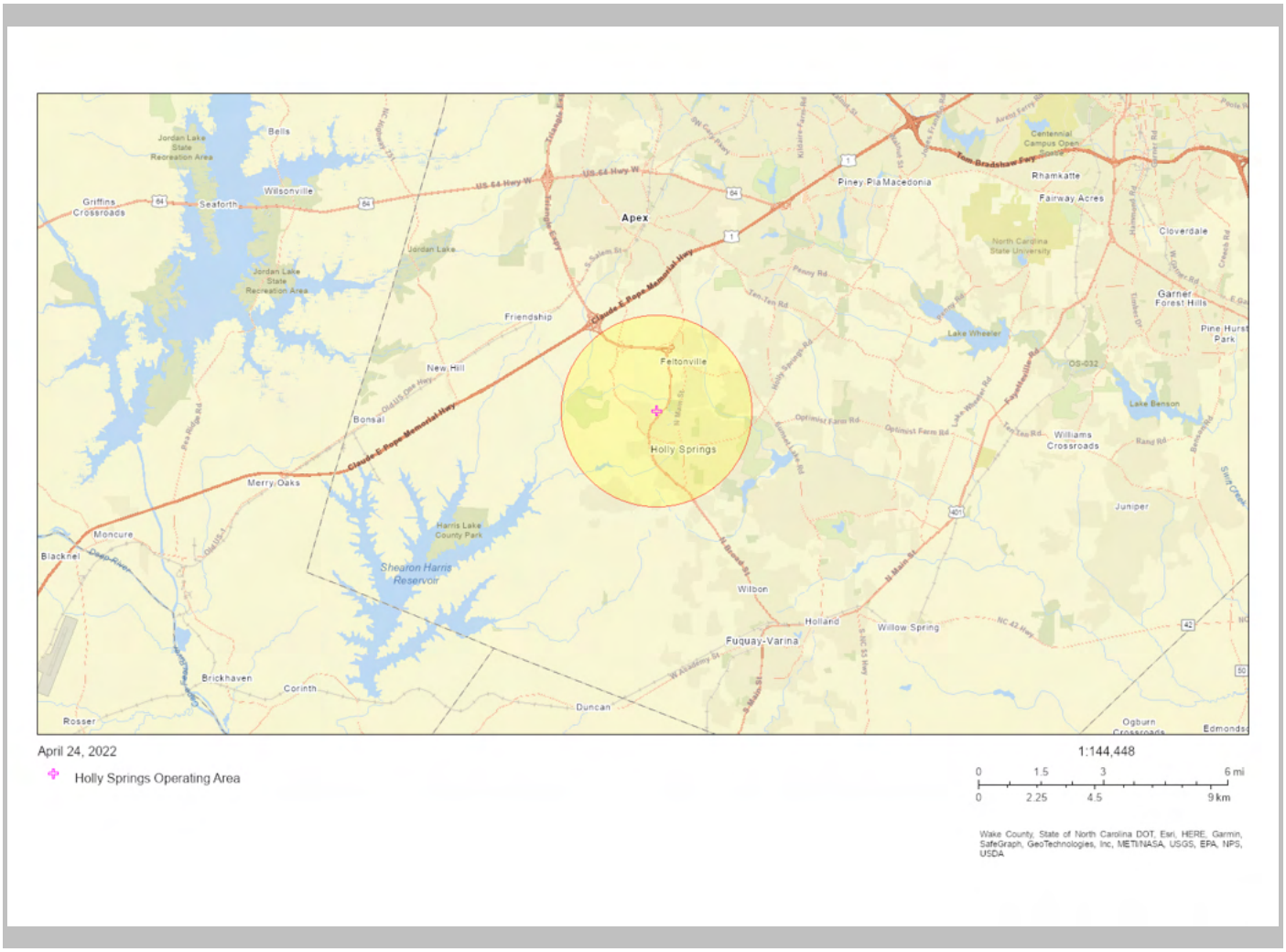
EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.666222,-78.845122, NORTH CAROLINA, EPA Region 4

Approximate Population: 24,293

Input Area (sq. miles): 16.61

Holly Springs Operating Area



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	3

EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.666222,-78.845122, NORTH CAROLINA, EPA Region 4

Approximate Population: 24,293

Input Area (sq. miles): 16.61

Holly Springs Operating Area

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	8.37	7.74	61	8.18	60	8.74	43
Ozone (ppb)	41.8	41.7	49	37.9	73	42.6	45
2017 Diesel Particulate Matter* (µg/m^3)	0.178	0.182	54	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	30	29	95	31	80-90th	29	80-90th
2017 Air Toxics Respiratory HI*	0.4	0.37	94	0.4	70-80th	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	310	350	69	430	67	710	57
Lead Paint (% Pre-1960 Housing)	0.023	0.16	22	0.15	29	0.28	20
Superfund Proximity (site count/km distance)	0.053	0.082	58	0.083	61	0.13	44
RMP Facility Proximity (facility count/km distance)	0.31	0.39	68	0.6	56	0.75	49
Hazardous Waste Proximity (facility count/km distance)	1.3	0.83	79	0.62	85	2.2	62
Underground Storage Tanks (count/km^2)	3.1	3.4	71	3.5	71	3.9	68
Wastewater Discharge (toxicity-weighted concentration/m distance)	1.2E-05	0.25	27	0.45	27	12	19
Socioeconomic Indicators							
Demographic Index	24%	36%	34	37%	32	36%	39
People of Color	32%	37%	51	39%	50	40%	50
Low Income	16%	34%	19	35%	18	31%	27
Unemployment Rate	4%	6%	47	6%	47	5%	49
Linguistically Isolated	1%	2%	59	3%	56	5%	49
Less Than High School Education	6%	12%	33	13%	31	12%	38
Under Age 5	7%	6%	70	6%	71	6%	68
Over Age 64	8%	16%	16	17%	15	16%	18

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.666222, -78.845122
Ring (buffer): 2.3-miles radius
Description: Holly Springs Operating Area

Summary of ACS Estimates	2015 - 2019
Population	24,293
Population Density (per sq. mile)	1,658
People of Color Population	7,787
% People of Color Population	32%
Households	8,052
Housing Units	8,355
Housing Units Built Before 1950	55
Per Capita Income	40,463
Land Area (sq. miles) (Source: SF1)	14.65
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.16
% Water Area	1%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	24,293	100%	649
Population Reporting One Race	22,981	95%	2,044
White	17,639	73%	615
Black	3,372	14%	312
American Indian	92	0%	97
Asian	831	3%	309
Pacific Islander	22	0%	39
Some Other Race	1,024	4%	672
Population Reporting Two or More Races	1,312	5%	255
Total Hispanic Population	2,240	9%	636
Total Non-Hispanic Population	22,053		
White Alone	16,506	68%	521
Black Alone	3,342	14%	312
American Indian Alone	33	0%	38
Non-Hispanic Asian Alone	831	3%	309
Pacific Islander Alone	22	0%	39
Other Race Alone	85	0%	95
Two or More Races Alone	1,234	5%	255
Population by Sex			
Male	11,714	48%	577
Female	12,579	52%	363
Population by Age			
Age 0-4	1,814	7%	187
Age 0-17	7,872	32%	383
Age 18+	16,421	68%	526
Age 65+	1,924	8%	154

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.666222, -78.845122
Ring (buffer): 2.3-miles radius
Description: Holly Springs Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	15,055	100%	540
Less than 9th Grade	460	3%	139
9th - 12th Grade, No Diploma	504	3%	128
High School Graduate	1,907	13%	199
Some College, No Degree	2,524	17%	259
Associate Degree	1,553	10%	177
Bachelor's Degree or more	8,106	54%	289
Population Age 5+ Years by Ability to Speak English			
Total	22,479	100%	659
Speak only English	19,950	89%	547
Non-English at Home[1+2+3+4]	2,529	11%	612
[1]Speak English "very well"	1,665	7%	253
[2]Speak English "well"	491	2%	156
[3]Speak English "not well"	195	1%	87
[4]Speak English "not at all"	177	1%	427
[3+4]Speak English "less than well"	372	2%	436
[2+3+4]Speak English "less than very well"	864	4%	463
Linguistically Isolated Households*			
Total	89	100%	75
Speak Spanish	48	54%	74
Speak Other Indo-European Languages	2	2%	23
Speak Asian-Pacific Island Languages	11	12%	17
Speak Other Languages	29	32%	25
Households by Household Income			
Household Income Base	8,052	100%	164
< $15,000	358	4%	102
$15,000 - $25,000	312	4%	66
$25,000 - $50,000	932	12%	119
$50,000 - $75,000	1,207	15%	163
$75,000 +	5,244	65%	272
Occupied Housing Units by Tenure			
Total	8,052	100%	164
Owner Occupied	6,477	80%	175
Renter Occupied	1,576	20%	161
Employed Population Age 16+ Years			
Total	17,463	100%	615
In Labor Force	12,806	73%	552
Civilian Unemployed in Labor Force	537	3%	174
Not In Labor Force	4,656	27%	362

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.666222, -78.845122
Ring (buffer): 2.3-miles radius
Description: Holly Springs Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	15,564	100%	638
English	13,809	89%	569
Spanish	846	5%	649
French	92	1%	280
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	17	0%	22
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	226	1%	282
Chinese	29	0%	44
Japanese	N/A	N/A	N/A
Korean	40	0%	169
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	17
Other Asian	132	1%	241
Tagalog	0	0%	17
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	212	1%	126
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	83	1%	103
Total Non-English	1,756	11%	855

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

EJScreen Report (Version 2.0)

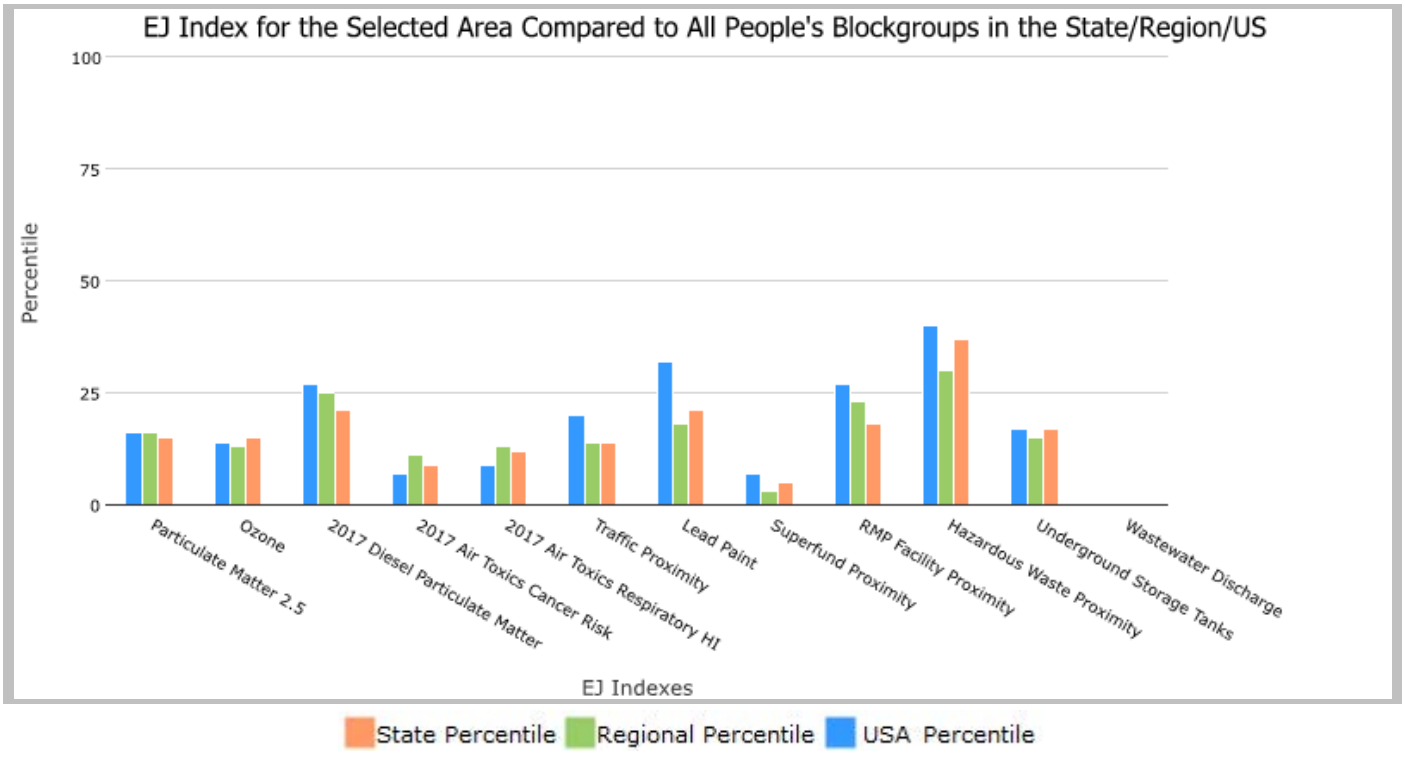
2.3 miles Ring Centered at 35.208082,-79.459573, NORTH CAROLINA, EPA Region 4

Approximate Population: 13,024

Input Area (sq. miles): 16.61

Pinehurst Operating Area

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	15	16	16
EJ Index for Ozone	15	13	14
EJ Index for 2017 Diesel Particulate Matter*	21	25	27
EJ Index for 2017 Air Toxics Cancer Risk*	9	11	7
EJ Index for 2017 Air Toxics Respiratory HI*	12	13	9
EJ Index for Traffic Proximity	14	14	20
EJ Index for Lead Paint	21	18	32
EJ Index for Superfund Proximity	5	3	7
EJ Index for RMP Facility Proximity	18	23	27
EJ Index for Hazardous Waste Proximity	37	30	40
EJ Index for Underground Storage Tanks	17	15	17
EJ Index for Wastewater Discharge	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

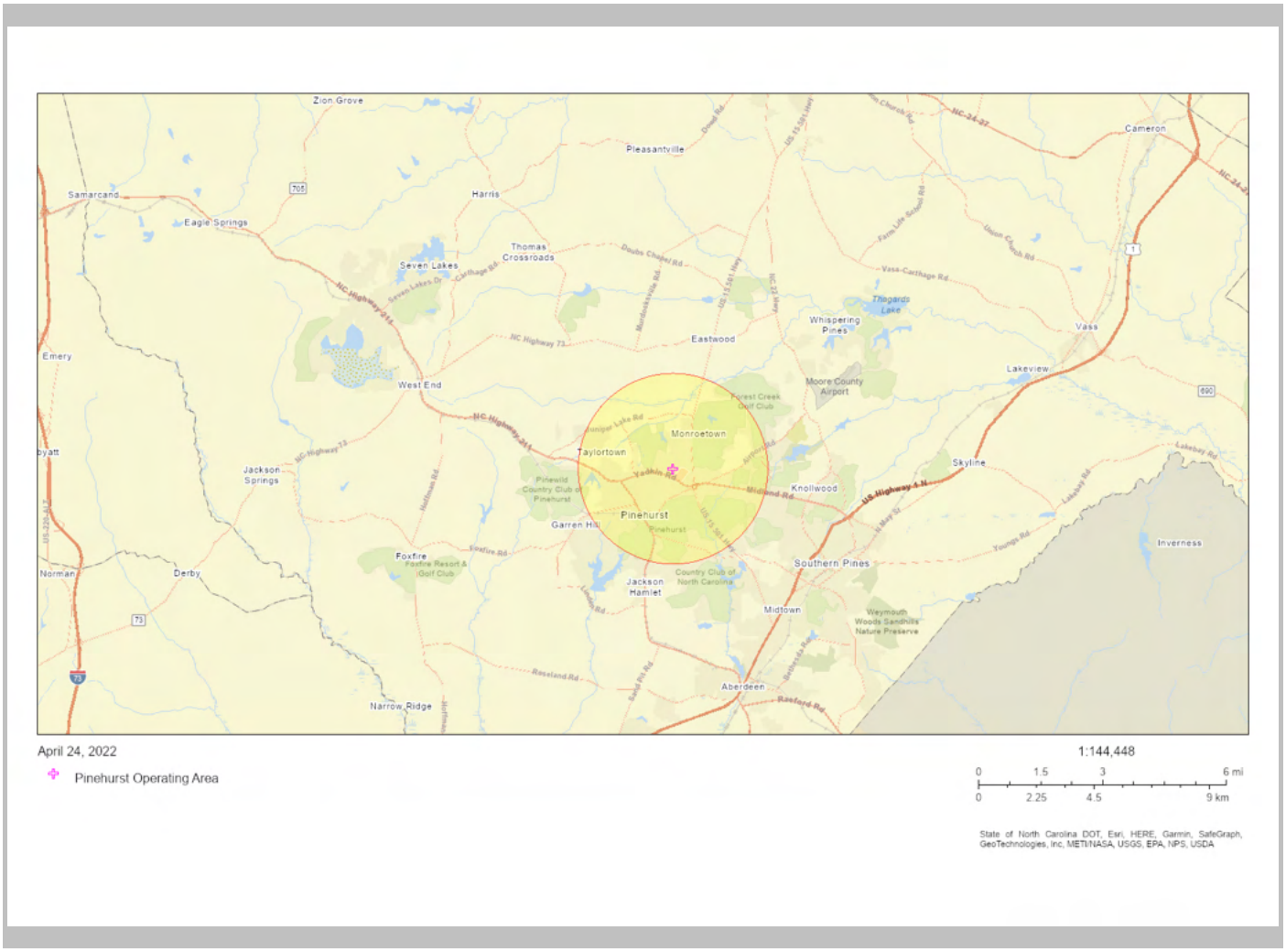
EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.208082,-79.459573, NORTH CAROLINA, EPA Region 4

Approximate Population: 13,024

Input Area (sq. miles): 16.61

Pinehurst Operating Area



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.208082,-79.459573, NORTH CAROLINA, EPA Region 4

Approximate Population: 13,024

Input Area (sq. miles): 16.61

Pinehurst Operating Area

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	7.45	7.74	34	8.18	18	8.74	20
Ozone (ppb)	40.1	41.7	21	37.9	59	42.6	33
2017 Diesel Particulate Matter* (µg/m^3)	0.124	0.182	29	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	35	29	97	31	80-90th	29	90-95th
2017 Air Toxics Respiratory HI*	0.4	0.37	94	0.4	70-80th	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	160	350	55	430	54	710	43
Lead Paint (% Pre-1960 Housing)	0.076	0.16	44	0.15	51	0.28	34
Superfund Proximity (site count/km distance)	0.14	0.082	88	0.083	86	0.13	77
RMP Facility Proximity (facility count/km distance)	0.16	0.39	44	0.6	35	0.75	28
Hazardous Waste Proximity (facility count/km distance)	0.086	0.83	13	0.62	20	2.2	14
Underground Storage Tanks (count/km^2)	1.1	3.4	48	3.5	50	3.9	47
Wastewater Discharge (toxicity-weighted concentration/m distance)	N/A	0.25	N/A	0.45	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	16%	36%	16	37%	16	36%	22
People of Color	16%	37%	26	39%	27	40%	30
Low Income	17%	34%	20	35%	19	31%	28
Unemployment Rate	4%	6%	45	6%	45	5%	47
Linguistically Isolated	2%	2%	66	3%	62	5%	55
Less Than High School Education	4%	12%	19	13%	16	12%	21
Under Age 5	6%	6%	53	6%	53	6%	51
Over Age 64	35%	16%	96	17%	94	16%	96

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.208082, -79.459573
Ring (buffer): 2.3-miles radius
Description: Pinehurst Operating Area

Summary of ACS Estimates	2015 - 2019
Population	13,024
Population Density (per sq. mile)	825
People of Color Population	2,065
% People of Color Population	16%
Households	5,705
Housing Units	7,179
Housing Units Built Before 1950	328
Per Capita Income	48,169
Land Area (sq. miles) (Source: SF1)	15.80
% Land Area	99%
Water Area (sq. miles) (Source: SF1)	0.17
% Water Area	1%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	13,024	100%	604
Population Reporting One Race	12,859	99%	1,247
White	11,502	88%	604
Black	968	7%	284
American Indian	47	0%	57
Asian	320	2%	225
Pacific Islander	14	0%	29
Some Other Race	9	0%	48
Population Reporting Two or More Races	165	1%	84
Total Hispanic Population	621	5%	304
Total Non-Hispanic Population	12,403		
White Alone	10,958	84%	591
Black Alone	909	7%	284
American Indian Alone	29	0%	57
Non-Hispanic Asian Alone	320	2%	225
Pacific Islander Alone	14	0%	29
Other Race Alone	9	0%	48
Two or More Races Alone	165	1%	84
Population by Sex			
Male	6,486	50%	449
Female	6,538	50%	325
Population by Age			
Age 0-4	754	6%	187
Age 0-17	2,353	18%	280
Age 18+	10,671	82%	360
Age 65+	4,517	35%	238

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.208082, -79.459573
Ring (buffer): 2.3-miles radius
Description: Pinehurst Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	10,185	100%	341
Less than 9th Grade	148	1%	126
9th - 12th Grade, No Diploma	209	2%	107
High School Graduate	1,593	16%	169
Some College, No Degree	1,971	19%	217
Associate Degree	813	8%	120
Bachelor's Degree or more	5,452	54%	259
Population Age 5+ Years by Ability to Speak English			
Total	12,270	100%	531
Speak only English	11,317	92%	450
Non-English at Home[1+2+3+4]	953	8%	218
[1]Speak English "very well"	582	5%	112
[2]Speak English "well"	172	1%	101
[3]Speak English "not well"	199	2%	190
[4]Speak English "not at all"	0	0%	12
[3+4]Speak English "less than well"	199	2%	190
[2+3+4]Speak English "less than very well"	371	3%	194
Linguistically Isolated Households*			
Total	103	100%	59
Speak Spanish	0	0%	12
Speak Other Indo-European Languages	31	30%	47
Speak Asian-Pacific Island Languages	72	70%	58
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	5,705	100%	193
< $15,000	341	6%	89
$15,000 - $25,000	428	7%	91
$25,000 - $50,000	1,074	19%	154
$50,000 - $75,000	1,010	18%	145
$75,000 +	2,853	50%	198
Occupied Housing Units by Tenure			
Total	5,705	100%	193
Owner Occupied	4,528	79%	188
Renter Occupied	1,178	21%	128
Employed Population Age 16+ Years			
Total	10,837	100%	401
In Labor Force	5,394	50%	346
Civilian Unemployed in Labor Force	192	2%	69
Not In Labor Force	5,442	50%	249

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.208082, -79.459573
Ring (buffer): 2.3-miles radius
Description: Pinehurst Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	4,300	100%	473
English	3,998	93%	523
Spanish	82	2%	143
French	39	1%	63
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	38	1%	87
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	39	1%	107
Chinese	19	0%	42
Japanese	N/A	N/A	N/A
Korean	0	0%	17
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	17
Other Asian	56	1%	107
Tagalog	0	0%	17
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	17
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	18	0%	52
Total Non-English	302	7%	705

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

EJScreen Report (Version 2.0)

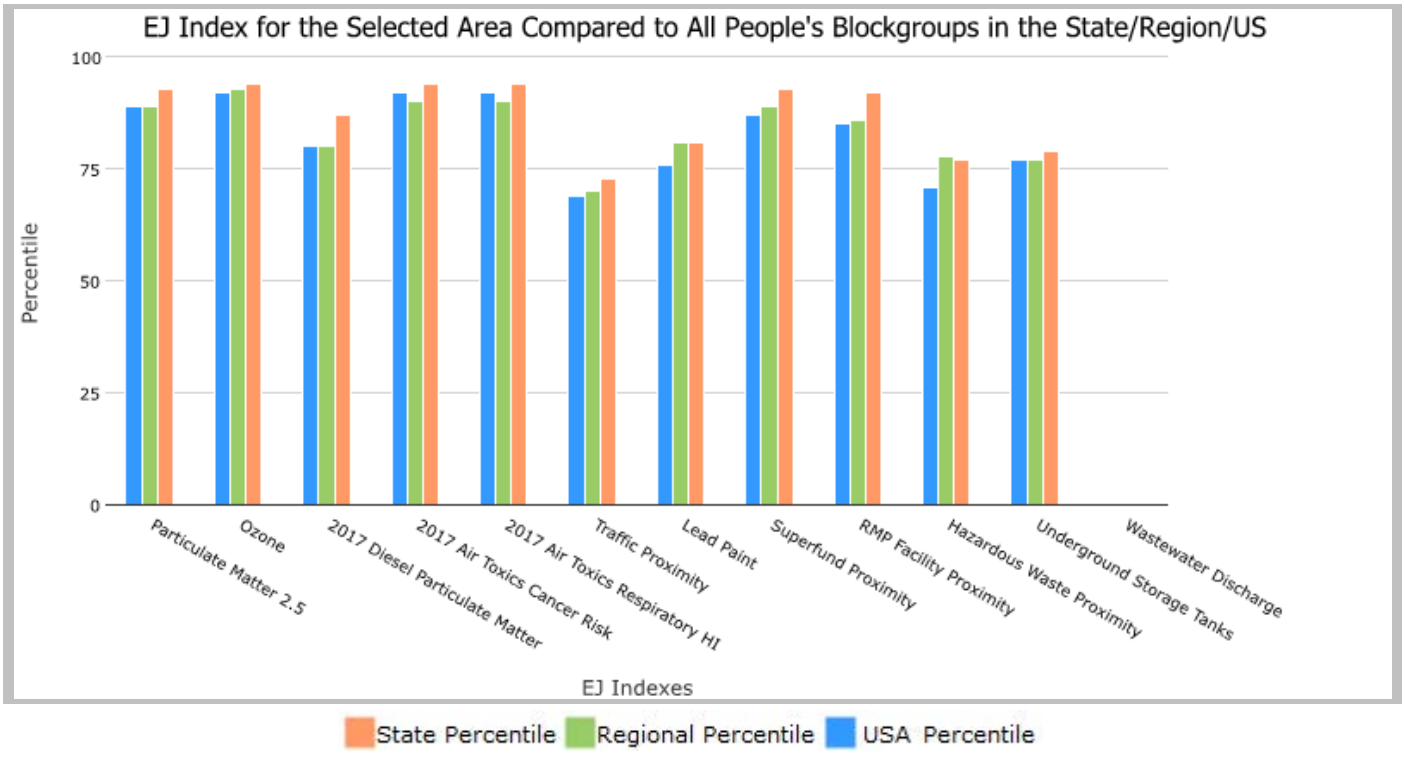
2.3 miles Ring Centered at 35.010218,-79.174283, NORTH CAROLINA, EPA Region 4

Approximate Population: 10,941

Input Area (sq. miles): 16.61

Raeford Operating Area

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	93	89	89
EJ Index for Ozone	94	93	92
EJ Index for 2017 Diesel Particulate Matter*	87	80	80
EJ Index for 2017 Air Toxics Cancer Risk*	94	90	92
EJ Index for 2017 Air Toxics Respiratory HI*	94	90	92
EJ Index for Traffic Proximity	73	70	69
EJ Index for Lead Paint	81	81	76
EJ Index for Superfund Proximity	93	89	87
EJ Index for RMP Facility Proximity	92	86	85
EJ Index for Hazardous Waste Proximity	77	78	71
EJ Index for Underground Storage Tanks	79	77	77
EJ Index for Wastewater Discharge	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

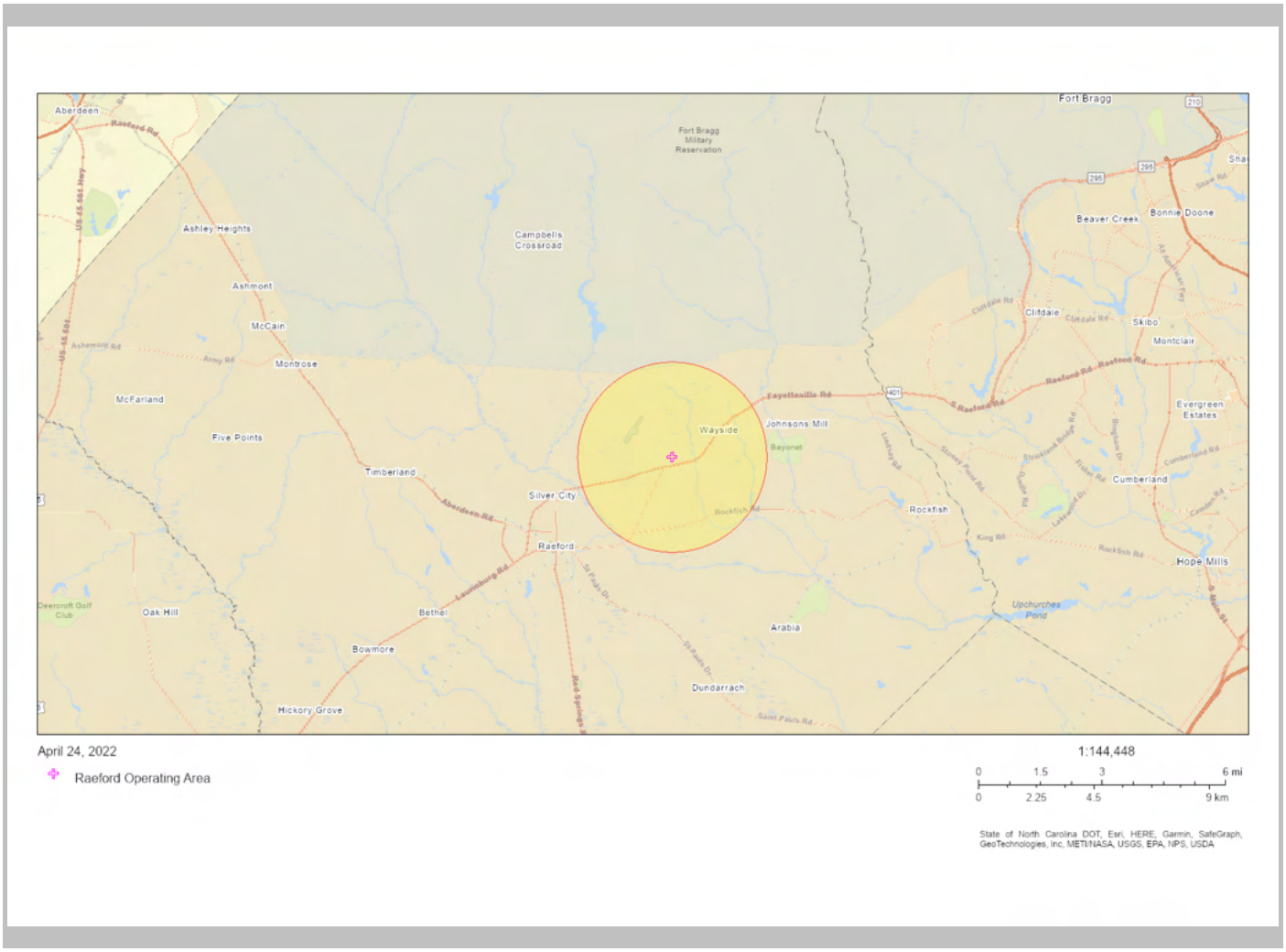
EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.010218,-79.174283, NORTH CAROLINA, EPA Region 4

Approximate Population: 10,941

Input Area (sq. miles): 16.61

Raeford Operating Area



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

2.3 miles Ring Centered at 35.010218,-79.174283, NORTH CAROLINA, EPA Region 4

Approximate Population: 10,941

Input Area (sq. miles): 16.61

Raeford Operating Area

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	7.29	7.74	29	8.18	13	8.74	16
Ozone (ppb)	41.1	41.7	37	37.9	67	42.6	39
2017 Diesel Particulate Matter* (µg/m^3)	0.136	0.182	35	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	30	29	95	31	80-90th	29	80-90th
2017 Air Toxics Respiratory HI*	0.4	0.37	94	0.4	70-80th	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	36	350	27	430	25	710	18
Lead Paint (% Pre-1960 Housing)	0.038	0.16	29	0.15	37	0.28	25
Superfund Proximity (site count/km distance)	0.075	0.082	72	0.083	71	0.13	56
RMP Facility Proximity (facility count/km distance)	0.41	0.39	75	0.6	62	0.75	55
Hazardous Waste Proximity (facility count/km distance)	0.15	0.83	28	0.62	39	2.2	24
Underground Storage Tanks (count/km^2)	0.71	3.4	39	3.5	42	3.9	40
Wastewater Discharge (toxicity-weighted concentration/m distance)	N/A	0.25	N/A	0.45	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	54%	36%	80	37%	77	36%	77
People of Color	67%	37%	83	39%	78	40%	76
Low Income	41%	34%	65	35%	64	31%	70
Unemployment Rate	11%	6%	87	6%	86	5%	88
Linguistically Isolated	4%	2%	82	3%	77	5%	69
Less Than High School Education	11%	12%	51	13%	50	12%	56
Under Age 5	10%	6%	87	6%	86	6%	85
Over Age 64	8%	16%	18	17%	16	16%	20

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.010218, -79.174283
Ring (buffer): 2.3-miles radius
Description: Raeford Operating Area

Summary of ACS Estimates	2015 - 2019
Population	10,941
Population Density (per sq. mile)	665
People of Color Population	7,306
% People of Color Population	67%
Households	3,477
Housing Units	4,140
Housing Units Built Before 1950	62
Per Capita Income	22,620
Land Area (sq. miles) (Source: SF1)	16.46
% Land Area	100%
Water Area (sq. miles) (Source: SF1)	0.07
% Water Area	0%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	10,941	100%	717
Population Reporting One Race	10,271	94%	1,884
White	4,497	41%	607
Black	4,729	43%	642
American Indian	140	1%	110
Asian	163	1%	150
Pacific Islander	30	0%	43
Some Other Race	711	6%	332
Population Reporting Two or More Races	670	6%	255
Total Hispanic Population	1,886	17%	421
Total Non-Hispanic Population	9,056		
White Alone	3,635	33%	436
Black Alone	4,588	42%	642
American Indian Alone	130	1%	110
Non-Hispanic Asian Alone	163	1%	150
Pacific Islander Alone	19	0%	29
Other Race Alone	53	0%	73
Two or More Races Alone	469	4%	209
Population by Sex			
Male	5,122	47%	356
Female	5,819	53%	466
Population by Age			
Age 0-4	1,073	10%	177
Age 0-17	3,047	28%	334
Age 18+	7,894	72%	488
Age 65+	913	8%	164

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.010218, -79.174283
Ring (buffer): 2.3-miles radius
Description: Raeford Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	6,946	100%	458
Less than 9th Grade	367	5%	123
9th - 12th Grade, No Diploma	368	5%	167
High School Graduate	2,135	31%	256
Some College, No Degree	1,999	29%	296
Associate Degree	953	14%	156
Bachelor's Degree or more	1,124	16%	150
Population Age 5+ Years by Ability to Speak English			
Total	9,868	100%	670
Speak only English	8,583	87%	608
Non-English at Home[1+2+3+4]	1,285	13%	300
[1]Speak English "very well"	675	7%	183
[2]Speak English "well"	201	2%	104
[3]Speak English "not well"	310	3%	175
[4]Speak English "not at all"	100	1%	83
[3+4]Speak English "less than well"	409	4%	194
[2+3+4]Speak English "less than very well"	610	6%	219
Linguistically Isolated Households*			
Total	153	100%	90
Speak Spanish	153	100%	89
Speak Other Indo-European Languages	0	0%	17
Speak Asian-Pacific Island Languages	0	0%	17
Speak Other Languages	0	0%	17
Households by Household Income			
Household Income Base	3,477	100%	179
< $15,000	576	17%	129
$15,000 - $25,000	231	7%	81
$25,000 - $50,000	934	27%	173
$50,000 - $75,000	580	17%	121
$75,000 +	1,156	33%	152
Occupied Housing Units by Tenure			
Total	3,477	100%	179
Owner Occupied	2,157	62%	170
Renter Occupied	1,320	38%	194
Employed Population Age 16+ Years			
Total	8,065	100%	546
In Labor Force	4,747	59%	346
Civilian Unemployed in Labor Force	463	6%	177
Not In Labor Force	3,318	41%	451

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 35.010218, -79.174283
Ring (buffer): 2.3-miles radius
Description: Raeford Operating Area

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	11,041	100%	681
English	9,734	88%	752
Spanish	1,035	9%	361
French	0	0%	19
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	58	1%	91
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	0	0%	19
Chinese	0	0%	19
Japanese	N/A	N/A	N/A
Korean	35	0%	60
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	19
Other Asian	9	0%	27
Tagalog	74	1%	108
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	45	0%	130
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	14	0%	35
Total Non-English	1,307	12%	1,015

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

Appendix F

AEDT Census Block Group Data

Appendix F: AEDT Block Group Data

Fayetteville Study Area Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Cumberland County	Block Group 1, Census Tract 32.07, Cumberland County, North Carolina	3959	1554	39.3	479	12.1
NC	Cumberland County	Block Group 1, Census Tract 32.09, Cumberland County, North Carolina	1201	531	44.2	196	16.3
NC	Cumberland County	Block Group 1, Census Tract 33.18, Cumberland County, North Carolina	1729	788	45.6	76	4.4
NC	Cumberland County	Block Group 1, Census Tract 32.03, Cumberland County, North Carolina	865	411	47.5	89	10.3
NC	Cumberland County	Block Group 3, Census Tract 19.03, Cumberland County, North Carolina	514	248	48.2	121	23.5
NC	Cumberland County	Block Group 4, Census Tract 32.03, Cumberland County, North Carolina	562	279	49.6	157	27.9
NC	Cumberland County	Block Group 1, Census Tract 33.17, Cumberland County, North Carolina	1514	793	52.4	68	4.5
NC	Cumberland County	Block Group 2, Census Tract 33.17, Cumberland County, North Carolina	1870	1005	53.7	139	7.5
NC	Cumberland County	Block Group 4, Census Tract 19.03, Cumberland County, North Carolina	809	454	56.1	252	31.3
NC	Cumberland County	Block Group 2, Census Tract 19.03, Cumberland County, North Carolina	1360	771	56.7	267	19.7
NC	Cumberland County	Block Group 2, Census Tract 32.03, Cumberland County, North Carolina	2636	1496	56.8	400	15.2
NC	Cumberland County	Block Group 1, Census Tract 20.02, Cumberland County, North Carolina	325	189	58.2	131	40.3
NC	Cumberland County	Block Group 3, Census Tract 20.02, Cumberland County, North Carolina	1162	681	58.6	173	15
NC	Cumberland County	Block Group 1, Census Tract 32.06, Cumberland County, North Carolina	1807	1108	61.3	34	1.9
NC	Cumberland County	Block Group 2, Census Tract 32.09, Cumberland County, North Carolina	3151	1966	62.4	528	17.3
NC	Cumberland County	Block Group 2, Census Tract 32.08, Cumberland County, North Carolina	816	510	62.5	106	13.3
NC	Cumberland County	Block Group 2, Census Tract 20.01, Cumberland County, North Carolina	1391	872	62.7	282	20.3
NC	Cumberland County	Block Group 2, Census Tract 20.02, Cumberland County, North Carolina	2159	1356	62.8	570	26.4
NC	Cumberland County	Block Group 2, Census Tract 32.05, Cumberland County, North Carolina	1918	1244	64.9	82	4.3
NC	Cumberland County	Block Group 1, Census Tract 32.05, Cumberland County, North Carolina	1984	1315	66.3	202	10.2
NC	Cumberland County	Block Group 1, Census Tract 20.01, Cumberland County, North Carolina	1728	1162	67.2	416	24.1
NC	Cumberland County	Block Group 3, Census Tract 32.08, Cumberland County, North Carolina	1856	1306	70.4	439	23.7
NC	Cumberland County	Block Group 1, Census Tract 33.07, Cumberland County, North Carolina	419	299	71.4	84	20.1
NC	Cumberland County	Block Group 1, Census Tract 19.02, Cumberland County, North Carolina	2135	1528	71.6	596	28.3
NC	Cumberland County	Block Group 3, Census Tract 32.05, Cumberland County, North Carolina	771	554	71.9	179	23.2
NC	Cumberland County	Block Group 2, Census Tract 33.11, Cumberland County, North Carolina	1883	1360	72.2	224	11.9
NC	Cumberland County	Block Group 1, Census Tract 19.03, Cumberland County, North Carolina	1125	837	74.4	362	32.2
NC	Cumberland County	Block Group 2, Census Tract 33.10, Cumberland County, North Carolina	680	516	75.9	103	15.1
NC	Cumberland County	Block Group 1, Census Tract 32.08, Cumberland County, North Carolina	1460	1126	77.1	212	14.5
NC	Cumberland County	Block Group 2, Census Tract 33.02, Cumberland County, North Carolina	1634	1300	79.6	596	36.5
NC	Cumberland County	Block Group 1, Census Tract 33.14, Cumberland County, North Carolina	1998	1595	79.8	468	23.4
NC	Cumberland County	Block Group 3, Census Tract 32.03, Cumberland County, North Carolina	631	509	80.7	289	45.8
NC	Cumberland County	Block Group 3, Census Tract 33.10, Cumberland County, North Carolina	2020	1640	81.2	354	17.5
NC	Cumberland County	Block Group 3, Census Tract 33.07, Cumberland County, North Carolina	1224	997	81.5	390	32.2
NC	Cumberland County	Block Group 1, Census Tract 33.10, Cumberland County, North Carolina	909	748	82.3	53	5.8
NC	Cumberland County	Block Group 1, Census Tract 33.02, Cumberland County, North Carolina	2701	2234	82.7	1121	41.6
NC	Cumberland County	Block Group 1, Census Tract 33.11, Cumberland County, North Carolina	962	800	83.2	216	22.5
NC	Cumberland County	Block Group 2, Census Tract 33.07, Cumberland County, North Carolina	1610	1348	83.7	200	12.5
NC	Cumberland County	Block Group 4, Census Tract 33.07, Cumberland County, North Carolina	718	609	84.8	133	18.5
NC	Cumberland County	Block Group 4, Census Tract 33.10, Cumberland County, North Carolina	1777	1511	85	371	20.9
NC	Cumberland County	Block Group 3, Census Tract 33.02, Cumberland County, North Carolina	1692	1447	85.5	314	18.6

Cumberland County Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Cumberland County	Block Group 1, Census Tract 33.10, Cumberland County, North Carolina	909	748	82.3	53	5.8
NC	Cumberland County	Block Group 2, Census Tract 21, Cumberland County, North Carolina	1477	1077	72.9	393	26.9
NC	Cumberland County	Block Group 2, Census Tract 35.02, Cumberland County, North Carolina	790	526	66.6	42	5.3
NC	Cumberland County	Block Group 1, Census Tract 28.02, Cumberland County, North Carolina	1205	75	6.2	115	9.5
NC	Cumberland County	Block Group 1, Census Tract 25.05, Cumberland County, North Carolina	2305	1382	60	508	37.7
NC	Cumberland County	Block Group 4, Census Tract 33.04, Cumberland County, North Carolina	752	573	76.2	203	27
NC	Cumberland County	Block Group 2, Census Tract 15, Cumberland County, North Carolina	1727	1027	59.5	281	18
NC	Cumberland County	Block Group 1, Census Tract 23.01, Cumberland County, North Carolina	1126	1003	89.1	611	55.4
NC	Cumberland County	Block Group 3, Census Tract 33.07, Cumberland County, North Carolina	1224	997	81.5	390	32.2
NC	Cumberland County	Block Group 2, Census Tract 34.10, Cumberland County, North Carolina	2347	1258	53.6	0	0
NC	Cumberland County	Block Group 2, Census Tract 28.02, Cumberland County, North Carolina	1561	354	22.7	182	11.7
NC	Cumberland County	Block Group 1, Census Tract 32.08, Cumberland County, North Carolina	1460	1126	77.1	212	14.5
NC	Cumberland County	Block Group 2, Census Tract 34.01, Cumberland County, North Carolina	1705	873	51.2	227	13.3
NC	Cumberland County	Block Group 1, Census Tract 24.01, Cumberland County, North Carolina	665	571	85.9	366	55
NC	Cumberland County	Block Group 2, Census Tract 30.04, Cumberland County, North Carolina	2740	1012	36.9	71	2.6
NC	Cumberland County	Block Group 3, Census Tract 8, Cumberland County, North Carolina	1035	326	31.5	202	19.5
NC	Cumberland County	Block Group 2, Census Tract 34.08, Cumberland County, North Carolina	1727	1123	65	29	1.7
NC	Cumberland County	Block Group 3, Census Tract 12, Cumberland County, North Carolina	873	852	97.6	486	56.8
NC	Cumberland County	Block Group 4, Census Tract 6, Cumberland County, North Carolina	412	396	96.1	203	49.3
NC	Cumberland County	Block Group 4, Census Tract 20.02, Cumberland County, North Carolina	1324	838	63.3	171	12.9
NC	Cumberland County	Block Group 1, Census Tract 33.04, Cumberland County, North Carolina	1187	805	67.8	83	7
NC	Cumberland County	Block Group 1, Census Tract 16.04, Cumberland County, North Carolina	1403	779	55.5	388	29.7
NC	Cumberland County	Block Group 1, Census Tract 23.02, Cumberland County, North Carolina	601	539	89.7	298	49.6
NC	Cumberland County	Block Group 2, Census Tract 33.18, Cumberland County, North Carolina	866	757	87.4	193	22.3
NC	Cumberland County	Block Group 1, Census Tract 17.01, Cumberland County, North Carolina	1795	959	53.4	446	24.8
NC	Cumberland County	Block Group 1, Census Tract 32.09, Cumberland County, North Carolina	1201	531	44.2	196	16.3
NC	Cumberland County	Block Group 3, Census Tract 35.01, Cumberland County, North Carolina	1582	955	60.4	268	17
NC	Cumberland County	Block Group 2, Census Tract 30.03, Cumberland County, North Carolina	946	193	20.4	283	29.9
NC	Cumberland County	Block Group 1, Census Tract 34.04, Cumberland County, North Carolina	2034	787	38.7	0	0
NC	Cumberland County	Block Group 2, Census Tract 33.14, Cumberland County, North Carolina	1964	1530	77.9	261	13.6
NC	Cumberland County	Block Group 2, Census Tract 7.02, Cumberland County, North Carolina	826	318	38.5	65	7.9
NC	Cumberland County	Block Group 1, Census Tract 20.01, Cumberland County, North Carolina	1728	1162	67.2	416	24.1
NC	Cumberland County	Block Group 1, Census Tract 21, Cumberland County, North Carolina	1311	849	64.8	194	14.8
NC	Cumberland County	Block Group 3, Census Tract 37, Cumberland County, North Carolina	1140	437	38.3	274	24
NC	Cumberland County	Block Group 4, Census Tract 12, Cumberland County, North Carolina	1693	1309	77.3	479	28.3
NC	Cumberland County	Block Group 1, Census Tract 11, Cumberland County, North Carolina	1048	886	84.5	188	18
NC	Cumberland County	Block Group 2, Census Tract 5, Cumberland County, North Carolina	441	206	46.7	324	73.5
NC	Cumberland County	Block Group 2, Census Tract 33.10, Cumberland County, North Carolina	680	516	75.9	103	15.1
NC	Cumberland County	Block Group 2, Census Tract 27.01, Cumberland County, North Carolina	1099	196	17.8	238	21.7
NC	Cumberland County	Block Group 3, Census Tract 34.01, Cumberland County, North Carolina	1632	800	49	138	12.8
NC	Cumberland County	Block Group 2, Census Tract 33.04, Cumberland County, North Carolina	1013	889	87.8	310	30.6
NC	Cumberland County	Block Group 3, Census Tract 17.02, Cumberland County, North Carolina	1336	1025	76.7	481	37.1
NC	Cumberland County	Block Group 1, Census Tract 19.02, Cumberland County, North Carolina	2135	1528	71.6	596	28.3
NC	Cumberland County	Block Group 1, Census Tract 32.05, Cumberland County, North Carolina	1984	1315	66.3	202	10.2
NC	Cumberland County	Block Group 1, Census Tract 33.16, Cumberland County, North Carolina	611	500	81.8	194	31.8
NC	Cumberland County	Block Group 2, Census Tract 17.01, Cumberland County, North Carolina	1082	771	71.3	390	36
NC	Cumberland County	Block Group 3, Census Tract 33.12, Cumberland County, North Carolina	1688	1152	68.2	133	7.9
NC	Cumberland County	Block Group 5, Census Tract 6, Cumberland County, North Carolina	905	272	30.1	109	12
NC	Cumberland County	Block Group 6, Census Tract 9, Cumberland County, North Carolina	655	129	19.7	15	2.3
NC	Cumberland County	Block Group 4, Census Tract 37, Cumberland County, North Carolina	2023	509	25.2	345	17.1
NC	Cumberland County	Block Group 2, Census Tract 31.06, Cumberland County, North Carolina	1650	456	27.6	403	24.5
NC	Cumberland County	Block Group 2, Census Tract 20.02, Cumberland County, North Carolina	2159	1356	62.8	570	26.4
NC	Cumberland County	Block Group 3, Census Tract 26, Cumberland County, North Carolina	1849	359	19.4	186	10.5
NC	Cumberland County	Block Group 2, Census Tract 6, Cumberland County, North Carolina	914	491	53.7	166	18.8
NC	Cumberland County	Block Group 1, Census Tract 12, Cumberland County, North Carolina	1453	931	64.1	499	36.6
NC	Cumberland County	Block Group 2, Census Tract 23.01, Cumberland County, North Carolina	1051	846	80.5	180	17.1
NC	Cumberland County	Block Group 1, Census Tract 31.03, Cumberland County, North Carolina	1419	620	43.7	304	21.7
NC	Cumberland County	Block Group 2, Census Tract 2, Cumberland County, North Carolina	1295	1260	97.3	817	63.1
NC	Cumberland County	Block Group 1, Census Tract 33.15, Cumberland County, North Carolina	1577	1230	78	555	35.3
NC	Cumberland County	Block Group 2, Census Tract 25.06, Cumberland County, North Carolina	1420	845	59.5	316	22.3
NC	Cumberland County	Block Group 1, Census Tract 33.02, Cumberland County, North Carolina	2701	2234	82.7	1121	41.6
NC	Cumberland County	Block Group 2, Census Tract 33.17, Cumberland County, North Carolina	1870	1005	53.7	139	7.5
NC	Cumberland County	Block Group 1, Census Tract 18, Cumberland County, North Carolina	1209	552	45.7	332	27.9
NC	Cumberland County	Block Group 2, Census Tract 24.02, Cumberland County, North Carolina	2331	1795	77	597	25.6

NC	Cumberland County	Block Group 2, Census Tract 30.02, Cumberland County, North Carolina	1538	579	37.6	303	19.7
NC	Cumberland County	Block Group 3, Census Tract 27.02, Cumberland County, North Carolina	1500	684	45.6	337	22.5
NC	Cumberland County	Block Group 1, Census Tract 16.06, Cumberland County, North Carolina	1620	694	42.8	360	22.5
NC	Cumberland County	Block Group 2, Census Tract 32.08, Cumberland County, North Carolina	816	510	62.5	106	13.3
NC	Cumberland County	Block Group 1, Census Tract 33.11, Cumberland County, North Carolina	962	800	83.2	216	22.5
NC	Cumberland County	Block Group 3, Census Tract 25.03, Cumberland County, North Carolina	1556	682	43.8	206	13.4
NC	Cumberland County	Block Group 3, Census Tract 7.01, Cumberland County, North Carolina	2151	862	40.1	514	23.9
NC	Cumberland County	Block Group 2, Census Tract 14.02, Cumberland County, North Carolina	1221	953	78.1	595	48.7
NC	Cumberland County	Block Group 1, Census Tract 36.02, Cumberland County, North Carolina	691	424	61.4	160	23.2
NC	Cumberland County	Block Group 3, Census Tract 9, Cumberland County, North Carolina	1104	573	51.9	32	3.2
NC	Cumberland County	Block Group 1, Census Tract 37, Cumberland County, North Carolina	2373	1400	59	231	9.7
NC	Cumberland County	Block Group 3, Census Tract 2, Cumberland County, North Carolina	676	474	70.1	310	46.8
NC	Cumberland County	Block Group 3, Census Tract 6, Cumberland County, North Carolina	1997	689	34.5	155	7.8
NC	Cumberland County	Block Group 2, Census Tract 33.07, Cumberland County, North Carolina	1610	1348	83.7	200	12.5
NC	Cumberland County	Block Group 3, Census Tract 29, Cumberland County, North Carolina	494	112	22.7	0	0
NC	Cumberland County	Block Group 3, Census Tract 19.03, Cumberland County, North Carolina	514	248	48.2	121	23.5
NC	Cumberland County	Block Group 3, Census Tract 25.06, Cumberland County, North Carolina	851	663	77.9	213	25
NC	Cumberland County	Block Group 2, Census Tract 16.04, Cumberland County, North Carolina	2554	2055	80.5	285	11.2
NC	Cumberland County	Block Group 1, Census Tract 33.18, Cumberland County, North Carolina	1729	788	45.6	76	4.4
NC	Cumberland County	Block Group 2, Census Tract 33.15, Cumberland County, North Carolina	2454	1686	68.7	265	10.9
NC	Cumberland County	Block Group 2, Census Tract 18, Cumberland County, North Carolina	1149	578	50.3	302	26.6
NC	Cumberland County	Block Group 2, Census Tract 23.02, Cumberland County, North Carolina	422	296	70.1	16	3.8
NC	Cumberland County	Block Group 1, Census Tract 25.01, Cumberland County, North Carolina	1477	1357	91.9	177	12.3
NC	Cumberland County	Block Group 2, Census Tract 32.09, Cumberland County, North Carolina	3151	1966	62.4	528	17.3
NC	Cumberland County	Block Group 1, Census Tract 35.02, Cumberland County, North Carolina	401	368	91.8	103	25.7
NC	Cumberland County	Block Group 1, Census Tract 22, Cumberland County, North Carolina	1278	669	52.3	190	14.9
NC	Cumberland County	Block Group 1, Census Tract 25.04, Cumberland County, North Carolina	1458	1018	69.8	575	39.4
NC	Cumberland County	Block Group 3, Census Tract 32.06, Cumberland County, North Carolina	1550	1109	71.5	48	3.1
NC	Cumberland County	Block Group 3, Census Tract 16.03, Cumberland County, North Carolina	789	591	74.9	489	62
NC	Cumberland County	Block Group 4, Census Tract 9, Cumberland County, North Carolina	702	366	52.1	331	47.2
NC	Cumberland County	Block Group 2, Census Tract 36.02, Cumberland County, North Carolina	373	79	21.2	42	11.3
NC	Cumberland County	Block Group 1, Census Tract 33.12, Cumberland County, North Carolina	1037	741	71.5	125	12.1
NC	Cumberland County	Block Group 1, Census Tract 8, Cumberland County, North Carolina	854	431	50.5	66	7.7
NC	Cumberland County	Block Group 2, Census Tract 25.05, Cumberland County, North Carolina	1690	1274	75.4	430	25.4
NC	Cumberland County	Block Group 3, Census Tract 14.01, Cumberland County, North Carolina	1513	602	39.8	233	16.1
NC	Cumberland County	Block Group 5, Census Tract 33.04, Cumberland County, North Carolina	1127	802	71.2	118	10.5
NC	Cumberland County	Block Group 2, Census Tract 34.04, Cumberland County, North Carolina	907	346	38.1	0	0
NC	Cumberland County	Block Group 2, Census Tract 20.01, Cumberland County, North Carolina	1391	872	62.7	282	20.3
NC	Cumberland County	Block Group 3, Census Tract 33.10, Cumberland County, North Carolina	2020	1640	81.2	354	17.5
NC	Cumberland County	Block Group 2, Census Tract 11, Cumberland County, North Carolina	848	834	98.3	242	28.5
NC	Cumberland County	Block Group 3, Census Tract 5, Cumberland County, North Carolina	450	308	68.4	187	41.6
NC	Cumberland County	Block Group 1, Census Tract 38, Cumberland County, North Carolina	943	943	100	389	41.3
NC	Cumberland County	Block Group 1, Census Tract 16.03, Cumberland County, North Carolina	2207	1365	61.8	452	20.6
NC	Cumberland County	Block Group 4, Census Tract 33.07, Cumberland County, North Carolina	718	609	84.8	133	18.5
NC	Cumberland County	Block Group 2, Census Tract 19.02, Cumberland County, North Carolina	2480	1497	60.4	372	15.5
NC	Cumberland County	Block Group 2, Census Tract 32.05, Cumberland County, North Carolina	1918	1244	64.9	82	4.3
NC	Cumberland County	Block Group 2, Census Tract 33.16, Cumberland County, North Carolina	1412	928	65.7	254	18
NC	Cumberland County	Block Group 2, Census Tract 32.03, Cumberland County, North Carolina	2636	1496	56.8	400	15.2
NC	Cumberland County	Block Group 1, Census Tract 17.02, Cumberland County, North Carolina	1816	1152	63.4	235	13.1
NC	Cumberland County	Block Group 4, Census Tract 33.12, Cumberland County, North Carolina	1714	1349	78.7	92	5.4
NC	Cumberland County	Block Group 2, Census Tract 16.05, Cumberland County, North Carolina	811	387	47.7	236	29.1
NC	Cumberland County	Block Group 1, Census Tract 35.01, Cumberland County, North Carolina	1166	796	68.3	405	34.7
NC	Cumberland County	Block Group 1, Census Tract 34.03, Cumberland County, North Carolina	1470	645	43.9	32	4.9
NC	Cumberland County	Block Group 1, Census Tract 10, Cumberland County, North Carolina	1038	753	72.5	267	30.9
NC	Cumberland County	Block Group 2, Census Tract 36.01, Cumberland County, North Carolina	611	519	84.9	165	27.1
NC	Cumberland County	Block Group 2, Census Tract 24.01, Cumberland County, North Carolina	729	598	82	298	40.9
NC	Cumberland County	Block Group 1, Census Tract 25.03, Cumberland County, North Carolina	1368	916	67	322	23.5
NC	Cumberland County	Block Group 1, Census Tract 9, Cumberland County, North Carolina	906	361	39.8	155	17.9
NC	Cumberland County	Block Group 4, Census Tract 32.03, Cumberland County, North Carolina	562	279	49.6	157	27.9
NC	Cumberland County	Block Group 3, Census Tract 30.04, Cumberland County, North Carolina	1832	531	29	240	13.1
NC	Cumberland County	Block Group 1, Census Tract 31.02, Cumberland County, North Carolina	631	204	32.3	71	11.3
NC	Cumberland County	Block Group 1, Census Tract 27.02, Cumberland County, North Carolina	1354	244	18	252	18.6
NC	Cumberland County	Block Group 2, Census Tract 31.05, Cumberland County, North Carolina	2546	776	30.5	601	23.6
NC	Cumberland County	Block Group 5, Census Tract 12, Cumberland County, North Carolina	722	545	75.5	213	30.9
NC	Cumberland County	Block Group 3, Census Tract 30.03, Cumberland County, North Carolina	2702	684	25.3	242	9
NC	Cumberland County	Block Group 4, Census Tract 27.02, Cumberland County, North Carolina	1249	432	34.6	56	4.5
NC	Cumberland County	Block Group 2, Census Tract 16.06, Cumberland County, North Carolina	2442	1494	61.2	203	9.4
NC	Cumberland County	Block Group 2, Census Tract 31.03, Cumberland County, North Carolina	2789	1661	59.6	802	28.8
NC	Cumberland County	Block Group 1, Census Tract 31.05, Cumberland County, North Carolina	2025	1199	59.2	105	5.2
NC	Cumberland County	Block Group 2, Census Tract 32.06, Cumberland County, North Carolina	2250	1280	56.9	0	0

NC	Cumberland County	Block Group 2, Census Tract 33.13, Cumberland County, North Carolina	3276	2727	83.2	313	9.6
NC	Cumberland County	Block Group 1, Census Tract 34.09, Cumberland County, North Carolina	5375	2063	38.4	64	7
NC	Cumberland County	Block Group 3, Census Tract 38, Cumberland County, North Carolina	618	587	95	162	26.4
NC	Cumberland County	Block Group 2, Census Tract 19.03, Cumberland County, North Carolina	1360	771	56.7	267	19.7
NC	Cumberland County	Block Group 3, Census Tract 33.14, Cumberland County, North Carolina	3521	2742	77.9	482	13.7
NC	Cumberland County	Block Group 3, Census Tract 25.01, Cumberland County, North Carolina	1887	768	40.7	378	20.1
NC	Cumberland County	Block Group 3, Census Tract 25.04, Cumberland County, North Carolina	2505	1537	61.4	96	3.8
NC	Cumberland County	Block Group 1, Census Tract 16.05, Cumberland County, North Carolina	1760	916	52	364	21.5
NC	Cumberland County	Block Group 2, Census Tract 32.07, Cumberland County, North Carolina	1818	1015	55.8	62	3.4
NC	Cumberland County	Block Group 1, Census Tract 32.03, Cumberland County, North Carolina	865	411	47.5	89	10.3
NC	Cumberland County	Block Group 2, Census Tract 28.01, Cumberland County, North Carolina	1956	464	23.7	403	20.6
NC	Cumberland County	Block Group 2, Census Tract 25.04, Cumberland County, North Carolina	3628	1972	54.4	517	14.3
NC	Cumberland County	Block Group 1, Census Tract 32.07, Cumberland County, North Carolina	3959	1554	39.3	479	12.1
NC	Cumberland County	Block Group 3, Census Tract 21, Cumberland County, North Carolina	1151	239	20.8	9	0.8
NC	Cumberland County	Block Group 1, Census Tract 28.01, Cumberland County, North Carolina	1896	565	29.8	263	13.9
NC	Cumberland County	Block Group 2, Census Tract 33.12, Cumberland County, North Carolina	3309	2481	75	1069	32.4
NC	Cumberland County	Block Group 4, Census Tract 19.03, Cumberland County, North Carolina	809	454	56.1	252	31.3
NC	Cumberland County	Block Group 2, Census Tract 29, Cumberland County, North Carolina	1496	492	32.9	134	9
NC	Cumberland County	Block Group 2, Census Tract 10, Cumberland County, North Carolina	1449	1364	94.1	638	45.1
NC	Cumberland County	Block Group 1, Census Tract 33.07, Cumberland County, North Carolina	419	299	71.4	84	20.1
NC	Cumberland County	Block Group 2, Census Tract 25.03, Cumberland County, North Carolina	1581	803	50.8	458	29.5
NC	Cumberland County	Block Group 2, Census Tract 7.01, Cumberland County, North Carolina	1251	136	10.9	17	1.4
NC	Cumberland County	Block Group 1, Census Tract 32.06, Cumberland County, North Carolina	1807	1108	61.3	34	1.9
NC	Cumberland County	Block Group 1, Census Tract 36.01, Cumberland County, North Carolina	1764	1105	62.6	292	16.6
NC	Cumberland County	Block Group 1, Census Tract 9802, Cumberland County, North Carolina	549	221	40.3	0	0
NC	Cumberland County	Block Group 2, Census Tract 27.02, Cumberland County, North Carolina	1838	796	43.3	136	7.4
NC	Cumberland County	Block Group 2, Census Tract 17.02, Cumberland County, North Carolina	2538	1711	67.4	353	14.1
NC	Cumberland County	Block Group 3, Census Tract 16.05, Cumberland County, North Carolina	725	414	57.1	49	6.8
NC	Cumberland County	Block Group 3, Census Tract 32.03, Cumberland County, North Carolina	631	509	80.7	289	45.8
NC	Cumberland County	Block Group 1, Census Tract 33.13, Cumberland County, North Carolina	4722	3659	77.5	491	10.5
NC	Cumberland County	Block Group 1, Census Tract 33.17, Cumberland County, North Carolina	1514	793	52.4	68	4.5
NC	Cumberland County	Block Group 3, Census Tract 32.05, Cumberland County, North Carolina	771	554	71.9	179	23.2
NC	Cumberland County	Block Group 3, Census Tract 34.08, Cumberland County, North Carolina	1202	394	32.8	142	11.8
NC	Cumberland County	Block Group 1, Census Tract 6, Cumberland County, North Carolina	1403	872	62.2	481	37.4
NC	Cumberland County	Block Group 1, Census Tract 30.02, Cumberland County, North Carolina	1151	287	24.9	149	12.9
NC	Cumberland County	Block Group 2, Census Tract 26, Cumberland County, North Carolina	1856	1080	58.2	271	14.6
NC	Cumberland County	Block Group 1, Census Tract 20.02, Cumberland County, North Carolina	325	189	58.2	131	40.3
NC	Cumberland County	Block Group 2, Census Tract 14.01, Cumberland County, North Carolina	1475	745	50.5	425	28.8
NC	Cumberland County	Block Group 3, Census Tract 11, Cumberland County, North Carolina	1916	1715	89.5	201	17.8
NC	Cumberland County	Block Group 2, Census Tract 25.01, Cumberland County, North Carolina	951	608	63.9	133	14
NC	Cumberland County	Block Group 1, Census Tract 31.06, Cumberland County, North Carolina	388	129	33.2	63	16.2
NC	Cumberland County	Block Group 3, Census Tract 36.02, Cumberland County, North Carolina	1264	906	71.7	490	38.9
NC	Cumberland County	Block Group 2, Census Tract 22, Cumberland County, North Carolina	1222	866	70.9	353	28.9
NC	Cumberland County	Block Group 1, Census Tract 30.04, Cumberland County, North Carolina	2176	564	25.9	17	0.8
NC	Cumberland County	Block Group 5, Census Tract 9, Cumberland County, North Carolina	551	167	30.3	110	20
NC	Cumberland County	Block Group 1, Census Tract 7.01, Cumberland County, North Carolina	1964	677	34.5	397	20.2
NC	Cumberland County	Block Group 4, Census Tract 16.04, Cumberland County, North Carolina	1697	1183	69.7	775	45.9
NC	Cumberland County	Block Group 3, Census Tract 33.02, Cumberland County, North Carolina	1692	1447	85.5	314	18.6
NC	Cumberland County	Block Group 3, Census Tract 32.07, Cumberland County, North Carolina	1622	629	38.8	22	1.4
NC	Cumberland County	Block Group 1, Census Tract 34.10, Cumberland County, North Carolina	2033	918	45.2	257	13.6
NC	Cumberland County	Block Group 3, Census Tract 31.03, Cumberland County, North Carolina	1753	737	42	88	5.1
NC	Cumberland County	Block Group 2, Census Tract 8, Cumberland County, North Carolina	851	263	30.9	130	15.3
NC	Cumberland County	Block Group 4, Census Tract 25.01, Cumberland County, North Carolina	3572	2126	59.5	716	20.3
NC	Cumberland County	Block Group 1, Census Tract 19.01, Cumberland County, North Carolina	899	565	62.8	153	17
NC	Cumberland County	Block Group 3, Census Tract 33.15, Cumberland County, North Carolina	764	598	78.3	178	23.3
NC	Cumberland County	Block Group 3, Census Tract 33.04, Cumberland County, North Carolina	2952	2164	73.3	740	25.1
NC	Cumberland County	Block Group 1, Census Tract 27.01, Cumberland County, North Carolina	1564	289	18.5	90	6.1
NC	Cumberland County	Block Group 2, Census Tract 19.01, Cumberland County, North Carolina	1221	575	47.1	314	25.7
NC	Cumberland County	Block Group 1, Census Tract 15, Cumberland County, North Carolina	1343	534	39.8	80	6
NC	Cumberland County	Block Group 3, Census Tract 34.03, Cumberland County, North Carolina	1391	772	55.5	132	10.8
NC	Cumberland County	Block Group 4, Census Tract 29, Cumberland County, North Carolina	1207	226	18.7	339	28.1
NC	Cumberland County	Block Group 2, Census Tract 37, Cumberland County, North Carolina	1447	409	28.3	45	3.1
NC	Cumberland County	Block Group 1, Census Tract 5, Cumberland County, North Carolina	1450	940	64.8	514	35.4
NC	Cumberland County	Block Group 1, Census Tract 26, Cumberland County, North Carolina	1409	370	26.3	227	16.1
NC	Cumberland County	Block Group 1, Census Tract 14.01, Cumberland County, North Carolina	658	137	20.8	0	0
NC	Cumberland County	Block Group 3, Census Tract 31.02, Cumberland County, North Carolina	2549	1143	44.8	247	9.7
NC	Cumberland County	Block Group 1, Census Tract 33.14, Cumberland County, North Carolina	1998	1595	79.8	468	23.4
NC	Cumberland County	Block Group 2, Census Tract 34.03, Cumberland County, North Carolina	1071	728	68	126	11.8
NC	Cumberland County	Block Group 2, Census Tract 9, Cumberland County, North Carolina	608	414	68.1	141	23.2
NC	Cumberland County	Block Group 1, Census Tract 7.02, Cumberland County, North Carolina	1365	283	20.7	127	9.3

NC	Cumberland County	Block Group 1, Census Tract 14.02, Cumberland County, North Carolina	1168	799	68.4	301	25.8
NC	Cumberland County	Block Group 1, Census Tract 30.03, Cumberland County, North Carolina	3162	1842	58.3	687	22.2
NC	Cumberland County	Block Group 3, Census Tract 36.01, Cumberland County, North Carolina	566	395	69.8	217	38.3
NC	Cumberland County	Block Group 4, Census Tract 33.10, Cumberland County, North Carolina	1777	1511	85	371	20.9
NC	Cumberland County	Block Group 3, Census Tract 32.08, Cumberland County, North Carolina	1856	1306	70.4	439	23.7
NC	Cumberland County	Block Group 1, Census Tract 24.02, Cumberland County, North Carolina	796	744	93.5	223	28.2
NC	Cumberland County	Block Group 3, Census Tract 16.04, Cumberland County, North Carolina	2628	1296	49.3	179	6.9
NC	Cumberland County	Block Group 2, Census Tract 35.01, Cumberland County, North Carolina	358	293	81.8	81	22.6
NC	Cumberland County	Block Group 1, Census Tract 25.06, Cumberland County, North Carolina	1312	659	50.2	66	5.2
NC	Cumberland County	Block Group 3, Census Tract 23.01, Cumberland County, North Carolina	1103	661	59.9	545	49.4
NC	Cumberland County	Block Group 1, Census Tract 2, Cumberland County, North Carolina	295	282	95.6	185	62.7
NC	Cumberland County	Block Group 2, Census Tract 33.11, Cumberland County, North Carolina	1883	1360	72.2	224	11.9
NC	Cumberland County	Block Group 2, Census Tract 16.03, Cumberland County, North Carolina	925	447	48.3	95	10.3
NC	Cumberland County	Block Group 1, Census Tract 19.03, Cumberland County, North Carolina	1125	837	74.4	362	32.2
NC	Cumberland County	Block Group 2, Census Tract 31.02, Cumberland County, North Carolina	2697	1292	47.9	195	7.2
NC	Cumberland County	Block Group 2, Census Tract 33.02, Cumberland County, North Carolina	1634	1300	79.6	596	36.5
NC	Cumberland County	Block Group 2, Census Tract 12, Cumberland County, North Carolina	638	628	98.4	446	69.9
NC	Cumberland County	Block Group 2, Census Tract 38, Cumberland County, North Carolina	972	584	60.1	78	24.9
NC	Cumberland County	Block Group 3, Census Tract 20.02, Cumberland County, North Carolina	1162	681	58.6	173	15
NC	Cumberland County	Block Group 1, Census Tract 34.08, Cumberland County, North Carolina	1953	868	44.4	140	8.8
NC	Cumberland County	Block Group 1, Census Tract 29, Cumberland County, North Carolina	1411	527	37.3	270	19.1
NC	Cumberland County	Block Group 6, Census Tract 33.04, Cumberland County, North Carolina	517	517	100	240	46.4

Holly Springs Study Area Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Wake County	Block Group 2, Census Tract 534.31, Wake County, North Carolina	2272	1520	66.9	136	6
NC	Wake County	Block Group 3, Census Tract 532.06, Wake County, North Carolina	1671	768	46	22	1.3
NC	Wake County	Block Group 2, Census Tract 532.04, Wake County, North Carolina	2410	908	37.7	182	7.6
NC	Wake County	Block Group 1, Census Tract 532.04, Wake County, North Carolina	2815	889	31.6	272	9.7
NC	Wake County	Block Group 1, Census Tract 532.03, Wake County, North Carolina	4823	1469	30.5	175	3.6
NC	Wake County	Block Group 1, Census Tract 532.08, Wake County, North Carolina	5165	1503	29.1	133	2.6
NC	Wake County	Block Group 1, Census Tract 534.32, Wake County, North Carolina	2563	739	28.8	185	7.2
NC	Wake County	Block Group 2, Census Tract 532.08, Wake County, North Carolina	5540	1526	27.5	133	2.4
NC	Wake County	Block Group 2, Census Tract 532.06, Wake County, North Carolina	1680	452	26.9	29	1.8
NC	Wake County	Block Group 1, Census Tract 534.31, Wake County, North Carolina	2635	652	24.7	74	2.8
NC	Wake County	Block Group 2, Census Tract 532.03, Wake County, North Carolina	3472	858	24.7	0	0
NC	Wake County	Block Group 2, Census Tract 532.05, Wake County, North Carolina	1767	278	15.7	100	5.7
NC	Wake County	Block Group 1, Census Tract 532.02, Wake County, North Carolina	3890	330	8.5	456	11.7

Wake County Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Wake County	Block Group 2, Census Tract 534.17, Wake County, North Carolina	2252	652	29	25	1.1
NC	Wake County	Block Group 2, Census Tract 532.09, Wake County, North Carolina	1073	431	40	247	23
NC	Wake County	Block Group 3, Census Tract 543.06, Wake County, North Carolina	1419	917	65	227	16
NC	Wake County	Block Group 1, Census Tract 543.04, Wake County, North Carolina	2379	870	37	201	8.5
NC	Wake County	Block Group 3, Census Tract 511.02, Wake County, North Carolina	870	523	60	27	23.9
NC	Wake County	Block Group 2, Census Tract 532.03, Wake County, North Carolina	3472	858	25	0	0
NC	Wake County	Block Group 1, Census Tract 532.08, Wake County, North Carolina	5165	1503	29	133	2.6
NC	Wake County	Block Group 2, Census Tract 532.05, Wake County, North Carolina	1767	278	16	100	5.7
NC	Wake County	Block Group 1, Census Tract 508, Wake County, North Carolina	1130	1050	93	283	25
NC	Wake County	Block Group 2, Census Tract 543.05, Wake County, North Carolina	2201	1184	54	66	3
NC	Wake County	Block Group 1, Census Tract 532.02, Wake County, North Carolina	3890	330	8	456	11.7
NC	Wake County	Block Group 2, Census Tract 523.07, Wake County, North Carolina	1730	1063	61	412	25.9
NC	Wake County	Block Group 1, Census Tract 540.17, Wake County, North Carolina	2858	1202	42	229	8.4
NC	Wake County	Block Group 3, Census Tract 537.22, Wake County, North Carolina	1004	0	0	0	0
NC	Wake County	Block Group 2, Census Tract 540.01, Wake County, North Carolina	1266	243	19	82	6.5
NC	Wake County	Block Group 3, Census Tract 519, Wake County, North Carolina	1144	578	50	412	36
NC	Wake County	Block Group 1, Census Tract 536.20, Wake County, North Carolina	1550	953	62	197	12.7
NC	Wake County	Block Group 1, Census Tract 536.17, Wake County, North Carolina	2075	474	23	122	5.9
NC	Wake County	Block Group 3, Census Tract 534.34, Wake County, North Carolina	3121	874	28	367	11.8

NC	Wake County	Block Group 2, Census Tract 536.08, Wake County, North Carolina	3011	1751	58	89	3
NC	Wake County	Block Group 1, Census Tract 541.15, Wake County, North Carolina	3241	2476	76	80	2.5
NC	Wake County	Block Group 1, Census Tract 532.04, Wake County, North Carolina	2815	889	32	272	9.7
NC	Wake County	Block Group 4, Census Tract 531.14, Wake County, North Carolina	785	27	3	60	7.6
NC	Wake County	Block Group 2, Census Tract 523.04, Wake County, North Carolina	680	120	18	377	55.4
NC	Wake County	Block Group 2, Census Tract 528.16, Wake County, North Carolina	4731	4573	97	93	2
NC	Wake County	Block Group 3, Census Tract 527.07, Wake County, North Carolina	1814	1277	70	63	3.5
NC	Wake County	Block Group 1, Census Tract 528.02, Wake County, North Carolina	2403	1166	48	158	6.6
NC	Wake County	Block Group 2, Census Tract 537.25, Wake County, North Carolina	1177	197	17	23	2
NC	Wake County	Block Group 2, Census Tract 532.06, Wake County, North Carolina	1680	452	27	29	1.8
NC	Wake County	Block Group 3, Census Tract 501, Wake County, North Carolina	964	223	23	69	7.2
NC	Wake County	Block Group 2, Census Tract 540.08, Wake County, North Carolina	2998	2685	90	869	29
NC	Wake County	Block Group 1, Census Tract 525.08, Wake County, North Carolina	2098	1021	49	356	17
NC	Wake County	Block Group 2, Census Tract 534.11, Wake County, North Carolina	2243	985	44	95	4.2
NC	Wake County	Block Group 1, Census Tract 515.01, Wake County, North Carolina	1620	296	18	48	3
NC	Wake County	Block Group 2, Census Tract 521.01, Wake County, North Carolina	1278	1246	98	105	8.2
NC	Wake County	Block Group 1, Census Tract 534.22, Wake County, North Carolina	2252	497	22	47	2.1
NC	Wake County	Block Group 2, Census Tract 540.12, Wake County, North Carolina	1162	228	20	16	1.4
NC	Wake County	Block Group 1, Census Tract 534.27, Wake County, North Carolina	1619	324	20	19	1.2
NC	Wake County	Block Group 2, Census Tract 506, Wake County, North Carolina	1004	936	93	540	53.8
NC	Wake County	Block Group 2, Census Tract 510, Wake County, North Carolina	1244	369	30	208	16.7
NC	Wake County	Block Group 1, Census Tract 537.29, Wake County, North Carolina	2365	451	19	35	1.5
NC	Wake County	Block Group 4, Census Tract 530.11, Wake County, North Carolina	977	301	31	116	11.9
NC	Wake County	Block Group 2, Census Tract 540.04, Wake County, North Carolina	1403	510	36	475	34
NC	Wake County	Block Group 3, Census Tract 537.14, Wake County, North Carolina	783	128	16	14	1.8
NC	Wake County	Block Group 2, Census Tract 525.07, Wake County, North Carolina	2234	539	24	220	9.8
NC	Wake County	Block Group 2, Census Tract 508, Wake County, North Carolina	929	856	92	436	48.3
NC	Wake County	Block Group 1, Census Tract 542.12, Wake County, North Carolina	2008	1152	57	0	0
NC	Wake County	Block Group 1, Census Tract 536.18, Wake County, North Carolina	2801	2205	79	133	4.7
NC	Wake County	Block Group 2, Census Tract 537.30, Wake County, North Carolina	1989	644	32	73	3.7
NC	Wake County	Block Group 1, Census Tract 532.06, Wake County, North Carolina	1537	747	49	95	6.2
NC	Wake County	Block Group 1, Census Tract 540.16, Wake County, North Carolina	1474	293	20	80	5.4
NC	Wake County	Block Group 5, Census Tract 530.03, Wake County, North Carolina	934	214	23	114	12.2
NC	Wake County	Block Group 2, Census Tract 534.21, Wake County, North Carolina	2525	509	20	146	5.8
NC	Wake County	Block Group 4, Census Tract 527.07, Wake County, North Carolina	1537	860	56	309	20.1
NC	Wake County	Block Group 1, Census Tract 543.03, Wake County, North Carolina	1487	1023	69	128	9
NC	Wake County	Block Group 1, Census Tract 542.03, Wake County, North Carolina	1715	407	24	57	3.3
NC	Wake County	Block Group 2, Census Tract 535.20, Wake County, North Carolina	3192	782	24	242	7.6
NC	Wake County	Block Group 2, Census Tract 532.02, Wake County, North Carolina	1913	281	15	67	3.5
NC	Wake County	Block Group 3, Census Tract 514, Wake County, North Carolina	693	55	8	0	0
NC	Wake County	Block Group 2, Census Tract 527.06, Wake County, North Carolina	2590	1938	75	290	11.7
NC	Wake County	Block Group 2, Census Tract 542.20, Wake County, North Carolina	929	374	40	0	0
NC	Wake County	Block Group 1, Census Tract 523.03, Wake County, North Carolina	1324	130	10	321	24.2
NC	Wake County	Block Group 1, Census Tract 540.23, Wake County, North Carolina	2939	2363	80	0	0
NC	Wake County	Block Group 2, Census Tract 537.23, Wake County, North Carolina	1640	333	20	43	2.6
NC	Wake County	Block Group 1, Census Tract 528.14, Wake County, North Carolina	1093	468	43	213	19.5
NC	Wake County	Block Group 3, Census Tract 528.01, Wake County, North Carolina	3188	1649	52	0	0
NC	Wake County	Block Group 3, Census Tract 516, Wake County, North Carolina	806	91	11	0	0
NC	Wake County	Block Group 1, Census Tract 530.11, Wake County, North Carolina	1502	990	66	0	0
NC	Wake County	Block Group 1, Census Tract 521.02, Wake County, North Carolina	2139	2069	97	362	17
NC	Wake County	Block Group 2, Census Tract 541.21, Wake County, North Carolina	3791	2406	64	493	13
NC	Wake County	Block Group 2, Census Tract 515.02, Wake County, North Carolina	1350	46	3	18	1.3
NC	Wake County	Block Group 2, Census Tract 507, Wake County, North Carolina	711	491	69	211	29.7
NC	Wake County	Block Group 1, Census Tract 537.16, Wake County, North Carolina	1009	147	15	17	1.7
NC	Wake County	Block Group 1, Census Tract 523.06, Wake County, North Carolina	871	235	27	226	25.9
NC	Wake County	Block Group 2, Census Tract 543.04, Wake County, North Carolina	1414	339	24	36	2.5
NC	Wake County	Block Group 2, Census Tract 531.11, Wake County, North Carolina	2192	925	42	179	8.2
NC	Wake County	Block Group 1, Census Tract 535.13, Wake County, North Carolina	1886	908	48	109	5.8
NC	Wake County	Block Group 3, Census Tract 530.06, Wake County, North Carolina	854	115	14	22	2.6
NC	Wake County	Block Group 1, Census Tract 530.04, Wake County, North Carolina	1417	122	9	103	7.3
NC	Wake County	Block Group 3, Census Tract 537.27, Wake County, North Carolina	2896	1075	37	156	5.4
NC	Wake County	Block Group 1, Census Tract 526.02, Wake County, North Carolina	1573	205	13	77	4.9
NC	Wake County	Block Group 1, Census Tract 534.24, Wake County, North Carolina	1656	492	30	74	4.5
NC	Wake County	Block Group 2, Census Tract 534.31, Wake County, North Carolina	2272	1520	67	136	6
NC	Wake County	Block Group 2, Census Tract 524.07, Wake County, North Carolina	1094	331	30	98	9

NC	Wake County	Block Group 2, Census Tract 509, Wake County, North Carolina	972	784	81	250	25.8
NC	Wake County	Block Group 1, Census Tract 524.10, Wake County, North Carolina	1388	601	43	205	14.8
NC	Wake County	Block Group 2, Census Tract 537.13, Wake County, North Carolina	1688	711	42	0	0
NC	Wake County	Block Group 2, Census Tract 537.11, Wake County, North Carolina	1588	268	17	0	0
NC	Wake County	Block Group 1, Census Tract 542.23, Wake County, North Carolina	1097	556	51	91	8.3
NC	Wake County	Block Group 2, Census Tract 542.15, Wake County, North Carolina	3128	1391	44	0	0
NC	Wake County	Block Group 1, Census Tract 519, Wake County, North Carolina	1994	1089	55	235	11.8
NC	Wake County	Block Group 2, Census Tract 535.18, Wake County, North Carolina	1651	501	30	73	4.4
NC	Wake County	Block Group 4, Census Tract 538.08, Wake County, North Carolina	681	106	16	0	0
NC	Wake County	Block Group 1, Census Tract 537.22, Wake County, North Carolina	1207	184	15	37	3.1
NC	Wake County	Block Group 1, Census Tract 545.02, Wake County, North Carolina	1500	1149	77	137	9.1
NC	Wake County	Block Group 3, Census Tract 531.12, Wake County, North Carolina	2333	616	26	21	0.9
NC	Wake County	Block Group 2, Census Tract 531.14, Wake County, North Carolina	1062	523	49	0	0
NC	Wake County	Block Group 1, Census Tract 534.26, Wake County, North Carolina	2509	1785	71	53	2.1
NC	Wake County	Block Group 2, Census Tract 534.10, Wake County, North Carolina	2318	1116	48	170	7.4
NC	Wake County	Block Group 3, Census Tract 541.16, Wake County, North Carolina	3107	2948	95	529	17
NC	Wake County	Block Group 1, Census Tract 512, Wake County, North Carolina	1715	312	18	232	13.5
NC	Wake County	Block Group 2, Census Tract 528.10, Wake County, North Carolina	2507	1857	74	440	17.6
NC	Wake County	Block Group 2, Census Tract 504, Wake County, North Carolina	887	340	38	86	16.2
NC	Wake County	Block Group 1, Census Tract 532.03, Wake County, North Carolina	4823	1469	30	175	3.6
NC	Wake County	Block Group 1, Census Tract 541.08, Wake County, North Carolina	2124	1193	56	118	5.9
NC	Wake County	Block Group 1, Census Tract 517, Wake County, North Carolina	859	0	0	0	0
NC	Wake County	Block Group 3, Census Tract 542.17, Wake County, North Carolina	2717	728	27	0	0
NC	Wake County	Block Group 3, Census Tract 535.20, Wake County, North Carolina	1988	1397	70	235	11.8
NC	Wake County	Block Group 2, Census Tract 535.16, Wake County, North Carolina	1033	200	19	35	3.4
NC	Wake County	Block Group 1, Census Tract 527.07, Wake County, North Carolina	1200	798	66	140	11.7
NC	Wake County	Block Group 4, Census Tract 514, Wake County, North Carolina	921	147	16	519	58.3
NC	Wake County	Block Group 4, Census Tract 528.11, Wake County, North Carolina	2663	2461	92	140	5.3
NC	Wake County	Block Group 2, Census Tract 540.19, Wake County, North Carolina	2917	680	23	29	1
NC	Wake County	Block Group 2, Census Tract 536.16, Wake County, North Carolina	689	201	29	59	8.6
NC	Wake County	Block Group 1, Census Tract 534.10, Wake County, North Carolina	3862	2347	61	181	4.7
NC	Wake County	Block Group 2, Census Tract 523.03, Wake County, North Carolina	3108	1267	41	1645	52.9
NC	Wake County	Block Group 2, Census Tract 532.08, Wake County, North Carolina	5540	1526	28	133	2.4
NC	Wake County	Block Group 2, Census Tract 536.12, Wake County, North Carolina	2199	1198	54	60	2.7
NC	Wake County	Block Group 2, Census Tract 528.14, Wake County, North Carolina	1154	884	77	137	11.9
NC	Wake County	Block Group 3, Census Tract 536.13, Wake County, North Carolina	1601	395	25	0	0
NC	Wake County	Block Group 2, Census Tract 537.24, Wake County, North Carolina	1725	536	31	26	1.5
NC	Wake County	Block Group 3, Census Tract 507, Wake County, North Carolina	1187	1061	89	74	6.3
NC	Wake County	Block Group 1, Census Tract 524.11, Wake County, North Carolina	2415	1292	54	487	20.2
NC	Wake County	Block Group 2, Census Tract 535.09, Wake County, North Carolina	2253	591	26	14	0.6
NC	Wake County	Block Group 3, Census Tract 542.18, Wake County, North Carolina	1272	476	37	24	1.9
NC	Wake County	Block Group 1, Census Tract 541.14, Wake County, North Carolina	2637	1019	39	94	3.6
NC	Wake County	Block Group 1, Census Tract 537.17, Wake County, North Carolina	1253	254	20	51	4.1
NC	Wake County	Block Group 2, Census Tract 527.04, Wake County, North Carolina	1920	1580	82	194	10.1
NC	Wake County	Block Group 2, Census Tract 534.19, Wake County, North Carolina	2367	348	15	62	2.6
NC	Wake County	Block Group 3, Census Tract 523.07, Wake County, North Carolina	1165	308	26	204	17.5
NC	Wake County	Block Group 1, Census Tract 537.28, Wake County, North Carolina	928	468	50	53	5.7
NC	Wake County	Block Group 1, Census Tract 537.14, Wake County, North Carolina	1747	428	24	132	7.6
NC	Wake County	Block Group 4, Census Tract 536.20, Wake County, North Carolina	1238	587	47	88	7.1
NC	Wake County	Block Group 2, Census Tract 544.03, Wake County, North Carolina	1181	660	56	26	2.2
NC	Wake County	Block Group 3, Census Tract 530.07, Wake County, North Carolina	898	0	0	25	2.8
NC	Wake County	Block Group 3, Census Tract 505, Wake County, North Carolina	812	303	37	98	12.1
NC	Wake County	Block Group 2, Census Tract 520.02, Wake County, North Carolina	2836	2473	87	211	7.4
NC	Wake County	Block Group 1, Census Tract 541.19, Wake County, North Carolina	4057	2314	57	131	3.3
NC	Wake County	Block Group 1, Census Tract 534.32, Wake County, North Carolina	2563	739	29	185	7.2
NC	Wake County	Block Group 1, Census Tract 525.04, Wake County, North Carolina	2042	1084	53	106	5.3
NC	Wake County	Block Group 2, Census Tract 530.04, Wake County, North Carolina	1423	391	28	40	2.8
NC	Wake County	Block Group 2, Census Tract 524.01, Wake County, North Carolina	1075	248	23	0	0
NC	Wake County	Block Group 1, Census Tract 524.08, Wake County, North Carolina	1112	528	48	261	23.5
NC	Wake County	Block Group 2, Census Tract 540.07, Wake County, North Carolina	2274	602	26	197	8.8
NC	Wake County	Block Group 4, Census Tract 545.02, Wake County, North Carolina	975	760	78	426	43.7
NC	Wake County	Block Group 2, Census Tract 534.29, Wake County, North Carolina	2218	222	10	120	5.4
NC	Wake County	Block Group 2, Census Tract 525.06, Wake County, North Carolina	1449	101	7	15	1
NC	Wake County	Block Group 4, Census Tract 545.01, Wake County, North Carolina	2411	1456	60	827	34.3
NC	Wake County	Block Group 3, Census Tract 531.13, Wake County, North Carolina	512	174	34	47	9.2
NC	Wake County	Block Group 3, Census Tract 503, Wake County, North Carolina	969	117	12	88	9.1
NC	Wake County	Block Group 3, Census Tract 530.03, Wake County, North Carolina	1403	719	51	65	4.6
NC	Wake County	Block Group 1, Census Tract 503, Wake County, North Carolina	1743	106	6	243	13.9
NC	Wake County	Block Group 3, Census Tract 541.14, Wake County, North Carolina	2878	2067	72	1077	37.4
NC	Wake County	Block Group 1, Census Tract 528.11, Wake County, North Carolina	618	618	100	57	9.2

NC	Wake County	Block Group 1, Census Tract 511.02, Wake County, North Carolina	517	161	31	0	0
NC	Wake County	Block Group 2, Census Tract 534.25, Wake County, North Carolina	1496	1323	88	39	2.6
NC	Wake County	Block Group 1, Census Tract 518, Wake County, North Carolina	1989	114	6	82	4.1
NC	Wake County	Block Group 2, Census Tract 544.02, Wake County, North Carolina	2032	1039	51	346	17
NC	Wake County	Block Group 3, Census Tract 535.17, Wake County, North Carolina	1750	840	48	132	7.7
NC	Wake County	Block Group 1, Census Tract 536.08, Wake County, North Carolina	4615	3413	74	224	4.9
NC	Wake County	Block Group 2, Census Tract 542.24, Wake County, North Carolina	1350	871	64	102	7.6
NC	Wake County	Block Group 3, Census Tract 537.20, Wake County, North Carolina	2060	142	7	51	2.5
NC	Wake County	Block Group 2, Census Tract 536.17, Wake County, North Carolina	4521	2625	58	608	13.4
NC	Wake County	Block Group 1, Census Tract 534.35, Wake County, North Carolina	4095	1037	25	107	2.6
NC	Wake County	Block Group 1, Census Tract 538.08, Wake County, North Carolina	1042	249	24	27	2.6
NC	Wake County	Block Group 1, Census Tract 514, Wake County, North Carolina	805	129	16	127	15.8
NC	Wake County	Block Group 3, Census Tract 540.12, Wake County, North Carolina	584	56	10	3	0.5
NC	Wake County	Block Group 3, Census Tract 534.15, Wake County, North Carolina	2358	1334	57	367	15.6
NC	Wake County	Block Group 1, Census Tract 520.01, Wake County, North Carolina	2611	2363	90	758	31.2
NC	Wake County	Block Group 2, Census Tract 541.15, Wake County, North Carolina	1260	477	38	201	16.6
NC	Wake County	Block Group 5, Census Tract 531.14, Wake County, North Carolina	1726	1308	76	279	16.2
NC	Wake County	Block Group 2, Census Tract 539.02, Wake County, North Carolina	2485	425	17	42	1.7
NC	Wake County	Block Group 2, Census Tract 527.05, Wake County, North Carolina	672	434	65	29	4.3
NC	Wake County	Block Group 1, Census Tract 532.10, Wake County, North Carolina	5246	804	15	137	2.6
NC	Wake County	Block Group 4, Census Tract 528.02, Wake County, North Carolina	1305	329	25	76	5.8
NC	Wake County	Block Group 3, Census Tract 536.11, Wake County, North Carolina	1721	873	51	85	4.9
NC	Wake County	Block Group 2, Census Tract 542.22, Wake County, North Carolina	1884	428	23	0	0
NC	Wake County	Block Group 1, Census Tract 541.09, Wake County, North Carolina	1846	744	40	44	2.4
NC	Wake County	Block Group 4, Census Tract 537.22, Wake County, North Carolina	732	196	27	14	1.9
NC	Wake County	Block Group 1, Census Tract 536.15, Wake County, North Carolina	1627	693	43	77	4.7
NC	Wake County	Block Group 1, Census Tract 528.01, Wake County, North Carolina	1093	381	35	0	0
NC	Wake County	Block Group 1, Census Tract 528.13, Wake County, North Carolina	801	496	62	85	10.6
NC	Wake County	Block Group 2, Census Tract 540.22, Wake County, North Carolina	1601	1148	72	619	38.7
NC	Wake County	Block Group 2, Census Tract 535.19, Wake County, North Carolina	2931	1844	63	311	10.6
NC	Wake County	Block Group 1, Census Tract 541.12, Wake County, North Carolina	1355	811	60	122	9
NC	Wake County	Block Group 1, Census Tract 540.21, Wake County, North Carolina	1238	123	10	20	1.6
NC	Wake County	Block Group 1, Census Tract 534.15, Wake County, North Carolina	1018	202	20	10	1
NC	Wake County	Block Group 2, Census Tract 515.01, Wake County, North Carolina	2396	185	8	4	0.2
NC	Wake County	Block Group 1, Census Tract 538.03, Wake County, North Carolina	2615	440	17	54	2.1
NC	Wake County	Block Group 3, Census Tract 540.08, Wake County, North Carolina	1440	1175	82	43	3
NC	Wake County	Block Group 2, Census Tract 525.08, Wake County, North Carolina	1739	226	13	11	0.7
NC	Wake County	Block Group 2, Census Tract 535.24, Wake County, North Carolina	2046	509	25	163	8
NC	Wake County	Block Group 1, Census Tract 530.03, Wake County, North Carolina	1097	37	3	0	0
NC	Wake County	Block Group 3, Census Tract 524.07, Wake County, North Carolina	1493	944	63	395	26.5
NC	Wake County	Block Group 1, Census Tract 528.09, Wake County, North Carolina	1131	666	59	86	7.6
NC	Wake County	Block Group 2, Census Tract 527.01, Wake County, North Carolina	1570	939	60	333	21.2
NC	Wake County	Block Group 2, Census Tract 537.19, Wake County, North Carolina	1201	84	7	24	2
NC	Wake County	Block Group 3, Census Tract 524.04, Wake County, North Carolina	688	249	36	36	5.2
NC	Wake County	Block Group 1, Census Tract 542.13, Wake County, North Carolina	1072	92	9	0	0
NC	Wake County	Block Group 1, Census Tract 534.34, Wake County, North Carolina	873	27	3	0	0
NC	Wake County	Block Group 2, Census Tract 535.07, Wake County, North Carolina	1581	741	47	263	16.6
NC	Wake County	Block Group 3, Census Tract 506, Wake County, North Carolina	1303	345	26	118	9.1
NC	Wake County	Block Group 3, Census Tract 537.19, Wake County, North Carolina	1129	164	14	5	0.4
NC	Wake County	Block Group 1, Census Tract 526.01, Wake County, North Carolina	2688	266	10	47	1.8
NC	Wake County	Block Group 1, Census Tract 525.05, Wake County, North Carolina	2896	521	18	352	12.2
NC	Wake County	Block Group 1, Census Tract 545.01, Wake County, North Carolina	1435	362	25	70	4.9
NC	Wake County	Block Group 3, Census Tract 534.30, Wake County, North Carolina	1735	475	27	0	0
NC	Wake County	Block Group 3, Census Tract 535.05, Wake County, North Carolina	1049	456	44	58	5.5
NC	Wake County	Block Group 1, Census Tract 540.06, Wake County, North Carolina	2236	1238	55	357	16.3
NC	Wake County	Block Group 1, Census Tract 534.05, Wake County, North Carolina	964	116	12	15	1.6
NC	Wake County	Block Group 2, Census Tract 503, Wake County, North Carolina	708	169	24	124	17.5
NC	Wake County	Block Group 1, Census Tract 541.16, Wake County, North Carolina	2759	1281	46	28	1
NC	Wake County	Block Group 2, Census Tract 511.02, Wake County, North Carolina	3531	619	18	0	0
NC	Wake County	Block Group 1, Census Tract 535.05, Wake County, North Carolina	1123	235	21	182	16.2

NC	Wake County	Block Group 4, Census Tract 531.13, Wake County, North Carolina	1583	791	50	85	5.4
NC	Wake County	Block Group 4, Census Tract 530.03, Wake County, North Carolina	1308	571	44	34	2.6
NC	Wake County	Block Group 2, Census Tract 542.14, Wake County, North Carolina	798	71	9	97	12.2
NC	Wake County	Block Group 2, Census Tract 518, Wake County, North Carolina	1478	134	9	0	0
NC	Wake County	Block Group 4, Census Tract 535.17, Wake County, North Carolina	281	10	4	0	0
NC	Wake County	Block Group 3, Census Tract 542.22, Wake County, North Carolina	2911	889	30	48	1.6
NC	Wake County	Block Group 2, Census Tract 524.08, Wake County, North Carolina	2708	1780	66	1195	44.1
NC	Wake County	Block Group 2, Census Tract 528.11, Wake County, North Carolina	747	508	68	0	0
NC	Wake County	Block Group 1, Census Tract 537.21, Wake County, North Carolina	713	121	17	0	0
NC	Wake County	Block Group 1, Census Tract 542.04, Wake County, North Carolina	3025	975	32	71	2.3
NC	Wake County	Block Group 2, Census Tract 540.16, Wake County, North Carolina	2107	318	15	62	3
NC	Wake County	Block Group 3, Census Tract 535.22, Wake County, North Carolina	3465	2477	72	79	2.3
NC	Wake County	Block Group 1, Census Tract 542.17, Wake County, North Carolina	2766	756	27	0	0
NC	Wake County	Block Group 3, Census Tract 528.07, Wake County, North Carolina	3164	2835	90	118	3.7
NC	Wake County	Block Group 2, Census Tract 536.18, Wake County, North Carolina	1560	1002	64	0	0
NC	Wake County	Block Group 2, Census Tract 534.09, Wake County, North Carolina	2753	941	34	0	0
NC	Wake County	Block Group 2, Census Tract 540.23, Wake County, North Carolina	3086	2782	90	131	4.2
NC	Wake County	Block Group 2, Census Tract 514, Wake County, North Carolina	1047	65	6	346	33
NC	Wake County	Block Group 4, Census Tract 536.11, Wake County, North Carolina	1652	814	49	31	1.9
NC	Wake County	Block Group 1, Census Tract 527.06, Wake County, North Carolina	2073	1616	78	161	7.8
NC	Wake County	Block Group 3, Census Tract 531.15, Wake County, North Carolina	712	89	12	42	5.9
NC	Wake County	Block Group 2, Census Tract 541.06, Wake County, North Carolina	1506	1167	78	53	3.7
NC	Wake County	Block Group 4, Census Tract 516, Wake County, North Carolina	1481	36	2	83	5.6
NC	Wake County	Block Group 4, Census Tract 528.01, Wake County, North Carolina	455	141	31	0	0
NC	Wake County	Block Group 1, Census Tract 537.24, Wake County, North Carolina	2298	956	42	99	4.3
NC	Wake County	Block Group 3, Census Tract 542.20, Wake County, North Carolina	2152	1029	48	549	25.5
NC	Wake County	Block Group 2, Census Tract 537.16, Wake County, North Carolina	1020	242	24	40	3.9
NC	Wake County	Block Group 3, Census Tract 532.06, Wake County, North Carolina	1671	768	46	22	1.3
NC	Wake County	Block Group 2, Census Tract 521.02, Wake County, North Carolina	1466	1319	90	308	21
NC	Wake County	Block Group 2, Census Tract 530.11, Wake County, North Carolina	885	233	26	46	5.2
NC	Wake County	Block Group 4, Census Tract 540.08, Wake County, North Carolina	933	771	83	86	9.2
NC	Wake County	Block Group 1, Census Tract 541.13, Wake County, North Carolina	1835	1244	68	219	11.9
NC	Wake County	Block Group 1, Census Tract 535.22, Wake County, North Carolina	2786	1172	42	113	4.1
NC	Wake County	Block Group 2, Census Tract 524.09, Wake County, North Carolina	1929	839	44	613	49.1
NC	Wake County	Block Group 1, Census Tract 523.07, Wake County, North Carolina	990	508	51	381	38.5
NC	Wake County	Block Group 1, Census Tract 543.05, Wake County, North Carolina	2162	803	37	475	22
NC	Wake County	Block Group 2, Census Tract 528.09, Wake County, North Carolina	1500	583	39	336	22.4
NC	Wake County	Block Group 2, Census Tract 535.13, Wake County, North Carolina	2269	1139	50	201	8.9
NC	Wake County	Block Group 3, Census Tract 527.01, Wake County, North Carolina	2210	1639	74	166	8.2
NC	Wake County	Block Group 1, Census Tract 538.07, Wake County, North Carolina	1979	504	26	0	0
NC	Wake County	Block Group 1, Census Tract 535.25, Wake County, North Carolina	1070	413	39	0	0
NC	Wake County	Block Group 3, Census Tract 525.09, Wake County, North Carolina	601	283	47	100	16.6
NC	Wake County	Block Group 1, Census Tract 541.18, Wake County, North Carolina	2114	1186	56	437	20.7
NC	Wake County	Block Group 1, Census Tract 524.07, Wake County, North Carolina	1893	910	48	99	5.2
NC	Wake County	Block Group 3, Census Tract 509, Wake County, North Carolina	597	518	87	271	45.4
NC	Wake County	Block Group 1, Census Tract 531.12, Wake County, North Carolina	1604	528	33	289	18
NC	Wake County	Block Group 2, Census Tract 542.13, Wake County, North Carolina	1450	447	31	0	0
NC	Wake County	Block Group 2, Census Tract 526.02, Wake County, North Carolina	1626	152	9	17	1
NC	Wake County	Block Group 1, Census Tract 531.06, Wake County, North Carolina	1735	1024	59	465	28
NC	Wake County	Block Group 2, Census Tract 534.24, Wake County, North Carolina	3254	1681	52	35	1.1
NC	Wake County	Block Group 2, Census Tract 525.05, Wake County, North Carolina	1848	816	44	211	11.4
NC	Wake County	Block Group 3, Census Tract 544.02, Wake County, North Carolina	3480	1183	34	568	16.3
NC	Wake County	Block Group 2, Census Tract 545.01, Wake County, North Carolina	1418	804	57	294	20.7
NC	Wake County	Block Group 1, Census Tract 534.31, Wake County, North Carolina	2635	652	25	74	2.8
NC	Wake County	Block Group 3, Census Tract 534.28, Wake County, North Carolina	7346	1791	24	67	0.9
NC	Wake County	Block Group 4, Census Tract 537.19, Wake County, North Carolina	1073	17	2	7	0.7
NC	Wake County	Block Group 2, Census Tract 540.06, Wake County, North Carolina	1149	213	18	81	7
NC	Wake County	Block Group 2, Census Tract 542.03, Wake County, North Carolina	2486	326	13	10	0.4
NC	Wake County	Block Group 2, Census Tract 530.07, Wake County, North Carolina	597	72	12	49	8.2
NC	Wake County	Block Group 1, Census Tract 535.06, Wake County, North Carolina	870	316	36	152	17.5
NC	Wake County	Block Group 2, Census Tract 542.06, Wake County, North Carolina	3210	988	31	46	1.4
NC	Wake County	Block Group 3, Census Tract 537.11, Wake County, North Carolina	1488	397	27	20	1.3
NC	Wake County	Block Group 3, Census Tract 528.10, Wake County, North Carolina	2968	2819	95	637	21.5
NC	Wake County	Block Group 2, Census Tract 542.23, Wake County, North Carolina	1400	146	10	73	5.2
NC	Wake County	Block Group 3, Census Tract 540.01, Wake County, North Carolina	1893	632	33	100	5.4

NC	Wake County	Block Group 1, Census Tract 540.18, Wake County, North Carolina	1341	1049	78	120	8.9
NC	Wake County	Block Group 2, Census Tract 537.29, Wake County, North Carolina	1978	759	38	328	17
NC	Wake County	Block Group 1, Census Tract 505, Wake County, North Carolina	1184	316	27	26	2.3
NC	Wake County	Block Group 3, Census Tract 534.11, Wake County, North Carolina	1764	571	32	0	0
NC	Wake County	Block Group 2, Census Tract 536.20, Wake County, North Carolina	2458	1683	68	0	0
NC	Wake County	Block Group 1, Census Tract 542.16, Wake County, North Carolina	808	370	46	107	13.2
NC	Wake County	Block Group 2, Census Tract 519, Wake County, North Carolina	1652	1285	78	250	15.1
NC	Wake County	Block Group 2, Census Tract 529.06, Wake County, North Carolina	1499	287	19	131	8.7
NC	Wake County	Block Group 1, Census Tract 541.17, Wake County, North Carolina	1857	1443	78	267	14.4
NC	Wake County	Block Group 1, Census Tract 531.13, Wake County, North Carolina	868	356	41	43	5.1
NC	Wake County	Block Group 2, Census Tract 512, Wake County, North Carolina	1310	179	14	175	13.4
NC	Wake County	Block Group 1, Census Tract 528.12, Wake County, North Carolina	1918	541	28	100	5.2
NC	Wake County	Block Group 3, Census Tract 542.21, Wake County, North Carolina	1495	282	19	0	0
NC	Wake County	Block Group 2, Census Tract 517, Wake County, North Carolina	1301	65	5	0	0
NC	Wake County	Block Group 1, Census Tract 535.17, Wake County, North Carolina	2244	1897	84	421	18.8
NC	Wake County	Block Group 2, Census Tract 528.02, Wake County, North Carolina	1099	823	75	208	18.9
NC	Wake County	Block Group 2, Census Tract 529.01, Wake County, North Carolina	764	86	11	12	1.6
NC	Wake County	Block Group 1, Census Tract 536.11, Wake County, North Carolina	1539	1472	96	32	2.1
NC	Wake County	Block Group 2, Census Tract 541.11, Wake County, North Carolina	531	170	32	10	1.9
NC	Wake County	Block Group 2, Census Tract 532.04, Wake County, North Carolina	2410	908	38	182	7.6
NC	Wake County	Block Group 1, Census Tract 540.20, Wake County, North Carolina	1667	769	46	60	3.7
NC	Wake County	Block Group 1, Census Tract 534.08, Wake County, North Carolina	2470	1444	58	51	2.1
NC	Wake County	Block Group 1, Census Tract 537.26, Wake County, North Carolina	1664	262	16	55	3.3
NC	Wake County	Block Group 1, Census Tract 516, Wake County, North Carolina	876	20	2	22	2.5
NC	Wake County	Block Group 1, Census Tract 536.13, Wake County, North Carolina	1629	350	22	34	2.1
NC	Wake County	Block Group 1, Census Tract 536.14, Wake County, North Carolina	847	372	44	0	0
NC	Wake County	Block Group 2, Census Tract 543.06, Wake County, North Carolina	1612	1087	67	209	13
NC	Wake County	Block Group 4, Census Tract 523.07, Wake County, North Carolina	668	339	51	254	38
NC	Wake County	Block Group 2, Census Tract 542.19, Wake County, North Carolina	2167	87	4	119	5.6
NC	Wake County	Block Group 2, Census Tract 535.23, Wake County, North Carolina	3391	971	29	202	6
NC	Wake County	Block Group 1, Census Tract 540.08, Wake County, North Carolina	1972	1426	72	350	17.7
NC	Wake County	Block Group 2, Census Tract 528.15, Wake County, North Carolina	1744	1052	60	425	24.4
NC	Wake County	Block Group 3, Census Tract 521.01, Wake County, North Carolina	1974	1974	100	878	44.5
NC	Wake County	Block Group 1, Census Tract 537.18, Wake County, North Carolina	1436	132	9	67	4.7
NC	Wake County	Block Group 3, Census Tract 527.04, Wake County, North Carolina	1840	1525	83	81	4.4
NC	Wake County	Block Group 2, Census Tract 526.03, Wake County, North Carolina	846	191	23	16	1.9
NC	Wake County	Block Group 2, Census Tract 538.05, Wake County, North Carolina	811	49	6	3	0.4
NC	Wake County	Block Group 2, Census Tract 529.02, Wake County, North Carolina	1803	707	39	14	0.8
NC	Wake County	Block Group 2, Census Tract 525.04, Wake County, North Carolina	1496	66	4	5	0.3
NC	Wake County	Block Group 1, Census Tract 506, Wake County, North Carolina	1295	878	68	27	8.1
NC	Wake County	Block Group 4, Census Tract 535.06, Wake County, North Carolina	1984	350	18	33	1.8
NC	Wake County	Block Group 1, Census Tract 536.04, Wake County, North Carolina	1903	1071	56	15	0.8
NC	Wake County	Block Group 1, Census Tract 534.23, Wake County, North Carolina	1257	246	20	45	3.6
NC	Wake County	Block Group 2, Census Tract 531.05, Wake County, North Carolina	2257	773	34	47	2.1
NC	Wake County	Block Group 1, Census Tract 534.33, Wake County, North Carolina	2971	161	5	0	0
NC	Wake County	Block Group 2, Census Tract 534.27, Wake County, North Carolina	2436	448	18	101	4.2
NC	Wake County	Block Group 1, Census Tract 511.01, Wake County, North Carolina	3790	708	19	0	0
NC	Wake County	Block Group 2, Census Tract 537.17, Wake County, North Carolina	3000	1560	52	198	6.6
NC	Wake County	Block Group 1, Census Tract 537.15, Wake County, North Carolina	1849	384	21	295	16
NC	Wake County	Block Group 3, Census Tract 530.09, Wake County, North Carolina	899	338	38	0	0
NC	Wake County	Block Group 3, Census Tract 530.05, Wake County, North Carolina	1329	113	8	28	2.1
NC	Wake County	Block Group 3, Census Tract 540.04, Wake County, North Carolina	1229	616	50	17	1.4
NC	Wake County	Block Group 2, Census Tract 542.12, Wake County, North Carolina	2331	896	38	461	19.8
NC	Wake County	Block Group 1, Census Tract 534.30, Wake County, North Carolina	1560	674	43	80	5.1
NC	Wake County	Block Group 3, Census Tract 508, Wake County, North Carolina	1954	1141	58	50	21.2
NC	Wake County	Block Group 1, Census Tract 524.04, Wake County, North Carolina	2318	630	27	450	19.4
NC	Wake County	Block Group 2, Census Tract 530.10, Wake County, North Carolina	1137	214	19	109	9.6
NC	Wake County	Block Group 3, Census Tract 537.24, Wake County, North Carolina	1682	390	23	193	11.6
NC	Wake County	Block Group 3, Census Tract 544.03, Wake County, North Carolina	1464	337	23	30	2
NC	Wake County	Block Group 2, Census Tract 535.12, Wake County, North Carolina	2513	699	28	49	1.9
NC	Wake County	Block Group 1, Census Tract 531.10, Wake County, North Carolina	2559	1011	40	87	3.4
NC	Wake County	Block Group 1, Census Tract 534.11, Wake County, North Carolina	9014	5129	57	313	3.5
NC	Wake County	Block Group 2, Census Tract 501, Wake County, North Carolina	2780	1446	52	93	5.7
NC	Wake County	Block Group 2, Census Tract 541.08, Wake County, North Carolina	2624	1326	50	222	8.5
NC	Wake County	Block Group 3, Census Tract 535.18, Wake County, North Carolina	812	115	14	9	1.1
NC	Wake County	Block Group 1, Census Tract 532.09, Wake County, North Carolina	906	0	0	0	0
NC	Wake County	Block Group 1, Census Tract 523.05, Wake County, North Carolina	1021	252	25	270	26.4
NC	Wake County	Block Group 1, Census Tract 537.20, Wake County, North Carolina	1159	135	12	25	2.2
NC	Wake County	Block Group 3, Census Tract 539.01, Wake County, North Carolina	1781	507	28	0	0
NC	Wake County	Block Group 3, Census Tract 544.04, Wake County, North Carolina	2101	1069	51	216	10.7
NC	Wake County	Block Group 2, Census Tract 538.03, Wake County, North Carolina	1251	109	9	0	0
NC	Wake County	Block Group 2, Census Tract 541.09, Wake County, North Carolina	1553	412	26	160	10.3

NC	Wake County	Block Group 1, Census Tract 528.07, Wake County, North Carolina	2030	1164	57	13	0.6
NC	Wake County	Block Group 3, Census Tract 539.02, Wake County, North Carolina	2767	569	21	119	4.3
NC	Wake County	Block Group 1, Census Tract 532.11, Wake County, North Carolina	4720	844	18	11	0.2
NC	Wake County	Block Group 1, Census Tract 529.05, Wake County, North Carolina	1996	604	30	17	0.9
NC	Wake County	Block Group 1, Census Tract 536.09, Wake County, North Carolina	1318	964	73	179	13.6
NC	Wake County	Block Group 2, Census Tract 538.04, Wake County, North Carolina	1068	114	11	14	1.3
NC	Wake County	Block Group 2, Census Tract 544.04, Wake County, North Carolina	1129	598	53	12	1.1
NC	Wake County	Block Group 2, Census Tract 537.12, Wake County, North Carolina	1543	110	7	57	3.7
NC	Wake County	Block Group 1, Census Tract 537.27, Wake County, North Carolina	1385	555	40	14	1
NC	Wake County	Block Group 4, Census Tract 530.05, Wake County, North Carolina	2266	358	16	114	5
NC	Wake County	Block Group 1, Census Tract 531.05, Wake County, North Carolina	1782	298	17	104	6
NC	Wake County	Block Group 3, Census Tract 531.09, Wake County, North Carolina	3135	480	15	73	2.3
NC	Wake County	Block Group 2, Census Tract 543.03, Wake County, North Carolina	1144	429	38	213	18.6
NC	Wake County	Block Group 2, Census Tract 538.06, Wake County, North Carolina	1016	56	6	29	2.9
NC	Wake County	Block Group 1, Census Tract 541.20, Wake County, North Carolina	2072	797	38	660	31.9
NC	Wake County	Block Group 3, Census Tract 531.10, Wake County, North Carolina	2350	423	18	148	6.3
NC	Wake County	Block Group 1, Census Tract 541.06, Wake County, North Carolina	2405	2082	87	363	15.1
NC	Wake County	Block Group 2, Census Tract 529.03, Wake County, North Carolina	2233	631	28	50	2.2
NC	Wake County	Block Group 1, Census Tract 534.09, Wake County, North Carolina	1645	798	48	0	0
NC	Wake County	Block Group 3, Census Tract 542.16, Wake County, North Carolina	2026	654	32	70	3.5
NC	Wake County	Block Group 3, Census Tract 541.17, Wake County, North Carolina	1940	1427	74	367	18.9
NC	Wake County	Block Group 1, Census Tract 542.14, Wake County, North Carolina	989	131	13	26	2.6
NC	Wake County	Block Group 3, Census Tract 535.06, Wake County, North Carolina	1661	83	5	45	2.7
NC	Wake County	Block Group 2, Census Tract 530.09, Wake County, North Carolina	1148	472	41	72	6.3
NC	Wake County	Block Group 1, Census Tract 536.03, Wake County, North Carolina	2119	815	38	75	3.5
NC	Wake County	Block Group 1, Census Tract 529.02, Wake County, North Carolina	2511	1016	40	94	3.7
NC	Wake County	Block Group 2, Census Tract 540.11, Wake County, North Carolina	1540	116	8	52	3.4
NC	Wake County	Block Group 3, Census Tract 531.11, Wake County, North Carolina	1396	621	44	88	6.3
NC	Wake County	Block Group 2, Census Tract 531.09, Wake County, North Carolina	5827	1757	30	482	8.4
NC	Wake County	Block Group 1, Census Tract 538.05, Wake County, North Carolina	1190	98	8	11	0.9
NC	Wake County	Block Group 3, Census Tract 534.05, Wake County, North Carolina	949	177	19	81	8.5
NC	Wake County	Block Group 2, Census Tract 542.21, Wake County, North Carolina	1648	570	35	67	4.1
NC	Wake County	Block Group 1, Census Tract 529.06, Wake County, North Carolina	2209	1026	46	109	5
NC	Wake County	Block Group 2, Census Tract 539.01, Wake County, North Carolina	1130	61	5	0	0
NC	Wake County	Block Group 2, Census Tract 535.06, Wake County, North Carolina	1146	322	28	106	9.2
NC	Wake County	Block Group 1, Census Tract 525.06, Wake County, North Carolina	994	416	42	53	5.3
NC	Wake County	Block Group 1, Census Tract 531.09, Wake County, North Carolina	2036	353	17	754	37
NC	Wake County	Block Group 2, Census Tract 534.28, Wake County, North Carolina	726	283	39	9	1.2
NC	Wake County	Block Group 2, Census Tract 525.09, Wake County, North Carolina	1786	92	5	128	7.3
NC	Wake County	Block Group 2, Census Tract 541.18, Wake County, North Carolina	2145	1188	55	28	1.3
NC	Wake County	Block Group 1, Census Tract 520.02, Wake County, North Carolina	2965	2779	94	817	27.8
NC	Wake County	Block Group 1, Census Tract 534.19, Wake County, North Carolina	1512	1018	67	4	0.3
NC	Wake County	Block Group 1, Census Tract 540.11, Wake County, North Carolina	1494	182	12	19	1.3
NC	Wake County	Block Group 2, Census Tract 542.18, Wake County, North Carolina	1766	1228	70	198	11.2
NC	Wake County	Block Group 1, Census Tract 535.09, Wake County, North Carolina	1622	150	9	0	0
NC	Wake County	Block Group 2, Census Tract 541.13, Wake County, North Carolina	2789	1795	64	270	9.8
NC	Wake County	Block Group 3, Census Tract 537.21, Wake County, North Carolina	1319	62	5	0	0
NC	Wake County	Block Group 2, Census Tract 536.13, Wake County, North Carolina	1297	668	52	139	10.7
NC	Wake County	Block Group 1, Census Tract 529.01, Wake County, North Carolina	1839	338	18	16	0.9
NC	Wake County	Block Group 2, Census Tract 531.15, Wake County, North Carolina	836	248	30	98	11.8
NC	Wake County	Block Group 3, Census Tract 528.11, Wake County, North Carolina	4551	4379	96	1568	34.5
NC	Wake County	Block Group 3, Census Tract 534.09, Wake County, North Carolina	2304	1236	54	14	0.6
NC	Wake County	Block Group 1, Census Tract 540.19, Wake County, North Carolina	1669	280	17	0	0
NC	Wake County	Block Group 2, Census Tract 532.11, Wake County, North Carolina	2564	231	9	36	1.4
NC	Wake County	Block Group 1, Census Tract 536.16, Wake County, North Carolina	1592	832	52	64	4
NC	Wake County	Block Group 2, Census Tract 542.17, Wake County, North Carolina	445	0	0	38	8.5
NC	Wake County	Block Group 2, Census Tract 534.36, Wake County, North Carolina	1362	100	7	42	3.1
NC	Wake County	Block Group 3, Census Tract 538.08, Wake County, North Carolina	1991	400	20	74	3.7

NC	Wake County	Block Group 1, Census Tract 531.14, Wake County, North Carolina	797	232	29	0	0
NC	Wake County	Block Group 1, Census Tract 524.09, Wake County, North Carolina	662	565	85	262	39.6
NC	Wake County	Block Group 4, Census Tract 542.22, Wake County, North Carolina	331	29	9	0	0
NC	Wake County	Block Group 1, Census Tract 537.11, Wake County, North Carolina	1607	234	15	0	0
NC	Wake County	Block Group 2, Census Tract 537.21, Wake County, North Carolina	1657	308	19	49	3
NC	Wake County	Block Group 1, Census Tract 535.18, Wake County, North Carolina	1833	99	5	99	5.4
NC	Wake County	Block Group 3, Census Tract 518, Wake County, North Carolina	1644	297	18	287	18.9
NC	Wake County	Block Group 1, Census Tract 530.07, Wake County, North Carolina	1749	486	28	36	2.1
NC	Wake County	Block Group 3, Census Tract 537.25, Wake County, North Carolina	1369	243	18	122	8.9
NC	Wake County	Block Group 1, Census Tract 544.04, Wake County, North Carolina	4199	2154	51	469	11.2
NC	Wake County	Block Group 1, Census Tract 537.12, Wake County, North Carolina	1331	138	10	9	0.7
NC	Wake County	Block Group 1, Census Tract 530.10, Wake County, North Carolina	2035	924	45	151	7.4
NC	Wake County	Block Group 2, Census Tract 530.05, Wake County, North Carolina	519	60	12	0	0
NC	Wake County	Block Group 2, Census Tract 534.33, Wake County, North Carolina	3129	371	12	134	4.3
NC	Wake County	Block Group 1, Census Tract 526.03, Wake County, North Carolina	2288	270	12	141	6.2
NC	Wake County	Block Group 3, Census Tract 525.04, Wake County, North Carolina	3714	706	19	588	16.4
NC	Wake County	Block Group 1, Census Tract 535.07, Wake County, North Carolina	667	111	17	9	1.3
NC	Wake County	Block Group 1, Census Tract 538.06, Wake County, North Carolina	2015	125	6	11	0.5
NC	Wake County	Block Group 1, Census Tract 527.05, Wake County, North Carolina	1816	1208	66	557	30.7
NC	Wake County	Block Group 1, Census Tract 529.03, Wake County, North Carolina	859	219	26	36	4.3
NC	Wake County	Block Group 1, Census Tract 543.06, Wake County, North Carolina	1392	1054	76	96	7.2
NC	Wake County	Block Group 3, Census Tract 541.19, Wake County, North Carolina	824	394	48	39	4.7
NC	Wake County	Block Group 2, Census Tract 540.20, Wake County, North Carolina	2948	529	18	105	3.6
NC	Wake County	Block Group 1, Census Tract 528.15, Wake County, North Carolina	3316	1985	60	838	25.6
NC	Wake County	Block Group 1, Census Tract 535.12, Wake County, North Carolina	3323	435	13	50	1.5
NC	Wake County	Block Group 2, Census Tract 531.10, Wake County, North Carolina	1396	430	31	301	21.6
NC	Wake County	Block Group 1, Census Tract 541.11, Wake County, North Carolina	1854	1090	59	164	8.9
NC	Wake County	Block Group 1, Census Tract 535.23, Wake County, North Carolina	2546	1037	41	369	14.5
NC	Wake County	Block Group 1, Census Tract 542.19, Wake County, North Carolina	1851	322	17	0	0
NC	Wake County	Block Group 1, Census Tract 540.22, Wake County, North Carolina	898	776	86	82	9.1
NC	Wake County	Block Group 2, Census Tract 536.14, Wake County, North Carolina	1821	360	20	38	2.1
NC	Wake County	Block Group 1, Census Tract 535.19, Wake County, North Carolina	1247	334	27	145	11.6
NC	Wake County	Block Group 2, Census Tract 535.21, Wake County, North Carolina	1492	219	15	192	12.9
NC	Wake County	Block Group 4, Census Tract 541.06, Wake County, North Carolina	1899	1463	77	103	5.4
NC	Wake County	Block Group 2, Census Tract 528.12, Wake County, North Carolina	1712	349	20	52	3
NC	Wake County	Block Group 2, Census Tract 531.13, Wake County, North Carolina	1311	535	41	112	8.8
NC	Wake County	Block Group 3, Census Tract 512, Wake County, North Carolina	1993	141	7	499	31.1
NC	Wake County	Block Group 2, Census Tract 538.07, Wake County, North Carolina	2700	711	26	10	0.4
NC	Wake County	Block Group 2, Census Tract 541.17, Wake County, North Carolina	1920	1308	68	165	8.8
NC	Wake County	Block Group 2, Census Tract 537.20, Wake County, North Carolina	915	106	12	67	7.3
NC	Wake County	Block Group 2, Census Tract 505, Wake County, North Carolina	1829	687	38	243	13.3
NC	Wake County	Block Group 2, Census Tract 534.15, Wake County, North Carolina	976	394	40	21	2.2
NC	Wake County	Block Group 2, Census Tract 536.04, Wake County, North Carolina	2515	896	36	67	2.7
NC	Wake County	Block Group 1, Census Tract 542.24, Wake County, North Carolina	1677	612	36	159	9.5
NC	Wake County	Block Group 2, Census Tract 542.16, Wake County, North Carolina	1824	228	12	49	2.7
NC	Wake County	Block Group 3, Census Tract 545.02, Wake County, North Carolina	2133	1132	53	445	37.1
NC	Wake County	Block Group 1, Census Tract 542.06, Wake County, North Carolina	811	94	12	48	7.3
NC	Wake County	Block Group 3, Census Tract 529.06, Wake County, North Carolina	946	470	50	106	11.2
NC	Wake County	Block Group 1, Census Tract 530.09, Wake County, North Carolina	1901	1203	63	527	27.7
NC	Wake County	Block Group 1, Census Tract 525.07, Wake County, North Carolina	1019	380	37	134	13.2
NC	Wake County	Block Group 3, Census Tract 545.01, Wake County, North Carolina	739	240	32	229	31.9
NC	Wake County	Block Group 2, Census Tract 537.14, Wake County, North Carolina	2397	601	25	63	2.6
NC	Wake County	Block Group 3, Census Tract 530.11, Wake County, North Carolina	705	197	28	10	1.4
NC	Wake County	Block Group 1, Census Tract 524.01, Wake County, North Carolina	4738	1239	26	370	7.8
NC	Wake County	Block Group 1, Census Tract 534.29, Wake County, North Carolina	503	60	12	10	2
NC	Wake County	Block Group 5, Census Tract 530.09, Wake County, North Carolina	1941	766	40	77	4
NC	Wake County	Block Group 3, Census Tract 542.13, Wake County, North Carolina	1176	127	11	0	0
NC	Wake County	Block Group 3, Census Tract 542.06, Wake County, North Carolina	1872	368	20	46	2.5
NC	Wake County	Block Group 1, Census Tract 540.07, Wake County, North Carolina	2423	831	34	435	18.3
NC	Wake County	Block Group 1, Census Tract 540.04, Wake County, North Carolina	1486	269	18	94	6.3
NC	Wake County	Block Group 1, Census Tract 530.05, Wake County, North Carolina	609	51	8	18	3
NC	Wake County	Block Group 3, Census Tract 526.02, Wake County, North Carolina	1169	268	23	119	10.3
NC	Wake County	Block Group 3, Census Tract 524.09, Wake County, North Carolina	1833	1345	73	667	36.8
NC	Wake County	Block Group 2, Census Tract 537.28, Wake County, North Carolina	1526	490	32	49	3.2
NC	Wake County	Block Group 1, Census Tract 544.03, Wake County, North Carolina	919	474	52	104	11.3
NC	Wake County	Block Group 3, Census Tract 536.20, Wake County, North Carolina	1757	1291	74	120	6.8
NC	Wake County	Block Group 1, Census Tract 510, Wake County, North Carolina	1476	353	24	174	12
NC	Wake County	Block Group 1, Census Tract 540.12, Wake County, North Carolina	1981	261	13	49	2.5
NC	Wake County	Block Group 3, Census Tract 527.05, Wake County, North Carolina	2795	1510	54	548	19.6
NC	Wake County	Block Group 2, Census Tract 535.25, Wake County, North Carolina	2376	479	20	147	6.2

NC	Wake County	Block Group 1, Census Tract 534.21, Wake County, North Carolina	2546	644	25	23	0.9
NC	Wake County	Block Group 1, Census Tract 527.04, Wake County, North Carolina	2024	1879	93	894	44.2
NC	Wake County	Block Group 1, Census Tract 521.01, Wake County, North Carolina	5375	4397	82	771	14.3
NC	Wake County	Block Group 5, Census Tract 514, Wake County, North Carolina	1220	87	7	21	1.7
NC	Wake County	Block Group 2, Census Tract 541.19, Wake County, North Carolina	5288	3532	67	140	2.6
NC	Wake County	Block Group 1, Census Tract 538.04, Wake County, North Carolina	2355	462	20	88	3.7
NC	Wake County	Block Group 2, Census Tract 535.22, Wake County, North Carolina	1200	583	49	11	0.9
NC	Wake County	Block Group 4, Census Tract 542.18, Wake County, North Carolina	1793	564	32	278	15.5
NC	Wake County	Block Group 3, Census Tract 537.16, Wake County, North Carolina	2528	1113	44	0	0
NC	Wake County	Block Group 2, Census Tract 524.11, Wake County, North Carolina	3741	1686	45	216	5.8
NC	Wake County	Block Group 3, Census Tract 528.14, Wake County, North Carolina	1632	493	30	196	12.4
NC	Wake County	Block Group 3, Census Tract 535.09, Wake County, North Carolina	2077	461	22	36	1.7
NC	Wake County	Block Group 1, Census Tract 542.21, Wake County, North Carolina	2878	429	15	37	1.3
NC	Wake County	Block Group 1, Census Tract 537.25, Wake County, North Carolina	2462	624	25	235	9.5
NC	Wake County	Block Group 2, Census Tract 534.05, Wake County, North Carolina	2530	485	19	87	3.4
NC	Wake County	Block Group 1, Census Tract 535.21, Wake County, North Carolina	2448	597	24	17	0.7
NC	Wake County	Block Group 1, Census Tract 536.12, Wake County, North Carolina	411	323	79	91	22.1
NC	Wake County	Block Group 5, Census Tract 528.01, Wake County, North Carolina	711	460	65	105	18.5
NC	Wake County	Block Group 1, Census Tract 528.16, Wake County, North Carolina	2670	2612	98	511	19.1
NC	Wake County	Block Group 2, Census Tract 527.07, Wake County, North Carolina	1911	1056	55	250	13.1
NC	Wake County	Block Group 3, Census Tract 536.16, Wake County, North Carolina	2622	898	34	71	2.7
NC	Wake County	Block Group 1, Census Tract 523.04, Wake County, North Carolina	2717	1330	49	622	24.2
NC	Wake County	Block Group 3, Census Tract 531.14, Wake County, North Carolina	2278	320	14	34	1.5
NC	Wake County	Block Group 2, Census Tract 541.14, Wake County, North Carolina	1992	1582	79	224	11.2
NC	Wake County	Block Group 3, Census Tract 541.06, Wake County, North Carolina	2536	1977	78	289	11.4
NC	Wake County	Block Group 3, Census Tract 540.23, Wake County, North Carolina	2086	904	43	51	2.4
NC	Wake County	Block Group 1, Census Tract 535.16, Wake County, North Carolina	2757	1480	54	55	2
NC	Wake County	Block Group 5, Census Tract 516, Wake County, North Carolina	748	9	1	50	6.7
NC	Wake County	Block Group 1, Census Tract 536.19, Wake County, North Carolina	478	294	62	72	15.1
NC	Wake County	Block Group 1, Census Tract 528.10, Wake County, North Carolina	943	478	51	25	2.7
NC	Wake County	Block Group 2, Census Tract 542.04, Wake County, North Carolina	2206	601	27	129	6
NC	Wake County	Block Group 1, Census Tract 504, Wake County, North Carolina	1171	169	14	32	2.7
NC	Wake County	Block Group 1, Census Tract 539.01, Wake County, North Carolina	818	257	31	199	24.3
NC	Wake County	Block Group 2, Census Tract 531.12, Wake County, North Carolina	1335	159	12	42	3.1
NC	Wake County	Block Group 2, Census Tract 534.26, Wake County, North Carolina	3518	2513	71	2146	61
NC	Wake County	Block Group 2, Census Tract 529.05, Wake County, North Carolina	1262	33	3	50	4
NC	Wake County	Block Group 2, Census Tract 536.03, Wake County, North Carolina	2482	1379	56	34	1.4
NC	Wake County	Block Group 2, Census Tract 534.34, Wake County, North Carolina	927	297	32	35	4
NC	Wake County	Block Group 2, Census Tract 545.02, Wake County, North Carolina	342	125	36	5	1.5
NC	Wake County	Block Group 2, Census Tract 537.22, Wake County, North Carolina	2044	339	17	120	6.3
NC	Wake County	Block Group 2, Census Tract 535.05, Wake County, North Carolina	948	112	12	10	1.1
NC	Wake County	Block Group 3, Census Tract 540.16, Wake County, North Carolina	3333	898	27	64	1.9
NC	Wake County	Block Group 2, Census Tract 541.16, Wake County, North Carolina	1066	477	45	100	9.4
NC	Wake County	Block Group 1, Census Tract 540.01, Wake County, North Carolina	2290	632	28	148	6.5
NC	Wake County	Block Group 1, Census Tract 542.15, Wake County, North Carolina	1149	684	60	50	4.4
NC	Wake County	Block Group 2, Census Tract 524.04, Wake County, North Carolina	1139	512	45	596	52.3
NC	Wake County	Block Group 1, Census Tract 509, Wake County, North Carolina	1548	986	64	58	7.5
NC	Wake County	Block Group 2, Census Tract 534.30, Wake County, North Carolina	907	254	28	0	0
NC	Wake County	Block Group 3, Census Tract 530.10, Wake County, North Carolina	1596	102	6	0	0
NC	Wake County	Block Group 1, Census Tract 537.13, Wake County, North Carolina	1518	620	41	87	5.7
NC	Wake County	Block Group 2, Census Tract 537.27, Wake County, North Carolina	671	186	28	66	9.8
NC	Wake County	Block Group 2, Census Tract 526.01, Wake County, North Carolina	850	24	3	6	0.7
NC	Wake County	Block Group 3, Census Tract 535.07, Wake County, North Carolina	1489	487	33	77	5.5
NC	Wake County	Block Group 2, Census Tract 537.18, Wake County, North Carolina	1858	441	24	39	2.1
NC	Wake County	Block Group 1, Census Tract 534.28, Wake County, North Carolina	1888	287	15	30	1.6
NC	Wake County	Block Group 2, Census Tract 531.06, Wake County, North Carolina	1664	156	9	0	0
NC	Wake County	Block Group 2, Census Tract 530.06, Wake County, North Carolina	791	30	4	13	1.6
NC	Wake County	Block Group 1, Census Tract 525.09, Wake County, North Carolina	1172	652	56	263	22.4
NC	Wake County	Block Group 2, Census Tract 534.23, Wake County, North Carolina	810	205	25	42	5.2
NC	Wake County	Block Group 2, Census Tract 530.03, Wake County, North Carolina	666	149	22	78	11.7
NC	Wake County	Block Group 4, Census Tract 530.09, Wake County, North Carolina	2135	226	11	43	2
NC	Wake County	Block Group 3, Census Tract 542.12, Wake County, North Carolina	2986	1831	61	773	25.9
NC	Wake County	Block Group 4, Census Tract 540.04, Wake County, North Carolina	921	697	76	274	29.8
NC	Wake County	Block Group 1, Census Tract 537.19, Wake County, North Carolina	886	267	30	19	2.1
NC	Wake County	Block Group 5, Census Tract 523.07, Wake County, North Carolina	1288	102	8	183	14.2
NC	Wake County	Block Group 1, Census Tract 531.11, Wake County, North Carolina	2030	689	34	108	5.3
NC	Wake County	Block Group 1, Census Tract 535.24, Wake County, North Carolina	1531	917	60	131	8.6
NC	Wake County	Block Group 1, Census Tract 527.01, Wake County, North Carolina	2913	1025	35	207	7.1
NC	Wake County	Block Group 1, Census Tract 542.18, Wake County, North Carolina	3816	2528	66	29	0.8

NC	Wake County	Block Group 3, Census Tract 535.12, Wake County, North Carolina	1619	647	40	211	13.5
NC	Wake County	Block Group 2, Census Tract 528.07, Wake County, North Carolina	1649	895	54	115	7.2
NC	Wake County	Block Group 4, Census Tract 521.01, Wake County, North Carolina	715	545	76	62	8.7
NC	Wake County	Block Group 1, Census Tract 507, Wake County, North Carolina	1220	888	73	152	12.5
NC	Wake County	Block Group 2, Census Tract 537.15, Wake County, North Carolina	1708	98	6	32	1.9
NC	Wake County	Block Group 2, Census Tract 540.21, Wake County, North Carolina	1349	266	20	65	4.8
NC	Wake County	Block Group 1, Census Tract 534.17, Wake County, North Carolina	2143	605	28	372	18.2
NC	Wake County	Block Group 1, Census Tract 515.02, Wake County, North Carolina	652	65	10	0	0
NC	Wake County	Block Group 1, Census Tract 541.21, Wake County, North Carolina	4815	2041	42	82	1.7
NC	Wake County	Block Group 1, Census Tract 535.20, Wake County, North Carolina	942	255	27	0	0
NC	Wake County	Block Group 3, Census Tract 541.08, Wake County, North Carolina	3015	2164	72	203	6.7
NC	Wake County	Block Group 3, Census Tract 540.22, Wake County, North Carolina	2126	1742	82	18	0.8
NC	Wake County	Block Group 2, Census Tract 534.08, Wake County, North Carolina	1484	358	24	7	0.5
NC	Wake County	Block Group 3, Census Tract 521.02, Wake County, North Carolina	3631	3531	97	277	7.7
NC	Wake County	Block Group 1, Census Tract 542.20, Wake County, North Carolina	2327	632	27	44	1.9
NC	Wake County	Block Group 1, Census Tract 542.22, Wake County, North Carolina	2012	395	20	172	8.5
NC	Wake County	Block Group 1, Census Tract 537.23, Wake County, North Carolina	2057	570	28	49	2.4
NC	Wake County	Block Group 2, Census Tract 537.26, Wake County, North Carolina	1444	799	55	188	13
NC	Wake County	Block Group 2, Census Tract 516, Wake County, North Carolina	1077	3	0	2	0.2
NC	Wake County	Block Group 2, Census Tract 528.13, Wake County, North Carolina	2649	837	32	151	5.8
NC	Wake County	Block Group 3, Census Tract 517, Wake County, North Carolina	1393	152	11	21	1.5
NC	Wake County	Block Group 1, Census Tract 531.15, Wake County, North Carolina	621	87	14	69	11.1
NC	Wake County	Block Group 2, Census Tract 523.05, Wake County, North Carolina	967	563	58	195	22.1
NC	Wake County	Block Group 2, Census Tract 536.15, Wake County, North Carolina	2314	1331	58	130	5.6
NC	Wake County	Block Group 2, Census Tract 536.11, Wake County, North Carolina	2126	1380	65	0	0
NC	Wake County	Block Group 3, Census Tract 529.02, Wake County, North Carolina	2919	554	19	34	1.2
NC	Wake County	Block Group 3, Census Tract 528.02, Wake County, North Carolina	1623	885	54	212	13.1
NC	Wake County	Block Group 2, Census Tract 520.01, Wake County, North Carolina	1564	1353	86	395	29
NC	Wake County	Block Group 1, Census Tract 540.15, Wake County, North Carolina	4119	2323	56	1138	27.6
NC	Wake County	Block Group 1, Census Tract 539.02, Wake County, North Carolina	655	121	18	75	11.5
NC	Wake County	Block Group 3, Census Tract 542.24, Wake County, North Carolina	1681	717	43	197	13
NC	Wake County	Block Group 3, Census Tract 541.15, Wake County, North Carolina	3539	2207	62	73	2.1
NC	Wake County	Block Group 2, Census Tract 535.17, Wake County, North Carolina	569	269	47	136	23.9
NC	Wake County	Block Group 2, Census Tract 538.08, Wake County, North Carolina	1509	92	6	14	0.9
NC	Wake County	Block Group 1, Census Tract 534.25, Wake County, North Carolina	1585	330	21	12	0.8
NC	Wake County	Block Group 2, Census Tract 511.01, Wake County, North Carolina	1655	896	54	441	35.3
NC	Wake County	Block Group 2, Census Tract 540.18, Wake County, North Carolina	2228	1739	78	440	19.7
NC	Wake County	Block Group 2, Census Tract 541.12, Wake County, North Carolina	2381	1568	66	208	8.7
NC	Wake County	Block Group 1, Census Tract 501, Wake County, North Carolina	1253	303	24	135	11.3
NC	Wake County	Block Group 1, Census Tract 544.02, Wake County, North Carolina	1159	677	58	0	0
NC	Wake County	Block Group 1, Census Tract 532.05, Wake County, North Carolina	2567	535	21	242	9.4
NC	Wake County	Block Group 1, Census Tract 537.30, Wake County, North Carolina	911	769	84	15	1.6
NC	Wake County	Block Group 3, Census Tract 536.17, Wake County, North Carolina	2705	1531	57	67	2.5
NC	Wake County	Block Group 4, Census Tract 528.10, Wake County, North Carolina	2405	2336	97	749	31.1
NC	Wake County	Block Group 1, Census Tract 530.06, Wake County, North Carolina	1401	147	10	0	0
NC	Wake County	Block Group 1, Census Tract 534.36, Wake County, North Carolina	1495	697	47	70	4.7
NC	Wake County	Block Group 2, Census Tract 528.01, Wake County, North Carolina	1207	315	26	5	0.4

Pinehurst Study Area Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Moore County	Block Group 3, Census Tract 9506.03, Moore County, North Carolina	696	477	68.5	229	32.9
NC	Moore County	Block Group 4, Census Tract 9506.03, Moore County, North Carolina	1006	332	33	17	1.7
NC	Moore County	Block Group 1, Census Tract 9506.03, Moore County, North Carolina	972	262	27	191	21
NC	Moore County	Block Group 2, Census Tract 9506.04, Moore County, North Carolina	1993	401	20.1	130	6.5
NC	Moore County	Block Group 3, Census Tract 9508.01, Moore County, North Carolina	2651	508	19.2	125	4.7
NC	Moore County	Block Group 2, Census Tract 9506.03, Moore County, North Carolina	1266	214	16.9	107	8.5
NC	Moore County	Block Group 2, Census Tract 9507.02, Moore County, North Carolina	2314	337	14.6	45	2.1
NC	Moore County	Block Group 2, Census Tract 9507.04, Moore County, North Carolina	1715	170	9.9	56	3.3
NC	Moore County	Block Group 2, Census Tract 9506.01, Moore County, North Carolina	1438	138	9.6	30	2.1
NC	Moore County	Block Group 1, Census Tract 9506.01, Moore County, North Carolina	789	64	8.1	8	1.2
NC	Moore County	Block Group 1, Census Tract 9507.02, Moore County, North Carolina	810	48	5.9	27	3.7
NC	Moore County	Block Group 4, Census Tract 9508.01, Moore County, North Carolina	718	20	2.8	16	2.2
NC	Moore County	Block Group 1, Census Tract 9506.04, Moore County, North Carolina	1280	32	2.5	0	0
NC	Moore County	Block Group 1, Census Tract 9507.04, Moore County, North Carolina	1174	19	1.6	98	8.3
NC	Moore County	Block Group 2, Census Tract 9508.02, Moore County, North Carolina	1082	10	0.9	53	4.9

Moore County Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Moore County	Block Group 2, Census Tract 9503.05, Moore County, North Carolina	1719	0	0	68	4
NC	Moore County	Block Group 1, Census Tract 9507.02, Moore County, North Carolina	810	48	6	27	4
NC	Moore County	Block Group 1, Census Tract 9509, Moore County, North Carolina	221	63	28	42	19
NC	Moore County	Block Group 3, Census Tract 9506.03, Moore County, North Carolina	696	477	68	229	33
NC	Moore County	Block Group 2, Census Tract 9504.02, Moore County, North Carolina	1132	236	21	36	3
NC	Moore County	Block Group 3, Census Tract 9505.06, Moore County, North Carolina	1914	159	8	84	4
NC	Moore County	Block Group 3, Census Tract 9503.04, Moore County, North Carolina	731	250	34	118	17
NC	Moore County	Block Group 1, Census Tract 9504.04, Moore County, North Carolina	1704	305	18	410	24
NC	Moore County	Block Group 1, Census Tract 9505.07, Moore County, North Carolina	2906	607	21	390	13
NC	Moore County	Block Group 1, Census Tract 9506.01, Moore County, North Carolina	789	64	8	8	1
NC	Moore County	Block Group 1, Census Tract 9503.03, Moore County, North Carolina	2034	309	15	120	6
NC	Moore County	Block Group 1, Census Tract 9510.01, Moore County, North Carolina	1845	618	34	269	16
NC	Moore County	Block Group 3, Census Tract 9511.01, Moore County, North Carolina	1842	441	24	128	7
NC	Moore County	Block Group 2, Census Tract 9507.03, Moore County, North Carolina	761	383	50	366	48
NC	Moore County	Block Group 1, Census Tract 9506.03, Moore County, North Carolina	972	262	27	191	21
NC	Moore County	Block Group 2, Census Tract 9505.03, Moore County, North Carolina	1183	369	31	88	8
NC	Moore County	Block Group 1, Census Tract 9508.01, Moore County, North Carolina	1309	833	64	680	58
NC	Moore County	Block Group 1, Census Tract 9512, Moore County, North Carolina	2033	916	45	209	10
NC	Moore County	Block Group 3, Census Tract 9511.02, Moore County, North Carolina	1515	286	19	276	18
NC	Moore County	Block Group 1, Census Tract 9510.02, Moore County, North Carolina	1213	86	7	38	3
NC	Moore County	Block Group 2, Census Tract 9504.03, Moore County, North Carolina	805	53	7	87	12
NC	Moore County	Block Group 1, Census Tract 9507.04, Moore County, North Carolina	1174	19	2	98	8
NC	Moore County	Block Group 1, Census Tract 9505.04, Moore County, North Carolina	3417	774	23	289	8
NC	Moore County	Block Group 1, Census Tract 9508.02, Moore County, North Carolina	1119	270	24	369	33
NC	Moore County	Block Group 3, Census Tract 9508.02, Moore County, North Carolina	687	91	13	17	2
NC	Moore County	Block Group 2, Census Tract 9502.02, Moore County, North Carolina	1491	147	10	254	18
NC	Moore County	Block Group 2, Census Tract 9512, Moore County, North Carolina	1028	280	27	70	7
NC	Moore County	Block Group 1, Census Tract 9511.01, Moore County, North Carolina	260	260	100	43	16
NC	Moore County	Block Group 3, Census Tract 9503.05, Moore County, North Carolina	795	258	32	0	0
NC	Moore County	Block Group 1, Census Tract 9501, Moore County, North Carolina	1397	373	27	61	4
NC	Moore County	Block Group 2, Census Tract 9502.01, Moore County, North Carolina	1083	584	54	283	28
NC	Moore County	Block Group 2, Census Tract 9509, Moore County, North Carolina	1054	259	25	100	10
NC	Moore County	Block Group 2, Census Tract 9510.01, Moore County, North Carolina	1080	99	9	52	5
NC	Moore County	Block Group 2, Census Tract 9505.06, Moore County, North Carolina	1061	127	12	0	0
NC	Moore County	Block Group 2, Census Tract 9504.04, Moore County, North Carolina	953	46	5	80	8
NC	Moore County	Block Group 2, Census Tract 9507.02, Moore County, North Carolina	2314	337	15	45	2
NC	Moore County	Block Group 1, Census Tract 9504.02, Moore County, North Carolina	2741	958	35	463	17
NC	Moore County	Block Group 4, Census Tract 9506.03, Moore County, North Carolina	1006	332	33	17	2
NC	Moore County	Block Group 1, Census Tract 9502.02, Moore County, North Carolina	1449	102	7	91	6
NC	Moore County	Block Group 3, Census Tract 9501, Moore County, North Carolina	948	102	11	138	15
NC	Moore County	Block Group 1, Census Tract 9502.01, Moore County, North Carolina	956	285	30	191	20
NC	Moore County	Block Group 1, Census Tract 9505.06, Moore County, North Carolina	2474	464	19	115	5

NC	Moore County	Block Group 4, Census Tract 9508.01, Moore County, North Carolina	718	20	3	16	2
NC	Moore County	Block Group 3, Census Tract 9502.02, Moore County, North Carolina	1525	390	26	163	11
NC	Moore County	Block Group 4, Census Tract 9508.02, Moore County, North Carolina	868	80	9	178	26
NC	Moore County	Block Group 3, Census Tract 9508.01, Moore County, North Carolina	2651	508	19	125	5
NC	Moore County	Block Group 2, Census Tract 9511.01, Moore County, North Carolina	1480	460	31	411	30
NC	Moore County	Block Group 1, Census Tract 9505.05, Moore County, North Carolina	1246	278	22	106	8
NC	Moore County	Block Group 1, Census Tract 9504.03, Moore County, North Carolina	616	94	15	57	11
NC	Moore County	Block Group 3, Census Tract 9502.01, Moore County, North Carolina	1104	860	78	64	6
NC	Moore County	Block Group 3, Census Tract 9510.01, Moore County, North Carolina	1353	62	5	0	0
NC	Moore County	Block Group 2, Census Tract 9511.02, Moore County, North Carolina	2242	568	25	56	2
NC	Moore County	Block Group 2, Census Tract 9503.04, Moore County, North Carolina	830	221	27	140	17
NC	Moore County	Block Group 3, Census Tract 9506.01, Moore County, North Carolina	1582	122	8	81	5
NC	Moore County	Block Group 2, Census Tract 9501, Moore County, North Carolina	1371	610	44	570	42
NC	Moore County	Block Group 2, Census Tract 9506.04, Moore County, North Carolina	1993	401	20	130	6
NC	Moore County	Block Group 1, Census Tract 9511.02, Moore County, North Carolina	1972	373	19	103	5
NC	Moore County	Block Group 1, Census Tract 9503.04, Moore County, North Carolina	799	135	17	113	14
NC	Moore County	Block Group 2, Census Tract 9508.02, Moore County, North Carolina	1082	10	1	53	5
NC	Moore County	Block Group 2, Census Tract 9506.01, Moore County, North Carolina	1438	138	10	30	2
NC	Moore County	Block Group 2, Census Tract 9505.07, Moore County, North Carolina	1226	317	26	286	23
NC	Moore County	Block Group 3, Census Tract 9504.03, Moore County, North Carolina	663	321	48	32	5
NC	Moore County	Block Group 1, Census Tract 9503.05, Moore County, North Carolina	1790	804	45	124	7
NC	Moore County	Block Group 1, Census Tract 9506.04, Moore County, North Carolina	1280	32	2	0	0
NC	Moore County	Block Group 2, Census Tract 9507.04, Moore County, North Carolina	1715	170	10	56	3
NC	Moore County	Block Group 3, Census Tract 9509, Moore County, North Carolina	778	48	6	16	2
NC	Moore County	Block Group 2, Census Tract 9508.01, Moore County, North Carolina	849	770	91	293	34
NC	Moore County	Block Group 1, Census Tract 9505.03, Moore County, North Carolina	1656	432	26	146	9
NC	Moore County	Block Group 2, Census Tract 9506.03, Moore County, North Carolina	1266	214	17	107	8
NC	Moore County	Block Group 1, Census Tract 9503.06, Moore County, North Carolina	2362	626	26	39	2
NC	Moore County	Block Group 3, Census Tract 9512, Moore County, North Carolina	2439	843	35	110	5
NC	Moore County	Block Group 1, Census Tract 9507.03, Moore County, North Carolina	1748	175	10	15	1

Raeford Study Area Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Hoke County	Block Group 4, Census Tract 9701.07, Hoke County, North Carolina	897	868	96.8	168	21.2
NC	Hoke County	Block Group 3, Census Tract 9701.04, Hoke County, North Carolina	1300	995	76.5	214	16.5
NC	Hoke County	Block Group 1, Census Tract 9701.04, Hoke County, North Carolina	2322	1631	70.2	606	26.1
NC	Hoke County	Block Group 1, Census Tract 9701.09, Hoke County, North Carolina	2335	1608	68.9	592	26.1
NC	Hoke County	Block Group 3, Census Tract 9701.07, Hoke County, North Carolina	1106	725	65.6	32	2.9
NC	Hoke County	Block Group 2, Census Tract 9701.04, Hoke County, North Carolina	1707	1061	62.2	232	14
NC	Hoke County	Block Group 2, Census Tract 9701.09, Hoke County, North Carolina	1494	862	57.7	149	10.2
NC	Hoke County	Block Group 1, Census Tract 9701.07, Hoke County, North Carolina	2165	1138	52.6	703	33.5
NC	Hoke County	Block Group 2, Census Tract 9701.07, Hoke County, North Carolina	2810	1445	51.4	565	20.1
NC	Hoke County	Block Group 1, Census Tract 9801, Hoke County, North Carolina	27	0	0	0	0

Hoke County Block Group ACS 2020 5-Year Estimate Data

STATE	COUNTY	NAME	Population Total	Population Minority	Percent Minority	Population Low Income	Percent Low income
NC	Hoke County	Block Group 1, Census Tract 9703, Hoke County, North Carolina	831	823	99	452	54
NC	Hoke County	Block Group 4, Census Tract 9701.07, Hoke County, North Carolina	897	868	97	168	21
NC	Hoke County	Block Group 3, Census Tract 9704.02, Hoke County, North Carolina	1050	983	94	267	25
NC	Hoke County	Block Group 2, Census Tract 9704.02, Hoke County, North Carolina	1033	966	94	446	43
NC	Hoke County	Block Group 1, Census Tract 9704.02, Hoke County, North Carolina	887	820	92	219	25
NC	Hoke County	Block Group 2, Census Tract 9703, Hoke County, North Carolina	1216	977	80	439	36
NC	Hoke County	Block Group 2, Census Tract 9704.01, Hoke County, North Carolina	2064	1617	78	487	24
NC	Hoke County	Block Group 5, Census Tract 9703, Hoke County, North Carolina	814	636	78	61	9
NC	Hoke County	Block Group 3, Census Tract 9701.04, Hoke County, North Carolina	1300	995	76	214	16
NC	Hoke County	Block Group 2, Census Tract 9702.02, Hoke County, North Carolina	1491	1131	76	366	24
NC	Hoke County	Block Group 2, Census Tract 9701.05, Hoke County, North Carolina	2921	2104	72	805	28
NC	Hoke County	Block Group 1, Census Tract 9701.04, Hoke County, North Carolina	2322	1631	70	606	26
NC	Hoke County	Block Group 1, Census Tract 9701.09, Hoke County, North Carolina	2335	1608	69	592	26
NC	Hoke County	Block Group 3, Census Tract 9702.01, Hoke County, North Carolina	1319	884	67	296	22

NC	Hoke County	Block Group 1, Census Tract 9701.05, Hoke County, North Carolina	2711	1807	67	18	1
NC	Hoke County	Block Group 3, Census Tract 9701.07, Hoke County, North Carolina	1106	725	66	32	3
NC	Hoke County	Block Group 2, Census Tract 9701.04, Hoke County, North Carolina	1707	1061	62	232	14
NC	Hoke County	Block Group 1, Census Tract 9702.02, Hoke County, North Carolina	2302	1355	59	483	21
NC	Hoke County	Block Group 2, Census Tract 9701.09, Hoke County, North Carolina	1494	862	58	149	10
NC	Hoke County	Block Group 4, Census Tract 9703, Hoke County, North Carolina	1543	876	57	474	34
NC	Hoke County	Block Group 2, Census Tract 9702.01, Hoke County, North Carolina	2080	1187	57	112	10
NC	Hoke County	Block Group 3, Census Tract 9701.06, Hoke County, North Carolina	3364	1931	57	255	8
NC	Hoke County	Block Group 3, Census Tract 9703, Hoke County, North Carolina	844	472	56	156	21
NC	Hoke County	Block Group 1, Census Tract 9701.07, Hoke County, North Carolina	2165	1138	53	703	34
NC	Hoke County	Block Group 2, Census Tract 9701.07, Hoke County, North Carolina	2810	1445	51	565	20
NC	Hoke County	Block Group 1, Census Tract 9702.01, Hoke County, North Carolina	782	390	50	71	9
NC	Hoke County	Block Group 1, Census Tract 9704.01, Hoke County, North Carolina	1716	828	48	377	22
NC	Hoke County	Block Group 2, Census Tract 9701.06, Hoke County, North Carolina	1229	551	45	165	14
NC	Hoke County	Block Group 1, Census Tract 9701.08, Hoke County, North Carolina	2661	1130	42	96	4
NC	Hoke County	Block Group 2, Census Tract 9701.08, Hoke County, North Carolina	1022	298	29	62	6
NC	Hoke County	Block Group 4, Census Tract 9702.01, Hoke County, North Carolina	1186	349	29	271	23
NC	Hoke County	Block Group 1, Census Tract 9701.06, Hoke County, North Carolina	2163	538	25	95	4
NC	Hoke County	Block Group 3, Census Tract 9701.08, Hoke County, North Carolina	1198	294	24	66	6
NC	Hoke County	Block Group 1, Census Tract 9801, Hoke County, North Carolina	27	0	0	0	0

Appendix G

Acronyms and Abbreviations

Appendix G: Acronyms and Abbreviations

ACS - American Community Survey

AEDT - Aviation Environmental Design Tool

AGL - Above Ground Level

APE - Area of Potential Effects

BCC - Birds of Conservation Concern

BVLOS - Beyond Visual Line of Sight

Causey - Causey Aviation Unmanned, Inc.

CEQ - Council on Environmental Quality

CFR - Code of Federal Regulations

COA - Certificate of Waiver or Authorization

CZMP - Coastal Zone Management Plan

dB - Decibel

DC - Distribution Center

DNL - Day-Night Average Sound Level

DOT - Department of Transportation

EA - Environmental Assessment

EJSCREEN - Environmental Justice Screening and Mapping Tool

EO - Executive Order

EPA - Environmental Protection Agency

ESA - Endangered Species Act

FAA - Federal Aviation Administration

FEMA - Federal Emergency Management Agency

FHWA - Federal Highway Administration

IPaC - Information for Planning and Consultation

IPP - UAS Integration Pilot Program

NAS - National Airspace System

NEPA - National Environmental Policy Act

NHPA - National Historic Preservation Act

NM - Nautical Mile

NMFS - National Marine Fisheries Service

NOA - Notice of Availability

NOAA - National Oceanic and Atmospheric Administration

NPDES - National Pollutant Discharge Elimination System

NRHP - National Register of Historic Places

NTSB - National Transportation Safety Board

OpSpecs - Operations Specifications

RPIC - Remote Pilot in Command

SHPO - State Historic Preservation Office(r)

The Commission - (North Carolina Wildlife Resources Commission)

THPO - Tribal Historic Preservation Office (r)

U.S.C - United States Code

UA - Unmanned Aircraft

UAS - Unmanned Aircraft Systems

USFWS - United States Fish and Wildlife Service

VLOS - Visual Line of Sight