

3.0 NOISE ABATEMENT ALTERNATIVES

This chapter presents the noise abatement alternatives that are under consideration for inclusion in the Waterbury-Oxford Airport (OXC) Noise Compatibility Program (NCP). The alternatives were evaluated for the anticipated benefits and costs associated with their implementation, including their overall effect on surrounding residential areas and noise sensitive facilities (i.e., schools, hospitals, and places of worship). Coordination with personnel from the New York and Bradley Terminal Radar Approach Control (TRACON) facilities and the OXC Air Traffic Control Tower (ATCT) was conducted to discuss the feasibility of implementing the noise abatement alternatives.

As part of the FAR Part 150 planning process, the FAA requires consideration of alternatives under each of the following categories:

1. Flight Tracks
2. Flight Management
3. Runway Use
4. Facility Development
5. Flight Restrictions
6. Miscellaneous (Noise Attenuating Standards)

Early in the evaluation process, ConnDOT met individually with the Towns of Oxford, Middlebury, and Southbury to identify and discuss their land use planning and zoning activities as related to airport noise. Of interest were any associated land use policies intended to reduce noise exposure to local residents. For the Towns of Oxford and Middlebury, where airport-generated noise levels are highest, noise issues have been considered in zoning decisions and site plan approvals; however, no formal noise-related land use policies have been established.

As such, this study uses the DNL 65 dB noise level as the threshold for land use compatibility in noise sensitive areas, as established by federal guidelines. It should be recognized that individual municipalities may establish their own airport noise compatibility guidelines. As the towns surrounding OXC have not established specific criteria at this time, the federal guidelines are employed in this study. Nevertheless, homes exposed to noise levels below DNL 65 dB were identified and evaluated throughout the alternative analysis, as noise complaints have been documented in many locations with lower airport noise exposure. However, most of the potential recommendations, or candidate alternatives, focus on mitigating noise to homes exposed to noise levels of DNL 65 dB or greater, per federal criteria.

Meeting minutes and correspondence with the surrounding towns is provided in Appendix C.

This chapter includes the following components:

- Evaluation of Current Program
- Noise Abatement Alternatives
- Summary of Candidate Noise Abatement Alternatives

3.1 Evaluation of Current Program

The Airport currently has very few procedures that are intended as noise abatement measures. However, touch and go operations and practicing low approaches, which are both primarily conducted for training purposes, are prohibited between the hours 11 p.m. and 7 a.m. Touch and go operations consist of practice landings, followed by immediate takeoffs, without bringing the aircraft to a stop. They enable a higher number of takeoffs and landings in a given time period. These can be annoying because the aircraft repeatedly fly and circle low over residential areas near an airport. Practicing low approaches consist of performing published instrument or visual runway approaches without actual landing. In general, under both training procedures, aircraft operate lower, slower, and at higher frequencies. This is why they are often prohibited during nighttime hours.

As discussed in Chapter 2, prevailing winds at OXC are from the north and northwesterly directions. This is the reason why Runway 36 is the primary runway, as it is safer for aircraft to operate into prevailing winds. Approximately 73 percent of OXC operations (takeoffs and landings) are conducted on Runway 36. Because of the limited runway length at OXC, it is not safe for larger aircraft to operate under tailwind conditions, which is why Runway 18 departures are infrequent.

OXC lies within the New York TRACON's regional airspace and radar control, but is just a few miles from the Bradley TRACON's airspace and radar control (to the north). The OXC approach and departure procedures are designed to retain aircraft within the area controlled by the New York TRACON. For example, when departing Runway 36, aircraft are directed to perform a 180 degree left turn to the south, before proceeding on course. This turn prevents departing aircraft (on filed flight plans) from entering the area controlled by the Bradley TRACON, as that would require a "hand-off" from one TRACON to the other. Modifying the OXC airspace in order to turn control over to the Bradley TRACON would require an airspace redesign, which is not under consideration by the FAA. Furthermore, such a runway change would not be efficient for current flight operations at OXC, as most aircraft are departing for destinations to the south (i.e., towards the New York TRACON's control area).

Runway 36 is also equipped with an Instrument Landing System (ILS) approach, which provides added accuracy and safety for aircraft landings during poor weather (IFR) conditions. Runway 36 was selected as the ILS runway end because of prevailing wind conditions at OXC. However, even during calm wind conditions and fair weather, the available ILS equipment further encourages landings on Runway 36.

3.2 Noise Abatement Alternatives

This section presents several noise abatement alternatives that were evaluated for their overall effect on residential areas and noise sensitive facilities (compared to 2008 Baseline conditions), as well as their operational feasibility and ability to implement. Comments from local officials and residents were also considered in the evaluation. Note that the alternatives consider impacts

to both existing and proposed residential development, as identified from site plans provided by the Towns of Middlebury and Oxford.

A total of 14 noise abatement (NA) alternatives were identified for OXC. The alternatives are classified by the six FAA-required categories listed above. For example, the five flight track alternatives are classified as NA.1A through NA.1E, while the two flight management alternatives are classified as NA.2A and NA.2B.

NA.1 Flight Tracks

Flight tracks consist of the approach and departure paths that aircraft follow. As discussed in Section 3.1, the existing OXC flight tracks primarily reflect prevailing wind conditions, as well as airspace and radar coverage issues (between the Bradley and New York TRACONs). For example, the flight track for aircraft departing Runway 36 (into prevailing winds) consists of performing a 180 degree left turn to the south (after crossing the Runway 18 end), which maintains control under the New York TRACON.

The flight track alternatives were designed to shift aircraft paths away from residential areas surrounding the Airport, with their resulting noise exposure evaluated using the FAA's INM. Graphic illustrations of the alternatives are provided. Note that flight track changes cannot be implemented until the environmental review process is completed under the National Environmental Policy Act (NEPA).

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.1A

NA.1A – All traffic departing Runway 18, turn left 10 degrees after crossing the Runway 36 end to a 170-degree heading, until reaching 1,000 feet above the Airport, before proceeding on course. This alternative would route aircraft east of runway centerline, reducing flights over the Glendale housing development in Oxford.

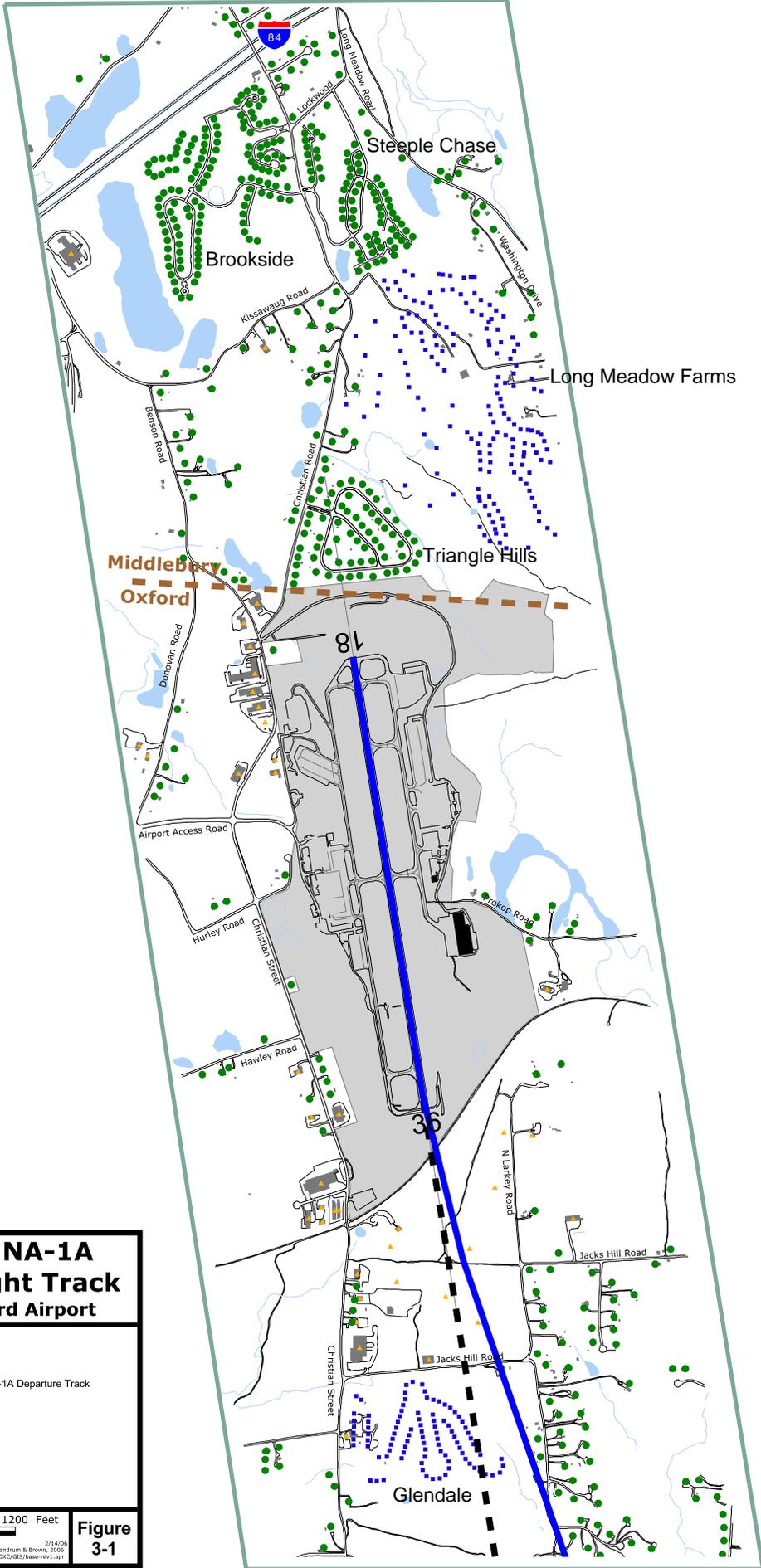
TITLE:	All traffic departing Runway 18, turn left 10 degrees after crossing the runway end to a 170-degree heading, until reaching 1,000 feet above the Airport, before proceeding on course.
DESCRIPTION:	Currently, departures from Runway 18 are directed to fly straight-out on runway heading. This alternative would route aircraft east of runway centerline, reducing flights over the Glendale housing development in Oxford (see Figure 3-1).
BENEFITS:	This alternative would reduce overflights of the Glendale housing development in Oxford.
DRAWBACKS:	This alternative would focus aircraft over existing homes located on Jacks Hill and Larkey Roads.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. ConnDOT (with FAA assistance) would assume the cost of environmental analysis under the NEPA.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND PRELIMINARY RECOMMENDATION:	With this alternative implemented, there would be no change in the number of homes in the 65 or 70 DNL. There would be an overall decrease in the number of homes in the 60-65 DNL of the Alternative NA.1A noise contour as compared to the 2008 Baseline noise contour (see Table 3-1). There is no change in the size of the Alternative NA.1A noise contour. No noise sensitive facilities would be located in the noise contour of Alternative NA.1A (see Figure 3-2). As there is no benefit to homes exposed to noise levels greater than 65 DNL, this alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

TABLE 3-1 – BASELINE versus NA.1A IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.1A						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	62	53	5	0	58	120
Planned	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
<i>Total</i>	67	53	5	0	58	125
Population						
Existing	151	129	12	0	141	292
Planned	<u>12</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>12</u>
<i>Total</i>	163	129	12	0	141	304
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	185	82	103	370	811

Note: No Noise Sensitive Facilities are located in the noise contour



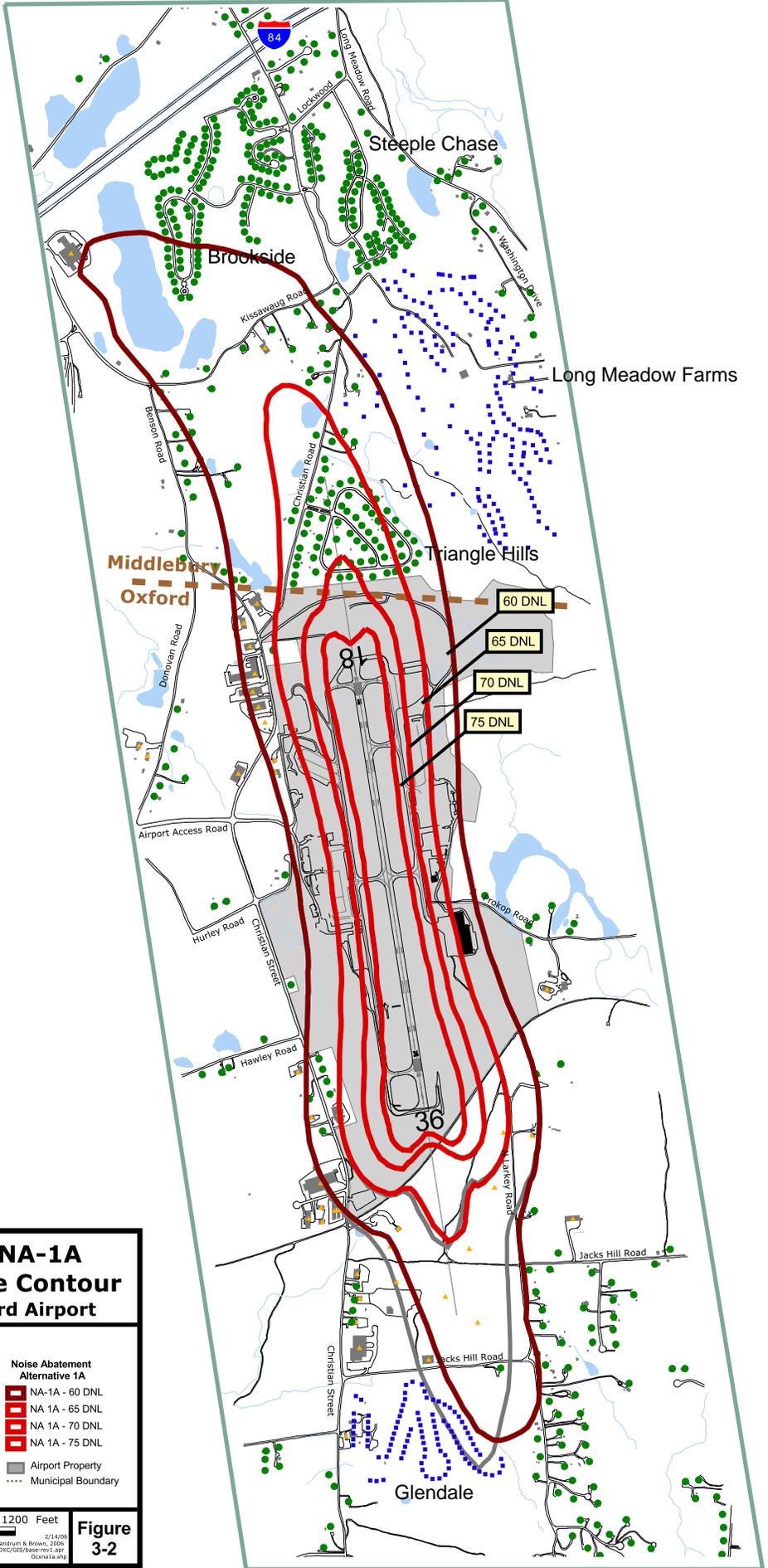
Alternative NA-1A Proposed Flight Track Waterbury-Oxford Airport

Legend

- Existing Runway 18 Departure Track
- Proposed Runway 18 Alternative NA-1A Departure Track
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- Municipal Boundary

0 600 1200 Feet

**Figure
3-1**



Alternative NA-1A Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 1A
Future (2008) NEM 60 DNL	NA-1A - 60 DNL
Future (2008) NEM 65 DNL	NA-1A - 65 DNL
Future (2008) NEM 70 DNL	NA-1A - 70 DNL
Future (2008) NEM 75 DNL	NA-1A - 75 DNL
Commercial Structure	Airport Property
Existing Single Family Structure	Municipal Boundary
Planned Single Family Structure	

0 600 1200 Feet

Figure 3-2

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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.1B

NA.1B – All traffic departing Runway 18, turn right 30 degrees after crossing the Runway 36 end to a 210-degree heading, until reaching 1,000 feet above the Airport, before proceeding on course. This alternative would route aircraft west of runway centerline, reducing flights over the Glendale housing development in Oxford.

TITLE:	All traffic departing Runway 18, turn right 30 degrees after crossing the runway end to a 210-degree heading, until reaching 1,000 feet above the Airport, before proceeding on course.
DESCRIPTION:	Currently, departures from Runway 18 are directed to fly straight-out on runway heading. This alternative would route aircraft west of runway centerline, reducing flights over the Glendale housing development in Oxford (see Figure 3-3).
BENEFITS:	This alternative would reduce overflights of the Glendale housing development in Oxford.
DRAWBACKS:	This alternative would focus aircraft over existing homes on Christian Street and Towner Lane. In addition, the pilot would need to promptly turn to a 180 heading once reaching 1,000 feet above the Airport, to avoid airspace conflicts.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. ConnDOT (with FAA assistance) would assume the cost of environmental analysis under the NEPA.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND PRELIMINARY RECOMMENDATION:	With this alternative implemented, there would no change in the number of homes in the 65 or 70 DNL of the Alternative NA.1B noise contour as compared to the 2008 Baseline noise contour (see Table 3-2). In the 60 DNL of the Alternative NA.1B noise contour, there would be a decrease of 9 homes (increase of three existing homes and a decrease of 12 planned homes) as compared to the 2008 Baseline noise contour. There would be a small reduction in the size of the Alternative NA.1B noise contour. No noise sensitive facilities would be located in the noise contour of Alternative NA.1B (see Figure 3-4). This alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

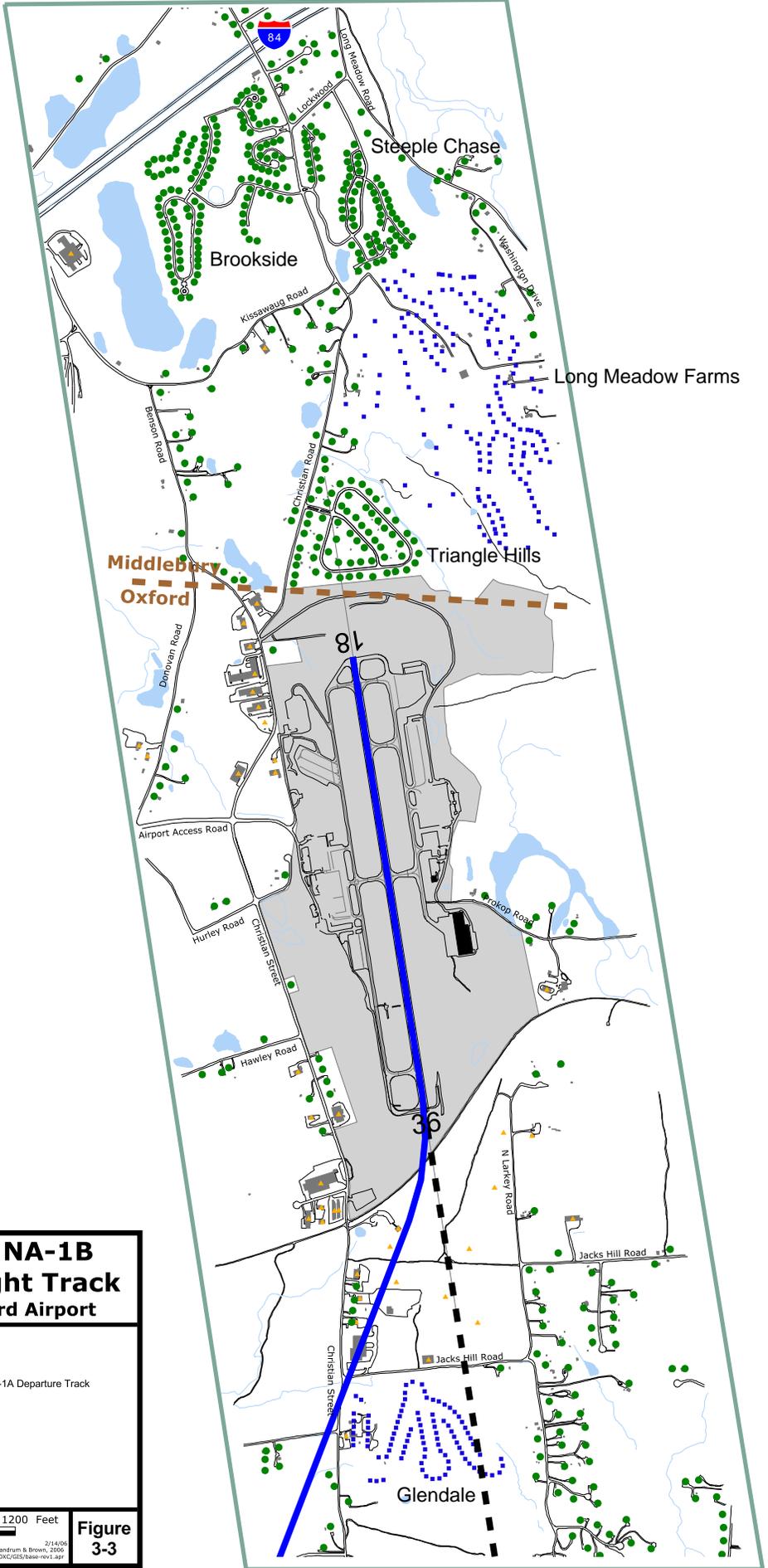
TABLE 3-2 – BASELINE versus NA.1B IMPACTS

2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.1B						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	64	53	5	0	58	122
Planned	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
<i>Total</i>	69	53	5	0	58	127
Population						
Existing	156	129	12	0	141	297
Planned	<u>12</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>12</u>
<i>Total</i>	168	129	12	0	141	309
Area						
Square Miles	0.67	0.29	0.13	0.16	0.58	1.25
Acres	441	185	82	103	370	811

Note: No Noise Sensitive Facilities are located in the noise contour



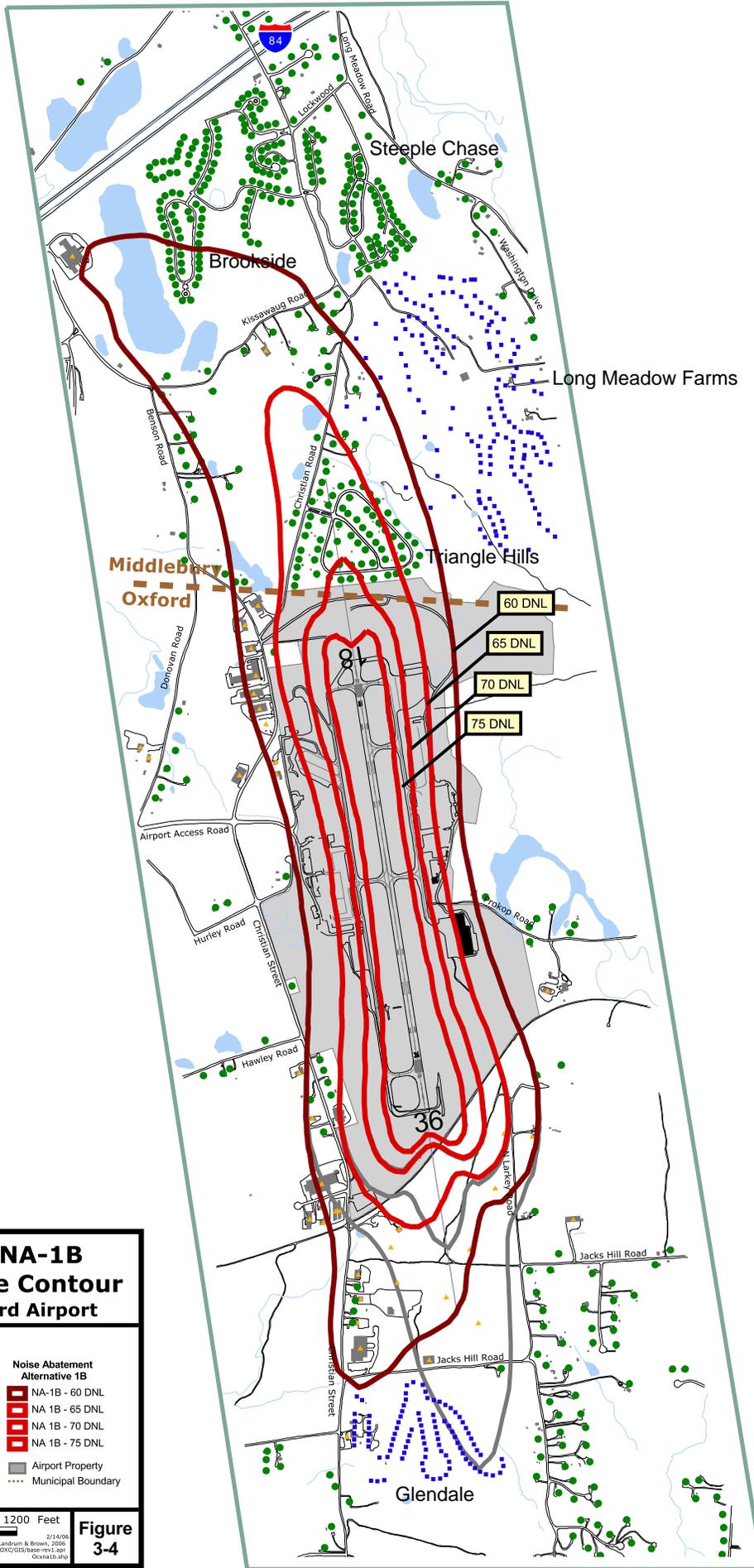
Alternative NA-1B Proposed Flight Track Waterbury-Oxford Airport

Legend

- Existing Runway 18 Departure Track
- Proposed Runway 18 Alternative NA-1A Departure Track
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- Municipal Boundary

0 600 1200 Feet

Figure 3-3



Alternative NA-1B Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 1B
[Grey Box] Future (2008) NEM 60 DNL	[Red Box] NA-1B - 60 DNL
[Light Grey Box] Future (2008) NEM 65 DNL	[Red Box] NA 1B - 65 DNL
[Medium Grey Box] Future (2008) NEM 70 DNL	[Red Box] NA 1B - 70 DNL
[Dark Grey Box] Future (2008) NEM 75 DNL	[Red Box] NA 1B - 75 DNL
[Yellow Triangle] Commercial Structure	[Grey Box] Airport Property
[Green Circle] Existing Single Family Structure	[Dotted Line] Municipal Boundary
[Blue Square] Planned Single Family Structure	

0 600 1200 Feet

Figure 3-4

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.1C

NA.1C – All traffic departing Runway 36, maintain runway heading until reaching 1,000 feet above the Airport, before proceeding on course. This alternative would extend the northerly heading of Runway 36 departures, preventing turns before reaching 1,000 feet above the Airport. The intent of this alternative would be to increase the altitude of aircraft before turning over populated areas.

TITLE:	All traffic departing Runway 36, maintain runway heading until reaching 1,000 feet above the Airport, before proceeding on course.
DESCRIPTION:	Currently, departures from Runway 36 perform a 180 degree left turn to the south. The Airport receives complaints from residents west of the Airport under westerly flight paths. These residents are located outside of the Existing and Future 60 DNL noise contours. This alternative would extend the runway heading of departures by not allowing turns before reaching 1,000 feet above the Airport. The intent would be to increase the altitude of aircraft before turning over populated areas farther along the departure path (see Figure 3-5).
BENEFITS:	This alternative would raise the altitude of aircraft before turning over populated areas.
DRAWBACKS:	Depending on the location of the aircraft, once reaching 1,000 feet above the Airport, conflicts with Bradley Approach (BDL) airspace could occur. Overflights and noise would increase for those areas under the extended centerline of Runway 36.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. ConnDOT (with FAA assistance) would assume the cost of environmental analysis under the NEPA.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be a decrease of one home in the 70-75 DNL noise contour. This one home would then be located in the 65-70 DNL, which overall has an increase of 7 homes as compared to the 2008 Baseline noise contour (see Table 3-3). The number of homes located in the 60-65 DNL of the Alternative NA.1C noise contour would

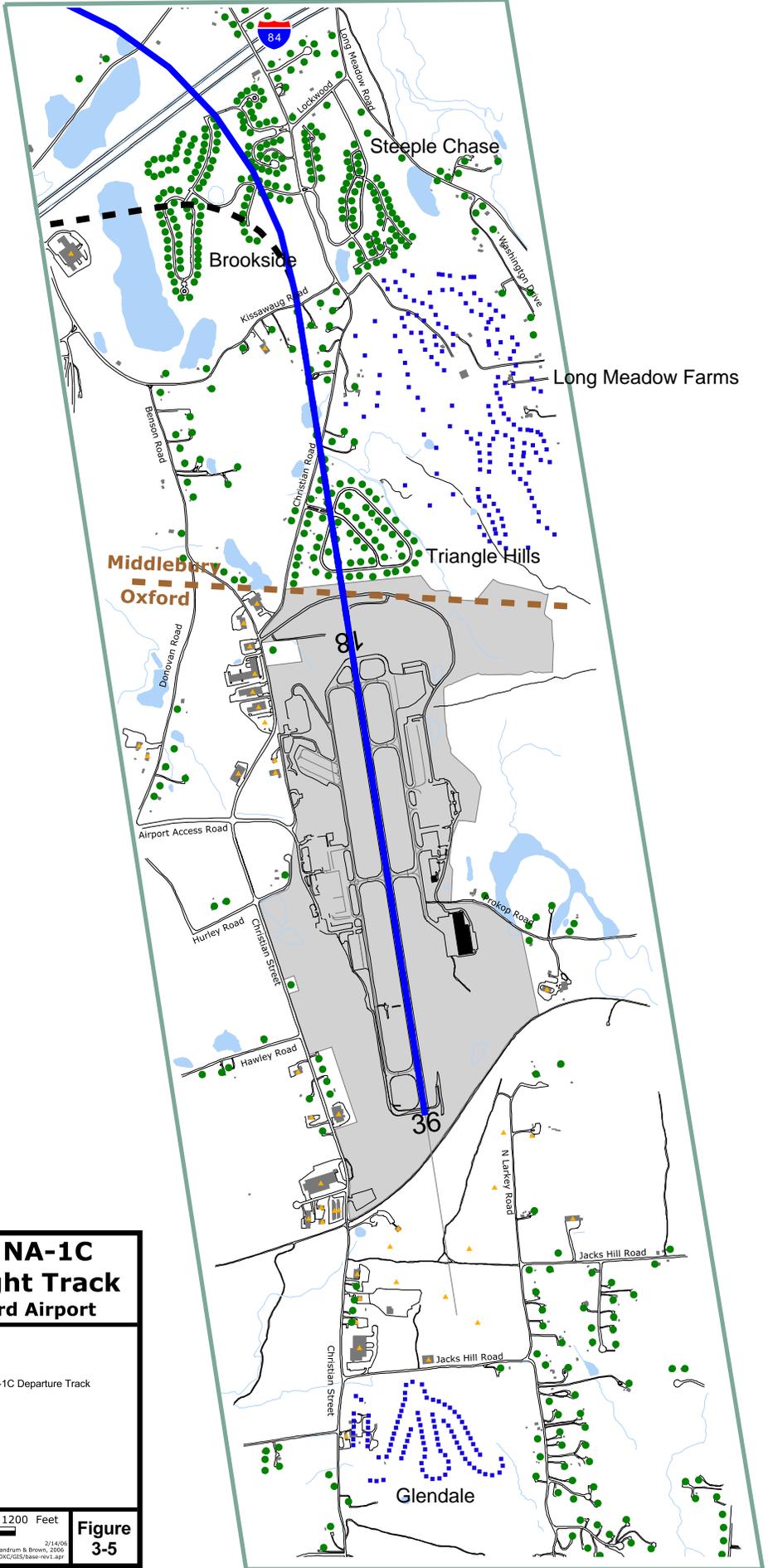
increase by 42 homes as compared to the Future 2008 Baseline. In addition, the overall size of the Alternative NA.1C noise contour would increase. No noise sensitive facilities would be located in the noise contour of Alternative NA.1C (see Figure 3-6). This alternative is **NOT A CANDIDATE** for inclusion in the NCP, given that no noise reduction benefit is seen over the Future 2008 Baseline.

TABLE 3-3 – BASELINE versus NA.1C IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	<i>78</i>	<i>53</i>	<i>5</i>	<i>0</i>	<i>58</i>	<i>136</i>
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	<i>185</i>	<i>129</i>	<i>12</i>	<i>0</i>	<i>141</i>	<i>326</i>
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.1C						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	99	60	4	0	64	163
Planned	<u>21</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>21</u>
<i>Total</i>	<i>120</i>	<i>60</i>	<i>4</i>	<i>0</i>	<i>64</i>	<i>184</i>
Population						
Existing	242	146	10	0	156	398
Planned	<u>46</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>46</u>
<i>Total</i>	<i>293</i>	<i>146</i>	<i>10</i>	<i>0</i>	<i>156</i>	<i>444</i>
Area						
Square Miles	0.72	0.30	0.13	0.16	0.59	1.31
Acres	462	190	82	103	375	837

Note: No Noise Sensitive Facilities are located in the noise contour



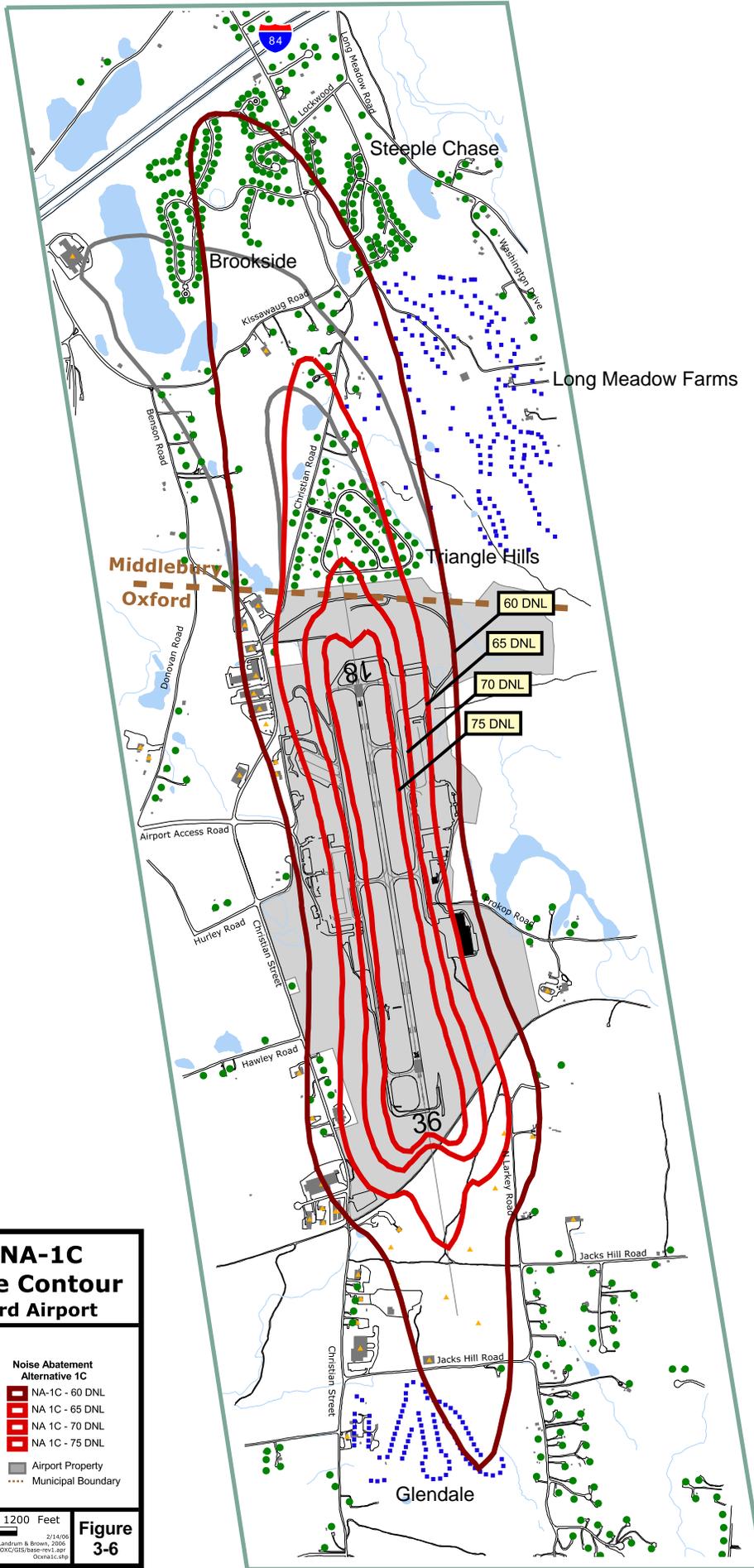
Alternative NA-1C Proposed Flight Track Waterbury-Oxford Airport

Legend

- Existing Runway 36 Departure Track
- Proposed Runway 36 Alternative NA-1C Departure Track
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- - - Municipal Boundary

0 600 1200 Feet

**Figure
3-5**



Alternative NA-1C Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 1C
[Grey Box] Future (2008) NEM 60 DNL	[Red Box] NA-1C - 60 DNL
[Light Grey Box] Future (2008) NEM 65 DNL	[Red Box] NA 1C - 65 DNL
[Medium Grey Box] Future (2008) NEM 70 DNL	[Red Box] NA 1C - 70 DNL
[Dark Grey Box] Future (2008) NEM 75 DNL	[Red Box] NA 1C - 75 DNL
[Yellow Triangle] Commercial Structure	[Grey Box] Airport Property
[Green Circle] Existing Single Family Structure	[Dotted Line] Municipal Boundary
[Blue Square] Planned Single Family Structure	

0 600 1200 Feet

Figure 3-6

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.1D

NA.1D – All traffic departing Runway 36, turn right 25 degrees after reaching 400 feet above the Airport, before proceeding on course. This alternative would route aircraft east of the runway centerline, reducing flights over the Brookside development in Middlebury.

TITLE:	All traffic departing Runway 36, turn right 25 degrees after reaching 400 feet above the Airport, before proceeding on course.
DESCRIPTION:	Currently, departures from Runway 36 perform a 180 degree left turn to the south. Implementing this alternative would route aircraft east of the Airport, requiring westerly departures to turn west, crossing back over the runway centerline. This alternative would route aircraft east of runway centerline reducing flights over the Brookside housing development in Middlebury (see Figure 3-7).
BENEFITS:	This alternative would reduce overflights of the Brookside housing development in Middlebury.
DRAWBACKS:	This alternative would focus aircraft over the Steeple Chase housing development and other existing homes located near Long Meadow Pond. In addition, a right turn after departure would require westerly departures to be routed back over the extended runway centerline, across homes that generally are not overflown today. This would increase the noise over more homes, and would increase the level of coordination with the Oxford Tower. During peak periods, this alternative could cause delays.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. ConnDOT (with FAA assistance) would assume the cost of environmental analysis under the NEPA.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be an increase of 4 homes located in the 65-70 DNL of the Alternative NA.1D noise contour as compared to the 2008 Baseline noise contour (see Table 3-4). The number of homes located in the 60-65 DNL of the Alternative NA.1D noise contour would increase by

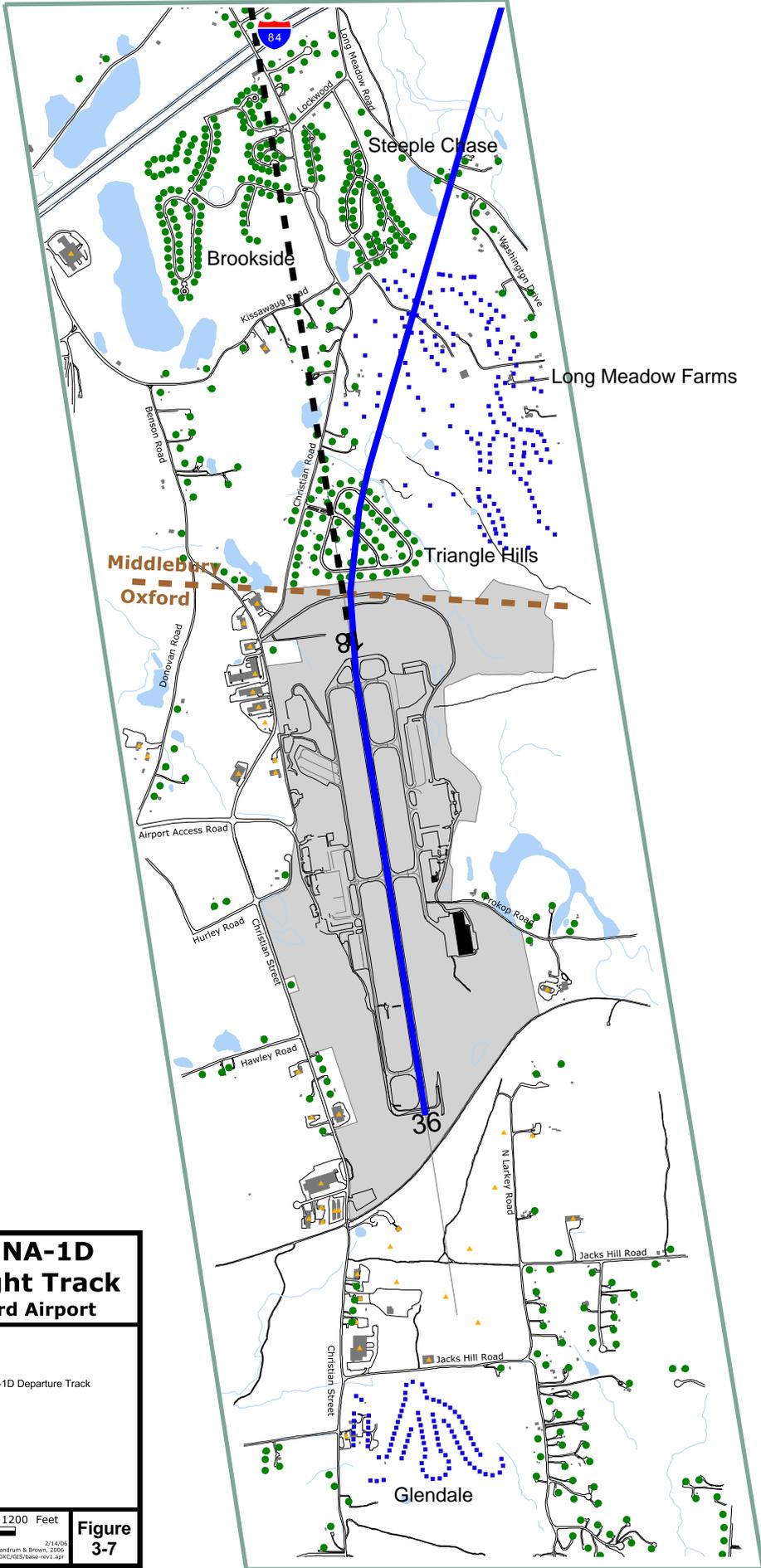
74 homes as compared to the Future 2008 Baseline. No change in the number of existing homes would occur in the 70-75 DNL of Alternative NA.1D. There would be no change in the overall size of the noise contour. No noise sensitive facilities would be located in the noise contour of Alternative NA.1D (see Figure 3-8). This alternative is **NOT A CANDIDATE** for inclusion in the NCP, given that no noise reduction benefit is seen over the Future 2008 Baseline.

TABLE 3-4 – BASELINE versus NA.1D IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.1D						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	79	48	5	0	53	132
Planned	<u>73</u>	<u>9</u>	<u>0</u>	<u>0</u>	<u>9</u>	<u>82</u>
<i>Total</i>	152	57	5	0	62	214
Population						
Existing	193	117	12	0	139	332
Planned	<u>170</u>	<u>22</u>	<u>0</u>	<u>0</u>	<u>22</u>	<u>192</u>
<i>Total</i>	371	139	12	0	161	524
Area						
Square Miles	0.68	0.30	0.13	0.16	0.59	1.27
Acres	436	191	82	103	376	812

Note: No Noise Sensitive Facilities are located in the noise contour



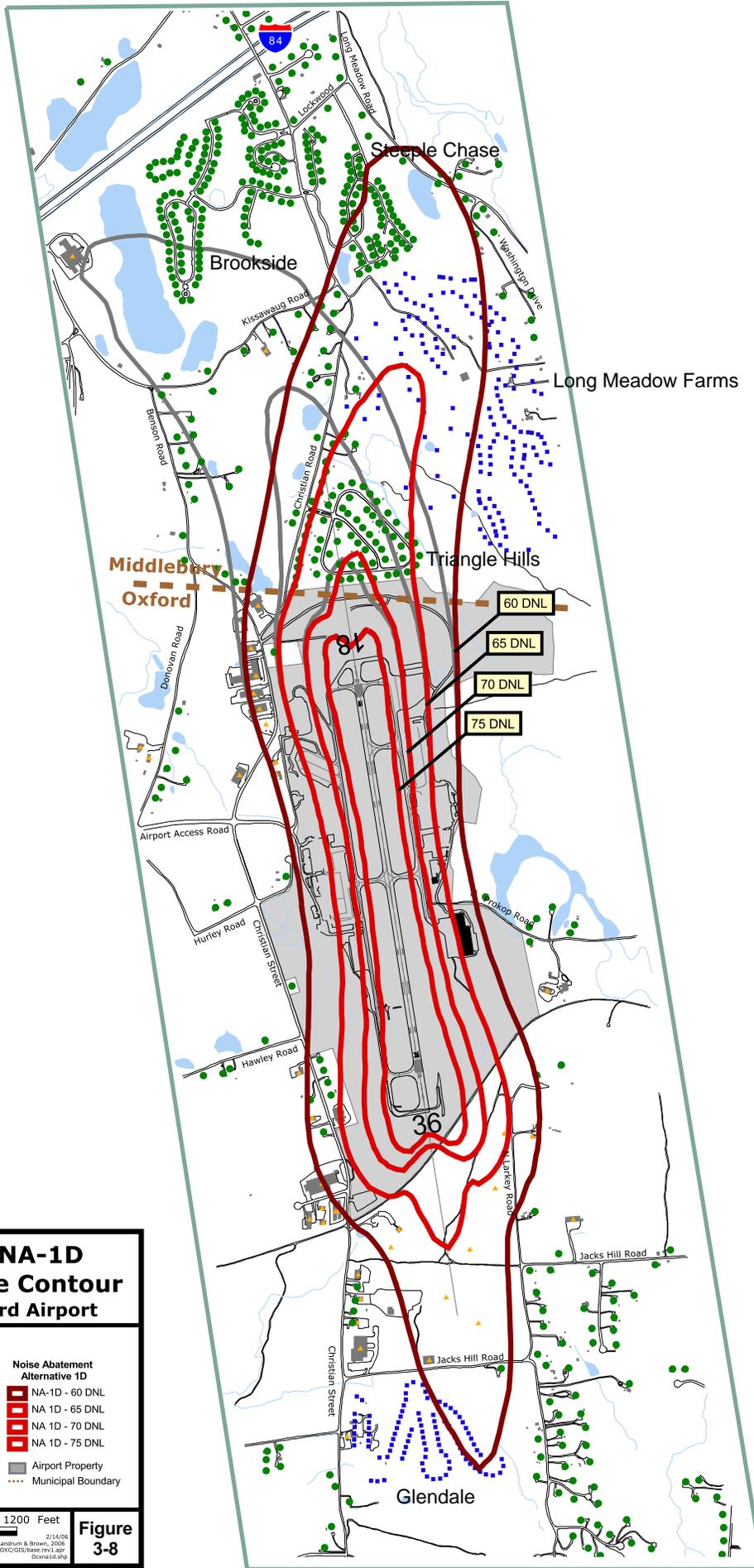
Alternative NA-1D Proposed Flight Track Waterbury-Oxford Airport

Legend

- Existing Runway 36 Departure Track
- Proposed Runway 36 Alternative NA-1D Departure Track
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- Municipal Boundary

0 600 1200 Feet

Figure
3-7



Alternative NA-1D Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 1D
Future (2008) NEM 60 DNL	NA-1D - 60 DNL
Future (2008) NEM 65 DNL	NA-1D - 65 DNL
Future (2008) NEM 70 DNL	NA-1D - 70 DNL
Future (2008) NEM 75 DNL	NA-1D - 75 DNL
Commercial Structure	Airport Property
Existing Single Family Structure	Municipal Boundary
Planned Single Family Structure	

0 600 1200 Feet

Figure 3-8

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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.1E

NA.1E – All traffic departing Runway 36, turn right 180 degrees to the south. This alternative would relocate the Runway 36 downwind departure over residential areas in Southbury (along Bucks Hill Road) to less developed areas in Oxford.

TITLE:	Jet traffic departing Runway 36, turn right 180 degrees to the south.
DESCRIPTION:	Currently, departures from Runway 36 perform a 180 degree left turn to the south. This alternative would route the aircraft to turn right 180 degrees to head to the south, requiring aircraft with destinations to the west to cross over the Airport to the south of the Runway 18. Aircraft would be routed over less developed areas over Oxford under this alternative (see Figure 3-9).
BENEFITS:	This alternative would reduce overflights of the residential areas in Southbury along Bucks Road.
DRAWBACKS:	A right turn after departure without a left turn following, would route the aircraft into Bradley Approach (BDL) airspace. This alternative is not supported by the New York TRACON. In addition, this alternative would route traffic over existing and proposed homes around Long Meadow Pond and other developments in the right downwind leg over Oxford.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. ConnDOT (with FAA assistance) would assume the cost of environmental analysis under the NEPA.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be an increase of 9 homes located in the 65-70 DNL of the Alternative NA.1E noise contour as compared to the 2008 Baseline noise contour (see Table 3-5). The number of homes located in the 60-65 DNL of the Alternative NA.1E noise contour would increase by 58 homes as compared to the Future 2008 Baseline. No change in the number of homes would occur in the 70-75 DNL of Alternative NA.1E. There would be no change in the size of the noise contour. No noise sensitive facilities would be

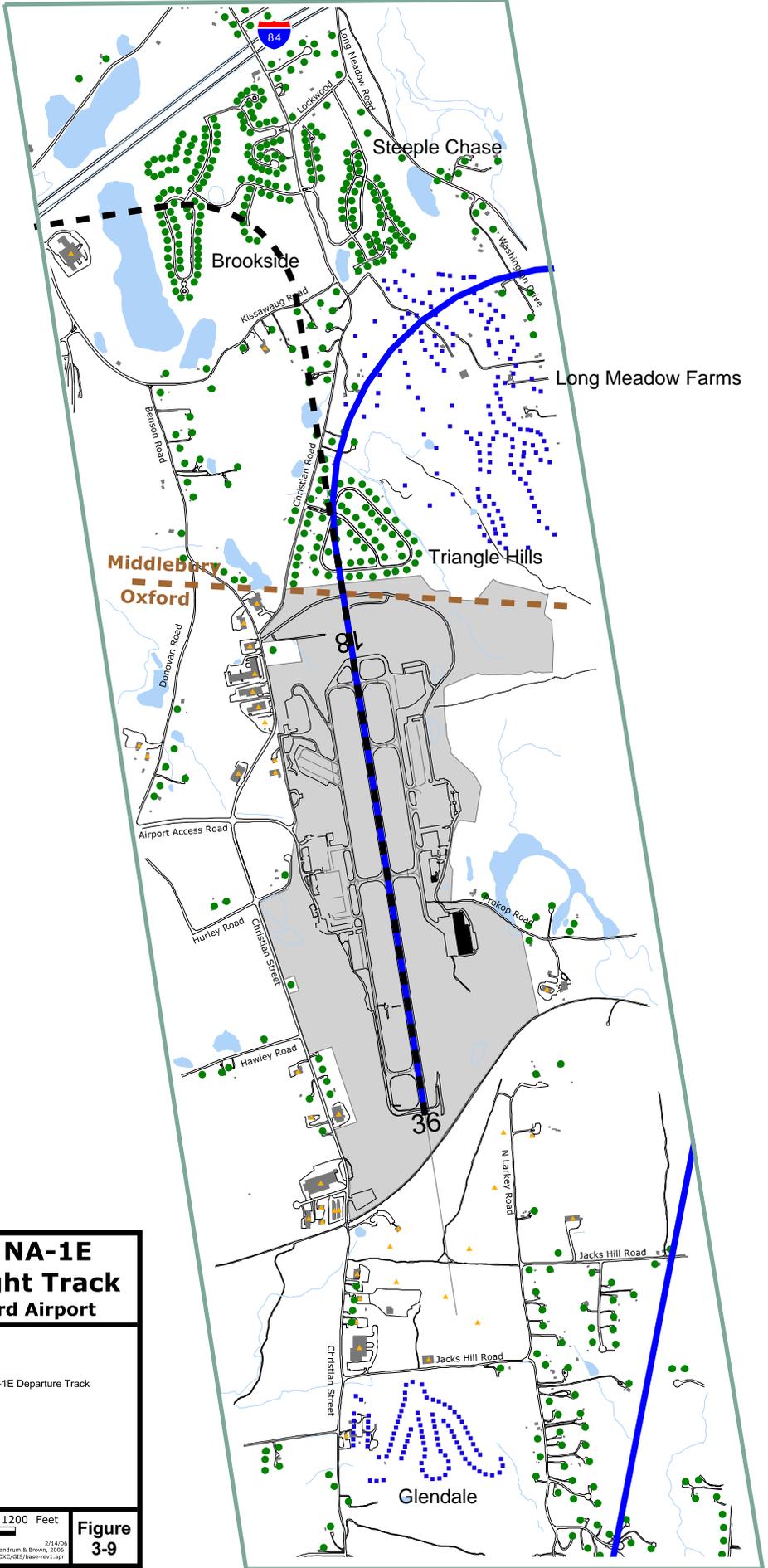
	located in the noise contour of Alternative NA.1D (see Figure 3-10). This alternative is NOT A CANDIDATE for inclusion in the NCP, given that no noise reduction benefit is seen over the Future 2008 Baseline.
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TABLE 3-5 – BASELINE versus NA.1E IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
Total	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
Total	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.1E						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	32	58	5	0	63	95
Planned	<u>104</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>108</u>
Total	136	62	5	0	67	203
Population						
Existing	78	142	12	0	154	232
Planned	<u>240</u>	<u>10</u>	<u>0</u>	<u>0</u>	<u>10</u>	<u>250</u>
Total	318	152	12	0	164	482
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	439	188	82	103	374	812

Note: No Noise Sensitive Facilities are located in the noise contour



Alternative NA-1E Proposed Flight Track Waterbury-Oxford Airport

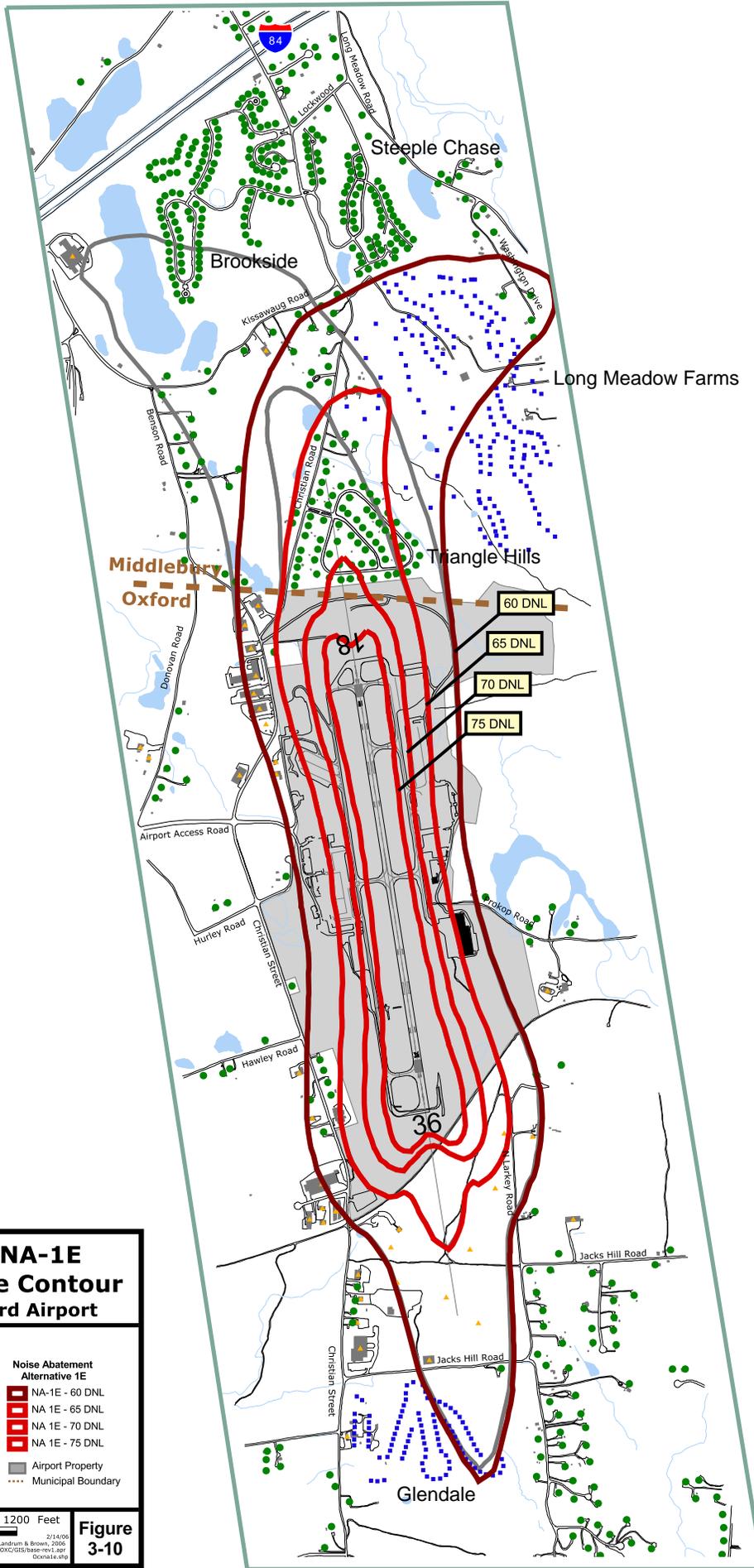
Legend

- Existing Runway 36 Departure Track
- Proposed Runway 36 Alternative NA-1E Departure Track
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- Municipal Boundary

0 600 1200 Feet

Figure
3-9

Landrum & Brown 2/14/06
 Created by Landrum & Brown, 2/14/06
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Alternative NA-1E Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 1E
[Grey Box] Future (2008) NEM 60 DNL	[Red Box] NA-1E - 60 DNL
[Light Grey Box] Future (2008) NEM 65 DNL	[Red Box] NA 1E - 65 DNL
[Medium Grey Box] Future (2008) NEM 70 DNL	[Red Box] NA 1E - 70 DNL
[Dark Grey Box] Future (2008) NEM 75 DNL	[Red Box] NA 1E - 75 DNL
[Yellow Triangle] Commercial Structure	[Grey Box] Airport Property
[Green Circle] Existing Single Family Structure	[Dotted Line] Municipal Boundary
[Blue Square] Planned Single Family Structure	

0 600 1200 Feet

Figure 3-10

NA.2 Flight Management

Flight management alternatives consist of aircraft operating procedures that can be performed to reduce noise exposure in specified areas, such as Area Navigation (RNAV) overlay procedures or National Business Aviation Association (NBAA) noise abatement procedures. The OXC flight management alternatives are discussed below.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.2A

NA.2A – This alternative consists of creating RNAV overlay procedures for all existing and proposed OXC departure procedures (for all RNAV equipped aircraft). These procedures would utilize on-board Global Positioning System (GPS) equipment to fly defined routes that avoid noise sensitive areas (see detailed description below). RNAV overlay procedures cannot be implemented until the environmental review process is completed under the National Environmental Policy Act (NEPA).

TITLE:	Create Area Navigation (RNAV) overlay procedures for all existing and proposed departure procedures at OXC (for all RNAV equipped aircraft).
DESCRIPTION:	Airports across the country are using RNAV procedures to assist in defining flight routes. RNAV procedures utilize ground-based Differential Global Positioning System (DGPS antenna); satellite-based, Global Positioning System (GPS); and on-board Flight Management System (FMS)/GPS equipment to assist the pilot in navigating from point to point. The systems work by identifying the geographic location of aircraft in relationship to another geographic location called a “waypoint.” This provides the necessary information to guide the aircraft towards the desired “waypoint.” With GPS, the pilot manually guides the aircraft towards the “waypoint,” while an FMS works with the auto-pilot system on the aircraft to automatically fly the aircraft towards the desired “waypoint.” In both cases, the use of GPS/FMS can reduce the width and size of departure corridors over standard navigation techniques. The advantage of FMS is that it can more accurately guide the aircraft towards the desired point than can the GPS/pilot system. Aircraft must be equipped with the necessary equipment to fly RNAV/FMS procedures. Both Runway 18 and Runway 36 currently have GPS approaches.
BENEFITS:	Increased accuracy on turns and decreased width of flight corridors. In addition, aircraft operators experience financial benefits through better control of flight and reduced separation.

DRAWBACKS:	Not all aircraft are equipped with RNAV capability (typically, the loudest aircraft are the oldest aircraft and the least likely to have RNAV on board). Initial FAA Flight Procedures review determined that an RNAV overlay is not feasible for the Runway 36 departure as IFR departures make a 180 degree left turn after takeoff. An RNAV departure requires aircraft to fly at least two miles on runway heading before executing a turn. As such an RNAV overlay procedure is only practical for Runway 18 departures. This alternative cannot be implemented until the environmental review process is completed under the NEPA.
COST TO IMPLEMENT:	The costs mainly accrue to the airport operators for equipping their aircraft. The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. In addition, the cost of an environmental analysis would be required.
EVALUATION METHOD:	Qualitative assessment.
FINDINGS AND RECOMMENDATION:	Satellite based technology will likely be the preferred navigational aid within the next ten years. By developing both GPS and FMS procedures, the Airport would be conforming to national standards, increasing the precision of flight for all aircraft with GPS procedures, providing a means for better course guidance to those aircraft equipped with FMS technology. As newer aircraft come into the fleet, their ability to utilize these procedures will continue to increase. This alternative <i>IS A CANDIDATE</i> for inclusion in the NCP for Runway 18 departures.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.2B

NA.2B – This alternative consists of implementing the NBAA noise abatement close-in departure procedures, which involve the management of aircraft thrust, flap settings, speed, and climb rate to reduce noise shortly after takeoff. These procedures would decrease noise levels close to the Airport.

TITLE:	Implement the National Business Aviation Association (NBAA) noise abatement close-in departure procedures (see http://web.nbaa.org/public/ops/quietflying/).
DESCRIPTION:	<p>The NBAA objectives and operating procedures are to reduce noise exposure for citizens on the ground. The NBAA noise procedures are recommended as a standard for all operations of turbojet business aircraft where aircraft manufacturers have not recommended specific procedures.</p> <p>The NBAA departure procedures involve the management of thrust, flap settings, speed, and climb rate to reduce noise shortly after takeoff. The NBAA close-in departure procedure calls for a thrust cutback at 500 feet above ground level (AGL) and 1,000 feet per minute climb to 3,000 feet altitude during acceleration and flap retraction (see Figure 3-11).</p>
BENEFITS:	This alternative would decrease noise associated with thrust used during takeoff. The close-in procedure would result in lower noise levels in areas near the airport (see Table 3-6).
DRAWBACKS:	This alternative would decrease noise levels associated with takeoff thrust at locations close to the Airport, but would in turn increase noise levels at locations farther from the Airport when the thrust cut backs are no longer occurring.
COST TO IMPLEMENT:	None.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be a decrease of one home located in the 65 DNL and 5 homes located in the 70 DNL of the Alternative NA.2B noise contour as compared to the 2008 Baseline noise contour (see Table 3-7). The homes that would be reduced from the 65 DNL and 70 DNL would then be located in the 60 DNL noise contour. As a result, the

	<p>number of homes located in the 60 DNL of the Alternative NA.2B noise contour would increase by 16 homes as compared to the Future 2008 Baseline. In addition, the overall size of the Alternative NA.2B noise contour would increase. No noise sensitive facilities would be located in the noise contour of Alternative NA.2B (see Figure 3-12). This alternative <i>IS A CANDIDATE</i> for inclusion in the NCP.</p>
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TABLE 3-6 – TYPICAL NOISE REDUCTION FROM THE USE OF NBAA CLOSE-IN DEPARTURE PROCEDURES (CALCULATED USING LMAX)								
PROCEDURE	Distance from Runway End (feet)							
	250	500	1,000	2,000	3,000	4,000	5,000	10,000
Standard Departure Procedures	87.2	86.4	85.0	82.6	80.6	78.9	77.4	72.2
NBAA Close-in Departure Procedures	82.0	81.5	80.7	79.2	77.9	76.8	75.7	71.5
Difference	-5.2	-4.9	-4.3	-3.4	-2.7	-2.1	-1.7	-0.7

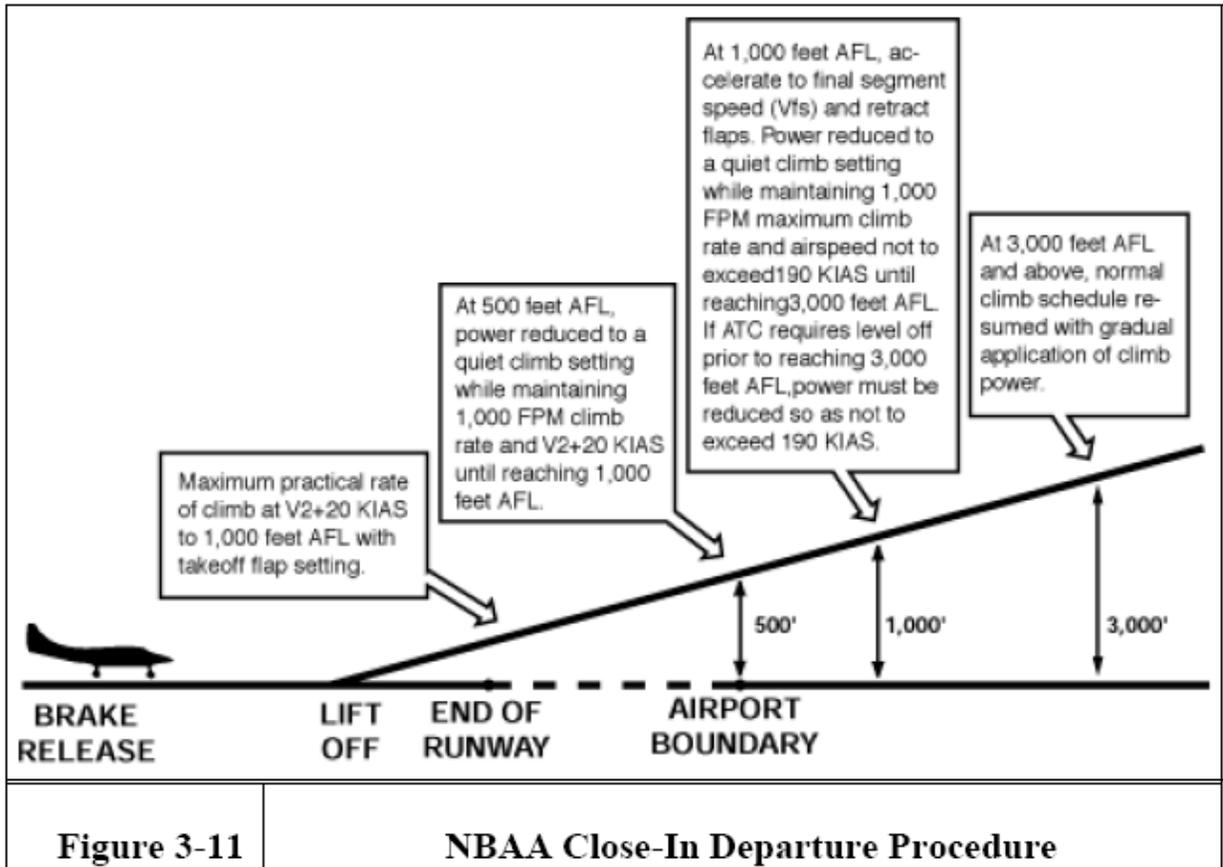
Note: The GIV was used to calculate noise levels.

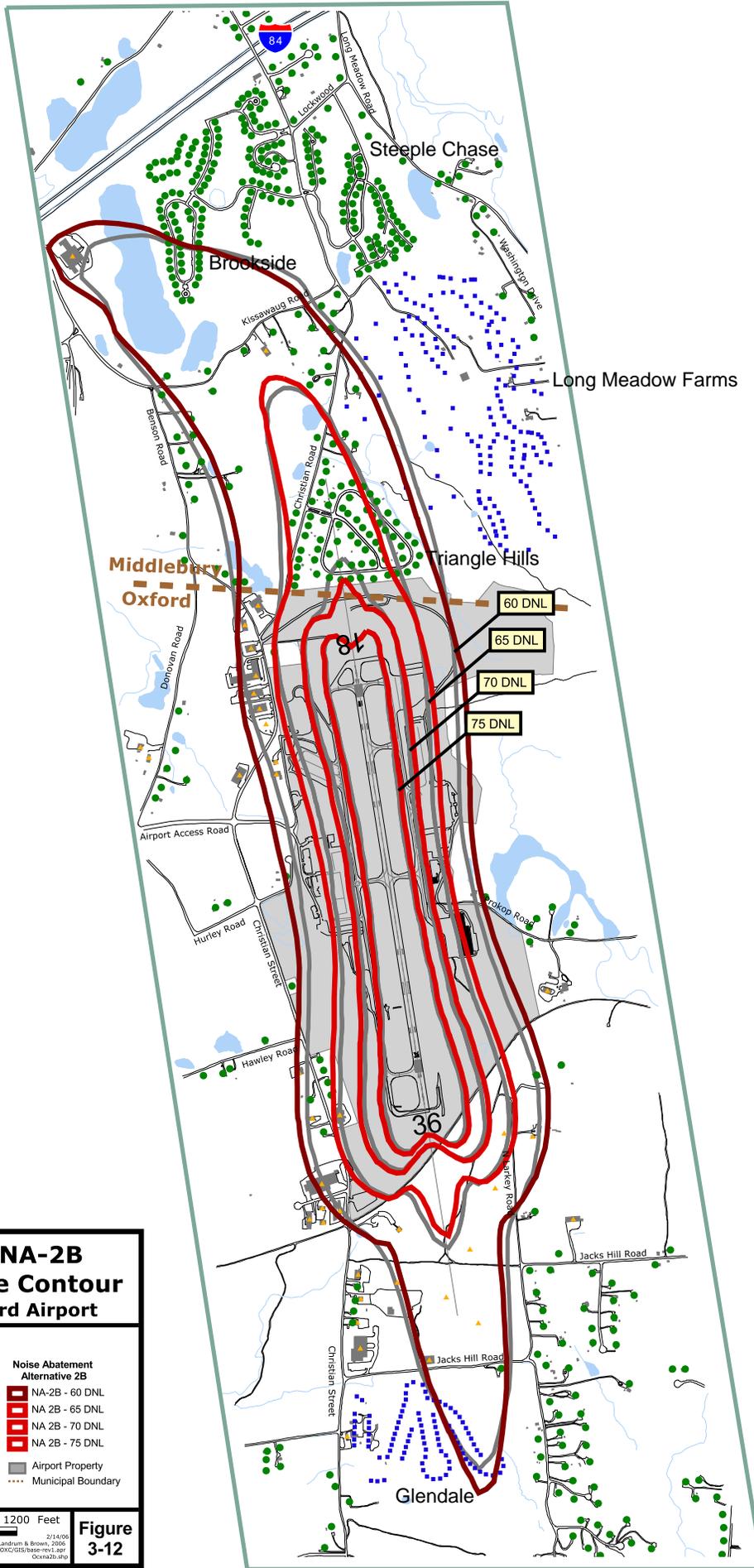
TABLE 3-7 – BASELINE versus NA.2B IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
Total	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
Total	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.2B						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	66	52	0	0	52	118
Planned	<u>28</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>28</u>
Total	94	52	0	0	52	146
Population						
Existing	161	127	0	0	127	288
Planned	<u>58</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>58</u>
Total	229	127	0	0	127	336
Area						
Square Miles	0.70	0.30	0.13	0.18	0.61	1.31
Acres	449	190	84	114	387	837

Note: No Noise Sensitive Facilities are located in the noise contour





Alternative NA-2B Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 2B
[Light Gray Box] Future (2008) NEM 60 DNL	[Red Box] NA-2B - 60 DNL
[Medium Gray Box] Future (2008) NEM 65 DNL	[Red Box] NA 2B - 65 DNL
[Dark Gray Box] Future (2008) NEM 70 DNL	[Red Box] NA 2B - 70 DNL
[Darkest Gray Box] Future (2008) NEM 75 DNL	[Red Box] NA 2B - 75 DNL
[Yellow Triangle] Commercial Structure	[Gray Box] Airport Property
[Green Circle] Existing Single Family Structure	[Dotted Line] Municipal Boundary
[Blue Square] Planned Single Family Structure	

0 600 1200 Feet

Figure 3-12

NA.3 Runway Use

Currently, the Airport operates 73 percent of the time in the north flow (takeoffs and landings on Runway 36), which creates high noise levels in the Triangle Hills neighborhood. As previously discussed, Runway 36 departures are preferred because of prevailing wind conditions and other logistical factors. Thus, the operational feasibility of implementing the runway use alternatives was carefully evaluated.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.3A

NA.3A – Wind and weather permitting, establish Runway 18 as the preferential runway at all times. Wind and weather analysis indicates that the Airport is capable of operating in the south flow 69 percent of the time with a three-knot tailwind.

TITLE:	Wind and weather permitting, establish Runway 18 as the preferential runway at all times.
DESCRIPTION:	<p>Currently, the Airport operates 73 percent of the time in north flow (Runway 36) and 27 percent in south flow (Runway 18). Reasons for Runway 36 being the preferred runway include: the prevailing winds favoring the use of Runway 36, airspace coordination required north of the Airport, and that Runway 36 is equipped with an Instrument Landing System (ILS).</p> <p>The intent of this alternative is to establish Runway 18 as the primary runway. Currently, Runway 18 is not equipped with an ILS, therefore aircraft can only land on the Runway during certain IFR conditions. In 2007, Runway 18 was equipped with a RNAV Localizer Precision with Vertical Guidance (LPV) approach. With this procedure, aircrafts are capable of landing on either runway during both IFR and VFR conditions.</p> <p>This alternative has been designed in accordance with FAA Order 8400.9, <i>National Safety and Operational Criteria for Runway Use Programs</i>. The order specifies that a runway use program may be used for noise purposes with a tailwind up to five knots. Wind and weather analysis shows that the Airport is capable of operating in south flow 69 percent of the time with a three-knot tailwind.</p>
BENEFITS:	This alternative, if fully implemented, would reduce overflights of the populated area north of the Airport in the Triangle Hills neighborhood.

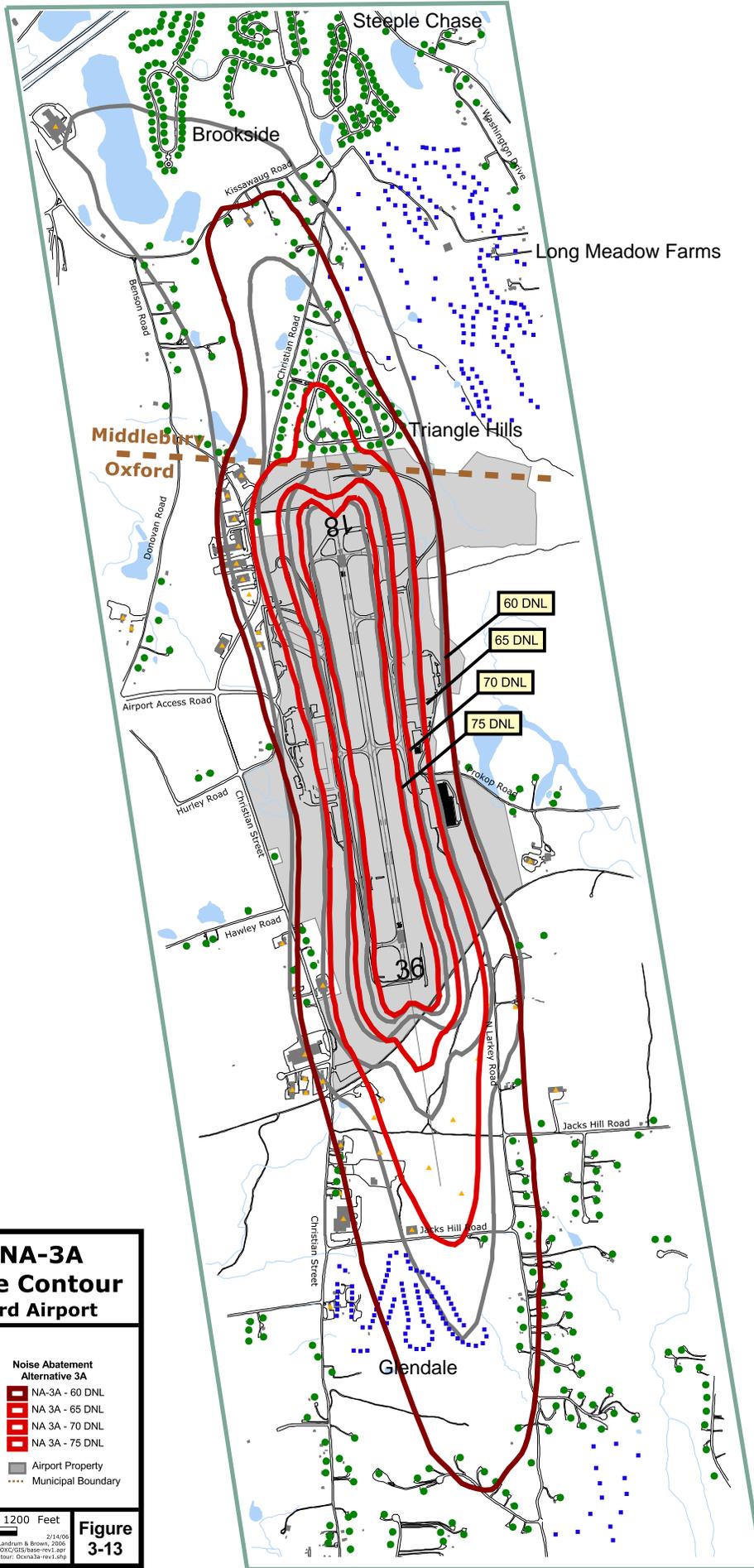
DRAWBACKS:	This alternative may not be fully implemented due to the aircraft operators desire to utilize the ILS on Runway 36. In addition, due to the relatively short runway length, operators may refuse to depart from Runway 18 if there is any tailwind. Increased coordination between air traffic controllers may also limit the use of the procedure. Noise and overflights would increase for the communities south of the Airport along Jacks Hill and Larkey Roads, due to an increase in departures on Runway 18.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. In addition, the cost of an environmental analysis would be required.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be a decrease of 36 homes located in the 65-70 DNL and 5 homes in the 70-75 DNL of the Alternative NA.3A noise contour as compared to the 2008 Baseline noise contour (see Table 3-8). The number of homes located in the 60-65 DNL would increase by 76 homes as compared to the Future 2008 Baseline. There is no change in the size of the noise contour. No noise sensitive facilities would be located in the noise contour of Alternative NA.3A. This alternative would decrease noise impacts in the north, but would create impacts to the south (see Figure 3-13). The previously mentioned issues (no ILS on Runway 18, refusal to operate on Runway 18 with any tailwind, increased coordination with ATC, and increased noise exposure south of the Airport) would limit the operational feasibility of implementing this alternative fully. Therefore, this alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

TABLE 3-8 – BASELINE versus NA.3A IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.3A						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	82	17	0	0	17	99
Planned	<u>72</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>72</u>
<i>Total</i>	154	17	0	0	17	171
Population						
Existing	197	41	0	0	41	238
Planned	<u>144</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>144</u>
<i>Total</i>	341	41	0	0	41	382
Area						
Square Miles	0.70	0.29	0.12	0.16	0.57	1.27
Acres	449	184	78	102	365	814

Note: No Noise Sensitive Facilities are located in the noise contour



Alternative NA-3A Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 3A
[Light Gray Box] Future (2008) NEM 60 DNL	[Red Box] NA-3A - 60 DNL
[Medium Gray Box] Future (2008) NEM 65 DNL	[Red Box] NA 3A - 65 DNL
[Dark Gray Box] Future (2008) NEM 70 DNL	[Red Box] NA 3A - 70 DNL
[Darkest Gray Box] Future (2008) NEM 75 DNL	[Red Box] NA 3A - 75 DNL
[Yellow Triangle] Commercial Structure	[Gray Box] Airport Property
[Green Circle] Existing Single Family Structure	[Dotted Line] Municipal Boundary
[Blue Square] Planned Single Family Structure	

0 600 1200 Feet

Figure 3-13

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Contour: Decm3a.next.shp

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.3B

NA.3B – Establish Runway 18 as the preferential nighttime (10:00 p.m. to 7:00 a.m.) runway. Nighttime weather analysis indicates that the Airport is capable of operating in the south flow 73 percent of the time with a three-knot tailwind.

TITLE:	Establish Runway 18 as the preferential nighttime (10:00 p.m. to 7:00 a.m.) runway.
DESCRIPTION:	<p>Currently, the Airport operates 73 percent of the time in north flow (Runway 36) and 27 percent in south flow (Runway 18). Reasons for Runway 36 being the preferred runway include: the prevailing winds favoring the use of Runway 36, airspace design coordination required north of the Airport, and Runway 36 is equipped with an Instrument Landing System (ILS).</p> <p>Given the preference for Runway 36, the intent of this alternative is to maximize the use of Runway 18 at night when aircraft noise is generally held more disruptive. Between the hours of 9:00 p.m. and 6:00 a.m. the Air Traffic Control Tower (ATCT) is closed and there are relatively few aircraft operations, limiting coordination efforts. Currently, Runway 18 is not equipped with an ILS, therefore aircraft can only land on the Runway during VFR conditions. By 2007, Runway 18 will be equipped with a RNAV Localizer with Vertical Guidance (LPV) approach. With this precision guidance equipment, aircraft will be capable of landing on either runway during both IFR and VFR conditions during the nighttime hours.</p> <p>This alternative has been designed in accordance with FAA Order 8400.9, <i>National Safety and Operational Criteria for Runway Use Programs</i>. The order specifies that a runway use program may be used for noise purposes with a tailwind up to five knots. Nighttime wind and weather analysis shows that the airport is capable of operating in south flow 73 percent of the time with a three-knot tailwind.</p>
BENEFITS:	This alternative, if fully implemented, would reduce overflights of the populated area north of the Airport in the Triangle Hills neighborhood during nighttime hours.
DRAWBACKS:	This alternative may not be fully implemented due to the aircraft operators desire to utilize the ILS on Runway 36. In addition, due to the relatively short runway length, operators may refuse to depart from Runway 18 if there is any tailwind.

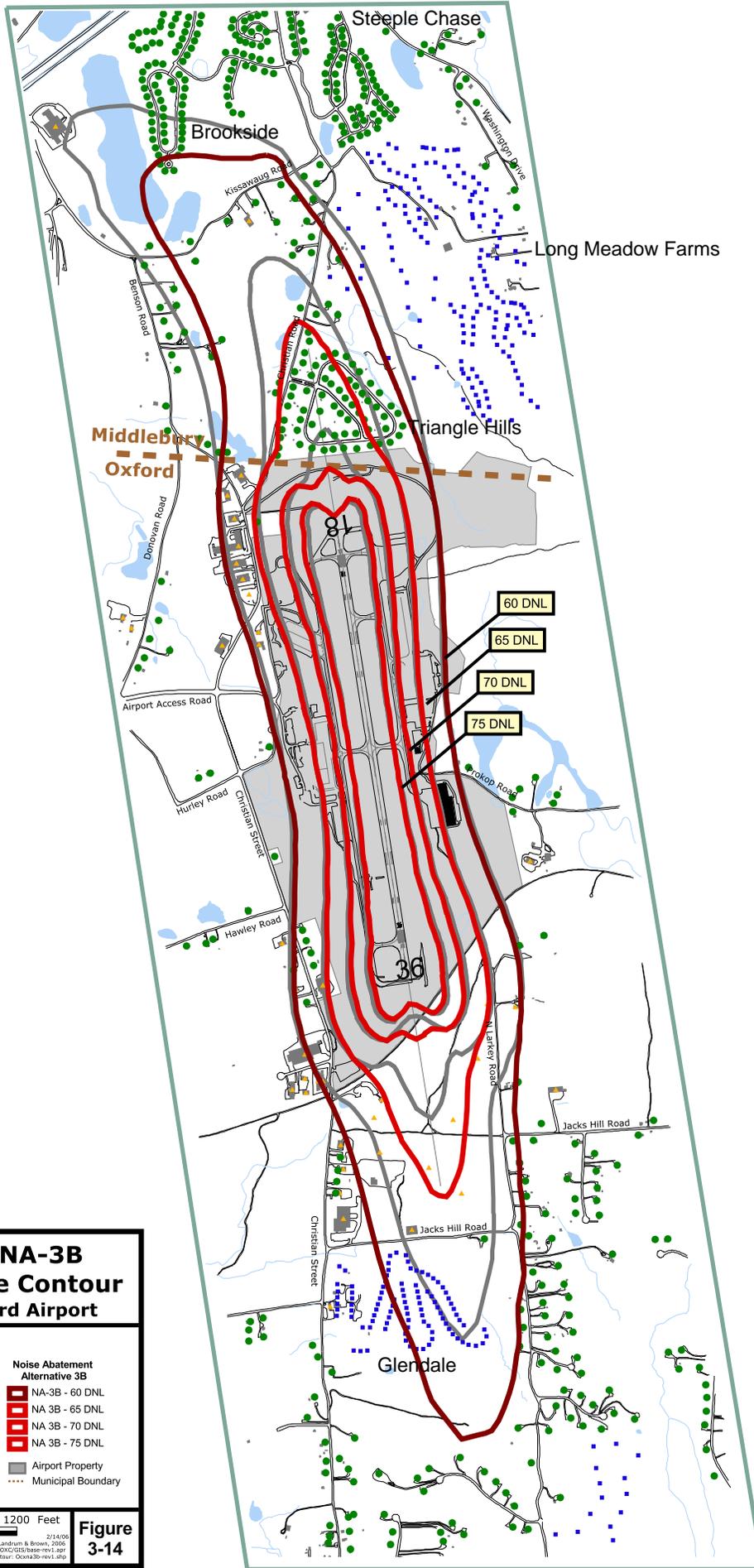
	Increased coordination between air traffic controllers may also limit the use of the procedure. Nighttime noise and overflights would increase for the communities south of the Airport along Jacks Hill and Larkey Roads, due to an increase in departures on Runway 18.
COST TO IMPLEMENT:	The costs for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA. In addition, the cost of an environmental analysis would be required.
EVALUATION METHOD:	Integrated Noise Model (INM) modeling.
FINDINGS AND RECOMMENDATION:	With this alternative implemented, there would be a decrease of 7 homes located in the 65-70 DNL and 5 homes in the 70-75 DNL of the Alternative NA.3B noise contour as compared to the 2008 Baseline noise contour (see Table 3-9). The homes that would be reduced from the 65 DNL and 70 DNL would then be located in the 60-65 DNL noise contour. As a result, the number of homes located in the 60 DNL of the Alternative NA.3B noise contour would increase by 40 homes as compared to the Future 2008 Baseline. There is no change in the size of the noise contour. No noise sensitive facilities would be located in the noise contour of Alternative NA.3B (see Figure 3-14). This alternative would reduce overflights of the Triangle Hills neighborhood during the sensitive nighttime hours (when wind conditions are typically calm), and therefore <i>IS A CANDIDATE</i> for inclusion in the NCP.

TABLE 3-9 – BASELINE versus NA.3B IMPACTS						
2008 BASELINE						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	61	53	5	0	58	119
Planned	<u>17</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>17</u>
<i>Total</i>	78	53	5	0	58	136
Population						
Existing	149	129	12	0	141	290
Planned	<u>36</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>36</u>
<i>Total</i>	185	129	12	0	141	326
Area						
Square Miles	0.69	0.29	0.13	0.16	0.58	1.27
Acres	441	186	82	103	371	812

Note: No Noise Sensitive Facilities are located in the noise contour

2008 ALTERNATIVE NA.3B						
CATEGORY	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL	60+ DNL
Housing Units						
Existing	57	46	0	0	46	100
Planned	<u>61</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>57</u>
<i>Total</i>	118	46	0	0	46	157
Population						
Existing	137	112	0	0	112	249
Planned	<u>123</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>123</u>
<i>Total</i>	260	112	0	0	112	372
Area						
Square Miles	0.71	0.29	0.12	0.16	0.57	1.28
Acres	454	184	78	104	365	820

Note: No Noise Sensitive Facilities are located in the noise contour



Alternative NA-3B Noise Exposure Contour Waterbury-Oxford Airport

Legend	
Future (2008) Noise Exposure Map	Noise Abatement Alternative 3B
Future (2008) NEM 60 DNL	NA-3B - 60 DNL
Future (2008) NEM 65 DNL	NA-3B - 65 DNL
Future (2008) NEM 70 DNL	NA-3B - 70 DNL
Future (2008) NEM 75 DNL	NA-3B - 75 DNL
Commercial Structure	Airport Property
Existing Single Family Structure	Municipal Boundary
Planned Single Family Structure	

NA.4 Facility Development

Facility development consists of the construction of physical structures that are designed to reflect or absorb noise, such as noise berms/walls or aircraft ground run-up barriers. The OXC facility development alternatives are discussed below.

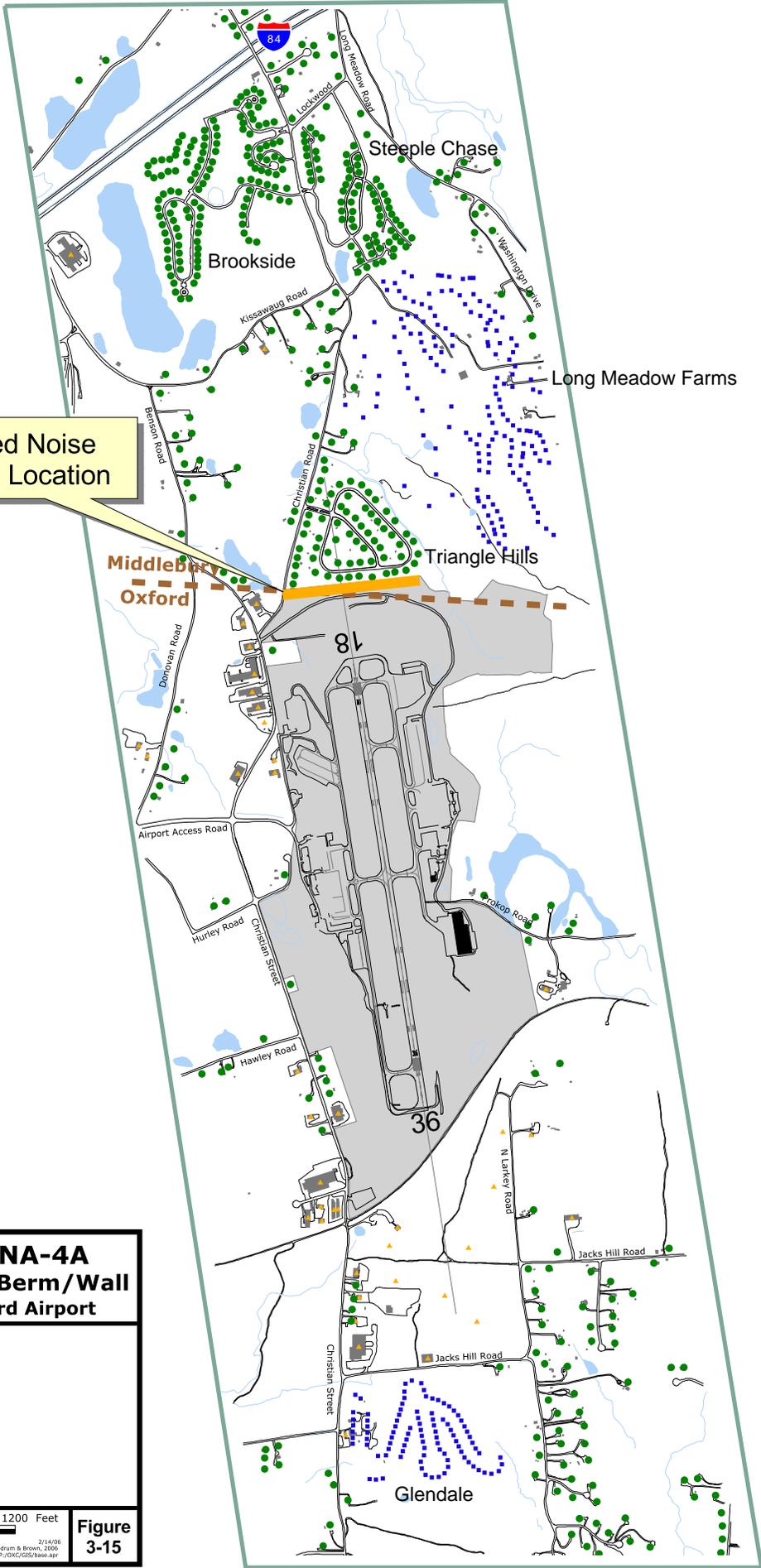
NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.4A

NA.4A – This alternative consists of constructing a noise berm/wall along the northern edge of the airport property. The purpose of the noise berm/wall would be to reflect/absorb ground noise resulting from Runway 18 departures, which would ideally reduce noise levels in the Triangle Hills neighborhood.

TITLE:	Construct a noise berm/wall on the end of Runway 18 (the northern edge of the airport property) near the Triangle Hills neighborhood.
DESCRIPTION:	Currently, there is not a noise berm/wall located on airport property. The closest housing development to the Airport is the Triangle Hills neighborhood located on the north end of Runway 36. Therefore, the intent of this alternative is to minimize ground noise impacts to the south of the Triangle Hills neighborhood. Noise berms/walls are most effective when located close to the source or close to the receiver. This alternative consists of building a 16-foot high noise berm/wall along the north end of the airport property (just south of Triangle Boulevard). See Figure 3-15.
BENEFITS:	A 16-foot high barrier could reduce ground noise levels by up to 6 to 10 dB for those homes on the south side of Triangle Boulevard immediately adjacent to the Airport property line.
DRAWBACKS:	A noise berm/wall provides no noticeable reduction of noise from aircraft in flight. In addition, the noise berm/wall would be constructed 50 to 100 feet below the runway elevation, and would therefore not be very effective in reducing ground noise levels in the Triangle Hills neighborhood.
COST TO IMPLEMENT:	Construction of a 16-foot berm/wall 1,720 feet long, is estimated to cost approximately \$550,400.
EVALUATION METHOD:	Qualitative assessment.

FINDINGS AND RECOMMENDATION:	Construction of a barrier would provide some limited ground noise reduction to homes adjacent to the berm/wall (elevation differences would decrease its effectiveness), but would provide no reduction for the noise generated by aircraft in flight. This alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.
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Proposed Noise Berm/Wall Location



**Alternative NA-4A
Proposed Noise Berm/Wall
Waterbury-Oxford Airport**

Legend

- Proposed Noise Berm/Wall Location
- ▲ Commercial Structure
- Existing Single Family Structure
- Planned Single Family Structure
- Airport Property
- ⋯ Municipal Boundary

0 600 1200 Feet

**Figure
3-15**

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.4B

NA.4B – This alternative would consist of constructing a ground run-up barrier on the northern edge of the Main Ramp, which may reduce noise levels in residential areas.

TITLE:	Construct a ground run-up barrier.
DESCRIPTION:	Ground run-ups are done as part of maintenance of aircraft engines. Currently, there are very few run-ups conducted at OXC. However, it may be appropriate to designate a location to construct a noise barrier specifically designed to reduce run-up noise. The best location for this barrier would be on the northern edge of the main ramp. Aircraft could taxi to the barrier and perform run-ups.
BENEFITS:	The construction of a ground run-up barrier may reduce noise from run-ups for the Triangle Hills neighborhood north of the Airport.
DRAWBACKS:	The cost of a run-up barrier can be in excess of \$200,000 and would only benefit those people living very near the Airport to the north. The money used to construct a barrier would likely delay other corrective land use programs, such as sound insulation and acquisition. There does not appear to be a need for a run-up barrier at this time.
COST TO IMPLEMENT:	A total of \$200,000 (\$120,000 for the barrier and \$80,000 for the pad).
EVALUATION METHOD:	Qualitative assessment.
FINDINGS AND RECOMMENDATION:	The number and type of engine maintenance run-ups currently performed or expected at the Airport by the year 2008 does not warrant the construction of a run-up barrier. However, if maintenance run-up operations increase dramatically in the future, a barrier may be considered. This alternative is NOT A CANDIDATE for inclusion in the NCP.

NA.5 Flight Restrictions

Flight restrictions include airport operating curfews and fines, or specific aircraft type restrictions (e.g., Stage 2 aircraft). Implementing flight restrictions at a public-use airport is very challenging, and requires FAA approval of a FAR Part 161 study.¹ Aircraft ground run-ups can also be restricted to designated areas of an airport, as discussed below.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.5A

NA.5A – This alternative consists of implementing non-voluntary airport operational restrictions at OXC (e.g., curfews, fines, aircraft type restrictions), and would require FAA approval of a FAR Part 161 study.

TITLE:	Implement non voluntary airport operational (Part 161) restrictions (e.g., curfews, fines, aircraft type restrictions).
DESCRIPTION:	This alternative considers the potential for implementing airport access restrictions for noise abatement, such as curfews or restrictions on aircraft types or groups. Any such action is subject to the provisions of Part 161, which requires extensive proof of benefits relative to costs prior to approval by FAA.
BENEFITS:	These restrictions can resolve noise annoyance problems during the most sensitive periods or of the most annoying events.
DRAWBACKS:	Part 161 requires extensive additional evaluation, with little hope of approval, given the FAA's current stance on Part 161 actions.
COST TO IMPLEMENT:	A comprehensive Part 161 study would cost \$3 to \$5 million. Litigation could cost a similar amount.
EVALUATION METHOD:	Qualitative assessment.
FINDINGS AND RECOMMENDATION:	Implementing operational restrictions requires an extensive cost benefit analysis that could cost \$3 to \$5 million. Currently, no Part 161 study has been approved by the FAA. This alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

¹A FAR Part 161 study evaluates the economic benefits and costs associated with implementing flight restrictions at a public use airport. In order for the FAA to approve a FAR Part 161 study, it must be determined that the economic benefits of implementing flight restrictions (e.g., reduced property insulation/acquisition costs) outweigh the economic costs (e.g., loss of airport business).

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.5B

NA.5B – Ground run-ups are performed as part of the maintenance of aircraft engines. This alternative consists of restricting ground run-ups to the Main Ramp at OXC.

TITLE:	Restrict ground run-ups to designated areas.
DESCRIPTION:	Ground run-ups are done as part of maintenance of aircraft engines. Currently, there are very few run-ups conducted at OXC. However, it may be appropriate to designate a location to where ground run-ups are restricted to reduce run-up noise. The best location for this would be on the Main Ramp. Aircraft could taxi to the ramp and perform run-ups.
BENEFITS:	The designation of a ground run-up location may reduce noise from run-ups for the Triangle Hills neighborhood north of the Airport.
DRAWBACKS:	Designating a location for run-ups would only benefit those people living very near the Airport to the north. There does not appear to be a need for a designated run-up area at this time.
COST TO IMPLEMENT:	None.
EVALUATION METHOD:	Qualitative assessment.
FINDINGS AND RECOMMENDATION:	There does not appear to be a need for a run-up designated area at this time. Thus, this alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

NA.6 Miscellaneous (Noise Attenuating Standards)

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA.6A

Noise attenuating standards consist of designing airport facilities to reflect/absorb aircraft ground noise. They can affect the layout, shape, height, and materials of airport facilities. Implement noise attenuating standards at OXC may be difficult, as development options are currently limited.

TITLE:	Incorporate noise attenuating standards into airport design criteria.
DESCRIPTION:	This alternative considers the noise reduction benefits in the design and location of structures built on the Airport through the overlapping of structural footprints between on-airport sources and off-airport impacted areas. Properly located, the height, materials, shape, and location of structures can reduce ground noise for the communities nearest the Airport.
BENEFITS:	This alternative could reduce noise levels by up to 8 to 10 dB depending on the design and location of structures.
DRAWBACKS:	The available property, steep terrain, and wetlands at OXC limit the ability to design future facilities with noise attenuating standards.
COST TO IMPLEMENT:	Costs would vary with any recommended development.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATION:	As discussed in the OXC Airport Master Plan Update (AMPU), the location of future buildings and facilities is highly dependent on the location of available property, steep terrain, and several areas of regulated wetland. The AMPU specifies the planned location of all potential facilities at OXC throughout the 20-year planning period. The AMPU evaluation identifies that there is little flexibility to pursue a design and location of future structures that attempt to reduce noise levels in the surrounding community. Therefore, this alternative is <i>NOT A CANDIDATE</i> for inclusion in the NCP.

3.3 Summary of Candidate Noise Abatement Alternatives

In summary, the following OXC noise abatement alternatives are candidates for inclusion in the Noise Compatibility Program (NCP):

- **NA.2A** – Create Area Navigation (RNAV) overlay procedures for existing and proposed departure procedures on Runway 18 (for all RNAV equipped aircraft).
- **NA.2B** – Implement National Business Aviation Association (NBAA) noise abatement close-in departure procedures (see <http://web.nbaa.org/public/ops/quietflying>).
- **NA.3B** – Establish Runway 18 as the preferential nighttime (10:00 p.m. to 7:00 a.m.) runway.

These alternatives are candidates based of the anticipated benefits associated with their implementation (i.e., reducing the number of homes exposed to noise levels greater than 65 DNL), as compared to 2008 Baseline noise levels. They avoid complex airspace issues between the New York and Bradley TRACONs, and consist of relatively easy to implement procedures for OXC. Further detailed evaluation of these alternatives is provided in the NCP (Chapter 5).