

DRAFT FINAL

**ENVIRONMENTAL ASSESSMENT
OF THE 445TH AIRLIFT WING CONVERSION
FROM C-5 TO C-17 AIRCRAFT
AT WRIGHT-PATTERSON AIR FORCE BASE, OH**



HEADQUARTERS AIR FORCE RESERVE COMMAND



DECEMBER 2010

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**FINDING OF NO SIGNIFICANT IMPACT/FINDING OF NO PRACTICABLE ALTERNATIVE FOR
445TH AIRLIFT WING CONVERSION FROM C-5 TO C-17 AIRCRAFT
WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500 - 1508, Department of Defense Directive (DoDD) 6050.1 and 32 CFR Part 989, the 88th Air Base Wing (ABW) Civil Engineer Directorate, Asset Management Division, prepared an Environmental Assessment (EA) for the 445th Airlift Wing (445 AW) based at Wright-Patterson Air Force Base (WPAFB), Ohio. This EA is incorporated by reference into this finding.

Purpose and Need

The United States Air Force (USAF) identified the need to maintain the Air Force Reserve Command's (AFRC's) airlift capabilities and the 445 AW's current military and humanitarian missions. An airlift fleet with new capabilities, able to move forces over intercontinental distances and deliver them directly to where they are required, is needed to provide rapid deployment of personnel and equipment. The purpose of the C-17 aircraft conversion is to ensure that AFRC will have a suitable replacement for the existing C-5 aircraft, which are scheduled to be retired or transferred from WPAFB in Fiscal Year 2011 (FY11). The C-17 aircraft offers more capability over the long term. This aircraft has the ability to fly long distances with large payloads yet still use smaller bases and shorter runways as necessary.

Description of Proposed Action

The Proposed Action consists of the following parts: aircraft changes, construction activities, changes in personnel, changes in operations, and use of an assault landing zone (LZ). The 445 AW's ten C-5 aircraft at WPAFB would be replaced with eight C-17 aircraft and one back-up aircraft. The number of C-5 aircraft would steadily draw down during FY11. The C-17 aircraft would begin arriving at WPAFB for basing in the second quarter of FY11. The last C-17 would arrive in the fourth quarter of FY11.

Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. Building and facility construction associated with the C-5 beddown in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration. The modifications would involve six facilities at the West Ramp of Area C at WPAFB. No new facility construction or facility demolition activities are anticipated.

By maintaining mission capabilities at WPAFB, the conversion of C-5 aircraft to C-17 aircraft would allow the USAF to retain skilled aircrew and aircraft maintenance personnel. There would be personnel changes, however, because the C-17 would require a smaller crew. These changes would involve a reduction of 2 full-time and 150 reserve positions.

The number of airfield operations conducted using C-5 aircraft for Calendar Year 2010 (CY10) is expected to be 1,750. Under the Proposed Action, the number of airfield operations for the C-17 would be 1,500. Approximately 25 percent of the 445 AW training activities for the C-17 would be conducted at WPAFB. Part of the training would require the use of assault LZs. Because WPAFB does not currently have an assault LZ, the balance of the training (approximately 75 percent) would be carried out at another location. Several potential LZs were considered in the selection of an LZ for the Proposed Action. Charleston AFB's (CHS) North Auxiliary Field (North Field) met the criteria for airfield requirements, relative proximity to WPAFB, and available capacity. In addition, the potential use of the North Field LZ was addressed as part of the *Environmental Assessment for East Coast Basing of C-17 Aircraft* (USAF, 2005). The Air Force conducted a full environmental analysis of the potential beddown location. While a Finding of No Significant Impact (FONSI) was issued for this alternative under the East Coast Basing EA, CHS and North Field were not selected as preferred basing locations. This basing location was fully analyzed and included in the FONSI, therefore, the

prior environmental analysis can be used to evaluate the North Field LZ as part of the Proposed Action for C-17 aircraft operations at WPAFB provided an updated capacity is achieved. The East Coast Basing EA is incorporated by reference in this EA.

No-Action Alternative

Under the no-action alternative, it is assumed that the C-5 aircraft at WPAFB would not be replaced by the C-17 aircraft. The 445 AW would continue to fly the current C-5s and aircraft operations would be similar to those programmed for the existing C-5 mission. These operations would include C-5 training, the majority of which takes place at WPAFB.

Alternatives Considered but Eliminated from Further Study

Two alternatives to the Proposed Action were considered to determine their feasibility as viable alternatives to the beddown of C-17 aircraft at WPAFB. The first alternative was to consider that C-5 operations at WPAFB would continue until the end of CY11, drawing down as proposed by the schedule described in the Proposed Action for this EA. Over this period, the C-5 aircraft would either be retired or transferred to another base. Replacement of these aircraft would not occur. Consequently, no aircraft would be available to maintain the 445 AW airlift capability at WPAFB. This alternative was eliminated from detailed analysis because it would not satisfy the need to maintain the AFRC's airlift capabilities and the 445 AW's current mission.

Modernizing the existing C-5A aircraft to the C-5M aircraft was considered as a second alternative to the Proposed Action. By modernizing the C-5 aircraft, the aging fleet would be rejuvenated and reliability of the C-5 aircraft would be improved. This alternative was eliminated because Congress has not yet approved funding to convert from C-5A to C-5M aircraft. If funded, however, active duty units would be given first priority to receive this aircraft. Therefore, the timeframe and funding for converting C-5A to C-5M aircraft at WPAFB would be uncertain. It would not meet the need to ensure that aircraft would be available to maintain the 445 AW mission.

Environmental Consequences

Airspace Management (EA Section 4.1): In the short-term, the Proposed Action would result in negligible adverse impacts. There would be long-term beneficial impacts on airfield operations with an anticipated decrease in 445 AW airfield operations.

Land Use (EA Section 4.2): The Proposed Action would result in no short-term or long-term impacts because no changes to land use would occur at or surrounding WPAFB.

Air Quality (EA Section 4.3): Under the Proposed Action, there would be minor short-term impacts from particulate matter and engine exhaust emissions generated during facility construction and renovation activities. Impacts would be minor because these activities involve interior modifications. In the long-term, there would be negligible impacts associated with long-term aircraft operations; however, net emissions for all pollutants would be reduced and air quality would be improved over current conditions.

Noise (EA Section 4.4): Under the Proposed Action, there would be minor impacts on ambient noise from construction activities. Impacts would be short-term and minor because these activities are primarily interior renovations and would be carried out during normal working hours. There would be a beneficial long-term impact on the noise environment with anticipated decrease in airfield operations and the use of a quieter aircraft.

Geology and Soils (EA Section 4.5): As a result of the Proposed Action, short-term impacts would be negligible because construction activities are primarily limited to interior renovations of existing structures. Long-term impacts to soils, topography, and physiographic features would also be negligible.

Water Resources (EA Section 4.6): Under the Proposed Action, there would be no impacts to surface waters during construction as the proposed activities would be primarily conducted inside existing facilities. The

Proposed Action would not pose any new risks; however, minor adverse effects on groundwater would continue to occur as a result of aircraft operations. Erosion and sedimentation controls would be implemented as a Best Management Practice (BMP). While portions of the parking apron are located in the 100-year floodplain and facility modifications are limited to building interiors, there would be no increase in impervious surfaces and there would be no net loss or gain of soil in the retarding basin. The Miami Conservancy District has concurred that the Proposed Action would have little impact on the retarding basin.

Biological Resources (EA Section 4.7): There would be a negligible short-term impact as the proposed activities would take place on previously disturbed areas with no naturally occurring vegetation. The short-term impacts on wildlife and threatened and endangered species would be negligible as the proposed project area does not provide suitable habitat, the current land use would not change, and proposed activities are not in close enough proximity to threatened and endangered species to generate noise-related impacts. The US Fish and Wildlife Service and Ohio Department of Natural Resources have concurred that the Proposed Action would have no adverse effects on these resources.

Cultural Resources (EA Section 4.8): Under the Proposed Action, the Area of Potential Effects is essentially the same as that previously coordinated with the State Historic Preservation Office (SHPO) for the transition to C-5 aircraft, which was completed 2 May 2005. Of the structures affected by the renovation/modification associated with the Proposed Action, only Building 30152 is considered eligible for the National Register of Historic Places. Modifications to the interior of the building would be necessary to accommodate the C-17 simulator; however, the proposed changes to the facility amount to minor interior alterations of non-original walls and fixtures, and would not affect historic property. The SHPO has concurred that the proposed changes to the facility would have no adverse effects on the facility.

Socioeconomic Resources (EA Section 4.9): Under the Proposed Action, there would be a short-term negligible adverse effect on the local workforce. There would be a beneficial impact to the local economy in the form of revenue generated by construction activities.

Environmental Justice (EA Section 4.10): Under the Proposed Action, land use would not change and there would be minimal emissions from the C-17 conversion. There would be no short-term or long-term disproportionate impacts to minority or low-income populations.

Infrastructure (EA Section 4.11): Under the Proposed Action, there would be negligible short-term impact from traffic interruption in the project area during construction activities. No adverse impacts are expected from the Proposed Action as there would be no increase in personnel or facility operations. No long-term impacts would result from the Proposed Action because the number of personnel supporting the C-17 mission would remain virtually the same.

Safety (EA Section 4.12): Under the Proposed Action, there would be potential minor impacts to workers during construction activities. Impacts associated with construction activities would be minimized by adherence to applicable safety standards. There would be no adverse effects associated with bird-aircraft strike hazards over current conditions.

Hazardous Materials and Waste (EA Section 4.13): The Proposed Action would have a negligible impact because hazardous materials used during construction would not be expected to increase. Hazardous materials used, including deicing fluid, would not be expected to increase. The number of C-17 aircraft that would operate would be less than the baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous wastes would be similar in nature with the baseline condition waste streams. Minor adverse impacts due to potential asbestos-containing materials and lead-based paint would be minimized by surveying buildings prior to construction/renovation and adhering to management plans. There would be no impacts on Installation Restoration Program sites.

Cumulative Impacts (EA Section 4.14): The cumulative effects of the Proposed Action when added to other past, present, and reasonably foreseeable future actions were evaluated and found to be insignificant. Additional projects in the area include replacement of the runway in Area A and reconfiguration of the entry control points. An environmental impact statement is being prepared to study the impacts of the entry control point project.

Agency Consultation

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of the Proposed Action. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

Public Notice

A public notice was posted in the *Dayton Daily News* on 4 December 2010 and a paper copy of the EA was made available for review at the Fairborn Library. The comment period was held from 4 December 2010 until 3 January 2011. A total of four comments were received from public agencies and all of them were positive. One comment recommended that state-of-the-art materials and fixtures be considered in the building renovation process. This comment is addressed by reference to Executive Order (EO) 13514, *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. No other comments were received from the public.

Finding of No Significant Impact (FONSI)

The Proposed Action is to replace the current C-5 aircraft with C-17 aircraft, which will involve aircraft changes, construction activities, changes in personnel, changes in operations, and use of the North Field LZ. Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality regulations, and 32 CFR 989.

Finding of No Practicable Alternative (FONPA)

Taking the above information into consideration, pursuant to EO 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*, and the authority delegated by Secretary of the Air Force, Order 791.1, I find there is no practicable alternative to conducting the Proposed Action within the floodplain and wetlands, and that the Proposed Action includes all practicable measures to minimize harm to the environment. This fulfills both the requirements of the referenced EOs and the Air Force Environmental Impact Analysis Process (32 CFR Part 989.14) for a Finding of No Practicable Alternative.



PAUL A. PARKER, SES
Command Civil Engineer
Communications, Installations
and Mission Support

Date: 12 Jan 2011

PUBLIC NOTICE

Notice of Availability

**WRIGHT-PATTERSON AIR FORCE BASE
ASSET MANAGEMENT DIVISION
ACCEPTING PUBLIC COMMENTS ON THE
DRAFT FINAL ENVIRONMENTAL ASSESSMENT FOR THE
445th AIRLIFT WING CONVERSION FROM C-5 TO C-17 AIRCRAFT**

WRIGHT-PATTERSON AFB – Beginning December 4, 2010 through January 3rd, 2011, the U.S. Air Force will accept comments on the Environmental Assessment (EA) for the 445th Airlift Wing (445 AW) Conversion from C-5 to C-17 Aircraft at Wright-Patterson Air Force Base (WPAFB), Ohio. The Air Force is proposing to issue a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) based on the EA. The analysis considered potential effects of the Proposed Action and the No Action Alternative on thirteen resource areas: airspace management, land use, air quality, noise, geology and soil, water resources, biological resources, cultural resources, socioeconomic resources, environmental justice, infrastructure, health and safety, and hazardous materials/hazardous wastes.

The results, as found in the EA, show that the Proposed Action would not have an adverse impact on the environment—indicating that a FONSI would be appropriate. In addition, as found in the EA, there are no practicable alternatives to the Proposed Action and negligible impacts to the floodplain—indicating a FONPA would be appropriate. An Environmental Impact Statement should not be necessary to implement the Proposed Action.

The public is invited to review the documents at the Greene County Public Library, Fairborn Branch, located at 1 East Main Street, Fairborn, OH 45324-4701, (937)878-9383.

Written comments and inquiries on the EA and FONSI/FONPA should be directed to:

Mr. Ted Theopolos, 88 ABW/PA
5215 Thurlow Street, Wright-Patterson AFB, Ohio 45433-5543
(937) 522-3521

DRAFT FINAL
FINDING OF NO SIGNIFICANT IMPACT/FINDING OF NO PRACTICABLE ALTERNATIVE
FOR 445TH AIRLIFT WING CONVERSION FROM C-5 TO C-17 AIRCRAFT
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
02 Dec 10

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500 - 1508, Department of Defense Directive (DoD) 6050.1 and Air Force Regulation (AFR) 32 CFR Part 989, the 88th Air Base Wing (ABW) Civil Engineer Directorate, Asset Management Division prepared an Environmental Assessment (EA) for the 445th Airlift Wing (445 AW) based at Wright-Patterson Air Force Base (WPAFB), Ohio. This EA is incorporated by reference into this finding.

Purpose and Need

The US Air Force (USAF) identified the need to maintain the Air Force Reserve Command's (AFRC) airlift capabilities and the 445 AW's current military and humanitarian missions. An airlift fleet with new capabilities, able to move forces over intercontinental distances and deliver them directly to where they are required, is needed to provide rapid deployment of personnel and equipment. The purpose of the C-17 aircraft conversion is to ensure that AFRC will have a suitable replacement for the existing C-5 aircraft, which are scheduled to be retired or transferred from WPAFB in Fiscal Year (FY) 11. The C-17 aircraft offers more capability over the long term. This aircraft has the ability to fly long distances with large payloads yet still use smaller bases and shorter runways as necessary.

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Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. Building and facility construction associated with the C-5 beddown in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration. The modifications would involve six facilities at the West Ramp of Area C at WPAFB. No new facility construction or facility demolition activities are anticipated.

By maintaining mission capabilities at WPAFB, the conversion of C-5 aircraft to C-17 aircraft would allow the USAF to retain skilled aircrew and aircraft maintenance personnel. There would be personnel changes, however, because the C-17 would require a smaller crew. These changes would involve a reduction of two full-time and 150 reserve positions.

The number of airfield operations conducted using C-5 aircraft for Calendar Year 2010 (CY 10) is expected to be 1,750. Under the Proposed Action, the number of airfield operations for the C-17 would be 1,500. Approximately 25% of the 445 AW training activities for the C-17 would be conducted at WPAFB. Part of the training would require the use of assault LZs. Because WPAFB does not currently have an assault LZ, the balance of the training (approximately 75%) would be carried out at another location. Several potential LZs were considered in the selection of an LZ for the Proposed Action. Charleston AFB's (CHS) North Auxiliary Field (North Field) met the criteria for airfield requirements, relative proximity to WPAFB, and available capacity. In addition, the potential use of the North Field LZ was addressed as part of the *Environmental Assessment for East Coast Basing of C-17 Aircraft* (U.S. Air Force, 2005). The Air Force conducted a full environmental analysis of the potential beddown location. While a FONSI was issued for this alternative under the East Coast Basing EA, CHS and North Field were not selected as preferred basing locations. Nevertheless,

because this basing location was fully analyzed was included in the FONSI, this prior environmental analysis can be used to evaluate the North Field LZ as part of the Proposed Action for C-17 aircraft operations at WPAFB provided an updated capacity is achieved. The East Coast Basing EA is incorporated by reference in this EA.

No-Action Alternative

Under the no-action alternative, it is assumed that the C-5 aircraft at WPAFB would not be replaced by the C-17 aircraft. The 445 AW would continue to fly the current C-5s and aircraft operations would be similar to those programmed for the existing C-5 mission. These operations would include C-5 training, the majority of which takes place at WPAFB.

Alternatives Considered but Eliminated from Further Study

Two alternatives to the Proposed Action were considered to determine their feasibility as viable alternatives to the beddown of C-17 aircraft at WPAFB. The first alternative was to consider that C-5 operations at WPAFB would continue until the end of CY11, drawing down as proposed by the schedule described in the Proposed Action for this EA. Over this period, the C-5 aircraft would either be retired or transferred to another base. Replacement of these aircraft would not occur. Consequently, no aircraft would be available to maintain the 445 AW airlift capability at WPAFB. This alternative was eliminated from detailed analysis because it would not satisfy the need to maintain the AFRC's airlift capabilities and the 445 AW's current mission.

Modernizing the existing C-5A aircraft to the C-5M aircraft was considered as a second alternative to the Proposed Action. By modernizing the C-5 aircraft, the aging fleet would be rejuvenated and reliability of the C-5 aircraft would be improved. This alternative was eliminated because Congress has not yet approved funding to convert from C-5A to C-5M aircraft. If funded, however, active duty units would be given first priority to receive this aircraft. Therefore, the timeframe and funding for converting C-5A to C-5M aircraft at WPAFB would be uncertain. It would not meet the need to ensure that aircraft would be available to maintain the 445 AW mission.

Environmental Consequences

Airspace Management (EA Section 4.1): In the short-term, the Proposed Action would result in negligible adverse impacts. There would be long-term beneficial impacts on airfield operations with an anticipated decrease in 445 AW airfield operations. The No Action alternative would have no impact over current conditions.

Land Use (EA Section 4.2): The Proposed Action would result in no short or long-term impacts because no changes to land use would occur at or surrounding WPAFB. The No Action alternative would have no impact over current conditions.

Air Quality (EA Section 4.3): Under the Proposed Action, there would be minor short-term impacts from particulate matter and engine exhaust emissions generated during facility construction and renovation activities. Impacts would be minor because these activities involve interior modifications. In the long-term, there would be negligible impacts associated with long-term aircraft operations; however, net emissions for all pollutants would be reduced and air quality would be improved over current conditions. The No Action alternative would have no impact over current conditions.

Noise (EA Section 4.4): Under the Proposed Action, there would be minor impacts on ambient noise from construction activities. Impacts would be short-term and minor because these activities are primarily interior renovations and would be carried out during normal working hours. There would be a beneficial long-term impact on the noise environment with anticipated decrease in airfield operations and the use of a quieter aircraft. The No Action alternative would have no impact over current conditions.

Soil Resources (EA Section 4.5): As a result of the Proposed Action, short-term impacts would be negligible because construction activities are primarily limited to interior renovations of existing structures. Long-term impacts to soils, topography, and physiographic features would also be negligible. The No Action alternative would have no impact over current conditions.

Water Resources (EA Section 4.6): Under the Proposed Action, there would be no impacts to surface waters during construction as the proposed activities would be primarily conducted inside existing facilities. The Proposed Action would not pose any new risks; however, minor adverse effects on groundwater would continue to occur as a result of aircraft operations. Erosion and sedimentation controls would be implemented as a Best Management Practice (BMP). While portions of the parking apron are located in the 100-year floodplain and facility modifications are limited to building interiors, there would be no increase in impervious surfaces and there would be no net loss or gain of soil in the retarding basin. The No Action alternative would have no impact over current conditions.

Natural Resources (EA Section 4.7): There would be a negligible short-term impact as the proposed activities would take place on previously disturbed areas with no naturally occurring vegetation. The short-term impacts on wildlife and threatened and endangered species would be negligible as the proposed project area does not provide suitable habitat, the current land use would not change, and proposed activities are not in close enough proximity to threatened and endangered species to generate noise-related impacts. The No Action alternative would have no impact over current conditions.

Cultural and Historic Resources (EA Section 4.8): Under the Proposed Action, the Area of Potential Effects is essentially the same as that previously coordinated with SHPO for the transition to C-5 aircraft, which was completed in May 2, 2005. Of the structures affected by the renovation/modification associated with the Proposed Action, only Building 30152 is considered eligible for the National Register of Historic Places. Modifications to the interior of the building would be necessary to accommodate the C-17 simulator; however, the proposed changes to the facility amount to minor interior alterations of non-original walls and fixtures, and would not affect historic property. The proposed changes to the facility would have no adverse effects on the facility. The No Action alternative would have no impact over current conditions.

Socioeconomic Resources (EA Section 4.9): Under the Proposed Action, there would be a short-term negligible adverse effect on the local workforce. There would be a beneficial impact to the local economy in the form of revenue generated by construction activities. The No Action alternative would have no impact over current conditions.

Environmental Justice (EA Section 4.10): Under the Proposed Action, land use would not change and there would be minimal emissions from the C-17 conversion. There would be no short-term or long-term disproportionate impacts to minority or low-income populations. The No Action alternative would have no impact over current conditions.

Infrastructure (EA Section 4.11): Under the Proposed Action, there would be negligible short-term impact from traffic interruption in the project area during construction activities. No adverse impacts are expected from the Proposed Action as there would be no increase in personnel or facility operations. No long-term impacts would result from the Proposed Action because the number of personnel supporting the C-17 mission would remain virtually the same. The No Action alternative would have no impact over current conditions.

Health and Safety (EA Section 4.12): Under the Proposed Action, there would be potential minor impacts to workers during construction activities. Impacts associated with construction activities would be minimized by adherence to applicable safety standards. There would be no adverse effects associated with bird-aircraft strike hazards over current conditions. The No Action alternative would have no impact over current conditions.

Hazardous Materials/Hazardous Waste (EA Section 4.13): The Proposed Action would have a negligible impact because hazardous materials used during construction would not be expected to increase. Hazardous materials used, including deicing fluid, would not be expected to increase. The number of C-17 aircraft that would operate would be less than the baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous wastes would be similar in nature with the baseline condition waste streams. Minor adverse impacts due to potential asbestos-containing materials and lead-based paint would be minimized by surveying buildings prior to construction/renovation and adhering to management plans. There would be no impacts on Installation Restoration Program sites. The No Action alternative would have no adverse impacts over current conditions.

Agency Consultation

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of the Proposed Action. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

Public Notice

A public notice was posted in the *Dayton Daily News* on December 4, 2010. The comment period was held from December 4, 2010 until January 3, 2011.

Finding of No Significant Impact (FONSI)

The Proposed Action is to replace the current C-5 aircraft with C-17 aircraft, which will involve aircraft changes, construction activities, changes in personnel, changes in operations, and use of the North Field LZ. Under the no-action alternative, it is assumed that the C-5 aircraft at WPAFB would not be replaced by the C-17 aircraft. The 445 AW would continue to fly the current C-5s and aircraft operations would be similar to those programmed for the existing C-5 mission. These operations would include C-5 training, the majority of which takes place at WPAFB. Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action and the no-action alternative will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality regulations, and 32 CFR 989.

Finding of No Practicable Alternative (FONPA)

Taking the above information into consideration under authorization delegated by the Secretary of the Air Force, I find there is no practicable alternative to converting the C-5 aircraft to C-17 aircraft, and the Proposed Action includes all practicable measures to minimize harm to the natural or cultural environment. This finding fulfills the requirement of the Air Force EA Process (32 CFR 989.14) for a FONPA.

NAME

Date: _____

NAME

Date: _____

**Draft Final
Environmental Assessment for the
C-17 Aircraft Conversion
Wright-Patterson Air Force Base**

**Contract No. W912QR-08-D-0013
Task Order 0014**

Submitted to:

**Wright-Patterson Air Force Base
88th Air Base Wing
Civil Engineering
Asset Management Division**

Prepared by:

**Shaw Environmental & Infrastructure, Inc.
5050 Section Avenue
Cincinnati, OH 45212**

December 2010

1 **COVER SHEET**

2
3 **ENVIRONMENTAL ASSESSMENT**
4 **OF THE 445TH AIRLIFT WING CONVERSION**
5 **FROM C-5 TO C-17 AIRCRAFT**
6 **AT WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

7
8 **Responsible Agencies:** U.S. Air Force (USAF); Air Force Reserve Command (AFRC); 445
9 Airlift Wing (445 AW); Wright-Patterson Air Force Base (WPAFB), Ohio

10
11 **Affected Location:** Wright-Patterson AFB, Ohio

12
13 **Proposed Action:** 445 AW Conversion from C-5 Aircraft to C-17 Aircraft

14
15 **Report Designation:** Environmental Assessment (EA)

16
17 Written comments and inquiries regarding this document should be directed to Mr. Ted
18 Theopolos, 88 ABW/PA, 5215 Thurlow Street, Wright-Patterson AFB, Ohio, 45433-5543,
19 (937)522-3521.

20
21 **Abstract:** Headquarters AFRC is proposing an aircraft replacement for the 445 AW based at
22 WPAFB, Ohio. The 445 AW currently possesses ten C-5 Primary Assigned Aircraft (PAA).
23 The ten C-5 aircraft would be replaced by eight C-17 PAA and one C-17 Backup Aircraft
24 Inventory (BAI), for a total of nine C-17 aircraft stationed at WPAFB. For analysis, eight C-17
25 PAA are evaluated because one C-17 BAI would only operate if one or more PAA were unable
26 to fly. The ten C-5 aircraft are expected to be retired or transferred over the next several years.
27 The aircraft conversion, if implemented, would begin in Fiscal Year (FY) 11 and end in FY12.
28 The drawdown of C-5s would begin in FY11. The Proposed Action would provide the necessary
29 facility modifications to enable 445 AW aircrews to perform readiness training operations and
30 ensure that mission requirements for C-17 aircraft are met and sustained.

31
32 This EA evaluates the Proposed Action and the No Action Alternative. Resources considered in
33 the impact analysis are airspace management, land use, air quality, noise, geological resources,
34 water resources, biological resources, cultural resources, socioeconomics and environmental
35 justice, infrastructure, health and safety, and hazardous materials and wastes. Analyses in this
36 document identify minor short-term adverse impacts on air quality and noise resulting from the
37 proposed construction activities related to the facility modifications and the operation of the
38 C-17 aircraft. The EA was made available to the public on December 4, 2010, for a 30-day
39 review period.

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LIST OF ACRONYMS

1		
2		
3	ABW	Air Base Wing
4	ACM	asbestos-containing materials
5	AFB	Air Force Base
6	AFI	Air Force Instruction
7	AFMC	Air Force Materiel Command
8	AFPD	Air Force Policy Directive
9	AFRC	Air Force Reserve Command
10	AFSC	Air Force Safety Center
11	AGE	Aerospace Ground Equipment
12	AGL	above ground level
13	AICUZ	Air Installation Compatible Use Zone
14	AMC	Air Mobility Command
15	APE	Area of Potential Effect
16	APZ	Accident Potential Zone
17	AQCR	Air Quality Control Region
18	AR	aerial refueling
19	ARB	Air Reserve Base
20	ASC	Aeronautical Systems Center
21	AST	aboveground storage tank
22	ATC	air traffic control
23	AW	Airlift Wing
24	BAI	Backup Aircraft Inventory
25	BAM	Bird Avoidance Model
26	BASH	Bird/Wildlife Aircraft Strike Hazard
27	BEEF	Base Engineer Emergency Force
28	BMP	Best Management Practice
29	BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
30	BUSTR	Bureau of Underground Storage Tank Regulation
31	CAA	Clean Air Act
32	CEQ	Council on Environmental Quality
33	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
34	CFR	Code of Federal Regulations
35	CHS	Charleston Air Force Base
36	CO	carbon monoxide
37	CWA	Clean Water Act
38	CY	calendar year
39	CZ	Clear Zone
40	dB	decibel
41	dBA	A-weighted sound level measurement
42	DLSME	Defense Land Systems and Miscellaneous Equipment
43	DNL	day-night average A-weighted sound level
44	DoD	U.S. Department of Defense
45	DOT	Department of Transportation
46	DP&L	Dayton Power & Light
47	EA	environmental assessment
48	EIAP	Environmental Impact Analysis Process
49	EIFS	Economic Impact Forecast System
50	EIS	Environmental Impact Statement

LIST OF ACRONYMS (continued)

1		
2		
3	EO	Executive Order
4	ERP	Environmental Restoration Program
5	ESA	Endangered Species Act
6	ESQD	Explosive Safety Quantity Distance
7	ESZ	Explosive Safety Zone
8	°F	degrees Fahrenheit
9	FAA	Federal Aviation Administration
10	FEMA	Federal Emergency Management Agency
11	FHWA	Federal Highway Administration
12	FICON	Federal Interagency Committee on Noise
13	FLIP	Flight Information Publication
14	FONPA	Finding of No Practical Alternative
15	FONSI	Finding of No Significant Impact
16	FR	Federal Register
17	ft ²	square feet
18	FY	Fiscal Year
19	GOV	government-owned vehicle
20	gpd	gallons per day
21	gpm	gallons per minute
22	gpy	gallons per year
23	HAP	High Accident Potential
24	HAZMART	hazardous material pharmacy
25	HUD	U.S. Department of Health and Urban Development
26	HVAC	heating, ventilation, and air conditioning
27	ICP	Integrated Contingency Plan
28	ICRMP	Integrated Cultural Resources Management Plan
29	IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
30	IPM	Issue Point Manager
31	IR	infrared
32	IRP	Installation Restoration Program
33	IT	International Technology Corporation
34	KIAS	knots indicated airspeed
35	LAIRCM	large aircraft infrared countermeasures system
36	LBP	lead-based paint
37	LTO	landing take-off
38	LZ	Landing Zone
39	MACT	Maximum Achievable Control Technology
40	µg/m ³	micrograms per cubic meter
41	MCD	Miami Conservancy District
42	mg/m ³	milligrams per cubic meter
43	MILCON	Military Construction
44	MMBtu/hr	million British thermal units per hours
45	MOA	Military Operation Area
46	MSA	Metropolitan Statistical Area
47	mph	miles per hour
48	MSL	mean sea level
49	MSW	mixed solid waste
50	MTR	military training routes

LIST OF ACRONYMS (continued)

1		
2		
3	NAAQS	National Ambient Air Quality Standards
4	NEPA	National Environmental Policy Act
5	NESHAP	National Emission Standards for Hazardous Air Pollutants
6	NHPA	National Historic Preservation Act
7	NOA	Notice of Availability
8	NOAA	National Oceanic and Atmospheric Administration
9	NO _x	nitrogen oxides
10	NO ₂	nitrogen dioxide
11	NRHP	National Register of Historic Places
12	NPDES	National Pollution Discharge Elimination System
13	NRCS	Natural Resource Conservation Service
14	NSR	New Source Review
15	NWI	National Wetlands Inventory
16	O ₃	ozone
17	OAC	Ohio Administrative Code
18	ODH	Ohio Department of Health
19	ODNR	Ohio Department of Natural Resources
20	OEPA	Ohio Environmental Protection Agency
21	ORC	Ohio Revised Code
22	OSHA	Occupational Safety and Health Administration
23	OU	Operable Unit
24	PAA	Primary Assigned Aircraft
25	Pb	lead
26	PBR	permitted-by-rule
27	PCB	polychlorinated biphenyl
28	PM	particulate matter
29	PM _{2.5}	particulate matter with an aerodynamic particle size less than 2.5 micrometers
30	PM ₁₀	particulate matter with an aerodynamic particle size less than 10 micrometers
31	POL	petroleum, oils, and lubricants
32	POV	Privately-owned Vehicle
33	ppb	parts per billion
34	ppm	parts per million
35	PSD	Prevention of Significant Deterioration
36	PTI	Permit to Install
37	RAPCA	Regional Air Pollution Control Agency
38	RCRA	Resource Conservation and Recovery Act
39	RICE	Reciprocating Internal Combustion Engines
40	ROI	region of influence
41	SARA	Superfund Amendments and Reauthorization Act
42	SEL	sound exposure level
43	SHPO	State Historic Preservation Office
44	SIP	State Implementation Plan
45	SO ₂	sulfur dioxide
46	SOP	standard operating procedure
47	SPC	Spill Prevention Coordinator
48	SPCC	spill prevention and control and countermeasures
49	SR	State Route
50	SWPPP	Storm Water Pollution Prevention Plan

LIST OF ACRONYMS (continued)

1		
2		
3	TGO	touch-and-go operations
4	TMDL	Total Maximum Daily Load
5	TMDL	Total Maximum Daily Load
6	tpy	tons per year
7	TSCA	Toxic Substances Control Act
8	TSD	Treatment, Storage, and Disposal Facility
9	UEC	Unit Environmental Coordinator
10	U.S.	United States
11	USACE	U.S. Army Corps of Engineers
12	USAF	U.S. Air Force
13	USC	U.S. Code
14	USDA–WS	U.S. Department of Agriculture–Wildlife Services
15	USEPA	U.S. Environmental Protection Agency
16	USFWS	U.S. Fish & Wildlife Service
17	UST	Underground Storage Tank
18	VOC	volatile organic compound
19	WPAFB	Wright-Patterson Air Force Base
20	WST	Weapons System Trainer

1.0 PURPOSE AND NEED FOR ACTION

This section provides a brief background description of the Proposed Action, a statement of the purpose of and need for the Proposed Action, an overview of the organization of the Environmental Assessment (EA), and a summary of the key environmental compliance requirements.

1.1 Project Description

The U.S. Air Force (USAF) has determined that it is necessary to replace some of the aging C-5 Galaxy aircraft across the USAF. The Air Force Reserve Command (AFRC) is proposing an aircraft replacement for the 445th Airlift Wing (445 AW) based at Wright-Patterson Air Force Base (WPAFB), Ohio. The 445 AW currently possesses ten C-5 Primary Assigned Aircraft (PAA), which would be replaced by eight C-17 Globemaster III PAA and one C-17 Backup Aircraft Inventory (BAI). A total of nine C-17 aircraft would be stationed at WPAFB. The ten C-5 aircraft are expected to be realigned over the next several years. The drawdown of C-5 aircraft would be completed during Calendar Year (CY) 2011.

WPAFB is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided into three areas: Areas A, B, and C. Areas A and C (primarily administrative offices and active airfield, respectively) are adjacent to one another. Area B (primarily research and development with educational functions) is across State Route (SR) 444 to the southwest. The 445 AW occupies an area near the western ramp of Area C. **Figure 1-1** shows the location of WPAFB and the surrounding area.

The 88th Air Base Wing (88 ABW) supports and maintains WPAFB as the host unit to more than 100 associate units. Several military missions are supported by the aircraft and personnel at WPAFB. The Aeronautical Systems Center (ASC) is the largest of four product centers in the Air Force Materiel Command (AFMC). The mission of the ASC is to rapidly deliver war-winning capability. ASC develops, acquires, modernizes, and sustains the world's best aerospace systems.

The 445 AW is an AFRC unit and a tenant at WPAFB. The mission of the 445 AW is to maintain operational readiness and provide strategic worldwide transport, including aero-medical evacuation. The 445 AW conducts recruitment and training activities to attain these goals. The wing has rescued prisoners of war from Hanoi, Vietnam; flown humanitarian missions to Somalia and Rwanda; provided ground support in Bosnia; transported military firefighters to western states to fight uncontrolled fires; and has been involved in Operation Enduring Freedom and Operation Iraqi Freedom.

This EA analyzes three possible alternatives and the No Action Alternative. If the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental

impacts, a Finding of No Significant Impact (FONSI) would be prepared. A FONSI briefly presents reasons why a Proposed Action would not have a significant effect on the human environment and why an Environmental Impact Statement (EIS) is unnecessary. If significant environmental issues result that cannot be mitigated to insignificance, an EIS would be required, or the Proposed Action would be abandoned and no action would be taken. Because activities associated with the Proposed Action would take place in the vicinity of the floodplain, a Finding of No Practicable Alternative (FONPA) would be prepared in conjunction with the FONSI, as necessary.

The USAF has prepared this EA in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the U.S. Air Force *Environmental Impact Analysis Process* (EIAP) [32 CFR Part 989].

1.2 Purpose and Need

An airlift fleet with new capabilities, able to move forces over intercontinental distances and deliver them directly to where they are required, is needed to provide rapid deployment of personnel and equipment. The purpose of the aircraft conversion is to ensure that AFRC will have a suitable replacement for the existing C-5 aircraft, which are scheduled to be retired or transferred from WPAFB in CY11. The C-5's maintenance and reliability issues, large consumption of fuel, and an average of 16 hours of maintenance required for each flight hour are additional contributing factors necessitating the proposed aircraft conversion. The replacement of the C-5 aircraft with the C-17 aircraft is needed to maintain AFRC's airlift capabilities and the 445 AW's current military and humanitarian missions. The C-17 aircraft offers more capability over the long term. This aircraft has the ability to fly long distances with large payloads yet still use smaller bases and shorter runways as necessary. By maintaining mission capabilities at WPAFB, the conversion of the C-5 aircraft to the C-17 aircraft would also allow the USAF to rely upon an available source of skilled aircrew and aircraft maintenance personnel.

1.3 Scope of Environmental Analysis

Consistent with the CEQ regulations, this EA is organized into the following sections:

- Section 1, Purpose and Need for Action, includes a background description, purpose and need statement, EA organization and scope of environmental analysis, and regulatory framework;
- Section 2, Description of Proposed Action and Alternatives, includes a process for alternatives development, alternatives considered but eliminated, and a comparison of impacts;
- Section 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding WPAFB that may be affected by the Proposed Action or the No Action Alternative;
- Section 4, Environmental Consequences, includes definitions and discussions of direct and indirect impacts, and mitigation and monitoring. The section also includes an analysis of the potential cumulative impacts on WPAFB, unavoidable adverse impacts, the relationship between short-term

Figure 1-1
Locations of Airfield and
Facilities to be Modified

use of the human environment and the maintenance and enhancement of long-term productivity, and irreversible and ir retrievable commitments of resources;

- Section 5, List of Preparers;
- Section 6, Consultation and Coordination, contains a list of agencies consulted in the preparation of this document;
- Section 7, References, contains references for studies, data, and other resources used in the preparation of this EA; and
- Appendices, as required.

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to proposed actions and to analyze impacts of those alternatives. Potential impacts of the proposed alternatives described in this document were assessed in accordance with the USAF EIAP process, which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. In order to help the public and decision-makers understand the implications of impacts, they are described in the short- and long-term, cumulatively, and within context.

Environmental issues analyzed in the EA include:

- Airspace Management;
- Land Use;
- Air Quality;
- Noise;
- Geology and Soils;
- Water Resources;
- Biological Resources, including vegetation, wetlands, wildlife, and threatened and endangered species;
- Cultural Resources;
- Socioeconomics;
- Environmental Justice;
- Infrastructure;
- Health and Safety; and
- Hazardous Materials and Waste.

Although all resources are evaluated, this EA is “issue-driven” emphasizing the resources of most concern to the project. These issues include airspace management, land use, air quality, and noise and are particularly emphasized as part of this EA.

1.4 Regulatory Framework

This section describes the statutes, regulations, and executive orders that govern and/or influence the scope of this EA. A number of statutes were considered but found to have no influence on this project. Although this list is not all-inclusive, the proposed alternatives must comply with all applicable regulatory requirements.

1.4.1 National Environmental Policy Act

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA mandates a structured approach to environmental impact analysis that requires Federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify the reasons to prepare an EA:

- Briefly provide evidence and analysis for determining whether to prepare an EIS or a FONSI;
- Aid in an agency's compliance with NEPA when an EIS is unnecessary;
- Facilitate preparation of an EIS when one is necessary.

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, State of Ohio, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is EIAP.

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision-maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

Potentially relevant statutes and regulations to which the USAF must comply are summarized in **Table 1-1**. The regulatory requirements are presented under each appropriate category in Section 3.0.

1.4.3 Interagency and Intergovernmental Coordination for Environmental Planning and Community Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decision making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. CEQ regulations implementing NEPA specifically state, "There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping."

Table 1-1. Summary of Applicable Regulatory Requirements

Compliance Area	Regulatory Requirements
Air Quality	Clean Air Act as amended, 42 USC § 7401 et seq.
	AFI 7040 Air Quality Compliance and Resources Management
	National Ambient Air Quality Standards (NAAQS) – 40 CFR 81.34 Metropolitan Dayton Intrastate Air Quality Control Region and 40 CFR 81.336 Ohio Attainment Standards
	Ohio Administrative Code (OAC) 3745-17 Particulate Matter Standards
	OAC 3745-31 Permit to Install New Source of Pollution
	OAC 3745-25 Emergency Episode Standards
	OAC 3745-15-05 <i>de minimis</i> air contaminant source exemption
Cultural/Historic Resources	National Historic Preservation Act (NHPA) as amended, 16 U.S.C § 470 et seq.
	36 CFR Part 800 – Protection of Historic and Cultural Properties
	AFI 32-7065, Cultural Resources Management
Health and Safety	Occupational Safety and Health Act (OSHA) as amended, Subpart Z Toxic and Hazardous Substances
	29 CFR Part 1910 Occupational Safety and Health Standards
	29 CFR Part 1926 Safety and Health Regulations for Construction
	National Fire Protection Association, National Fire Codes
Land Use	AFI 32-7063, Air Installation Compatible Use Zone (AICUZ) Program
Natural Resources	Endangered Species Act (ESA), 16 U.S.C §1531 et seq.
	50 CFR Part 402 Interagency Cooperation--ESA of 1973, as amended
	Ohio Revised Code (ORC) 1531.25, Protection of Species Threatened with State-Wide Extinction
	National Environmental Policy Act (NEPA) as amended, 42 U.S.C. § 4321 et seq.
	AFI 32-7064, Integrated Natural Resource Management Plan
Noise	29 CFR 1910.95 Occupational Noise Exposure
Wastewater & Storm water	Federal Water Pollution Control Act (Clean Water Act [CWA]) as amended, 33 U.S.C. § 1251 et seq.
	AFI 32-1021 Planning and Programming Military Construction (MILCON) Projects (FONPA)
	40 CFR Part 122.26 Storm Water Discharges
	OAC 3745-33 Ohio NPDES Individual Permits
	OAC 3745-38 Ohio NPDES General Permits
	OAC 3745-42 Permits to Install and Plan Approvals for Water Pollution Control
	City of Dayton Sewer Use Ordinance (September 21, 1994).

Notes: CFR = Code of Federal Regulations; AFI = Air Force Instruction; OAC = Ohio Administrative Code; ORC = Ohio Revised Code; USC = U.S. Code; NPDES = National Pollutant Discharge Elimination System

The Intergovernmental Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in

1 implementing a Federal proposal. AFI 32-7060 requires AFMC to implement a process known as
2 Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), which is used for
3 the purpose of agency coordination and implements scoping requirements.

4
5 Through the IICEP process, AFMC notified relevant Federal, state, and local agencies of the action
6 proposed and provided them the opportunity to make known their environmental concerns specific to the
7 action. The IICEP process provides AFMC the opportunity to cooperate with and consider state and local
8 views in implementing the Federal proposal. As part of the regulatory consultation process, IICEP letters
9 were sent to the U.S. Fish and Wildlife Service (USFWS); Ohio Department of Natural Resources
10 (ODNR); Miami Conservancy District (MCD); and the State Historic Preservation Office (SHPO). In
11 addition, IICEP letters were sent on December 2, 2010, to the Federal Aviation Administration (FAA),
12 U.S. Environmental Protection Agency (USEPA), and other Federal, state, and local agencies.

13
14 The comment period lasted for 30 days, ending on January 3, 2011. Agency responses will be provided
15 to AFMC and incorporated into the analysis of potential environmental impacts performed as part of the
16 EA. IICEP correspondence will be included in the appendix.

17
18 A Notice of Availability (NOA) for the EA and Draft FONSI/ FONPA was published in the *Dayton Daily*
19 *News* and the Base paper, *The Skywrighter*, initiating the public review period. The EA and Draft
20 FONSI/FONPA were made available in the Fairborn Public Library until January 3, 2011. During this
21 time period, [number pending] of public comments were received. The NOA and comments received will
22 be included in **Appendix A**.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This section provides an introduction to the Proposed Action, criteria used in selecting the Proposed Action, a detailed description of the Proposed Action, a description of the No Action Alternative, identification of alternatives eliminated from further consideration, and a comparison of environmental consequences between the alternatives.

This section describes the alternatives AFRC is analyzing to accomplish the Proposed Action and presents the No Action Alternative, as prescribed by CEQ regulations. The Proposed Action would provide the necessary Base infrastructure modifications that would enable 445 AW aircrews to perform readiness training operations and ensure that mission requirements for C-17 aircraft are met and sustained.

2.2 Alternatives Selection Criteria

The development of reasonable alternatives involved discussions with the 445 AW and 88 ABW to identify a Proposed Action. Several requirements were identified in order to fulfill the purpose of the Proposed Action at WPAFB. The Proposed Action and other alternatives were screened against the following criteria:

- Any alternative must have adequate existing facilities. Inadequate facilities would require construction of aircraft parking, maintenance, and operations work space and emergency response facilities and equipment to support the safe operation of the C-17 aircraft.
- Any alternative must have an operational runway.
- Any alternative must have an active Reserve Associate unit.
- Any alternative must have an airlift mission. This would avoid the potential for operational incompatibilities that can occur when aircraft with dissimilar operating parameters such as large, slower airlift and small, faster fighter aircraft operate from the same runway.
- Any alternative evaluated must include a heavy-cargo transport designed to provide airlift support for deployment and supply of combat that employs recent technologies and would be readily available in Fiscal Year (FY) 11.
- Due to manpower constraints base-wide, no alternative can have substantive impacts on mission operations.
- Any alternative evaluated must fully comply with all federal, state, and local laws and regulations, as well as Department of Defense (DoD) and Air Force policies, directives, and regulations.
- The action must be economically feasible and protect the environment.

2.3 Description of the Proposed Action

The Proposed Action consists of four parts: aircraft changes, construction/renovation activities, changes in personnel, and changes in operations. The Proposed Action is further detailed in the following subsections. Implementation of the Proposed Action is the preferred alternative of AFRC.

2.3.1 Aircraft Changes at WPAFB

The Proposed Action involves the replacement of the 445 AW's ten C-5 PAA at WPAFB with eight C-17 PAA and one C-17 BAI. For analytical purposes, the eight C-17 PAA are evaluated because BAI are only flown when one or more aircraft is incapable of being flown. No more than eight C-17 aircraft would be flown at any one time at WPAFB. The number of C-5 aircraft would steadily draw down during CY11. Under the Proposed Action, C-17 aircraft would begin arriving at WPAFB for basing in the first quarter of CY11. The last C-17 aircraft would arrive in the fourth quarter of CY11. **Table 2-1** shows the proposed C-5 drawdown and C-17 basing schedule.

Table 2-1. Proposed C-5 Drawdown and C-17 Basing Schedule

Quarter/Fiscal Year	Quarter/Calendar Year	C-5	C-17	Total
1/10	4/09	10	0	10
2/10	1/10	10	0	10
3/10	2/10	10	0	10
4/10	3/10	10	0	10
1/11	4/10	5	0	5
2/11	1/11	5	4	9
3/11	2/11	5	4	9
4/11	3/11	5	4	9
1/12	4/11	0	8	8
2/12	1/12	0	8	8
3/12	2/12	0	8	8
4/12	3/12	0	8	8
1/13	4/12	0	8	8

Characteristics of C-5 Aircraft

The C-5 Galaxy aircraft is a heavy-cargo transport designed to provide airlift support for deployment and supply of combat (**Figure 2-1**). The gigantic C-5 aircraft, with its tremendous payload capability, provides the Air Mobility Command (AMC) global airlift in support of U.S. national defense (USAF 2009). It has been in operation since 1970. It is one of the largest aircraft in the world, almost as long as a football field and as high as a six-story building. Four turbofan engines mounted on pylons under the wings power the C-5 aircraft. Each engine provides 43,000 pounds of thrust, enabling the aircraft to cruise at speeds of approximately 518 miles per hour. The C-5 aircraft carries fully equipped, combat-ready military units to any point in the world on short notice and provides the field support required to help sustain the fighting force. They support U.S. Army, U.S. Navy, U.S. Marine Corps, and allied forces.

Unique features of the C-5 aircraft include the forward and aft cargo door and ramp systems. These full-size doors allow simultaneous on-loading and off-loading and drive-on/drive-off loading from either end of the aircraft. The C-5 Galaxy also features landing gear with “kneeling” capability that eases on-loading and off-loading operations by lowering the cargo compartment floor from 10 to 3 feet off the ground. The C-5 aircraft can carry up to 36 standard military 436-L pallets (each with an area of approximately 66 square feet [ft²]) spread over the floor of the aircraft. The C-5 aircraft has carried special loads on past missions that would require extra time, manpower, and money if transported via land, ship, or rail. The upper deck is self-contained with a galley, two lavatories, and enough seating for 73 passengers. Another 267 airline seats can be installed on the cargo compartment floor, although troops are transported only in unusual circumstances.

Figure 2-1. C-5 Galaxy Aircraft



Source: <http://www.af.mil>

Characteristics of C-17 Aircraft

Operational since 1995, the C-17 Globemaster III is the newest, most flexible cargo aircraft to enter the airlift force (USAF 2008). The C-17 is a high-wing military airlift aircraft capable of rapid strategic delivery of troops and all types of cargo (payloads up to 169,000 pounds) to main operating bases or directly to forward bases in the deployment area (**Figure 2-2**). The inherent flexibility and performance of the C-17 force improve the ability of the total airlift system to fulfill the worldwide air mobility requirements of the U.S.

The ultimate measure of airlift effectiveness is the ability to rapidly project and sustain an effective combat force close to a potential battle area. Threats to U.S. interests have changed in recent years, and the size and weight of U.S.-mechanized firepower and equipment have grown in response to improved

capabilities of potential adversaries. This trend has significantly increased air mobility requirements, particularly in the area of large or heavy outsize cargo. As a result, newer and more flexible airlift aircraft are needed to meet potential armed contingencies, peacekeeping or humanitarian missions worldwide. The C-17 is capable of meeting today's demanding airlift missions. In contrast to documented issues with the older C-5, reliability and maintainability are two outstanding benefits of the C-17 system.

Figure 2-2. C-17 Globemaster III Aircraft



Source: <http://www.af.mil>

The C-17 measures 174 feet long with a wingspan of 169 feet, 10 inches. The aircraft is powered by four, fully reversible engines. The aircraft has been certified since 2008 for using a more-efficient synthetic fuel, thereby having less reliance on imported petrol. Each engine provides 40,440 pounds of thrust, enabling the aircraft to cruise at speeds of 518 miles per hour.

The C-17 is operated by a crew of three, reducing manpower requirements (six crew are required for C-5), risk exposure, and long-term operating costs. As depicted in **Figure 2-3**, cargo is loaded onto the C-17 through a large aft door that accommodates military vehicles and palletized cargo. The C-17 can carry all of the Army's air-transportable equipment, with the cargo compartment having a sufficiently large cross-section to transport large wheeled and tracked vehicles, tanks, helicopters (such as the AH-64 Apache), artillery, and weapons such as the Patriot missile system. Three Bradley armored vehicles comprise one deployment load on the C-17. The US Army M1A1 main battle tank can be carried with other vehicles.

Figure 2-3. C-17 Cargo Compartment



Source: <http://www.af.mil>

The design of the aircraft allows it to operate on small, austere airfields. The C-17 can safely take off and land a full payload on runways as short as 3,500 feet and only 90 feet wide. Even on such narrow runways, the C-17 can turn around using a 180° three-point star turn in 80 feet and its backing capability. The C-17 is designed to airdrop 102 paratroopers and equipment. The aircraft at WPAFB will also be equipped with the Northrop Grumman large aircraft infrared countermeasures (LAIRCM) system (**Figure 2-4**).

LAIRCM is based on the AN/AAQ-24(V) NEMESIS and was developed in response to heat seeking missiles that are able to outsmart the flares that large aircraft deploy to thwart them. The LAIRCM system is an active laser-based countermeasure that is designed to defend the C-17 and other large, slow-moving aircraft from an infrared missile attack by automatically detecting a missile launch, determining if it is a threat, and activating a high-intensity system of pulsed lasers to track and defeat the threat by confusing its guidance head. In addition, the LAIRCM system automatically counters advanced infra-red (IR) missile systems with no action required by the crew. The pilot would simply be informed that a threat missile was detected and jammed. **Table 2-2** provides the general characteristics of the C-5 and C-17 aircraft, respectively.

Figure 2-4. C-17 LAIRCM System

Source: <http://www.defenseindustrydaily.com/96M-to-DS2-for-LAIRCM-Aircraft-Defense-System-Support-06289/>

Table 2-2. Comparative Characteristics of the C-5 and C-17 Aircraft

Characteristic	C-5	C-17
Primary Function	Cargo and troop transport	Cargo and troop transport
Engine	Four General Electric TF39-GE-1C turbofan engines	Four Pratt & Whitney F117-PW-100 turbofan engines
Thrust	43,000 pounds/engine	40,440 pounds/engine
Speed	518 miles per hour	518 miles per hour
Wingspan	222 feet, 9 inches	169 feet 10 inches
Length	247 feet, 10 inches	174 feet
Height	65 feet, 1 inch	55 feet 1 inch
Maximum Takeoff Weight	840,000 pounds peacetime	585,000 pounds peacetime
Crew	Six (pilot, co-pilot, two flight engineers and two loadmasters)	Three (two pilots and one loadmaster)
Cargo Compartment		
Length	143 feet, 9 inches	88 feet
Width	19 feet	18 feet
Height	13 feet, 6 inches	12 feet 4 inches
Load	270,000 pounds (36 pallet positions)	170,900 pounds of cargo (18 pallet positions)

2.3.2 Proposed Construction Program to Support C-17 Conversion at WPAFB

Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. No new facility construction or facility demolition activities are anticipated. Building and facility construction associated with the C-5 beddown in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration. The proposed renovation projects were chosen based on

accepted criteria and best professional judgment to identify feasible, realistic scenarios for meeting mission objectives and facility requirements as follows:

- Consistency with the land use designation of the site
- Adequately sized area to support required operational functions
- Access to necessary base infrastructure
- Suitability of the site for support of operations

AFRC has identified the need for six building renovation projects to support the proposed beddown of C-17 aircraft at WPAFB. The construction projects would upgrade existing inadequate facilities and capabilities necessary to perform required activities. **Table 2-3** presents the six proposed construction projects. All of these projects would be scheduled for FY11 award and construction would extend into FY12. The projects are also discussed in greater detail below.

Table 2-3. Proposed Construction Projects to Support C-17 Conversion at WPAFB

	Project Name	Bldg. No.	Description
1	Renovate Scheduled Maintenance Hangar	F/34015	Renovate interior of existing Scheduled Maintenance Hangar by relocating service utilities and fire protection system.
2	Renovate Multipurpose Hangar	F/34016	Renovate interior of existing Multipurpose Hangar by relocating service utilities and fire protection system.
3	Renovate Fuel Cell Hangar	F/34007	Renovate interior of existing Fuel Cell Hangar by relocating service utilities and fire protection system.
4	Construct Composite Material Shop Area	F/34026	Modify interior of existing shop facility (F34026) by installing a prefabricated clean room with associated service utilities.
5	Alter Flight Simulator Facility	F/30152	Alter interior walls, concrete pad, and utilities of existing C-5 simulator building to support C-17 simulators.
6	Repair for Supply Point	F/34012	Remove an unused electrical bus duct and repair a deteriorated loading dock.

Figure 2-5 shows the location of proposed construction projects that would be directly related to the C-17 conversion. Photographs of these facilities are provided in **Appendix B**. All projects would involve required anti-terrorism/force protection measures and conform to applicable State of Ohio and WPAFB building codes and regulations. Because the Proposed Action would involve the alteration of federal buildings, modifications and renovations would comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* and implement other “high performance sustainable principles” as applicable under EO 13514(2)(g). Although other construction and renovation projects are planned for 445 AW facilities (**Table 2-4**), these projects are not directly related to the C-17 conversion. The projects on **Table 2-4** are intended to meet current requirements; however, they are more urgent due to the C-17 conversion.

Table 2-4. Proposed Ancillary Projects for 445 AW Facilities at WPAFB

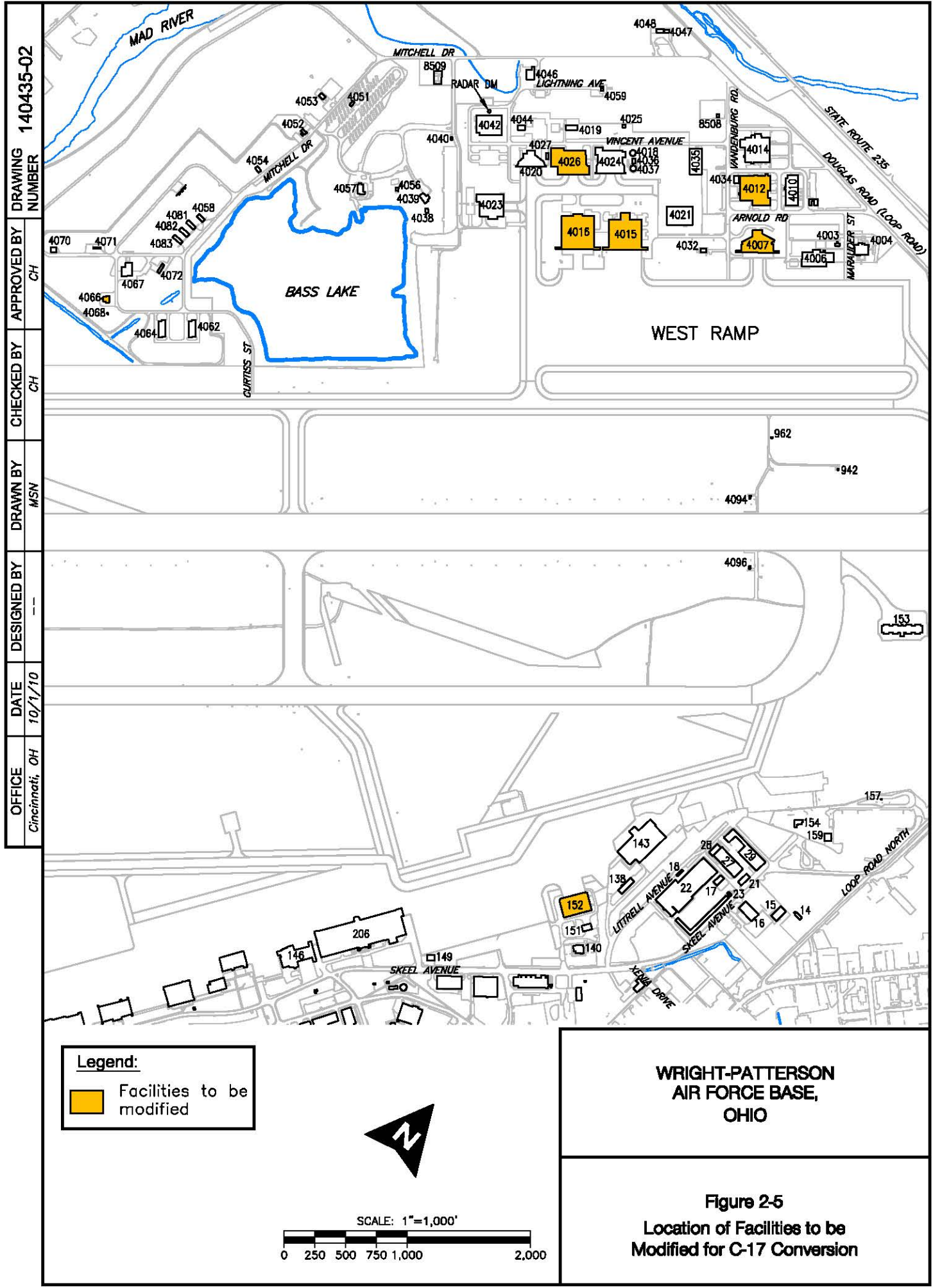
	Project Name	Bldg. No.	Description
1	Overlay Hangar Parking Area	N/A	Remove damaged concrete, provide asphalt overlay, and restripe parking area.
2	Convert Sprinklers to Wet Pipe	F/34007	Convert existing sprinkler system from pre-action to wet pipe.
3	Convert Sprinklers to Wet Pipe	F/34016	Convert existing sprinkler system from pre-action to wet pipe.
4	Convert Sprinklers to Wet Pipe	F/34015	Convert existing sprinkler system from pre-action to wet pipe.
5	Construct Composites Workroom	F/34026	Modify interior of existing shop facility (F34026) by installing a prefabricated clean room with self-contained heating, ventilation, and air conditioning (HVAC) system and providing lighting and power and oil-free dry nitrogen, provide 12-ft by 12-ft roll-up door.
6	Renovate F/34066	F/34066	Renovate existing Facility 34066, a former munitions shop, for assembly of replaceable countermeasure flare kits. Replace doors and install low slope curbs at rolling doors. Install and replace various lights and lighting fixtures. Replace explosion-proof receptacles. Clean/paint restrooms and office area and replace rain gutter.
7	Maintain Finishes Wing HQ	F/34010	Replace carpet and repaint walls.
8	Maintain Floor Finishes F/34012	F/34012	Replace carpet.
9	Repair Roof F/34024	F/34024	Replace roof with standing seam metal roof including cross supports onto existing rafters. Install underground drains for downspouts and include surface drains to divert rainwater.

Project 1: Renovate Scheduled Maintenance Hangar (F/ 34015)

Certain feature reconfigurations of this existing 62,700 ft² Scheduled Maintenance Hangar are required to house the proposed C-17 aircraft while it undergoes maintenance. Fire protection foam generators would be relocated to clear the C-17 aircraft frame, and fall protection systems would be installed over wing locations to ensure maintenance personnel safety while working on the wings and fuselage. Additional renovation requirements for this facility include providing power for aircraft cooling units; painting a stop-block for aircraft nose wheels; and replacing ladders with stairways and railings. Although not directly required for the C-17 conversion, the current electronic fire detection system would be replaced with a wet-pipe sprinkler system to minimize past maintenance and operational issues.

Project 2: Renovate Multi-Purpose Hangar (F/34016)

Certain feature reconfigurations of this existing 65,070-ft² Multi-Purpose Hangar are required to house the proposed C-17 aircraft while it undergoes maintenance. Fire protection foam generators would be relocated to clear the C-17 aircraft frame, and fall protection systems would be installed over wing locations to ensure maintenance personnel safety while working on the wings and fuselage.



Additional renovation requirements for this facility include providing power for aircraft cooling units; painting a stop-block for aircraft nose wheels; replacing ladders with stairways and railings; replacing sub-standard door handles; and installing ventilations systems in the restrooms and kitchen, ensuring all electrical systems are brought up to code. Although not directly required for the C-17 conversion, the current electronic fire suppression system would be replaced with a wet-pipe sprinkler system to minimize past maintenance and operational issues.

Project 3: Renovate Fuel Cell Hangar (F/34007)

Certain feature reconfigurations of this existing 35,635-ft² Fuel Cell Hangar are required to house the proposed C-17 aircraft while it undergoes maintenance. Aperture doors would be replaced to accommodate the C-17 fuselage, and fall protection systems and utility system drops would be installed over wing locations to ensure maintenance personnel safety while working on the wings and fuselage. Additional renovation requirements for this facility include providing power for aircraft cooling units and painting a stop-block for aircraft nose wheels. Although not directly required for the C-17 conversion, the current electronic fire suppression system would be replaced with a wet-pipe sprinkler system to minimize future maintenance and operational issues.

Project 4: Construct Composite Material Shop Area (F/34026)

The current F/34026 facility does not provide dedicated space with the necessary specialized climate controls and industrial gasses to support maintenance and repair work on composite components that comprise portions of the C-17 aircraft. The facility would be reconfigured to accommodate a prefabricated clean room with a 15-foot ceiling. Additional renovation requirements for this shop area include providing a self-contained heating, ventilation, and air conditioning (HVAC) system, lighting and power; oil-free nitrogen gas piping; and a 12-foot by 12-foot rollup door. Although the need for this work is increased due to the C-17 conversion, this project meets current requirements as well. A 9-foot-high chain-link fence, steel shelving, and lockable service windows and gates would also be installed.

An environmental survey will need to be accomplished to identify any asbestos-containing material that may be disturbed during construction. Any newly installed refrigerant-containing equipment must utilize HFC refrigerants only.

Project 5: Alter Simulator Facility (F/30152)

The existing 12,106 ft² Simulator Facility would be reconfigured through selective interior demolitions and removals to accommodate the C-17 simulator. Proposed activities would include replacing Weapons System Trainer (WST) mounting slab; reconfiguring interior space to provide a loadmaster training room; providing a maintenance room door and combination door locks; reconfiguring the utilities to provide power necessary power and HVAC; and installing a wet pipe sprinkler system and water detection system under raised floor areas, along with extending the fire alarm system.

1 An environmental survey will need to be accomplished to identify any asbestos-containing material that
2 may be disturbed during construction. Any newly installed refrigerant-containing equipment must utilize
3 HFC refrigerants only.

5 **Project 6: Repair for Supply Point (F/34012)**

6 This project would consist of removing an electrical bus duct and repairing a deteriorating load dock.

8 **2.3.3 Changes in Personnel**

9 Program Manpower Changes in personnel would occur as a result of the proposed aircraft conversion.
10 These changes include operations, maintenance, and support staff. The number of full-time personnel
11 would slightly decrease from 392 to 390. Reserve personnel would be reduced from 1,718 to 1,568. The
12 net change in the overall staff would be a decrease of 152 personnel.

14 **2.3.4 Changes in Aircraft Operations**

15 The C-17 is a heavy cargo transport aircraft designed to provide inter-theater airlift support to U.S.
16 national defense. Operations that would be performed by the C-17 aircraft would be similar to current
17 operations performed by the C-5 aircraft. No low-level military airspace would be used by the 445 AW
18 in the vicinity of WPAFB or en route to other locations. Use of established airspace with a base altitude
19 of 3,000 feet above ground level (AGL) does not require environmental analysis in accordance with the
20 USAF EIAP, 32 CFR Part 989, as amended, Appendix B, A2.35. As discussed in the following section
21 (Section 2.3.5), however, low-level military airspace at less than 3,000 feet AGL would be used by C-17
22 aircraft during training activities. The low-level flying would be accomplished within military training
23 routes (MTRs) and slow routes.

25 A *sortie* is a single military aircraft flight from initial takeoff through final landing. The types of aircraft
26 operations discussed in this document are referred to as *airfield operations*. An airfield operation
27 represents the single movement or individual portion of a flight in the Base airfield airspace environment,
28 such as one departure, one arrival, or one transit of the airport traffic area. Thus, a single flight would
29 generate at least two airfield operations (takeoff and landing).

31 The 445 AW is expected to conduct approximately 1,750 annual airfield operations at WPAFB. Airfield
32 operations consist of landings and takeoffs, touch-and-go operations (TGOs), and closed-pattern flights.
33 Since a pilot performing a TGO or a closed-pattern flight essentially performs a landing and a takeoff,
34 TGOs and closed-pattern flights are each counted as two airfield operations. **Table 2-5** shows current and
35 proposed 445 AW total airfield operations at WPAFB. The percent change between CY10 and CY12
36 would be 14%.

Table 2-5. Current and Proposed 445 AW Total Airfield Operations at WPAFB

Calendar Year	Current Airfield Operations (C-5 Aircraft)	Proposed Airfield Operations (C-17 Aircraft)	Total Airfield Operations
09	2,000	0	2,000
10	1,750	0	1,750
11	750	938	1,688
12	0	1,500	1,500

2.3.5 Use of Assault Landing Zones

A key ability of the C-17 aircraft is its capability to land and take off from a short runway, known as a landing zone (LZ). While approximately 25% of the 445 AW training activities for the C-17 would be conducted at WPAFB, the balance of the C-17 training would require approaches and landings on an assault LZ. WPAFB does not currently have an assault LZ; furthermore, there are no funds approved or construction planned for an assault LZ in the foreseeable future. It would be necessary for the C-17s from WPAFB to fly to a LZ and use established MTRs for low-level flying. Therefore, approximately 75% of the training would be carried out at an assault LZ(s) at another location.

The selection criteria for a LZ include the following:

- The airfield should have a primary runway that has the weight-bearing capacity, length, and width to also support non-LZ C-17 operations such as takeoffs, landings, and closed patterns.
- The airfield should have an existing LZ that is at least 3,500 feet long and 90 feet wide with the weight-bearing capacity to support C-17 tactical arrivals, departures, and landings.
- The airfield location should have C-17 maintenance personnel on-site.
- Other traffic at the LZ airfield should not conflict with C-17 tactical arrivals, departures, and landing and other training operations.
- The potential LZ location should have recorded cross-wind, visibility, and precipitation data to determine if weather at the airfield is favorable for LZ operations and other associated aircraft movement such as take-off after a tactical landing.
- The potential LZ should be located within a reasonable distance of the home base to minimize travel time and fuel consumption.
- Because LZ capability is needed by the second quarter of FY11 time is a critical factor. Therefore,, the potential LZ location and its associated MTRs must have been previously evaluated under NEPA for C-17 operations and have sufficient capacity to accommodate additional LZ training activities of the 445AW.

Several potential LZs were considered in the selection of a LZ for the Proposed Action, including LZs at Charleston AFB, South Carolina (CHS); Camp Shelby, Mississippi; and Altus AFB, Oklahoma. Camp Shelby and Altus AFB did not have sufficient analyzed capacity to meet the selection criteria. Camp Shelby conducted C-17 analysis for eight C-17s and currently operates eight C-17s. Altus AFB conducted analysis for 18 C-17s and currently operates 15 C-17s.

CHS, however, meets the selection criteria based on its airfield requirements, relative proximity to WPAFB, existing and relevant NEPA analysis, and available capacity. Therefore, it is proposed that the balance of the C-17 training for the 445 AW would use the LZ located at CHS's North Auxiliary Field, South Carolina (North Field). North Field is located 3 miles east of the town of North, South Carolina, and 65 miles northwest of CHS (**Figure 2-6**). It is anticipated that the established MTRs in South Carolina would be used for low-level flying below 3,000 AGL. Should the 445 AW wish to conduct C-17 operations at other LZ locations in the future, the appropriate NEPA documentation would be completed prior to conducting LZ work at these locations.

The potential use of the North Field LZ for additional C-17 operations on the East Coast was addressed as part of the *Environmental Assessment for East Coast Basing of C-17 Aircraft* (USAF, 2005). One of the alternative actions for the EA was to base and operate an additional 12 C-17 aircraft at CHS, which would have ultimately increased the total number of aircraft at CHS to 60 aircraft. CHS aircrews would have used 17 MTRs for low-level navigation training. Tactical arrival, departure, and landing training would have been accomplished at the LZ at North Field.

The Air Force conducted a full environmental analysis of the potential beddown of the C-17 aircraft utilizing CHS and North Field as an alternative beddown location. While a FONSI was issued for this alternative under the East Coast Basing EA, CHS and North Field LZ were not selected as preferred basing locations. Nevertheless, because this basing location was fully analyzed and was included in the FONSI, this prior environmental analysis can be used to evaluate the North Field LZ as part of the Proposed Action alternative for C-17 aircraft operations at WPAFB provided an updated capacity is achieved.

To determine whether the North Field LZ continues to have sufficient capacity to accommodate the additional C-17 aircraft from WPAFB, the current use of the LZ was compared with the capacity projected for North Field in the East Coast Basing EA. The EA projected a total of 92,513 operations for C-17s at CHS (**Table 2-6**), which represented 267 operations/day averaged over 346 days/year (Table 2.4.4-2; USAF 2005). These airfield operations were associated with training activities for 60 assigned aircraft. The East Coast Basing EA also calculated capacity for other aircraft from the east coast using the LZ at North Field. The category of "other aircraft" included 9,469 annual operations or 27.37 daily operations by C-17 aircrews from Dover AFB and McGuire AFB. Approximately 57% of the CHS C-17 operations and 55% of the overall airfield operations were projected to occur during nighttime (10:00 PM to 7:00 AM).

Table 2-6. Annual and Average Landing Zone Operations Analyzed for Charleston AFB Alternative Action in the East Coast Basing EA

Aircraft	Total Annual Operations	Average Daily Operations
C-17	92,513	267.38
Other Aircraft	9,469	27.37
Total	101,982	294.75

Reference: Table 2.4.4-2; USAF, 2005

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	11/29/10	--	JLS	SB	CH	S-140435.0602-11/10-W



A number line representing a distance of 1 mile. The line is marked at 0, 0.5, and 1 mile. A black bar is positioned above the line from 0 to 0.5, and a white bar is positioned below the line from 0.5 to 1.

NORTH, SOUTH CAROLINA

Figure 2-6
Location of North Field
Landing Zone

For purposes of this current EA, actual data on CY09 and CY10 airfield operations were obtained from CHS to determine how this data compared with the projected airfield operations estimated in 2005 (CHS 2010a). The total number of airfield operations in CY09 was 30,646, which is equivalent to 2,553.8 operations per month. Although actual data are not yet available for November and December 2010, the total number of airfield operations in CY10 is estimated to be 32,089 or an average of 2,674.1 operations per month. Therefore, total annual airfield operations for 2009 and 2010 (30,646 and 32,089, respectively) are approximately 35% of the total annual operations considered and analyzed in the East Coast Basing EA (92,513 operations).

It is also noteworthy that approximately six of the C-17s currently assigned to CHS would be transferred to the 445 AW at WPAFB as part of the Proposed Action. Although the aircraft for CHS would be replaced by additional C-17 aircraft, the FY12 Program Objective Memorandum (POM) allows for 48 PAA and 4 BAI at CHS (AMC 2010). Therefore, the number of C-17s assigned to CHS would continue to be less than the 60 C-17s evaluated at CHS and North Field LZ in the East Coast Basing EA.

With respect to recent use of the North Field LZ by “other aircraft”, it was documented that C-17s from McGuire AFB exclusively use the Naval Air Engineering Station (NAES) Lakehurst, New Jersey LZ unless flying an exercise mission (WPAFB 2010a). From August 2010 through October 2010, the C-17 aircraft from Dover AFB used NAES Lakehurst LZ for 69% (42 of 61) of their sorties and North Field LZ for the other 31% (19 of 61). Therefore, the LZ at North Field was only utilized by Dover AFB 19 times over a 90-day period. For example, if one quarter of 346 days per year is equal to 86 days (August through October) and an average of 12 airfield operations per sortie was completed at the LZ, the average daily total operations by Dover AFB was 2.65 operations. This number of operations is well below the 27.37 operations assumed for “Other Aircraft” in the East Coast Basing EA.

The 445 AW would conduct LZ training by flying C-17 aircraft from WPAFB to one of the established MTRs in the vicinity of the North Field LZ. Projected usage of the North Field LZ by the 445 AW at WPAFB was conservatively based on the following assumptions (WPAFB 2010b):

- Six sorties would be conducted per week.
- Each sortie would consist of 12 operations (6 arrivals, 6 departures).
- All (100%) of the sorties would include assault training at North Field LZ.
- Assault training lasts approximately 2 hours per sortie.
- Sorties would be conducted 48 weeks per year.

Assuming that one quarter of the 346 days per year assumed in the East Coast Basing EA is equivalent to 86 days (e.g., August through October) and an average of 12 airfield operations per sortie would be completed at the LZ per week, it is anticipated that the average estimated total operations contributed by C-17 aircraft from WPAFB would be 10.33 operations per day (**Table 2-7**).

Table 2-7. Estimated C-17 Operations for 445 AW at North Field LZ per Quarter

	Operations per Sortie	Total Sorties	Total Days	Average Daily Total Operations
Arrivals	6	74	86	5.16
Departures	6	74	86	5.16
Total Operations	12	74	86	10.33

Reference: WPAFB 2010a.

On an annual basis, the WPAFB C-17s would contribute an additional 3,574 airfield operations at North Field LZ (**Table 2-8**). Adding the WPAFB operations to the number of operations estimated for North Field LZ in CY 10 (32,089), the total annual number of operations at the North Field LZ would be approximately 35,663 or approximately 39% of the total annual operations assumed for North Field in the East Coast Basing EA. Due to the available capacity at the North Field LZ, the contribution from “Other Aircraft” would be expected to be very minor.

Table 2-8. Proposed Annual and Average Landing Zone Operations Compared with Operations Projected for the East Coast Basing EA

Aircraft	Total Annual Operations	Average Daily Operations
Analyzed Capacity at North Field LZ (East Coast Basing EA) ^a		
CHS C-17	92,513	267.38
Other Aircraft	9,469	27.37
Total	101,982	294.75
Current Utilization of North Field LZ (CY09 and CY10) ^b		
CHS C-17 (CY09)	30,646	84.19
CHS C-17 (CY10)	32,089	88.16
Proposed Additional Utilization of North Field LZ (Proposed Action) ^c		
WPAFB C-17	3,574	10.33

a) Table 2.4.4-2; USAF 2005

b) CHS 2010a

c) WPAFB 2010a

Based on the data, additional capacity is available at CHS for use by 445 AW for the C-17s from WPAFB. Using this rationale, the impact analysis from the East Coast Basing EA has been incorporated by reference into the evaluation of proposed C-17 training activities for this current EA.

2.4 No Action Alternative

Under the No Action Alternative, it is assumed that the C-5 aircraft at WPAFB would not be replaced by the C-17 aircraft. The 445 AW would continue to fly the current C-5s and aircraft operations would be similar to those programmed for the existing C-5 mission. These operations would include C-5 training, the majority (approximately 90%) of which takes place at WPAFB.

2.5 Alternatives Eliminated from Further Study

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the action based on the project requirements stated in

1 Section 2.2. Two alternatives to the Proposed Action were considered to determine their feasibility as
2 viable alternatives to the beddown of C-17 aircraft at WPAFB.

3
4 Under the first alternative considered, it was assumed that the C-5 operations at WPAFB would continue
5 until the end of CY11, drawing down as proposed by the schedule in **Table 2-1**. Over this period, the C-5
6 aircraft would either be retired or transferred to another base. Replacement of these aircraft by C-17
7 aircraft would not occur. Consequently, no aircraft would be available to maintain the 445 AW airlift
8 capability at WPAFB. This alternative was eliminated from detailed analysis because it would not satisfy
9 the need to maintain AFRC's airlift capabilities and the 445 AW's current mission.

10
11 The second alternative under consideration involved modernizing the existing C-5A aircraft to the C-5M.
12 The C-5M Super Galaxy is the largest airlifter in the USAF inventory. Based on its cargo volume and
13 payload capacity, the C-5M is projected to handle greater combat payloads over longer distances than any
14 other airlifter. The C-5M is designed to take off and land in shorter distances than the C-5A while
15 operating under austere conditions. The engines enable the aircraft to carry strategic loads over very long
16 distances. With aerial refueling, the C-5M can travel anywhere in the world nonstop. In addition to the
17 upgraded engine, the cockpit has been updated as well. By modernizing the C-5 aircraft, the aging fleet
18 would be rejuvenated and reliability of the C-5 aircraft would be improved.

19
20 Although conversion from the existing C-5A to the C-5M may be possible, Congress has not yet
21 approved funding to convert from C-5A to C-5M aircraft. If funded, active duty units would be the first
22 to receive this aircraft. It could be several years before C-5M aircrafts would be available to reserve
23 units, such as the 445 AW. This alternative was eliminated because the timeframe and funding for
24 converting C-5A to C-5M aircraft at WPAFB would be uncertain. It would not meet the need to ensure
25 that aircraft would be available to maintain the 445 AW mission.

26 27 **2.6 Comparison of Environmental Consequences**

28 The impacts associated with the Proposed Action and the No Action Alternative are summarized in
29 **Table 2-9**. The information includes a concise definition of the issues addressed and the environmental
30 impacts associated with each alternative. The analysis is based on information discussed in detail in
31 Section 4.0, Environmental Consequences.

1

Table 2-9. Comparison of Environmental Consequences

Affected Environment	Proposed Action	No Action Alternative
Airspace Management	Short-Term: Negligible adverse impact. Long-Term: Beneficial effect on airfield operations at WPAFB with anticipated decrease in 445 AW airfield operations.	Short-Term: No impact. Long-Term: No impact
Land Use	Short-Term: No impact because no changes to land use would occur at or surrounding WPAFB Long-Term: No impact because no changes to land use would occur at or surrounding WPAFB	Short-Term: No impact. Long-Term: No impact.
Air Quality	Short-Term: Minor, short-term impact from particulate matter and engine exhaust emissions generated during construction activities. Long-Term: Negligible impacts with net emissions reductions for all pollutants and improvement in air quality over current conditions.	Short-Term: No impact. Long-Term: No impact.
Noise	Short-Term: Minor impacts on ambient noise from construction activities. Impacts would be minor because these activities are primarily interior renovations and would be carried out during normal working hours. Long-Term: Beneficial impact on the noise environment with anticipated decrease in 445 AW airfield operations and use of a quieter aircraft.	Short-Term: No impact. Long-Term: No impact.
Geology and Soils	Short-Term: Negligible impact because construction activities are primarily limited to interior renovations. Long-Term: Negligible impact to soils, topography, or physiographic features.	Short-Term: No impact. Long-Term: No impact.
Water Resources		
Groundwater	Short-Term: Negligible impact during construction as the proposed activities would be primarily conducted inside existing facilities. Long-Term: Though the Proposed Action would not pose any new risks, minor adverse effects on groundwater would continue to occur as a result of aircraft operations.	Short-Term: No impact. Long-Term: No impact.
Surface Water	Short-Term: Negligible impact during construction as the proposed activities would be primarily conducted inside existing facilities. Long-Term: Though the Proposed Action would not pose any new risks, minor adverse effects on surface water would continue to occur as a result of aircraft operations.	Short-Term: No impact. Long-Term: No impact.
Floodplains	Short-Term: Negligible impact. Although portions of the parking apron are in the 100-year floodplain, facility modifications are limited to building interiors so there would be no increase in impervious surfaces. In addition, there would be no loss or gain of soil in the retarding basin. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.

Affected Environment	Proposed Action	No Action Alternative
Biological Resources Vegetation Wildlife Threatened and Endangered Species Wetlands	Short-Term: Negligible impact as the proposed activities would take place on previously disturbed areas with no naturally occurring vegetation. Long-Term: No impact. Short-Term: Negligible impact on wildlife as the proposed project area does not provide suitable habitat, the current land use would not change, and proposed activities are not in close enough proximity to any T&E species to generate noise-related effects. Long-Term: No impact. Short-Term: Negligible impact on threatened and endangered species as the proposed project area does not provide suitable habitat and the current land use would not change. Long-Term: No impact. The proposed project area does not provide suitable habitat and the current land use would not change Short-Term: No impact. No wetlands in the area. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact. Short-Term: No impact. Long-Term: No impact. Short-Term: No impact. Long-Term: No impact. Short-Term: No impact. Long-Term: No impact.
Cultural Resources	Short-Term: Building 30152 is the only structure considered eligible for listing in the NRHP. The proposed changes to the facility involve minor interior alterations of non-original walls and fixtures. There would be no adverse effects on the building. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Socioeconomics	Short-Term: Negligible adverse effect on local workforce. Beneficial impact on local economy from revenue generated by construction activities. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Environmental Justice	Short-Term: No impact. Long-Term: No impact as there is no change in land use and minimal emissions from the C-17 Conversion.	Short-Term: No impact. Long-Term: No impact.
Infrastructure	Short-Term: Negligible adverse impact from construction traffic. Negligible impacts from utilities as there would be no increase in personnel or facility operations. Long-Term: No impact because the number of personnel supporting the C-17 mission would remain virtually the same. There would be no disproportionate impacts on minority or low-income populations.	Short-Term: No impact. Long-Term: No impact.
Health and Safety	Short-Term: Potential minor impacts to workers during construction activities. Impacts would be minimized by adherence to safety standards. There would be no adverse impacts associated with bird-aircraft strike hazards. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.

Affected Environment	Proposed Action	No Action Alternative
Hazardous Materials/Waste Hazardous Materials Hazardous Waste Asbestos-Containing Material (ACM) and Lead-Based Paint (LBP) Installation Restoration Program	Short-Term: Negligible impact. Hazardous materials used during construction would not be expected to increase. Long-Term: Negligible impact. Hazardous materials used, including deicing fluid, would not be expected to increase. Procurement of products containing hazardous materials would be comparable to those used for the C-5 due to (1) the similarity of the maintenance and support activities for the two aircraft; and (2) the proposed number of C-17 aircraft is less than the number of C-5 aircraft that are being retired or transferred. Short-Term: Negligible impact. Hazardous wastes generated during construction would not be expected to increase. Long-Term: Negligible impact. The number of C-17 aircraft that would operate would be less than the baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous wastes would be similar in nature with the baseline condition waste streams. Short-Term: Minor adverse impact. ACM and LBP could be encountered during construction and renovation projects. Impacts would be minimized by surveying the buildings prior to construction and renovation and following management plans for ACM and LBP as well as USAF policy. Long-Term: No adverse impact. Short-term: Building modifications would be limited to the interior and would have no adverse impact to IRP sites. Long-term: No impact.	Short-Term: No impact. Long-Term: No impact. Short-Term: No adverse impact. Short-Term: No impact. Long-Term: No impact. Short-Term: No impact. Long-term: No impact.

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3.0 AFFECTED ENVIRONMENT

This section describes the current environmental and socioeconomic conditions most likely to be affected by the Proposed Action. It provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action.

In compliance with NEPA, CEQ guidelines, and 32 CFR 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include airspace management, land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomic, environmental justice, infrastructure, health and safety, and hazardous materials and wastes. Analysis of potential environmental effects focuses on those resource areas that are appropriate for consideration in light of a proposed action. All resource areas are initially considered, but some may be eliminated from detailed examination because they do not directly apply to a particular proposal.

The resource areas located at WPAFB are described in the sections below. Descriptions of the most relevant resources for the North Field LZ, such as airspace management, land use, air quality, and noise, are briefly discussed below, as appropriate. These resource areas as well as those not directly related to this EA are found in the East Coast Basing EA (USAF 2005) and are incorporated by reference.

3.1 Airspace Management

3.1.1 Definition of the Resource

The USAF describes airspace management as the coordination, integration, and regulation of the use of airspace of defined dimensions. The objective of airspace management is to meet military training requirements through the safe and efficient use of available navigable airspace, in a peacetime environment, and while minimizing the impact on other aviation users and the public (AFI 13-201).

There are two categories of airspace, or airspace areas: regulatory and non-regulatory. Within these two categories, further classifications include controlled, uncontrolled, special use, and airspace for special use. The categories and types of airspace are dictated by:

- The complexity or density of aircraft movement
- The nature of the operations conducted within the airspace
- The level of safety required
- National and public interest in the airspace

Controlled Airspace

Controlled airspace encompasses the different classifications (Classes A, B, C, D, and E) of airspace and defines dimensions within which air traffic control (ATC) service is provided to flights under instrument meteorological conditions, and to flights under visual meteorological conditions. All military and civilian

aircraft are subject to Federal Aviation Regulations. The controlled airspace classifications are defined, as follows:

- Class A: Includes all operating altitudes of 18,000 feet above mean sea level (MSL) and above. Class A airspace is most frequently used by commercial aircraft between altitudes of 18,000 and 45,000 feet above MSL.
- Class B: Typically comprises contiguous cylinders of airspace, stacked one upon another and extending from the surface up to 10,000 feet AGL. To operate in Class B airspace, pilots must contact appropriate controlling agencies and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics that allow air traffic controllers to track aircraft speed, altitude, and position accurately.
- Class C: Generally described as controlled airspace that extends from the surface or a given altitude to a specified higher altitude. Class C airspace is designed and implemented to provide additional ATC into and out of primary airports where aircraft operations are periodically at high density levels. All aircraft are required to maintain two-way radio communication with local ATC facilities.
- Class D: Encompasses a 5-statute-mile radius of an operating air traffic-controlled airport. It extends from the ground to 2,500 feet AGL or higher. All aircraft must be in two-way radio communication with the ATC facility.
- Class E: May range from ground level at non-towered airfields up to 18,000 feet above MSL. The majority of Class E airspace is where more stringent airspace control has not been established.

The airways associated with Classes A through D frequently intersect approach and departure paths from both military and civilian airfields. With respect to airspace in southwestern Ohio, Class B airspace is associated with major airport complexes, such as the Cincinnati-Northern Kentucky International Airport, Kentucky. The James M. Cox Dayton International Airport, Ohio operates within Class C airspace. The airspace surrounding WPAFB is designated as Class D airspace.

Uncontrolled Airspace

Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the surface to 700 feet AGL in urban areas, and from the surface to 1,200 feet AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 feet above MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating under visual meteorological conditions.

Special Use Airspace

Special Use Airspace consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on aeronautical charts. Chart depictions include hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in FAA Order 7400.8, Special Use Airspace. Examples of special use airspace in the local

1 flying area of WPAFB are restricted areas (e.g., R-3701), military operations areas (e.g., Buckeye MOA),
2 prohibited areas (e.g., P-56), and warning areas (e.g., W-107) (FAA 2010).

4 **Airspace for Special Use**

5 Airspace for Special Use are areas used by military aircraft but do not put restrictions on nonparticipating
6 aircraft. They are designated as such for informational purposes for general aviation. Examples of
7 airspace for special use are MTRs, slow routes, and aerial refueling (AR) tracks.

8
9 MTRs are flight paths that provide a corridor for low-altitude navigation and training. Low-altitude
10 navigation training is important because aircrews might be required to fly at low altitudes for tens or
11 hundreds of miles to avoid detection in combat conditions. To train realistically and safely, the military
12 and the FAA have developed MTRs. This allows the military to train for low-altitude navigation at
13 airspeeds in excess of 250 knots indicated airspeed (KIAS) (approximately 285 mph). There are two
14 types of MTRs: instrument routes and visual routes. Typical MTRs are from 4 to 10 nautical miles wide
15 and have altitude structures from 100 feet AGL to 5,000 feet above MSL or higher. The centerlines of
16 MTRs are depicted on aeronautical charts.

17
18 Slow routes are similar to MTRs in structure but are used by aircraft that normally operate at low-level
19 airspeeds of less than 250 KIAS. Slow routes are designated through military approval channels and do
20 not require FAA coordination. The maximum altitude that can be flown in slow routes is 1,500 feet AGL.

21
22 The typical air refueling mission would use AR tracks already established in the DoD *Flight Information*
23 *Publication AP/1B, Area Planning, Military Training Routes* (called “the FLIP”) with generic routing to
24 and from the tracks. These AR tracks are located throughout the country. Use of established airspace
25 with a base altitude of 3,000 feet AGL does not require environmental analysis in accordance with the
26 USAF *EIAP*, 32 CFR 989, as amended. The 445 AW does not currently fly C-5 aircraft on MTRs or slow
27 routes and does not use low-level (less than 3,000 feet AGL) airspace; however, MTRs and low-level
28 airspace would be used for C-17 aircraft.

30 **3.1.2 Existing Conditions**

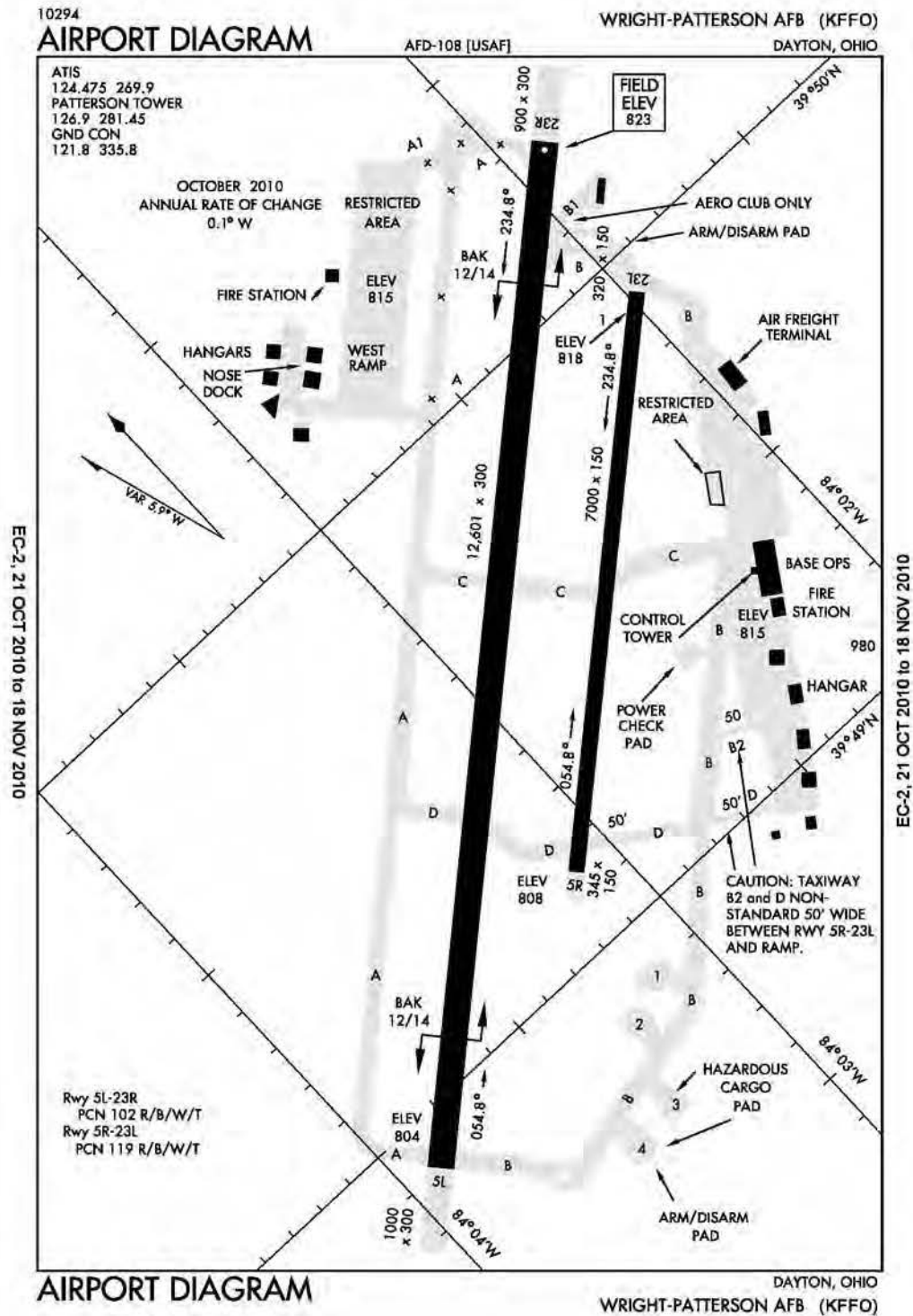
31 **Wright-Patterson AFB**

32 WPAFB is managed and maintained by the 88 ABW. The Base is in many measures the largest, most
33 diverse, and organizationally complex installation in the USAF. Missions range from acquisition and
34 logistics management to research and development, education, flight operations, and many other defense-
35 related activities. The 445 AW currently flies and maintains ten C-5 aircraft in the mission of worldwide
36 mobility (**Table 2-5**).

37
38 WPAFB has two runways oriented north-south: Runway 05L/23R is 12,601 feet long and Runway
39 05R/23L is 7,000 feet. **Figure 3-1** provides an airfield diagram of WPAFB. The airfield is surrounded

1

Figure 3-1. WPAFB Airfield Diagram



Source: NIMA 2010

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4

by Class D airspace and lies under the Class C airspace of James M. Cox Dayton International Airport. **Figure 3-2** depicts the local controlled airspace in the vicinity of WPAFB.

Transition Training Airfields

The 445 AW conducts the majority of its aircraft operations at WPAFB. For transition training, the 445 AW uses various transitional airfields, primarily Dayton International Airport, Ohio; and Grissom AFB, Indiana (WPAFB 2010a). Other possible locations include Selfridge Air National Guard Base, Michigan; Rickenbacher International Airport, Ohio; and Campbell Army Airfield, Kentucky. These airfields are currently used to conduct instrument and visual flight rules pattern practice (landing and takeoff practice) when the local weather at WPAFB is unsuitable for training requirements and/or construction precludes safe flying operations. Approximately 5% of current training is considered to be transition training.

The 445 AW currently maintains Letters of Agreement with civilian airfields, which establish procedures and requirements for both the 445 AW and the airfield. These Letters of Agreement also provide a tool for Operational Risk Management. Letters of Agreement are not required for use of military airfields.

North Field

In the East Coast Basing EA (USAF 2005), the MTRs that were proposed for use by CHS occur within the states of Virginia, Tennessee, North Carolina, South Carolina, Georgia, and Alabama (**Figure 2-15 in USAF 2005**). For purposes of C-17 training for the 445 AW, the MTRs closest to CHS and North Field would be utilized. Airspace management for these MTRs was assessed in the East Coast Basing EA (USAF 2005) and incorporated into this EA by reference.

3.2 Land Use

3.2.1 Definition of the Resource

The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure both orderly growth and compatible uses among adjacent property parcels or areas. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions

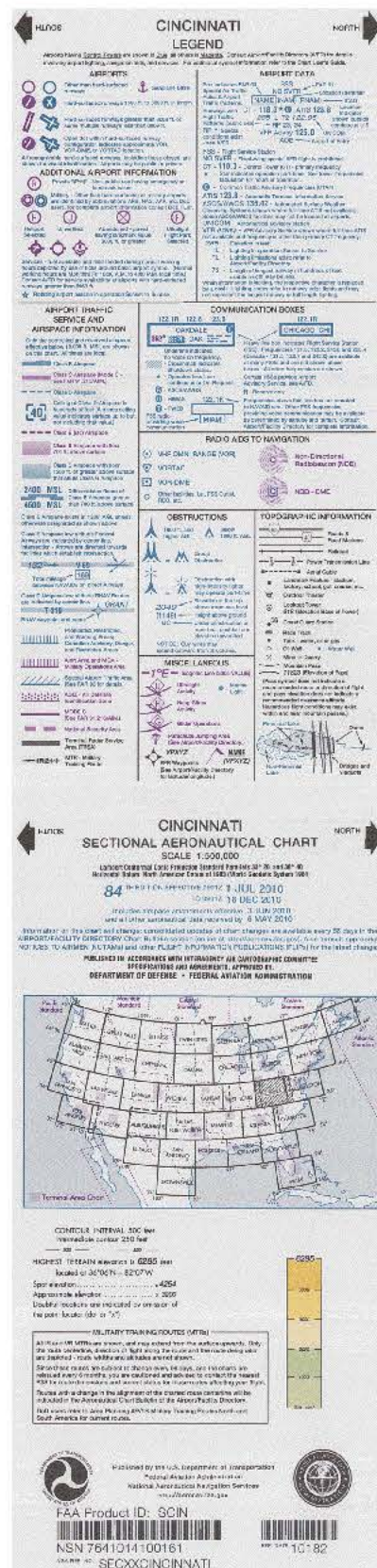
1 need to be evaluated for their potential effects on project sites and adjacent land uses. The foremost
2 factor affecting a proposed action in terms of land use is its compliance with any applicable land use or
3 zoning regulations. Other relevant factors include existing land use at the project site, the types of land
4 uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity,
5 and its “permanence.”
6

7 To address land use with respect to noise and safety associated with aircraft operations, DoD required
8 military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal
9 of AICUZ is to promote compatible land use around air bases by providing information concerning
10 aircraft operations, noise exposure, and accident potential to local governments (WPAFB 1995a, 2001).
11

12 One component of the AICUZ study was the development of noise contours. These contours are
13 produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the
14 NOISEMAP methodology. In the context of aircraft operations, land use compatibility is also described
15 in the context of noise levels. The AICUZ study included both the conditions that existed at the time the
16 study was prepared as well as a Maximum Mission Scenario that was based on the noise effects of various
17 potentially feasible mission changes. The Maximum Mission (also known as Mission Capacity) Scenario
18 was established for WPAFB to provide consistency when zoning and land use policies in the community
19 are established. Because the noise contours were based on conservative assumptions regarding future
20 missions, local zoning does not need to be adjusted with changes in missions. Therefore, the noise
21 contours for the Maximum Mission Scenario remain in effect for local community planning purposes.
22 Noise contour analysis is addressed in Section 3.4 of this EA.
23

24 The AICUZ program is also intended to reduce the potential for aircraft mishaps in populated areas. As a
25 result of this program, WPAFB has altered basic flight patterns to avoid heavily populated areas. In
26 addition, airfield safety zones were established under AICUZ to minimize the number of people who
27 would be injured or killed if an aircraft crashed. Three safety zones are designated at the end of all active
28 runways: Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II.
29

30 The CZ represents the most hazardous area. APZs are outside of the CZs. APZ I is immediately beyond
31 the CZ and has a high potential for accidents. APZ II is immediately beyond APZ I and has measurable
32 potential for accidents. While aircraft accident potential in APZs I and II does not necessarily warrant
33 acquisition by USAF, land use planning and controls are strongly encouraged for the protection of the
34 public. Compatible land uses are specified for these zones. According to AFI 32-7063, all new construc-
35 tion is required to comply with the AICUZ. The West Ramp is not located in any of the APZs.
36
37
38
39



Source: FAA 2010

**WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO**

FIGURE 3-2
Local Controlled Airspace Surrounding
Wright-Patterson AFB

3.2.2 Existing Conditions

On-Base Land Use

WPAFB comprises 8,145 acres near Dayton, Ohio, and is divided into three areas: A, B, and C. Area A contains primarily administrative activities; Area B focuses on acquisition, education, research, and development; and Area C is dominated by airfield operation, maintenance, and civil engineering activities. The Base is expected to fulfill numerous roles within the USAF, incorporating both natural and man-made development constraints within the Base boundaries. Over 2,500 acres of WPAFB remain undeveloped due to various development constraints.

There is a wide variety of land use classifications on WPAFB. Open Space and Outdoor Recreation represent some of the land constrained from development. Over 2,000 acres of this undeveloped land lies within the natural constraints area, which is composed of areas such as floodplains, lakes, wetlands, or areas with unsuitable soil for building. Also located within the natural constraint area is the Huffman Prairie Flying Field containing remnant prairie habitat, which includes several rare plant and animal species within the 109 acres.

Human-made constraints also restrict development within the WPAFB boundaries. Included in these types of constraints are archaeological sites and historic buildings, which can be identified sites or those that remain undiscovered. Operational restrictions can also impede development. Noise contours from aircraft operations and explosive safety zones must be considered when looking at developing areas on the Base. Airfield and airspace control surfaces, such as runway approach CZs, are to remain clear of building obstructions. The presence of past waste disposal sites and fire training areas must be considered when siting facilities (WPAFB 1995a).

Surrounding Land Use

Land uses around WPAFB vary from heavily urbanized to rural agricultural (**Figures 3-3 and 3-4**). Most of the urbanized areas are west of the Base, with the low-density or agricultural area located east of the Base.

To the west and south of WPAFB is the Dayton metropolitan area. This area is comprised of higher population density cities such as Dayton, Huber Heights, Riverside, Fairborn, and Beavercreek. These cities, along with WPAFB, are within Greene and Montgomery counties. The 2010 census data had not been finalized when this EA was prepared; therefore, the most recent census data from 2000 were used. According to the most recent census data, Greene County has a population of 147,886 persons while Montgomery County has 559,062 persons (Bureau of Census 2000a). To the east and north of WPAFB is largely open area with agricultural lands interspersed with low-density development located within Miami and Clark counties. According to the most recent census data, Miami County has a population of 98,868 persons while Clark County has 144,741 persons (Bureau of Census 2000a).

Most of the land surrounding WPAFB that is impacted from Base activities is compatible with Base operations. Many factors contribute to the compatibility of land uses that are within Base activity areas. Development patterns and services available encourage or restrict development in many areas outside incorporated cities, and many areas immediately surrounding the Base are development-restricted due to floodplains or well water protection restrictions. Progressive land use controls have been the most important factor concerning compatible development within noise and APZs at WPAFB (WPAFB 1995a).

Land Use at North Field

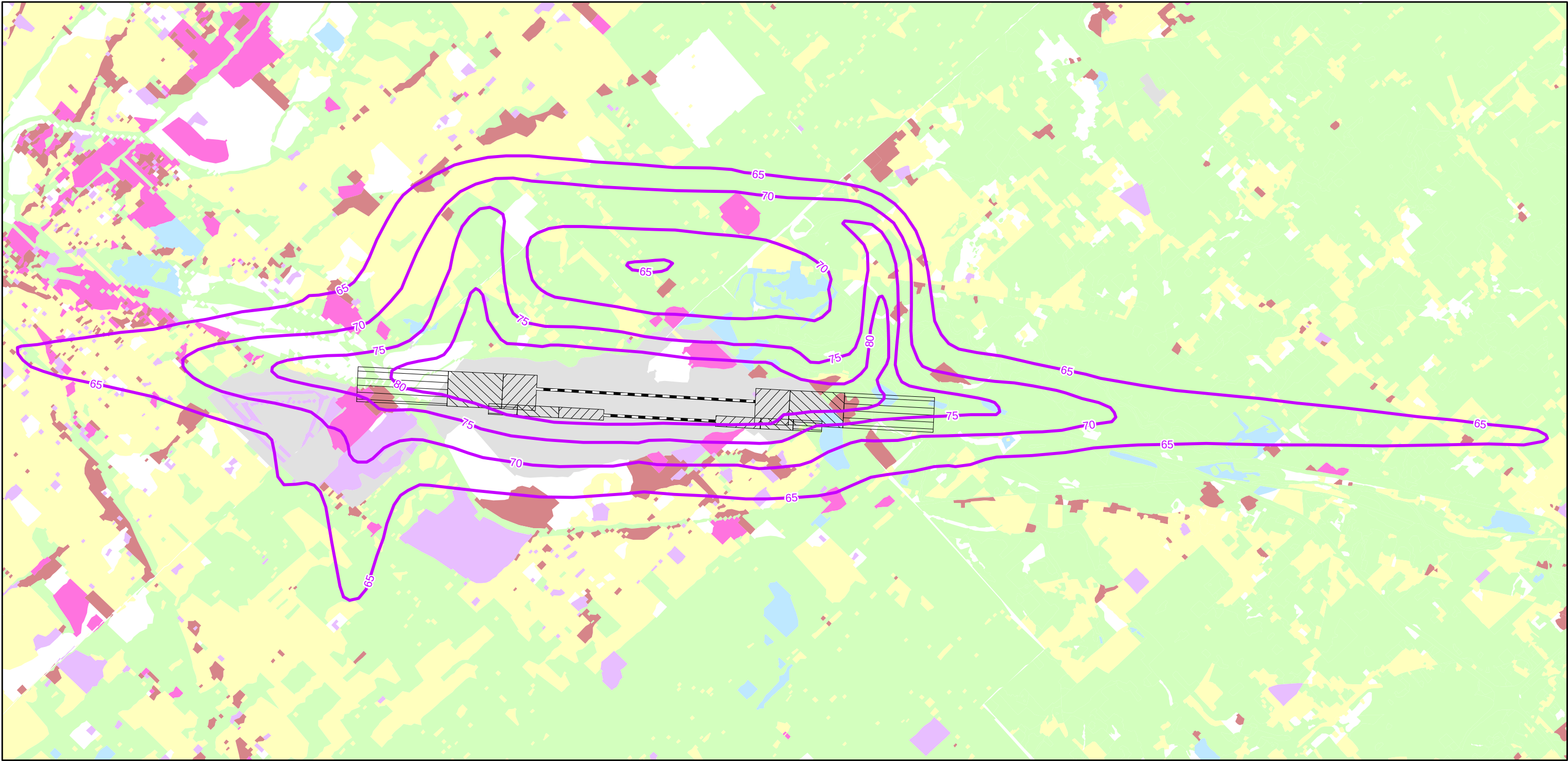
North Field is located southeast of the municipal boundaries of the town of North, South Carolina. Land use in the vicinity of North Field is described in Section 3.3.8.2 of the East Coast Basing EA (USAF 2005). The predominant land uses surrounding the airfield are undeveloped (open space), agricultural, or low-density residential. The town of North, just northwest of the airfield, is the principal development in the vicinity of North Field. The town is comprised of a few commercial uses in the center of town, two schools, a library, offices, several churches, and mostly medium-density single-family residential uses.

3.3 Air Quality

3.3.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the “air basin,” and the prevailing meteorological conditions.

The CAA directed USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$\text{PM}_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-1** presents the primary and secondary NAAQS.

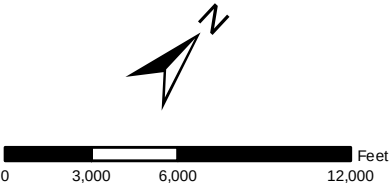


Legend:

- | | | | |
|--|------------------------------------|--|-------------|
| | Maximum Mission DNL Noise Contours | | Runway |
| | Residential | | Clear Zones |
| | Commercial | | APZ I |
| | Industrial | | APZ II |
| | Institutional | | |
| | Open Space | | |
| | Vacant and Agricultural | | |
| | Extractive | | |
| | Airports | | |

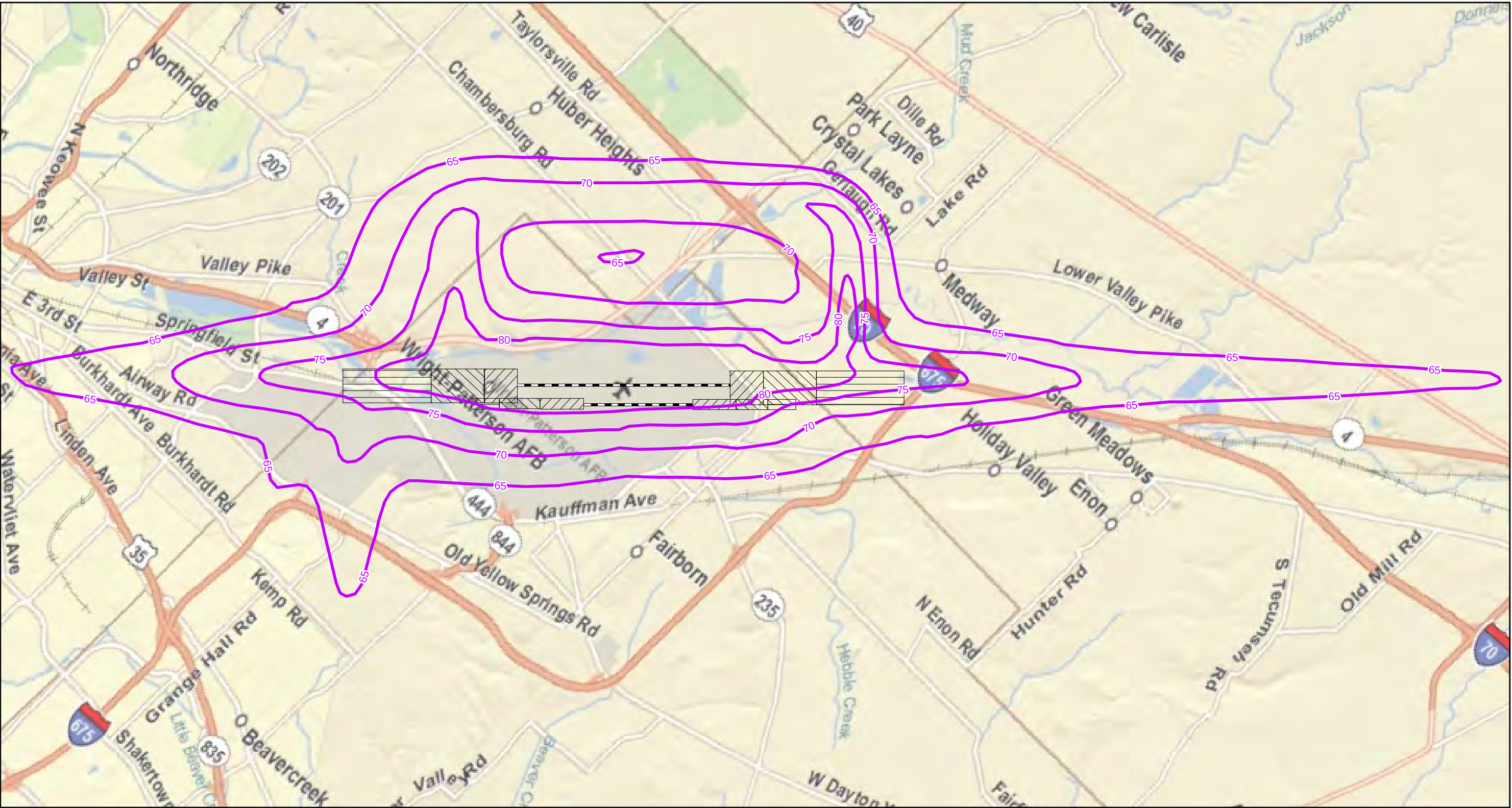
Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission
Source: Land Use - Ohio Department of Natural Resources
Montgomery County Land Use data; Miami County Land Use Data;
Clark County Land Use data; Greene County Land Use data.



WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3-3
Existing Land Use and
Maximum Mission Noise Contours

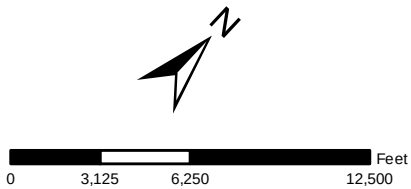


Legend:

	1995 Maximum Mission Noise Contours		Clear Zones
	Runway		APZ I
			APZ II

Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission
Source: Street Map-ESRI GIS server arcgisonline.com



WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3-4
Maximum Mission Noise Contours
Area Map

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value ⁶		Standard Type
CARBON MONOXIDE (CO)			
8-hour average	9 ppm	(10 mg/m ³)	Primary
1-hour average	35 ppm	(40 mg/m ³)	Primary
NITROGEN DIOXIDE (NO ₂)			
Annual arithmetic mean	0.053 ppm	(100 µg/m ³)	Primary and Secondary
1-hour average ¹	0.100 ppm	(188 µg/m ³)	Primary and Secondary
OZONE (O ₃)			
1-hour average ²	0.12 ppm	(235 µg/m ³)	Primary and Secondary
8-hour average ²	0.075 ppm	(147 µg/m ³)	Primary and Secondary
LEAD (Pb)			
3-month average ³		0.15 µg/m ³	Primary and Secondary
PARTICULATE < 10 MICROMETERS (PM ₁₀)			
24-hour average ⁴		150 µg/m ³	Primary and Secondary
PARTICULATE < 2.5 MICROMETERS (PM _{2.5})			
Annual arithmetic mean ⁴		15 µg/m ³	Primary and Secondary
24-hour average ⁴		35 µg/m ³	Primary and Secondary
SULFUR DIOXIDE (SO ₂)			
1-hour average ⁵	0.075 ppm	(196 µg/m ³)	Primary
Annual arithmetic mean ⁵	0.03 ppm	(80 µg/m ³)	Primary
24-hour average ⁵	0.14 ppm	(365 µg/m ³)	Primary

Notes:

- 1 In February 2010, USEPA established a new 1-hr standard at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the existing annual standard.
- 2 In March 2008, the USEPA revised the level of the 8-hour standard to 0.075 ppm. With regards to the secondary standard for O₃, USEPA revised the current 8-hour standard by making it identical to the revised primary standard.
- 3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m³. USEPA revised the averaging time to a rolling 3-month average.
- 4 In October 2006, USEPA revised the level of the 24-hour PM_{2.5} standards to 35 µg/m³ and retaining the level of the annual PM_{2.5} standard at 15 µg/m³ and retaining the level of the annual PM_{2.5}. With regard to primary standards for particle generally less than or equal to 10 µm in diameter (PM₁₀), USEPA is retaining the 24-hour standard and revoking the annual PM₁₀ standard.
- 5 In June 2010, USEPA established a new 1-hr SO₂ standard at a level of 75 parts per billion (ppb), based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The USEPA is also revoking both the existing 24-hour and annual primary SO₂ standards.
- 6 Parenthetical value is an approximately equivalent concentration for NO₂, O₃ and SO₂.

ppb: parts per billion

ppm: parts per million

mg/m³: milligrams per cubic meterµg/m³: micrograms per cubic meter

1 The criteria pollutant O₃ is not usually emitted directly into the air, but is formed in the atmosphere by
2 photochemical reactions involving sunlight and previously emitted pollutants or “O₃ precursors.” These
3 O₃ precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are
4 directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to
5 limit atmospheric O₃ concentrations by controlling VOC pollutants (also identified as reactive organic
6 gases) and NO_x.

7
8 USEPA has recognized that particulate matter emissions can have different health affects depending on
9 particle size and, therefore, developed separate NAAQS for coarse particulate matter PM₁₀ and fine
10 particulate matter PM_{2.5}. The pollutant PM_{2.5} can be emitted from emission sources directly as very fine
11 dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter
12 typically forming nitrate and sulfate compounds. Precursors of condensable PM_{2.5} can include SO₂, NO_x,
13 VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant
14 emission sources located there and thus which precursors are considered significant for PM_{2.5} formation
15 and identified for ultimate control.

16
17 The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and
18 local agencies. As such, each state must develop air pollutant control programs and promulgate
19 regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels.
20 These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or
21 local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies,
22 schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any
23 changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be
24 incorporated into the SIP and approved by USEPA.

25
26 The CAA required that USEPA draft general conformity regulations. These regulations are designed to
27 ensure that Federal actions do not impede local efforts to achieve or maintain attainment with the
28 NAAQS. The General Conformity Rule and the promulgated regulations found in 40 CFR 93 exempt
29 certain Federal actions from conformity determinations (e.g., contaminated site cleanup and natural
30 disaster response activities). Other Federal actions are assumed to conform if total indirect and direct
31 project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons
32 of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once
33 the net change in nonattainment pollutants is calculated, the Federal agency must compare them to the *de*
34 *minimis* thresholds.

35
36 In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour
37 O₃, PM_{2.5}, and regional haze standards that were promulgated in that year. Because of the litigation and
38 resulting delay in implementing the new O₃ and PM_{2.5} ambient air quality standards, however, these new
39 conformity requirements were not completed by USEPA until 2006 when the PM_{2.5} *de minimis* levels

were added. The last revision of the General Conformity rules occurred in April 2010. The USEPA rule in this latest revision sought to clear up identified issues, reduce specific regulatory burdens, and modify the rules to be helpful to states revising their SIP for implementing the revised NAAQS while assuring Federal agency actions continue to conform. Several of the burden reduction measures changes made to the General Conformity applicability in 40 CFR 93.153 include:

1. Deleting the provision that requires Federal agencies to conduct a conformity determination for regionally significant actions where the direct and indirect emission of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory even though the total direct and indirect emissions are below de minimis levels.
2. Adding new types of actions that Federal Agencies can include in their "presumed to conform" lists and permitting States to establish in their General Conformity SIPs "presumed to conform" lists for actions within their State.
3. Finalizing an exemption for the emissions from stationary sources permitted under the minor source New Source Review (NSR) programs similar to the EPA's existing General Conformity regulation which already provides for exemptions for emissions from major NSR sources.
4. Establishing procedures to follow in extending the 6-month conformity exemption for actions taken in response to an emergency.

Title V of the CAA Amendments of 1990 requires states and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (e.g., plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O₃ nonattainment area is 10 tpy of potential VOC or NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m³ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

3.3.2 Existing Conditions

Regional Climate

The climate of this region of Ohio is humid and temperate with warm summers and cold winters. Average minimum and maximum temperatures are between 21 and 36 degrees Fahrenheit (°F) in January

and 45 and 85 °F in July. The average annual precipitation is 38.43 inches, with June typically being the wettest month and October the driest month. The prevailing winds are from the southwest, with average monthly wind speeds between 3 and 7 knots.

Regional Air Quality

Under the authority of the CAA and subsequent regulations, USEPA has divided the country into geographical regions known as Air Quality Control Guidance Regions (AQCRs) to evaluate compliance with the NAAQS. Through the CAA, Congress has stated that the prevention and control of air pollution belongs at the state and local level, thus USEPA has delegated enforcement of the PSD and Title V programs to the Ohio Environmental Protection Agency (OEPA). The OEPA has adopted the NAAQS by reference, thereby requiring the use of the standards within the state of Ohio.

Wright-Patterson AFB

WPAFB is located in Greene and Montgomery counties, which are located in the Metropolitan Dayton Intrastate AQCR (40 CFR 81.34). Each AQCR is classified as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Ambient air quality for the Metropolitan Dayton Intrastate AQCR, which was formerly classified as a maintenance area for the 1-hour and 8-hour O₃, is not yet designated for the new 8-hour O₃ NAAQS established in 2008.

Ambient air quality, which was classified as attainment for the NO₂ annual standard, is not yet designated for the new 1-hour standard established in 2010. Ambient air quality for SO₂ is not yet designated for the new 1-hour standard established in 2010. Ambient air quality for lead, which was in attainment for the previous quarterly standard, is not yet designated for the new rolling 3-month standard established in 2008. The ambient air quality for PM_{2.5} is classified as attainment for the 24-hour standard and nonattainment for the annual standard. The region is designated as an unclassifiable/attainment area for all other criteria pollutants. Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS. Any of the pending attainment designations have no regulatory effect on the current analysis.

Air quality is typically good in the vicinity of WPAFB, and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at WPAFB include natural gas and coal-fired boilers; research and development sources, such as laboratory fume hoods and test cells; paint spray booths; refueling operations; and emergency power generators.

WPAFB is under the jurisdiction of USEPA Region 5 and the OEPA. The Regional Air Pollution Control Agency (RAPCA), under the jurisdiction of the OEPA, conducts annual compliance inspections at Wright-Patterson AFB. The base has long had an aggressive program of internal audits and inspections to ensure continual compliance with all applicable air permit terms and conditions. Detailed records are maintained to demonstrate compliance with emission limits, and reports are submitted in a timely manner to the local regulatory agency.

The Wright-Patterson AFB air emissions inventory includes over 1,400 emissions sources. Of these, approximately 1,050 are included in the Base's Title V permit application, which was originally submitted to the OEPA in February 1996 in accordance with CAA requirements. Many of the Title V sources are insignificant, including emergency generators and laboratory fume hoods. There were 29 permitted non-insignificant emissions units identified in the original application, most of which were boilers and paint spray booths. The OEPA finalized the Title V Operating Permit for Wright-Patterson AFB in January 2004 with an effective date of February 17, 2004 (OEPA 2004). A Title V renewal permit application was submitted to the Ohio EPA in May 2008 and is currently under review. The Title V renewal application notified Ohio EPA that the number of permitted non-insignificant emission units was reduced from 29 to 26.

445 Airlift Wing

The 445 AW stationary air emissions sources are included in the WPAFB Title V Operating Permit. Title V permitted emissions units within the 445 AW compound are listed below by Title V emission unit ID number (OEPA 2004):

- B604 – 18.3 million British thermal units per hours (MMBtu/hr) Dual Fuel Boiler in Building F/34019
- B605 – 18.3 MMBtu/hr Dual Fuel Boiler in Building F/34019
- B660 – 18.75 MMBtu/hr Dual Fuel Boiler in Building F/34019
- K608 – Fuel Cell Maintenance Facility in Building F/34020
- K609 – Corrosion Control (touch-up painting) in Building F/34024
- K610 – Corrosion Control (touch-up painting) in Building F/34026
- K617 – Surface Coating Paint Spray Booth in Building F/34024

A number of insignificant emissions units located within the 445 AW compound are listed in the Wright-Patterson AFB Title V permit, identified on the Title V renewal application, or listed in the OEPA Air Services profile. These include:

- 6 Emergency Backup Generators
- 1 Fuel Dispensing Facility
- 1 Aircraft Fuel Loading Hydrant System

- 2 Touch-Up Painting/Stenciling Operations
- 1 Fire Training Facility
- 4 Cold Cleaner Degreasers
- 2 Paint Spray Gun Cleaners
- 13 Storage Tanks
- 2 Boilers (< 10 MMBtu/hr)
- 25 Hand-Wipe Cleaning Operations
- 3 Abrasive Blasters
- 1 Portable Wash Rack
- 1 Pressure Washers
- 3 Welding Operations
- 1 Fire Suppression System
- 1 Fluorescent Penetrant System
- 2 Vacuum Tables

Insignificant sources listed in the Title V permit may or may not have permit conditions or reporting requirements depending on the regulatory qualifications that categorizes a source as insignificant. Insignificant sources that were specifically issued a Permit-to-Install (PTI) must be evaluated individually prior to commencing work to assure that the terms and conditions of the issued PTI are maintained. Insignificant sources that were permitted-by-rule (PBR) may be modified or relocated without notification provided the terms and conditions of the PBR are maintained. Insignificant sources that are de minimis or to which only generally applicable requirements apply may undergo additions, removals, and relocations and do not require a modification of the Title V permit provided the changes do not exceed insignificant emission levels.

Insignificant emission levels are defined in OAC rule 3745-77-01(V)(3) to be less than or equal to 5 tpy of any regulated air pollutant other than a Hazardous Air Pollutant and not more than 20 % of an applicable major source threshold. Changes to insignificant sources are handled as routine administrative changes through air profile updates submitted through Air Services to the OEPA, Division of Air Pollution Control.

An Air Conformity Applicability Analysis was prepared for the Proposed Action. This analysis is discussed in Section 4 and provided in **Appendix C**.

North Field

The regional air quality for CHS and North Field LZ is discussed in Section 3.3.2.2 of the East Coast Basing EA (USAF 2005), and incorporated into this current EA by reference. Air emissions for North Field are included in the air emissions inventory for AQCR 53. The region is in attainment for all criteria pollutants and the General Conformity Rule is not applicable (USAF 2005).

3.4 Noise

3.4.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Decibels are used to characterize sound levels that can be sensed by the human ear. “A-weighted” decibels (dBA) incorporates an adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted.

Single-event noise, such as an overflight, is described by the sound exposure level (SEL). Cumulative noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or airfield environment, and are measured in the DNL metric, as described in Section 3.2.1. A general discussion of these metrics is provided below and a detailed explanation is provided in **Appendix D**.

Sound Exposure Level

The SEL measurement describes a noise event, such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing, the instant when the aircraft is closest to the receptor and the maximum noise level is experienced, and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure that accounts for both loudness and duration of a noise event.

The SEL metric relates to a single event, which is useful when calculating the noise effects of aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings. **Table 3-2** provides SEL values at various altitudes for aircraft operating directly over head at various speeds and power settings depending on aircraft type (values in the table represent averages).

Table 3-2. SEL dB Values for Aircraft Operating in the Vicinity of WPAFB

Altitude (feet AGL)	C-5 ¹	C-17 ¹	KC-135R ¹	F-16C ¹
200	118.5	107.6	102.3	100.9
500	111.7	100.2	95.9	94.4
1,000	105.8	93.4	90.8	89.0
2,000	98.9	85.1	85.1	82.9
3,150	93.4	79.1	80.8	78.4
5,000	86.5	73.0	76.0	73.3

¹ Day based on steady, level flight and using Omega 10.9 aircraft profile data from actual over-flight noise measurements. Omega 10.9 is a standalone DoD noise-modeling program that allows the user to retrieve data from the NOISEMAP database.
AGL = above ground level.

Day-Night Average A-Weighted Sound Level

The DNL noise metric incorporates a “penalty” for nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. The DNL values are obtained by averaging aircraft single event SEL values for a given 24-hour period. DNL is the preferred noise metric of U.S. Department of Housing and Urban Development (HUD), FAA, USEPA, and DoD for modeling aircraft noise in airport environs.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 % of the population is not significantly bothered by outdoor sound levels below DNL of 65 dBA (USDOT 1980).

Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. The “Schultz Curve” (discussed in **Appendix D**) shows the relationship between DNL noise levels and the percentage of the population predicted to be highly annoyed.

Noise Criteria and Regulations

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Guidelines and regulations that are relevant to the project are described below.

According to USAF, FAA, and HUD criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds DNL of 75 dBA, “normally unacceptable” in regions exposed to noise between the DNL of 65 to 75 dBA, and “normally acceptable” in areas exposed to noise where the DNL is 65 dBA or less. The Federal Interagency Committee on Noise (FICON) developed land-use compatibility guidelines for noise in terms of DNL (USDOT 1980). DNL is

the metric used by the USAF in determining noise impacts of military airfield operations for land use planning.

USAF land use compatibility guidelines (relative to DNL values) are documented in the *AICUZ Program Handbook* (USAF 1999). Four noise zones are used in AICUZ studies to identify noise impacts from aircraft operations. These noise zones range from DNL of 65 to 80 dBA and above. For example, it is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA.

If sensitive structures are located in areas within a DNL of 65 to 75 dBA, noise-sensitive structures should be designed to achieve a DNL of 25 to 30 dBA interior noise reduction. Noise-sensitive structures might include schools, concert halls, hospitals, and nursing homes. Elevated noise levels in these structures can interfere with speech, causing annoyance or communication difficulties. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the effects of noise (USEPA 1974).

Response to Noise Events

Noise can cause a person to be irritated or annoyed. Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. **Table 3-3** describes the percentage of people who were “highly annoyed” when exposed to various levels of noise measured in DNL. The data shown provides a perspective on the level of annoyance that might be anticipated. For example, 15 to 25% of persons exposed on a long-term basis to DNL of 65 to 69 dBA are expected to be highly annoyed by noise events.

Table 3-3. Percentage of Population Highly Annoyed by Noise Zones

DNL	Percentage of Persons Highly Annoyed	
	Low	High
65–69 dBA	15	25
70–74 dBA	25	37
75–79 dBA	37	52
80 + dBA	61	61

Source: USAF 2000

Notes: dBA = A-weighted decibel; DNL = Day-Night Average A-Weighted Sound Level

The effects of noise on sleep are of concern, primarily in ensuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dBA penalty to nighttime noise events (10:00 p.m. to 7:00 a.m.). More typically, single noise events, not average sound levels, correlate with sleep disturbance. A discussion of the relationships between the occurrence of awakening and SEL

is presented in **Appendix D**. Most of these relationships do not reflect habituation and, as such, do not address long-term sleep disturbance effects. Nevertheless, the studies can be used to demonstrate relative differences in interference among different noise-event exposure scenarios.

3.4.2 Existing Conditions

Construction Program

Building construction, modification, and demolition work can cause considerable noise emissions. A variety of sounds come from cranes, cement mixers, welding, hammering, boring, and other work processes. Construction equipment and building operations are often poorly silenced, but quickly become a part of the ambient noise levels heard every day.

The six proposed construction, modification, and removal projects detailed in Section 2.2.2 would potentially generate the types of sounds listed above. These activities would occur intermittently in FY11 and FY12.

Aircraft Operations

Existing noise contours were analyzed using results from DoD-approved noise models in the vicinity of WPAFB. NOISEMAP has a specific database for military helicopters and fixed-wing type aircraft, including C-5 and C-17 aircraft (USAF 1990).

The noise contour analysis for WPAFB is presented in the *1995 AICUZ Study for Wright-Patterson AFB, Ohio* (WPAFB 1995a). Based on reasonable assumptions at the time of the 1995 AICUZ Study, a Maximum Mission/Maximum Capacity Scenario was analyzed and incorporated a potential increase in F-16, F-15, C-141, and C-5 aircraft operations. Although it is not anticipated that all aircraft operations projected in the Maximum Mission Model would be stationed at WPAFB at any one time, the Maximum Mission Model was intended to capture the maximum feasible operational capacity of the airfield and support activities. Within the limits of accuracy of the model itself, it was meant to provide a good-faith “worst-case” baseline for the surrounding communities’ zoning and land-use decisions, thus limiting encroachment and preserving the capacity of the Base to host additional flying missions. To confirm that C-5 noise levels were within the Maximum Mission/Maximum Capacity Scenario, data were collected and analyzed in 2008 to produce noise contours that reflected C-5 operations. This analysis confirmed that noise levels were within the Maximum Mission/Maximum Capacity contours established in 1995 (WPAFB 2010c). Therefore, the contours from 2008 depict current noise conditions and the 1995 contours depict the relevant planning contours.

Because the Maximum Mission Scenario noise contours have been, and are currently, used for noise compatibility planning around the Base, these contours are used as the baseline for the noise analysis in this EA. **Figures 3-3 and 3-4** depict the baseline noise contours presented in the 1995 AICUZ Study (WPAFB, 1995a).

No noise-sensitive receptors were identified in the AICUZ. There have been no recent complaints regarding aircraft noise (WPAFB 2010c). Aircrews limit their routes to the south and east as much as possible. Although construction is underway for a hospital in the vicinity of I-675 and Fairfield Road, this facility will be located outside of the 65-dBA noise contour. In addition, construction of new housing occurs outside of 70-dBA contours..

North Field LZ

The primary source of noise in the vicinity of North Field is airfield operations. Under the baseline conditions reported in the East Coast Basing EA (USAF 2005), there were 241.27 average daily airfield operations conducted at the North Field LZ. Approximately 56% of the operations occurred between 10:00 PM and 7:00 AM. The details of the noise contour analysis for CHS, North Field, and the associated MTRs are presented in Section 3.3.3 of the East Coast Basing EA and incorporated in this current EA by reference.

3.5 Geology and Soils

3.5.1 Definition of the Resource

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography, soils, geology, minerals, and, where applicable, paleontology.

Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality and quantity and its movement.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use.

3.5.2 Existing Conditions

Topography and Geology

The topography of Areas A and C is flat with some portions of Area C included in the 100-year floodplain of the Mad River. The highest elevations on the Base are in Area B and occur along a bedrock ridge that extends from the southeast corner of Area B to the Wright Memorial. The majority of the base is on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock (WPAFB 2001). The elevation on Base ranges from approximately 760 to 980 feet above MSL (WPAFB 2001).

Wright-Patterson AFB is within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys (WPAFB 2007a).

Natural Hazards

The state of Ohio is characterized by a low level of seismic activity (USGS 2002). The Dayton, Ohio, area does not typically experience earthquakes because of its location in relation to fault zones (Hansen 2002). Northwest Ohio had a series of historic earthquakes in the late 1800s to mid 1900s. The majority of these earthquakes were located in Auglaize and Shelby counties, which are approximately 45 miles from Greene County, Ohio (Hansen 2002), with the greatest instrumented magnitude recorded between 5.0 and 5.4 (USGS 2010). On July 23, 2010, a 5.0 magnitude earthquake originating along the Quebec-Ontario border was felt in Dayton and surrounding areas.

Soils

Surface soil at WPAFB formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess (WPAFB 2007a). Development and substantial earthmoving activities have altered the natural soil characteristics at WPAFB, making precise classifications difficult. The U.S. Department of Agriculture-Natural Resource Conservation Service (NRCS) mapped most of WPAFB as urban land complexes.

According to the NRCS, the soil survey for Greene County, Ohio indicated that the soils in the project area (0 to 5 feet below the ground surface) are of the Sloan-Fill land complex (USDA-SCS 1978). The Sloan-Fill complex is made up of nearly level soil on floodplains where as much as 50% of the original soil has been covered by fill. The main area of the complex is on WPAFB. It is specifically in runways, taxiways, and land adjacent to these uses. The fill areas have 3 to 5 feet of fill material, mostly Sloan soil and some Westland and Linwood soils. The fill material is generally mineral soil, organic material, and other organic or inorganic debris from various sources. The parts of the mapping unit that are not covered by fill are mostly Sloan silty clay loam. Bass Lake was completed in the saturated sands and gravels of the aquifer.

North Field LZ

No geologic, physiographic, or soils impacts were anticipated for the proposed activities in the East Coast Basing EA and earth resources were not analyzed in detail. This rationale is presented in Section 1.4.2 of the East Coast Basing EA (USAF 2005).

3.6 Water Resources

3.6.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

Groundwater

Groundwater consists of the subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water

Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Storm water flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, parking lots, and airfields are important to the management of surface water. Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. Higher densities of development, such as those found in the West Ramp, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

Floodplains

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. Such lands might be subject to periodic or infrequent inundation due to rain or melting snow. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1% chance of inundation by a flood event in a given year.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only

practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document *Further Advice on EO 11988 Floodplain Management*. As a planning tool, the NEPA process incorporates floodplain management through analysis and public coordination of the EA.

In addition, all floodplain related construction activities must be coordinated with the MCD for approval. The MCD through the *Land Use Agreement* (dated January 7, 2000) and the *MCD Policy and Procedure for Permits in Retarding Basins*, regulates all construction on land within the Huffman Dam Retardation Basin and more than 5 feet below the spillway elevation of 835 feet, above MSL.

3.6.2 Existing Conditions

Groundwater

WPAFB is regionally located in the Great Miami River Valley, which is filled with glacial deposits of sand and gravel. The glacial outwash deposits are very permeable and exhibit high transmissivity and hydraulic conductivity. The resulting aquifer system, collectively called the Miami Valley Buried Aquifer, is a highly productive source of water for the millions of people in southwest Ohio. The USEPA designated the Miami Valley Buried Aquifer system as a sole-source aquifer in 1988, meaning that all new projects must be approved by USEPA Region 5 to ensure its continued use as a drinking water supply (53 Federal Register 15876). The buried aquifer system provides drinking water for more than 1.6 million people in southwest Ohio (Debrewer et al. 2000).

Groundwater can also be found in large volumes in the Silurian-age (415 to 465 million years ago) limestone and dolomite bedrock underneath the buried valley aquifer system. Private wells and smaller public systems typically use this bedrock aquifer because, though not as productive as the buried aquifer, it is adequate for such uses (MCD 2002). Underneath the limestone and dolomite bedrock is Ordovician-age (465 to 510 million year ago) bedrock shales and limestones of the Richmond Group. The lower bedrock aquifer system generally produces less than 5 gallons per minute (gpm) and is only productive enough for livestock use.

The buried valley aquifers coincide with the present Great Miami River and its tributaries. Water underground generally follows the same flows as surface waters with upland areas serving as recharge areas and groundwater divides (MCD 2002). At WPAFB, the Mad River follows the course of the Mad River Buried Aquifer, part of the Miami Valley Buried Aquifer system. South of Huffman Dam (a flood control dam that is managed by the MCD), a till zone divides the Mad River Buried Aquifer into an upper water table unit and a lower confined unit.

However, north of the dam and in other parts of the buried valley aquifer, till zones occur less frequently as discontinuous, less-permeable zones within the more permeable outwash deposits (WPAFB 1995b). The glacial deposits have been reported to be up to 250 feet thick in the buried rock valley underlying

Areas A and C of WPAFB. The depth to the water table occurs approximately 10 to 20 feet below ground surface across most of Areas A and C (WPAFB 1995b). Vertical hydraulic gradients vary throughout the area, and both upward and downward gradients have been recorded in nested monitoring wells at WPAFB. Most of the wells in the outwash deposits yield between 750 and 1,500 gallons gpm, but can vary from less than 200 to more than 4,000 gpm (WPAFB 1995b). The City of Dayton groundwater production wells at Huffman Dam are screened at depths of over 100 feet below ground surface. Because of the limestone and dolomite bedrock, groundwater is typically hard (Debrewer et al. 2000).

Surface Water

WPAFB is in the Mad River Valley. The Mad River originates approximately 40 miles north of Springfield, Ohio, and flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam. The Mad River approaches WPAFB from the north and flows along the western border of Area C (**Figure 3-5**). OEPA has divided the Mad River watershed into five areas: the headwaters; Mad River between Kings and Chapman Creeks; Buck Creek; Mad River from Chapman to Mud Creeks; and the lower Mad River (Mud Creek to the Great Miami River). Mud Creek enters the Mad River 2,000 feet due north of the SR 235 bridge, near the northwest corner of Area C. WPAFB lies adjacent to the northernmost portion of the lower Mad River segment.

OEPA has determined that segments of the Mad River watershed do not support designated aquatic life uses for Warmwater Habitat, Modified Warmwater Habitat, Coldwater Habitat, or the Primary Contact Recreational use (OEPA 2009). Specifically, OEPA has identified the lower segment of the Mad River, which flows through WPAFB, as an impaired water under Section 303(d) of the Clean Water Act (CWA) for not meeting aquatic life and recreation use standards (OEPA 2010).

The USEPA has established the total maximum daily load of effluent (TMDL) for the Mad River in the *Mad River Total Maximum Daily Loads for Sediment and Turbidity* (USEPA 2007). A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. The TMDL for the Mad River watershed has been set at 120% of natural sediment loading. According to the report, the natural sediment loading in the basin is approximately 894 tons/mi²/yr based on an annual average.

There are several recreational lakes in Area C of WPAFB. The largest is Bass Lake in the northeastern corner of Area C (**Figure 3-5**). The Twin Lakes Recreational Area, comprised of East Twin Lake, West Twin Lake, and Gravel Lake, is located in the southwest corner of Area C (WPAFB 1999). Trout and Hebble creeks are minor surface water features located in Areas A and C. They flow in a general westward direction into the Mad River. Mud Run is another small surface water feature joining the Mad

River along the Base's northern border. Of these, Bass Lake is in the immediate vicinity of the West Ramp (**Figure 3-5**).

The WPAFB Storm Water Pollution Prevention Plan (SWPPP) (prepared to comply with the CWA and the Ohio Water Pollution Control Act) provides detailed descriptions of storm drainage areas and their associated outfalls, potential storm water pollution sources, and material management approaches to reduce potential storm water contamination (WPAFB 2007b). The SWPPP is under revision by the base. An industrial permit with OEPA (NPDES 11O00001*DD) covers the WPAFB storm water program. The SWPPP provides specific Best Management Practices (BMPs) to prevent surface water contamination from activities such as storing and transferring of fuels, storage of coal piles, storage and use of deicing fluids, storage and use of lubrication oils and maintenance fluids, solid and hazardous waste storage, and salt and scale inhibitor storage. Some storm water also enters the Base from surrounding communities and areas (WPAFB 2001).

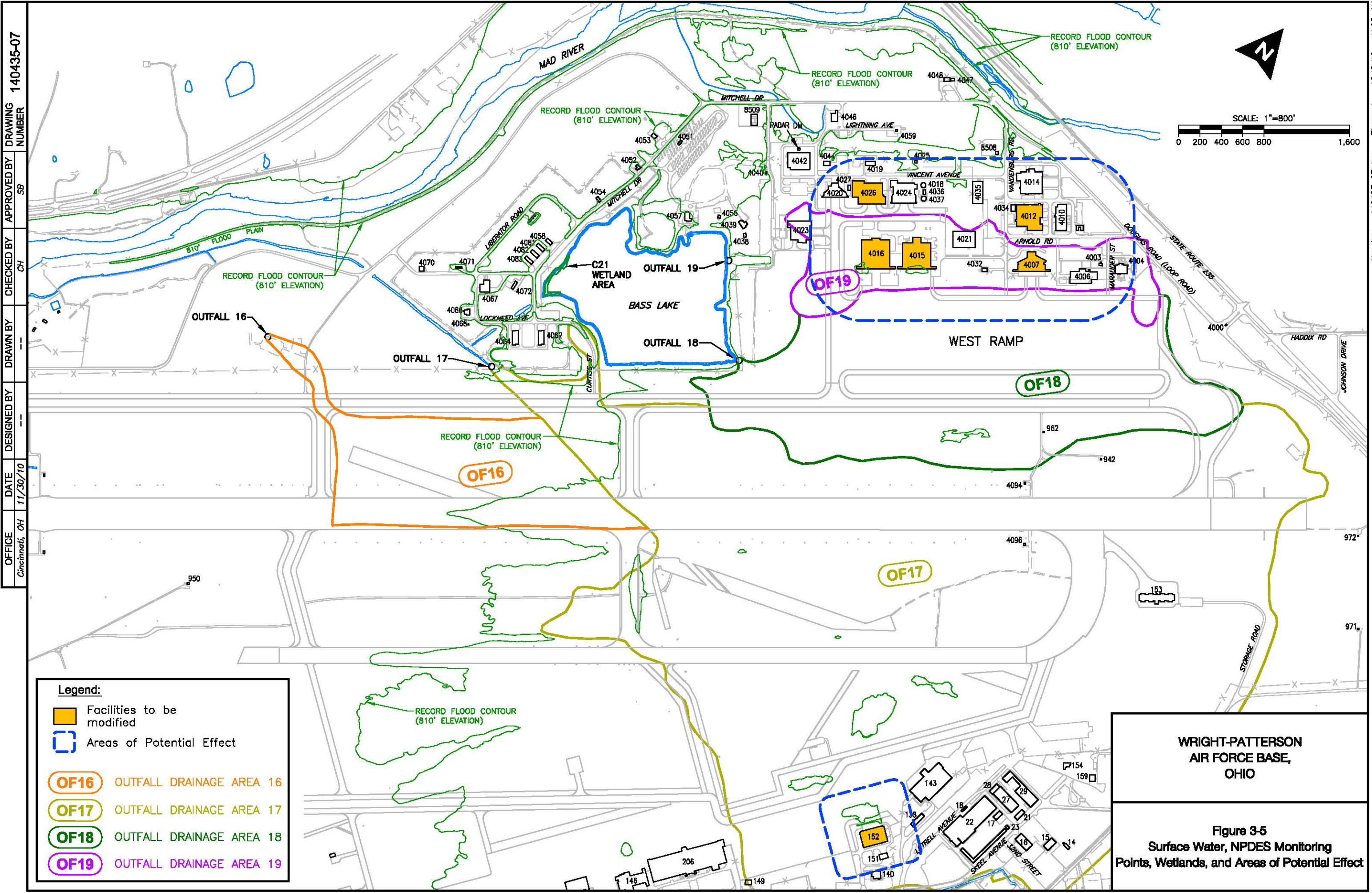
WPAFB's National Pollution Discharge Elimination System (NPDES) permit became effective in October 2010. Twenty defined drainage or "Outfall Areas" occur on Base (WPAFB 2007b). Outfalls in Areas A and C discharge either directly to the Mad River or indirectly to the Mad River via Hebble Creek, Trout Creek, Mud Run, or other minor surface drainages (WPAFB 2007b). There are 23 NPDES monitoring points on Base. **Table 3-4** provides specific information about Points 13 to 18, which primarily drain Area C. These outfalls are monitored for glycol under the revised NPDES permit. The outfalls that drain the West Ramp are shown in **Figure 3-5**.

Table 3-4. Drainage Areas at Area C Monitored under NPDES Permit

Drainage Basin Number ¹	Description
13	Drains the East Ramp and includes aircraft operations and maintenance and runway/taxi/ apron pavement. Runoff discharges south and west to Hebble Creek near the intersection of Skeel Avenue and Wright Avenue.
14	Drains the East Airfield and includes airfield pavement and runway/taxi/apron pavement, and small areas of open space aircraft operations and maintenance. Discharges west to Trout Creek near the intersection of Pylon Road and Marl Avenue.
15	Drains a large portion of the West Airfield and includes aircraft pavement and runway/taxi/ apron pavement. Discharges west to Trout Creek along Symmes Road.
16	Drains a small portion of the West Airfield and includes airfield pavement and runway/taxi/ apron pavement. Discharges towards the north, north of Riverview Road.
17	Drains a large portion of the West Airfield and includes airfield pavement and runway/taxi/ apron pavement. Discharges north and west toward the Mad River.
18	Drains the West Ramp, primarily runway/taxi/apron pavement and some of the airfield pavement. Discharges west to Bass Lake.

Source: WPAFB 2007b

1 Drainage basin number corresponds to NPDES monitoring points indicated on Figure 3-5.



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Floodplains

A large portion of WPAFB lies within the Mad River floodplain. Most of Area C is behind Huffman Dam and subject to flooding. The 10-year floodplain is at 804.7 feet above MSL, and the 100-year floodplain is at 814.3 feet above MSL. Portions of the parking apron, runway, and operations buildings are in the 100-year floodplain (**Figure 3-5**).

North Field LZ

Water resources were not analyzed in detail in the East Coast Basing EA. The rationale is presented in Section 1.4.2 of the East Coast Basing EA (USAF 2005).

3.7 Biological Resources

3.7.1 Definition of the Resource

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS or a state.

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the “the waters of the United States” under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands).

The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 328).

Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an “endangered species” is defined as any species in danger of extinction throughout all or a large portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

3.7.2 Existing Conditions

Vegetation

Natural vegetative communities on WPAFB can be divided into five general categories: forest/woodlands (709 acres), prairie (109 acres), old fields (388 acres), wetlands (23 acres), and maintained areas that are routinely mowed (e.g., airfields, parks, roadsides, and golf courses) and other developed areas such as parking lots, residential lawns, and other green space between buildings.

The location of the West Ramp and proposed project area are in an area designated by the Base as “unimproved maintained” grounds (i.e., grounds are mowed only as needed for bird control, habitat modification, or to eliminate fire hazards). Vegetation in this area consists primarily of grasses, with few weeds. Dominant species include tall fescue (*Festuca arundinacea*), Kentucky bluegrass (*Poa pratensis*), dandelion (*Taraxacum officinale*), and clover (*Trifolium pratense* and *T. repens*) (WPAFB 2001).

The wooded areas in the vicinity of the West Ramp are of particular interest. Of particular interest to airfield operations at the West Ramp are the wooded areas of WPAFB. The majority of wooded acres on WPAFB are riparian forest within the floodplain of the Mad River (WPAFB 2007a). Forest habitat on the Base is composed of riparian forest and upland forest. Riparian forest is located mainly along the Mad River while the majority of upland forest is found in scattered woodlots away from the river. WPAFB forest resources are of limited commercial value and therefore managed for their aesthetic and wildlife habitat value. Maintaining or improving forests for their aesthetic value or habitat value for legally protected species places constraints on the USAF mission. Forest resources can also conflict with the WPAFB mission by interfacing with flight paths. For flight safety, some areas (e.g., clear zones [CZ]) must be clear of trees and in other areas, trees cannot exceed specific heights (e.g., glide- and side-slope areas).

WPAFB has been awarded the Arbor Day Foundation’s Tree City USA designation for twelve years. The Tree City USA award originates from the National Arbor Day Foundation, an organization founded in 1976 dedicated to tree plantings, conservation, and promotion of community forestry (WPAFB 2009a). Benefits of being a Tree City designee include creating a framework for action, education, a positive public image, and citizen pride (Arbor Day 2010).

Prairie habitat is present within WPAFB’s Huffman Prairie, which is an open (relatively treeless) community typically dominated by characteristic grasses. Huffman Prairie, covering approximately 109 acres in Area C, is one of the largest tall grass prairie remnants in Ohio. The majority of the vegetation at Huffman Prairie reflects recent land use history. Introduced forage grasses and nonnative forbs are well established. While there are about 125 native plant species in Huffman Prairie, there are also at least half that many nonnative species (WPAFB 2007a). The aggressive nonnative plants contribute to the degraded condition of the prairie. Degraded prairie, evidenced by a higher proportion of nonnative than

native plant species, covers approximately 72 acres and high-quality prairie covers roughly 25 acres (WPAFB 2007a).

Wetlands

EO 11990, *Protection of Wetlands*, May 24, 1977, directs Federal agencies to consider alternatives to avoid adverse effects on and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

The CWA sets the basic structure for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands. The National Wetlands Inventory (NWI) (a department within USWFS), USEPA, and the NRCS help in identifying wetlands.

A thorough base-wide wetland survey was conducted in June and July of 2004 and documented in the 2005 Wetland Management Plan (BHE 2005). No wetlands are located in the vicinity of the proposed project area. The nearest wetland is C-21 on the shore of Bass Lake, southeast of the proposed site (WPAFB 2007a) (**Figure 3-5**). Wetlands located in Area C are shown in **Figure 3-6**.

Wildlife

WPAFB is home to a diverse assemblage of animals. Many animals are only present at WPAFB for a short period while migrating between winter and summer habitats, while others are year-round residents. Common mammals on WPAFB include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), groundhog (*Marmota monax*), eastern fox squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and deer mouse (*Peromyscus mamniculata*).

Common birds on Base include European starling (*Sturnus vulgarus*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*), savannah sparrow (*Passerculus sandwichensis*), red-winged blackbird (*Agelaius phoeniceus*), Canada goose (*Branta canadensis*), red-tailed hawk (*Buteo jamaicensis*), horned lark (*Eremophila alpestris*), American robin (*Turus migratorius*), turkey vulture (*Cathartes aura*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferous*), American crow (*Corvus brachyrhynchos*), and mallard (*Anas platyrhynchos*).

Because birds as well as mammals pose a hazard to airfield and aircraft operations, the Air Force has established bird air strike hazard and wildlife management plans. WPAFB implements a comprehensive Bird/Wildlife Aircraft Strike Hazard (BASH) plan that involves prevention, monitoring, and reduction of bird/wildlife hazards (WPAFB 2007a).

Threatened and Endangered Species

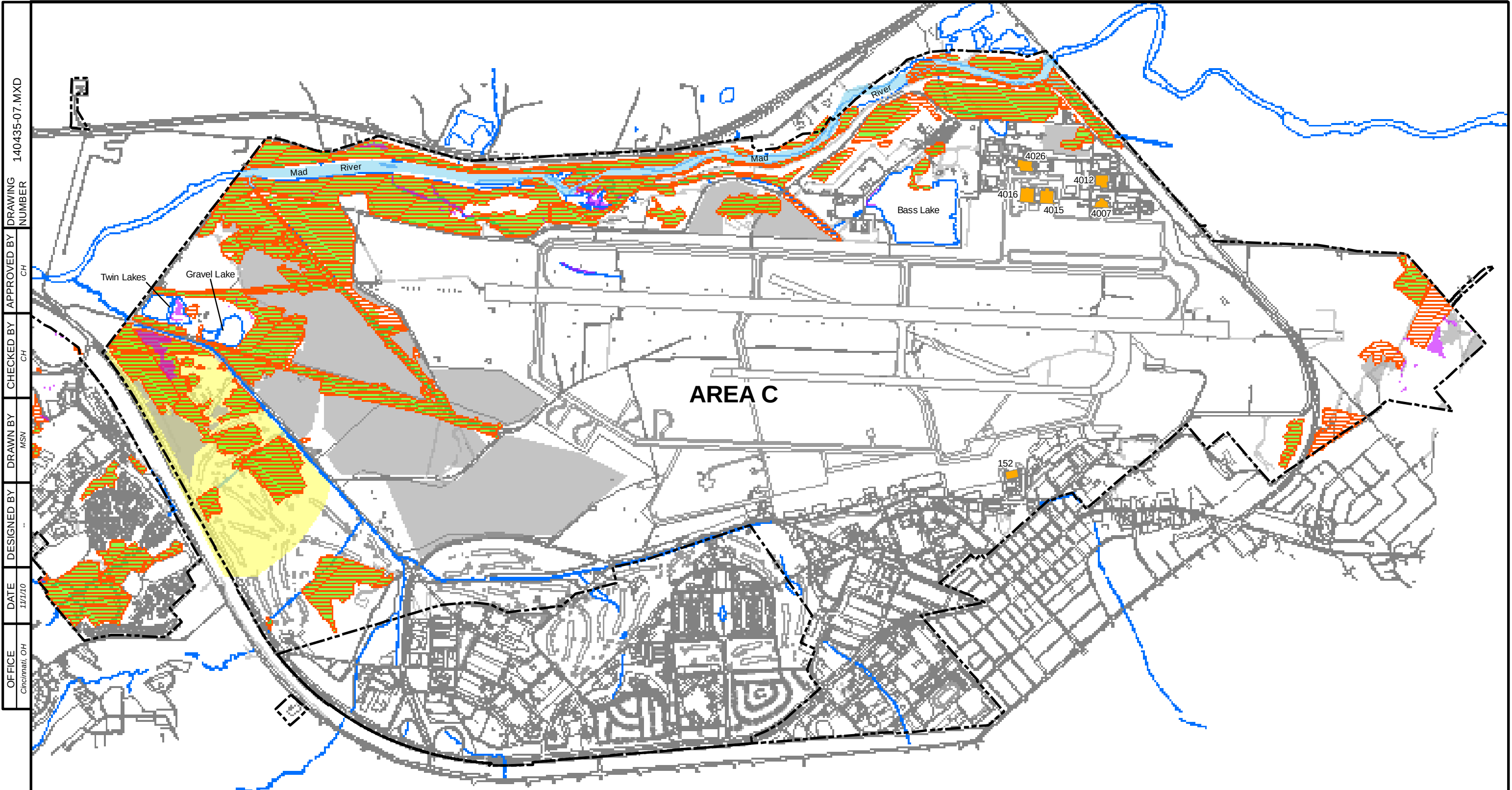
Compliance with AFD 32-70 and AFI 32-7064 requires all Air Force properties to protect species classified as endangered or threatened under the ESA and to comply with Ohio Revised Code (ORC) 1531.25 and its implementing regulations for species listed by the state as threatened and endangered. To comply with these requirements, WPAFB developed an Endangered Species Management Plan (BHE 2001). The WPAFB Integrated Natural Resources Management Plan (WPAFB 2007a) contains a recent summary of threatened and endangered species on Base. Locations of habitat for threatened and endangered species are shown in **Figure 3-6**.

Federal- and state-listed species at WPAFB considered imperiled or vulnerable include the Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), and the clubshell (*Pleurobema clava*, a mussel). The eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is a candidate for federal listing, and the blazing star stem borer, a moth (*Papaopema beeriana*) is a vulnerable state listed species. There are no federally listed plants on Base, and naturally occurring state-listed vegetation include whorled water-milfoil (*Myriophyllum verticillatum*) and pigeon grape (*Vitis cinerea*) (WPAFB 2007a).

The Indiana bat habitat follows the lower reaches of Hebble Creek, Trout Creek, and the riparian corridor of Mad River from its northern reach in Area A to its confluence with Hebble Creek (WPAFB 1995b, BHE/IT 1999) where this species roosts during the summer and forages in the floodplain/riparian forests. In July 2000, two Indiana bats (a juvenile female and an adult post-lactating female) were captured along Trout Creek during a base-wide mist net survey (BHE 2001). Radio tracking of these two bats confirmed the presence of a maternity colony in a dead slippery elm (*Ulmus rubra*) in a woodlot on the campus of Wright State University. No sightings of Indiana bats have been reported within the area of the Proposed Action.

The bald eagle is a federal-listed threatened and a state-listed endangered species found throughout much of the contiguous 48 states along waterways and impoundments. Although bald eagles may be found year round in Ohio, they only occur near WPAFB as rare winter visitors with most recent WPAFB sightings occurring along the Mad River corridor in 1984. During the winter of 2004/2005, one bald eagle was recorded in Greene County, and two in Montgomery County. In the winter of 2005/2006, one bald eagle was observed in Greene County, and no eagles were observed in either Greene or Montgomery Counties during the winter of 2006/2007. There are no records of bald eagles nesting on Base (WPAFB 2007a). No sightings of the bald eagle have been reported within the project area.

The eastern massasauga rattlesnake is usually found in wet areas including wet prairies, marshes, and low lying areas. Neither the historic nor current population size and status of massasauga snakes at WPAFB have been determined. Reports of massasauga sightings have been limited to the Prime Base Engineer Emergency Force (BEEF) Training Area and Twin Base Golf Course in Area C, which are not in the

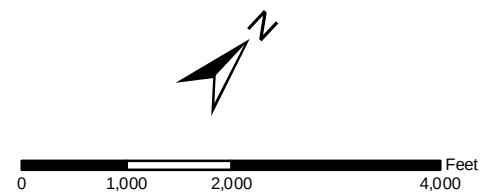


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Legend

- WETLAND AREA
- INDIANA BAT
- CLUBSHELL
- BALD EAGLE
- BLAZING STAR STEM BORER
- EAST MASS SNAKE
- FACILITIES TO BE MODIFIED
- FACILITY BOUNDARY

Source: Base Map, Threatened, Endangered Species and Wetlands data from WPAFB.



WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3-6
Threatened and Endangered Species
and Wetland Locations Area C
Wright-Patterson AFB

vicinity of the proposed action (WPAFB 2007a). There is no requirement to survey construction areas for potential snake habitat because the massasauga rattlesnake is a federal candidate species. No sightings of the massasauga rattlesnake have been reported within the project area.

The clubshell is a federal- and state-listed endangered species occurring in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, and West Virginia. Surveys by 3D/International, Inc. (1998) and BHE Environmental (1999a) documented clubshell subfossil remains at the confluence of Trout Creek and the Mad River and near the confluence of Mud Run and the Mad River (WPAFB 2007a). There are no creeks or streams in the West Ramp area and no sightings of the clubshell have been reported within the project area.

The blazing star stem borer moth is a state-listed endangered species occurring only in disjunct populations throughout the midwestern U. S. It is highly dependent upon remnants of mesic tall grass prairies. In 1992, three stem borers were captured at WPAFB's Huffman Prairie. Huffman Prairie is one of three locations where this species has been found in Ohio (WPAFB 2007a). No sightings of the blazing star stem borer have been reported within the project area.

The Ohio Department of Natural Resources, Division of Wildlife was also contacted to request a search of their Biodiversity Database. The following species were identified as occurring within a 1-mile radius at of the project site. The following species were reported to be within the project area:

- *Exoglossum laurae* - tongue-tied minnow, threatened species.
- *Spiranthes magiamporum* – Great Plains Ladies'-tresses, potentially threatened (2 sites)
- *Myotis sodalis* – Indiana bat, State endangered, Federal endangered
- *Bartramia longicauda* – Upland Sandpiper, threatened
- *Carex mesochorea* – Midland Sedge, endangered

The Biodiversity Database was also searched for locations of the Indiana bat within a five mile radius of the project area. None of the identified species were found to be located within the immediate project area. Correspondence from ODNR and the results of the search are provided in **Appendix A**.

North Field LZ

Biological resources were not analyzed in detail in the East Coast Basing EA. The rationale is presented in Section 1.4.2 of the East Coast Basing EA (USAF 2005).

3.8 Cultural Resources

3.8.1 Definition of the Resource

As defined by 36 CFR 800.16, historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are

related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria. Several Federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures might warrant protection if they have potential as Cold War-era resources. Structures less than 50 years in age, and particularly DoD structures in the category of Cold War-era, are evaluated under explicit guidance of the National Park Service Bulletin 22.

The EA process and the consultation process prescribed in Section 106 of the NHPA requires an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's Area of Potential Effect (APE), which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO.

There are several archeological sites, historic structures, or other significant cultural resources associated with the APE. These areas are identified in the *Integrated Cultural Resources Management Plan* (ICRMP) for WPAFB (2006). The ICRMP was established in concurrence with the SHPO on January 25, 1999, and updated on May 1, 2006 (WPAFB 2010d).

3.8.2 Existing Conditions

With the exception of Building 30152, the APE for the Proposed Action includes buildings located in the area of the West Ramp (**Figure 3-5**). The West Ramp is located immediately east and adjacent to Bass Lake. According to the ICRMP, there are several archaeological sites, historic structures, or other significant cultural resources located in the immediate project area (WPAFB, 2006). Four known historical archaeological resources are located at the West Ramp. These include the following: 1) Site 33 GR 1031, identified as the site of a former structure, is located in an area between Bass Lake and the West Ramp parking apron and is considered to be an ineligible (due to extensive disturbance of the area)

1 historical archaeological resource (i.e., not eligible for listing on the National Register of Historic Places
2 [NRHP]); 2) Site R8 T3 S33 #10, a “residence,” is located in an area between Bass Lake and the West
3 Ramp parking apron and is considered to be an ineligible historical archaeological resource; 3) R8 TS
4 S33 #7, a “residence,” is located on the west side of the West Ramp parking apron and is considered to be
5 an ineligible historical archaeological resource; and 4) Site R8 T3 S34 #9, a “residence,” is located on the
6 west side of the West Ramp parking apron and is considered to be an ineligible historical archaeological
7 resource. These sites have been determined to be ineligible because the area has been disturbed.
8

9 All the structures associated with the West Ramp Area were built between 1958 and 1960. There are two
10 Cold War-era significant buildings in the general area. Building 34004, the 4043rd Strategic Wing
11 Squadron Operations Building and Alert Scramble Facility, is located in the northeast portion of West
12 Ramp adjacent to the parking apron and was built in 1960. This building is not included in any of the
13 historic districts on Base, however, is considered individually eligible for listing in the NRHP. Buildings
14 34062 and 34064, ammunition bunkers, are both individually eligible for listing on the NRHP due to their
15 Cold War significance. Both buildings are also located on the West Ramp within the general project area.
16

17 The APE also includes Building 30152, the former Readiness Hangar, located in the East Ramp. This
18 building is not included in any of the historic districts on Base, however, it is considered individually
19 eligible for listing in the NRHP (WPAFB 2006). Building 30152 was constructed as a hangar in 1953,
20 and its eligibility lies in its role as part of the first line of air defenses of Cold War America. The building
21 would be modified under the Proposed Action.
22

23 **North Field LZ**

24 Cultural resources were described in Sections 1.4.2.4 and 3.3.7 of the East Coast Basing EA (USAF
25 2005) and are incorporated by reference in this current EA. The cultural resources for the CHS
26 Alternative Action were limited to Native American interests associated with CHS and the MTRs.
27

28 **3.9 Socioeconomics**

29 **3.9.1 Definition of the Resource**

30 Socioeconomics are defined as the basic attributes and resources associated with the human environment,
31 particularly population and economic activity. Regional birth and death rates and immigration and
32 emigration affect population levels. Economic activity typically encompasses employment, personal in-
33 come, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators
34 might be accompanied by changes in other components, such as housing availability and the provision of
35 public services. Socioeconomic data at county, state, and national levels permit characterization of
36 baseline conditions in the context of regional, state, and national trends.
37

38 Data in three areas provide key insights into socioeconomic conditions that might be affected by a pro-
39 posed action. Data on employment could identify gross numbers of employees, employment by industry

1 or trade, and unemployment trends. Data on personal income in a region could be used to compare the
2 “before” and “after” effects of any jobs created or lost as a result of a proposed action. Data on industrial
3 or commercial growth or growth in other sectors provides baseline and trend line information about the
4 economic health of a region.

5
6 In appropriate cases, data on an installation’s expenditures in the regional economy help to identify the
7 relative importance of an installation in terms of its purchasing power and jobs base. Demographics
8 identify the population levels and changes to population levels of a region. Demographics data might also
9 be obtained to identify, as appropriate to evaluation of a proposed action, its characteristics in terms of
10 race, ethnicity, poverty status, educational attainment level, and other broad indicators.

11
12 Socioeconomic data are presented at county, state, and U.S. levels to characterize baseline socioeconomic
13 conditions in the context of regional, state, and national trends. Data have been collected from previously
14 published documents issued by Federal, state, and local agencies and from state and national databases
15 (e.g., U.S. Bureau of Economic Analysis’ Regional Economic Information System).

16
17 EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires Federal
18 agencies, to the extent permitted by law and mission, to identify and assess environmental health and
19 safety risks that might disproportionately affect children. The EO further requires Federal agencies to
20 ensure that their policies, programs, activities, and standards address these disproportionate risks. The
21 order defines environmental health and safety risks as “risks to health or to safety that are attributable to
22 products or substances that the child is likely to come in contact with or ingest (such as the air we breathe,
23 the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or
24 are exposed to).” Such information aids in evaluating whether a proposed action would render vulnerable
25 children targeted for protection in the EO.

26 27 **3.9.2 Existing Conditions**

28 **Social and Economic Conditions**

29 **Population** – WPAFB is located 10 miles outside of Dayton, Ohio. The city of Dayton has a population
30 of 166,179; the Dayton-Springfield, Ohio Metropolitan Statistical Area (MSA) has a population of
31 950,558 (Bureau of Census 2000a). The MSA is defined by the U.S. Census Bureau as a core area with a
32 large population nucleus (at least 50,000) and the adjoining communities that have a high degree of
33 economic and social integration within that core (Bureau of Census 2000b).

34
35 The Dayton-Springfield MSA includes the counties of Greene, Montgomery, Miami, and Clark. For the
36 purposes of this EA, the MSA is considered the region of influence (ROI) around WPAFB (Bureau of
37 Census 2000a).

Employment – Some of the key industries in the Dayton, Ohio, economy include services, trade (wholesale and retail), government, and manufacturing. In FY06, the finance and insurance industries employed 14,595 employees and jobs provided by the government totaled 37,298 (DACC 2010).

Table 3-5 lists the industry of employment for residents around WPAFB, the Dayton-Springfield MSA, and the state of Ohio in 2000. A large portion of residents in the Dayton-Springfield MSA are employed in education, health and social services, and public education or manufacturing; a lower percentage are employed in agriculture, forestry, fishing and hunting, and mining.

Table 3-5. Employment of Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)

Employment by Industry	Dayton– Springfield MSA	Greene County	State of Ohio
Percent of Employed Persons in Armed Forces	0.7%	2.2%	0.1%
Industry of Civilian Labor Force			
Agriculture, forestry, fishing and hunting, and mining	0.5%	0.7%	1.1%
Construction	5.4%	5.4%	6.0%
Manufacturing	19.1%	13.8%	20.0%
Wholesale trade	3.2%	2.6%	3.6%
Retail trade	12.0%	12.3%	11.9%
Transportation and warehousing, and utilities	4.8%	3.9%	4.9%
Information	2.3%	2.3%	2.4%
Finance, insurance, real estate, and rental and leasing	5.0%	4.5%	6.3%
Professional, scientific, management, administrative, and waste management services	9.0%	9.6%	8.0%
Education, health and social services	20.8%	23.8%	19.7%
Arts, entertainment, recreation, accommodation, and food services	7.5%	7.9%	7.5%
Other services (except public administration)	4.4%	4.2%	4.5%
Public administration	5.9%	8.9%	4.1%

Source: Bureau of Census 2000a
MSA = Metropolitan Statistical Area

WPAFB provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For FY09, the total number of jobs provided by WPAFB was 27,406 (WPAFB 2009b). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. The number of indirect jobs supported by the base, such as restaurants, dry cleaners, and others is estimated at 33,090. The total economic impact to the local Dayton community was \$5.1 billion.

The unemployment rate for the Dayton-Springfield MSA in July 2010 was 11.2%, slightly higher than the statewide average of 10.3% (DACC 2010). The 2010 unemployment rate in the MSA around WPAFB and within Greene County was 9.6%, slightly lower than the state average of 10.2%. Residents living in Greene County have a lower per capita income and median household income in comparison to the MSA and the state of Ohio (Bureau of Census 2000a). The residents of Greene County also have a higher

percent of persons living below the poverty level (**Figure 3-7**). The difference between the income and poverty levels are not considered to be substantially different from the MSA, countywide, or statewide averages.

Education – The percent of residents who have obtained a high school diploma is substantially the same around WPAFB, countywide, and statewide (**Figure 3-8**). However, a smaller percentage of residents in the MSA achieved a college education (22.4%) in comparison to Greene County (22.7%) and statewide (23.2%) percentages.

North Field LZ

Socioeconomics were described for CHS in Section 3.3.6 of the East Coast Basing EA (USAF 2005), which focused on the construction activities for the CHS Alternative Action. Because North Field was evaluated as a LZ, no specific socioeconomic parameters were considered for North Field.

3.10 Environmental Justice

3.10.1 Definition of the Resource

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities, and to ensure that there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. A “minority” is defined as a person who is Black, Hispanic (regardless of race), Asian American, American Indian, and/or Alaskan Native. “Low-income” is defined as a household income at or below the U.S. Census Bureau Poverty Threshold (FHWA 1998).

A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity, or are geographically dispersed or transient persons (such as migrant workers) who will be similarly affected by a proposed program, policy, or action (FHWA 1998). Minority populations residing in the study area were compared to the population characteristics of the city and state. The CEQ guidance states that “minority populations should be identified where either (a) the minority population of the affected area exceeds 50% or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.”

Low-income status was based upon comparing the income of the proposed project site and larger study area residential population to the U.S. Census Bureau Poverty Threshold (U.S. Census Bureau, Housing and Household Economic Statistics Division 2000a). The CEQ guidelines do not specifically state the percentage considered meaningful in the case of low-income populations. The definition of “low income populations” is defined by HUD as populations where “50% or greater are low-income individuals”.

Figure 3-7. Income and Poverty Level of Residents in Dayton–Springfield MSA, Greene County, and the State of Ohio (2000)

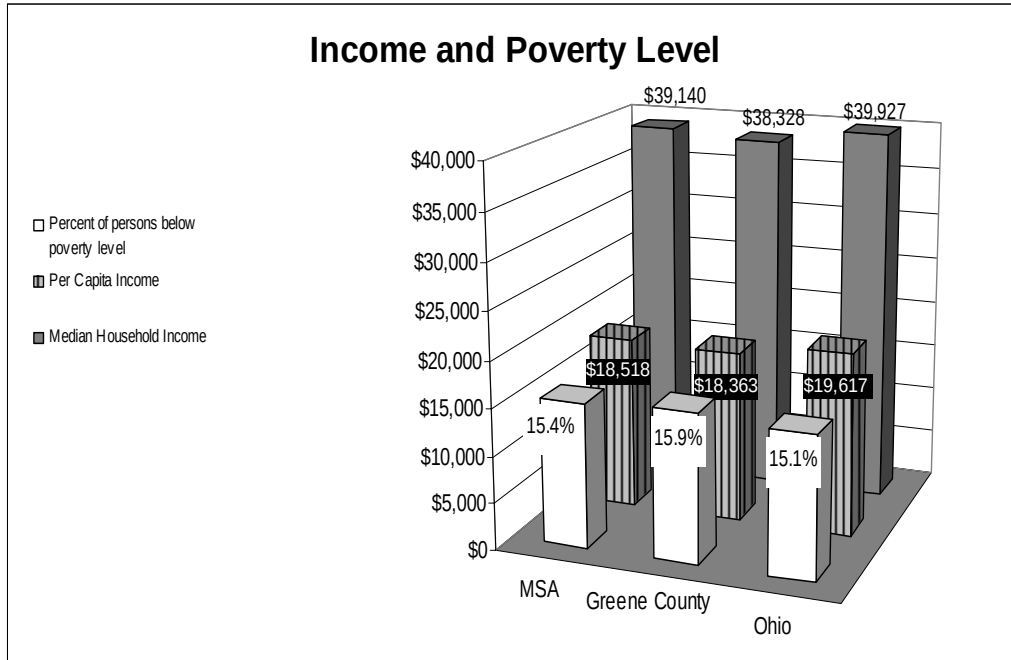
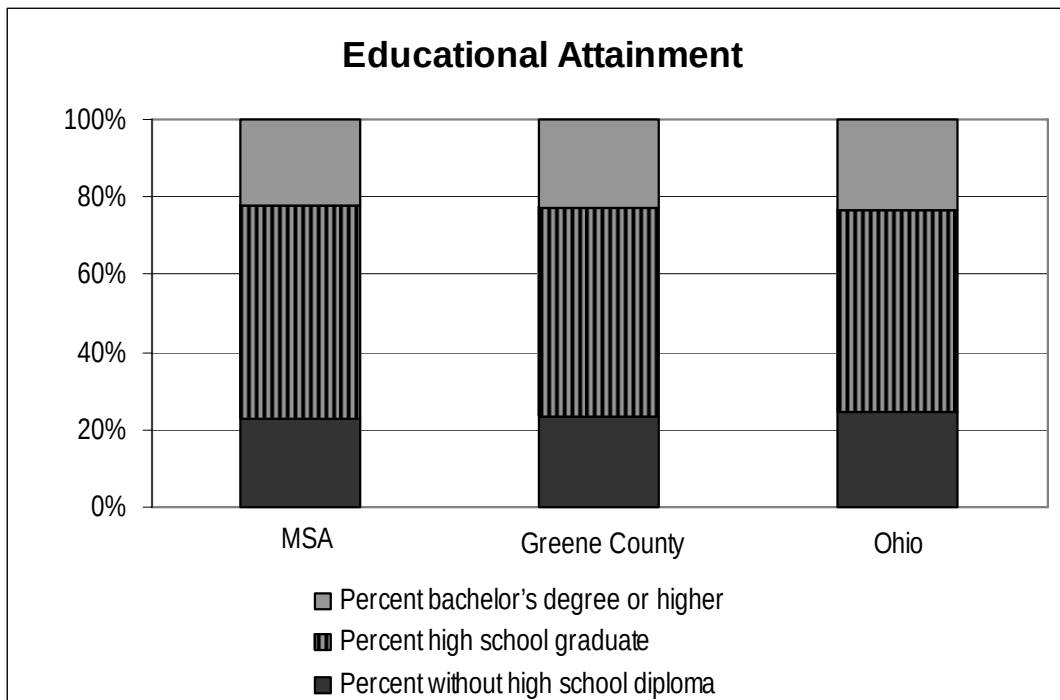


Figure 3-8. Educational Attainment of the Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)

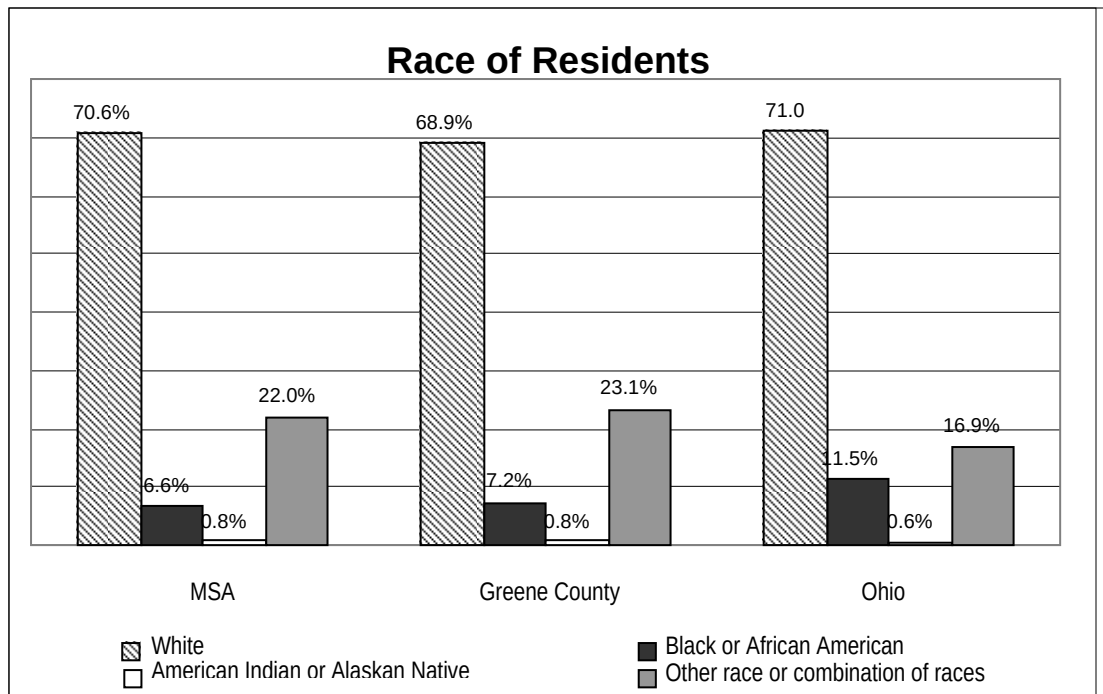


3.10.2 Existing Conditions

A screening analysis using U.S. Census Bureau racial and economic information catalogued by Census Tract and Block Group for 2000 was used to identify low income and minority populations living within the MSA around WPAFB. For the purpose of this analysis, residents living within Census Bureau Tract 2001.02 and 2007 are further evaluated to determine if a disproportionate level of impact could occur.

Census Bureau Tract 2001.02, which is northwest of WPAFB, was found to have a somewhat higher portion of minority populations (25%) than adjoining areas (average of 15%) (**Figure 3-9**). Census Bureau Tract 2007, which is located southeast of the Base, has a minority population that is relatively equal to surrounding areas (Bureau of Census 2000a).

Figure 3-9. Race of Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)



Residents of Census Bureau Tract 2001.02 were also found to have a lower per capita income (\$13,339), a higher unemployment rate (9.4%), a higher portion of residents living below the poverty level (38.5%), and a higher population growth rate between 1990 and 2000 (31%) in comparison with residents in adjoining areas (Bureau of Census 1990 2000a). Residents of Census Bureau Tract 2007 were also found to have a lower per capita income (\$13,295), a slightly higher unemployment rate (3.6%), a higher portion of residents living below the poverty level (23.3%), and a higher population growth rate between 1990 and 2000 (24%) in comparison to residents in adjoining areas (Bureau of Census 1990 2000a).

North Field LZ

Environmental justice was generally described in Section 1.4 3 of the East Coast Basing EA (USAF 2005), and are incorporated by reference in this current EA.

3.11 Infrastructure

3.11.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area.

The infrastructure components to be discussed in this section include transportation systems, utilities (electrical power, natural gas, liquid fuel, and water supply), pollution prevention, solid waste, sanitary and wastewater systems, heating and cooling, communications, and airfield pavement.

Solid waste management primarily concerns itself with the availability of landfills to support a population’s residential, commercial, and industrial needs. Alternative means of waste disposal might involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and are limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, and papers) reduce reliance on landfills for disposal.

3.11.2 Existing Conditions

The infrastructure information contained in this section was obtained from the WPAFB General Plan (WPAFB 2001) and provides a brief overview of each infrastructure component and comments on its existing general condition.

Transportation System

State highways provide direct access to WPAFB. SR-444 bisects the Base creating a barrier between Wright Field and Patterson Field (WPAFB 2001). SR-844 provides a route from Gate 15A to I-675, which is located east of the Base. I-675 provides direct access to I-70, which is approximately 9 miles to the north; U.S. 35, which is approximately 5 miles to the south; and I-75, which is approximately 15 miles to the southwest (WPAFB 2001). SR-235 provides access from Gate 26C to SR-4 and I-70 (WPAFB 2001). The primary access to the West Ramp area is Gate 26C. Access to the airfield is controlled and requires specific authorization and identification. In addition, the off-Base transportation system at WPAFB consists of direct connections to city streets in the bordering communities of Fairborn, Riverside, and Huber Heights, Ohio (WPAFB 2001).

Electrical Power

Dayton Power & Light (DP&L) provides WPAFB with electrical power (WPAFB 2001). The Base receives power via two substations, which is delivered by over 500 miles of primary electrical lines on Base. These aboveground and underground transmission lines are owned by WPAFB (WPAFB 2001).

The electrical distribution system on Base is designed to meet the needs of a much larger base population so the demands of service are within the system's capacity (WPAFB 2001). The overall condition of the system is adequate in providing the power to the current Base population.

Natural Gas. The natural gas at WPAFB is supplied by Vectren. The on-Base natural gas system, which is owned by WPAFB, contains over 130,000 linear feet of underground piping and 11 distribution subsystems (WPAFB 2001). Vectren owns a distribution line that goes past the Wright Memorial area. The natural gas system is the principal heating option for housing areas and outlying areas of the Base. It feeds some individual buildings and the three satellite heating plants: Buildings 20581, 10849, and 4019 (WPAFB 2001).

Liquid Fuel. The liquid fuel system at WPAFB is delivered primarily by tank trucks with an alternate capability for pipeline delivery. Defense Logistics Agency-Energy is responsible for determining mode of delivery. WPAFB operates approximately 85 underground storage tanks (USTs) and 175 above ground storage tanks (ASTs). Eighty percent of the storage capacity on Base is for Jet Fuel-8 (JP-8), which is supplied directly to the Base via tank truck from Defense Fuel Support Point – Lebanon. The Bulk Fuels Storage tank farm is comprised of ten 420,000-gallon JP-8 ASTs and one 840,000-gallon JP-8 AST, one 15,000-gallon motor gas AST, and one 220,000-gallon diesel AST. There are four 50,000-gallon USTs that feed the fuel hydrant system on the West Ramp flightline (WPAFB 2010e).

Water Supply. The water supply and distribution system at WPAFB consists of three Base-owned and operated water collection, treatment, storage, and distribution systems (WPAFB 2001). One system services Wright Field (Area B) and The Woods (formerly referred to as Woodland Hills), a second system services Area A and Patterson Field, and the third system provides water for the Marksmanship Facility (formerly referred to as the Combat Arms Training and Maintenance (CATM) Facility, which was installed in April 2005). The only portion of the Base that does not use the WPAFB water distribution system is the Page Manor housing area. Page Manor receives water from the Montgomery County Sanitary Sewer District (WPAFB 2001). WPAFB utilizes approximately 3.2 million gallons of drinking water per day (WPAFB 2010f).

Pollution Prevention. AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*; and EO 12902, *Energy Efficiency and*

1 *Water Conservation at Federal Facilities.* AFI 32-7080 prescribes the establishment of Pollution
2 Prevention Management Plans. The 88 ABW fulfills this requirement with the following plans (WPAFB
3 2001):

- 4 • Integrated Solid Waste Management Plan
- 5 • Storm Water Pollution Prevention Plan
- 6 • Hazardous Waste Management Plan
- 7 • Hazardous Material Emergency Planning and Response Plan
- 8 • The Spill Prevention Control and Countermeasure Plan

9
10 These plans ensure that WPAFB maintains a waste reduction program and meets the requirements of the
11 CWA; NPDES permit program; and Federal, state, and local requirements for spill prevention control and
12 countermeasures.

13
14 **Solid Waste.** Municipal solid waste (MSW) at WPAFB is managed in accordance with the guidelines
15 specified in AFI 32-7042, *Solid and Hazardous Waste Compliance*. This AFI incorporates by reference
16 the requirements of Subtitle D, 40 CFR 240 through 244, 257, and 258, and other applicable Federal
17 regulations, AFIs, and DOD Directives. In general, AFI 32-7042 establishes the requirement for
18 installations to have a solid waste management program that incorporates the following: a solid waste
19 management plan; procedures for handling, storage, collection, and disposal of solid waste; record-
20 keeping and reporting; and pollution prevention.

21
22 WPAFB operates a Qualified Recycling Program that is run by 88 ABW/CEANP. The recycling center is
23 located in Building 10293 on Patterson Field. The recycling program includes aluminum, glass, paper,
24 plastics, oil, and ferrous and nonferrous materials (WPAFB 2001).

25
26 WPAFB has a contract for solid waste pick-up and disposal of all refuse on the base (WPAFB 2001).
27 The contractor removes refuse from military family housing and industrial areas on the Base.

28
29 **Sanitary Sewer and Wastewater Systems.** The sanitary sewer collection system at WPAFB is owned by
30 the Base and consists of 43 miles of pipelines. The wastewater produced on the north side of Patterson
31 Field is discharged to the Fairborn treatment plant, northwest of the Base. The wastewater produced on
32 the remainder of Patterson Field, Wright Field, and Page Manor is served by the Dayton treatment system
33 (WPAFB 2001).

34
35 WPAFB produces an average of 3.5 million gallons per day (gpd) of sewage (WPAFB 2010f). The
36 overall condition of the system is adequate in the collection of wastewater. The current system is
37 designed to accommodate a Base population that is approximately 50% larger (WPAFB 2001).

38
39 **Heating and Cooling.** WPAFB is heated with six coal- and gas-fired central heating plants. These plants
40 are located throughout the Base and provide approximately 80% of the annual heating requirements for

WPAFB (WPAFB 2001). The two largest central heating plants are in Building 31240, which serves Patterson Field and Kittyhawk Community Center; and Building 20770, which serves Wright Field (WPAFB 2001). There are also four satellite heating plants that serve smaller areas on the Base. These plants operate on natural gas and provide 4% of the Base's overall heating needs. The remaining 16% of the Base's overall heating is met by natural gas furnaces in individual buildings (WPAFB 2001).

Communications. The communications system at WPAFB provides support to the 445 AW and its associate units. The communications system consists of telephone, local computer systems, long-haul communications, and land mobile radio systems (WPAFB 2001). There are over 100 miles of communication cable ducts on Base (WPAFB 2001).

WPAFB's communications and information utility infrastructure is in good condition (WPAFB 2001). There are improvements planned for the Base that would enable it to meet any known future communication requirements (WPAFB 2001).

Airfield Pavement. The airfield pavement system at Patterson Field includes an extensive system of taxiways and two parking aprons: the east and west ramps (WPAFB 2001). The West Ramp provides aircraft parking for C-5 aircraft associated with the 445 AW.

North Field LZ

Because North Field was evaluated as a LZ, infrastructure primarily involved the flight line.

3.12 Health and Safety

3.12.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The public has little access to the construction activities associated with the Proposed Action, so the primary safety concern is the potential for aircraft crashes and loss of life and property damage. Aircraft safety focuses on matters such as the potential for aircraft mishaps, airspace congestion, BASH, munitions handling and use, flight obstructions, weather, and fire risks.

Aircraft mishaps might involve midair collisions with other aircraft; collisions with objects such as towers, or buildings; weather-related accidents; and bird/wildlife-aircraft collisions. The environment for air safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning air safety. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including those at WPAFB. Since the inception of the USAF in 1947, aircraft accidents have steadily declined each year.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the

exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environs. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation processes creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

The following provides additional information on specific safety hazards associated with training flights.

Aircraft Operations

The existing environment for air safety is based on the physical risks associated with aircraft flight and current military operation procedures concerning air safety. Obstructions to flights, which include things such as towers and power transmission lines, represent safety concerns for aircrews, especially those engaged in low-altitude flight training. Aircrews are briefed and familiarized with potential obstructions along their routes before undertaking a mission. Furthermore, DoD FLIP and aeronautical charts identify the location of such hazards and indicate the required horizontal and/or vertical separation distances to ensure safety.

Hazardous weather conditions can pose safety hazards and influence a pilot to alter flight. Pilots consult the National Weather Service or weather services at local airports to obtain preflight weather information. Adverse weather conditions of concern include tornadoes, thunderstorms, hail, severe turbulence, dust storms, and wind shear. The evaluation of potential hazards of weather conditions rests in a pilot's sound discretion based on knowledge of available information, experience, and the operational limits of the aircraft.

The U.S. Air Force Safety Center (AFSC) has defined four classifications of mishaps: Classes A, B, and C; and High Accident Potentials (HAPs). Class A mishaps result in a total cost in excess of \$1 million for injury, occupational illness, and property damage; a fatality or permanent total disability; or destruction or damage beyond economical repair to USAF aircraft. Class B mishaps result in a total cost in excess of \$200,000 (up to \$1 million) in property damage, permanent partial disability, or hospitalization of five or more personnel. Class C mishaps result in total damage that costs in excess of \$10,000 (up to \$200,000), or an injury or occupational illness that results in a loss of workers productivity greater than 8 hours. Mishaps not meeting the definitions of Class A, B, or C, but, because of damage or injury necessitate USAF reporting, are classified as HAPs.

BASH are a safety concern due to the potential damage that a strike might have on the aircraft or potential injury to aircrews. Birds might be encountered at altitudes of 30,000 feet and higher; however, most birds fly close to ground level. Approximately 95% of all reported incidents in which a USAF aircraft has

1 struck a bird have been below 3,000 feet AGL. Approximately half of these bird strikes occur in the
2 airport environment, and approximately one-third occur during low-altitude training. Strike rates rise
3 substantially as altitude decreases.

4
5 The USAF devotes considerable attention to avoiding the possibility of bird/wildlife-aircraft strikes. It
6 has conducted a worldwide program for decades to study bird migrations, bird flight patterns, and past
7 strikes to develop predictions of where and when bird/wildlife-aircraft strikes might occur. This program,
8 which consistently updates the data, also defines avoidance procedures through a Bird Avoidance Model
9 (BAM). Each time an aircrew plans a training sortie along an established training route or other training
10 airspace, they use the BAM to define altitudes and locations to avoid. Use of this model has minimized
11 BASH. Each base or flying unit also develops and maintains a bird/wildlife-aircraft avoidance plan that
12 dictates the location and timing of avoidance measures within the airspace used by the base or unit.

13 14 **Munitions and Explosive Safety**

15 Explosive safety zones (ESZs) are required for areas where ordinance are stored or handled. ESZs are
16 typically determined based upon the net explosive weight of the ordinance to be stored or handled and the
17 blast resistance properties of the magazine. Explosive Safety Quantity Distance (ESQD) arcs that
18 delineate the extents of each ESZ are constructed. ESZ and ESQD requirements are specified in Air
19 Force Manual 91-201, *Explosive Safety Standards*.

20 21 **Construction and Demolition Safety**

22 Construction site safety is largely adherence to regulatory requirements imposed for the benefit of
23 employees and implementation of operational practices that reduce risks of illness, injury, death, and
24 property damage. The health and safety of onsite military and civilian workers are safeguarded by DoD
25 and USAF regulations designed to comply with standards issued by OSHA and USEPA. These standards
26 specify the amount and type of training required for industrial workers, the use of protective equipment
27 and clothing, engineering controls, and maximum exposure limits for workplace stressors.

28 29 **3.12.2 Existing Conditions**

30 **Fire Hazards and Public Safety**

31 The Fire Department at WPAFB provides fire, crash, rescue, and structural fire protection at the Base.
32 The 445 AW abides by a general safety policy relating to the performance of all activities at the Base.
33 Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts
34 and safety awareness and strict compliance with established safety standards are expected.

35 36 **Aircraft Safety**

37 Risks associated with takeoffs and landings at WPAFB are presented in the 1995 AICUZ Study for the
38 base, which was developed to address safety issues and to identify hazard potential due to aircraft
39 accidents, obstructions to navigation, and incompatible land uses based on exposure levels to aircraft

noise in the surrounding area. The WPAFB AICUZ Study also defines obstruction-free areas and APZs relative to runways and taxiways, which in turn results in constraints in the siting and location of facilities on Base (WPAFB 1995a).

Air safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning air safety. Historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. Historical data on C-5 mishaps are listed in **Table 3-6**, which provides statistics from the past 10 years as well as for the overall lifetime of the aircraft from the beginning of the operation of the aircraft in CY68. The lifetime rate of Class A and Class B mishaps is 1.04 and 3.02 mishap, respectively, per 100,000 hours of flight time for the C-5 aircraft (AFSC 2009a). An aircraft mishap can cause fire and environmental contamination. Military aircraft have the capability to carry large amounts of fuel that can ignite in the event of an aircraft crash. Initial response to an aircraft accident is the responsibility of the civilian authorities nearest the crash site. These authorities would provide emergency services such as fire, police, and medical assistance, as necessary. The civilian agency responding to an aircraft accident is responsible for determining what response actions they are capable of performing. If the responding unit is not capable of performing certain response actions, they request assistance from the nearest civilian agency capable of performing the required response. In the event of an aircraft mishap, these authorities would notify the nearest USAF installation.

Table 3-6. Historical Data on C-5 Mishaps (CY68–FY09)

Year	Class A		Class B		Fatal		Hours Flown	Cumulative Hours ²
	No.	Rate ¹	No.	Rate ¹	Pilot	All		
FY00	0	0.00	4	7.57	0	0	52,872	1,830,930
FY01	1	1.72	1	1.72	0	0	58,244	1,889,174
FY02	0	0.00	4	4.19	0	0	95,513	1,984,687
FY03	0	0.00	2	1.93	0	0	103,382	2,088,069
4FY04	3	4.06	3	4.06	0	0	73,829	2,161,898
FY05	1	1.56	2	3.12	0	0	64,019	2,225,917
FY06	2	3.71	3	5.57	0	0	53,855	2,279,772
FY07	1	2.25	4	9.01	0	0	44,380	2,324,152
FY08	0	0.00	5	11.13	0	0	44,917	2,369,069
FY09	0	0.00	4	8.65	0	0	46,230	2,415,299
Lifetime ²	25	1.04	73	3.02	5	168	2,415,299	

Source: AFSC 2009a

Notes:

¹ Rate of mishap per 100,000 hours flown.

² Statistics from the last ten years are shown. Cumulative hours represent lifetime mishap record totals from the beginning of C-5 operations (CY68) to present.

Upon notification of the aircraft accident, the commanding officer of the nearest USAF installation dispatches a disaster response force team. The response team would provide security, medical, fire, legal, munitions, and mortuary services, as required. The response team would also assist with evacuation, accident evaluation and investigation, and retrieval of classified materials or equipment, as well as protective measures such as munitions disposal and hazardous/toxic materials removal or treatment. When necessary, the disaster response force team would coordinate activities with other regional response forces to ensure all personnel and equipment is dispatched for proper control of the accident site.

Bird/Wildlife-Aircraft Strike Hazard

The office of primary responsibility for the BASH Plan at WPAFB is the 88 ABW Flight Safety Office. The 445 AW at WPAFB actively supports the BASH Plan (WPAFB 2010g) per the Host Tenant Support Agreement. The plan is intended to reduce the potential for a bird/wildlife strike to occur at the Base by providing procedures for:

- The Base's Bird Hazard Working Group
- Altering or discontinuing flying operations based on reported hazardous bird activity
- Disseminating information to all assigned and transient aircrews for specific bird hazards and procedures for avoidance
- Eliminating or reducing environmental conditions that attract birds to the airfield
- Dispersing birds on the airfield

The BASH Plan includes maintenance specifications for grass mowing on the airfield to range from 7 to 14 inches, seasonal inspection requirements for grain-type grasses that attract high-threat avian species, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding. In addition, any newly constructed detention basins on WPAFB must drain within a 48-hour maximum time limit to help prevent future BASH hazards (WPAFB 2010f). The BASH Plan also established a Bird Hazard Warning System to provide a means for immediate exchange of information between the ground operations and aircrews concerning the existence of birds that pose a hazard (WPAFB 2010a). BASH reduction techniques currently listed in the WPAFB BASH Plan include abating nuisance avian species using pyrotechnics and depredation, when necessary.

At the Base, there are several common bird types that might be present and pose a hazard: waterfowl (ducks and geese), raptors (hawks and birds of prey), pigeons, doves, meadowlarks, blackbirds, starlings, and killdeer. Migratory waterfowl (ducks, geese, and swans) pose a threat to low-flying aircraft. Waterfowl vary considerably in size, from 1 to 2 pounds for ducks, 5 to 8 pounds for geese, and up to 20 pounds for most swans. Waterfowl are usually only a hazard during the migratory season. Waterfowl typically migrate at night, and generally fly between 1,500 and 3,000 feet AGL during the fall migration and 1,000 to 3,000 feet AGL during spring migration. In addition, other large migratory avian species, such as turkey vultures and gulls, pose a threat to military aircraft.

Strike rates rise dramatically as altitude decreases, which is partly due to the greater number of low-altitude missions, but mostly because birds are commonly active close to the ground. Any gain in altitude above 1,000 feet represents a substantially reduced threat of a bird strike (AMC 2002). The C-5 aircraft at WPAFB are not flown regularly on low-level routes, which are less than 3,000 feet AGL. Missions conducted at heights above 3,000 feet AGL account for less than 6% of all USAF wildlife strikes where altitude was known (AFSC 2007).

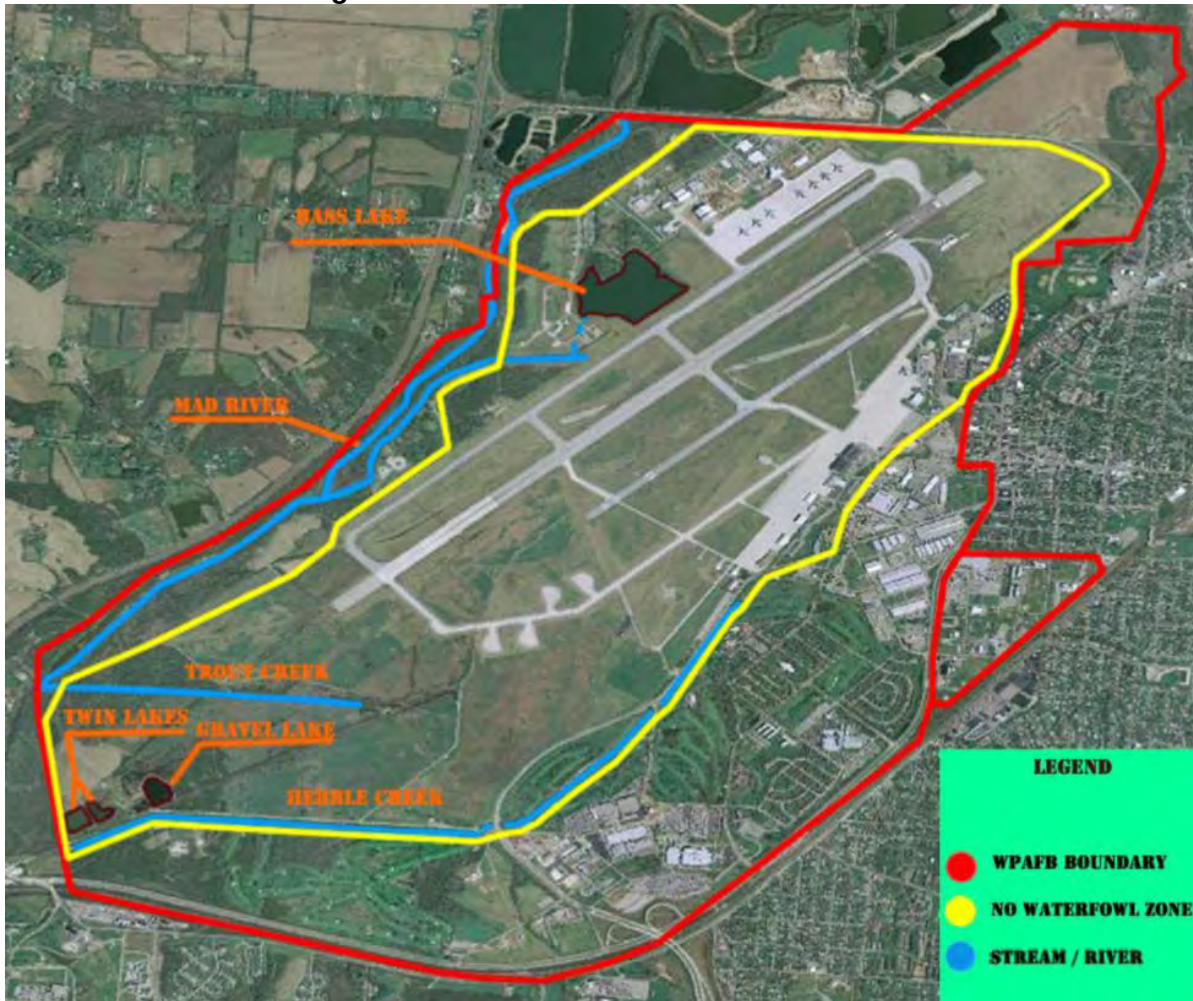
BAMs are used to analyze BASH visually during flight planning. The majority of costs incurred by the USAF occur during the fall migration of waterfowl and raptors. On average in the month of September, approximately 13.97% of all bird/wildlife-aircraft strikes occur, accounting for 42.13% of USAF BASH costs (AFSC 2009d). In addition, most bird/wildlife-aircraft strikes occur after 10:00 a.m. (AFSC 2009d). Using online BAM software to calculate avian densities during the highest risk months and at high-risk day times for WPAFB, avian density over the ROI is shown as low to moderate (USAF 2010). No severe avian densities are shown for these high-risk seasons or day times.

Figure 3-10 presents the no waterfowl zone (yellow line) in relation to the WPAFB property boundary. Features such as lakes, streams, and rivers are shown in blue line.

Several incidences of bird-aircraft strikes have been reported at WPAFB. The Flight Safety Officer prepares bird strike reports that include the date and time of each strike, conditions, aircraft model, number of birds, bird species, and altitude and location at the time of the strike (WPAFB 2010g). The potential exists for future bird strikes although current BASH Plan and U.S. Department of Agriculture–Wildlife Services (USDA–WS) management strategies and protocols continue to be implemented. The USAF BASH Team maintains historic records of bird/wildlife-aircraft strikes. C-5 aircrafts have been involved in a total of 51 bird strikes that have occurred at WPAFB from 2006 to the present (WPAFB 2010h).

WPAFB maintains a USFWS depredation permit that specifies numbers of birds that may be killed by species as part of an overall management program (WPAFB 2007a). However, depredation permits are not required for killing English house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), common pigeons or rock doves (*Columba livia*), and mute swans (*Cygnus olor*). In addition, 50CFR21.43 excludes the need for a depredation permit for red-winged blackbirds (*Agelaius phoeniceus*), rusty blackbirds (*Euphagus carolinus*), brown-headed cowbirds (*Molothrus ater*), common grackle (*Quiscalus quiscula*), and American crows (*Corvus brachyrhynchos*) when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

Figure 3-10. No Waterfowl Zone at WPAFB



Source: WPAFB 2010g

In addition, a Wildlife Survey and Airfield Management Plan was developed to provide information regarding bird and mammal activities on the airfield and detail short- and long-term ways of reducing BASH potential (WPAFB 2007a). A Cooperative Services Agreement between WPAFB and USDA–WS was finalized in September 2001 to obtain USDA–WS assistance in reducing BASH potential (WPAFB 2007a).

Munitions and Explosives Safety

There are several areas that are constrained by ESQD CZs in the Patterson Field area (WPAFB 2001). The weapons storage area near the West Ramp provides space for conventional munitions maintenance and storage. The ESQD CZ for two storage structures is 1,255 feet and 1,468 feet (WPAFB 2010i). Hot cargo pads provide space for loading and unloading of cargo aircraft that are transporting munitions. The normal day-to-day CZs are 1,250 feet. Larger CZs are used when required for emergency operations. Two locations on the India ramp (I-1 and I-2) are sited for Hazard Class/Division 1.4 explosives storage.

Explosives are classified based on their reactions to specific influences. The explosives hazard class is further subdivided into “division”, based on the character and predominance of the associated hazards and their potential for causing personnel casualties or property damage. Explosives Hazard Class/Division 1.4 designates a moderate fire with no significant blast or fragment hazard (Sandia 2010).

The southernmost hot cargo pad is no longer used for hot cargo operations. Fourteen contingency hot cargo pads are provided along Taxiway A. These pads require a 1,250-foot ESQD CZ (WPAFB 2001). Less restrictive ESQDs are along the west parking apron. An arm/de-arm and hung ordnance pad is provided at both ends of Taxiway B.

Construction and Demolition Safety

All contractors performing construction activities are responsible for following ground safety regulations and worker compensation programs, and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplace operations; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous materials), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

North Field LZ

Aircraft safety for the North Field LZ was described in Section 3.3.10.4 of the East Coast Basing EA (USAF 2005) and is incorporated by reference in this current EA.

3.13 Hazardous Materials/Waste, Stored Fuels, and IRP

3.13.1 Definition of the Resource

AFPD 32-70, *Environmental Quality*, establishes the policy that the USAF is committed to

- Cleaning up environmental damage resulting from its past activities
- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Managing responsibly the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste; or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

Evaluation of hazardous materials and wastes focuses on USTs and ASTs and the storage, transport, and use of pesticides and herbicides, fuels, and petroleum, oils, and lubricants (POL). Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), radon, lead-based paint (LBP), polychlorinated biphenyls (PCBs), and unexploded ordnance. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), defines hazardous materials. The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through its Environmental Restoration Program (ERP), the DoD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the migration of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

3.13.2 Existing Conditions

Hazardous Materials

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or

1 track any of those activities. A privately contracted hazardous material pharmacy (HAZMART) is
2 located in Building 30089. The HAZMART ensures that only the smallest quantities of hazardous
3 materials necessary to accomplish the mission are purchased and used (WPAFB 2001).

4
5 Hazardous and toxic material procurements at WPAFB are approved and tracked by the Bioenviron-
6 mental Engineering Office. The Asset Management Division supports and monitors environmental
7 permits, hazardous material and hazardous waste storage, spill prevention and response, and participation
8 on the Base Environmental Protection Committee. The Hazardous Substance Steering Committee is a
9 network safety, environmental and logistics experts who work with hazardous material Issue Point
10 Managers (IPMs), Unit Environmental Coordinators (UECs), and other hazardous material users to ensure
11 safe and compliant hazardous material management throughout the base (WPAFB 2008a).

12
13 The 445 AW uses a propylene glycol-based deicing fluid for aircraft deicing operations. Propylene glycol
14 is a colorless, odorless, water-soluble liquid considered safe for use in commercial formulations of foods,
15 drugs, and cosmetics (HHS 1997). Propylene glycol is used widespread because of its low toxicity; only
16 very high doses result in adverse health effects (HHS 1997). However, propylene glycol requires oxygen
17 for breakdown, which can deplete surface waters of dissolved oxygen, resulting in oxygen impairments.

18
19 According to a 2009 Process Specific Opportunity Assessment (PSOA) Aircraft Deicing report, the 445
20 AW uses approximately 14,000 gpy of pure deicing fluid (before dilution) on Base. Of that, approxi-
21 mately 10,700 gpy of the concentrated fluid is used on the West Ramp for C-5 aircraft and transient
22 aircraft. The propylene glycol is diluted to 60% propylene glycol, 40% hot water. The amount of deicing
23 fluid used at the West Ramp varies depending upon the weather conditions. The 445 AW currently
24 captures about 20% of the deicing fluid using a mobile vacuum unit (Shaw E&I 2009). Approximately
25 4,000 gallons were collected last winter (WPAFB 2010j). The recovered deicing fluid is stored in four
26 1,500-gallon ASTs behind Building 34044. The recovered deicing fluid is recycled/disposed at an off-site
27 location. WPAFB is in the process of issuing a contract for recycling and disposal. Deicing fluid not
28 recovered is discharged to the Base's storm water system, which flows into Bass Lake and the Mad River.
29 The outfalls associated with the airfield are monitored for glycol as required by the WPAFB NPDES
30 storm water permit.

31 32 **Hazardous Waste**

33 The 88 ABW maintains a Hazardous Waste Management Plan (WPAFB 2008b) as directed by AFI 32-
34 7042, *Solid and Hazardous Waste Compliance*. This plan prescribes the roles and responsibilities of all
35 members of WPAFB with respect to the waste stream inventory, waste analysis plan, hazardous waste
36 management procedures, training, emergency response, and pollution prevention. The plan establishes
37 the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous
38 waste management.

Wastes generated at WPAFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste (MSW), and other miscellaneous wastes. Management of hazardous waste is the responsibility of each waste-generating organization and Asset Management Division (88 ABW/CEA). WPAFB produces more than 1,000 kilograms of hazardous waste per month and is considered a large quantity hazardous waste generator.

There is one 90-day accumulation site and a one-year Treatment, Storage, and Disposal Facility (TSD). The TSD is operated by 88 ABW/CEA under a RCRA Part B permit and is located in Facility 20479. Most hazardous wastes are picked up by contract from the 90-day storage facilities and disposed of at an OEPA-approved site (WPAFB 2008b).

Stored Fuels

Stored fuels present a potential threat to the environment, which is mitigated at WPAFB through spill prevention and control and countermeasures (SPCC). The WPAFB SPCC Plan (WPAFB 2008c) describes practices used to minimize the potential for stored fuel spills, prevent spilled materials from migrating off the base, and ensure that the cause of any spill is corrected. The WPAFB Oil and Hazardous Substance Integrated Contingency Plan (WPAFB 2005a) describes emergency planning, notification and spill response practices. Collectively, the SPCC Plan with a focus on spill prevention and the Integrated Contingency Plan (ICP) with a focus on spill response provide a comprehensive strategy for preventing stored fuel releases to the environment.

The Spill Prevention Coordinator (SPC) is the primary point of contact for the SPCC Program. The SPC works closely with Tank Managers, UECs, and WPAFB emergency response personnel to implement the SPCC Plan. Required SPCC training, standard operating procedures (SOPs), inspections, and record keeping are coordinated by the SPC.

Asbestos-Containing Materials

AFI 32-1052, *Facilities Asbestos Management*, provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DoD Directives.

AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos-management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by USEPA with the authority promulgated under OSHA, 29 U.S.C. 669, et seq. Section 112 of the CAA regulates emissions

of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

The 88 ABW/CEA has developed standard contract specifications for the removal and disposal of ACM. These specifications incorporate all applicable USEPA, OSHA, and Department of Transportation (DOT) requirements. The Ohio Department of Health (ODH) must license contractors, and all asbestos-abatement work must be done under the onsite supervision of an ODH-designated “competent person.” Work area monitoring for airborne asbestos fibers is accomplished by an industrial hygienist certified by the American Board of Industrial Hygiene. Industrial hygienists must also be certified by the ODH. Laboratory analyses of air samples and of bulk samples must be accomplished in a certified and accredited laboratory.

Non-friable ACM can be disposed of in a sanitary landfill. Friable asbestos must be disposed of in a USEPA-approved landfill. ACM-abatement contractors are responsible for obtaining all required permits from regulatory agencies and for OEPA and ODH notification requirements (WPAFB 2001). WPAFB has implemented an Asbestos Management Plan to minimize risk from friable ACM in buildings where the material remains. Additional sampling is usually required in buildings scheduled for renovation or demolition (WPAFB 2001).

Of the buildings considered for the Proposed Action, Buildings 30152 and 34026 potentially contain ACM. Although Building 34012 may contain ACM, it would not be located in the area where work will be performed. Buildings 34007, 34015, and 34016 do not contain ACM (WPAFB 2010k).

Lead-Based Paint

The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on October 28, 1992, regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards.

USAF policy and guidance establishes LBP management at USAF facilities. The policy incorporates, by reference, the requirements of 29 CFR 1910.120, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the CAA, and other applicable Federal regulations. Additionally, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards.

More than 95% of WPAFB facilities were constructed prior to 1980 and contain LBP. Lead concentrations are generally low with the exception of paints used on outdoor structures such as water towers. The HUD action level is 5,000 ppm. However, even when concentrations are below this, OSHA Lead Construction Standard (29 CFR 1926.62) must be followed. All workers performing lead abatement

1 or removal or any other lead disturbance are required to have a lead workers license issued by the ODH.
2 Licensing is not required if the contract involves mechanical demolition. Contractors containerize LBP
3 wastes which are disposed of under contract. Bioenvironmental engineering samples and monitors all in-
4 house projects involving LBP (WPAFB 2001).

5
6 Of the buildings considered for the Proposed Action, Building 34026 potentially contains LBP. Although
7 Building 34012 may contain LBP, it would not be located in the area where work will be performed.
8 Buildings 34007, 34015, and 34016 do not contain LBP (WPAFB 2010k).

9 10 **Environmental Restoration Program**

11 The ERP is a subcomponent of the Defense Environmental Restoration Program that became law under
12 SARA (formerly the Installation Restoration Program [IRP]). The ERP requires each DoD installation to
13 identify, investigate, and clean up hazardous waste disposal or release sites. WPAFB began its IRP in
14 1981 with the investigation of possible locations of hazardous waste contamination. In 1988, WPAFB
15 entered into an Ohio Consent Order with the OEPA. In October 1989, WPAFB was placed on USEPA's
16 National Priorities List, a list of sites that are considered to be of special interest and require immediate
17 attention (WPAFB 2001).

18
19 WPAFB currently has identified 67 IRP sites, two regional groundwater sites, and several areas of con-
20 cern per the Air Force Restoration Information Management System. WPAFB has grouped the majority
21 of confirmed or suspected sites requiring investigation and characterization in 11 geographically-based
22 operable units (OUs), designated as OUs 1 through 11 (IT 1999). In addition to the 11 OUs, WPAFB
23 addressed base-wide issues of groundwater and surface water contamination under the Basewide Moni-
24 toring Program (BMP) and Long-Term Groundwater Monitoring (LTM) Program. Principal groundwater
25 contaminants beneath WPAFB include benzene, toluene, ethylbenzene, xylene; trichloroethene; and tetra-
26 chloroethene (WPAFB 2007c)

27
28 The only IRP site in the West Ramp vicinity is the former UST at Building 34020, which is located in
29 OU11. After a leak of JP-4 was discovered in 1986 the UST for Building 34020 was removed. The site
30 was investigated during the Phase II, Stage 2 Investigation (Weston 1989) and it was determined that
31 hydrocarbon levels did not exceed the Bureau of Underground Storage Tank Regulations (BUSTR)
32 cleanup criteria. The site was subsequently closed under the *Record of Decision for 41 No Action Sites at*
33 *WPAFB, OH* (WPAFB 1998).

34 35 **North Field LZ**

36 Hazardous materials and hazardous wastes were generally described for CHS in Section 3.3.4 of the East
37 Coast Basing EA (USAF 2005) and are incorporated by reference in this current EA.

4.0 ENVIRONMENTAL CONSEQUENCES

This section presents an evaluation of the environmental impacts that might result from implementing the Proposed Action or the No Action Alternative. The section also includes an analysis of the potential cumulative impacts on WPAFB; unavoidable adverse impacts; the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; and irreversible and irretrievable commitments of resources.

The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; Federal, state, or local agency guidelines and requirement; and/or legislative criteria. Proposed mitigation measures are included for each environmental issue, as appropriate, to reduce potential impacts.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact, but are reasonably foreseeable.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short-term or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. For example, air quality impacts from fugitive dust associated with construction would be considered short-term as they would only last for the duration of the construction activities. Long-term impacts are generally considered those impacts that would result in permanent effects. For example, the loss of vegetation, or the increase in traffic, associated with new development would be considered long-term.

The thresholds of change for the intensity of impacts are defined as follows:

Negligible, the impact is localized and not measureable or at the lowest level of detection;
Minor, the impact is localized and slight but detectable;
Moderate, the impact is readily apparent and appreciable; or
Major, the impact is severely adverse or highly noticeable and considered to be significant.

The resource areas located at WPAFB are analyzed in the sections below. Descriptions of the most relevant resources for North Field LZ, such as airspace management, land use, air quality, and noise, are briefly discussed below, as appropriate. The impact analyses for these resource areas as well as those not directly related to this EA are found in the East Coast Basing EA (USAF 2005) and are incorporated by reference.

4.1 Airspace Management

4.1.1 Evaluation Criteria

Impacts on airspace use were assessed by comparing the projected military flight operations with existing conditions and with forecasted civil aviation activities in the defined ROI. This assessment included analyzing the capability of affected airspace elements to accommodate projected military activities, and determining whether such increases would have any adverse impacts on overall airspace use in the area.

Also included are considerations of the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace; possible impacts on other nonparticipating civil and military aircraft operations; and possible impacts on civil airports that underlie or are proximate to the airspace involved in the proposal. The ROI for airspace management has been limited to WPAFB and the transitional airfields.

The airspace classification is currently Class D and is not expected to change with the implementation of the C-17s. Depending upon requirements, some C-17 training would occur at low levels (<3,000 AGL) (WPAFB 2010a). According to 32 CFR 989, Appendix B, A.2.3.36, airfield approaches, departures, and en-route procedures that are less than 3,000 AGL and also route traffic over noise-sensitive areas, such as residential neighborhoods or cultural, historical, or outdoor recreational areas, may be categorically excluded.

4.1.2 Proposed Action

Wright-Patterson AFB

Effects on airspace management are predicated on the extent to which the Proposed Action would affect air traffic in the vicinity of WPAFB and the navigable airspace in an en-route environment. For additional information regarding airspace management, see Section 3.1.1.

Total 445 AW airfield operations would decrease by approximately 14% under the Proposed Action when comparing C-5 operations in CY10 to proposed C-17 operations in CY12 (see **Table 2-5**). Training requirements on the C-17 aircraft would be similar to what is currently being flown in C-5 aircraft. ATC operations would remain similar since the C-5 and C-17 aircraft fly at similar speeds (**Table 2-2**) and possess the same wake turbulence category.

Table 2-1 shows the total amount of PAA aircraft that would be based at WPAFB throughout the 445 AW's transition from the C-5 to the C-17. Beginning with the second quarter of FY11, five C-5 and four C-17 aircraft would be based at WPAFB. This is the largest number of aircraft on the Base throughout the duration of the transition, which would have negligible short-term adverse effect on the airspace surrounding WPAFB. By the first quarter of FY12, WPAFB would have completed its drawdown of C-5 aircraft and there would be eight C-17 aircraft based at WPAFB. Overall, the Proposed Action would have a long-term beneficial effect on airfield operations at WPAFB.

Under the Proposed Action, the 445 AW would be expected to visit transition training airfields, primarily Dayton International Airport, Ohio and Grissom AFB, Indiana (WPAFB 2010a) with the same frequency as that of the C-5 aircraft (approximately 5%). The proposed C-17 aircraft operations would be conducted within the parameters of the existing Letters of Agreement with the transition training airfields. Therefore, the Proposed Action would not have an adverse effect on transitional airfields.

North Field LZ

For purposes of C-17 training for the 445 AW, the MTRs closest to CHS and North Field would be utilized. Airspace management for these MTRs was assessed in Section 4.6.10 of the East Coast Basing EA (USAF 2005). It was concluded that the existing aircraft ground tracks, pattern altitudes, and instrument approach procedures, as well as the air traffic control procedures were compatible with the requirements associated with the additional C-17 operations evaluated in the EA. Given the projected operations, C-17 aircraft from WPAFB would add an average of approximately 10.33 daily operations at the North Field LZ. Therefore, the impact to airspace management at the North Field LZ would be negligible.

4.1.3 No Action

The No Action alternative would have no adverse impact on airspace management over the current conditions.

4.2 Land Use

4.2.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be adverse if it met the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies
- Precluded the viability of existing land use
- Precluded continued use or occupation of an area
- Incompatibility with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property

4.2.2 Proposed Action

There would be no adverse effects on the land use surrounding WPAFB. All renovation and modification activities would be limited to areas located on the Base. The renovation projects would upgrade capabilities necessary to perform required activities. Renovation projects would occur on two types of land classified as improved lands: Aircraft Operations and Maintenance, and Aircraft Taxiways (**Figure 3-3**).

Interior renovation/modification to existing facilities would not result in any adverse or incompatible land use changes on or off the Base. The basing and operation of C-17 aircraft would not alter the

relationships of the general land use areas that have been designated in the base-planning guidance documents. The land use categories incorporate developed and undeveloped lands. These land use designations were established to segregate aircraft facilities from other military base support areas. Renovation of C-17 facilities would not be in conflict with base land use policies or objectives. The Proposed Action would not conflict with any applicable off-Base land use ordinances or designated CZs.

Effects associated with removal of construction materials and debris would include minor, temporary disruption of land uses due to elevated noise levels and potential interference with roadway access due to construction vehicles.

Land use associated with aircraft noise would not be affected because the noise associated with the C-17 aircraft is projected to be less than that of the C-5 at WPAFB. The noise contour analysis is presented in Section 4.4. No changes to land use would occur at WPAFB as a result of the Proposed Action. The noise contour analysis is presented in Section 4.4.

North Field LZ

In the East Coast Basing EA (Section 4.6.8.2; USAF 2005), it was concluded that the implementation of the CHS Alternative Action would slightly increase noise exposure when compared with baseline conditions at North Field. Land uses adjacent to North Field are predominantly open space and agricultural uses. These land uses are consistent with comprehensive plans for the area, and the slight increase in noise would not impact land uses. Therefore, land use plans for the community would not be affected.

4.2.3 No Action

The No Action alternative would have no impact on land use over current conditions.

4.3 Air Quality

4.3.1 Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. For the purposes of this EA, the impact in NAAQS “attainment” areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP

As mentioned in Section 3.3, the area including WPAFB is classified as a moderate maintenance area for O₃, designated as moderate nonattainment for PM_{2.5}, and is designated as an unclassified/attainment area for all other criteria pollutants.

Impacts on air quality in NAAQS “nonattainment” areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP

Because WPAFB is located in an area designated as maintenance for O₃ and non-attainment for PM_{2.5}, a conformity applicability analysis is required to determine whether the Proposed Action is subject to the Conformity Rule. With respect to the General Conformity Rule, effects on air quality would be considered significant and, therefore, subject to an evaluation to determine compliance with the General Conformity Rule, if:

- The proposed Federal action does not relate to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act, and
- The Proposed Action-related direct and indirect emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been re-designated as a maintenance area.

The *de minimis* threshold emission rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to have “significant” air quality impacts. **Table 4-1** presents these thresholds, by regulated pollutant. These *de minimis* thresholds are similar, in most cases, to the definitions for major stationary sources of criteria and precursors to criteria pollutants under the CAA’s NSR Program (CAA Title I). As shown in **Table 4-1**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

In addition to the *de minimis* emission thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Federal Class I area (e.g., wilderness area greater than 5,000 acres or national park greater than 6,000 acres) and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 µg/m³ or more [40 CFR 52.21(b)(23)(iii)]. Although PSD rules apply only to stationary sources of emissions, for the purposes of this EA, such an impact to a Class I area would be considered adverse.

Table 4-1. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	<i>de minimis</i> Limit (tpy)
Ozone (measured as NO _x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO _x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO _x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/maintenance	All	100
Particulate Matter (PM ₁₀)	Nonattainment/maintenance	Serious	70
		Moderate	100
		Not applicable	100
Particulate Matter (PM _{2.5})	Nonattainment/maintenance	Direct Emissions	100
		SO ₂ precursors	100
		NO _x precursors	100
Sulfur Dioxide (SO ₂)	Nonattainment/maintenance	Not applicable	100
Nitrogen Oxides (NO _x)	Nonattainment/maintenance	Not applicable	100

Source: 40 CFR 93.153 (b)

tpy: tons per year

4.3.2 Proposed Action**Air Quality Regulations Applicable to the Proposed Action**

Stationary Sources and New Source Review. Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through Federal and state permitting program requirements under NSR regulations (40 CFR 51 and 52). Local stationary source permits are issued and enforced by RAPCA. As noted previously, WPAFB has appropriate permits in place and has met all applicable permitting requirements and conditions for existing stationary devices. No new or modified stationary sources are anticipated as part of the Proposed Action.

National Emissions Standards for Hazardous Air Pollutants (NESHAP). Because WPAFB has the potential to emit more than 25 tpy of hazardous air pollutants, certain hazardous air pollutant-emitting activities on Base are subject to regulation under Federal NESHAP, are promulgated in 40 CFR Parts 61 and 63. These NESHAP require emissions control measures and detailed recordkeeping to show compliance with NESHAP restrictions on the types of materials, such as paints, adhesives, and solvents, which can be used in specific operations. Specific NESHAP to which activities at WPAFB are subject include:

- 40 CFR 63 Subpart GG, Aerospace NESHAP
- 40 CFR 63 Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE MACT)
- 40 CFR 61 Subpart M, Asbestos Remediation

In addition, WPAFB would also be subject to the Defense Land Systems and Miscellaneous Equipment (DLSME) NESHAP when that rule is promulgated. This rule would cover military surface coating operations other than those subject to the Aerospace and Shipbuilding NESHAP. The intent is to simplify compliance for DoD facilities that are currently forced to comply with multiple overlapping, and sometimes conflicting, NESHAP, including the Miscellaneous Metal Parts and Products Coating NESHAP, Plastic Parts and Products Coating NESHAP, Metal Furniture Coating NESHAP, Large Appliance Coating NESHAP, and Fabric and Other Textiles Coating NESHAP. USEPA currently has no date set for publication of a draft DLSME NESHAP.

Conformity. Because both a maintenance area and a nonattainment area are affected by this Proposed Action, the USAF must comply with the Federal General Conformity Rule. To do so, an analysis has been completed to ensure that, given the changes in direct and indirect emissions of the O₃ precursors (NO_x and VOCs), direct PM_{2.5}, and PM_{2.5} precursors (SO₂ and NO_x), the Proposed Action would be in conformity with CAA requirements. The Conformity Determination requirements specified in this rule can be avoided if the project nonattainment pollutant rate increase resulting from the Proposed Action is below *de minimis* threshold levels for each nonattainment pollutant. For purposes of determining conformity in these nonattainment areas, projected regulated pollutant emissions associated with the Proposed Action were estimated using available aircraft operations data and emissions information. The emissions calculations and *de minimis* threshold comparisons are collectively presented in the Air Conformity Analysis provided in **Appendix C**.

Based on a review of current C-5 activities and other airfield operations at WPAFB, it has been determined that the potential sources of PM_{2.5}, SO₂, NO_x and VOC pollutant emissions associated with the Proposed Action would be from (1) construction/renovation activities associated with the Proposed Action; (2) aircraft operations, maintenance, and support activities after delivery of the C-17 aircraft; and (3) motor vehicle emissions. Under the Proposed Action, the first of the C-17 aircraft would be delivered in the second quarter of FY11. Although some construction activities would extend into FY12, it was conservatively assumed that construction activities would be completed in FY11. The scope of the analysis was limited to those operations or activities that result in emissions that would be directly or indirectly attributable to the implementation of the Proposed Action.

The potential air quality impacts have been assessed based on the characteristics of the Proposed Action (i.e., aircraft operations, construction) and are presented below.

Proposed Action Direct and Indirect Emissions

Construction Activities. The Proposed Action consists of the six construction projects at various locations and facilities throughout WPAFB that are required by the Proposed Action. These projects address the requirements for the C-17 airframe and support facilities. They include only minor modification of existing buildings.

The construction projects would generate particulate (PM₁₀ and PM_{2.5}) emissions as fugitive dust from movement of construction equipment (e.g., concrete delivery trucks and waste hauling) and demolition. Fugitive dust emissions would occur during CY11 and CY12. Because the emissions are estimated to be very small and there is some uncertainty regarding precisely when they would occur, they were all conservatively assumed to occur during CY11 for this EA. Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA's AP-42 Sections 11.9 and 11.19 dated July 1998 and Section 13.2 dated October 2006 (USEPA 1998, 2006).

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment as well as evaporative emissions from architectural coatings. These emissions would be of a temporary nature. The coating emissions were estimated using paint specifications and material balance calculations. For the construction equipment combustion products, the emissions factors and estimates were generated based on guidance provided in Air Emission Factor Guide for Air Force Mobile Sources (AFCEE 2009).

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. The construction emissions are presented in **Table 4-2** and include the estimated annual emissions from on-road construction worker commuting vehicle exhaust associated with the Proposed Action construction activities.

Aircraft Operations. Emissions from airfield operations at WPAFB affect Greene and Montgomery Counties, which are included in the Metropolitan Dayton Intrastate AQCR. Calculations of airfield air pollutant emissions from both baseline and Proposed Action aircraft operations were based on the annual number of landing and takeoffs (LTO) and TGO cycles at the WPAFB airfield.

As mentioned in Section 2.2, operations that would be performed by the C-17 aircraft would be similar to current operations performed by the C-5 aircraft. Low-level military airspace would not be used by the 445 AW. Use of established airspace with a base altitude of 3,000 feet AGL is not expected to affect ground level air quality and does not require environmental analysis in accordance with the USAF EIAP, 32 CFR 989 (Appendix B, CATEx A2 3.36), as amended. In addition, the Proposed Action would reduce the number of airfield operations by approximately 14%, relative to current levels.

Table 4-2. Net Change in Emissions at Wright-Patterson AFB Associated with the Proposed Action

Air Pollutant Emissions Source	NO _x Emissions (tpy)	VOC Emissions (tpy)	CO Emissions (tpy)	SO ₂ Emissions (tpy)	PM ₁₀ Emissions (tpy)	PM _{2.5} Emissions (tpy)
BASELINE YEAR 2009						
Airfield Operations Emissions ^a	192.80	10.62	35.12	10.80	9.40	9.40
AGE Operation Emissions	34.48	2.02	20.14	0.65	1.55	1.51
Baseline Emissions 2009 (Airfield and AGE Operations Only) ^a	227.29	12.64	55.26	11.45	10.95	10.90
CALENDAR YEAR 2010						
Airfield Operations Emissions Net Increase ^a	-24.10	-1.33	-4.39	-1.35	-1.17	-1.17
AGE Operations Emissions Net Increase	-4.31	-0.25	-2.52	-0.08	-0.19	-0.19
Commuter Emissions Net Increase ^c	-	-	-	-	-	-
Construction Commuter Emissions	-	-	-	-	-	-
Construction Activities Emissions ^b	-	-	-	-	-	-
Surface Coating Emissions	-	-	-	-	-	-
Total 2010 Proposed Action Emissions Increase	-28.41	-1.58	-6.91	-1.43	-1.37	-1.36
CALENDAR YEAR 2011						
Airfield Operations Emissions Net Increase ^a	-70.57	-5.66	-13.61	-3.41	-5.47	-5.51
AGE Operations Emissions Net Increase	-16.28	-0.19	-7.69	-0.30	-0.59	-0.58
Commuter Emissions Net Increase ^c	-0.003	-0.003	-0.042	0.000	0.000	0.000
Construction Commuter Emissions	0.09	0.08	1.18	0.00	0.01	0.00
Construction Activities Emissions ^b	0.091	0.01	0.04	0.01	1.16	0.18
Surface Coating Emissions	-	0.02	-	-	-	-
Total 2011 Proposed Action Emissions Increase	-86.76	-5.77	-20.16	-3.71	-6.05	-6.08
CALENDAR YEAR 2012						
Airfield Operations Emissions Net Increase ^a	-112.91	-9.53	-26.72	-6.31	-8.85	-8.90
AGE Operations Emissions Net Increase	-26.05	-0.31	-12.31	-0.48	-0.95	-0.92
Commuter Emissions Net Increase ^c	-0.003	-0.003	-0.042	0.000	0.000	0.000
Construction Commuter Emissions	-	-	-	-	-	-
Construction Activities Emissions ^b	-	-	-	-	-	-
Surface Coating Emissions	-	-	-	-	-	-
Total 2012 Proposed Action Emissions Increase	-138.96	-9.84	-39.07	-6.79	-9.80	-9.82

Notes:

^a Airfield emissions include landings and take-offs, touch-and-goes (TGOs), auxiliary power unit operation, and on-wing engine tests.^b Construction emissions include demolition, and nonmobile and mobile motorized construction equipment.^c Motor vehicle emissions increases include privately-owned commute vehicles for added staff.

Tpy: tons per year

Current (2009) C-5 airfield emissions are based on the programmed airfield activities per C-5 PAA per year (50 landings/take-offs and 150 touch and go operations per aircraft). This level of aircraft operations activities was deemed to be the best representation of “baseline” conditions because the actual 2009 level was atypically low due to a higher than normal number of aircrafts being out of service. Projected C-17

airfield operations are based on 75 LTO and 450 TGO per C-17 PAA per year. These levels are the programmed (i.e., planned) number of operations based on anticipated training activities at the base.

Aerospace Ground Equipment and Aircraft Support Operations. Because the number of aircraft and the total aircraft operations would be reduced under the Proposed Action, emissions from Aerospace Ground Equipment (AGE) are expected to be reduced. Also, the C-17 by design requires fewer service hours by AGE than a C-5. The estimated reduction in AGE emissions is presented in **Table 4-2** and the calculations in **Appendix C**.

Vehicle Operations. Calculations of air pollutant emissions from privately owned vehicles (POVs) used for aircraft program staff commuting were based on the vehicle miles traveled, vehicle category or classification (e.g., light-duty gasoline vehicle), average vehicle speed measured in mph, average vehicle occupancy rate, and USEPA-approved pollutant emission factors. Emissions factors from USEPA's mobile source emission model, MOBILE6, were used to estimate emissions from motor vehicles. The decrease in staff associated with the Proposed Action (decrease by 2) is expected to result in a corresponding decrease in motor vehicle commute emissions in the Dayton Metropolitan area.

The same on-road and off-road government-owned vehicles (GOVs) currently supporting C-5 operations would also be used to support C-17 basing and operations. Because the AFRC aircraft support staff would be decreasing slightly, it was assumed for this analysis that the usage of on-road and off-road GOVs would not change.

Analysis. The information presented in **Table 4-2** shows that NO_x, VOC, CO, SO₂, PM₁₀ and PM_{2.5} emissions are projected to decrease under the Proposed Action at WPAFB. As shown in **Table 4-2**, the Proposed Action would not result in a net emission increase above conformity *de minimis* limits listed in 40 CFR 93.153 (b). Because the emissions expected from the Proposed Action would not exceed *de minimis* levels, the General Conformity Rule does not apply and the Proposed Action can be deemed to be in conformity with the Ohio SIP. **Appendix C** details the emissions factors, calculations, and estimates of construction, airfield, and motor vehicle emissions for the Proposed Action.

According to 40 CFR 81 Subpart D, no Class I visibility areas are located within 10 kilometers of WPAFB. The closest Federal Class I area is Mammoth Cave National Park in Kentucky, 320 kilometers to the south. Therefore, air emissions from the Proposed Action would not affect any Class I area.

The Proposed Action is projected to result in net emissions reductions for all pollutants. The maximum Proposed Action-related net emissions increases are below all General Conformity *de minimis* thresholds. As a result of the Proposed Action, there would be negligible impacts with an improvement in air quality over current conditions.

North Field LZ

Under the CHS Alternative Action in the East Coast Basing EA (Section 4.6.2.2; USAF 2005), it was concluded that the corresponding AQCR for North Field (AQCR 53) emissions were not considered to be regionally significant because the region was in attainment. Therefore, the General Conformity Rule was not applicable. Similarly, emissions from C-17 operations on the MTRs within the affected AQCR would not have been regionally significant.

Under the Proposed Action for this current EA, no construction or aircraft maintenance would occur at North Field. Air emissions would be primarily generated by aircraft. The additional C-17 operations at North Field proposed by the 445 AW would be within the number of average daily operations as well as the total annual operations analyzed in the East Coast Basing EA. Therefore, the Proposed Action would result in negligible impacts to air quality at the North Field LZ. Furthermore, an Air Conformity Determination would not be required.

4.3.3 No Action

The No Action alternative would have no adverse impact on air quality over the planned airfield operations.

4.4 Noise

4.4.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated quantitatively for both the No Action and the Proposed Action for the conditions expected in CY12 when the C-17 transition is complete and fully operational.

4.4.2 Proposed Action

Construction Program

Implementation of the Proposed Action would have minor, temporary effects on the noise environment near the project sites resulting from the use of heavy equipment for renovation/modification. The nearby facilities would experience muffled construction noise during the workday. However, noise generation would last only for the duration of renovation/modification activities, and could be reduced through the use of equipment exhaust mufflers and restriction of renovation/modification and demolition activities to normal working hours (between 7:00 a.m. and 5:00 p.m.).

Because the noise environment on Base and in the vicinity of WPAFB is dominated by military aircraft overflights, noise produced by renovation/modification and interior demolition activities would not affect

sensitive receptors on or off the Base. Noise associated with renovation/modification and interior demolition activities would be comparatively minor, and would occur in relatively remote areas of the Base.

Aircraft Operations

Noise is a principal concern associated with aircraft operations. The main issues concerning noise effects on humans are physiological effects such as hearing loss and non-auditory effects, behavioral effects such as speech or sleep interference and performance effects, and subjective effects such as annoyance. These issues are discussed in greater detail in **Appendix D**. Noise impacts would be considered adverse if increased noise levels resulted in land use incompatibility.

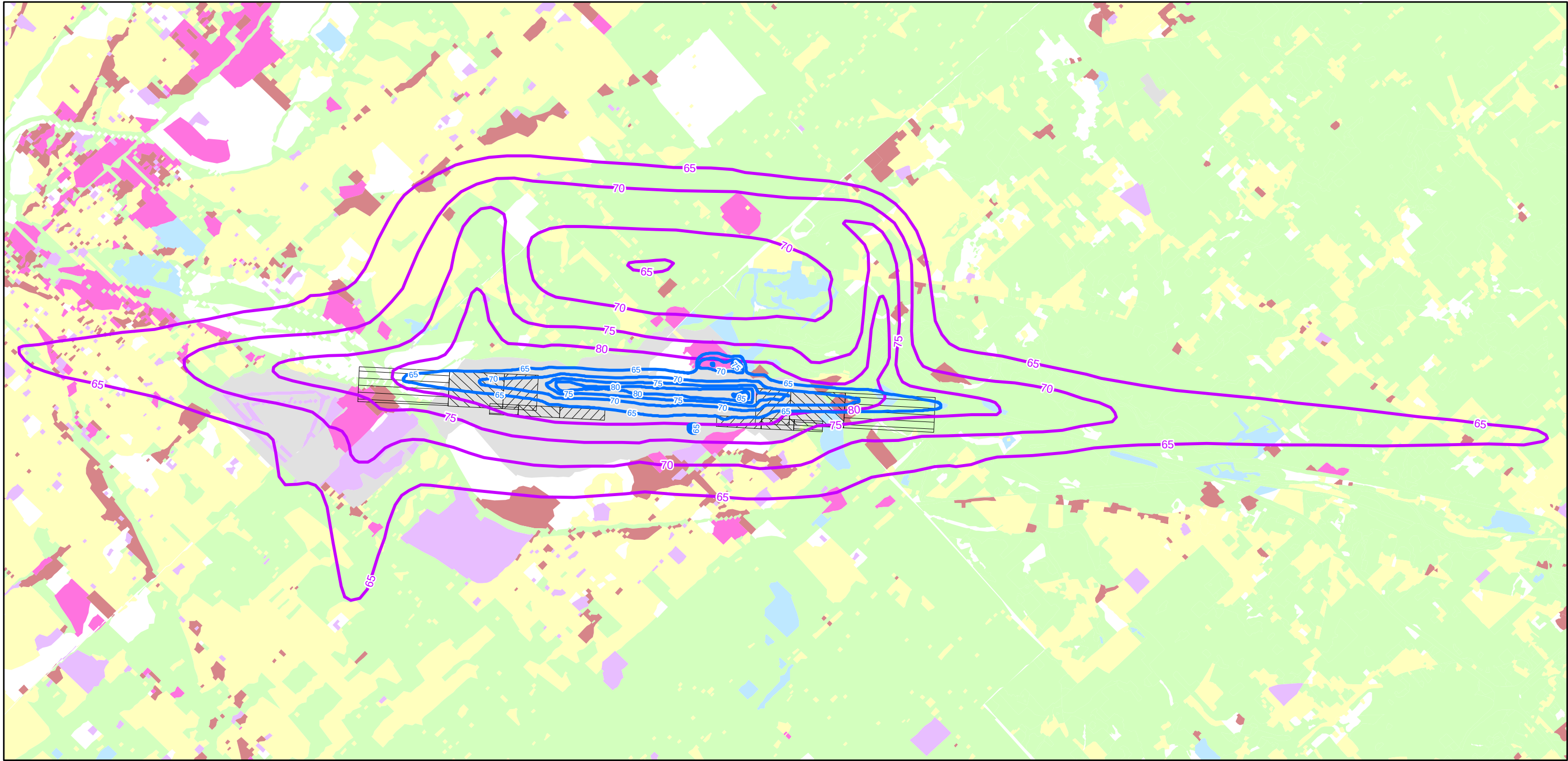
Under the Proposed Action, the number of C-5 airfield operations would be reduced to zero and the number of C-17 airfield operations would increase to 1,500 by CY12, which equates to a 14% reduction in airfield operations as compared to the CY10 C-5 mission plans. Review of the Proposed Action airfield operations showed that the conversion from C-5 to C-17 aircraft would not increase the footprint of WPAFB's Maximum Mission/Maximum Capacity Scenario Noise Contours. Generally there is a notable decrease in the amount of noise generated by the C-17 aircraft when compared to the C-5 (see **Table 3-2**). Consequently, the change in overall noise is due to the C-17 being a quieter aircraft as well as the decrease in airfield operations and varying flight profiles as compared to the Maximum Mission Scenario.

The area exposed to the noise levels of DNL 65 dBA or higher under the Proposed Action and Maximum Mission Noise Contours is summarized in **Table 4-3**. Due to the facts that the Maximum Mission Scenario accounted for maximum airfield operations including both the C-5 and C-17 operations and the Proposed Action would eliminate all C-5 airfield operations and is based on projected 2012 airfield operations, implementation of the Proposed Action would have a beneficial impact on the noise environment when compared to the Maximum Mission Scenario. **Figure 4-1** presents the Proposed Action and Maximum Mission Scenario Noise Contours with respect to land use. A street map of the area is provided in **Figure 4-2**.

Table 4-3. Proposed Action, No Action, and Maximum Mission/Maximum Mission Noise Contour Acreages in the Vicinity of WPAFB

Contour Value (DNL)	Maximum Mission (acres)	Proposed Action (acres)	No Action (acres)
65–69 dBA	10,028	905	3,701
70–74 dBA	6,800	442	1,475
75–79 dBA	2,856	199	756
80 + dBA	2,442	139	661
Total	22,126	1,685	6,633

Note: DNL = day-night average A-weighted sound level

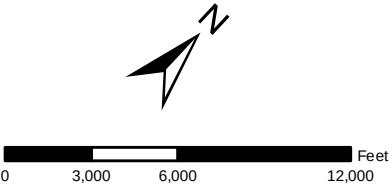


Legend:

- | | |
|---|---|
|  Proposed Action Noise Contours (C-17) |  Runway |
|  Maximum Mission DNL Noise Contours |  Clear Zones |
|  Residential |  APZ I |
|  Commercial |  APZ II |
|  Industrial | |
|  Institutional | |
|  Open Space | |
|  Vacant and Agricultural | |
|  Extractive | |
|  Airports | |
- Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

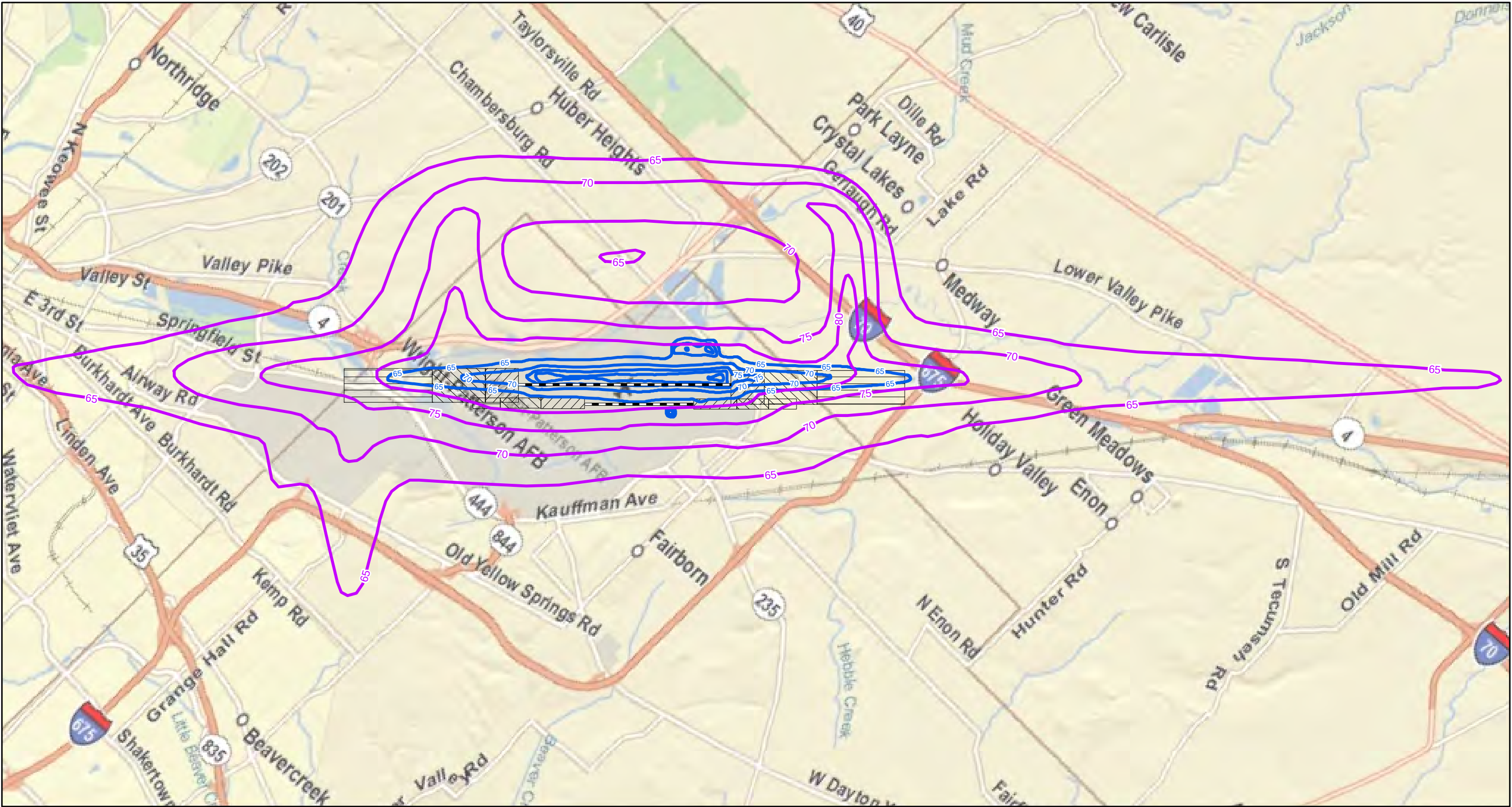
Source: 1995 AICUZ Study Maximum Mission

Source: Land Use - Ohio Department of Natural Resources
Montgomery County Land Use data; Miami County Land Use Data;
Clark County Land Use data; Greene County Land Use data.



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Figure 4-1
Existing Land Use and Proposed and
Maximum Mission Noise Contours

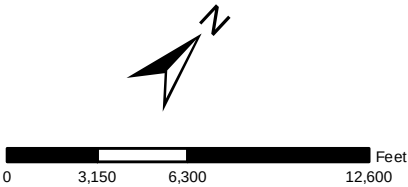


Legend:

- | | |
|--|---|
| — 1995 Maximum Mission Noise Contours |  Clear Zones |
| — C-17 Noise Contours |  APZ I |
|  Runway |  APZ II |

Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission
Source: Street Map-ESRI GIS server arcgisonline.com



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Figure 4-2
1995 Maximum Mission Contour vs.
the C-17 2012 Contour

1 North Field LZ

2 The East Coast Basing EA (Section 4.6.3.2; USAF 2005) concluded that the CHS Alternative Action
3 would have resulted in an estimated 15% increase in persons exposed to DNL 65 dBA and greater. The
4 density of residences in the newly exposed areas would have been consistent with adjacent residential
5 area exposure to aircraft noise under the baseline condition. It was anticipated that there would have been
6 a corresponding increase in the in the potential for sleep awakenings and speech disruption compared
7 with baseline condition. It was also concluded that noise from MTRs would not have exceeded the level
8 at which residential and other noise-sensitive land uses would be unacceptable.

9
10 Under the Proposed Action for this current EA, the additional C-17 operations at North Field proposed by
11 the 445 AW would be within the number of average daily operations as well as the total annual operations
12 analyzed in the East Coast Basing EA. Therefore, the Proposed Action would result in negligible impacts
13 to noise at the North Field LZ.

15 4.4.3 No Action

16 The No Action alternative assumes that the airfield operations would be similar to the current conditions.
17 Thus, the No Action alternative would have no adverse impact on noise quality over the planned airfield
18 operations. The area exposed to the noise levels of DNL 65 dBA or higher under the future No Action
19 and Proposed Action noise contours is shown in **Table 4-3**. As the comparison notes, the conversion to
20 C-17 aircraft in the Proposed Action results in substantial noise reductions as compared to the No Action
21 condition. Again, this is a result of the fact that the C-17 is a quieter aircraft than the C-5 as well as the
22 fact that its operational profile will generally result in reduced operational levels as compared to the C-5.
23 **Figure 4-3** presents the No Action and Proposed Action noise contours.

25 4.5 Geology and Soils

26 4.5.1 Evaluation Criteria

27 Protection of unique geological features, minimization of soil erosion, and the siting of facilities in
28 relation to potential geologic hazards are considered when evaluating potential impacts of a proposed
29 action on geological resources. Generally, impacts can be avoided or minimized if proper construction
30 techniques, erosion control measures, and structural engineering design are incorporated into project
31 development.

32
33 Analysis of potential impacts on geological resources typically includes the following steps:

- 34 • Identification and description of resources that could potentially be affected
- 35 • Examination of a proposed action and the potential impacts this action may have on the resource
- 36 • Assessment of the level of potential impacts
- 37 • Provision of mitigation measures in the event that potentially adverse impacts are identified

Effects on geology and soils would be adverse if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure or function within the environment.

4.5.2 Proposed Action

Short- and long-term impacts on geological resources are anticipated to be negligible as a result of the Proposed Action. Since proposed activities are limited to interior renovation/modification and minor demolition activities, there would be negligible soil disturbance.

The proposed C-17 operations at the North Field LZ would involve approaches and landings on the flight line. There would be no impacts to geology and soils.

4.5.3 No Action

The No Action alternative would have no adverse impact on geology and soils over current conditions.

4.6 Water Resources

4.6.1 Evaluation Criteria

Evaluation criteria for impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. The Proposed Action would be adverse if it does one or more of the following:

- Reduces water availability or supply to existing users
- Overdrafts groundwater basins
- Exceeds safe annual yield of water supply sources
- Affects water quality adversely
- Endangers public health by creating or worsening health hazard conditions
- Threatens or damages unique hydrologic characteristics
- Violates established laws or regulations adopted to protect water resources

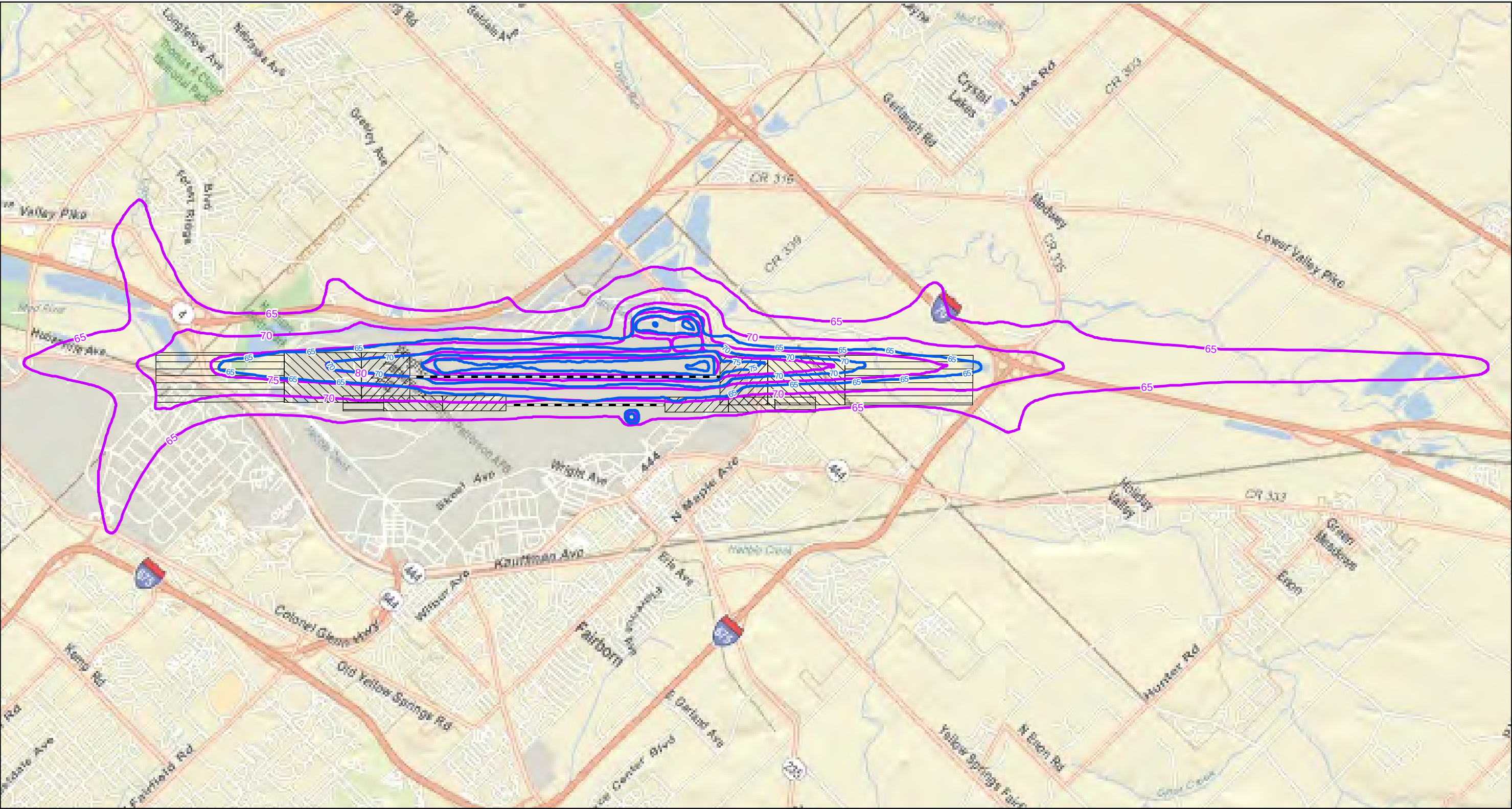
The effect of flood hazards on a proposed action is important if such an action is in an area with a high probability of flooding.

4.6.2 Proposed Action

Groundwater and Surface Water

The groundwater and surface water systems that surround WPAFB are closely interconnected. Runoff contaminants that might result from construction and aircraft operations that would impact surface water quality could also impact groundwater quality. Therefore, they are analyzed together.

Because interior renovation/modification activities at the West Ramp and Building 30152 would not involve land disturbance; therefore, sediment and erosion controls would not be necessary and a NPDES construction general permit through Ohio EPA would not be required. In addition, the Proposed Action

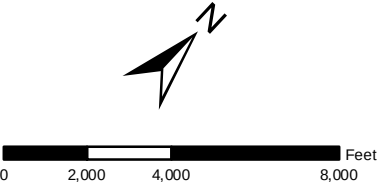


Legend:

	C17 2012 Scenario		Clear Zones
	No Action 2012 Contour		APZ I
	Runway		APZ II

Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission
Source: Street Map-ESRI GIS server arcgisonline.com



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Figure 4-3
C-5 Planned Mission Contour
vs. the C-17 Contour
Area Map

does not involve an increase in impervious surfaces on at West Ramp and runoff to airfield drainages flowing to the Mad River would not be increased from current conditions.

Aircraft operations under the Proposed Action are expected to decrease by 14% from CY10 to CY12 (see **Table 2-5**). Though the C-17 aircraft are slightly smaller than the C-5's, the operations and maintenance of the aircraft would not change drastically. If there are fewer operations of the C-17, there would be a slightly beneficial effect, if any, on groundwater and surface water quality. Proposed C-17 operations would involve the same types of hazardous materials that are already used at WPAFB with the C-5 aircraft, such as jet fuel (JP-8) or deicing fluid (propylene glycol).

Aircraft deicing could continue to be conducted on the West Ramp. The Base's NPDES Permit for storm water discharge became effective in October 2010. Under the provisions of the permit, the 445 AW collects deicing fluid with, a mobile vacuum unit (WPAPB 2010f).

Quantities of hazardous materials used would likely not increase due to the C-17 being a smaller aircraft. Refer to Section 4.13 for more detailed information regarding quantities of hazardous materials associated with the Proposed Action. Although the Proposed Action would not pose any new risks, minor adverse effects on groundwater and surface water would still be possible in the event of a spill as a result of aircraft operations. Management plans are in place for hazardous or harmful materials should a spill occur.

While the entire West Ramp is outside any wellhead protection areas, Building 30152 is within the projected 5-year travel time recharge area for the Area A/C Well Field (Tetra Tech 2007). The renovation/modification activities at Building 30152 are not anticipated to impact groundwater quality.

Floodplains

According to EO 11988, *Floodplain Management*, any new construction in the regulatory floodplain must apply accepted flood protection to reduce the risk of flood-associated damages; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Portions of the parking apron are in the 100-year floodplain; however, no modifications to the parking aprons at the West Ramp and Building 30152 are anticipated (**Table 2-3**) and the floodplain would not be affected (**Figure 4-4**). Because the modifications would be interior, construction/renovation activities would not involve loss or gain of soil in the retarding basin. Therefore, there would be negligible effects associated with the proposed construction projects.

As part of the IICEP process for this EA, WPAFB requested input from MCD on the Proposed Action. MCD reviewed the Proposed Action for renovation and modification of the interior of the maintenance and operations facilities. As most of the proposed development is located within the Huffman Retarding Basin, all development would be subject to building restrictions as set forth by MCD. The MCD concluded that the Proposed Action would have little impact on the retarding basin; however, if fill material

were to be placed anywhere on the property below a spillway elevation of 835.0 MSL, written approval would be required by MCD. Copies of correspondence with MCD are provided in **Appendix A**.

The current configuration of the West Ramp apron and aircraft maintenance buildings is in or adjacent to the 100-year floodplain. No additional, practical alternatives were identified that would meet the objectives of the Proposed Action. If the Proposed Action is pursued, the USAF will issue its findings in the FONSI/FONPA for this EA.

North Field LZ

No impacts to water resources were anticipated for the proposed activities in the East Coast Basing EA and, therefore, water resources were not analyzed in detail. This rationale is presented in Section 1.4.2 of the East Coast Basing EA (USAF 2005).

The proposed C-17 operations at the North Field LZ would involve approaches and landings at the airfield. There would be no impact on water resources.

4.6.3 No Action

The No Action alternative would have no adverse impact on water resources.

4.7 Biological Resources

Biological resources that could be impacted by the Proposed Action include vegetation, wildlife, threatened and endangered species, and wetlands.

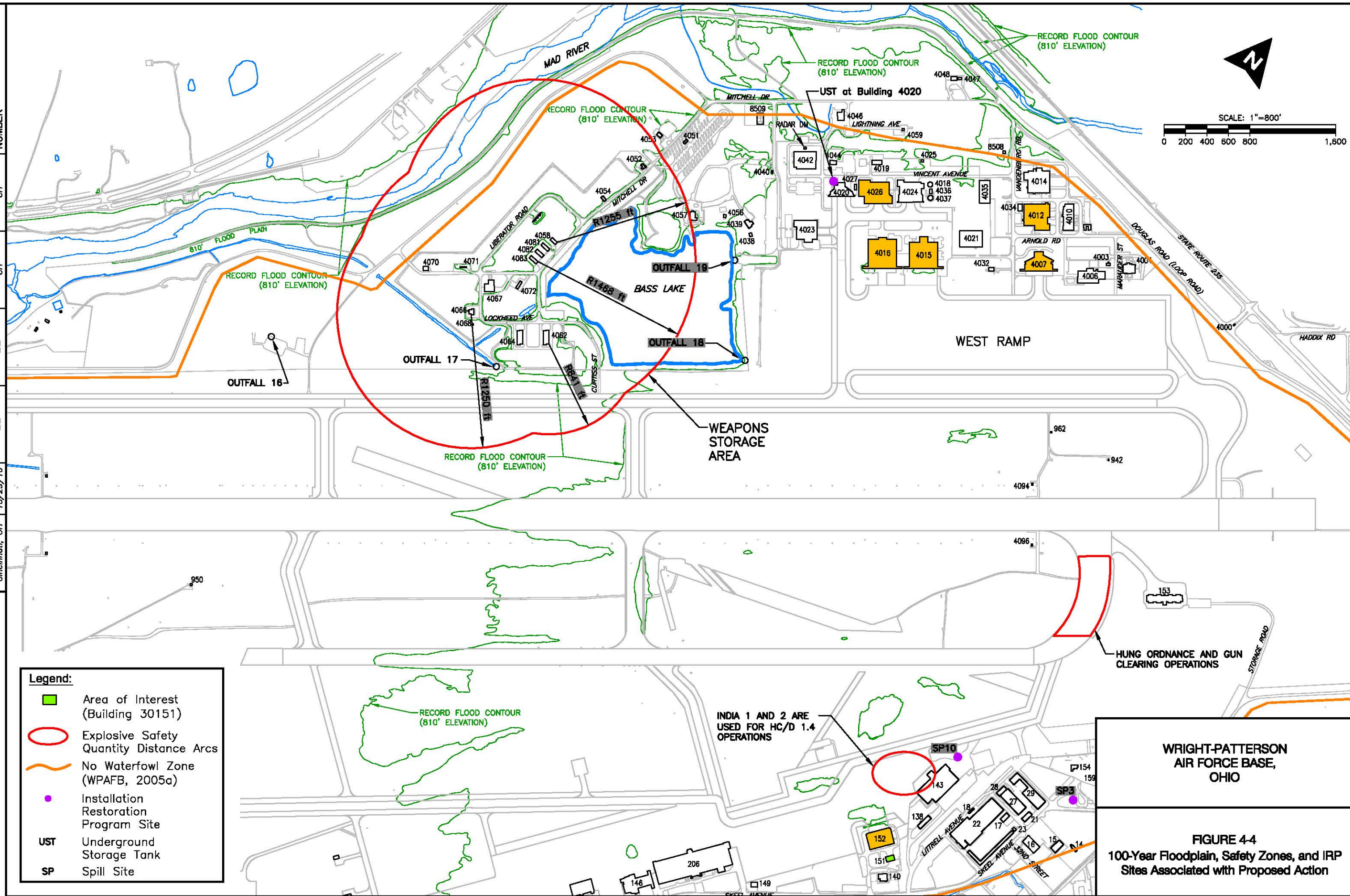
4.7.1 Evaluation Criteria

This section evaluates the potential impacts on the biological resources under the Proposed Action and the No Action Alternative. The level of impact on biological resources is based on:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- Proportion of the resource that would be affected relative to its occurrence in the region
- Sensitivity of the resource to the proposed activities
- Duration of ecological ramifications

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid “taking” threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with



USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

4.7.2 Proposed Action

WPAFB has been extensively altered over time and the project area is permanently disturbed with existing facilities and paved roads. Therefore, there would be no adverse effects on the biological resources resulting from implementation of the Proposed Action.

Based on the rationale presented in Section 1.4.2.4 of the East Coast Basing EA, biological resources were not analyzed in detail the EA (USAF 2005). No adverse impacts would have been anticipated.

Under the Proposed Action for this current EA, C-17 operations would consist of approaches and landings and would be limited to the flight line of the assault LZ. There would be no impacts over current conditions with respect to biological resources.

Vegetation

Proposed renovation/modification activities to support the beddown of the C-17 aircraft at WPAFB are primarily interior in nature and would occur solely within the improved areas of the Base. There are no naturally occurring vegetation communities within the ROI of the proposed activities. Land disturbing activities associated with renovation/modification and interior demolition are limited to lawn and landscaped areas. Affected areas would be mulched and revegetated with native plants following the construction and demolition period to prevent nonnative, invasive plant growth. Short-term, localized effects on vegetation could be expected in proximity to the construction and demolition sites. Therefore, negligible adverse effects on vegetation would be expected as a result of the implementation of the Proposed Action at WPAFB.

Wildlife

Wildlife habitat within the improved areas of the Base is limited due to fragmentation by the existing facilities, roads, and impervious surfaces at WPAFB. Furthermore, most of the area associated with the Proposed Action consists of disturbed, landscaped, paved, or mowed lands. Renovation/modification activities would not impact habitat available to the mammals, birds, or herptiles that occur at WPAFB. This assessment is based on the limited extent of areas that would be affected by the Proposed Action.

Potential effects on wildlife are also a function of noise produced by aircraft operations (see also Section 3.4.1). Predictors of wildlife response include prior experience with overflights, aircraft approach distance, stage in the breeding cycle, activity or context, age, and sex composition. Previous experience with similar overflights is the most important of these indicators. The rate of habituation to aircraft overflights is not known. However, the maximum sound level projected for the aircraft operations within all

of the training areas that are part of the Proposed Action would be less than current conditions (see Section 4.4). Therefore, no adverse effects on wildlife would be expected to result from the Proposed Action.

Threatened and Endangered Species

As previously mentioned, there are several Federal- and state-listed threatened or endangered species as well as species of concern, candidate species, and potentially threatened species that have the potential to occur in proximity to the proposed renovation/modification and interior demolition project area. Short-term noise created during renovation/modification and interior demolition activities to support the C-17 basing is not likely to affect threatened or endangered species due to the proximity of construction activities to these species.

No renovation/modification activities would occur within areas where threatened or endangered species have been documented or within their potential habitat. Therefore, there would be no effect on threatened or endangered species or species of concern, candidate species, and potentially threatened species as a result of the renovation/modification associated with the Proposed Action on WPAFB.

The foregoing observations concerning aircraft overflights apply equally to wildlife listed as threatened or endangered. Effects on threatened and endangered species as a result of the use of the C-17 within the study area would not be expected due to the decreased noise levels associated with the C-17 aircraft. The Proposed Action is not likely to jeopardize the continued existence of Federal- or state-listed threatened and endangered species on or in proximity to WPAFB.

No adverse effects on threatened and endangered species would be expected as a result of the Proposed Action at WPAFB. Correspondence from the USFWS states that there are no Federal wilderness areas, wildlife areas, wildlife refuges or designated critical habitat within the vicinity of the project area. With respect to threatened and endangered species, USFWS would not anticipate any impact on federally-listed endangered, threatened, and candidate species, or their habitats due to the project type, sized, and location. Based on the information provided, USFWS had no objection to the proposed project. Correspondence with USFWS is included in **Appendix A**.

Wetlands

Renovation/modification activities at WPAFB would not occur within the vicinity of the jurisdictional wetlands identified on the Base. Therefore, no effects on wetlands are expected at WPAFB as a result of the Proposed Action.

4.7.3 No Action

The No Action alternative would have no adverse impact on biological resources.

4.8 Cultural Resources

4.8.1 Evaluation Criteria

Adverse impacts on cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sell, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

4.8.2 Proposed Action

Building 30152 is the only one of the structures affected by renovation/modification associated with the Proposed Action that is considered eligible for the NRHP. The extent of the changes to the original APE have been discussed in verbal consultation with SHPO (WPAFB 2010d). As part of the SHPO coordination for the C-5 conversion (WPAFB 2004), it was identified that the only impact the changes would have on historic properties would occur in Building 30152. These changes were minor in scope and did not affect the historic fabric of the building. Similarly, modifications to the interior of the building for the C-17 conversion would be necessary to accommodate the C-17 simulator; however, the proposed changes to the facility amount to minor interior alterations of non-original walls and fixtures, and do not affect historic property. The Cultural Resources Program Manager (88 ABW/CEANQ) has determined that the proposed changes to the facility do not have the potential for adverse effects on the facility. Therefore, according to 36 CFR 800.3(a)(1), WPAFB has notified SHPO of a finding of no adverse effect to the historic property and has allowed SHPO the opportunity to comment. Correspondence with the SHPO is included in sections in **Appendix A**.

The most relevant impacts on cultural resources at WPAFB would be related to the direct impacts from building alteration and ground-disturbing activities. The construction/renovation activities would involve interior modifications and no other ground-disturbing activity would occur as a result of the Proposed Action. There are no known potential prehistoric or historic site locations in the areas where ground-disturbing activities are planned. The areas are not considered to have a high sensitivity for cultural resources. Furthermore, the area has been heavily disturbed in the past. Therefore, no impacts to cultural resources are expected to occur under the proposed action. In the event that cultural items are encountered during project activities, work would cease immediately and the Cultural Resources Program Manager (88 ABW/CEANQ) would be contacted to assess the items.

There is no potential for degradation of the setting from noise and visual intrusion related to the renovation/modification activities or aircraft operations proposed in this EA, nor are there potential for structural damage from noise and low-frequency sound vibrations associated with the renovation/modification activities or aircraft operations. Noise levels would not exceed a level of 127 dBA, at which damage could be expected (USAF 2005).

No NRHP-eligible or potentially eligible districts or landscapes are within the APE for the Proposed Action. Therefore, historic districts or landscapes would not be affected by the Proposed Action.

North Field LZ

As stated in Sections 1.4.2.4 and 4.6.7 of the East Coast Basing EA (USAF 2005), no structures or sites eligible for the NRHP or other formal recognition were identified. In addition, no adverse effects to archaeological or historic features would have been anticipated because the maximum sound produced by the C-17 while flying over MTRs would not have exceeded the minimum level of 127 dBA, at which damage could be expected.

Under the Proposed Action for this current EA, no construction or ground disturbance would take place at North Field. The C-17 operations would consist of approaches and landings and would be limited to the flight line at the assault LZ. There would be no impacts to cultural resources.

4.8.3 No Action

The No Action alternative would have no adverse impact on cultural resources.

4.9 Socioeconomics

4.9.1 Evaluation Criteria

Elements of the Proposed Action include six construction/renovation projects (see **Table 2-3**) and changes in the number of military, USAF civilian, and contractor personnel. The level of construction expenditure impacts is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions might be unnoticed in an urban area, but might have adverse impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered adverse.

This section identifies potential economic and social impacts that might result from the Proposed Action. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DOD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach. The EIFS assesses potential impacts on four principal indicators of regional economic impact: business volume, employment, personal income, and population. As a “first tier” approximation of effects and their significance, these four indicators have proven very effective. The methodology for social impacts is based on the Guidelines and Principles for Social Impact Assessment, developed by an inter-organizational committee of experts in their field (NOAA 1994).

The Proposed Action at WPAFB would have an adverse impact with respect to the socioeconomic conditions in the surrounding MSA if it would:

- Change the local business volume, employment, personal income, or population that exceeds the MSA's historical annual change; and/or
- Negatively affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates.

4.9.2 Proposed Action

Aircraft operation activities already exist at WPAFB and the Proposed Action involves the net loss of 152 personnel. The reduced personnel necessary to support the C-17 aircraft operations would decrease the amount of personnel by less than one percent. Therefore, the decreased number of personnel at WPAFB resulting from the Proposed Action is expected to have a negligible effect on the local workforce.

Construction/renovation costs associated with the Proposed Action are estimated to be \$1.5 million through CY12, which would have a minor, beneficial impact on the local economy. Construction workers would primarily be drawn from the local workforce, resulting in a short-term, beneficial direct impact on the local economy. Census data for the MSA found 24,578 employees working in the construction industry in 2000 (Bureau of Census 2000a). The number of construction workers required for the proposed construction projects is very small compared to the available work force in the MSA, and would not impact local employment.

Indirect effects are expected to be short-term and beneficial to local employment and the local economy. The Proposed Action would have no permanent or long-term effects on employment, population, personal income, poverty levels, or other demographic or employment indicators in the Dayton–Springfield MSA. The Proposed Action does not involve changes in land use or new development; therefore, no impacts on social conditions are anticipated.

In addition, EO 13045 requires that Federal agencies identify and assess environmental health and safety risks that might disproportionately affect children. The Proposed Action would not likely pose any adverse or disproportionate environmental health or safety risks to children living in the vicinity of the Base. The likelihood of the presence of children at the site where the Proposed Action would occur on Base is considered minimal, which further limits the potential for effects. Therefore, no adverse effects would be expected.

North Field LZ

Under the Proposed Action for this current EA, C-17 operations would consist of approaches and landings and would be limited to the surface of the assault LZ. There would be no impacts to socioeconomics in the vicinity of North Field.

4.9.3 No Action

Under the No Action Alternative, the 445 AW would continue to fly the C-5 aircraft and aircraft operations would be similar to those programmed for the existing C-5 mission. There would be no impact upon socioeconomics over current conditions.

4.10 Environmental Justice

4.10.1 Evaluation Criteria

This section evaluates environmental justice concerns to include disproportionate impacts on low-income or minority populations. The Proposed Action at WPAFB would have an adverse impact with respect to environmental justice in the surrounding MSA if it would disproportionately impact minority populations or low-income populations.

4.10.2 Proposed Action

As discussed in Section 3.10.1, the USAF has issued guidance on Environmental Justice analysis. To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to state and national statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action. The review indicates that residents living within Census Bureau Tracts 2001, 2002, and 2007 have a lower per capita income, a higher unemployment rate, and a higher percentage of residents living below the poverty level than county or state averages (Bureau of Census 2000a). The review also indicates that the percentage of minority residents is somewhat higher than county or state averages.

Potential adverse effects from the new renovation/modification activities would occur on the Base, with no adverse effects anticipated off-base. The environment around WPAFB is influenced by USAF operations, land management practices, vehicle traffic, and emissions sources outside the Base. Increased traffic from temporary renovation/modification activities would affect local air quality, but these short-term effects would be dispersed and affect area residents and base employees equally. The renovation/modification projects would be performed by outside contractors with employees living within Greene County and the ROI. Long-term economic benefits would be minimal since the Proposed Action would require 152 less personnel at WPAFB.

No disproportionate short- or long-term effects on minority or low-income populations from the Proposed Action are anticipated.

North Field LZ

As stated in the FONSI for the East Coast Basing EA (USAF 2005), none of the alternatives were found to have adverse environmental effects on adjacent populations. Therefore, no disproportionately high and adverse effects would have occurred to minority and/or lower-income populations. Under the Proposed

Action for this current EA, C-17 operations would consist of approaches and landings and would be limited to the flight line of the assault LZ. There would be no disproportionate impacts to on minority or low-income populations in the vicinity of North Field.

4.10.3 No Action

Under the No Action Alternative, the 445 AW would continue to fly the C-5 aircraft and aircraft operations would be similar to those programmed for the existing C-5 mission. The No Action Alternative would have no adverse impact over current conditions with respect to environmental justice.

4.11 Infrastructure

4.11.1 Evaluation Criteria

Impacts on infrastructure are evaluated for their potential to disrupt or improve existing levels of service and additional needs for energy and water consumption, sanitary sewer systems, and transportation patterns and circulation. Impacts might arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to Base activities.

4.11.2 Proposed Action

Transportation Systems

There would be a temporary increase in use of the Base's roadways as a result of construction traffic. Construction equipment would be driven to the project locations and would be kept on site during the duration of the project. All damaged base transportation infrastructure from construction activities on the Base would be repaired.

The number of personnel supporting the C-17 mission would decrease as a result of the Proposed Action. The Proposed Action involves the net loss of 152 personnel. The reduced personnel necessary to support the C-17 aircraft operations would decrease the amount of personnel by less than one percent, which is minor in comparison to the approximately 27,406 personnel currently working at WPAFB. Therefore, negligible effects on transportation systems would be expected under the Proposed Action.

Electrical Power

The Proposed Action would result in a negligible, if any, net change in the electrical power system. Therefore, negligible effects on the electrical power would be expected under the Proposed Action.

Natural Gas

The Proposed Action would result in a negligible, if any, net change in the natural gas system. Therefore, negligible effects on natural gas demand would occur as a result of the Proposed Action.

Liquid Fuels

Under the Proposed Action, the liquid fuels system would be unchanged to accommodate the C-17 aircraft. Motorized equipment and vehicle operations are estimated to remain nearly unchanged under the Proposed Action. Therefore, there would be negligible effects on the liquid fuels system as a result of the Proposed Action.

Water Supply

The Proposed Action would result in a net decrease of personnel and use of the water supply system. However, this would be a negligible decrease in the demand for water. Therefore, there would be no adverse effects on the water supply system as a result of the Proposed Action.

Pollution Prevention

It is anticipated that the Proposed Action would not affect the Pollution Prevention Program at WPAFB. Quantities of hazardous material and chemical purchases, off-Base transport of hazardous waste, disposal of MSW, and energy consumption would continue. Operation of the C-17 aircraft at WPAFB would require procurement of products containing hazardous materials, generation of hazardous waste, and consumption of energy consistent with the operation of the C-5 aircraft (refer to Section 4.13.2 for further information on quantities of hazardous materials at WPAFB).

Solid Waste

In considering the basis for evaluating the level of impacts on solid waste, several items are considered. These items include evaluating the degree to which the proposed construction/renovation projects would affect the existing solid waste management program and capacity of the area landfill.

Solid waste generated from the proposed construction activities would consist of building materials such as solid pieces of concrete, metals (conduit, piping, and wiring), and lumber. Contractors are required to recycle construction and demolition waste to the greatest extent possible as part of Base policy, and any recycled construction and demolition waste would be diverted from landfills.

Long-term changes in solid waste generation due to the operation of the renovated facilities and the decrease in personnel would be minor. Therefore, the Proposed Action would have a minor, adverse impact on the solid waste management program at WPAFB.

Sanitary Sewer and Wastewater Systems

The Proposed Action would result in a net change in the use of the sanitary sewer system due to the decrease in personnel. However, this would be a negligible decrease in future use of the sanitary sewer system. Deicing fluid is collected by 445 AW via a mobile vacuum truck; therefore, the discharge from the West Ramp to the Fairborn treatment plant would be negligible. Therefore, no impacts on the sanitary sewer system would result because of the Proposed Action.

Heating and Cooling

The Proposed Action would not result in a net change in heating and cooling systems usage. Therefore, no adverse impacts on heating and cooling systems would result from the Proposed Action.

Communications

The Proposed Action would not result in a net change in communications systems. Therefore, no adverse impacts on the communications system would result from the Proposed Action.

North Field LZ

Under the Proposed Action for this current EA, C-17 operations would consist of approaches and landings and would be limited to the flight line of the assault LZ. There would be negligible impacts over current conditions.

4.11.3 No Action

Under the No Action Alternative, there would be no change in baseline conditions and none of the proposed construction projects would occur. Therefore, there would be no impact on WPAFB's infrastructure.

4.12 Safety

4.12.1 Evaluation Criteria

Potential impacts were assessed based on direct effects from aircraft crashes (i.e., damage to aircraft and points of impact), as well as secondary effects, such as fire and environmental contamination. The extent of these secondary effects is situationally dependent and difficult to quantify. For example, there would be a higher risk of fire from aircraft crashes in highly vegetated areas during a hot, dry summer than would be the case if the mishap occurred in a rocky, barren area during the winter. As stated in Section 3.12.1, historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft.

4.12.2 Proposed Action

Fire Hazards and Public Safety

No effects regarding fire hazards or public safety would be expected to occur on Base from renovation/modification projects planned as part of the Proposed Action.

Aircraft Safety

Negligible adverse effects would be expected as a result of the Proposed Action. Historical data on C-17 mishaps are presented in **Table 4-4**, which provides statistics from the past 10 years as well as for the overall lifetime of the aircraft from the beginning of the operation of the aircraft in FY91. For the C-17

aircraft, the rate of Class A mishaps per 100,000 hours of flight time is approximately 1.29 and the rate of Class B mishaps is approximately 2.96 mishaps per 100,000 hours of flight time (AFSC 2009b). This rate is compared with C-5 aircraft Class A mishaps (approximately 1.04 mishaps per 100,000 hours of flight time for Class A and approximately 3.02 mishaps per 100,000 hours of flight time for Class B—refer to **Table 3-6** in Section 3.12.2). The 445 AW estimates that the C-17 would fly approximately 6,600 hours per year, with 4,400 hours attributable to missions and 2,200 hours for training. The potential for mishaps would be less than current conditions because some of the C-17 training would be conducted in the simulator.

Table 4-4. Historical Data on C-17 Mishaps (FY91 – FY09)

Year	Class A		Class B		Fatal		Hours Flown	Cumulative Hours ²
	No.	Rate ¹	No.	Rate ¹	Pilot	All		
FY00	0	0.00	3	5.13	0	0	58,423	224,478
FY01	0	0.00	3	3.70	0	0	81,072	305,550
FY02	2	1.82	10	9.10	0	0	109,878	415,428
FY03	1	0.63	7	4.38	0	0	159,836	575,264
FY04	3	1.92	3	1.92	0	0	156,297	731,561
FY05	6	3.80	9	5.71	0	0	157,753	889,314
FY06	2	1.26	1	0.63	0	0	158,855	1,048,169
FY07	2	1.13	2	1.13	0	0	177,297	1,225,466
FY08	0	0.00	5	2.74	0	0	182,635	1,408,101
FY09	2	0.93	3	1.40	0	0	214,105	1,622,206
Lifetime²	21	1.29	48	2.96	0	0	1,622,206	

Source: AFSC 2009b

Notes:

¹ Rate of mishap per 100,000 hours flown.

² Statistics from the last 10 years are shown. Cumulative hours represent lifetime mishap record totals from the beginning of C-17 operations (FY91) to present.

The Proposed Action would also result in a decrease in the total number of aircraft operations by approximately 14%. Therefore, no adverse effects would be expected as a result of the Proposed Action.

Bird/Wildlife-Aircraft Strike Hazard

Because there are currently no bird strike statistics for the C-17 at WPAFB, statistics from C-17s at March Air Reserve Base (ARB) were obtained. The flight operations for C-17 at March ARB are similar to those expected to be conducted at WPAFB. In addition, both bases are in proximity to flyways for migratory birds. WPAFB is near the Mississippi Flyway while March ARB is near the Pacific Flyway. During the period from January 2006 through October 2010, March ARB reported 48 bird strikes for C-17 aircraft. WPAFB recorded a similar number of bird strikes (51) for the C-5 aircraft during the same period (WPAFB 2010h).

Continued adherence to the WPAFB BASH Plan would decrease the potential for bird/wildlife-aircraft strikes. Aircraft operations at WPAFB would decrease with implementation of the Proposed Action,

1 which would also reduce the likelihood of a bird/wildlife-aircraft strike. Therefore, no adverse effects
2 would be expected as a result of the Proposed Action.

3 4 **Explosive Safety Zones**

5 No effects on ESZs would occur as a result of the proposed construction/renovation projects because
6 these activities would only involve the interiors of the facilities. The other safety zones indicated on
7 **Figure 4-4** (encircling the west ramp and the flight simulator parking aprons) are the ESQD arcs for areas
8 used to unload and transport munitions. Because the operation of C-17s on the West Ramp would be
9 similar to those of the C-5 aircraft, there would be no impact on the ESZs. Therefore, no effects on ESZs
10 would occur as a result of the Proposed Action.

11 12 **Construction Safety**

13 Minor adverse effects would be expected. Implementation of the Proposed Action would slightly
14 increase the short-term risk associated with construction contractors performing work at WPAFB during
15 the normal work day because of the increase in construction activities. Contractors would be required to
16 establish and maintain safety programs, and adhere to SOPs. Projects associated with the Proposed
17 Action would not pose a safety risk to base personnel or to activities at the Base. Proposed
18 construction/renovation projects would enable the 445 AW to meet future mission objectives at the Base,
19 and conduct or meet mission requirements in a safe operating environment. Therefore, no effects would
20 occur as a result of the Proposed Action due to safeguards existing to protect personnel .

21 22 **Large Aircraft Infrared Countermeasures (LAIRCM)**

23 The LAIRCM system is a countermeasure to protect large aircraft from man-portable missiles. The C-17
24 aircraft are equipped with the LAIRCM system, which employs Class 4 lasers mounted in pointer-tracker
25 turret assemblies. The 445 AW would address and identify the processes that would be performed with
26 the LAIRCM laser systems, such as how many persons would be involved, how often the inspection
27 process would performed, the location to be designated for testing, maintenance, and inspection (WPAFB
28 2010l). Therefore, the 445 AW would develop written procedures for training and maintenance
29 procedures. There would be no adverse impacts on safety because SOPs would be in place and
30 safeguards would protect personnel from exposures.

31 32 **North Field LZ**

33 Aircraft safety was analyzed in Section 4.6.10.4 of the East Coast Basing EA (USAF 2005) and is
34 incorporated by reference in this current EA. It was concluded that the probability would have been low
35 that an aircraft involved in an accident at or around CHS airfield or on a MTR would strike a person or
36 structure on the ground. To evaluate BASH, estimated flying time and the Air Force-wide rate of
37 0.052 strike per flying hour were used to calculate an anticipated rate of three bird-aircraft strikes per year
38 from MTR operations. It was considered unlikely that any of these bird-aircraft strike incidents would

1 result in an aircraft accident, involve injury either to air crews or the public, or damage property other
2 than the aircraft.

3
4 Under the Proposed Action for this current EA, C-17 operations would consist of approaches and
5 landings and would be limited to the MTRs and assault LZ. There would be fewer C-17 operations at
6 North Field than the number of operations analyzed in the East Coast Basing EA. In addition, there has
7 not been an increasing trend in bird-aircraft strikes at North Field, nor have there been apparent changes
8 in migratory bird patterns (CHS 2010b). Therefore, the potential for adverse impacts due to air mishaps
9 and BASH issues would be negligible.

10
11 The LAIRCM system is intended to be utilized during operational missions rather than training activities.
12 In addition, testing and maintenance of the laser and associated equipment would not be conducted at the
13 LZ. Therefore, there would be no impacts associated with LAIRCM at the LZ.

14 15 **4.12.3 No Action**

16 The No Action alternative would have no adverse impact on safety at WPAFB.

17 18 **4.13 Hazardous Materials and Wastes**

19 **4.13.1 Evaluation Criteria**

20 Impacts to hazardous material management would be considered adverse if the Federal action resulted in
21 noncompliance with applicable Federal and state regulations, or increased the amounts generated or
22 procured beyond current WPAFB waste management procedures and capacities.

23
24 Impacts on pollution prevention would be considered adverse if the Federal action resulted in worker,
25 resident, or visitor exposure to these materials, or if the action generated quantities of these materials
26 beyond the capability of current management procedures. Impacts on the ERP would be considered
27 adverse if the Federal action disturbed (or created) contaminated sites resulting in negative effects on
28 human health or the environment. Impacts on fuels management would be adverse if the established
29 management policies, procedures, and handling capacities could not accommodate the activities
30 associated with the Proposed Action.

31 32 **4.13.2 Proposed Action**

33 **Hazardous Materials**

34 Products containing hazardous materials would be procured and used during the proposed renova-
35 tion/modification projects and subsequent operation of the C-17 aircraft. It is anticipated that the quantity
36 of products containing hazardous materials used during the renovation/modification of Base facilities
37 would be minimal and their use would be of short duration. Contractors would be responsible for the
38 management of hazardous materials, which would be handled in accordance with Federal and state

1 regulations. Therefore, hazardous materials management at WPAFB would not be impacted by the
2 proposed renovation/modification activities.

3
4 Should the proposed basing of C-17 aircraft occur at WPAFB, it is anticipated that procurement of
5 products containing hazardous materials would be comparable to those used for the C-5 due to the
6 similarity of the maintenance and support activities for the two aircraft. Additionally, the proposed
7 number of C-17 aircraft is less than the number of C-5 aircraft that are being retired or transferred from
8 WPAFB and the C-17 has slightly less surface area. Therefore, it is estimated that hazardous material
9 procurement would remain comparable to the current condition. USAF is pursuing aircraft maintenance
10 procedures that would use fewer hazardous materials. As the procedures are developed, it is likely that
11 the quantity of hazardous materials required for C-17 maintenance activities would decrease. Therefore,
12 there would be no impact on hazardous materials management from C-17 operations at WPAFB.

13 14 **Hazardous Wastes**

15 It is anticipated that the quantity of hazardous wastes generated from proposed renovation/modification
16 activities would be negligible. Contractors would be responsible for the disposal of hazardous wastes in
17 accordance with Federal and state laws and regulations. Construction of the proposed facilities would not
18 impact the Base's hazardous waste management program.

19
20 The number of C-17 aircraft that would operate under the Proposed Action would be less than the
21 baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of
22 hazardous wastes associated with the Proposed Action would be similar in nature with the baseline
23 condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled
24 in accordance with the WPAFB Hazardous Waste Management Plan. If fewer hazardous materials are
25 used for C-17 aircraft maintenance, the quantity of hazardous wastes generated would decrease.
26 Therefore, it is anticipated that the Proposed Action would result in minor adverse impacts to hazardous
27 materials at WPAFB.

28 29 **Asbestos-Containing Material and Lead-Based Paint**

30 Specifications for the proposed renovation/modification activities and USAF regulations prohibit the use
31 of ACM and LBP for new construction. Some of the facilities (Buildings 30152, 34012, and 34026) to be
32 modified as part of the proposed project area of the 445 AW may contain ACM and/or LBP. Interior
33 demolition and modification activities would be handled in accordance with the Asbestos Management
34 Plan, LBP Management Plan, and USAF policy. The potential for adverse impacts would be minor.

35 36 **Environmental Restoration Program**

37 Five of the six building renovation and construction projects would be located within OU11 (**Figure 4-4**).
38 In 1996, a field investigation showed no significant risk in OU11 and, in September 1998, a ROD for no
39 further action was signed (WPAFB 1998). Because the renovation and construction projects would not be

conducted outside buildings or involve soil disturbance, there would be no effects on OU 11. The Flight Simulator Facility (Building 30152) is located within OU2. The closest IRP sites to Building 30152 are Spill Sites 3 and 10 (**Figure 4-4**). The ROD for Spill Sites 2, 3, and 10 (WPAFB 1997) specified monitored natural attenuation as the selected remedy for these sites. The wastes reported for Spill Sites 2, 3, and 10 included benzene, toluene, ethylbenzene, and xylene; jet petroleum; and other hydrocarbons. Currently, at Spill Sites 2, 3, and 10, groundwater and soil gas are monitored under the Basewide Monitoring Program/Long Term Monitoring (BMP/LTM) Program. The renovation at Building 30152 would not occur near Spill Sites 3 and 10.

A Focused Facility Investigation is currently being conducted at Building 30151 to determine the extent of petroleum hydrocarbon contamination in the soil and groundwater. Building 30151 is located immediately southeast of Building 30152 (Figure 3.1-2). The release of petroleum hydrocarbon product including jet fuel and possibly motor vehicle gas occurred at an oil/water separator coupling just outside the north wall of Building 30151. Initial results from this investigation indicate that the extent of contamination is limited to the vicinity of the northeast and northwest sides of Building 30151 (WPAFB 1997). Because modifications to Building 30152 would be interior, there would be no adverse impacts anticipated to Building 30151 or the surrounding area.

North Field LZ

Under the Proposed Action for this current EA, C-17 operations would consist of approaches and landings and would be limited to the flight line at the assault LZ. There would be negligible impacts to hazardous materials and hazardous wastes over current conditions at North Field.

4.13.3 No Action

The No Action alternative would have no adverse impact on hazardous materials storage and waste generation.

Under the No Action Alternative, hazardous waste generation would be similar to the existing rate of generation. In addition, procurement of products containing hazardous materials would be similar to the existing rate of procurement due to the current C-5 aircraft operations remaining similar to those programmed for the existing C-5 mission.

4.14 Cumulative Impacts

The CEQ regulations (40 CFR 1508.7) require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that

are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

Projects proposed for the reasonably foreseeable future that are relevant to the project area include the ancillary projects for 445 AW facilities at WPAFB, listed below.

Overlay Hangar Parking Area – Proposed plans include removing damaged concrete, providing asphalt overlay, and restriping the parking area.

Convert Sprinklers to Wet Pipe in Buildings F/34007, F/34016, and F/34015 – Proposed activities consist of converting existing sprinkler system from pre-action to wet pipe.

Construct Composites Workroom in Building F/34026– Proposed project consists of modifying the interior of existing shop facility (F34026) by (1) installing a prefabricated clean room with a self-contained heating, ventilation, and air conditioning (HVAC) system; (2) providing lighting, power and oil-free dry nitrogen; and (3) providing a 12-ft by 12-ft roll-up door.

Renovate Building F/34066 – This project proposes to renovate existing Facility 34066, a former munitions shop, for assembly of replaceable countermeasure flare kits. Proposed activities include replacing doors and install low slope curbs at rolling doors; installing and replacing various lights and lighting fixtures; replacing explosion-proof receptacles; cleaning and painting restrooms and office area; and replacing a rain gutter.

Maintain Finishes at Wing HQ in Building F/34010 – Proposed project includes replacing carpet and repainting walls.

Maintain Finishes at Wing HQ in Building F/34012 – Proposed project includes replacing carpet.

Repair Roof in Building F/34024 – Proposed project includes replacing the roof with standing seam metal roof including cross supports onto existing rafters; and installing underground drains for downspouts, including surface drains to divert rainwater.

These projects, should they be constructed as anticipated, are not expected to result in any cumulative impacts associated with the Proposed Action.

In addition, two proposed projects could occur in Area C. First, the proposed replacement of the primary runway in Area C would occur in the project area. The expansion of easements associated with the glide-slope corridor would also be evaluated. Potential cumulative impacts on C-17 operations would depend upon the timetable for implementation. Second, an EIS is being prepared to evaluate impacts associated with the proposed reconfiguration of Entry Control Points at Gates 15A, 1C, and 26C, and changes to

1 traffic flow in SR 444. This project would not be expected to impact the facility modifications or
2 operation of the C-17s.

4.15 Unavoidable Adverse Effects

5 Unavoidable adverse impacts would result from implementation of the Proposed Action.

7 **Noise.** The noise resulting from anticipated aircraft operations is an unavoidable condition; however, the
8 C-17 is a slightly smaller, quieter aircraft than the C-5. Although aircraft noise would continue under the
9 Proposed Action, the noise would decrease with the operation of the C-17 aircraft. Noise is not
10 considered an adverse impact.

12 **Safety.** The potential for aircraft mishaps, the potential for accidents or spills at the fuel storage facility,
13 and the generation of hazardous wastes are unavoidable conditions associated with the Proposed Action.
14 However, the potential for these unavoidable situations would not increase over baseline conditions.

16 **Energy.** The use of nonrenewable resources is an unavoidable occurrence, although this use is negligible
17 compared with total use of energy. The Proposed Action would require the use of fossil fuels, a
18 nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the
19 Proposed Action or No Action alternative.

4.16 Relationship of Short-Term Uses and Long-Term Productivity

22 Short-term uses of the biophysical components of man's environment include direct construction-related
23 disturbances and direct impacts associated with an increase in population and activity that occur over a
24 period of less than five years. Long-term uses of human environment include those impacts occurring
25 over a period of more than five years, including permanent resource loss.

27 The Proposed Action would not result in intensification of land use at WPAFB or the surrounding area.
28 Development of the Proposed Action would not represent a loss of open space. Therefore, it is
29 anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts.
30 Long-term productivity of this site would be increased by the implementation of the Proposed Action.

32 In the short-term, the conversion to C-17 aircraft would enhance the 445 AW mission capabilities as well
33 as increasing efficiency by improving reliability, reducing maintenance and decreasing fuel consumption.
34 The Proposed Action would result in long-term productivity because the conversion to the C-17 aircraft
35 would sustain the 445 AW airlift mission.

4.17 Irreversible and Irretrievable Commitments of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals).

Material Resources. Material resources used for the Proposed Action include building materials (for construction of facilities), concrete and asphalt (for roads), and various material supplies (for infrastructure). Most of the materials that would be consumed are not in short supply and would not limit other unrelated construction activities.

Energy Resources. Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products, such as gasoline, jet fuel, diesel, natural gas, and electricity. During construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place an overburdening demand on their availability in the region.

Human Resources. The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial.

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5.0 LIST OF PREPARERS

This EA has been prepared under the direction of the 88 ABW/CEANQ. The individuals who contributed to the preparation of this document are listed below.

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6.0 LIST OF PERSONS CONTACTED

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John Lynch	North Field Site Manager	Glacier Tech, LLC
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Paul Woodruff	Cultural Resources Program Manager	88 ABW/CEANQ

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WPAFB 2010b	Personal communication between Lt. Col. David Marlin (445 OG/OGV) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning airfield operations and C-17 flight profiles. October 2010.

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WPAFB 2010d	Personal communication from Mr. Paul Woodruff (88 ABW/CEANQ) regarding WPAFB ICRMP. November 2010.
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WPAFB 2010i	Personal communication between Mr. William (Marty) Curtis (88 ABW/SEW) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning explosives safety zones. October 2010.
WPAFB 2010j	Personal communication between Mr. Gregory Kern (445 LRS/LGE) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning use of deicing fluid and fuel at West Ramp. October 2010.
WPAFB 2010k	Personal communication between Mr. John Fuller (88 ABW/CEPMP) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning facilities modification for C-17 conversion. September and October 2010.
WPAFB 2010l	Personal communication between Ms. Debora Hurst (88 AMDS/SGPB) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning LAIRCM system and laser safety. October 2010.

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Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Correspondence



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

5 November 2010

88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Dr. Mary Knapp
U.S. Fish and Wildlife Service
6950 Americana Parkway, Suite H
Reynoldsburg, OH 43068-4127

Dear Dr. Knapp:

The U.S. Air Force is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposed aircraft replacement for the 445th Airlift Wing (445 AW) from C-5 cargo aircraft to similarly sized C-17 cargo aircraft. The C-5 aircraft are expected to be retired over the next several years.

Wright-Patterson Air Force Base (WPAFB) has initiated an Environmental Assessment (EA) for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The proposed location for this project is shown on the enclosed maps. Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. No new facility construction or facility demolition activities are anticipated. Building and facility construction associated with the C-5 conversion in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration. The EA prepared for the C-5 conversion resulted in a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA).

Proposed activities would include:

- Interior renovation of the existing scheduled maintenance hangar (Building 34015);
- Interior renovation of the existing multipurpose hangar (Building 34016);
- Interior renovation of the existing fuel cell hangar (Building 34007);
- Construction of a Composite Material Shop within the interior of (Building 34026);
- Interior alteration of existing flight simulator facility (30152); and
- Repair of supply point fuel cell (34012).

Under the No Action alternative, it is assumed that the aircraft operations for the 445 AW would be similar to the current C-5 mission.



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The geographic location of the proposed project area is Greene County, R.8, T.3 (Figure 1). The area of the proposed C-17 conversion is in and around the developed West Ramp area located in the northwest corner of Area C. This site is bordered by Douglas Road (Loop Road) to the north, Riverview Road to the west, and the airfield to the south and east. While the proposed area would undergo interior modifications to accommodate C-17 aircraft, the current configuration of this area would not change (Figure 2). The West Ramp consists primarily of the runways, asphalt parking lots, aircraft hangars, support facilities, and maintained lawns. Natural resources in the vicinity of the project area include Bass Lake (adjacent and southwest of the area), Mad River (east of the area), a wetland on the southwest edge of Bass Lake, and wooded areas to the north and west. The proximity of the project area with respect to habitat for threatened and endangered species as well as wetlands in Area C is shown in Figure 3. Given that the construction and renovation work would be confined to the interior of the buildings, no impacts to natural resources would be anticipated.

Under the Proposed Action, there would be fewer aircrafts (ten C-5 versus eight C-17). Airfield operations would also decrease as there are 1,750 flight operations estimated for the C-5 in 2010 versus 1,500 airfield operations projected for the C-17s in 2012. Furthermore, approximately 75 percent of the 445 AW training mission for the C-17 would be conducted at other locations. According to our air conformity applicability analysis, the air emissions estimated from the C-17 are lower than those from the C-5. Similarly, our NOISEMAP modeling has indicated that the noise impacts from the C-17 are less than the C-5. In addition, less fuel and deicing fluid would be needed per aircraft for the C-17.

Therefore, based on our analysis, no impacts to natural resources from C-17 operations would be anticipated. Thank you for your consideration. Please let us know if you concur with the no effect determination. Due to our schedule for this project, we would appreciate your response in two weeks. If you have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

Sincerely

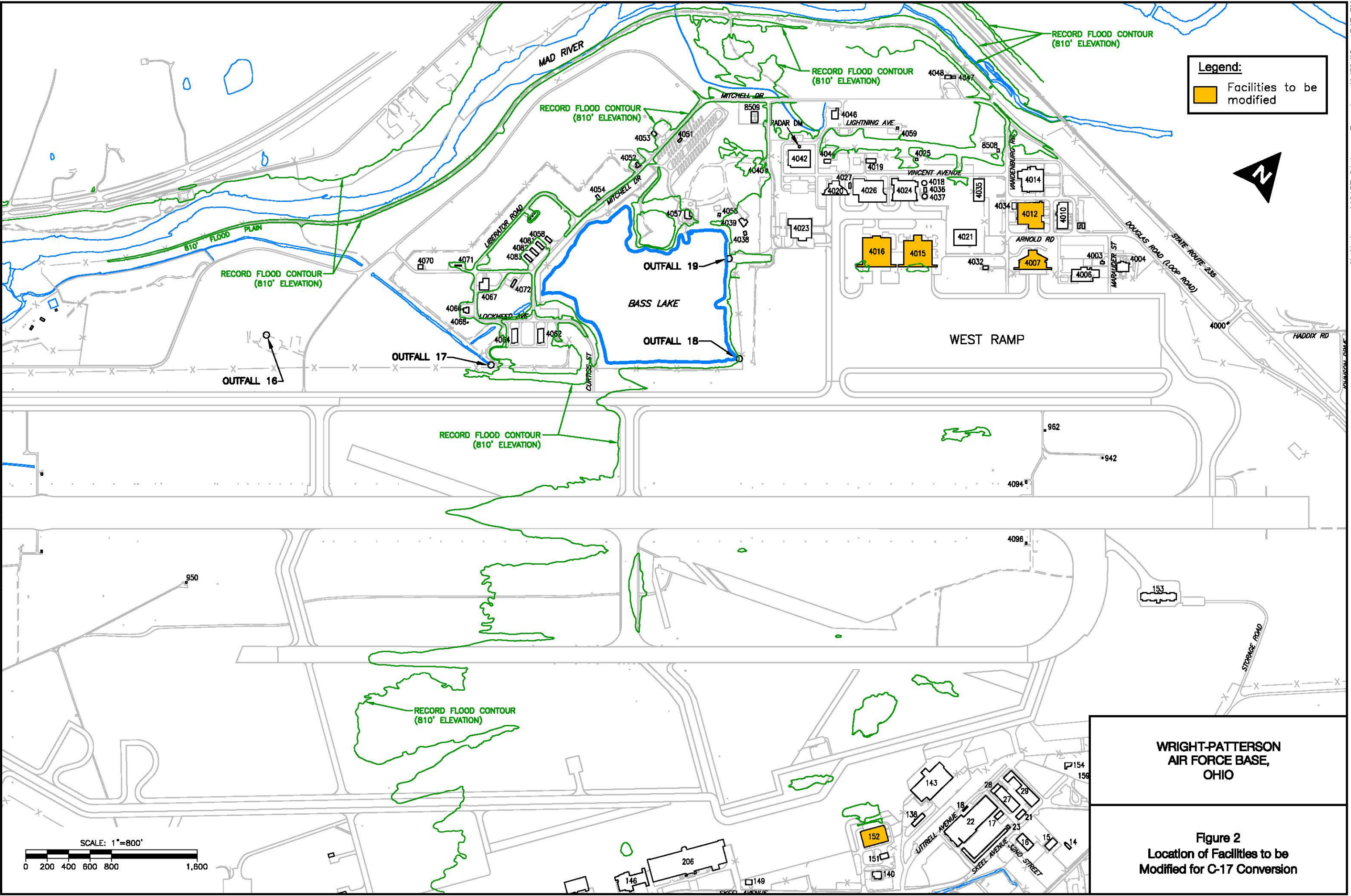


Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.)

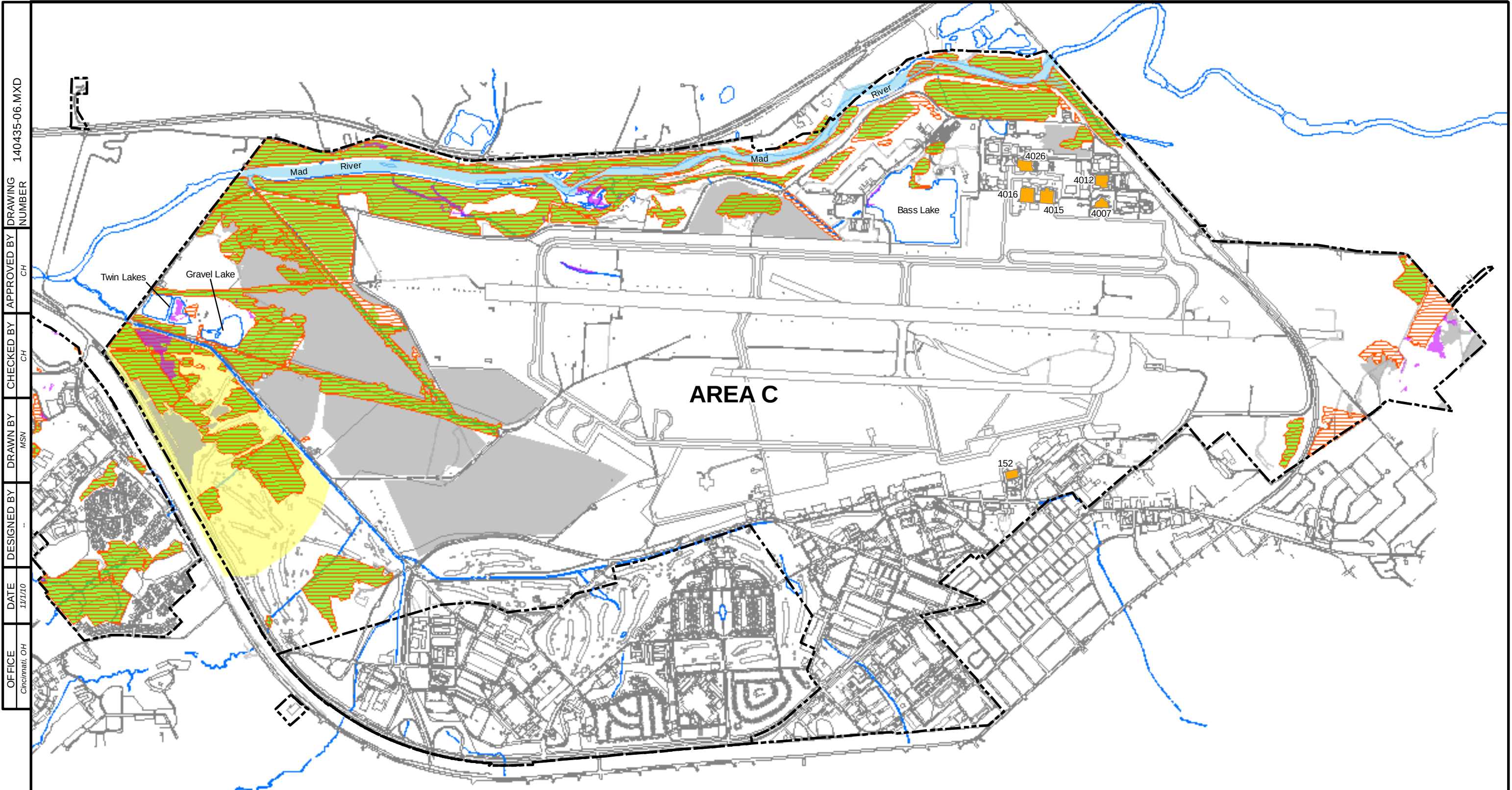
Enclosures: USGS Quadrangle Map
GIS Figure

Figure 1
Locations of Airfield and
Facilities to be Modified



**WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO**

**Figure 2
Location of Facilities to be
Modified for C-17 Conversion**

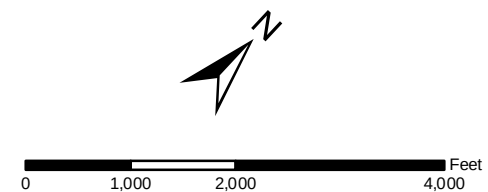


OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	11/11/10	MSN	CH	CH		140435-06.MXD

Legend

- WETLAND AREA
- INDIANA BAT
- CLUBSHELL
- BALD EAGLE
- BLAZING STAR STEM BORER
- EAST MASS SNAKE
- FACILITIES TO BE MODIFIED
- FACILITY BOUNDARY

Source: Base Map, Threatened, Endangered Species and Wetlands data from WPAFB.



WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3
Threatened and Endangered Species
and Wetland Locations Area C
Wright-Patterson AFB



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

November 16, 2010

Darryn Warner
Department of the Air Force
88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

TAILS #: 31420-2011-TA-0118
31420-2011-CPA-0038

Re: USFWS Response to Facilities to be Modified for C-17 Conversion

Dear Mr. Warner:

We have received your recent correspondence dated November 5, 2010 requesting information about the subject proposal. There are no Federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. Based on the information you have provided, at this time we have no objection to the proposed project.

ENDANGERED SPECIES COMMENTS: Due to the project type, size, and location, we do not anticipate any impact on federally listed endangered, threatened, or candidate species, or their habitats. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

If you have additional questions or require further assistance with your project proposal, please contact me at the following number (614) 416-8993 x12. I would be happy to discuss the project in further detail with you and provide additional assistance if necessary. In addition, you can find more information on natural resources in Ohio by visiting our homepage at: <http://www.fws.gov/midwest/ohio>.

Sincerely,

Mary Knapp, Ph.D.
Field Supervisor

*Rec'd 19 Nov 2010
Darryn Warner*



November 5, 2010

Ms. Debbie Woischke
Ohio Department of Natural Resources
Division of Wildlife
Ohio Biodiversity Database Program
2045 Morse Road, Building G-3
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation
Environmental Assessment of 445th Airlift Wing Conversion from C-5 to C-17 Aircraft
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the National Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinity of the West Ramp at Wright-Patterson Air Force Base (WPAFB). The Air Force Reserve Command (AFRC) is proposing an aircraft replacement of C-5 cargo aircraft to similarly sized C-17 cargo aircraft for the 445th Airlift Wing. The C-5 aircraft are expected to be retired over the next several years.

We are currently preparing an Environmental Assessment (EA) under contract to WPAFB, which will address potential impacts associated with the aircraft conversion. The intent of the EA is to satisfy requirements under the National Environmental Policy Act (NEPA) of 1969. We are requesting the locations of known populations of rare, threatened and endangered species within a one mile radius of this project site as part of this assessment. For the Indiana bat, we are requesting information within a five-mile radius. We would also like to request informal consultation regarding possible impacts of this proposed project on species listed as threatened or endangered in accordance with Section 7 of the Endangered Species Act.

The proposed location for this project is shown on the enclosed maps. Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. No new facility construction or facility demolition activities are anticipated. Building and facility construction associated with the C-5 conversion in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration. The EA prepared for the C-5 conversion resulted in a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA).

Proposed activities would include:

- Interior renovation of the existing scheduled maintenance hangar (Building 34015),
- Interior renovation of the existing multipurpose hangar (Building 34016),
- Interior renovation of the existing fuel cell hangar (Building 34007),
- Construction of a Composite Material Shop within the interior of Building 34026,

- Interior alteration of existing flight simulator facility (30152), and
- Repair of supply point fuel cell (34012).

Under the No Action alternative, it is assumed that the aircraft operations for the 445 AW would be similar to the current C-5 mission.

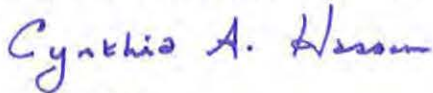
The geographic location of the proposed project area is Greene County, R.8, T.3 (Figure 1). The area of the proposed C-17 conversion is in and around the developed West Ramp area located in the northwest corner of Area C. This site is bordered by Douglas Road (Loop Road) to the north, Riverview Road to the west, and the airfield to the south and east. While the proposed area would undergo interior modifications to accommodate C-17 aircraft, the current configuration of this area would not change (Figure 2). The West Ramp consists primarily of the runways, asphalt parking lots, aircraft hangars, support facilities, and maintained lawns. Natural resources in the vicinity of the project area include Bass Lake (adjacent and southwest of the area), Mad River (east of the area), a wetland on the southwest edge of Bass Lake, and wooded areas to the north and west. The proximity of the project area with respect to habitat for threatened and endangered species as well as wetlands in Area C is shown in Figure 3. Given that the construction and renovation work would be confined to the interior of the buildings, no impacts to natural resources would be anticipated.

Under the Proposed Action, there would be fewer aircrafts (ten C-5 versus eight C-17). Airfield operations would also decrease as there are 1,750 flight operations estimated for the C-5 in 2010 versus 1,500 airfield operations projected for the C-17s in 2012. Furthermore, approximately 75 percent of the 445 AW training mission for the C-17 would be conducted at other locations. According to our air conformity applicability analysis, the air emissions estimated from the C-17 are lower than those from the C-5. Similarly, our NOISEMAP modeling has indicated that the noise impacts from the C-17 are less than the C-5. In addition, less fuel and deicing fluid would be needed per aircraft for the C-17. Therefore, based on our analysis, no impacts to natural resources from C-17 operations would be anticipated.

The form for our Data Request has been attached. We would appreciate any information from your database that applies to our project area. Please let us know if you concur with the no effect determination. Due to our schedule for this project, we would appreciate your response in two weeks. Please contact me at 513/782-4967 or by email at Cindy.Hassan@shawgrp.com if you have any questions. Thank you for your consideration.

Sincerely,

SHAW ENVIRONMENTAL & INFRASTRUCTURE, INC.



Cynthia A. Hassan
Project Manager

cc: K. Beason (88 ABW/CEAOR, WPAFB)

Enclosures: USGS Quadrangle Map
GIS Figure
Threatened & Endangered Species/Wetlands Map
Ohio Biodiversity Database Program Data Request Form

DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
OHIO BIODIVERSITY DATABASE PROGRAM
2045 MORSE RD., BLDG. G-3
COLUMBUS, OHIO 43229-6693
PHONE: 614-265-6452; FAX: 614-267-3096

INSTRUCTIONS:

Please complete both sides of this form, sign and return it to the address or fax number given above along with: (1) a brief letter describing your project, and (2) a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

FEES:

As of June 2010, we have temporarily suspended charging a fee until a review of the data request process has been completed.

WHAT WE PROVIDE: The Biodiversity Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Records for the following will be provided: plants and animals (state and federal listed species), high quality plant communities, geologic features, breeding animal concentrations and unprotected significant natural areas. We also provide locations for managed areas including federal, state, county, local and non-profit sites, as well as state and national scenic rivers. A minimum one mile radius around the project site will automatically be searched. Because the data is sensitive information, it is our policy to provide only the data needed to complete your project.

Date: November 5, 2010

Company name: Shaw Environmental & Infrastructure, Inc.

Name of person response letter should be addressed to: Mr. ☐ Ms. ☒

Cynthia A. Hassan, Project Manager

Address: 5050 Section Avenue

City/State/Zip: Cincinnati, Ohio 45212-2025

Phone: 513/782-4967 Fax: 513/782-4663

E-mail address: Cindy.Hassan@shawgrp.com

Project Name: Environmental Assessment, C-17 Conversion EA, Wright-Patterson AFB, Ohio

Project Number: _____

Project Site Address: West Ramp, Area C, Wright-Patterson Air Force Base

Project County: Greene

Project City/Township: Fairborn / Mad River

Project site is located on the following USGS 7.5 minute topographic quad(s): _____

Fairborn Quad, R.8, T.3

Description of work to be performed at the project site: Renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. No new facility construction or facility demolition activities are anticipated.

How do you want your data reported? (Both formats provide exactly the same data. The only difference is in the format of our response. The manual search is most appropriate for small scale projects or for those who do not have GIS capabilities. Please choose only one option.)

Printed list and map (manual search) X OR GIS shapefile (computer search) _____

Additional information you require: For the Indiana bat, include information with a five-mile radius.

How will the information be used? The name, status and location of each species will be published in an environmental assessment that is being performed to satisfy requirements under the National Environmental Policy Act (NEPA).

I certify that data supplied by the Ohio Biodiversity Database Program will not be published without crediting the ODNR Division of Wildlife as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Wildlife, Ohio Biodiversity Program.

Signature Cynthia A. Hesson

Date: November 5, 2010



Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Wildlife

John M. Daugherty, Acting Chief
2045 Morse Rd., Bldg. G-3
Columbus, OH 43229-6693
Phone: (614) 265-6300

November 15, 2010

Cynthia Hassan
Shaw Environmental & Infrastructure, Inc.
5050 Section Ave.
Cincinnati, OH 45212

Dear Ms. Hassan:

I have reviewed our Biodiversity Database for the C-17 Conversion project area, including a one mile radius, at Wright-Patterson Air Force Base in Greene County, and on the Fairborn Quad. The numbers on the list below correspond to the areas marked on the accompanying map. Common name, scientific name and status are given for each species.

Fairborn Quad

1. *Exoglossum laurae* - Tonguetied Minnow, threatened
2. *Spiranthes magnicamporum* - Great Plains Ladies'-tresses, potentially threatened (2 sites)
3. *Myotis sodalis* - Indiana Bat, state endangered, federal endangered
4. *Bartramia longicauda* - Upland Sandpiper, threatened
5. *Carex mesochorea* - Midland Sedge, endangered

I have also performed a search for Indiana Bat (*Myotis sodalis*, state endangered, federal endangered) sites within a five mile radius of the project site. The results are shown on a separate map.

We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests, or other protected natural areas within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

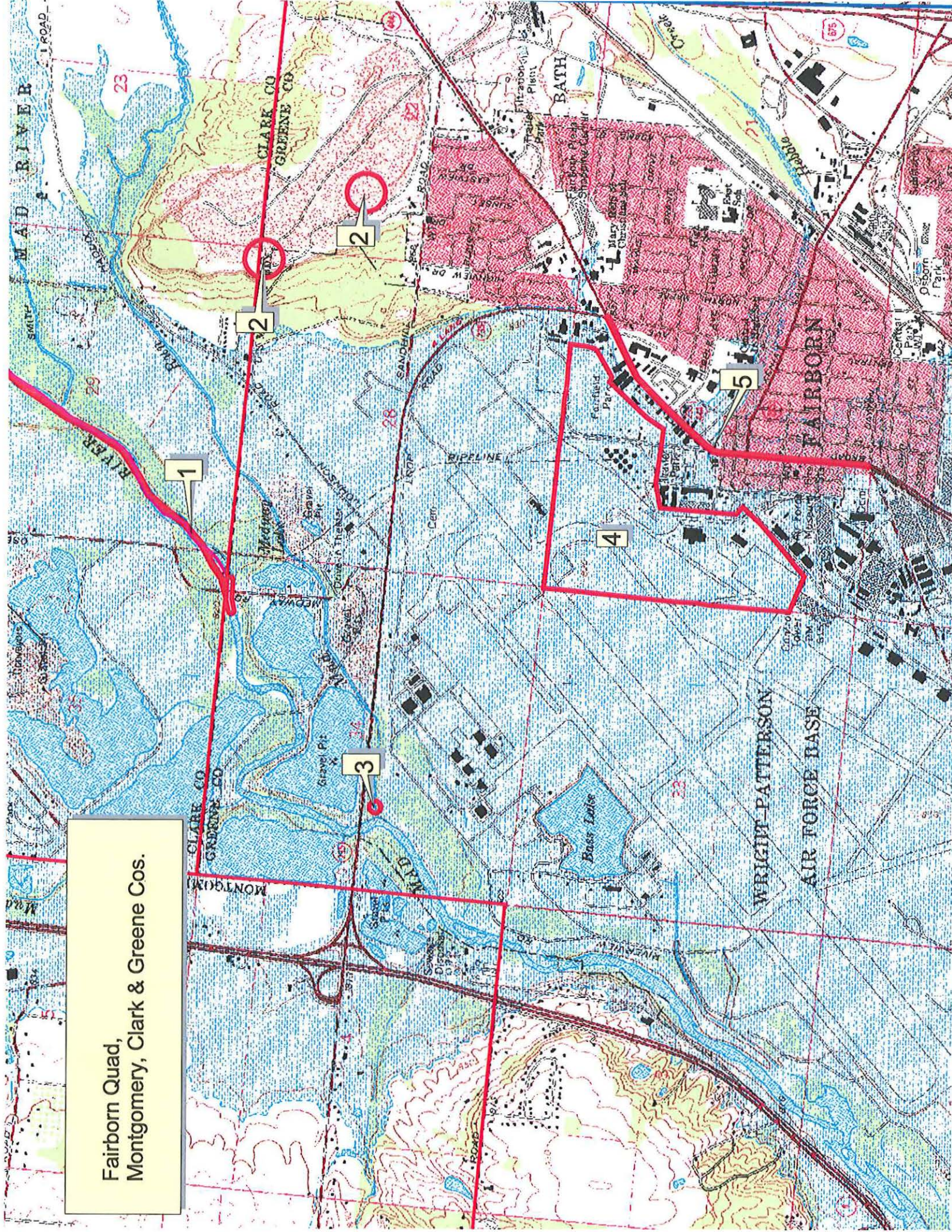
Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

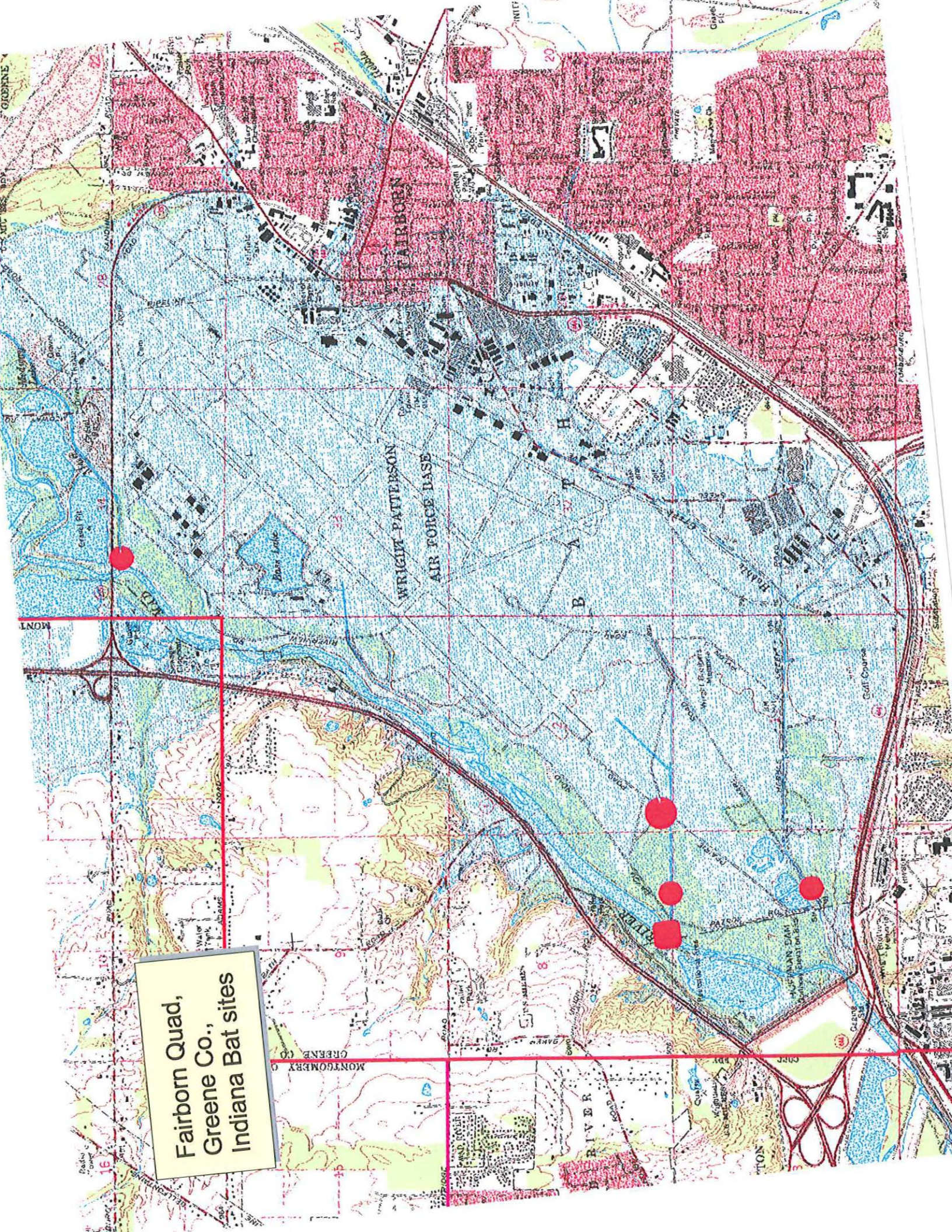
Debbie Woischke, Ecological Analyst
Ohio Biodiversity Database Program



Fairborn Quad,
Montgomery, Clark & Greene Cos.



Fairborn Quad,
Greene Co.,
Indiana Bat sites





DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

1 November 2010

88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Mr. Kurt Rinehart
Miami Conservancy District
38 E. Monument Avenue
Dayton, OH 45402

Dear Mr. Rinehart:

Wright-Patterson AFB (WPAFB) is preparing an Environmental Assessment (EA) to evaluate the environmental impacts of the proposed conversion from C-5 cargo aircraft to similarly sized C-17 cargo aircraft by the 445th Airlift Wing. The C-5 aircraft are expected to be retired over the next several years. WPAFB has initiated an EA for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The purpose of this letter is to notify you of this proposed project and request your evaluation of potential impacts of this project on the Miami Conservancy District.

Construction activities under the Proposed Action would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. No new facility construction or facility demolition activities are anticipated. Building and facility construction associated with the previous C-5 conversion in 2005 provided the necessary facilities for conversion to C-17 aircraft with minor reconfiguration.

Proposed activities would include:

- Interior renovation of the existing scheduled maintenance hangar (Building 34015),
- Interior renovation of the existing multipurpose hangar (Building 34016),
- Interior renovation of the existing fuel cell hangar (Building 34007),
- Construction of a Composite Material Shop within the interior of Building 34026,
- Interior alteration of existing flight simulator facility (30152), and
- Repair of supply point fuel cell (34012).

Under the No Action alternative, the strategic airlift mission at WPAFB would continue current operations until the remaining C-5 aircraft are retired or their useful life is extended. Replacement of these aircraft by C-17 aircraft would not occur.



Recycled Paper

The geographic location of the proposed project area is Greene County, R.8, T.3 (Figure 1). The area of the proposed C-17 conversion is in and around the developed West Ramp area located in the northwest corner of Area C. This site is bordered by Douglas Road (Loop Road) to the north, Riverview Road to the west, and the airfield to the south and east. The elevation of the West Ramp is 810 ft MSL. The West Ramp consists primarily of the runways, asphalt parking lots, aircraft hangars, support facilities, and maintained lawns. While the proposed area would undergo interior modifications to accommodate C-17 aircraft, the current configuration of this area would not change (Figure 2). Given that the construction/renovation work would be confined to the interior of the buildings, no impacts to the floodplain would be anticipated.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

Sincerely

Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
Cynthia Hassan (Shaw Environmental & Infrastructure. Inc.)

Enclosures: USGS Quadrangle Map
GIS Figure



**MIAMI
CONSERVANCY
DISTRICT**

BOARD OF DIRECTORS

William E. Lukens
Gayle B. Price, Jr.
Thomas B. Rentschler

GENERAL MANAGER

Janet M. Bly

November 11, 2010

Mr. Darryn Warner
88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Re: Huffman Retarding Basin, WPAFB, Proposed Renovation of Facilities

Dear Mr. Warner:

We have reviewed the Proposed Action of the 88 ABW/CEANQ for renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB.

As most of the proposed development is located within the Huffman Retarding Basin all development would be subject to those building restrictions as set forth by the Miami Conservancy District (MCD).

Based on our review it appears the proposed project will have little impact on the retarding basin, however, if fill material is to be placed anywhere on the property below the spillway elevation of 835.0 prior written approval must be obtained from MCD.

Your cooperation regarding this matter is appreciated and if you have any further questions please contact me at (937) 223-1278, ext. 3230.

Very truly yours,

Roxanne H. Farrier
Property Administrator

RHF:rmc

cc: Kurt Rinehart

File: WPAFB



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

5 November 2010

88 ABW/CEANQ
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein
Department Head, Resource Protection & Review
Ohio Historic Preservation Office
1982 Velma Ave
Columbus OH 43211-2497

Dear Mr. Epstein

Wright-Patterson Air Force Base is proposing to undertake a project to renovate a part of Facility 30152, located in Area C, making minor modification to areas of the building that were renovated in 2005. The renovation in 2005 encompassed alterations to the facility to accommodate installation of a simulator for C-5 aircraft, control areas, training rooms, and office support areas. The 2005 undertaking was coordinated with your office, and your office was in concurrence with a no adverse effect finding (see Attachment 1). Facility 30152 is eligible for listing on the National Register of Historic Places for its Cold War significance. It is our opinion that the proposed action will have no adverse effect on the historic property. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the undertaking. WPAFB proposes to make modification to the interior spaces of Facility 30152 to accommodate installation of a simulator for C-17 aircraft, control areas, training rooms, and office support areas as described below and shown in Attachment 2.

PROPOSED BUILDING MODIFICATIONS: An Architectural /Engineering (A/E) firm reviewed the space and provided design solutions and drawings on the space and equipment modifications. The following are areas of modifications:

Weapon System Trainer (WST) Motion Bay: Verification of the structural capability of the existing concrete floor with Boeing's specifications was completed. It will be required to jack hammer and remove the existing approximately 31 ft by 31 ft section of concrete floor and metal rebar and reinstalling new rebar, anchor bolts and concrete. Installation of an additional section of raised metal platform from the existing stairs and platform to provide access to the WST will be required.

Hydraulic Room: Hydraulics is no longer used on the simulator. All movement actions are done electronically. The existing hydraulic room would be converted to a maintenance stockroom, workroom area.

Electrical and HVAC Systems: Verify if the existing electrical and HVAC systems can support the power and cooling requirements for the new C-17 WST and, if needed, to provide required upgrades for each system to support the simulator bed down.

Computer Room: Check the existing cooling needs for the equipment and up size if required. Install new power cables from the motion bay to the computer room in the existing concrete trenchers and under the raised computer room flooring. All upgrades will meet current Air Force and Building Code design criteria.

Office Space: There are no planned changes to the existing layout of office space. However, possible changes may involve removal of existing walls between office spaces in order to make larger rooms.

Room/Ceiling/Floor Finishes: Finishes were replaced in 2005 and the space was not used due to not having the C-5 WST installed. Possible work would include repainting of walls, replacing any damaged ceiling tile, and replacing any damaged carpet.

Lighting and electrical outlets: Existing light fixtures may be replaced to meet lighting illumination needs and additional electrical, communication and computer outlets may be installed to meet planned operations.

Restrooms: There is currently no plans to modify the existing restrooms.

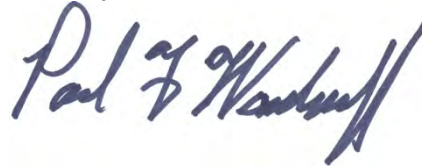
Site Work: There are currently no plans to modify the existing parking areas or any of the exterior façade/features.

Description of steps taken to identify historic properties. WPAFB has assessed all buildings on the installation that are 50 years old or older, and has assessed buildings for exceptional significance relating to the Cold War. Facility 30152 was constructed in 1953 as a maintenance hangar for Air Defense Command. The building was constructed as a support structure associated with the Alert Facility for the 97th Fighter-Interceptor Squadron. This squadron was in charge of defending the airspace of Ohio, Kentucky, Tennessee and Indiana against a surprise strike by the Soviet Union and the Eastern Bloc. The 97th Squadron was on alert 24 hours a day, and was accommodated in Building 30153, which was designed to allow the pilots to scramble within 5 minutes notice. Building 30152 was completed only 6 months after Building 30153. The determination of eligibility was made on January 25, 1999. The Ohio Historic Inventory form is enclosed as Attachment 3.

Description of the undertaking's effects on historic properties. It is our opinion that the proposed interior renovations and will not have an adverse effect on the property. Because this renovation work is so minor and affects only areas previously altered for the C-5 aircraft simulator, previously completed, it is our opinion that, in accordance with 36 CFR 800.5(b), the proposed action has no adverse effect on Facility 30152.

Please review the documentation we have provided and let us know whether you concur with the no adverse effect determination. Should you have questions, I can be reached at 937-257-5528, or via email at paul.woodruff@wpafb.af.mil.

Sincerely

A handwritten signature in blue ink that reads "Paul F. Woodruff". The signature is stylized with a large, looped 'P' and a long, sweeping underline.

PAUL F. WOODRUFF
Cultural Resource Program Manager
Environmental Quality Section
Environmental Branch

Attachments:

1. SHPO concurrence letter 2 May 2005
2. Drawings and photos
3. Ohio Historic Inventory Form for Facility 30152



May 2, 2005

Jan Ferguson
Cultural Resources Program Manager
Operations Branch
Office of Environmental Management
88 ABW/EMO Bldg 89
5490 Pearson Road
Wright-Patterson Air Force Base, Ohio 45433-5332

Dear Ms. Ferguson:

Re: 445th Airlift Wing Conversion from C-141C to C-5 Aircraft, Wright-Patterson Air Force Base, Ohio

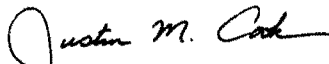
This is in response to correspondence, received on February 10, 2005. My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Last year we reviewed your assessment of effects likely to result from the proposed conversion of the 445th Airlift Wing at Wright-Patterson Air Force Base from C-141C to C-5 aircraft. A condition attached to our concurrence with your no adverse effect finding for this project required that you submit plans and specifications for the rehabilitation of Facility 30152, a building that has been determined to be eligible for listing in the National Register of Historic Places, to OHPO for review and approval when they became available. To fulfill this condition, you have submitted 30% design documents, drawings from the 1998 rehabilitation of Facility 30152, and documentation related to the historic and significance of the facility.

I have carefully reviewed the information submitted. It is my opinion that the proposed work conforms to the Secretary of the Interior's Standards for Rehabilitation. Therefore, I approve this project. No further coordination with this office is necessary unless there is a change in the project.

If you have any questions, please contact me by phone at (614) 298-2000 or by e-mail at jcook@ohiohistory.org. Thank you for your cooperation.

Sincerely,



Justin M. Cook, History Reviews Manager
Resource Protection and Review

OHIO HISTORICAL SOCIETY

Ohio Historic Preservation Office

567 East Hudson Street, Columbus, Ohio 43211-1030 ph: 614.298.2000 fx: 614.298.2037

www.ohiohistory.org

106523

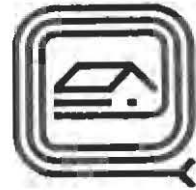
Ohio Historic Preservation Office

567 East Hudson Street
Columbus, Ohio 43211-1030
614/ 298-2000 Fax: 614/ 298-2037

Visit us at www.ohiohistory.org

June 24, 2004

Jan Ferguson
Cultural Resources Program Manager
Operations Branch
Office of Environmental Management
88 ABW/EMO Bldg 89
5490 Pearson Road
Wright-Patterson Air Force Base, Ohio 45433-5332



OHIO
HISTORICAL
SOCIETY
SINCE 1885

Re: 445th Airlift Wing Conversion from C-141C to C-5 Aircraft at Wright-Patterson Air Force Base, Ohio

Dear Ms. Ferguson:

This is in response to correspondence, received on April 6, 2004, regarding the above referenced project. My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Thank you for providing a detailed assessment of the effects of the proposed undertaking on historic properties. The proposed 445th Airlift Wing Conversion will affect one historic property – Facility 30152. Based on your letter dated April 2, 2004, it is our understanding that plans and specification for the proposed modifications to Facility 30152 have yet to be developed. However, it is known that the existing C-141 flight simulator will be removed and a new, larger C-5 flight simulator will be installed. The Air Force intends to design the proposed modifications to Facility 30152 to ensure that they conform to the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*.

Based on the recommendation of my staff, I concur with your finding that the proposed project will have no adverse effect on historic properties, provided that the following condition is met:

The Air Force must submit standard project documentation – including plans, specifications, and photographs – for the proposed modification of Facility 30152 to the Ohio Historic Preservation Office (OHPO) for review and approval prior to the initiation of the undertaking.

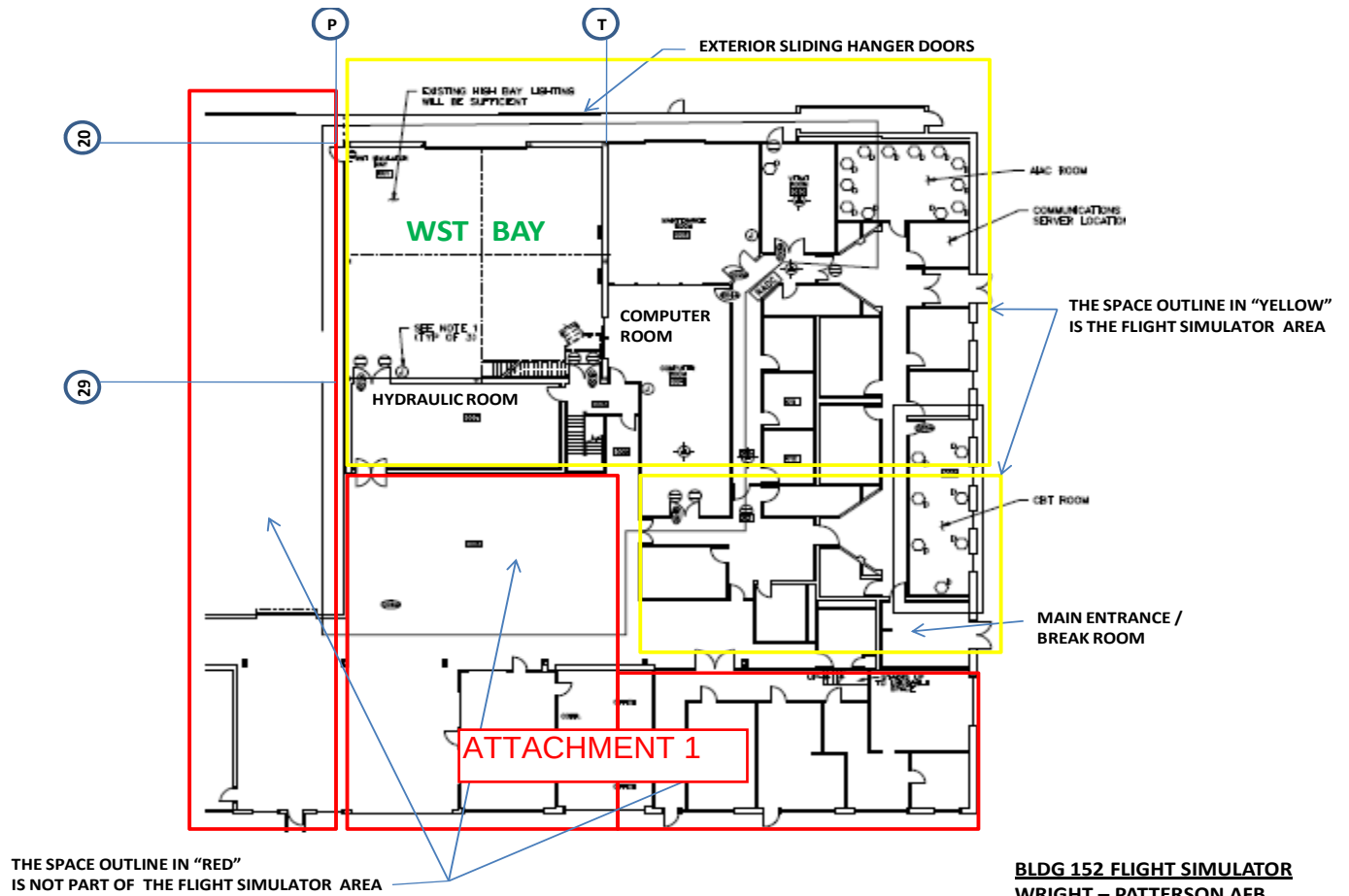
If you have any questions, please contact Justin Cook, History Reviews Manager, by phone at (614) 298-2000 or by e-mail at jcook@ohiohistory.org. Thank you for your cooperation.

Sincerely,

Mark J. Epstein, Department Head
Resource Protection and Review

MJE/JMC:jc

ATTACHMENT 2



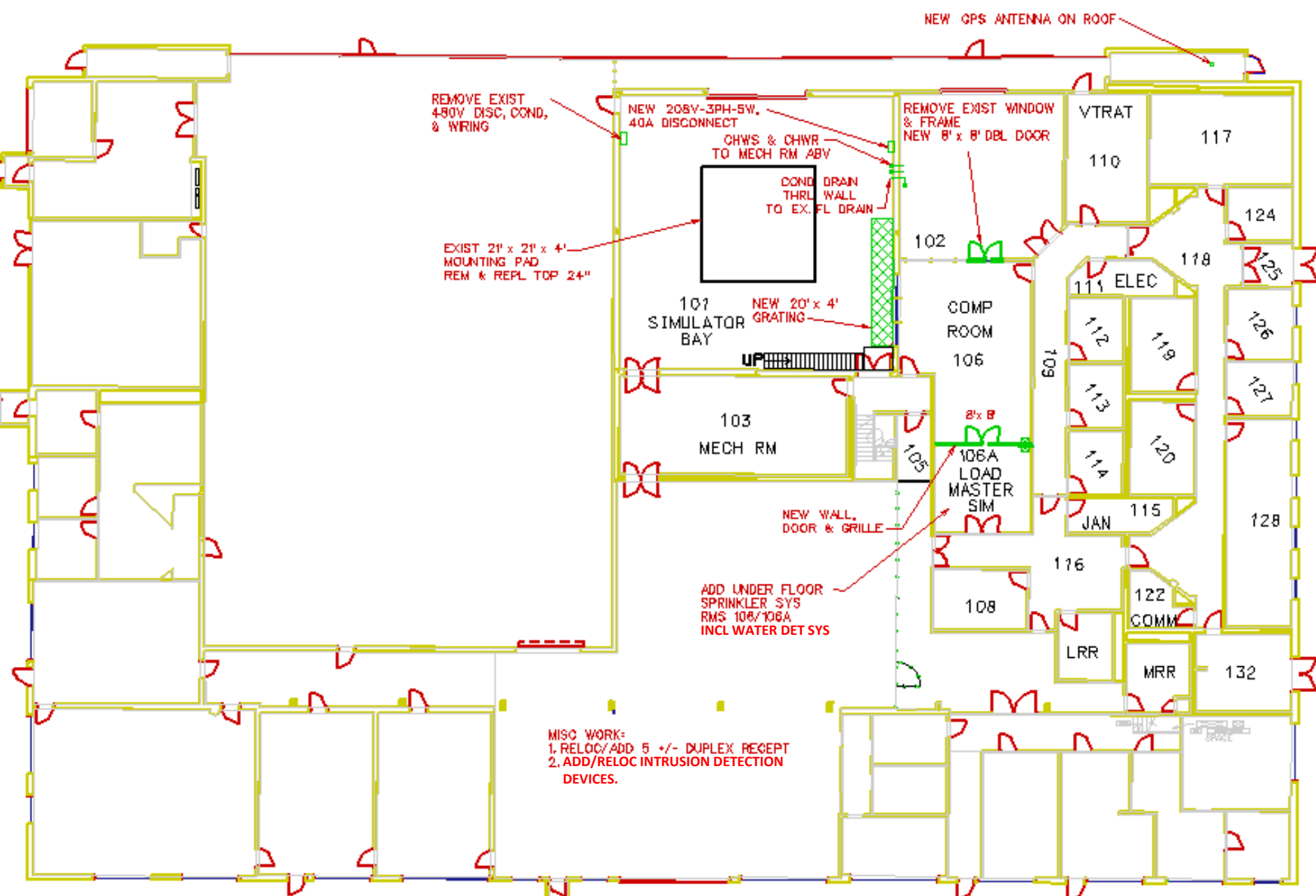




Figure 8 Weapon System Trainer

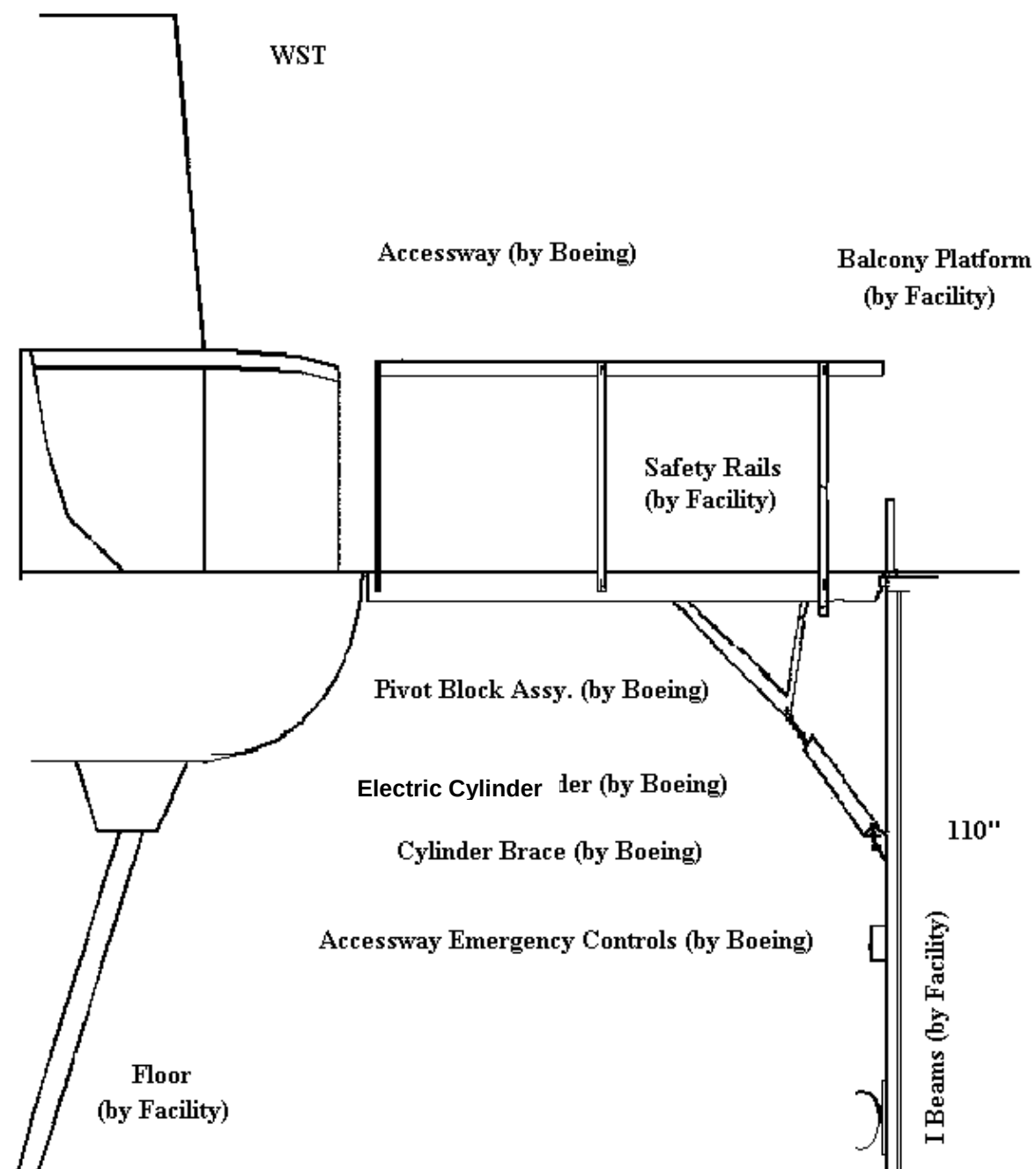
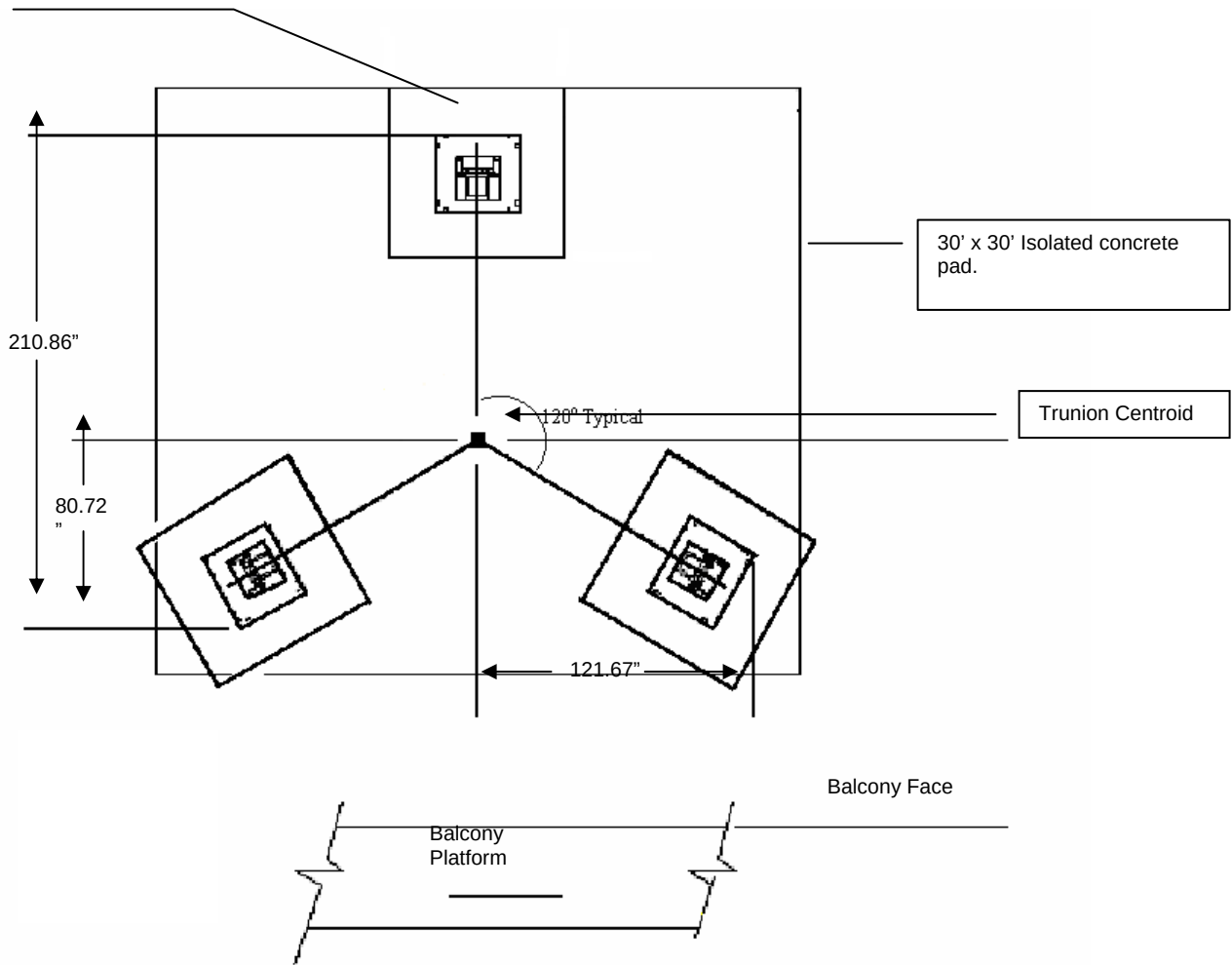


Figure 12: WST Access Elevation

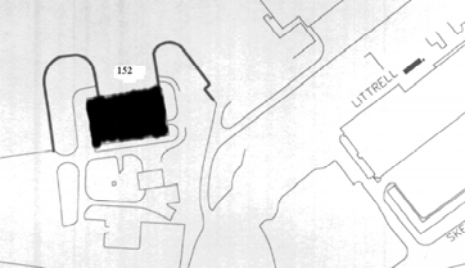
Minimum distance from edge of mounting pad and edge of isolated concrete pad = 20"



OHIO HISTORIC INVENTORY

Ohio Historic Preservation Office
1985 Velma Avenue
Columbus, Ohio
614/297-2470



1. No.		2. County Greene		4. Present Name(s) Facility 30152		ATTACHMENT 3		1. No.			
3. Location of Negatives WPAFB - EM Division				5. Historic or other Name(s) Readiness Hangar						2. County	
Roll No. 4		Picture No.(s) 12-17								4.5. Present or Historic Name	
6. Specific Address or Location 1455 Air Freight Road Area C, WPAFB, Ohio				16. Thematic Association(s) Military Aviation		28. No. of Stories 1		2. County			
6a. Lot, Section or VMD Number N/A				17. Date(s) or Period 1953		17b. Alteration Date(s) c. 1980		29. Basement? Yes ☐ No ☒			
7. City or Village If Rural, Township & Vicinity Wright-Patterson Air Force Base				18. Style or Design ☐ High Style Utilitarian ☐ Element		30. Foundation Material Concrete		31. Wall Construction Steel Frame / Concrete Block			
8. Site Plan with North Arrow 				18a. Style of Addition or Element(s) Utilitarian		32. Roof Type & Material Stdg Seam GA Alum Bowstring Arch		33. No. of Bays Front 10 Side 7			
9. U.T.M. Reference Quadrangle Name Fairborn, Ohio 1 6 7 5 3 9 5 5 4 4 1 2 3 9 5				19. Architect or Engineer USAF		34. Exterior Wall Material(s) .032 Deep Rib, Aluminum Siding		35. Plan Shape Irregular			
Zone Easting Northing				20. Contractor or Builder Unknown		36. Changes Addition ☐ (Explain in #42) Altered ☒ Moved ☐		37. Window Types 4 pane dark ins. ☐ 6 over 6 ☐ 2 over 2 ☐ 4 over 4 ☒ Other			
10. SITE Site ☐ Building ☒ Structure ☐ Object ☐				21. Building Type or Plan Hangar - Rectangular		38. Building Dimensions 232' x 147'		39. Endangered? Yes ☐ By What? No ☒			
11. On National Register? Yes ☐ No ☒				22 Original Use, if apparent Readiness Hangar		40. Chimney Placement None		41. Distance from and Frontage on Road N/A			
12. N.R. Potential? Yes ☒ No ☐				23. Present Use Honor Guard Drill Facility and Offices		42. Description of Important Interior and Exterior Features (Continue on reverse if necessary) Facility 30152 is a steel frame and concrete block hangar with office space surrounding it on three sides. The hangar has a smooth concrete floor with exposed steel columns and trusses. The office space has GWB walls and carpeted concrete floors with acoustical drop ceilings. The roof is a segmental arch with standing seam aluminum. The exterior of the building has metal ribbed cladding and 4 pane windows that are replacements. An 8-leaf sliding metal hangar door faces the flightline.		6. Specific Address or Location			
13. Part of Estab. Hist. Dist? Yes ☐ No ☒				24. Ownership Public ☒ Private ☐ US Air Force		43. History and Significance (Continue on reverse if necessary) Building 30152 was constructed in 1953 as the Maintenance Hangar. The structure originally had 35,342 square feet of area, cost \$363,651 to build, and was completed in September of 1953. The building was listed on real property records as originally having been under the jurisdiction of Air Defense Command. This indicates that the building was almost certainly constructed as a support structure associated with the Alert Facility for the 97th Fighter-Interceptor Squadron. This squadron was in charge of defending the airspace of		46. Prepared by R. Hampton & S. Popovich			
14. District Potential? Yes ☐ No ☒				25. Owner's Name & Address, if known US Air Force Wright-Patterson Air Force Base		47. Organization Hardlines: Design & Delineation		48. Date Recorded in Field May 1998			
15. Name of Established District (N.R. or Local)				26. Property Acreage N/A		49. Revised by		50a. Date Revised			
45. Sources of Information Walker, Lois. From Huffman Prairie to the Moon: The History of Wright-Patterson Air Force Base. Washington D.C.: U.S. Government Printing Office, 1985. Wright-Patterson Air Force Base. Real Property Records, 1947-1998.				27. Other Surveys in Which Included N/A		50b. Reviewed by					

51. Condition of Property

☐ Excellent

☐ Good/Fair

☐ Deteriorated

☐ Ruin

☐ Destroyed/Burned Date

52. Historic Outbuildings and Dependencies

Barn Type(s)

Corn Crib or Shed

Summer Kitchen

Silo

Designed landscape features

Smoke House

Spring House

Ice House

Privy

Garage

53. Affiliated OAI Site Number(s)

Archeological Feature:

Observed

Expected on Basis of Archival Research

Well

Privy

Cistern

Foundation

Structural Rubble

Formal Trash Dump

Other

54. Farmstead Plan

42. (Cont'd)

43. (Cont'd)

Ohio, Kentucky, Tennessee and Indiana against a surprise strike by the Soviet Union and the Eastern Bloc. The 97th Squadron was on alert 24 hours a day, and was accommodated in Building 30153, which was designed to allow the pilots to scramble within 5 minute's notice. Building 30152 was completed only 6 months after Building 30153.

Building 30152 had a 46 square foot addition in 1956. A series of minor alterations have been made to the building, and in 1975, additional doors and partitions were installed in the building. From 1982 to 1986 the facility was leased to an airline for use. The building at that time was also being used by the 4950th Test Wing. In 1986, the building was modified as a location of a CAD computer system. The northeast office portion of the building was recently vacated and is now empty. The central hangar space and two offices at the rear of the building are now being used as the administrative and drill space for the Wright-Patterson Honor Guard. The honor guard members serve as ceremonial escorts at Air Force military funerals in Ohio, Indiana, and Kentucky.

WRIGHT-PATTERSON AIR FORCE BASE HISTORIC STRUCTURES INVENTORY

EXTERIOR CHARACTER DEFINING FEATURES

1. No. 2. Building Name Facility 30152

3. Building Type Hangar - Rectangular

4. General Exterior Features Description

Facility 30152 is a rectangular segmental arched hangar with ribbed metal cladding. An U-shaped space around the hangar on the south, east, and west sides with standing seam metal roofs. The northeast elevation has 6 insulated dark glass aluminum frame windows and a small shed roofed vestibule entry with metal siding. The southwest elevation has 12 insulated windows. The northwest elevation has an 8-leaf hangar door and vent. The southeast elevation has 4 metal and glass doors and metal windows

5. Structural System Steel frame and trusses

6. Exterior Wall Materials

☐ Concrete	☐ Clapboard	Other
☐ Concrete Block	☐ Wood Shingle	
☐ Stone	☐ Board and Batten	
☐ Stucco	☐ Vertical Board	
☐ Terra Cotta	☐ Asbestos/Asphalt	
☐ Log	☐ Brick	
☐ Horizontal Wood Siding	☒ Metal	
☐ Rustic/Drop		

7. Roof Type ☐ Gable ☐ Hip ☐ Pyramidal ☐ Shed ☐ Flat ☐ Monitor ☐ Gambrel

Other Segmental arch

8. Roofing Materials ☒ Metal ☐ Composition Other Standing seam aluminum

☐ Wood Shingle ☐ Slate

☐ Wood Shake ☐ Tile

9. Foundation Materials ☒ Poured Concrete ☐ Concrete Block ☐ Wood ☐ Stone ☐ Brick

Other

10. Window Type ☐ Double-hung ☐ Casement ☐ Awning ☐ Hopper ☐ Industrial

10a. Window Description Dark glass insulated with sliding panels at bottom.

11. Window Materials ☐ Wood ☐ Steel ☒ Aluminum

11a. Glazing ☐ Single ☒ Double ☐ Triple

11b. Glazing Pattern ☐ 1 over 1 ☐ 2 over 2 ☐ 4 over 4 ☐ 6 over 6

Other 4 pane

WRIGHT-PATTERSON AIR FORCE BASE HISTORIC STRUCTURES INVENTORY

EXTERIOR CHARACTER DEFINING FEATURES (cont'd)

12. Exterior Trim Elements

None

13. Exterior Light Fixtures

Flood lights mounted on hangar door towers.

14. Exterior Doors

8-leaf metal sliding hangar door on north elevation. Metal garage door on east elevation and four metal pedestrian doors with glass windows are located in building also.

15. Machinery

None

16. Equipment

Heating and air conditioning equipment.

17. Significant Additions

Side wings of hangar are original, but have probably been painted. The windows in these wings are relatively new.

18. Non-Historic Additions or Elements

Shed roof entrance on NE and SW elevations are probably an addition with aluminum siding.

19. Significant Site Features

Facility 30152 is located on the Area C flight line of the main runway.

WRIGHT-PATTERSON AIR FORCE BASE HISTORIC STRUCTURES INVENTOF

INTERIOR CHARACTER DEFINING FEATURES

1. No. 2. Building Name Facility 30152

3. Building Type Hangar - Rectangular

4. General Interior Features Description

Facility 30152 has an open central hangar area with a u-shaped area surrounding it. The u-shaped area has GWB walls, carpeting, and drop ceilings. The central space has original truss ceiling, concrete floors, and low concrete block walls on west and east sides.

5. Exposed Structure

Steel trusses, concrete block walls, and steel columns.

6. Interior Wall Materials ☐ Plaster ☐ Paneling ☐ Brick
☒ GWB ☐ Tile ☐ Concrete Block
☐ Wallpaper ☐ Concrete

6a. Interior Wall Surfaces Description

GWB in offices on east side, corrugated steel in some sections of west wing, and concrete block and corrugated steel in hangar space.

7. Flooring Type ☐ Wood ☒ Concrete ☐ Stone ☐ Metal

7a. Flooring Description

Concrete floors in hangar space and west wing. Carpet covers the concrete floors in east wing.

8. Ceiling Materials ☐ Plaster ☐ GWB ☐ Wood ☒ Metal ☐ Concrete ☒ Acoustical Tile

8a. Ceiling Description

Acoustical drop ceilings in offices, while the hangar space has steel trusses with insulation under corrugated steel roof.

9. Interior Door Types ☒ Wood ☒ Metal ☐ Fireproof ☐ Glass

9a. Interior Doors Description

Wood doors in office spaces, steel doors elsewhere.

WRIGHT-PATTERSON AIR FORCE BASE HISTORIC STRUCTURES INVENTORY

INTERIOR CHARACTER DEFINING FEATURES (cont'd)

10. Stair Materials ☐ Wood ☐ Metal ☐ Concrete

10a. Stairs

No stairs in facility.

11. Interior Trim Elements

None

12. Significant Hardware Features

None

13. Interior Light Fixtures

Hanging incandescent lights in hangar space, fluorescent ceiling lights in office spaces.

14. Plumbing Fixtures ☒ Bathtub ☒ Sink ☐ Water Closet ☐ Shower

14a. Other Plumbing Fixtures

Small ground washing facility for shoes and other equipment.

15. Significant Built-In Elements

Steel wall frames are being installed in the west wing, otherwise the wing is open with a shed roof and plywood sheathing.

16. Mechanical Equipment

Air conditioning and heating equipment.

17. Other Significant Interior Features

APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) CORRESPONDENCE AND COMMUNITY INVOLVEMENT

Lynn Lewis, Asst. Regional Director
Ecological Services
U.S. Fish and Wildlife Services
One Federal Drive
Ft. Snelling, MN 55111-4056

Mary Knapp, Field Supervisor
U.S. Fish and Wildlife Service
Ohio Ecological Services Field office
4625 Morse Road, Suite 104
Columbus, OH 43230

U. S. Army Corps of Engineers
Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202-2232

Local Agencies and Points of Contact

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Mayor, Dayton, Ohio
101 W. Third Street
P.O. Box 22
Dayton, OH 45401-0022

Ms. Marilyn Reid
Greene County Board of Commissioners
35 Greene Street
Xenia, OH 45385

Mr. Alan Anderson
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Stephen Anderson
Greene County
Regional Planning and Coordinating
Commission
651 Dayton-Xenia Road
Dayton, OH 45385



Shaw® Shaw Environmental & Infrastructure, Inc.

December 2, 2010

Stephen Anderson
Greene County
Regional Planning and Coordinating Commission
651 Dayton-Xenia Road
Dayton, OH 45385

Dear Mr. Anderson:

The Air Force Reserve Command (AFRC) has prepared an Environmental Assessment (EA) for the 445th Airlift Wing Conversion from C-5 to C-17 Cargo Aircraft at Wright-Patterson Air Force Base (WPAFB), Ohio. Shaw Environmental & Infrastructure, Inc. has been contracted by the Air Force to assist in the preparation of the EA. The Air Force has prepared this EA in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the U.S. Air Force *Environmental Impact Analysis Process* (EIAP) [32 CFR Part 989].

Per Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the enclosed Draft-Final EA and providing your comments concerning the proposal and any potential environmental consequences. A listing of the Federal, state, and local agencies that have also been contacted is enclosed (see Attachment 1).

Please provide written comments or information regarding the proposed action at your earliest convenience but no later than January 3, 2011 to: Mr. Ted Theopolos at (937) 522-3521 or via email at Theodore.Theopolos@WPAFB.AF.MIL. If you have any questions regarding these materials, please contact me at (513)782-4967 or by email at Cindy.Hassan@shawgrp.com.

Sincerely,

SHAW ENVIRONMENTAL & INFRASTRUCTURE, INC.

Cynthia A. Hassan
Project Manager

cc: Karen Beason (WPAFB 88 ABW/CEAOR)

Enclosure: Draft-Final EA, 445th Airlift Wing Conversion from C-5 to AC-17 Aircraft (CD-ROM)
Attachment: Distribution List

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Appendix B
Site Photographs

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	S-140435, 0601-10/10-W
Cincinnati, OH	10/28/10	--	JIS	SB	CH		



1. Looking north toward the front of the Fuel Cell Hangar - Building 34007.



2. Looking west toward the southeast side of the Fire Station - Building 34012.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/28/10	--	JIS	SB	CH	s-140435,0601-10/10-w



3. Looking northwest toward the front of the Shop Facility - Building 34026.



4. Looking northeast toward the front of the Flight Simulator Facility - Building 30152.

OFFICE Cincinnati, OH	DATE 10/28/10	DESIGNED BY --	DRAWN BY JIS	CHECKED BY SB	APPROVED BY CH	DRAWING NUMBER S-140435.0601-10/10-W
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5. Looking north toward Building 34016 (left of center) and Building 34015 (right of center).

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Appendix C
Clean Air Act
General Conformity Analysis

EXECUTIVE SUMMARY

Agencies: U.S. Air Force (USAF), Air Force Reserve Command (AFRC), 445th Airlift Wing (445 AW), Wright-Patterson Air Force Base (AFB), Ohio

Designation: Clean Air Act General Conformity Analysis

Affected Location: Wright-Patterson AFB, Ohio

Proposed Action: 445 AW conversion from C-5 aircraft to C-17 aircraft

Abstract: AFRC is proposing an aircraft replacement for the 445 AW based at Wright-Patterson AFB, Ohio. The 445 AW currently possesses ten C-5 Primary Assigned Aircraft (PAA). The ten C-5 aircraft would be replaced by eight C-17 PAA and one Backup Aircraft Inventory (BAI) for a total of nine C-17 aircraft. The ten C-5 aircraft are scheduled to be retired or transferred from WPAFB. The drawdown of C-5 aircraft is scheduled to begin in Fiscal Year 2011 (FY 11). The aircraft conversion, if implemented, would begin in FY 11 and end by the first quarter in FY 12. The Proposed Action would provide the necessary base infrastructure modifications and personnel changes to enable 445 AW aircrews to perform readiness training operations and ensure that mission requirements for C-17 aircraft are met and sustained.

The Proposed Action at Wright-Patterson AFB would be located in the Dayton-Springfield Metropolitan Area, which is currently designated as a “maintenance” area for attainment with the National Ambient Air Quality Standard (NAAQS) for ozone (O₃; both 1-hour and 8-hour standards) (OEPA 2010a-c). In addition, the area is classified for very fine particulate matter (PM_{2.5}) as attainment with the 24-hour standard and nonattainment for the annual standard (OEPA 2010a-c).

The USEPA recently proposed new NAAQS for several criteria pollutants including O₃ (March 2008), lead (Pb; November 2008), nitrogen dioxide (NO₂; February 2010), and sulfur dioxide (SO₂; June 2010) (USEPA 2008a, b);(USEPA 2010a, c). The USEPA and Ohio EPA have not yet completed effective designations for these pollutants as of the date of this conformity applicability analysis (OEPA 2010a-c). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Actions has no statutory impact on this Conformity Analysis because Section 6 of 176.c of the CAAA states that Conformity does not take effect until one year after the effective date of a nonattainment designation (40 CFR 93.153(k)).

Based upon the conformity applicability criteria requirements, and the current attainment status of the areas affected by Wright-Patterson AFB operations, this conformity analysis focuses upon potential air emissions of O₃ precursors, [i.e., volatile organic compounds (VOCs) and nitrogen oxides (NO_x)], PM_{2.5} direct emissions, and PM_{2.5} precursors (i.e. SO₂ and NO_x). This analysis does not address the pollutants for which affected areas are in “attainment” – sulfur oxides (SO_x), nitrogen dioxide (NO₂), carbon monoxide (CO), fine particulate matter (PM₁₀), and Lead (Pb).

1 Emissions of VOC, NO_x, PM_{2.5}, and SO₂ in the vicinity of Wright-Patterson
2 AFB (Metropolitan Dayton Intrastate Air Quality Control Region [AQCR]) are
3 all expected to be reduced as a result of the Proposed Action.

4 The conformity analysis completed for this project concluded that the
5 Proposed Action at Wright-Patterson AFB will not be required to conduct a
6 conformity determination under the requirements of the Federal Conformity
7 Rule. Emissions estimates attached to this analysis predict a net decrease for
8 all criteria pollutants for any calendar year of the proposed project and thus
9 would fall below the 100 tons per year *de minimis* thresholds of VOC, NO_x,
10 PM_{2.5}, and SO₂ for triggering a formal Conformity determination, as defined in
11 40 CFR 93.153(b). The General Conformity Regional Significance threshold
12 no longer applies because it was deleted in the new Federal General
13 Conformity rules promulgated on April 4, 2010 (USEPA 2010b).

14 **Conformity**

15 **Analysis:**

16 After careful and thorough consideration of the facts contained herein, and
17 following consideration of the views of those agencies having jurisdiction by
18 law or special expertise with respect to air quality impacts and the SIP, the
19 project proponent finds that the proposed Federal actions are consistent with
20 the objectives as set forth in Section 176(c) of the Clean Air Act (CAA), as
21 amended, and its implementing regulation, 40 CFR Part 93, Subpart B,
22 Determining Conformity of General Federal Actions to State and Local
23 Implementation Plans, and said actions conform to the applicable SIP in
accordance with the law.

24 The conformity analysis is based upon the total direct and indirect emissions
25 associated with the proposed conversion of ten C-5 to nine C-17 aircraft at
26 Wright-Patterson AFB. Future activity levels and aircraft operations
27 associated with Wright-Patterson AFB addressed by this action may differ
28 from those analyzed in this conformity analysis. If the Proposed Action is
29 changed so that there would be a change in the total direct and indirect
30 emissions reported in this analysis, a new conformity analysis would be
31 performed.

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C.1. Introduction

The Clean Air Act Amendments (CAAA) of 1990 require Federal agencies to ensure that their actions conform to the applicable State Implementation Plan (SIP). The SIP is a U.S. Environmental Protection Agency (USEPA)-approved plan developed by state or local agencies. It provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP includes emission limitations, rules, schedules, and specific control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the Clean Air Act (CAA), means conforming to the SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards.

As a Federal agency and proponent of a "Federal Action," the U.S. Air Force (USAF) must complete a conformity analysis to determine whether the basing of C-17 aircraft and associated regulated pollutant emissions at Wright-Patterson AFB would conform to the Ohio SIP. This project includes the replacement of ten C-5 Galaxy aircraft with nine C-17 Globemaster aircraft as well as construction activities limited to the renovation/modification of the interior of several existing maintenance and operations facilities. Five construction projects were identified that would be needed to provide adequate facilities for the C-17 airframe and required personnel training and support mission. Personnel authorizations would decrease by two for the full-time staff and 150 for the reserve staff. All elements of the Proposed Action could affect areas covered by the SIP, so a conformity analysis is required.

C.1.1 Background

The CAA and CAAA were passed by Congress and corresponding rules were promulgated by USEPA because it has been determined that certain pollutants have the potential to cause an adverse effect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain healthful air, NAAQS were established for seven criteria pollutants. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter less than 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), sulfur oxides (SO_x), and lead (Pb). Ozone is not typically emitted directly from emission sources, but rather is formed in the atmosphere by photochemical reactions involving sunlight and other emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, O₃ concentrations in the atmosphere are controlled through limiting the emissions of NO_x and VOCs.

PM_{2.5} can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable PM_{2.5} can include SO₂, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there. The States in developing SIP revisions must determine which precursors are considered significant for PM_{2.5} formation. In the draft Ohio SIP revisions proposed on April 24, 2009, Ohio EPA included in the definition of “PM_{2.5} precursor” that PM_{2.5} precursors include sulfur dioxide and nitrogen oxides in OAC Rule 3745-31-01(UUUU) draft 04/24/2009.

Air quality conformity provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in; support in any way; provide financial assistance for; license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176(c) (42 United States Code 7506c) of the CAA, as amended in 1990, further explained conformity to an implementation plan as meaning conformity to the plan’s purpose of eliminating or reducing the severity of violations of the NAAQS, and achieving timely attainment of these standards. In November 1993, USEPA promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA.

In establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate a proposed Federal action and ensure that it does not:

1. Cause a new violation of a NAAQS
2. Contribute to an increase in the frequency or severity of violations of NAAQS
3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors) emitted in areas designated as nonattainment for those pollutants as well as pollutants for which an area has been redesignated from nonattainment to attainment (i.e., a maintenance area).

The Conformity Rule requires that Federal agencies do a conformity applicability analysis to determine whether a formal conformity determination is required. The primary criteria used in an applicability analysis are the *de minimis* thresholds. The total direct and indirect emissions associated with a proposed action are compared to the *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). **Table C-1** below presents the applicable *de minimis* thresholds under the General Conformity Rule.

1

Table C-1. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	<i>de minimis</i> Limit (tpy)
Ozone (measured as NO _x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO _x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO _x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/maintenance	All	100
Particulate Matter (PM ₁₀)	Nonattainment/maintenance	Serious	70
		Moderate	100
		Not applicable	100
Sulfur Dioxide (SO ₂)	Nonattainment/maintenance	Not applicable	100
Nitrogen Oxides (NO ₂)	Nonattainment/maintenance	Not applicable	100
Lead (PB)	Nonattainment/maintenance	All	25

Source: 40 CFR 93.153

tpy: tons per year

2

3 When applicable, another required analysis is a comparison of the Federal action's emissions to any
4 existing SIP emission budgets that have been established specifically for the Federal facility or the
5 affected region. If the action would cause an increase in emissions such that the established SIP
6 emissions budgets would be exceeded, a formal conformity determination and other applicable rule
7 requirements would apply. In the case of Wright-Patterson AFB, there is no facility-specific
8 emissions budget in the Ohio SIP.

9 **C.1.2 Purpose**

10 The purpose of this general conformity analysis is to document the USAF's compliance with CAA
11 requirements in accordance with 40 CFR 93 subpart B and Ohio Administrative Code, Rule 3745-
12 102. This conformity analysis will analyze the air quality impact of emissions of nonattainment
13 pollutants (i.e., NO_x, VOC, PM_{2.5}, and SO₂) resulting from the proposed Federal action in order to
14 determine whether the Proposed Action will be subject to these Federal and state conformity rules.

C.1.3 Document Organization

The remainder of Section C.1 presents the purpose and background for the document, describes the proposed project at Wright-Patterson AFB and summarizes the existing air quality conditions in the region. Section C.2 of this analysis outlines the regulatory requirements of the General Conformity Rule and their relationships to this Conformity Analysis.

Section C.3 details the applicability of the conformity rule to the proposed Wright-Patterson AFB C-5 to C-17 conversion project. Section C.4 provides the conformity analysis results for the Proposed Action. Finally, the emissions estimations attached to this analysis detail the calculation methodologies and results used for this conformity analysis.

C.1.4 Existing Air Quality

Air Basins/Air Quality Control Regions

Wright-Patterson AFB is located in Greene and Montgomery counties, Ohio, which are in the Metropolitan Dayton Intrastate Air Quality Control Region (AQCR). The Metropolitan Dayton AQCR consists of the counties of Clark, Greene, Miami, Montgomery, Darke, and Preble.

Air quality resources in the Metropolitan Dayton AQCR are managed by the Ohio Environmental Protection Agency (OEPA), Division of Air Pollution Control (DAPC). Local permitting of stationary air emissions sources is delegated to the Regional Air Pollution Control Agency (RAPCA) in Dayton. Ambient air quality for the Metropolitan Dayton Intrastate AQCR was formerly classified as a maintenance area for the 1-hour O₃ and 8-hour O₃ (1997) standards and is classified as a nonattainment area for the annual PM_{2.5} NAAQS (USEPA 2005); (USEPA 2007). Except as noted in the following paragraph, the Metropolitan Dayton Intrastate AQCR is designated as an unclassifiable/attainment area for all other criteria pollutants, which include SO_x, PM₁₀, CO, NO₂, and Pb.

Ambient Air Quality Attainment Designations for Affected Air Quality Control Region

The USEPA recently proposed new NAAQS standards for several criteria pollutants including O₃ (March 2008), Pb (November 2008), NO₂ (February 2010), and SO₂ (June 2010) (USEPA 2008a, b); (USEPA 2010a, c). The USEPA and Ohio EPA have not yet completed effective designations for these pollutants as of the date of this conformity applicability analysis (OEPA 2010a, b); (OEPA 2010). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Action has no statutory impact on this Conformity Analysis. Furthermore, the recently revised General Conformity Rule included new *de minimis*

1 thresholds for PM_{2.5} and did not change the other pollutant thresholds (USEPA 2010b). This is
2 because the General Conformity *de minimis* thresholds correspond to the CAAA Title V Major
3 Stationary Source emissions thresholds for each nonattainment classification. The new Major
4 Stationary Source emission threshold for “basic” nonattainment with the 8-hour O₃ standard is 100
5 tons per year. Therefore, assuming that the General Conformity Rule follows this precedent when
6 updated, the General Conformity *de minimis* thresholds for NO_x, VOC, PM_{2.5}, and SO₂ in the Dayton-
7 Springfield Metropolitan Area would be expected to remain at 100 tpy for the next several years.

8 ***Nonattainment Pollutants***

9 Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously
10 emitted pollutants (mainly VOCs and NO_x) and sunlight. A brown odorless gas, O₃ can cause
11 irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum
12 effect of the precursor emissions on O₃ formation may be many miles from the source because O₃ is a
13 by-product of a photochemical reaction.

14 PM_{2.5} can be emitted from emission sources directly as very fine dust and/or liquid mist or formed
15 secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate
16 compounds. Precursors of condensable PM_{2.5} can include SO₂, NO_x, VOC, and ammonia. Secondary
17 (indirect) emissions vary by region depending upon the predominant emission sources located there.
18 Health studies have shown a significant association between exposure to fine particles and premature
19 death from heart and lung disease. Fine particles can aggravate heart and lung diseases and have been
20 linked to effects such as: cardiovascular symptoms; cardiac arrhythmias; heart attacks; respiratory
21 symptoms; asthma attacks; and bronchitis. These effects can result in increased hospital admissions,
22 emergency room visits, absences from school or work, and restricted activity days.

23 ***State Implementation Plan***

24 In accordance with Federal and state CAA requirements, the OEPA and all agencies responsible for
25 CAA implementation in nonattainment areas must develop and implement a plan to reduce and
26 maintain regulated air pollution levels that are less than the NAAQS. On April 24, 2009, Ohio EPA
27 completed draft amendments to several rules in OAC Rule 3745-31 and OAC Rule 3745-17-08 rules
28 related to Federal changes affecting the implementation of PM_{2.5}. On December 9, 2009, Ohio EPA
29 drafted new rules and amended several rules in OAC Rule 3745-21, OAC Rule 3745-72, and OAC
30 Rule 3745-110 intended to assist in achieving and maintaining the NAAQS for O₃ through the control
31 of O₃ precursors. These draft rules have not become SIP approved by the USEPA as of the

1 completion of this applicability determination. Ohio EPA maintains a current listing of area
2 attainment status on its website at <http://www.epa.ohio.gov/dapc/general/naaqs.aspx>.

3

C.2. GENERAL CONFORMITY DETERMINATION REQUIREMENTS

C.2.1 Regulatory Background

USEPA has promulgated rules that establish the conformity determination criteria and procedures for Federal actions, pursuant to Section 176(c) of the CAA. The General Conformity Rule (40 CFR Part 93, Subpart B) defines the “general” conformity criteria and procedures for Federal agencies that propose to implement non-transportation projects. The Ohio Administrative Code Rule 3745-102 contains the General Conformity Rules promulgated by the state of Ohio. These Ohio rules essentially mirror the Federal requirements of the Federal General Conformity Rule; however, the most recent revisions to the Federal General Conformity Rule that became final on April 5, 2010 (75 FR 17274) have not been incorporated into the Ohio SIP as of the date of this applicability analysis.

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as nonattainment areas), and/or areas that are subject to attainment maintenance plans (designated as maintenance areas). As noted in Section C.1, the Proposed Action would be located in the Metropolitan Dayton AQCR in Ohio. This AQCR has been designated a maintenance area for O₃ and non-attainment for PM_{2.5}. The AQCR is in attainment with NAAQS for each of the other criteria pollutants. This conformity applicability analysis will evaluate the conformity of the Proposed Action emissions of O₃ precursors (NO_x and VOC), direct PM_{2.5}, and indirect PM_{2.5} precursors (SO₂ and NO_x) in the affected region. The following subsections describe the General Conformity Rule procedures and criteria, and how they specifically pertain to this conformity analysis.

C.2.2 Exemptions and Applicability

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo thorough air quality analysis to comply with other statutory requirements; actions that would result in no emission increase or an increase in emissions that is clearly *de minimis*; or actions presumed to conform by the agency through separate rule-making actions. These exemptions include the transfer of ownership of real property under 40 CFR 93.153(c)(2)(xiv and xx), as well as leasing agreements pending environmental restoration under 40 CFR 93.153(c)(2)(xix).

1 The only source exemption potentially applicable to the USAF's Proposed Action for basing of C-17
2 aircraft at Wright-Patterson AFB is the exemption for major or minor new or modified *stationary*
3 sources, which are subject to permits under OEPA's New Source Review (NSR) program or
4 Prevention of Significant Deterioration (PSD) program (40 CFR 93.153(d)(1)). No new or modified
5 stationary sources included in this Proposed Action are anticipated to require a permit.

6 ***De minimis Emission Levels***

7 In addition to the specific source exemptions identified in the conformity rule, Federal actions might
8 be exempt from the conformity requirements if the action meets the applicability criteria for *de*
9 *minimis* emission levels. The applicability determination procedures presented in the rule include the
10 following elements:

- 11 • Define the applicable emission sources for the Federal action
- 12 • Quantify the total direct and indirect emissions of nonattainment pollutants from these
13 sources
- 14 • Compare these emission rates against the appropriate *de minimis* emission levels

15 If the total direct and indirect emissions of nonattainment pollutants reach or exceed these
16 applicability threshold values, a Conformity Determination must be prepared by the Federal agency
17 before undertaking the action.

18 The conformity rule defines direct and indirect emissions based upon the timing and location of the
19 emissions. "Direct" emissions are those that are caused or initiated by the Federal actions, and occur
20 at the same time and place as the action and are reasonably foreseeable. "Indirect" emissions are
21 those that originate in the same nonattainment or maintenance area, but occur at a different time or
22 place from the Federal action. In addition, the conformity rule limits the scope of indirect emissions
23 to those that are *reasonably foreseeable* by the agency at the time of analysis, and those emissions
24 that the Federal agency can practicably control and maintain control of through its continuing
25 program responsibility.

26 The definitions of direct and indirect emissions do not distinguish among specific source categories;
27 point, area, and mobile sources are given equal consideration in the conformity requirements. All
28 substantive procedural requirements of the General Conformity Rule apply to the total of the net
29 increases and decreases in direct and indirect emissions resulting from the action.

1 If the total of direct and indirect emissions from the action meet or exceed the *de minimis*, the agency
2 must perform a conformity determination to demonstrate the positive conformity of the Federal
3 action. The *de minimis* emission levels vary by the criteria pollutant and the severity of the region's
4 nonattainment conditions.

5 Section C.3 presents the specific emission thresholds and the applicability analysis results for the
6 USAF's Proposed Action to retire ten C-5 aircraft and beddown nine C-17 aircraft at Wright-
7 Patterson AFB.

8 **C.2.3 CAA General Conformity Criteria**

9 If the Proposed Action is not exempt from the conformity demonstration requirements, the General
10 Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal
11 action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses
12 and/or dispersion modeling for the nonattainment pollutants. If the Federal action meets the
13 conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If
14 the action cannot meet the criteria and requirements, the agency must develop an enforceable
15 implementation plan to mitigate effectively (e.g., completely offset) the increased emissions from the
16 Proposed Action to meet the conformity requirements. The Federal action cannot proceed unless
17 positive conformity can be demonstrated.

18 The General Conformity Rule provides the option to select any one of several criteria to analyze the
19 conformity of the Proposed Action. Presented in 40 CFR 93.158, the criteria are primarily based
20 upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes
21 that further conformity analyses are required to demonstrate positive conformity (i.e., *de minimis*
22 thresholds are exceeded) the following conformity criteria (paraphrased below) can be used to
23 demonstrate conformity for a proposed action in a nonattainment area:

- 24 • The total direct and indirect emissions for the Proposed Action are specifically identified
25 and accounted for in the applicable SIP's attainment or maintenance demonstration. [40
26 CFR 93.158(a)(1)].
- 27 • The total direct and indirect emissions of O₃ precursors are fully offset within the same
28 nonattainment or maintenance area through a revision to the applicable SIP or a similarly
29 enforceable measure so that there is a no net increase in emissions [40 CFR
30 93.158(a)(2)].
- 31 • The State has made a revision to the area's attainment or maintenance demonstration
32 after 1990 and the State either:

- o Determines and documents that the action, together with all other emissions in the nonattainment (or maintenance) area, *would not* exceed the emissions budget specified in the applicable SIP.
- o Determines that the action, together with all other emissions in the nonattainment (or maintenance) area, *would* exceed the emissions budget specified in the applicable SIP but the State’s Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR 93.158(a)(5)(i)(A & B)].
- The Federal action fully offsets its entire emissions within the same nonattainment area through a revision to the SIP or a similar measure so that there is no net increase in nonattainment pollutant emissions [40 CFR 93.158(a)(5)(iii)].
- The State has not made a revision to the approved SIP since 1990, and the total emissions from the action do not increase emissions above the baseline emissions which are either:
 - o Calendar Year 1990 (CY 90) emissions or another calendar year that was the basis for the nonattainment area designation) [40 CFR 93.158(a)(5)(iv)(A)].
 - o Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.
- Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards [40 CFR 93.158(b)].

The USEPA revised the general conformity regulation on April 5, 2010 (USEPA 2010). One of the changes to the regulation relates to the determination of regional significant action. The USEPA deleted the provision of the then existing regulation (40 CFR 93.153) that requires Federal agencies to conduct conformity determinations for regional significant actions where the direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area’s emission inventory for that pollutant. It applied even though the total direct and indirect emissions from the actions are below the *de minimis* emission levels or the actions are otherwise “presumed to conform.” The OEPA is revising its general conformity rule to be consistent with the revised Federal regulation (USEPA 2010c).

C.2.4 Other State Implementation Plan Consistency Requirements

The conformity analysis must also demonstrate that total direct and indirect emissions from the Proposed Action will be consistent with the applicable SIP requirements and milestones, including:

- Reasonable further progress schedules
- Assumptions specified in the attainment or maintenance demonstration
- SIP prohibitions, numerical emissions limits, and work practice requirements

C.3. APPLICABILITY ANALYSIS

This section of the conformity analysis describes the applicability analysis of the proposed C-5 to C-17 conversion project at Wright-Patterson AFB to the General Conformity Rule requirements.

C.3.1 Sources Included in the Conformity Analysis

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from proposed Federal action includes several types of stationary and mobile sources. These emissions would occur during construction and operational conditions with the Proposed Action. As defined by the rule and applied to the Proposed Action at Wright-Patterson AFB, direct emissions would result from emissions sources not subject to air permitting as well as proposed C-17 flight operations. Examples of direct emissions sources include construction activities, aerospace ground equipment (AGE) devices, and flight operations. Indirect pollutant emissions for the proposed project include activities that the USAF can control as part of the Federal action and include government-owned vehicles (GOVs) and privately-owned vehicles (POVs), and various military support activities at the base.

C.3.2 Total Direct and Indirect Emission Calculations

The estimates of the net changes in nonattainment pollutant emissions that would result from implementation of the Proposed Action at Wright-Patterson AFB are presented in the attachment of this Appendix. These calculations are based on a comparison of future activities to current operations at Wright-Patterson AFB, including operations and support of the existing ten C-5 aircraft that are scheduled to be phased out and replaced by nine C-17 aircraft. The resulting analyses indicate that the majority of the potential pollutant impacts would result from three elements of the Proposed Action: (1) construction activities at Wright-Patterson AFB, (2) airfield operations at Wright-Patterson AFB, and (3) commuter traffic from motor vehicles. The net changes in direct and indirect VOC, NO_x, PM_{2.5}, and SO₂ emissions from these elements of the Proposed Action are presented below.

Construction Activities

AFRC has identified five construction activities that are directly related to the proposed beddown of C-17 aircraft at Wright-Patterson AFB. The construction activities would be limited to renovation/modification of the interior of several existing maintenance and operations facilities at WPAFB to support C-17 aircraft. The portion of the construction activities that have the potential to emit air pollutants include the demolition and reconstruction of a concrete pad, painting the new

concrete pad, painting air craft nose wheel stop blocks, and painting two interior walls. Additional emissions would result from construction worker commuter traffic that would occur during the entire execution of the Proposed Action.

The construction activities identified for analysis would occur during fiscal years 2011 and 2012. All emissions are attributed to calendar year 2011 in this analysis because it is difficult to predict which activities will occur in 2011 and which will occur in 2012. This assignment of all activities to 2011 will have no significant impact on the analysis conclusion because the associated emissions are very small. PM₁₀ and PM_{2.5} emissions would be generated in the form of fugitive dust from concrete demolition, material transfer, and truck/equipment movement. All criteria pollutants would also be emitted during construction as combustion by-products from diesel-fueled construction equipment and truck hauling vehicles. VOC evaporative emissions would occur due to equipment and building interior painting. The construction worker commuter emissions are accounted for in the commuter section below.

Table C-2 presents the estimated annual emissions of the nonattainment pollutants generated during construction activities at Wright-Patterson AFB. As shown, the greatest total annual pollutant emission rates for construction activities are projected to occur during CY 2011.

**Table C-2. Construction Activity Emissions from the Proposed Action
at Wright-Patterson AFB**

Construction Period (CY)	VOC (tpy)	NO _x (tpy)	PM _{2.5} (tpy)	SO ₂ (tpy)
2010	-	-	-	-
2011	0.104	0.181	0.182	0.009
2012	-	-	-	-

CY: Calendar Year

tpy: tons per year

Airfield Flight Operations

The replacement of the C-5 with C-17 aircraft would not be an instantaneous event, but rather would take place as a gradual transition. It is assumed that C-5 aircraft would be retired beginning with five aircraft during the last quarter of CY 2010 and the remaining five during the third quarter of CY 2011. The buildup of the C-17s would overlap with the drawdown of the C-5 aircraft. The first four C-17s would be expected during the first quarter of CY 2011, with additional four aircraft arriving by the fourth quarter of CY 2011.

C-17 operational activities would reach full activity levels in CY 2012. Though airfield operations and training flights would not cease during the transition, the expected pattern of drawdown/buildup may result in a period of slightly reduced operations activity during the period of maximum construction activity. All seven regulated criteria pollutants are emitted from both operations and construction activities as by-products of fuel combustion.

Aircraft support operations, including AGE, fuel storage and handling, on- and off-road GOV use, touch-up surface coating, and fuel cell maintenance have been reviewed. Emissions from touch-up surface coating, fuel storage and handling, and fuel cell maintenance might change slightly as a result of the Proposed Action, but the changes would not be substantial, relative to normal year-to-year variations, and therefore, have not been estimated. Furthermore, these sources are stationary sources that are subject to NSR permitting and, therefore, not subject to General Conformity analysis. Of all the emission-related activities at Wright-Patterson AFB, only airfield operations, which include landings and takeoffs (LTOs), touch-and-gos (TGOs), auxiliary power units, on-wing engine testing, and AGE would change as a result of the Proposed Action. It is noted that this analysis addresses operations associated with the existing airfield at WPAFB. Although there is the potential for constructing an assault airstrip at WPAFB in the future, there are no plans at this time. In the event the assault strip is funded and designed, the appropriate EIAP documentation would be prepared

Table C-3 presents estimates of current C-5 airfield operations emissions as well as projections of the net changes in airfield operations emissions (relative to current activities) as a result of the Proposed Action.

Table C-3. Baseline and Net Changes in Military Airfield Operation Emissions Associated with the Proposed Action at Wright-Patterson AFB

Projected Year	VOC (tpy)	NO _x (tpy)	PM _{2.5} (tpy)	SO ₂ (tpy)
Current/Baseline C-5 Airfield Emissions:	10.62	192.80	9.40	10.80
2010 net change	-1.33	-24.10	-1.17	-1.35
2011 net change	-5.66	-70.57	-5.51	-3.41
2012 and beyond net change	-9.53	-112.91	-8.90	-6.31

tpy: tons per year

As shown in **Table C-3**, the expected emissions of VOC, NO_x, PM_{2.5}, and SO₂ are all less than current emissions for all future years under the Proposed Action. This is due to the fact that two

fewer number of C-17 aircraft will be completing about 25% less operations per year than the current C-5 aircraft. Additionally, the C-17 aircraft requires about 80% less AGE operating time than the C-5 aircraft. Detailed emission calculations for proposed airfield operations are presented in the attachment to this Conformity Analysis.

For the purposes of this analysis, an air pollutant ‘mixing height’ of 3,000 feet above ground level (AGL) has been assumed. That is, aircraft emissions released above this altitude are not considered to have any impact on ground-level air quality. Therefore, airfield activity emissions are tabulated from the ground up to 3,000 feet AGL.

Motor Vehicle Emissions

Motor vehicle emissions include commuter emissions associated with the changes in permanent program staff (i.e., maintenance, operations and support staff) associated with the C-5 to C-17 conversion. Commuter vehicle emissions associated with temporary construction workers and activities are included in the construction emissions in **Table C-2** above.

The Proposed Action is expected to require 152 fewer full-time staff and part-time staff which is made up of two less full time and 150 less part-time. Because the majority of the staff reductions are part-time reserve duty personnel, the vehicle emissions were calculated using full-time staff reduction levels that are anticipated to occur in the first year of the Proposed Action. **Table C-4** below lists the projected net changes in commuter motor vehicle emissions under the Proposed Action.

Table C-4. Net Changes in Motor Vehicle Emissions Associated with the Proposed Action at Wright-Patterson AFB

Projected Year	VOC (tpy)	NO _x (tpy)	PM _{2.5} (tpy)	SO ₂ (tpy)
2010 net change	-	-	-	-
2011 net change	-0.003	-0.003	-0.0002	-0.0001
2012 and beyond net change	-0.003	-0.003	-0.0002	-0.0001

tpy: tons per year

C.3.3 Applicability Analysis Results

Wright-Patterson AFB Operations

Table C-5 sums the net Proposed Action emissions changes from Tables C-2 through C-4 above, and compares those impacts to the applicable General Conformity *de minimis* thresholds. The results of the applicability analysis indicate that total cumulative peak year direct and indirect emissions at Wright-Patterson AFB (i.e., the sum of construction and airfield operations) within the Metropolitan Dayton Intrastate AQCR would *not* exceed the 100 tpy *de minimis* for any of the criteria pollutants of concern. Therefore, state and Federal General Conformity rules are not applicable, and no conformity determination is required for this Proposed Action.

Table C-5. Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC), Fine Particulate Matter (PM_{2.5}), and Sulfur Dioxide (SO₂) Emissions – Comparison to Conformity *de minimis* Thresholds for Metropolitan Dayton Intrastate Air Quality Control Region

Criteria Pollutant	Ozone Attainment Status ¹	<i>de minimis</i> Threshold (tpy)	Proposed Action Emissions Net Change ² (tpy)	% of <i>de minimis</i> Threshold
NO_x (as O ₃ precursor)	Maintenance	100	-138.96	-239.0%
VOC	Maintenance	100	-9.84	-109.8%
PM_{2.5}	Nonattainment	100	-9.82	-109.8%
SO₂	Nonattainment	100	-6.79	-106.8%
NO_x (as PM _{2.5} precursor)	Nonattainment	100	-138.93	-238.9%

¹ There are no NO_x (NO₂) or SO₂ nonattainment areas. The *de minimis* threshold for NO_x and SO₂ emissions is defined by the ozone and PM_{2.5} attainment statuses respectively.

² Net emissions change corresponding to 2012 and beyond. Note that this table format does not evaluate the interim-year emissions increases shown in Tables C-2 through C-4. However, a review of Tables C-2 through C-4 shows that the net emissions change for interim years show emission reductions for all pollutants of concern (emissions will be reduced relative to current emissions).

tpy: tons per year

C.4. CONFORMITY ANALYSIS AND RESULTS

This section presents the conclusion of the conformity analysis for the proposed conversion of C-5 to C-17 aircraft at Wright-Patterson AFB. The purpose of this analysis is to determine whether the USAF's Proposed Action at Wright-Patterson AFB would conform to the applicable SIP, based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158.

The regulatory basis and specific criteria for this analysis were presented in Section 2.0 above. This Section C.4 presents the results of the conformity analysis for the following criterion:

A Conformity Determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal Action would equal or exceed any of the (de minimis) rates.[40 CFR, 93.153(b)]

This criterion is shown to be satisfied by the information presented in Section C.3, Tables C-2 through C-5. That is, the reasonably foreseeable project emissions of NO₂, VOC, PM_{2.5}, and SO₂ would not exceed the General Conformity Rule *de minimis* levels. This conclusion is supported by the calculations attached to this analysis.

Based upon the conformity analyses results summarized in the previous sections, the proposed Federal action at Wright-Patterson AFB has been shown to meet the conformity criteria for consistency with the Ohio SIP requirements. The proposed Federal actions are therefore consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the applicable SIP in accordance with the law.

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Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Summary of Proposed Action Emissions

BASELINE (CY2009)

Operation	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM10 (tpy)	PM2.5 (tpy)
Airfield	192.80	10.62	35.12	10.80	9.40	9.40
AGE	34.48	2.02	20.14	0.65	1.55	1.51
Commuter (net)	-	-	-	-	-	-
Construction Commuter	-	-	-	-	-	-
Construction Activities	-	-	-	-	-	-
Surface Coating	-	-	-	-	-	-
Total Baseline	227.29	12.64	55.26	11.45	10.95	10.90

CY2010

Operation	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM10 (tpy)	PM2.5 (tpy)
Airfield	168.70	9.29	30.73	9.45	8.22	8.22
AGE	30.17	1.77	17.62	0.57	1.36	1.32
Commuter (net)	-	-	-	-	-	-
Construction Commuter	-	-	-	-	-	-
Construction Activities	-	-	-	-	-	-
Surface Coating	-	-	-	-	-	-
Total CY2010	198.88	11.06	48.35	10.02	9.58	9.54

CY2011

Operation	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM10 (tpy)	PM2.5 (tpy)
Airfield	122.23	4.96	21.51	7.39	3.93	3.89
AGE	18.20	1.83	12.44	0.35	0.96	0.93
Commuter (net)	-0.003	-0.003	-0.042	0.000	0.000	0.000
Construction Commuter	0.089	0.081	1.183	0.003	0.007	0.004
Construction Activities	0.091	0.007	0.035	0.007	1.158	0.178
Surface Coating	-	0.016	-	-	-	-
Total CY2011	140.52	6.87	35.10	7.74	4.89	4.82

CY2012

Operation	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM10 (tpy)	PM2.5 (tpy)
Airfield	79.89	1.09	8.40	4.50	0.55	0.50
AGE	8.43	1.71	7.82	0.16	0.60	0.58
Commuter (net)	-0.003	-0.003	-0.042	0.000	0.000	0.000
Construction Commuter	-	-	-	-	-	-
Construction Activities	-	-	-	-	-	-
Surface Coating	-	-	-	-	-	-
Total CY2012	88.32	2.80	16.19	4.66	1.15	1.08

Net Emissions Changes for Proposed Action

Deltas for Proposed Action, Relative to Current Operations		NO _x (tons)	HC (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	PM2.5 (tons)
	CY2010	-28.41	-1.58	-6.91	-1.43	-1.37	-1.36
	CY2011	-86.76	-5.77	-20.16	-3.71	-6.05	-6.08
	CY2012	-138.96	-9.84	-39.07	-6.79	-9.80	-9.82
CY2013 and Beyond		-138.96	-9.84	-39.07	-6.79	-9.80	-9.82

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Airfield Operation Emissions (LTOs and TGOs)

Discussion of Airfield Operations

Of the stationary and mobile air emissions sources at Wright-Patterson AFB, the source category most impacted by the Proposed Action will be airfield operations for the aircraft operated by 445 AW at the Wright-Patterson AFB Airfield.

Airfield operations include landings and takeoffs (LTOs) , which consist of
"Idle Out" as the aircraft rolls out to the runway and queues for takeoff;
"Takeoff" which is a short burst of full-power acceleration down the runway.
"Climbout" which is the climb from the runway to 3,000 ft AGL (the 'mixing height' altitude above which emissions have little or no impact on ground-level air quality);
"Approach" which is the descent from 3,000 ft to the runway, and braking;
"Idle In" which is the taxi back to the apron or terminal.

Touch-and-Go (TGO) operations are practice landings and takeoffs. These operations are characterized in exactly the same way as LTOs, but with no idle time. Because the airplanes do not slow to a stop, there may also be no "takeoff" thrust required, only "approach" and "climbout".

Assumptions Used in Emissions Estimates

The methodology and times-in-mode (TIM) minutes at each throttle setting used in this analysis were obtained from the "Air Emissions Factor Guide to Air Force Mobile Sources" HQ AFCEE/TDEQ, December 2009.

"Trim tests" is the generic term used here to refer to all on-wing testing of engines. Actual trim tests are tests done to balance the throttles when the computer indicates a thrust imbalance or when an engine is replaced. Other on-wing tests include leak checks after routine or unscheduled service, isochronal inspections which are scheduled activities based on cycles and flying hours, and other scheduled and unscheduled maintenance activities. The Air Force's Air Conformity Assessment Model (ACAM) assumes 28 on-wing engine tests per year per aircraft, with time-in-mode designed to represent the spectrum of different on-wing tests. ACAM assumes these same values for all aircraft, unless the user keys in site-specific data. After confirming with Lt. Col. Marlin, it was agreed that a value of 16 trim tests per engine per plane was a more accurate assumption yet still conservative based on WPAFB experience. The same test schedule has been assumed for both the C-17 and C-5 operations.

Auxiliary Power Unit (APU) operation depends on the outside temperature and whether AGE equipment to provide compressed air and electricity is available in proximity to the aircraft. For this analysis, we have conservatively assumed that each airplane operates an APU for one hour before each takeoff and 1/2 hour after each landing. This assumption will tend to double count a few pounds of emissions that are attributed to AGE equipment.

Aircraft Descriptions and Airfield Activity Data

C-5 A/B Total Airfield Operations by Year

	2009	2010	2011	2012
LTO Ops	500	438	188	0
TGO Ops	1,500	1,313	563	0
Total Ops	2,000	1,750	750	0
APU Cycles	500	438	188	0
Trim Tests	160	140	60	0

C-5A/B Aircraft Data

assigned aircraft	10
engines each	4
engine model	TF39-GE-1C
APU model	GTCP85-98D

C-5 data (engine TF39-GE-1C) from Tables 3-3 and 3-7, AFIERA AEI Guidance for Mobile Sources, January 2002.

LTO & TGO ops. Data from Tables 2-5, DOPPA for the Wright-Patterson AFB C-5 to C-17 Conversion, October 2010

Data assumes 50 LTO and 150 TGO per C-5 Primary Assigned Aircraft (PAA) per year.

C-17A Total Airfield Operations by Year

	2009	2010	2011	2012
LTO Ops	0	0	375	600
TGO Ops	0	0	563	900
Total Ops	0	0	938	1,500
APU Cycles	0	0	375	600
Trim Tests	0	0	80	128

C-17A Aircraft Data

assigned aircraft	8
engines each	4
engine model	F117-PW-100
APU model	331-259(G)

C-17 data (engine F117-PW-100) from Tables 1-4 and 1-8, Air Emissions Factor Guide for Air Force Mobile Sources, December 2009.

LTO & TGO ops. Data from Tables 2-5, DOPPA for the Wright-Patterson AFB C-5 to C-17 Conversion, October 2010

Data assumes 75 LTO per C-17 PAA per year and 450 TGO per C-17 PAA per year of which only 25% occur at WPAFB.

Emission Factors, Time-In-Mode, and Fuel Consumption Rates (per engine)

C-5 A/B

[illegible]

C-17A												
Fuel (thrust)	Activity	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	Trim Test (minutes)	NOx (lb/Mlb)	VOC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM10 (lb/Mlb)	PM2.5 (lb/Mlb)	lbs/hr
8.6%	Taxi Out	0.02023	9.2		9.0	3.95	2.05	23.81	1.40	0.15	0.14	1,213.99
100.0%	Takeoff	0.23518	0.4	0.4	9.0	34.23	0.11	0.38	1.40	0.12	0.11	14,110.81
78.4%	Climbout	0.18428	1.2	1.2	6.8	29.95	0.11	0.38	1.40	0.19	0.17	11,056.81
30.9%	Approach	0.07271	5.1	5.1	20.2	13.00	0.29	1.25	1.40	0.16	0.14	4,362.80
8.6%	Taxi In	0.02023	6.7			3.95	2.05	23.81	1.40	0.15	0.14	1,213.99

References:
Emission factors & TIM for C-5 (engine TF39-GE-1C) from Tables 3-3 and 3-7, AFIERA AEI Guidance for Mobile Sources, January 2002.
Emission factors & TIM for C-17 (engine F117-PW-100) from Tables 1-4 and 1-8, Air Emissions Factor Guide for Air Force Mobile Sources, Decenber 2009.
These TIMs assume an average mixing height of 3000 ft., and are the default values for USAF transport aircraft.

SOx emission factors use a sulfur content from Table 1-7 of the AEFGAFMS (12/09) document, 0.07% wt for East/Central US JP-8.

Each set of LTO TIMs and TGO TIMs listed in the tables above corresponds to two ops: a complete landing and takeoff or a complete touch-and-go.

APU Emission Factors (@ 100% load)

Aircraft	APU model	LTO TIM (minutes)	LTO TIM (hours)			NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO2 (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)
C-5 A/B APU	GTCP165-1B/2	90	1.5			1.23	0.07	3.8	0.30	0.13	0.13
C-17 A APU	331-259(G)	90	1.5			2.55	0.11	1.11	0.27	0.13	0.13

Emission factors from Table 1-5, Air Emissions Factor Guide for Air Force Mobile Sources, December 2009. The factors for a GTCP331-200ER was used because no factors specific to the GTCP331-259(G) were found in the literature. PM10 and PM2.5 Factors are asumed to be the same for both APUs.

Calculations

- LTO/TGO
- Trim Tests
- APU
- lbs = (# engines)*(EF lb/Mlb fuel)*(fuel Mlb/min)*(TIM minutes)(total Ops) summed over all power settings
- lbs = (# engines)*(EF lb/Mlb fuel)*(fuel Mlb/min)*(TIM minutes)(trim tests) summed over all power settings
- lbs = (1 APU)*(EF lb/hr)*(TIM hours)*(total LTO cycles)

2009 Airfield Operation Emissions Estimates (Baseline)

C-5 A/B 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	66,769	13,802	47,098	4,529	4,894	4,894
TGOs	192,572	3,580	7,277	10,364	8,352	8,352
Trim Tests	125,346	3,796	13,016	6,491	5,448	5,448
APU	923	53	2,850	225	98	98
Totals	385,610	21,231	70,241	21,609	18,792	18,792

C-17A 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	0	0	0	0	0	0
TGOs	0	0	0	0	0	0
Trim Tests	0	0	0	0	0	0
APU	0	0	0	0	0	0
Totals	0	0	0	0	0	0

Grand Total 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	66,769	13,802	47,098	4,529	4,894	4,894
TGOs	192,572	3,580	7,277	10,364	8,352	8,352
Trim Tests	125,346	3,796	13,016	6,491	5,448	5,448
APU	923	53	2,850	225	98	98
Totals	385,610	21,231	70,241	21,609	18,792	18,792
Total Tons per Year	192.80	10.62	35.12	10.80	9.40	9.40

2010 Airfield Operation Emissions Estimates (Proposed)

C-5 A/B 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	58,423	12,077	41,211	3,963	4,283	4,283
TGOs	168,501	3,132	6,367	9,068	7,308	7,308
Trim Tests	109,678	3,322	11,389	5,680	4,767	4,767
APU	807	46	2,494	197	85	85
Totals	337,409	18,577	61,461	18,908	16,443	16,443

C-17A 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	0	0	0	0	0	0
TGOs	0	0	0	0	0	0
Trim Tests	0	0	0	0	0	0
APU	0	0	0	0	0	0
Totals	0	0	0	0	0	0

Grand Total 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	58,423	12,077	41,211	3,963	4,283	4,283
TGOs	168,501	3,132	6,367	9,068	7,308	7,308
Trim Tests	109,678	3,322	11,389	5,680	4,767	4,767
APU	807	46	2,494	197	85	85
Totals	337,409	18,577	61,461	18,908	16,443	16,443
Total Tons per Year	168.70	9.29	30.73	9.45	8.22	8.22

2011 Airfield Operation Emissions Estimates (Proposed)

C-5 A/B 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	25,038	5,176	17,662	1,698	1,835	1,835
TGOs	72,215	1,342	2,729	3,886	3,132	3,132
Trim Tests	47,005	1,424	4,881	2,434	2,043	2,043
APU	346	20	1,069	84	37	37
Totals	144,604	7,962	26,340	8,103	7,047	7,047

C-17A 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	23,902	1,203	12,365	2,116	241	217
TGOs	32,994	320	1,312	2,161	253	225
Trim Tests	41,535	374	2,385	2,249	241	217
APU	1,434	62	624	152	73	73
Totals	99,865	1,959	16,686	6,678	809	732

Grand Total 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	48,941	6,378	30,027	3,815	2,077	2,053
TGOs	105,209	1,662	4,041	6,047	3,385	3,357
Trim Tests	88,539	1,798	7,266	4,684	2,285	2,260
APU	1,780	82	1,693	236	110	110
Totals	244,469	9,921	43,027	14,782	7,856	7,779
Total Tons per Year	122.23	4.96	21.51	7.39	3.93	3.89

2012 Airfield Operation Emissions Estimates (Proposed)

C-5 A/B 2012 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	0	0	0	0	0	0
TGOs	0	0	0	0	0	0
Trim Tests	0	0	0	0	0	0
APU	0	0	0	0	0	0
Totals	0	0	0	0	0	0

C-17A 2012 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	38,243	962	9,892	1,693	193	174
TGOs	52,790	512	2,100	3,458	405	359
Trim Tests	66,456	599	3,816	3,599	386	347
APU	2,295	99	999	243	117	117
Totals	159,785	2,172	16,806	8,992	1,102	997

Grand Total 2012 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
LTOs	38,243	962	9,892	1,693	193	174
TGOs	52,790	512	2,100	3,458	405	359
Trim Tests	66,456	599	3,816	3,599	386	347
APU	2,295	99	999	243	117	117
Totals	159,785	2,172	16,806	8,992	1,102	997
Total Tons per Year	79.89	1.09	8.40	4.50	0.55	0.50

Net Change in Emissions Estimates from the Conversion

Base Year - CY	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)
2009 - 2010	-24.10	-1.33	-4.39	-1.35	-1.17	-1.17
2009 - 2011	-70.57	-5.66	-13.61	-3.41	-5.47	-5.51
2009 - 2012	-112.91	-9.53	-26.72	-6.31	-8.85	-8.90

Estimates of Fleet and LTO/TGO Airfield Operations by Year

The only emissions that are expected to change appreciably as a result of the Proposed Action are Airfield Operations.

Table 2-5 of the October 2010 DOPAA indicates that in addition to the number of based Primary aircraft is being reduced by 20%, the number of airfield operations is further expected to be reduced by 25%. The number of landing and takeoff operations expected to increase by 50% per plane is offset by the touch-and-go operations at WPAFB expected to reduce by 25%.

The following Table mirrors the drawdown/buildup schedule from Table 2-1 of the October 2010 DOPAA, and combines this with the the Current and Proposed 445 AW Total Airfield Operations listed on Table 2-5 of the October 2010 DOPAA.

C-5 A/B Drawdown/C-17 A Ramp-Up					Projected Operations by CY			
Qtr/FY	Qtr/CY	C-5	C-17	Total	Avg C-5	C- 5 Ops	Avg C-17s	C-17 Ops
1/10	4/09	10	0	10	10	2,000	0	0
2/10	1/10	10	0	10	8.8	1,750	0	0
3/10	2/10	10	0	10				
4/10	3/10	10	0	10				
1/11	4/10	5	0	5				
2/11	1/11	5	4	9	3.8	750	5	938
3/11	2/11	5	4	9				
4/11	3/11	5	4	9				
1/12	4/11	0	8	8				
2/12	1/12	0	8	8	0.0	0	8	1,500
3/12	2/12	0	8	8				
4/12	3/12	0	8	8				
1/13	4/12	0	8	8				

Ref: Tables 2-1 and 2-5, DOPPA for the Wright-Patterson AFB C-5 to C-17 Conversion, October 2010

Note that the total number of aircraft stationed at Wright-Patterson is actually reducing from 10 to 9 (10 primary assigned aircraft (PAA) plus 0 backup aircraft inventory (BAI) to 8 PAA plus 1 BAI) per Section 2.2.1 of the October 2010 DOPPA

Airfield Ops Emissions Estimates for Target Years

Baseline

Model	Year	Total Ops	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	Notes	
C-5A/B	2009	2,000	192.80	10.62	35.12	10.80	9.40	9.40	10	aircraft (avg)
C-17	2009	0	0.00	0.00	0.00	0.00	0.00	0.00	0	aircraft (avg)
Total for Baseline			192.80	10.62	35.12	10.80	9.40	9.40		

CY2010

Model	Year	Estimated Ops	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	Notes	
C-5A/B	2010	1,750	168.70	9.29	30.73	9.45	8.22	8.22	8.8	aircraft (avg)
C-17	2010	0	0.00	0.00	0.00	0.00	0.00	0.00	0	aircraft (avg)
Total for 2010			168.70	9.29	30.73	9.45	8.22	8.22		

CY2011

Model	Year	Estimated Ops	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	Notes	
C-5A/B	2011	750	72.30	3.98	13.17	4.05	3.52	3.52	3.8	aircraft (avg)
C-17	2011	938	49.93	0.98	8.34	3.34	0.40	0.37	5.0	aircraft (avg)
Total for 2011			122.23	4.96	21.51	7.39	3.93	3.89		

CY2012

Model	Year	Estimated Ops	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	Notes	
C-5A/B	2012	0	0.00	0.00	0.00	0.00	0.00	0.00	0.0	aircraft (avg)
C-17	2012	1,500	79.89	1.09	8.40	4.50	0.55	0.50	8.0	aircraft (avg)
Total for 2012			79.89	1.09	8.40	4.50	0.55	0.50		

Net Emissions Changes for Aircraft Operations, Relative to Current Operations

Year	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)
2010	-24.10	-1.33	-4.39	-1.35	-1.17	-1.17
2011	-70.57	-5.66	-13.61	-3.41	-5.47	-5.51
2012	-112.91	-9.53	-26.72	-6.31	-8.85	-8.90

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

AGE Operations Emissions

AGE (GSE) Equipment Assignments

	GSE Type	GSE Model	Operating Time per LTO (hr)
C-5 A/B	Generator	A/M32A-86D	13
	Start Cart	A/M32A-95	2
	Heater A/C	MA-3D	12
	Hydraulic Test Stand	MJ-1	1
	Light Cart	NF-2	16
	Air Compressor	MC-2A	16
	Jacking Manifold	A/M27M-1	3
C-17A	Generator	A/M32A-86D	2
	Start Cart	A/M32A-95	2
	Heater A/C	MA-3D	1.5
	Light Cart	NF-2	1.5
	Air Compressor	MC-2A	0.66
	Pressure Tester	AF/M27M-1	0.5
	Cargo Loader	MJ-1B	1.5

AGE (GSE) Assignments from Table 2.1 of 2010 AFCEE Mobile Source Guide

AGE (GSE) Equipment	Model	Fuel Flow (gal/hr)	Average Power (hp)	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO2 (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)
Generator	A/M32A-86D	6.47000	148.0	7.97	0.20	1.52	0.08	0.091	0.0880
Start Cart	A/M32A-95	N/A	180.0	1.47	0.07	5.86	0.09	0.110	0.1070
Heater A/C	MA-3D	4.57000	110.0	0.64	0.28	0.06	0.06	0.145	0.1410
Hydraulic Test Stand	MJ-1	2.52000	97.0	0.76	0.03	0.04	0.05	0.145	0.1410
Light Cart	NF-2	N/A	18	0.11	0.01	0.08	0.01	0.010	0.0097
Air Compressor	MC-2A	3.3	52	1.29	0.06	0.64	0.03	0.145	0.1410
Press. Tester/Jack Man.	A/M27M-1	1.78	30	0.18	0.28	12.26	0.02	0.145	0.1410
Cargo Loader	MJ-1B	N/A	97.0	4.78	3.04	3.04	0.05	0.800	0.7760

AGE (GSE) Emission Factors from Table 2-2 of 2010 AFCEE Mobile Source Guide

SO2 emission factor (lb/hr) calculated from 0.07% S content (Table 2-11), 6.67 lb/ga JP-8 Density (Table 2-8), 124,000 Btu/gal JP-8 (Table 2-6), 7,000 Btu/hp-hr engine rating (Equation 2-5 of 2010 AFCEE Mobile Source Guide), and 2.0 molar ratio of SO2 to S.

2009 AGE Operation Emissions Estimates (Baseline)

C-5 A/B 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	51,805	1,300	9,880	507	592	572
Start Cart	1,470	70	5,860	95	110	107
Heater A/C	3,840	1,680	360	348	870	846
Light Cart	880	80	640	76	80	78
Air Compressor	10,320	480	5,120	219	1,160	1,128
Other	650	435	18,410	49	290	282
Totals	68,965	4,045	40,270	1,294	3,102	3,013

C-17A 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	0	0	0	0	0	0
Start Cart	0	0	0	0	0	0
Heater A/C	0	0	0	0	0	0
Light Cart	0	0	0	0	0	0
Air Compressor	0	0	0	0	0	0
Other	0	0	0	0	0	0
Totals	0	0	0	0	0	0

Grand Total 2009 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	51,805	1,300	9,880	507	592	572
Start Cart	1,470	70	5,860	95	110	107
Heater A/C	3,840	1,680	360	348	870	846
Light Cart	880	80	640	76	80	78
Air Compressor	10,320	480	5,120	219	1,160	1,128
Other	650	435	18,410	49	290	282
Totals	68,965	4,045	40,270	1,294	3,102	3,013
Total Tons per Year	34.48	2.02	20.14	0.65	1.55	1.51

2010 AGE Operation Emissions Estimates (Proposed)

C-5 A/B 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	45,329	1,138	8,645	444	518	501
Start Cart	1,286	61	5,128	83	96	94
Heater A/C	3,360	1,470	315	304	761	740
Light Cart	770	70	560	66	70	68
Air Compressor	9,030	420	4,480	192	1,015	987
Other	569	381	16,109	43	254	247
Totals	60,344	3,539	35,236	1,133	2,714	2,636

C-17A 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	0	0	0	0	0	0
Start Cart	0	0	0	0	0	0
Heater A/C	0	0	0	0	0	0
Light Cart	0	0	0	0	0	0
Air Compressor	0	0	0	0	0	0
Other	0	0	0	0	0	0
Totals	0	0	0	0	0	0

Grand Total 2010 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	45,329	1,138	8,645	444	518	501
Start Cart	1,286	61	5,128	83	96	94
Heater A/C	3,360	1,470	315	304	761	740
Light Cart	770	70	560	66	70	68
Air Compressor	9,030	420	4,480	192	1,015	987
Other	569	381	16,109	43	254	247
Totals	60,344	3,539	35,236	1,133	2,714	2,636
Total Tons per Year	30.17	1.77	17.62	0.57	1.36	1.32

2011 AGE Operation Emissions Estimates (Proposed)

C-5 A/B 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	19,427	488	3,705	190	222	215
Start Cart	551	26	2,198	36	41	40
Heater A/C	1,440	630	135	130	326	317
Light Cart	330	30	240	28	30	29
Air Compressor	3,870	180	1,920	82	435	423
Other	244	163	6,904	18	109	106
Totals	25,862	1,517	15,101	485	1,163	1,130

C-17A 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	5,978	150	1,140	59	68	66
Start Cart	1,103	53	4,395	71	83	80
Heater A/C	360	158	34	33	82	79
Light Cart	62	6	45	5	6	5
Air Compressor	319	15	158	7	36	35
Other	2,723	1,763	4,009	32	477	463
Totals	10,544	2,143	9,781	206	751	729

Grand Total 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	25,404	638	4,845	249	290	281
Start Cart	1,654	79	6,593	107	124	120
Heater A/C	1,800	788	169	163	408	397
Light Cart	392	36	285	34	36	35
Air Compressor	4,189	195	2,078	89	471	458
Other	2,966	1,926	10,913	50	586	569
Totals	36,406	3,660	24,882	692	1,914	1,859
Total Tons per Year	18.20	1.83	12.44	0.35	0.96	0.93

2012 AGE Operation Emissions Estimates (Proposed)

C-5 A/B Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	0	0	0	0	0	0
Start Cart	0	0	0	0	0	0
Heater A/C	0	0	0	0	0	0
Light Cart	0	0	0	0	0	0
Air Compressor	0	0	0	0	0	0
Other	0	0	0	0	0	0
Totals	0	0	0	0	0	0

C-17A 2011 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	9,564	240	1,824	94	109	106
Start Cart	1,764	84	7,032	114	132	128
Heater A/C	576	252	54	52	131	127
Light Cart	99	9	72	9	9	9
Air Compressor	511	24	253	11	57	56
Other	4,356	2,820	6,414	51	764	741
Totals	16,870	3,429	15,649	330	1,202	1,166

Grand Total 2012 Emissions Estimates

	NOx (lbs)	VOC (lbs)	CO (lbs)	SO2 (lbs)	PM10 (lbs)	PM2.5 (lbs)
Generator	9,564	240	1,824	94	109	106
Start Cart	1,764	84	7,032	114	132	128
Heater A/C	576	252	54	52	131	127
Light Cart	99	9	72	9	9	9
Air Compressor	511	24	253	11	57	56
Other	4,356	2,820	6,414	51	764	741
Totals	16,870	3,429	15,649	330	1,202	1,166
Total Tons per Year	8.43	1.71	7.82	0.16	0.60	0.58

Net Change in Emissions Estimates from the Conversion

Base Year - CY	NOx (tpy)	VOC (tpy)	CO (tpy)	SO2 (tpy)	PM10 (tpy)	PM2.5 (tpy)
2009 - 2010	-4.31	-0.25	-2.52	-0.08	-0.19	-0.19
2009 - 2011	-16.28	-0.19	-7.69	-0.30	-0.59	-0.58
2009 - 2012	-26.05	-0.31	-12.31	-0.48	-0.95	-0.92

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Privately-Owned Vehicle Emissions Associated with the C-5 to C-17 Conversion Proposed Action - Employees

As described in Section 2.2.3 of the DOPAA, proposed program manpower authorizations would be reduced for full-time personnel from 392 to 390 and for reserve personnel from 1718 to 1568. This worksheet estimates the reduction in privately-owned vehicle commuting emissions expected to result from the Proposed Action on full-time personnel only as being most representative.

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, we have assumed that the commuter fleet corresponding to these additional employees will reflect the passenger vehicle fleet on the roads in the vicinity of Wright-Patterson AFB. The passenger care VMT data for Green County and Montgomery County Ohio, as compiled by U.S. EPA for traffic emissions modeling, were used.

Greene and Montgomery County Passenger Vehicle VMT Mix

VClassId	VMT	Vehicle Class	Mix
1	4,168.815	LDGV	67.72%
2	367.869	LDGT1	5.98%
3	1,224.654	LDGT2	19.89%
4	372.532	LDGT3	6.05%
24	22.185	MC	0.36%
Total (mi/day)	6,156.054		100.00%

Assumptions Used To Estimate Mileage

1.2	Riders per vehicle
20	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip
230	Working Days Per Year
-2	Net Personnel Gain

Source for VMT Mix: National Mobile Inventory Model (NMIM) county-level database of NONROAD and MOBILE5 National Emission Inventory (NEI) 2002. ftp://ftp.epa.gov/EmisInventory/prelim2002nei/mobile/nmim_related/

POV Vehicle Miles Traveled Assumed for This Estimate

Description of Vehicle Class	Vehicle Class	POV VMT %	POV Annual Miles
Light-duty gasoline vehicles (passenger cars)	LDGV	67.72%	-6,490
Light-duty gasoline trucks (SUVs, pickups GVWR 0-6000 lbs, LVW 0-3750 lbs)	LDGT1	5.98%	-573
Light-duty gasoline trucks (GVWR 0-6000 lbs, LVW 3751-5750 lbs)	LDGT2	19.89%	-1,906
Light-duty gasoline trucks (GVWR 6001-8500 lbs, ALVW 0-5750 lbs)	LDGT3	6.05%	-580
Motorcycles	MC	0.36%	-35
	Total	100%	-9,583

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet

Emission Factors

Emission factors are taken from the U.S. EPA MOBILE6 emissions model, as compiled and published in "Air Emissions Factor Guide to Air Force Mobile Sources" Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AF IERA), December 2009.

All vehicle emissions are calculated assuming that the average commute vehicle is five years old. That is calendar year 2011 emissions estimates assume that the average vehicle in each vehicle class is a 2005 model.

Note that PM10 and PM2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).

Emission Factors in g/mi from MOBILE6 Tables for 2005 Model Year Vehicles in CY2011.

POV Low Altitude g/mi - 2010						
Vehicle Class	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	0.27	0.25	3.77	0.01	0.024	0.014
LDGT1	0.32	0.27	4.24	0.01	0.024	0.014
LDGT2	0.32	0.27	4.24	0.01	0.024	0.014
LDGT3	0.52	0.41	5.14	0.01	0.024	0.014
MC	1.12	2.56	11.17	0.003	0.040	0.020

Reference: Tables 4-2 through 4-53, (AF IERA, December 2009)

Notes:

LDGT1 and LDGT2 emission factors shown above were taken from AF IERA LDGT1 (3,000 average lbs) emission factors

LDGT3 emission factors shown above were taken from AF IERA LDGT3 (7,250 average lbs) emission factors

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

POV Emissions by Vehicle Class for (-2) Employees - CY2011 & Beyond						
	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	-0.002	-0.002	-0.027	-0.00007	-0.00017	-0.00010
LDGT1	0.000	0.000	-0.003	-0.00001	-0.00002	-0.00001
LDGT2	-0.001	-0.001	-0.009	-0.00002	-0.00005	-0.00003
LDGT3	0.000	0.000	-0.003	-0.00001	-0.00002	-0.00001
MC	0.000	0.000	0.000	0.00000	0.00000	0.00000
Total	-0.003	-0.003	-0.04	-0.00011	-0.00025	-0.00015

Converted from grams to tons

The ramp-down from current conditions to the Proposed Action net emissions increase shown above will be assumed to occur in 2011.

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with the C-5 Conversion Proposed Action - Construction Workers

The average daily number of construction workers on each worksite will depend on the area under construction, the required completion schedule, and the nature of the construction activity. For example construction or renovation of a flight simulator facility requires a large number of specialized workers than painting interior walls in a flight hanger. Eight workers assumed per each of five construction projects.

The following annual average construction worker counts have been assumed for this analysis:

CY2010	0	workers
CY2011	40	workers
CY2012	0	workers

The average construction worker commute distance has been assumed to be 30 miles each way, as opposed to 20 miles each way for Base employees. Some specialized construction workers will come from greater distances, but many of these workers will stay at nearby motels during the week, and those that commute from large distances will be traveling outside the Dayton Metro area, where vehicle emissions will not contribute to pollution in the non-attainment area.

The vehicle fleet used by the construction workers is expected to include more pickups and fewer SUVs than employee fleet, but this will have little impact on fleet average emission rates, so the vehicle class mix used here will match the mix used for employee POV estimates.

Construction workers are more likely to rideshare (in company-owned crewcab pickups) than employees. However, ridesharing is difficult to predict, so this estimate will assume 1.2 riders per vehicle, as was done for the employee POV estimates.

Construction worker counts will be unaffected by vacation and 'days off' for other reasons, but some days will be lost due to adverse weather, so the working days per year is estimated to be 230, as was done for the construction equipment emission estimates.

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, we have assumed that the commuter fleet corresponding to the construction workers will reflect the passenger vehicle fleet on the roads in the vicinity of Wright-Patterson AFB. The passenger care VMT data for Green County and Montgomery County Ohio, as compiled by U.S. EPA for traffic emissions modeling, were used.

Greene and Montgomery County Passenger Vehicle VMT Mix

VClassId	VMT	Vehicle Class	Mix
1	4,168.815	LDGV	67.72%
2	367.869	LDGT1	5.98%
3	1,224.654	LDGT2	19.89%
4	372.532	LDGT3	6.05%
24	22.185	MC	0.36%
Total (mi/day)	6,156.054		100.00%

Assumptions Used To Estimate Mileage

1.2	Riders per vehicle
30	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip
0	Working Days Per Year 2010
230	Working Days Per Year 2011
0	Working Days Per Year 2012

Source for VMT Mix: National Mobile Inventory Model (NMIM) county-level database of NONROAD and MOBILE6 National Emission Inventory (NEI) 2002. ftp://ftp.epa.gov/EmisInventory/prelim2002nei/mobile/nmim_related/

POV Vehicle Miles Traveled Assumed for This Estimate

Description of Vehicle Class	Vehicle Class	2010 Annual Miles	2011 Annual Miles	2012 Annual Miles
Light-duty gasoline vehicles (passenger cars)	LDGV	0	181,713	0
Light-duty gasoline trucks (SUV/pickups GVWR 0-6000 lbs, LVW 0-3750 lbs)	LDGT1	0	16,035	0
Light-duty gasoline trucks (GVWR 0-6000 lbs, LVW 3751-5750 lbs)	LDGT2	0	53,381	0
Light-duty gasoline trucks (GVWR 6001-8500 lbs, ALVW 0-5750 lbs)	LDGT3	0	16,238	0
Motorcycles	MC	0	967	0
	Total	0	268,333	0

Calculation:

Miles = (# commuters/riders per car) * (working days) * (miles/day) + (# commuters/riders per car) * (working days) * (miles/errand) * (% vehicles doing errands)

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet

Emission Factors

Emission factors are taken from the U.S. EPA MOBIL6 emissions model, as compiled and published in "Air Emissions Factor Guide to Air Force Mobile Sources" Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), December 2009.

All vehicle emissions are calculated assuming that the average commute vehicle is five years old. That is calendar year 2010 emissions estimates assume that the average vehicle in each vehicle class is a 2005 model.

Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).

Emission Factors in g/mi from MOBILE6 Tables for 2005 Model Year Vehicles in CY2010.

	POV Low Altitude g/mi - 2010					
	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	0.27	0.25	3.77	0.01	0.024	0.014
LDGT1	0.32	0.27	4.24	0.01	0.024	0.014
LDGT2	0.32	0.27	4.24	0.01	0.024	0.014
LDGT3	0.52	0.41	5.14	0.01	0.024	0.014
MC	1.12	2.56	11.17	0.003	0.040	0.020

Reference: Tables 4-2 through 4-53, (AF IERA, December 2009)

Notes:

LDGT1 and LDGT2 emission factors shown above were taken from AF IERA LDGT1 (3,000 average lbs) emission factors

LDGT3 emission factors shown above were taken from AF IERA LDGT3 (7,250 average lbs) emission factors

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

	Construction Commute Emissions by Vehicle Class- 2010					
	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	0.000	0.000	0.000	0.000	0.000	0.000
LDGT1	0.000	0.000	0.000	0.000	0.000	0.000
LDGT2	0.000	0.000	0.000	0.000	0.000	0.000
LDGT3	0.000	0.000	0.000	0.000	0.000	0.000
MC	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.00	0.000	0.000	0.000

	Construction Commute Emissions by Vehicle Class- 2011					
	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	0.054	0.050	0.755	0.002	0.005	0.003
LDGT1	0.006	0.005	0.075	0.000	0.000	0.000
LDGT2	0.019	0.016	0.249	0.001	0.001	0.001
LDGT3	0.009	0.007	0.092	0.000	0.000	0.000
MC	0.001	0.003	0.012	0.000	0.000	0.000
Total	0.089	0.081	1.18	0.003	0.007	0.004

	Construction Commute Emissions by Vehicle Class- 2012					
	NOx	VOC	CO	SO2	PM10	PM2.5
LDGV	0.000	0.000	0.000	0.000	0.000	0.000
LDGT1	0.000	0.000	0.000	0.000	0.000	0.000
LDGT2	0.000	0.000	0.000	0.000	0.000	0.000
LDGT3	0.000	0.000	0.000	0.000	0.000	0.000
MC	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.00	0.000	0.000	0.000

Converted from grams to tons

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Construction Activities Emissions

Emissions to Occur during Calendar Year 2011

Input Parameters and Assumptions

Demolition of Concrete Slab			
			Sources:
Size of Concrete slab	30	cu.yd.	
Density of Concrete	145	lb/cu.ft.	(http://www.cement.org/tech/faq_unit_weights.asp)
Amount of concrete removed	58.725	tons	
PM-10 Emission factor crushing	0.0024	lb/ton	(AP-42 Table 11.19.2-2 for tertiary stone crushing uncontrolled)
PM-10 Emissions crushing	0.14094	lbs	
PM-10 Emission factor Truck loading	0.0001	lb/ton	(AP-42 Table 11.19.2-2 for truck loading)
PM-10 Emissions loading	0.0058725	lbs	
Assume Total PM-10=PM-2.5	7.34E-05	tons	

Road Emission from Heavy Duty Concrete Delivery and Waste Hauling Trucks			
			Sources:
Mean vehicle speed, S:	15	mi/hr	(On-site)
Qty concrete trucks:	4.00	vehicles	
Qty disposal trucks:	2.00	vehicles	
Qty Delivery Trucks:	100.00	vehicles	
On-site VMT/vehicle:	10	mi/veh	
Silt Loading Factor sL	9.70	g/sq.m.	(AP-42 Table 13.2.1-4 11/06)
PM10 Adjustment Factor k	0.016	lb/VMT	(AP-42 Table 13.2.1-1 11/06)
PM2.5 Adjustment Factor k	0.0024	lb/VMT	(AP-42 Table 13.2.1-1 11/06)
PM10 Adjustment Factor C	0.00047	lb/VMT	(AP-42 Table 13.2.1-2 11/06)
PM2.5 Adjustment Factor C	0.00036	lb/VMT	(AP-42 Table 13.2.1.2 11/06)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Vehicle Traffic	$[k(sL/2)^{0.65} (W/3)^{1.5} - C]$	lbs/VMT	Section 13.2.1.3

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 11/06

Calculation of PM10 and PM2.5 Emission Factors for Concrete Slab Replacement

Pollutant	Emission Factor (lb/VMT)	VMT	Emissions	
			(lb)	(ton)
PM10	2.174	1060	2303.95	1.1520
PM2.5	0.326	1060	345.28	0.1726

Total PM10 and PM2.5 Road Emissions For Trucks

PM10	1.152 tons
PM2.5	0.173 tons

3. Diesel Equipment Engine Emissions

Equipment	Load Factor (%)	Operating Hours	HP hp	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr
Backhoe	0.21	8	500	1.55	6.64	7.08	1.07	1.03	0.46
Diesel Truck	0.59	16	1500	0.29	1.66	5.11	0.26	0.25	0.37
Concrete Saw	0.59	8	40	0.64	3.98	5.3	0.66	0.64	0.41
Cement Mixer	0.43	8	150	0.82	3.25	7.16	0.61	0.59	0.39

Emission factors from Table 3-1 of Air Emissions Factor Guide for Air Force Mobile Sources, December 2009.

Assumed Values for Operating Hours and specific HP of equipment

Calculation of Emissions from Equipment Engines

Equipment	VOC	CO	NOx	PM-10	PM-2.5	SO2
Backhoe	2.87	12.30	13.11	1.98	1.91	0.85
Diesel Truck	9.05	51.82	159.52	8.12	7.80	11.55
Concrete Saw	0.27	1.66	2.21	0.27	0.27	0.17
Cement Mixer	0.93	3.70	8.14	0.69	0.67	0.44
Total Emissions (lb)	13.12	69.47	182.98	11.07	10.65	13.02
Total Emissions (ton)	0.0066	0.0347	0.0915	0.0055	0.0053	0.0065

Construction Period (CY)	VOC (tpy)	CO (tpy)	NOx (tpy)	PM-10 (tpy)	PM-2.5 (tpy)	SO2 (tpy)
2010	-	-	-	-	-	-
2011	0.104	1.218	0.181	1.165	0.182	0.009
2012	-	-	-	-	-	-

Air Quality Emissions Calculation for 445th Airlift Wing Conversion from C-5 A/B to C-17A Aircraft Wright-Patterson AFB, OH

Construction Surface Coating Emissions

Calculation of VOC Emissions Due to Site Surface Coating Activities (Uncontrolled).

Emissions to occur during Calendar Year 2011

Input Parameters and Assumptions

All paint is restricted to maximum VOC

150	g/L of VOC
0.33	lb/L of VOC
1.25	lb/gal of VOC

TOTAL PAINTING VOC EMISSIONS

Operation	Length (ft)	Height (ft)	Total Area (ft ²)	Coats	Paint Coverage (ft ² /gal)	Max. VOC (lb)
Paint 2 walls, both sides	20	10	800	3	350	8.58
Paint new concrete pad surface	-	-	625	3	100	23.47
Paint stop block	-	-	8	3	75	0.40
Total (lb)						32.46
Total (tons)						0.016

Resources:

Dimensions from: Fuller, John B Civ USAF AFMC 88 ABW/CEPMP, email to Cindy Hassan, 13 Oct. 2010.

Paint Coverage Rate is from Sherwin Williams Product Data Sheet for Surface Coating for exterior paint, surface coating of poured concrete, and surface coating concrete block.

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Appendix D

Noise Terminology and Analysis Methodology

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section D.1 is a general discussion on the properties of noise. Section D.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section D.3 provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

D.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound’s loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective “A-weighted” is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms “sound level” and “A-weighted sound level” or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common: 1 second and 1/8 of a second. A measured

sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective “slow response” is usually omitted. It is easy to understand why the proper descriptor “slow response A-weighted sound level” is usually shortened to “sound level” in environmental impact analysis documents.

D.2 NOISE METRICS

A “metric” is defined as something “of, involving, or used in measurement.” As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DOD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

D.2.1 Maximum Sound Level

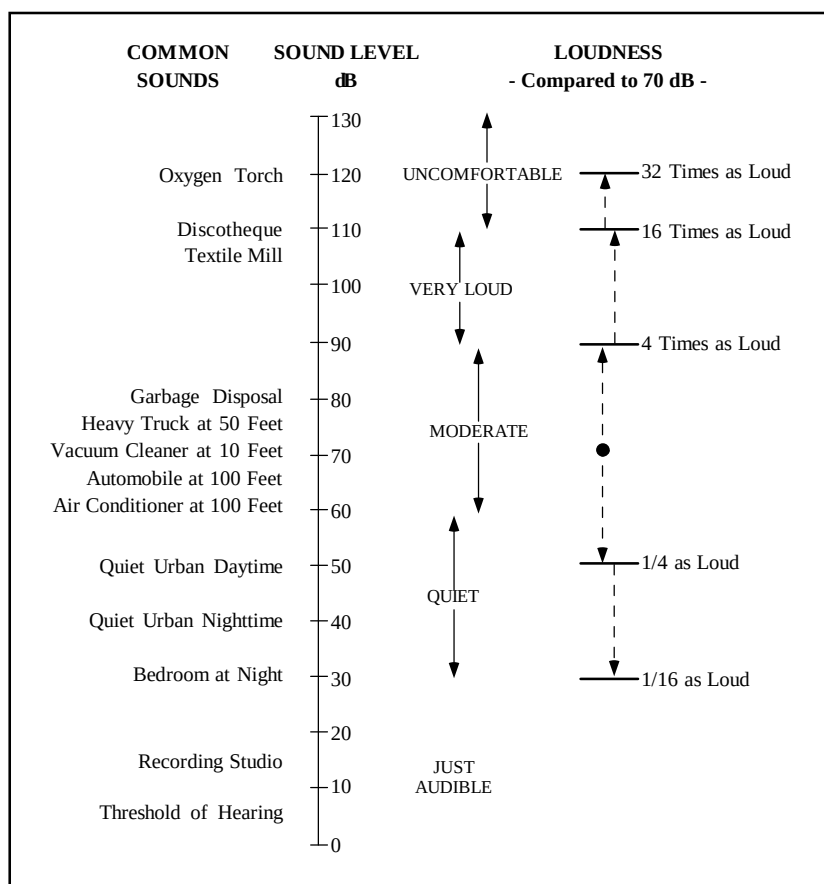
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, $L_{\max}$, or $L_{A\max}$. The typical A-weighted levels of common sounds are shown in Figure D-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

D.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: (1) a sound level which changes throughout the event, and (2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.



Source: Harris 1979

Figure D-1. Typical A-Weighted Sound Levels of Common Sounds

D.2.3 Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10 dB “penalty” represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10 dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

DNL provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure D-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure D-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure D-3 shows an updated form of the curve fit in comparison with the original (Finegold et al. 1992). The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

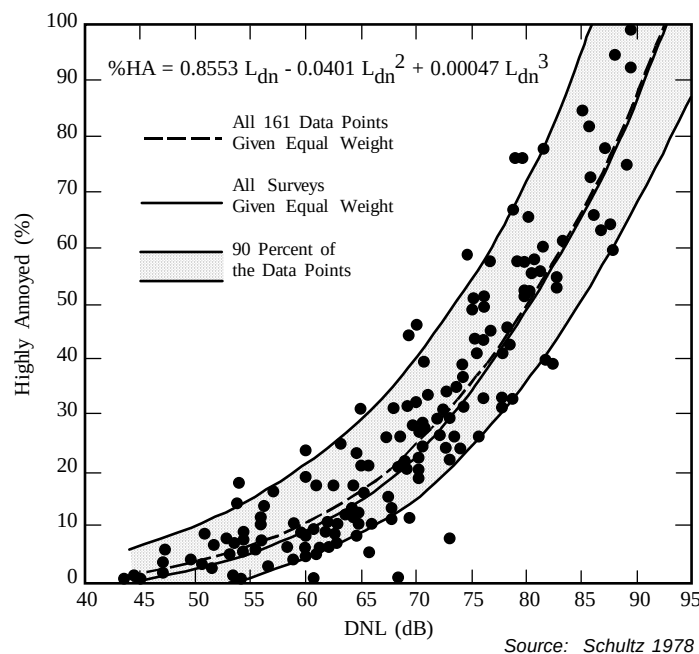
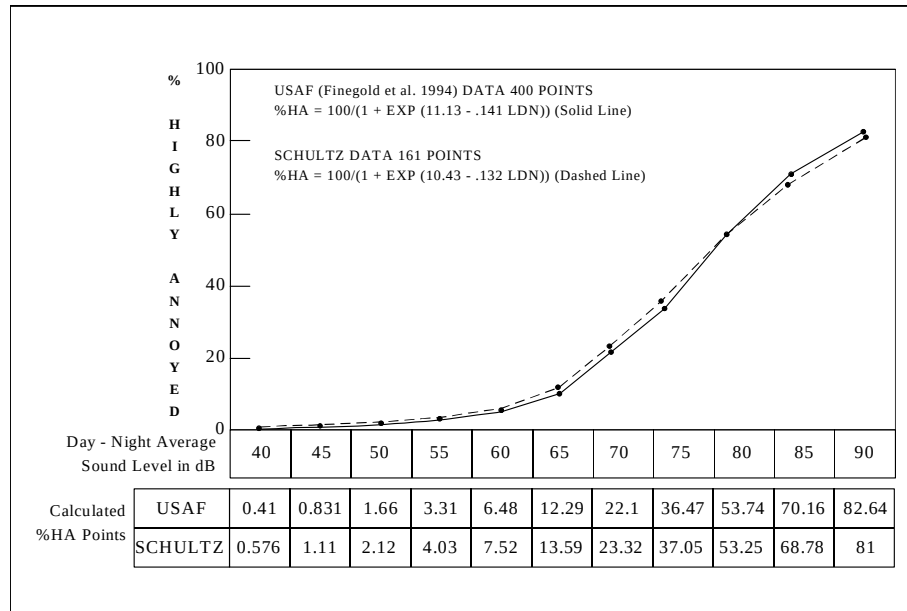


Figure D-2. Community Surveys of Noise Annoyance



Sources: Schultz 1978 and Finegold et al. 1994

Figure D-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current USAF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration (NASA) study reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day (Fields and Powell 1985). The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

D.3 LAND-USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an ad hoc FICUN published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DOD, Department of Transportation, Department of Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table D-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table D-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DOD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

Table D-1. Land Use Compatibility Guidelines with Yearly

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals & nursing homes	Y	25	30	N	N	N
Churches, auditoria, & concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business, & professional	Y	Y	25	30	N	N
Wholesale & retail-building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic & optical	Y	Y	25	30	N	N
Agriculture (except livestock) & forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming & breeding	Y	Y(6)	Y(7)	N	N	N
Mining & fishing, resource production & extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas & spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits & zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, & camps	Y	Y	Y	N	N	N
Golf courses, riding stables, & water recreation	Y	Y	25	30	N	N
Key: Y (Yes) = Land use and related structures compatible without restrictions. N (No) = Land use and related structures are not compatible and should be prohibited. NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure. 25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures. Notes: (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low. (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low. (4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal level is low. (5) Land-use compatible, provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25 dB. (7) Residential buildings require an NLR of 30 dB. (8) Residential buildings not permitted.						

Source: FAA 1985 and USDOT 1984

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